Global Journal of Science Frontier Research: D
Agriculture and Veterinary
Volume 14 Issue 1 Version 1.0 Year 2014
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Public Perceptions of Urban Forests in Okitipupa Nigeria: Implication for Environmental Conservation

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Abstract- The paper assessed the public perceptions of urban forest in Okitipupa' Nigeria with a view to recommending appropriate management strategies. Two hundred respondents were purposively selected from the study area with structured questionnaire. Results revealed that 90.2% of the respondents has preference for trees and 85.4% will be willing to participate in a project to plant trees. More than 50% of the respondents would like to contribute 1-2 hours per week to the project while 31.7% would like to contribute #500-1000 annually for tree planting and maintenance. Most of the respondents love to live and work in a green environment and would like to pay extra cost to rent property located in it. Most of the respondents planted trees around their houses for purpose of providing fruits, nuts and vegetable. 50% indicated that it is for the purpose of making their environment to be more beautiful, attractive and for the provision of medicinal plants. There are no statistically significant differences ($p>0.05$) of opinions in the respondents' education, age, family size and type of employer and participation in urban forestry project. There should be frequent inventory and survey of trees to note the distribution and density as well as structural and physical changes necessary for management practices. Also a survey of tree preference when planning for a tree planting programme should be carried out.

Keywords : *urban forest, management strategies, willingness to contribute.*

GJSFR-D Classification : *FOR Code: 620399*

Strictly as per the compliance and regulations of:

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I. Introduction

Urban forests are ecosystems characterized by the presence of trees and other vegetation in association with human developments (1). Increasing urbanization and development have placed urban forests under extreme pressure, threatening their ability to maintain the basic ecological functions, including water and air purification, upon which human existence depends (2). Community involvement is critical for the continued vitality of the urban forest (3). To encourage and ensure this involvement, it is important to understand the public's shared beliefs and attitudes toward trees that promote their care, management, and protection. According to (4), the urban environment is generally characterized by impervious surfaces, highly reflective and radiating materials like concrete, and metals. These are in addition to the presence of economic activities, such as heating, cooking, and transportation. All of these have inherent capacities to produce immense heat, smoke, and dust, which severally and collectively degrade the urban environment. Urbanization, which is occurring most rapidly in developing countries, is causing major social and economic changes (5), carrying along with it increasing demand for basic needs as fuelwood, low-cost construction materials, drinking water and water for household use. These are in addition to huge and growing social and environmental problems such (i) air, land and noise pollution (ii) non-conducive local microclimatic conditions and (iii) a stressful social and psychological living environment, resulting from inadequate, dilapidated and overstretched infrastructure, degraded urban physiognomy, increasing levels of unemployment, crime, insecurity and other social vices inherent in many arears of the developing world. Urban forestry- a major component of management of trees outside forests offers a variety of benefits capable of mitigating these problems. These benefits include; providing the urban dwellers, (especially the urban poor) with some essential forest produce, mitigation of the ecological effects of urban sprawl, improving the living environment in urban areas, attraction of tourism, provision of avenue for recreation and solitude fort activities, encouragement of investment, as well as creation training and employment opportunities (6). Urban forests have a positive impact of air quality through deposition of pollutants to the vegetation canopy, sequestration of atmospheric CO_2 in woody biomass, and reduction of temperature. Furthermore, urban forests are one of the most cost-effective means of mitigating urban heat islands and associated expenditure for air conditioning (7). Trees also intercept and store rainfall on leaves and branch surfaces, thereby reducing runoff volumes and delaying the onsets of peak flows. Root growth and decomposition increase the capacity and rate of soil infiltration by rainfall and reduce overland flow. Urban canopy reduces soil erosion by diminishing the impact of raindrops on barren surfaces. By virtue of their proximity to people, urban forests can provide substantial environment and recreational benefits to urban dwellers. Trees as a solar-powered technology can help restore balance to dysfunctional urban ecosystems. Besides, urban forests are strands in the

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urban fabric that connect people to nature and to each other (7).

The Society of American Foresters has developed the following definition of urban forestry: "Urban forestry is a specialized branch of forestry that has as its objective the cultivation and management of trees for their present and potential contribution to the physiological, sociological, and economic well-being of urban society. Inherent in this function is a comprehensive program designed to educate the urban populace on the role of trees and related plants in the urban environment. In its broadest sense, urban forestry embraces a multimanagerial system that includes municipal watersheds, wildlife habitats, outdoor recreation opportunities, landscape design, recycling of municipal wastes, tree care in general, and the future production of wood fiber as raw material."

Urban forestry is a specialized branch of forestry and has as its objective the cultivation and management of trees for their present and potential contribution to the physiological, sociological. and economic well being of urban society. These contributions include the over-all ameliorating effect of trees on their environment, as well as their recreational and general amenity value (8). (14) defined urban forestry as an integrated citywide approach to the planting, care, and management of trees in the city to secure multiple environmental and social benefits for urban dwellers while (9) viewed urban forestry as the management of trees for their contribution to the physiological, sociological and economic well being of the urban society. He also stressed that urban forestry includes the management of individual as well as groups of trees and is not restricted to planted trees alone, but also includes naturally grown trees within urban areas. Regardless of the divergent, yet interrelated above conceptualisations, an apparent holistic concept of urban forestry will have to be a planned, integrated, and systematic approach to the management of entire tree and woodland (forest) resource in urban and peri-urban areas (10) for their contributions to the physiological, sociological, psychological and economic well being of the urban society. Sustainable urban locality, to ensure continuous tree cover, vis-à-vis the production of benefits for current and future generations. Urban forestry encompasses all the typical activities involving trees which occur principally, but not exclusively in urban areas. At its most comprehensive level it involves the management of an entire urban tree population (15). Beings a mixture of naturally occurring and planted trees in specific locations, the creation and preservation of urban forests require active planning and management by diverse groups of owners, managers, and stakeholders (11). Planning is important because successful incorporation of trees into the physical and social fabric of towns and cities requires incorporating forestry into overall urban planning. This paper assessed the public perceptions of urban forest in Okitipupa Nigeria with a view to recommending appropriate management strategies.

II. Methodology

a) Study area

Fig. 1a. Map of Nigeria showing Ondo State

Fig :1a. Map of Nigeria Showing Ondo State

The research was carried out in Okitipupa area of Ondo State. The present Okitipupa Local Government came into being after splitting Ikale Local Government into Irele and Okitipupa Local Governments in 1991. The Old Okitipupa Division is now split into Okitipupa, Irele, Ilaje and Ese-Odo Local Governments. The Local Government lies between Longitudes 4^0 .3" and 6 00" East of Greenwich Meridian and latitudes 5^0 45" and 8^0 15" North of the Equator. It has a population of about 233,565 as at 2006 census and covers a land area of about 803 km^2. It is bounded on the east by Irele and Ese-Odo Local Government while to its west lies Odigbo Local Government and part of Ogun State. To its north lies Odigbo Local Government while it is bounded in the south south by Ilaje Local Government. The Inhabitants of the Local Government Area are mainly Yoruba of Ikale ethnic group. Yoruba is therefore widely spoken, while English is the official language. The area is mainly an agricultural society planting both cash and food crops. The Local Government has a high literacy level with a pool of highly skilled manpower covering all spheres of endeavours (http://en.wikipedia.org/w/index.php?title=Okitipupa&oldid=49735356)

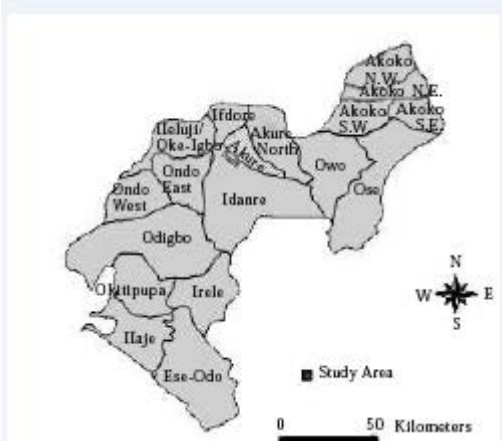

Fig :1b. Map of Ondo State showing Okitipupa

b) Data Collection and Procedures

To know public attitudes toward urban trees and to formulate a financial strategy for urban forest programs acceptable to the public, a survey was conducted with a questionnaire. Two hundred respondents were randomly selected for the study. Questions related to the following aspects were asked:

- Perceived importance of urban trees on personal and community property
- Perceived benefits and negative features of urban trees and forests
- Attitudes toward public funding of urban forests
- Participation in urban forestry activities
- Willingness to donate money or volunteer time to urban tree activities
- Socio-demographic information such as age, education, employment status, income, gender and number of children.

c) Data Analysis

The primary data collected was be processed into suitable format for analyses. Data were analysed using descriptive statistics and non-parametric test.

d) Chi-square (χ^2) test

Chi-square is a non-parametric inferential statistics that can be used to test the hypothesis that two systems of classification are independent of one another. Chi-square test can be applied when;

1. There are two variables randomly drawn from independent samples, each of which is categorized in two or more ways.
2. The data are non metric; ordinal (ranking), or nominal and expressed in frequencies.
3. When the hypothesis to be tested does not involve population parameters.
4. There is no restrictive assumption of normality about the distribution of the variables (4).

The chi_square model for r x c contingency table is specified as:

$$\chi^2 = 1/G \sum \frac{(Ga_{ij} - S_i T_j)^2}{S_i T_j} \quad \text{with (r-1) (c-1) degrees of freedom equation (1)}$$

where

χ^2 = estimated chi-square value
G = sum of all the observation
a_{ij} = individual observation in ith row and jth column
S_i = sum of individual observation in ith row
T_j = sum of individual observation in jth row
r = number of rows
e = number of columns

III. Results

a) Urban Trees in Okitipupa, Nigeria

Most of the trees are sighted around houses and along roads (plate 1-8). Table 1 presents some if the identified trees and their major functions in Okitipupa.

Table 1: Some of the Identified trees and shrubs and their functions in Okitipupa

S/N	Scientific names	Common names	Family	Major functions
1.	*Annona muricata*	Sour sup	Annonaceae	Food, medicine
2.	*Alstonia boonei*	Awun	Apocynaceae	Protection
3	*Avocadro*	pea		Food, shade, medicine
4.	*Azadirachta indica*	Neem tree	Meliaceae	Shade, aesthetic, protection, medicine
5.	*Annona senegalensis*	Mahogany	Annonaceae	Timber, medicine
6.	*Bambusa vulgari*	Bamboo	Bambusaceae	Protection, firewood
7.	*Citrus sinensis*	Orange	Rutaceae	Food
8.	*Citrus limon*	Lemon	Rutaceae	Medicine
9.	*Cocos nucifera*	Coconut tree	Arecaceae	Food
10.	*Carica papaya*	Pawpaw	Caricaceae	Food
11.	*Chrysophyllum albidum*	Cherry	Sapotaceae	Food
12.	*Cola nitida*	Kola	Steculiaceae	Medicine
13.	*Dacryodes edulis*	Pea	Burseraceae	Food, medicine, shade
14.	*Elaeis guinnensis*	Oil palm tree	Arecaceae	Food
15.	*Eugenia malaccensis*	Apple	Myrtaceae	Food
16.	*Ficus exasperata*	Sand paper tree	Moraceae	Protection
17.	*Ficus vogelli*		Moraceae	Protection
18.	*Glicidia sepium*	Agunmaniye	Leguminosaei, Papilionoideae	Food for animal, protection
19.	*Gmelina arborea*	Gmelina	Verbanaceae	Timber, protection, shade
20.	*Hura crepitans*	Sand paper tree	Euphorbiaceae	Shade
21.	*Jatropha cauca*	Lapalapa	Euphorbiaceae	Medicine, protection
22.	*Mangifera indica*	Mango	Anacardiaceae	Food
23.	*Moringa oleifera*	Moringa	Moringaceae	Food , medicine
24.	*Milletia exelsa*	Iroko	Meliaceae	Timber, protection
25.	*Newbodia leavis*	Akoko	Bignoniaceae	Protection
26.	*Nuclear latifolia*		Rubiaceae	Protection
27.	*Persea americana*	Avocadro, pear	Lauraceae	Food, medicine
28.	*Psidium guavaja*	Guava	Myrtaceace	Food
29.	*Polyalthia longiflora*	Masquerade tree, police tree	Annomaceae	Aesthetic
30.	*Quercus robur*	Oak	Fagaceae	Protection
31.	*Rauwolfia vomitoria*	Asofeyeje	Apocynaceae	Protection
32.	*Senna siamia*	Cassia	Leguminosae, Caesalpiniodeae	Firewood
33.	*Spondia mombin*	Iyeye	Anacardiaceae	Food
34.	*Treculia africana*	Bread fruit	Moraceae	Food
35.	*Terminalia catapa*	Almond fruit	Combretaceae	Food, shade, aesthetic
36.	*Tectona grandis*	Teak	Verbanaceae	Timber, protection, shade
37.	*Vernomia amygdalina*	Bitter leaf	Compositae	Food, medicine

Plate 1 : OSUSTECH Mini Campus with *Tectona grandis* and *Gmelina arborea*

Plate 2 : Trees as source of shade to scrap sellers along Idepe Road

Plate 3 : Discussion on Urban Forest under shade trees in Ode Aye

Plate 4 : Shade trees in Ode aye

Plate 5 : Palm trees as shade tree in Ilutitun

Plate 6 : Palm trees shade as car park in Ilutitun

Plate 7 : A residential area beautify with trees in Ilutitun

Plate 8 : A residential area in Okitipupa

b) Demographic Characteristics of Respondents

The demographic characteristics of the respondents are presented in Table 2. More than half of the respondents are married; government employed and has a family size of between one to four. 71.3% of the respondents are male and with age ranges from 20 to 60 years. Most of the respondents are educated with 44.5% having B.Sc/HND qualification. Table 3 revealed that there is no significant relationship ($p>0.05$) between level of education and interest in planting trees. Appendix 1, 2 and 3 showed that there is no significant relationship ($p>0.05$) between age and interest in planting trees, level of education and the respondents' interest in planting trees and type of employer and participation in urban forest activities.

Table 2 : Demographic characteristics of respondents

Demographic characteristics	Frequency	Percentage
Marital status		
Married	98	59.8
Widowed	4	2.4
Divorced	1	0.6
Single	61	37.2
Level of formal education		
M.Sc/ Ph.D	6	3.7
B.Sc/ HND	73	44.5
NCE/ OND	33	20.1
School certificate	42	25.6
Primary	5	3.0
No formal education	5	3.0
Gender		
Male	117	71.3
Female	47	28.7
Age		
20 - 30 years	71	43.0
31 - 40 years	59	35.7
41 - 50 years	23	14.0
51 - 60 years	8	4.9
Above 60 years	3	1.9
Who is your employer		
Government	90	54.9
Private	31	18.9
Self employed	43	26.2
What is your family size		
1 – 4	101	61.6
5 – 8	55	33.5
9 – 12	5	3.0
> 12	2	1.8

Table 3 : Level of Education and interest in planting trees

Variable		Does Planting of trees interest you		Total	Chi-square Statistic (P-value)
		Yes	No		
What is your level of formal education	M.Sc/ Ph.D	6(100)	0(0)	6(100)	4.447 (0.487)
	B.Sc/ HND	68(93.2)	5(6.8)	73(100)	
	NCE/ OND	32(97.0)	1(3.0)	33(100)	
	School certificate	41(97.6)	1(2.4)	42(100)	
	Primary	5(100)	0(0)	5(100)	
	No formal education	4(80.0)	1(20.0)	5(100)	
Total		156(95.1	8(4.9)	164(100.0)	

c) Preference and Participation to Contribute to Urban Forest Management

Table 4 revealed that 90.2% of the respondents have preference for trees and most of them would like to participate in a project of planting trees. About 50% of the respondents would like to be involved in educating and mobilizing the people for the project.

Table 4 : Preference and participation to contribute to urban forest management

Variables	Frequency	Percentage
Do you have preference for trees?		
Yes	148	90.2
No	16	9.8
Would you therefore be willing to participate in a project to plant trees?		
Yes	140	85.4
No	24	14.6
If no, can you state the reason		
Time factor	14	8.5
Cannot obtain seedling	1	0.6
No sufficient land to plant trees	3	1.8
Maintenance could be difficult	6	3.7
Areas of Participation		
Being part of the committee that will plan and take decision on the project	60	36.6
Be involved in educating and mobilizing the people for the project	83	50.6
Be physically involved in the tree planting project	58	35.4
Join volunteer group to take care and monitor the planted trees in your neighbourhood	67	40.9

d) Willingness to Contribute to Project of Planting Trees

As indicated in Table 5, more than 50% of the respondents would like to contribute 1-2 hours per week to the project while 31.7% would like to contribute #500-1000 annually for tree planting and maintenance. Most of the respondents would like the state government to manage the fund for its proper management.

Table 5 : Willingness to contribute to project of planting trees

Variables	Frequency	Percentage
How many hours will you be personally willing to contribute weekly to the project of planting and maintaining trees		
1 – 2 hours	96	58.5
3 – 4 hours	38	23.2
5 – 6 hours	19	11.6
7 – 8 hours	6	3.7
More than 10 hours	5	3.0
Which of the following amounts of money would you be willing to contribute yearly for tree planting and maintenance		
N100 - N200	50	30.5
N300 - N400	32	19.5
N500 - N1000	52	31.7
N2,500 - N5,000	17	10.4
N10,000 and above	13	7.9
Who would you prefer to manage the project		
State government	52	31.7
Local government	31	18.9
Environmental Non-governmental organization	45	27.4
Community development unions	36	22.0
Why would you prefer this type of institution to manage such a project and funds		
To avoid fraud	22	13.4
To avoid failure	51	31.1
Proper management of fund	91	55.5

e) Urban Trees and Maintenance

Most of the respondents have trees planted around their neighbourhood, working places and houses. 80.5% maintain the trees by themselves (Table 6).

Table 6 : Urban trees and maintenance

Variables	Frequency	Percentage
Do you have trees planted around your neighbourhood?		
Yes	137	83.5
No	27	16.5
Do you have trees planted around your working place?		
Yes	120	73.2
No	44	26.8
Do you have trees planted around your house?		
Yes	133	81.1
No	31	18.9
How do you maintain these trees?		
By employing extra hands	32	19.5
By doing it yourself	132	80.5
Who takes care of trees that falls on the road		
Individual	73	44.5
Community	57	34.8
Government	34	20.7

f) Affinity for Green Environment

As shown in table 7, most of the respondents love to live and work in a green environment and would like to pay extra fee to rent property located in it.

Table 7 : Affinity for green environment

Variables	Frequency	Percentage
Do you love to live in a green environment planted with trees?		
Yes	157	95.7
No	7	4.3
Do you love to work in a green environment planted with trees?		
Yes	149	90.9
No	15	9.1
Will you like to pay extra fee to rent or buy a landed (houses) property located in green environment?		
Yes	119	72.6
No	45	27.4

g) Purpose of Planting Trees Around the Buildings

As indicated in table 8, most of the respondents planted trees around their houses for purpose of providing food such as fruit, nuts and vegetable leaves. 50% indicated that it is for the purpose of making their environment to be more beautiful and attractive and for the provision of medicinal plants.

Table 8 : Purpose of planting trees around the buildings

Purpose of tree planting	Frequency	Percentage
Provision of food such as fruit, nuts and vegetable leaves	101	61.6
Provision of employment opportunities	81	49.4
Making the environment to be more beautiful and attractive	82	50.0
Provision of firewood	28	17.7
Provision of medicinal plants	82	50.0
Provision of shade along the streets and roads	45	27.4
Provision of recreational opportunities	48	29.3
Improvement of microclimate	31	18.9
Reduction of Environmental hazards (pollution, erosion)	67	40.9
Attraction of birds	14	8.5

h) Perceived Environmental Hazards that Can Be Remedied with Urban Forest

As shown in table 10, 47% of the respondents indicated that water erosion/flooding can be remedied by planting trees, reduced erosion (31.1%), lower high temperature (12.2%), deforestation (4.3%) and prevent desertification (3.7%).

Table 9 : Perceived environmental hazards that can be remedied with urban forest

Which of these environmental hazards do you think can be remedied by planting trees	Frequency	Percentage
Water erosion/ Flooding	77	47.0
High temperature	20	12.2
Wind erosion	51	31.1
Desertification	6	3.7
Drying up/ scarcity of underground water	2	1.2
Acid rain	1	0.6
Deforestation	7	4.3

i) Disadvantages of Planting of Trees

More than 40% of the respondents indicated that fallen leaves dirty the environment and the roots damages houses. To others, it causes obstruction on roads when it falls.

Table 10 : Disadvantages of planting of trees

Disadvantages of planting of trees	Frequency	Percentage
Danger to life and property	24	14.6
Fallen leaves dirty the environment	71	43.3
Roots damages roads	27	16'5
Roots damages houses	68	41.5
Causes obstruction if fallen on roads	46	28.0

IV. Discussion

The study has shown that Okitipupa city is rich with different trees. About thirty five different trees were identified as urban trees. Many of these trees are located in the respondents' compound and around their houses. According to the Council of Tree and Landscape Appraisers (5), well-maintained landscapes can contribute up to 20% to the value of an improved residential property." The major functions performed by the identified trees in okitipupa include provision of shade, aesthetics and other beautification functions, protection of buildings from wind and water erosion, production of edible fruits and vegetables, utilization of the parts as medicine and utilization of dead and fallen branches as firewoods. According to (11) and (1), a prime focus in the past for developed countries was the management of urban forest for aesthetic purposes, whereas now, as urban population have grown, intensified, and expanded, it has shifted to management for enhancing ecosystem services. In developing countries, a more important focus may be managing vegetation to provide materials such as firewood, fruits and timber at local scale. Over time, each city and region may manage its urban forest for an increasingly broader and more inclusive range of benefits. (11) opined that in defining the bounds of urban forestry as a discipline, it is important to consider the current developmental needs of a population as they establish urban forestry goals most suited to their city's social, economic and geographical context. The respondents in Okitipupa do not just want trees of any kind in their environment, but have specific preference for the trees. The diversity, stability, and functionality of urban forests

are directly influenced by the type of trees selected to plant. Findings from this study may be instructive also for those features that showed no statistically significant differences of opinions, such as respondents' education, age, family size and type of employer and participation in urban forestry project (14). This data alone could be useful to any future urban forestry efforts within the State. An overwhelming majority of the respondents are willing to participate in project of planting trees. Most of respondents were willing to volunteer some of their time to help maintain street trees planted along the street that they lived on. About thirty-two percent of respondents reported a willingness to contribute money (#500-#1000 per year) toward a fund to be used solely for the care of street trees in Okitipupa. According to (12, 15) financial assistance is the most effective means to promote urban forestry programs and different kinds of activities in urban and community forestry programs are provided through various funding. The most important activities include tree planting, and public awareness. Studies have shown that people develop emotional attachments to trees that give them special status and value. For many, a feeling of attachment to trees in cities influence feelings for preservation of trees (13) The respondents indicated that water erosion/flooding can be remedied by planting trees, reduced erosion, lower high temperature, prevent deforestation and desertification.

V. Conclusion and Recommendations

The study has shown that Okitipupa residents have a strong attachment and appreciation of trees. It also showed the unique ways trees are valued for a variety of uses including medicine, food, fuel, beauty and shade.

For effective and sustainable management of trees in Okitipupa, there is need for the following:

1. Frequent inventory and survey of trees to note the distribution and density as well as structural and physical changes necessary for management practices. This will enabled the concerned tree manager to note and mark weak trees on time before they cause damage to property or take life. Weak trees that pose to life and property should be removed and replaced with minimum of two seedlings.
2. Survey the tree preference when planning for a tree planting programme. This is most important in residential areas where the fate for the survival of the trees will be determined by the residents living close to them.
3. There is need to establish tree management committee in Okitipupa who will be in-charge of maintenance and care of street trees, particularly in pruning and when the tree fell on roads.

VI. Acknowledgments

I gratefully acknowledge the financial support of the OSUSTECH (Ondo State University of Science and Technology, Okitipupa, Nigeria) RESEARCH GRANT Committee. Comments from two anonymous reviewers are also greatly appreciated.

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