



## **ASSESSMENT OF PERCEPTION AND ATTITUDE OF CITY DWELLERS ON URBAN FORESTRY IN SOKOTO METROPOLIS**

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### **ABSTRACT**

This study examined the perception and attitude of urban dwellers on urban forestry in Sokoto Metropolis. It is a well-known fact that urban Sokoto has been expanding at a very high rate since independence. This expansion has resulted in diminishing tree cover in the metropolis due to high demand for land for developmental projects both by the government and individuals. So much has been written on the growth of the metropolis but little was written on the perception and attitudes of city dwellers to urban forestry in the study area. It is on this premise that this study seeks to assess the perception and attitude of people in metropolitan Sokoto on Urban forestry. Data for the study were obtained via primary and secondary sources. Structured questionnaire was used to elicit responses from a total of 347 respondents selected via systematic sampling technique. Sokoto Metropolis was divided into 3 clusters namely, the walled city, the Government Reserved Area (G.R.A) and the fringe settlement. The essence is to have a broad view of the attitudes and practices of city dwellers towards urban forestry. The major finding of the study reveals that all the respondents (100%) viewed urban forestry as a good phenomenon but some of the respondents were incapacitated by lack of water (43%) and space (37%) in their efforts to plant trees. Similarly, the study shows that Government is the major culprit in the decline of tree cover in the metropolis due to indiscriminate allocation of land for other developmental projects. The study recommends the need to enact comprehensive urban greening laws which can provide impetus and a structured framework to greening work as well as encouraging the participation of the citizenry in the process.

**Keywords:** Urban forestry; attitudes; perception; Sokoto

### **INTRODUCTION**

The world is undergoing massive urbanization due to natural population increase, migration and redistribution of economic activities. The population of urban areas have changed dramatically from 750 million people globally in 1950s to over half of the 7.6 billion people as at 2015 and it is expected that this number will rise to 60% by the year 2030. It is important to note that close to 2/3 of the world's economy emanates from the towns and cities and by 2030 this will rise to over three-fourths, with close to \$90 trillion a year of economic output coming from cities across the world (Revi, 2017). The growth of these cities has come at a huge price: large environmental impacts, air and water pollution, and unsustainable forest

and resource extraction. Cities also concentrate risk due to natural hazards such as the earthquake in Haiti, Hurricane Sandy or Cyclone Hainan as well as technological hazards such as Bhopal, Chernobyl and more recently Fukushima. Preparing our cities for disasters and reducing vulnerability by strengthening housing and improving services can protect lives, improve livelihoods and the quality of life for hundreds of millions of people across the world (Revi, 2017). In both developing and developed countries, urban growth has been accompanied by severe social and economic problems, some of which appear likely to worsen as overall population growth is accompanied by the trend towards greater urban growth (Beauregard, 2001).

One of the major challenges of urban growth is reduction in trees and vegetal covers across cities. Expansion of the built environment is often at the expense of vegetal cover and species. It is noteworthy to state that green cover has now been replaced by grey cover of concretes and slabs in most of urban areas of developing societies. Tree species across cities and towns are being diminished to provide spaces for housing and infrastructure. This growth not only affects individual species of trees around plots of land but also the various designated greenbelts around the metropolis resulting in diminishing urban forest as well as plant cover (Benedine *et al.*, 2017; Ladipo, 2015). The geographical location of Sokoto (being a Sudan Savannah vegetation region as well as a tropical arid zone) placed it at a disadvantage position forest and vegetation wise. Trees in this zone need to be preserved, protected and enhanced to deal with the ever increasing threat of climate change and global warming to which the study area is highly vulnerable.

Grey and Deneke, (1986) defines “Urban forestry as the management of trees for their contribution to the physiological, sociological, and economic well-being of urban society. Urban forestry deals with woodlands, groups of trees, and individual trees, where people live - it is multifaceted, for urban areas include a great variety of habitats (streets, parks, derelict corners, etc) where trees bestow a great variety of benefits and problems”.

Studies on the rapidity of the growth of Sokoto Metropolis abound in the literature. Yelwa *et al.* (2009) observed residential encroachment into the adjoining agricultural Sokoto-Rima floodplain, while Eniolorunda (2010a) attributed the degradation of the Giginya Greenbelt in the metropolis to urban expansion. Between 1985 and 2007, the study area expanded by 201%, annexing surrounding villages in an omni-directional pattern (Eniolorunda, 2010b). Eniolorunda (2010a) and Eniolorunda *et al.* (2012) further discovered that the residential land use expanded by 122% between 1986 and 2005 at an annual rate of 1.9km<sup>2</sup>. In their study, Adamu *et al.* (2015) stated that residential and commercial land uses have largely encroached upon green areas within and at the margin of the metropolis. Despite all these studies, there is dearth of studies that attempt to examine the perception and attitude of city dwellers to urban forestry in the study area. Thus, the intent of this study is to assess how the community members reacts to urban forestry particularly in this era of global climate change and unpredictability of weather elements. This study will focus on both naturally growing and planted tree species in Sokoto metropolis with a view of devising ways of achieving Sustainable Development Goals Agenda number 11 which focuses on the development of inclusive, productive, safe, resilient as well as sustainable cities and communities (Expert Group on the Urban Environment, 2016). It is on this premise that this study seeks to examine the growth of Sokoto metropolis and the attitude of city dwellers to urban forestry.

## MATERIALS AND METHODS

### Study Area

Sokoto Metropolis is located between Latitudes 12<sup>0</sup>46'N to 13<sup>0</sup>08'N and Longitudes 5<sup>0</sup>14'E to 5<sup>0</sup>30'E at average elevation of 272m above sea level (see figure 1). The total population of the area is estimated at 1.1 million people as at year 2016 with an average annual growth rate of 2.6%, and an average density of 500 persons/km<sup>2</sup>. Sokoto metropolis covers 16 km radius from Kangiwa square and it shares boarders with Kware local council to the east, Wamakko to the west and Dange-Shuni area council to the south, (Mamman, 1996). A cursory look at the growth of Sokoto Metropolis in terms of increase in developed land shows that, as at 1986 the total developed land in the metropolis is 26.3 square kilometers, 32.2 km<sup>2</sup> in 2002, 40.9km<sup>2</sup> in 2005 and the growth is projected to be within the region of 80-82 square kilometers by the year 2020 (Eniolorunda and Dankani,2012).

Sokoto metropolis is situated in the Sudan savannah vegetation belt (Olayinka, 2003), Its annual rainfall stands around 600mm which normally starts in June and ends in October while average daily temperature is about 36<sup>0</sup>C (Odjugo, 2010; Ifabiyi and Eniolorunda, 2012; Umar, 2013). Generally, the vegetation of the area is characterized by short and stunted shrubs and grasses around the metropolis, but the inner part and the precincts have vestiges and patches of vegetation composed mainly of trees (Eniolorunda, and Dankani 2012). In the north of the metropolis is the Sokoto-Rima river floodplain which prevents the city growth in that direction. This and a number of anthropogenic factors are contributory to land use /land cover changes that impact on the vegetation within the metropolis.

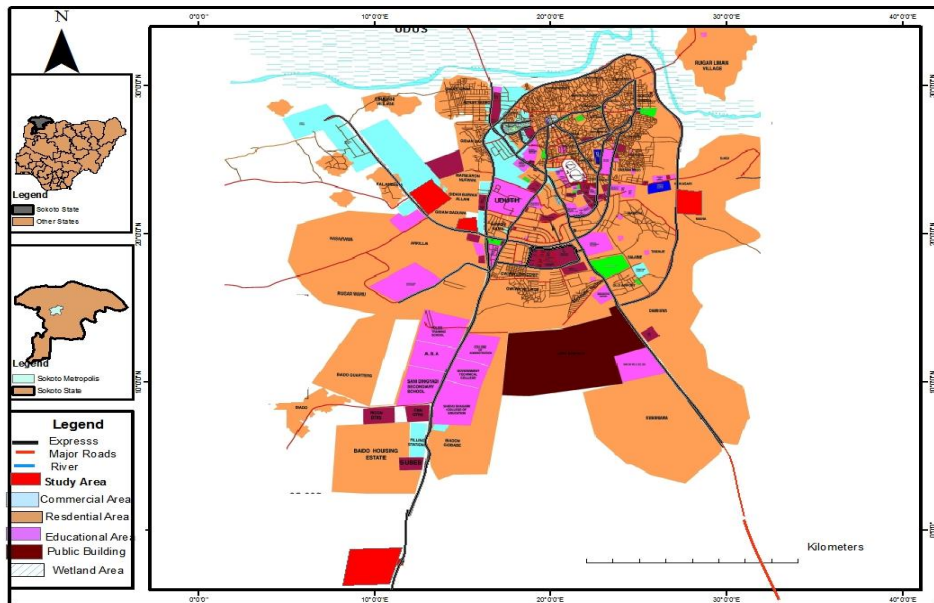


Figure 1: Map of Sokoto Metropolis  
Source: GIS, Lab, UDUS

The Sokoto Metropolis, according to documentary evidence has a legacy of vegetation patches in the form of green tract projects since colonial times which became incorporated into the Sokoto Master Plan in 1983. These vegetation patches and green tracts covered 420ha as at 1967; by 2002 they had declined to 101.38 ha, and by 2010, they had further reduced to 55.46 ha (Adamu *et al.*, 2017).

### **Data Sources**

To examine the attitude of city dwellers to urban forestry, questionnaire instrument was devised to elicit vital information from city dwellers regarding tree planting and its management in the study area. Secondary information was obtained via published materials.

### **Sampling Technique**

For the purpose of this study, Sokoto Metropolis was divided into 3 clusters namely, the walled city, the G.R.A and the fringe settlement. The essence is to have a broad view of the attitudes and practices of city dwellers towards urban forestry. Respondents for the study were systematically sampled. Every 10<sup>th</sup> household within the three clusters were selected and administered with questionnaire. A total of 347 respondents were obtained with 142 respondents from the traditional walled city 'Birni', 116 from the fringe settlement of Bado, Arkilla, Mabera, and Nakasari areas and 89 from the GRA and High-class residential areas of Sama Road and Gawon Nama.

### **Data Analysis and Presentation**

Descriptive statistics was used to analyze the data on demographic characteristics as well as the respondents' perception on urban forestry. Summarized results are presented in the form of tables showing frequencies and percentages. Spearman's correlation was carried out in order to determine the relationship between educational background and people's attitudes and perception towards urban tree planting.

## **RESULTS AND DISCUSSION**

Results of socio-economic characteristics of respondents in Table 1 revealed that 85.9% of the sampled respondents are male while females accounts for 14.1%. Educationally, 42.4 % of respondents acquired Islamic education, 25.1% attended tertiary institutions, while 11.8% and 20.7% of the respondents attended primary and secondary schools respectively. The finding on educational background indicates that all the respondents have one form of education or the other. Age distribution of respondents shows that Majority (29.7%) are within the age bracket of 41-50, 27.1% are within 31-40 years while 23.9% are below 30 years of age. This finding will be used at a later stage to ascertain whether age of respondents influences their perception and attitude towards urban forestry. Further analysis of the socio-economic characteristics of the respondents shows that 89% are married while single, widows and divorcees constitute the remaining percentages. Investigation into place of residence revealed that 40.9% of the respondents lives within the traditional city, 33.4% at the fringes while 25.6% lives at the Government Reservation Area (GRA). It is imperative for this study

to examine whether there is a relationship between place of residence and perception and attitude of respondents towards urban forestry.

Table 1: Socio-economic characteristics of the respondents

Socio-Economic Characteristics	Frequency	%
Sex		
Male	298	85.9
Female	49	14.1
Educational Background		
Islamic	147	42.4
Primary	41	11.8
Secondary	72	20.7
Tertiary	87	25.1
Age		
Less than 30	83	23.9
31-40	94	27.1
41-50	103	29.7
Above 50	67	19.3
Marital Status:		
Married	308	88.8
Single	21	6.0
Others (Specify)	18	5.2
Place of Residence		
GRA	89	25.6
Traditional City	142	40.9
Fringe Settlement	116	33.4

Source: Author's Fieldwork, 2017

Table 2 analyzes respondent's views on tree planting and urban forestry. All the respondents viewed tree planting exercise as good and beneficial. Almost all the respondents underscored the essence of tree planting in Sokoto metropolis as being a tropical arid region as well as areas dominated by grasses and little shrubs with fewer trees. In this environment green cover proliferate only during the rainy season usually between the months of May to September of each year. Bare soils and land cover are common sights during the dry season. Respondents also opined that the intense heat that characterizes the metropolis as well as the state necessitates the need to plant new trees and maintain, protect and conserved the existing ones.

Investigation into whether respondents ever planted a tree in Table 2 shows that majority (50.4%) never planted a tree, while 49.6% have ever planted trees. Out of the total of 172 respondents that planted trees, 62.8% claimed to have planted trees in their homes, 33.1% claimed they planted the trees in their community and neighborhood while 4.1% stated that they planted trees at schools, mosques and farmlands. Several reasons were adduced by those who planted the trees. Prominent among the reasons were provision of shade as attested by 35.7% of the respondents, 19.5% stated that they plant trees because of their ecstatic beauty, 16.2% cited halting desertification as the main reason why they plant trees. Similarly, 6.0%, 9.5% and 2.5% cited combating climate change, halting of soil erosion and religious injunction as the main reason why they planted trees. Sokoto is a very hot environment, it is

an arid region characterized by less than 4 months of rainfall. Tree cover is a necessity in this environment particularly during the hot season which lasted from the Month of March – June, of every year (Umar, 2013).

On the other hand, those respondents that never planted trees also stated their reasons as lack of interest (19.4%), lack of enough space to plant trees (37.1%) around homes and neighborhood, while 43.5% claimed that lack of water prevented them from planting trees. Sokoto metropolis just like major urban centers in Nigeria are experiencing water shortages. Most households (even those connected with water system from the water board) are experiencing water shortages and have to rely on alternative sources particularly water vendors for its supply and this seriously hinders some respondents from engaging in tree planting especially considering the importance of water in any tree planting activity. Similarly, in some part of Sokoto particularly the traditional city there is shortage of spaces for planting of trees. Urban growth within the traditional city absorbs spaces with trees changing the land cover from green to grey color. Most available spaces are used up either for residential or commercial purposes leaving no space for trees to grow.

Table 2: Respondents views on tree planting and urban forestry

Urban Forestry Issue	Frequency	%
What is your opinion about tree planting in urban areas?		
Good	347	100
Bad	0	0
No Idea	0	0
Have you ever Planted a tree?		
Yes	172	49.6
No	175	50.4
If Yes, Where?		
Home	108	62.8
Community/Neighborhood	57	33.1
Others (specify)	07	4.1
Why do you Plant Trees?		
Because they Provide Shade	172	35.7
Aesthetic Beauty	94	19.5
Recycling of Gases	24	5.0
Combat Climate Change	29	6.0
Halting Desertification	78	16.2
Prevent Soil Erosion	46	09.5
For Fruits and Food	27	5.6
Religious Injunction	12	2.5
	482	
If No, Why?		
Lack of Interest	34	19.4
Lack of enough Space	65	37.1
Lack of enough water or watering Tress	76	43.5

Source: Author's Fieldwork, 2017

Results in Table 3 indicates respondents view on massive cutting down of trees in the metropolis. Information from the Tables shows that the entire respondents (100%) viewed

## Assessment of perception and attitude of city dwellers to urban forestry in Sokoto

the practice of indiscriminate cutting down of trees as bad and disastrous to the environment. When further asked who could be responsible for the cutting down of trees and disappearance of greenbelts and other vegetation patches in the study area, 54.5% attributed the blame to the state government who they claimed embarked on housing development and allocation of plots of land to wealthy individuals and politicians along and around the various vegetation patches in the metropolis such as Gidan Man Ada area (Behind Shehu Kangiwa secretariat), Kaduna Road (close to Federal Secretariat) and areas adjacent Runjin Sambo Round about. Another 28.0% attributed it to individuals and families building houses within the metropolis and 17.5% attributed it to property developers operating within the metropolis. This finding corroborates the work of Shackleton and Blair (2013) in South Africa where government is responsible for massive tree depletion through allocation of land for development and weak political will to ensure trees are conserved and protected. Fuwape and Onyekwelu (2011) and Adekunle *et al.* (2013) in their studies in Addis Ababa and West Africa respectively, showed that government has a very strong role to play in urban forestry. According to them government is the only agency with full authority to guide and ensure how society should be governed, protected and preserve.

**Table 3: Opinion of respondents on urban forestry**

Opinion	Frequency	%
What is your view on massive cutting down of Trees in Sokoto metropolis?		
Good	00	0.00
Bad	342	98.56
Indifferent	05	1.44
Who do you think are responsible for cutting down of trees?		
Individuals and families	97	28.0
Government	189	54.5
Property Developers	61	17.5
Is the Government doing enough to tackle deforestation?		
Yes	118	34
No	229	66
Would you support any tree planting campaign?		
Yes	342	98.5
No	05	1.5
If yes why?		
protect the environment/Combat Climate Change	342	43.2
Improve Aesthetic Beauty	94	11.8
Provide cooler environment	321	40.5
Provision of clean Air	34	4.5
Others Specify	00	00
*Multiple Responses		
If No Why?		
I have no interest	00	00
I cannot afford it	00	00
Its Government Responsibility	05	100
Others (Specify)	00	00

Further inquiry into whether the government is doing enough to tackle deforestation shows that majority of the respondents (66.0%) did not believe in government's effort in curtailing the situation while 34.0% believed the government is doing its own best to tackle

the situation. It is important to note that residents of the study area often blamed the State Government for the decline in tree cover in the state. It is noteworthy to state that tree cover in Sokoto metropolis has declined from 434 hectares in 1984 to 176 hectares in the year 2017 (Adamu *et al.*, 2017). A decline of about 258 hectares over a period of 33 years. Similarly, Adamu *et al.* (2017) reported that key vegetation patches in the metropolis are undergoing massive decline. For instance, vegetation patches adjacent to Runjin Sambo roundabout and the one close to Federal Secretariat denoted by A and D on figures 2A and 2B shows a total depletion over the years while patches behind Giginya Secretariat and along Police Headquarters close to Wurno road (depicted by B and C in figures 2A and 2B) shows 96% and 79% depletion respectively from 1984 to 2017. This calls for a serious cause for concern particularly in this era of global climatic change. What is most baffling is the fact that government is responsible for most of this decline because of allocation of land for both public and private developments.

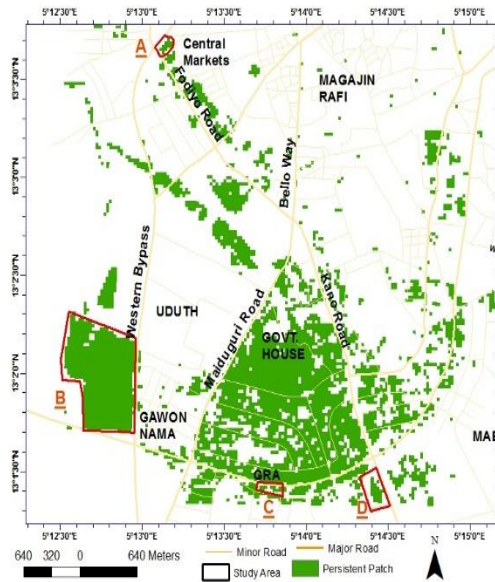


Figure 2A: Vegetated areas in 1984  
Source: Adamu *et al.* (2017)

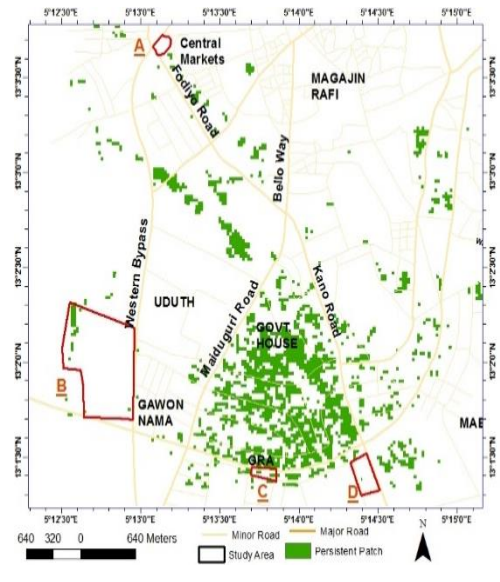


Figure 2B: Vegetated areas in 2017  
Source: Adamu *et al.* (2017)

On willingness of the respondents to support any tree planting campaign initiated by the government, NGOs and individuals, majority (98.5%) of the respondents shows overwhelming desire to support any sort of tree planting campaign in urban Sokoto. Majority of the respondents (43.2%) cited protection of the environment and combating the imminent threat of climate change as the reason why they will support tree planting campaign. Similarly, 40.5% of the respondent stated that they will support the campaign in order to provide cooler environment to reduce the excessive heat particularly during the hot season when the average day time temperature reaches up to 40-45<sup>o</sup>C. Other reasons cited includes, Improvement of aesthetic beauty 11.8% and provision of clean air 4.5%. On the other hand those who said they will not support any tree planting campaign collectively viewed the



## Assessment of perception and attitude of city dwellers to urban forestry in Sokoto

exercise as purely government's responsibility not the citizen. Some of them argued that Government is being given ecological fund and it should make use of the fund to ensure the success of tree planting in the study area.

Attitude of those engaged in indiscriminate cutting down of tree in the metropolis was assessed and the entire respondents (100%) viewed the practiced as condemnable and unfortunate. They further asserted that definitely demand for residential, commercial, institutional as well as other land uses will result in cutting down of trees but effort should be made by people and government to ensure that for each tree felled replacement should be planted.

Attempt was made to look into relationship or correlation between passion for tree planting and respondent's educational background and place of residence as presented in Table 4. Results of the Spearman's Rank correlation revealed a low but positive correlation ( $r=0.39$ ) between passion for tree planting and educational level which is statistically significant ( $p=0.00$ ) at 99% confidence level. This means that about 15.5% of the passion for tree planting among respondents is determined by their level of education. Thus, the higher the level of education the higher the passion for tree planting.

Similarly, the Spearman's Rank also reveals a little ( $r= -0.196$ ) but statistically significant correlation ( $p=0.00$ ) between passion for tree planting and place of residence. This indicates that 3.8% interest for tree planting in the study area is negatively influenced by people's place of residence.

Table 4: Spearman's Rank correlation between passion for tree planting and education background and respondent's place of residence

		Passion for tree planting	Educational Background	Place of Residence	
Spearman's rho	Passion for tree planting	Correlation Coefficient	1.000	.394**	-.196**
		Sig. (2-tailed)	.	.000	.000
		N	347	347	347
	Educational Background	Correlation Coefficient	.394**	1.000	-.084
		Sig. (2-tailed)	.000	.	.119
		N	347	347	347
	Place of Residence	Correlation Coefficient	-.196**	-.084	1.000
		Sig. (2-tailed)	.000	.119	.
		N	347	347	347

\*\* . Correlation is significant at the 0.01 level (2-tailed).

## CONCLUSION

This study has shown that residents of Sokoto metropolis perceive tree cover as a vital component of the environment and majority are willing to partake in ensuring that the tree covers are protected and preserved. As it is presently, a great deal of efforts needs to be put in place to check the continuous depletion of tree cover in the study area. Sadly, in the case of this study the Government is the major culprit. It is important to note that a hallmark of a sustainable city is the embodiment of sufficient natural ingredients in a permeating configuration into the built-up matrix.

There is a need to overhaul the existing urban planning regime with a view to treating greening as an indispensable infrastructure, rather than dispensable options to fill residual niches. Enacting a comprehensive urban greening ordinance/ laws can provide impetus and a structured framework to greening work. Encouraging public participation and engagement could make urban greening relevant and welcome by citizens.

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