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Awareness and Perception of Urban Forestry among Urban Dwellers in Sahel Savannah Region Of Nigeria

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Abstract

Urban forestry and greening provides critical ecosystem services which contributes substantially to human health, livelihood and environmental quality. However, little is known about the level of awareness and perception of urban forestry among the urban dwellers of Sahel savannah region of Nigeria. Thus, the aim of this study is to assess the level of awareness and perception of urban forestry among urban dwellers in Maiduguri Metropolitan Council of Borno State located along the ecological zone of Sahel savannah of Nigeria and identifying key challenges faced by the urban dwellers concerned with provision of urban forest and greening of their environment .The survey was conducted using structured questionnaires distributed randomly to selected respondents. Descriptive statistical technique was used for analysis of the primary data. The result showed that majority of the respondents were male (64%) and 71.33% were married. The respondents are literate and had formal education (95.33%). Majority of them fall within the age bracket of 24-59 years (74%) and are students (44%). Furthermore, 68.67% of the sampled respondents are not aware of the concept of urban forestry and it importance. Poor funding (22.55%) of the urban forestry sector and poor enlightenment (16.85%) are believed to be the major constraints of urban forestry in the State. It is recommended that adequate enlightenment of the populace should be intensified in the area to dissuade the negative thought of the people about urban forestry in order to increase the environmental benefits provided by urban forestry.

Keywords: *Urban Forestry, Development, Sahel Savannah region, Participation, Nigeria*

INTRODUCTION

Urban forests have played important roles in social, cultural, economic and environmental development of urban centers in West Africa through benefit such as landscape enhancement, provision of recreational and cultural facilities, erosion control, watershed protection and supply of fruit and fuel wood (Fuwape and Onyekwelu, 2011). The rapid urbanization and growing world population occasioned by the demographic switch from rural to urban have led to the destruction and disappearance of the natural forest ecosystem and the extinction of forest resources, increased urban dwellers and wide spread deforestation caused by human activities have also impacted negatively on the forest ecosystem, thus, arousing serious concern globally (Fuwape and Onyekwelu, 2011; United Nation, 2007).This major changes in society have led to a call for structural changes in forestry, Urbanisation as one of the major driving forces has had a clear impact in Sahel forestry .This has prompted many governments and stakeholders in the forestry sector to evolve ways of arresting this ugly situation (Hussain, 1989) .One of the new approaches emerging in response is the concept of urban forestry (Konijnendik, 2003) .Consequently; the sustainability of towns and

cities is becoming an environmental issue of increasing concern. In this regard, urban forestry is of primary interest because it provides numerous ecosystem goods and services which benefit humankind (Colding et al., 2006), a key one of which is biodiversity which underpins many other ecosystem goods and services (Jim and Chen, 2009).The urban biodiversity also enables urban inhabitants to interact with nature, thereby enhancing appreciation and understanding of the importance's of ecological, social and psychological functions the green areas perform. Urban forestry is aimed at providing ecological, economic and social security to the people, particularly the urban populace and involving them right from the planning to the harvesting stages of plantation establishment, but not as wage earners (Ekwebelam and Onewota, 1989). The people's participation ranges from horticultural nurseries to private woodlots, agro forestry, creation of parks and orchards. It also includes raising or establishment of forest tracts in cities, either in the form of avenue planting and woodlots.

Urban forestry practice requires adequate knowledge of the ecological, environmental, social, aesthetic and economic factors of the area concerned. Consequently the success or failure of urban forestry practice depends on the silvicultural knowledge of the manager involved.

However, sustainable urban forestry implies managing naturally occurring and planted trees in the cities to provide the inhabitants with a continuing level of economic, social, environmental and ecological benefit today and into the future by way of appropriate strategies and integration of urban forestry initiatives into the overall urban planning program. In essence, technical needs as well as financial, human, and institutional resources requirement must be recognized, while means of involving the local people and forging links between the private, public and academic sectors must be intensified (Aslin, 2004)

Urban forestry offer a variety of benefits such as providing the urban poor with some forest products, mitigating the ecological effect of urban sprawl and improving the living environment in urban areas. Also, some of the environmental benefits include climate modification, control of air and noise pollution, erosion control, protection of catchment areas for urban water supplies, habitat for wildlife and the productive use of safe dispersal of urban waste (Aimufia, 2002; Donovan and Butry, 2009 ; Fuwape and Onyekwelu, 2011). It also plays a vital role in the enhancement of human well-being given the social benefits and recreational opportunities they offer for inhabitants (Tyrvainen et al., 2005).

A considerable number of studies have shown that visiting green spaces and being exposed to natural element can reduce psychological strain and stress, increase psychological well-being, and support recovery from illness (Hansmann et al., 2007; Riediker and koren, 2004; Kaplan, 2001; Frumkin, 2001; Parson et al., 1998).

They also promote economic benefits as it is well established that trees increase the value of houses that are in close proximity (Georgi and Dimitriou, 2010), as well as through the promotion of tourism and economic development by contributing to the quality and aesthetics of residential and working environments(Tyrvainen et al., 2005; Chaudhry and Tewari, 2010). From an aesthetic perspective, tree-lined streets are frequently regarded as important in providing "visual relief in concretized city settings" (Nagendra and Gopal, 2010). Urban trees are also beneficial to street vendors through the provision of shade and thereby some protection from the sun and rain (Nagendra and Gopal, 2010). Securing the biodiversity, ecological, social and economic benefits offered by urban forest is particularly challenging in developing countries because of rapid development and urbanisation (Jim and Chen, 2009)

This study is aimed at assessing the level of awareness of urban forestry among urban dwellers in Maiduguri, State capital of Borno State Nigeria by identifying the challenges of urban forestry and also determining the perceived benefits of urban forestry in the State.

MATERIAL AND METHODS

The study was conducted in Maiduguri Metropolitan Council of Borno State located on Sahel savannah region of Nigeria with latitude $11^{0}30^{'}$N and longitude $13^{0}0$'E. The vegetation consist mainly shrub grassland, which is favourable for extensive grazing. It has a mean annual rainfall of 600mm, which falls in the four months of rainy season and lasts between June and September. This lack of water is associated with high temperatures (up to 45^{o}C at certain periods of the year especially during the dry season and Harmattan period). Here drought and overgrazing have led to desertification (Ziervogel et al., 2006). 300 Structured questionnaires were randomly distributed to respondents. Respondents were also interviewed to acquire the needed information on their level of awareness of urban forestry concept in the state, source of information, perceived challenges of the urban forestry concept and the way forward for Urban Forestry in the state. Secondary sources of information were collected from available literatures in the State forestry department and a number of semi-structured, key informant interviews with forest Officers at the municipal forestry office of the State department of forestry were conducted to determine their views and perceptions on the manner in which urban trees are selected and accommodated in the urban landscape, and the challenges they face in their establishment and maintenance. Descriptive statistical technique was used in analyzing the data collected.

RESULTS AND DISCUSSION

Demographic characteristics of respondents

Table 1 indicate that majority of the respondents are male (64.33%) and 84.67% of the respondents were within the productive age range of 25-49 years. This result is a good indication that the population is active and can gainfully participate in the development of the sector in the State if given the necessary impetus to be involved.

The level of western education in the study area is relatively high. Table 1 show that 32% of the respondents had tertiary education while 44% and 19.33% of the respondents had secondary and primary education respectively. Njoku (2000) and Adam (1982) assert that formal education has the potential for making up some of the deficiency in non-formal education and could positively influence the adoption of innovation. With their level of education, the respondents possess the ability to participate effectively in the development of urban forestry in the State.

The marital status of the respondents indicated that 71.33% of the respondents were married therefore implying more pressure on the available green infrastructures in the State. Also, 44% of the respondents were students. This is an indication that sensitization of the urban dwellers will be relatively easy if proper enlightenment is carried out in schools and colleges which the students will be willing to extend the knowledge to their relations at home. According to Konijnendik (2003) urban forestry, is firmly rooted in some of the basic concepts of traditional forestry, such as sustained yield, which underpins forestry; it sets out to achieve and maintain a balanced age structure within each urban locality, ensure continuous tree cover, and hence sustained provision of goods and services for current and future generations.

Table 1. Demographic distribution of respondents

Variables	Frequency	Percentage (%)
Sex		
Male	193	64.33
Female	107	35.66
Age distribution		
< 29 years	44	14.67
30 – 49 years	222	74
> 50 years	34	11.33
Educational state		
Primary	58	19.33
Secondary	132	44
Tertiary	96	32
Non-formal	14	4.67
Marital status		
Married	214	71.33
Un married	86	28.67
Occupation		
Traders	70	23.33
Student	132	44
Civil servant	54	18
Farming	44	14.67
Total	**300**	**100**

Awareness of the concept of urban forestry

Table 2 reveals that 68.67% of the respondents are not aware of the concept of urban forestry while 31.33% were aware. This figure explains why there is little appreciation of trees around the homes and offices of the urban dwellers. Most of the green areas are rather cleared and the trees cut down to make space for commercial areas and also as a source of fuel wood for the urban dwellers which has monetary returns. If this trend is allowed to continue in the state metropolis unchecked, this will lead to decrease in resilience of the urban dwellers to extreme weather events associated with the Sahel savannah region such as increased in desert encroachment which will be unabated , since there no trees to fix or cushion the effect of sand dunes which is as result of desert encroachment and increase of diseases outbreak like Meningitis which is associated with increase heat intensity and increase in temperature .

Table 2. Awareness and Source of respondents' knowledge of urban forestry

Variable	Frequency	Percentage (%)
Awareness of Respondents		
Aware	94	31.33
Not aware	206	68.67
Total	**300**	**100**
Source of respondent's knowledge		
Radio	66	11.85
Television	73	13.11
Newsprint	84	15.08
School	278	49.91
Tree planting campaign	56	10.05
Total	**557**	**100**

Source of respondents' knowledge of urban forestry

The school was found to be the major source of forestry knowledge to 49.91% of the respondents (Table 2). Literature and reading materials on or related to the topic could be found in books and in the internet. Despite the wide publicity that usually characterizes Tree Planting Campaign (TPC) exercises across the country, it was surprising that only 10.05% of the respondent's received information from TPC, radio and television respectively as observed by Udofia and Ikojo (2003). This explains why there is a need for a State wide enlightenment and sensitization of people on the need for trees and green vegetation around

their homes and offices. This will not only beautify the surroundings, fix sandunes but will also help in cutting down the CO2 emission through carbon sequestration process thereby mitigating climate change impact such drought which is more severely felt in the Sahel savannah region of the country, as have been recorded that tree planted in erosion prone areas in Imo , Anambra , Abia , and Enugu states located in the rainforest ecological zone of Nigeria have enhanced water percolation during rainfall and reduced instances of runoff and soil erosion(Fuwape and Onyekwelu , 2011). Fuwape (2005) stated that *Eucalyptus* species interspersed with *Acacia* species and *Azadirachta indica* provide effective wind break in the Sahel and Sudan ecological zones of Nigeria.

Respondents view of the challenges facing urban forestry in Borno State

Majority of the urban dwellers (22.55%) in Maiduguri Metropolitan Council believed poor funding of the forestry sector by the State government posed a serious challenge to the growth of urban forestry in the State followed by inadequate trained personnel in the sector (17.66%) and poor enlightenment of the masses on the need for urban forestry (16.85%) respectively (Table 3). An institutional inadequacy (5.71%) was viewed by the respondents as the least challenges facing the growth of urban forestry in the State. This implies that funding for the sector by the State government should be improved upon and given the necessary impetus to address the challenges in the sector coupled with the recruitment of trained personnel to execute projects in the State.

Table 3. Respondents view of challenges facing urban forestry

Challenges	Frequency	Percentage (%)
Inadequate land use plan	41	11.15
Inadequate public enlightenment	62	16.85
Low private participation	24	6.53
Poor government policies	62	16.85
Institutional inadequacies	21`	5.71
Poor funding	83	22.55
Inadequate personnel	65	17.66
Total	**368**	**100**

The way forward for urban forestry in Borno State

Table 4 shows that 162 (23.21%), 157 (22.49%) and 139 (19.91%) of the respondents viewed improved funding, proper enlightenment and employment respectively as a way forward in the improvement of urban forestry in the State. Adequate land use plan 97 (13.90%) and increased private participation (8.17%) was ranked least, thus further stressing the need for proper funding of the sector (Table 4) and the lack of interest of the respondents in tree planting around their dwelling and business premises. Fuwape and Onyekwelu (2011) ,recommended that an appropriate integrated management approach be adopted which involve all the stakeholders (the public , private , academic and local community within the urban setting) in the planning , establishment , maintenance of urban forest for it to provide the needed essential environmental service also education campaign about urban forest should be intensified.

Table 4. Respondents view of a way forward for urban forestry in the State

Solutions	Frequency	Percentage (%)
Adequate land use plan	97	13.90
Proper enlightenment	157	22.49
Increased private participation	57	8.17
Improved government policies	86	12.32
Improved funding	162	23.21
Employment of personnel	139	19.91
Total	**698**	**100**

Benefits accrued from urban forestry

Table 5 shows that majority of the respondents exhibited apparent ignorance of the economic values accrue from urban forestry in the form of revenue (4.74%) and timber (10.51%) in the State, and the aesthetic value (10.06%) which could be derived from avenue trees in the State Metropolis. It was however worthy to note that the people appreciated the environmental service provided by the trees in the metropolis as a source of wind break (23.81%), shade (20.34%) and a source of household fuel for cooking (12.48%) for low income households living at the peri-urban centers respectively.

Most of the environmental benefits associated with urban forestry, such as CO2 sequestration (McPherson and Simpson, 2000; Nowak and Crane, 2000), air pollution removal (Escobedo and Nowak, 2009), microclimate modification and reduction of the urban heat island through shading and evaporative cooling (Donovan and Butry, 2009), are related to their size, and particularly to the size of their crowns. Many of the benefits are directly related to leaf-atmosphere processes and thus they are a function of tree canopy cover and leaf area (Stoffberg et al., 2010). Estimating the environmental benefits of urban trees is particularly important in strengthening the position of the green infrastructure in the political agenda of public administrations and gaining more substantial financial and technical support for the planning, development and management of the urban forest, through evidence of economic return for the resources allocated, and of forgone benefits when green spaces are not adequately supported (Wolf, 2004; Schwab, 2009).

Table 6. Respondents perceived benefits to be accrued from urban forestry

Benefits	Frequency	Percentage (%)
Revenue generation	41	4.74
Employment	62	7.17
Aesthetics	87	10.06
Wind break	206	23.81
Shade	174	20.34
Firewood	108	12.48
Timber	91	10.51
Soil improvement	96	11.09
Total	**865**	**100**

CONCLUSION

The task of conserving the natural ecosystem and indeed the urban forestry sector rest on every citizen particularly the urban dwellers that reside and transact their business in the metropolis since they are more vulnerable to the impacts of environmental hazard.

Intensive and extensive urban forestry extension and education of the urban dwellers could serve as a necessary tool to create the required enlightenment that is capable of dissuading the wrong impression that urban forestry development is the sole responsibility of the state government alone. It was also observed that the respondent's appreciated the environmental services provided by the trees in the metropolis and as a source of domestic fuel; hence they should be made to Plant Avenue and multi-purpose trees around their dwelling for sustained and improved environmental services which include reducing heat intensity, improving air quality, curbing the advance of desertification by serving as windbreak and shelterbelts, fixing sand dunes thereby encouraging agricultural activities which will in turn improve their livelihood strategies.

Adequate funding by the state government should be provided to the sector for enhanced and sustainable projects implementation including the establishment of woodlots in the state metropolis would help in ameliorating the environmental hazards occasioned in the metropolis. Tree nurseries should also be established across the state where seedlings could be produced at large quantities for projects implementation and public procurement to enhance private participation.

Recommendation

In view of the revelations emanating from the findings of this study, it is recommended that;

i. Environmental impact related issues bordering on the need and role of urban greening should be incorporated and taught in school curriculum even at primary school level.
ii. Government should permeate the various states and local government Forestry Department and activate forestry related curricular activities in academic institutions with the sole aim of sensitizing the students on the role of forestry in environmental and national economic issues.
iii. Workshops, seminars and symposiums should be organized on a continuous and perseverance basis to create awareness on forestry.
iv. Government should create a functional urban forestry unit in each Forestry Department charge with the responsibility of implementing and monitoring urban trees to ensure achievement of the goal of urban greening in a well funded environment.

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