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A Survey of Fruit Trees Species in an Urban Community in Ekiti State, Nigeria

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Abstract: *A rapid appraisal technique was used to survey fruit trees species in Ifaki-Ekiti, an urban community in Ekiti State, Nigeria. The three major routes in the town and three educational institutions were sampled. Fruit trees within each stratum were identified to species level, counted and recorded. Similarity indices and indices of diversity in the occurrences of the species were determined among the strata. The perceptions of residents on the fruit trees were also determined through the use of a semi- structured questionnaire matrix administered on 20 randomly selected individuals in each of the stratum. Respondents' indigenous knowledge on the species were determined and recorded. 96 fruit trees individuals belonging to 9 species and 6 families were sampled. The family Anacardiaceae has the highest number of species. The most frequently occurring species along the routes were Carica papaya, Anacardium occidentale, and Citrus sinensis with 12,10 and 8 individuals respectively and for the educational institutions were Anacardium occidentale, Mangifera indica and Carica papaya with 26,17 and 8 individuals respectively. 87% of the respondents were familiar with the cultivation of fruit trees and 67% of respondents were involved in planting of fruit trees in their household environment. Preference was skewed towards planting of fruit trees as food, source of vitamins and source of income. Strategies that could improve fruit tree diversity in the study area were proposed.*
Keywords: *fruit trees; urban community; urban forestry; Nigeria*

I. Introduction

Fruit tree is a tree which bears fruits that is consumed or used by human and some animals – all trees that are flowering plant produce fruits, which are the ripened ovaries of flowers containing one or more seeds (Baugher and Singha 2003). Fruit trees can withstand the variability of rainfall and the perennial growth habit. The diversification into fruit trees based system generates high returns to the farmer and creates opportunities for value addition and avenue for employment creation, especially at the village level (Dhyani et al. 2013). The cultivation of fruit trees outside the farms is an important component of urban forestry.

Wikipedia (2020) described an urban forest is a forest, or a collection of trees, that grow within a city, town or a suburb. In a wider sense, it may include any kind of woody plant vegetation growing in and around human settlements. Urban forests are the trees outside the front doors (USDA 2020). These trees are quite important as they play numerous roles. They contribute to social, aesthetic and economic benefits within cities (Tomicevic-Dubljevic et. al. 2017). USDA 2020) asserted that the trees help to filter air and water, control storm water, conserve energy, and provide animal habitat and shade. They add beauty, form, and structure to urban design.

Previously, urban forests were mainly associated with health, aesthetic and recreational benefits in industrialized cities (Tyrväinen et. al., 2005) but recent initiatives now revealed that urban forests are important to people as symbols of personal, local, community and cultural meanings. Also, the importance of urban forestry in a developing country such as Nigeria cannot be over-emphasized. Konijnendijk et. al.. (2003) opined that the challenges faced by modern, rapidly urbanizing society are felt mostly by the developing countries. Most

of the urban population growth and future megacities are located in these countries. Sustainable urban development will require providing healthy and sustainable living environments with all the necessary basic services for all. Thus, the concept of urban forestry is one of the innovative approaches developed for planning and management of urban green structures. It focused on the tree-dominated part of urban green, and it is a strategic, integrative, interdisciplinary and participatory approach, aimed at sustainably developing the multiple benefits of forests and trees in urban environments. Estimates revealed that by 2030, 60% of the projected world population increase is expected to occur in cities and towns. Developing countries will account for nearly 90% of this (WRI, 2001; Palijon, 2002). Thus human survival will depend on the economic and livelihood (Kuchelmeister1998, Anthon and Thorsen 2001), environmental and biodiversity (Harris, 1992, Konijnendijk 1999, Sadio 1999, McPherson and Simpson 1999), social and cultural (Seeland 2003) values of urban green.

Previous study in Nigeria has revealed that urban forest development is presently been threatened due to rapid urban population growth, human activities, limited land area and poor implementation of government policies (Ezeabasili et. al. 2014). Thus, an enumeration of the existing tree demography in various urban communities in the country is considered necessary in providing data bank that could assist policy makers in formulating appropriate policy on urban forestry for the country. The study being reported here is aimed to contribute to this important issue.

II. Materials and Methods

2.1 Description of the Study Area

Ifaki – Ekiti, an urban community in Ido- Osi Local Government Area of Ekiti- State, Nigeria, is situated on Latitude 7^{o} 79’ North, Longitude 5^{o} 25’ East and elevation of 457 meters above the sea level (Anon, 2020). Two climatic seasons prevailed – a rainy season between March to October and a dry season between November to February (Kayode, 2004). It has a population of 9,185 who are mostly engaged in farming activities (Obembe and Kayode 2019).

2.2 Methods

a. Sampling Procedure for Data Collection

Field survey of fruit tree species was adopted for data collection. This study was divided into two parts: the survey of fruit trees and perception of the respondents on fruit trees at Ifaki- Ekiti, Nigeria.

b. Survey of Fruit Trees

A stratified sampling technique was used in this study. The three major routes and three educational institutions in the town were used for the study. The routes are: Ifaki – Ado Road (Stratum A), Ifaki-Ido Road (Stratum B) and Ifaki – Oye Road (Stratum C), The education institutions are: Methodist Girl High School (Stratum D), Ifaki Grammar School (Stratum E) and Ekiti State University campus (Stratum F).

In Strata A, B and C, 1000m was measured from the central Ifaki roundabout with the aid of measuring tape. Also along the measured roads, a length of 15m was measured out on both sides of the roads, from the center of the road. Fruit trees found within the measured lengths on both sides of the road were identified, counted and recorded. Also in Strata D, E and F, fruit trees found in these schools’ compounds were identified, counted and recorded. All the fruit trees were identified to species level with their botanical, common, vernacular

names. Their families were also identified. The species were identified with the aid of tree identification guide books, including Tropical Tree Crops (Okpeke, 1987), Trees of Nigeria (Keay, 1989), Flora of West Tropical Africa (Hutchinson and Dalziel 1958-1968).

Voucher specimen of the identified fruit trees were collected, and taken to the herbarium of the Department of Plant Science and Biotechnology, Ekiti State University, Ado-Ekiti, Nigeria for authentication.

The index of similarity (IS) on the occurrence of the fruit trees among the strata was determined according to Kayode (1999) as:

IS = 2C x 100/ (A+B)

Where;

A is the number of fruit tree species in one stratum;

B is the number of fruit tree species in another stratum;

C is the number of fruit tree species common to both strata.

Similarly, indices of diversity on the occurrence of the fruit trees species were determined, according to Bongers et al. (1988) as follows:

1. Shannon - Wiener Index (H'),

   $H' = -\sum Pi \ln pi$

   Where;

   P i= ni/N,

   ni is number of individual of species *i*,

   N is total number of all individuals

   ln is natural logarithm

2. Simpson Index (C),

   $C = \sum Pi^2$

   Where;

   Pi = ni /N

   ni = number of individual of species i and

   N= total number of all individual

3. Equitability Index (E),

   $E = H'/H_M$

   Where;

   $H_M = \ln S$

   H'= Shannon-Wiener index

   S = total number of species

   In = natural logarithm

c. Perception of Urban Respondents on Fruit Trees

In each stratum, 20 respondents were randomly selected and interviewed with the aid of semi-structural questionnaire matrix. The interviews were focused, conversational and two ways in communication. The indigenous knowledge of the respondents on the identified fruit tree species was obtained. Fruit tree species cultivation habit of the respondents, benefits derived from the fruit tree species, respondents' preferences on fruit tree species and factors that hinder fruit tree species cultivation were established.

Three group interviews, each made up of at least three respondents, were conducted in each stratum do determine group consensus on the issues raised at the individual interview level. Fruit trees domestication habits in the heart of the community and that of the educational institutions were compared.

Key informants, made up of community leaders, staff of the educational institutions and forestry official in the Local Government where the study area is domiciled were interviewed. Secondary information was obtained from records and journals.

III. Results

3.1 The Fruit Trees

A total of 9 (nine) fruit tree species, belonging to 6 (six) families were sampled in both the roadsides and the educational institutions of the study area (Table1).The family Rutaceae has the highest number of species (3 species), followed by family Anacardiaceae (2 species), family Caricaceae, Arecaceae, Myrtaceae, and Combretaceae has 1species each. Table 2 revealed the demography of the identified species in the community. Stratum E had the highest number of fruit trees (36 fruit trees) while the least was observed in Stratum D (7 fruit trees). Both strata were educational institutions. In the roadsides' strata, Stratum A had the highest number of fruit trees (18 fruit trees), Stratum B had the least (11 fruit trees). *A. occidentale* has the highest number of individuals (36) followed by *C.papaya* and *M. indica* (20 individuals each). While a total of 96 fruit trees individuals were sampled in the study area, there were more fruit trees in the educational institutions (55 fruit trees) than the roadsides (41 fruit trees) (Table 2).

Table 3 revealed that the fruit trees sampled in the strata were highly similar. Strata D, E and F appeared to be the most similar with indices of similarities of 86% (Strata D and E, D and F) and 75% (Strata E and F). The most dissimilar, in term of fruit tree occurrence, was Strata A and D, with IS value of 40%. Others with similar fruit trees occurrence were Strata B and C with IS value of 83% (Table 3) and Strata B and F, C and F with IS values of 80% each. The indices of diversity (Table 4) revealed that the fruit trees in the roadsides were more diverse than those of the educational institutions.

3.2 Respondents' Perception on Fruit Trees

The sampling conducted to examine the perception of respondents on fruit trees in the study area revealed a diverse socio-economic classes of respondents that belonged to different gender, age, literary, religion and marital status. Table 5 revealed that most of the respondents were female (55%), adults (63%), literates (69%), Christians (61%) and married. The respondents identified two major methods of planting fruit trees in the study area-either from seeds or through planting of wildlings. Most respondents (74%, Table 6) opined that most fruit trees could be cultivated from trees in the study area. The art of planting fruit trees was regarded as desirable (87%) and 67% of the respondents (Table 6) had been involved in the planting of fruit trees. 41%, 31%, 29% and 24% of respondents in this categories have planted *M. indica, C. sineensis, C. papaya* and *A. occidentale* respectively (Table 7). A wide range of benefits is derived from the fruit trees. Table 8 revealed that the trees serve as sources of food (55%), vitamins (29%) and income (25%). Other benefits included the provision of shade, medicine, wind and erosion control and the provision of work environment for artisans.

The determination of the respondents' preference for fruit trees revealed that *C. sinensis M. indica* and *C. papaya* ranked higher on the preference list with 32%, 26% and 13% of the field observation. Respondents inclined toward them (Table 9). Willingness to invest in fruit tree cultivation was however found to depend on land ownership, interest of the land owner and ability to prevent the tree seedlings from browsing animals, especially goats and sheep that are reared on free-range system in the study area.

Table 1. Checklist of Fruit Trees Species Sampled Found in an Urban Community in Ekiti State, Nigeria

S/n	Botanical name	Common name	Indigenous name	Family name
1	*Anacardium occidentale* Linn.	Cashew	Kasu/kaju	Anacardiaceae
2	*Carica papaya* L.	Pawpaw	Ibepe	Caricaceae
3	*Citrus sinensis* (L)Osbeck	Orange	Osan	Rutaceae
4	*Citrus reticulata*	Tangerine	Osan oyinbo	Rutaceae
5	*Citrus aurantifolia* (L)Burm .F.	Lime orange	Osan wewe	Rutaceae
6	*Cocos nucifera* L	Coconut	Agbon	Arecaceae
7	*Magifera indica* L	Mango	Mangoro	Anacardiaceae
8	*Psidium guajava* L	Guava	Gurofa	Myrtaceae
9	*Terminalia catappa* L	Fruits	Furutu	Combretaceae

Source: Field Survey

Table 2. Demography of Fruit Tree Species in an Urban Community in Ekiti State, Nigeria

S/n	Fruit Trees	Strata						
		Routes			Schools			Total
		A	B	C	D	E	F	
1	*A. occidentale*	-	5	5	1	22	3	36
2	*C. papaya*	9	2	1	5	1	2	20
3	*C. sinensis*	4	1	3	-	-	1	9
4	*C. reticulata*	1	-	-	-	3	-	4
5	*C. aurantifolia*	-	-	1	-	-	-	1
6	*C. nucifera*	-	1	1	-	-	-	2
7	*M. indica*	1	1	1	1	10	6	20
8	*P. guajava*	2	-	-	-	-	-	2
9	*T. catappa*	1	1	-	-	-	-	2
Total		18	11	12	7	36	12	96

Table 3. Index of Similarity in the Occurrence of Fruit Tree Species in an Urban Community in Ekiti State, Nigeria

S/n	Strata	IS (%)e
1	A-B	67
2	A-C	50
3	A-D	40
4	A-E	60
5	A-F	60
6	B-C	83
7	B-D	67
8	B-E	60
9	B-F	80
10	C-D	67
11	C-E	60
12	C-F	80
13	D-E	86
14	D-F	86
15	E-F	75

Table 4. Indices of Diversity of Fruit Tree Species Sampled in an Urban Community in Ekiti State, Nigeria

Indices	Strata					
	A	B	C	D	E	F
Shannon-Wiener Index	1.37	1.54	1.33	0.79	0.96	1.19
Simpson Index	0.32	0.27	3.00	0.54	0.45	0.12
Equitability Index	0.77	0.86	0.75	1.64	0.70	0.86

Table 5. Socio–Economic Classification of Respondents Sampled in an Urban Community in Ekiti State, Nigeria

Features	Description	Proportion (%) of Respondents* (N =120)
Gender	Male	45
	Female	55
Age	Below 20 years	37
	Above 20 years	63
Literacy status	Illiterate	31
	Literate	69
Religious status	Christian	61
	Muslim	39
Marital status	Married	60
	Single	40

Table 6. Indigenous Knowledge of Respondents on Fruit Trees in an Urban Community in Ekiti State, Nigeria

Features	Description	Proportion(%) of Respondents* (N =120)
Mode of propagation	Seeds	74
	Wildlings	38
Desirability	Desirable	87
	Not desirable	13
Planting habit	Involved in planting	67
	Not involved	33

Source: Field Survey

Table 7. Rank Order of Fruit Trees Planted by Respondents in an Urban Community in Ekiti State, Nigeria

Rank	Species	Proportion (%) of Respondents (N = 80)*
1	*M. indica*	41
2	*C. sinensis*	31
3	*C. papaya*	29
4	*A. occidentale.*	24
5	*C. nucifera*	16
6	*P. guajava*	5
7	*C. aurantifolia*	3
8	*T. catappa*	1

*N = Number of respondents that has being involved in planting of fruit trees

Table 8. Rank Order of Benefits derived by Respondents in an Urban Community in Ekiti State, Nigeria

Rank	Benefits derived	Proportion (%) of Respondents* (N = 80)
1	Sources of food	55
2	Sources of vitamins	29
3	Sources of income	25
4	Provide shade	23
5	Use for medicinal purpose	16
	Serve as wind break	16
7	Have aesthetic value	14
8	Provide workshop for artisans workshop	4
	Control of erosion	4

*N = Number of Respondents that has being Involved in Planting of Fruit Trees

Table 9. Rank Order of Preferred Fruit Trees by Respondents in an Urban Community in Ekiti State, Nigeria

Rank	Species	Proportion (%) of Respondents
1	*C. sinensis*	32
2	*M. indica*	26
3	*C. papaya*	13
4	*M. domestica*	11
5	*A. occidentale*	7
6	*C. nucifera*	5
7	*C. aurantifolia*	3
8	*T. catappa*	2
9	*P. guajava*	1

IV. Discussion

The results obtained in this study revealed the presence of nine different fruit species in the study community. This might be considered as too poor in view of the numerous fruit tree species that abound in the rainforest zone of Nigeria (Kayode 2006) to which the study community belonged. The low number of tree species diversity and abundance as obtain in this study (96 individuals) could be attributed to the lackadaisical attitude of Nigerians to tree planting. Kayode (2004) had earlier alluded to this trend. Members of the families Rutaceae and Anacardiaceae dominated the species enumerated in this study. Members of the family Rutaceae are known to survive very well in rainforest environment (Auld 2001). Keith and Myerscough (1993) asserted that species in this family thrives well even in nutrient-poor soils. Their seeds are widely dispersed by animals and ants. Members of the family are known to have their seeds mature for dispersal just before the onset of the rains. These features, no doubt, contribute immensely to their distribution. Similarly, the family Anacardiaceae has been reported to be frequent in Africa (Apema et al. 2009). Their seeds are widely dispersed by animals including man. Seeds of these species germinate readily in the study area.

The results revealed that more fruit trees individuals were obtained in the educational institutions than the roadsides strata. Field observation revealed that the institutions were immune to browsing animals than the roadsides. Each of the school compounds was fenced.

Also more labour hands (students) were available in the educational institutions to tend the fruit tree seedlings than individual that cultivated the fruit trees by the roadsides. The fruit tree species in the roadsides were possessed higher diversity than those obtained from the education institutions. This observation tends to suggests that the managements of these institutions do not pay attention to the cultivation of urban trees. This observation lends credence to that of Ajayi et. al. (2020).

A. occidentale has the highest number of individual in this study. The ecological success demonstrated by this species could be attributed to its nutritious fruits and its ability to grow seamlessly in the study area. Study by Olife et. al. (2013) revealed that this species grow in varieties of soils that vary from soil in distinct dry season of annual rainfall as low as 50cm to well-drained soil in high rainfall as high as 350cm. Similar reasons may also be attributed to the number of *C.papaya* and *M. indica*. Agbowuro (2012) asserted that the fruit of *C. papaya* is one of the most nutritional and cheapest fruits grown in Ekiti State, Nigeria and the species is consumed the year round. Also, Aigbokhan, (2014) listed *Magifera indica* as one of the fruits mostly consumed in Nigeria. Awodoyin et. al. (2015) asserted that all these fruit tree species are excellent sources of crucial vitamins, minerals or anti-oxidants and thus essential as supplemental food for a nutritionally-balanced diet.

The perception of the urban dwellers (respondents) is seen as a means of determining the strategies that could be used to improve tree cultivation in the study area. In this study, female dominated the respondents used. Recent initiative has revealed that socio-economic classification is not a pre-requisite to tree mindedness (Ajayi et. al. 2020). Indeed, Kayode (2006) opined that there exists a special relationship between female and the environment. Females are known for the subsistence use of the environment, especially the non-wood forest products hence they have a versed knowledge of issues affecting the environment. In this study, considerable number of respondents had been involved in the planting of fruit tree species. Field observation revealed that many of the respondents were involved in on-farm tree cultivation rather than urban forestry. Planting urban trees might be impossible for someone who lacks land. Tenants are often disallowed to plant trees in the study areas. Thus irrespective of the interest tenants may have on trees, they are likened to beggars that wish to ride horses.

The urban fruit trees were valued as sources food, vitamins and additional income to the family when the fruits are harvested for sale. Field observation however revealed that the income derived from them were infinitesimally low. Quite often, the fruits produced were pilfered upon or seen as public properties especially by the youths. All these hindered the returns obtainable from these plants. However, the respondents revealed that fruit tree species have multipurpose advantages irrespective of the species when planted in the urban environment. Field observation revealed that some of them were being utilized as workshops by artisans, shops for retailers selling diverse household products, shades for relaxation and erosion control. Previous study by Schreckenberg (2004) also made similar observation.

The examination of fruit tree species preference among the respondents was skewed toward *C. sinensis, A. occidentale* and *C. papaya*. These preferred fruit trees are widely consumed in the study area. They germinate seamlessly and were highly nutritious. *C. sinensis* has a multipurpose utility in the study area. Apart from the fruits that are a good source of vitamin C, as well as several other vitamins, minerals, and antioxidants (Anon. 2019), they have medicinal values by lowering the risk of heart disease, anemia and kidney stones. Similarly *A. occidentale*'s fruits are nutritious and eating the nuts derived from cashew apple can lower the risk of cardiovascular disease, as study has shown that eating the nuts reduced blood pressure and cholesterol levels (Anon. 2018). The fruits of *C. papaya* contain high fiber and water contents, both of which help to prevent constipation and promote

regularity and a healthy digestive tract (Anon. 2017). It also contains an enzyme called papain that aids digestion. Study by Tietze (2002) revealed that mature green papaya contains more vitamin A than carrots, more vitamin C than oranges, abundant vitamin B factors and vitamin E. It also possesses antiseptic qualities and helps prevent the abnormal proliferation of undesirable bacteria in the intestines (Ray 1994). Apart from the leaves, other parts of *C. sinensis, A. occidentale* and *C. papaya* are also use for medicinal purposes in the study area.

V. Conclusion

Consequent on the above, the need to improve on urban forestry through the use of fruit tree species should be encouraged. The wide acceptability and consumption of fruits in the study area are positive incentives to leverage upon in this task. Sustainable strategies that could encourage the planting of fruit trees in the study area are being prescribed as follow:

1. Governments should encourage the planting of fruit trees for their nutritious and economic benefits.
2. Public awareness on the planting of fruit trees should be embarked upon through production of jingles disseminated through electronic media especially, the radio.
3. The planting of indigenous fruit trees should be encouraged as the existing practice were mostly concentrated on exotic species.
4. Universities and research institutions should be funded and mandated to produce tree fruit seedlings for free distribution for the populace to plant in their household environments.
5. All local governments in the country should be compelled to plant fruit trees by the urban roadsides. This will protect the roads from erosion, improve aesthetic nature of the urban areas and reduce urban air pollution.

References

Agbowuro, G. (2012). "Factors Constraining the Production and Marketing of Pawpaw (*Carica Papaya*)". Continental J. Agricultural Economics 6 (2): 32-35.

Aigbokhan, E.I. (2014). "Annotated Checklist of Vascular Plants of Southern Nigeria – a Quick Reference Guide to the Vascular Plants of Siuthern Nigeria: A Systematic Approach. Uniben Press, Benin City, Nigeria. 346pp.

Ajayi, I. K., Kayode, J. and Ademiluyi, B. O. (2020). "Study on Urban Trees in Ekiti State University, Ado-Ekiti, Nigeria: Budapest International Research in Exact Sciences 2 (2): 147 -156.

Anon. (2017). "What are the Health Benefits of Papaya?" https://www.medicalnewstoday.com/articles/275517 Assessed on May 7, 2020

Anon. (2018). "Are Cashews Good for You?" https://www.healthline.com/health/are-cashews -good- for-you Assessed on May 7, 2020

Anon. (2019). "Oranges 101: Nutrition Facts and Health Benefits". https://www.healthline.com/nutrition/foods/oranges Assessed on May 7, 2020

Anon. (2020). "Trees Have Aesthetic Value and Improve Property Values. Urban Forestry Network". http://urbanforestrynetwork.org/benefits/aesthetic.html Assessed on May 5, 2020

Anthon, S. & Thorsen, B. J. 2001). "Værdisætning af Statslig Skovrejsning. En Husprisanalyse. (Valuation of Afforestation by the State. A House Price Analysis)". Skov & Landskab, Danish Forest and Landscape Research Institute, Hoersholm.

Apema, R.., Mouzouloua, D. Madoapevo, S.N. Vander Brugt, X., Vander Maeseri, J. & Onana, J. M. (2009). "Inventaire preliminair des fruits savages comestible Vendus sur

les marches de Bangui". Pp. 113-319. In systematique et conservation des plantes Africaines, Yaounde, Cameroon.
Auld, T. D. (2001). "The Ecology of the Rutaceae in the Sydney Region of South-Eastern Australia: Poorly Known Ecology of a Neglected Family". Cunninghamia 7(2): 213-239.
Awodoyin, R. , Olubode, O. , Ogbu, J. , Balogun, R. , Nwawuisi, J. & Orji, K. (2015). "Indigenous Fruit Trees of Tropical Africa: Status, Opportunity for Development and Biodiversity Management". Agricultural Sciences, 6, 31-41. doi: 10.4236/as.2015.61004.
Baugher, T. A. & Singha, S. (2003). "Concise Encyclopedia of Temperate Tree Fruit". Food Products Press, New York 388pp
Bongers, F., Popma, J., Meavedel Castilo, J. & Carabias, J. (1988). "Structure and Floristic Composition of the Lowland Rain Forest of Los Tuxtlas". Vegetation 74: 55-80.
Dhyani, S. K. & Handa, A. K . (2013). "Area under Agroforestry in India: An assessment for Present status and future perspective". India Journal of Agroforestry. 15 (1):1-11
Ezeabasili, A. C. C., Iloghalu, I. E., Okoro, B. U. & Manafa, I. F. (2014). "Sustainable Urban Forestry in Nigerian Built Environments". Journal of Scientific Research & Reports 5(7): 524-531
Harris, R.W. (1992). Arboriculture: Integrated Management of Landscape Trees, Shrubs and Vines.
Second edition. Prentice Hall, New Jersey. Hutchinson, J. & Dalziel, J. M. (1958 – 1968). "Flora of West Tropical Africa". Edition 2, Volume 2 (Revised by Keay, R. V. and Happer, F. N.). Crown Agent for Oversea Government and Administration, London. 424p.
Kayode, J. (1999). "Phytosociological Investigation of Compositae Weeds in Abandoned Farmlands in Ekiti State, Nigeria". Compositae Newsletter 34:62-68.
Kayoede, J. (2004). "Conservation Perception of Endangered Tree Species by Rural Dwellers of Ekiti State, Nigeria". Journal of Sustainable Forestry 19(4): 1-9
Kayode, J. **(**2006). Conservation in Nigeria Perspective. Akolawole Press, Ado-Ekiti, 66pp.
Keay, R. W. J. (1989). "Trees of Nigeria". Oxford University Press, New York. 476p.
Keith, D.A. & Myerscough, P.J. (1993). "Floristics and Soil Relations Of Upland Swamp Vegetation Near Sydney". Australian Journal Of Ecology 18: 325–344.
Konijnendijk, C.C. (1999). "Urban Forestry In Europe: A Comparative Study of Concepts, Policies and Planning for Forest Conservation, Management and Development in and Around Major European Cities". Doctoral Dissertation. Research Notes No. 90. Faculty of Forestry, University of Joensuu, Joensuu.
Konijnendijk, C. C., Sadio, S., Randrup, T. B. and Schipperijn, S. (2003). Urban and Peri-urban Forestry for Sustainable Urban Development. http://www.fao.org/3/XII/0976-B5.htm
Kuchelmeister, G. (1998). "Urban Forestry in the Asia-Pacific Region: Status and Prospects". APFSOS Working Paper No. 44. Forestry Policy and Planning Division, Rome, Regional Office for Asia and the Pacific, Bangkok, Thailand
McPherson E.G. &Simpson, J.R. (1999). "Carbon Dioxide Reductions through Urban Forestry: Guidelines, for Professional and Volunteer Tree Planters". General Technical Report Psw-171. USDA Forest Service, Pacific Southwest Research Station, Albany, CA.
Obembe, M. O. and Kayode, J. (2019). Evaluation of the Insecticidal Properties of Cassia alata L. against Cowpea Weevil, Callobruchus Maculatus Fab. (Coleoptera: Bruchidae).

Budapest International Journal in Exact Sciences 1(4), 84-92. DOI: https://doi.org/10.33258/birex.v1i4.481
Okpeke, L. K. (1987). “Tropical Tree Crops”. Spectrum Books Ltd., Ibadan.
Olife, I. C., Jolaoso, M. A. & Onwualu, A. P. (2013). “Cashew Processing for Economic Development in Nigeria”. Agricultural Journal 8(1): 45-50.
Palijon, A. M. (2001). “An Analysis of Green Space Management Strategies in Metro Manila”. Pp. 147-164.In: Sievänen, T., Konijnendijk, C.C., Langler, L. and Nilsson, K. (eds.). Forest and Social Services: the Role of Research. Proceedings of IUFRO Research Groups 6.01, 6.11.04 and 6.14 Sessions at the XXI IUFRO World Congress 2000, Kuala Lumpur, Finnish Forest Research Institute, Vantaa.
Ray J.W. (1994). “Patient’s Guide to Body Electronics”. http://www.bodymindhealing.info/papaya.php Assessed on May 7, 2020
Sadio, S. (1999). “Evaluation of the Implementation of FAO -TCP Project- EGY/7928 Tree Planting using Sewage Water In Egypt”. Mission Report, Cairo, Egypt.
Schreckenberg, K. (2004). “The Contribution of Shea Butter (Vitellaria paradoxa C. F. Gaertner) to Local Livelihood and Conservation: Case Studies of Non-Timber Forest Product Systems”. Volume 2-Africa. CIFOR, Indonesia.
Seeland, K. (2003). “Urban Forestry in India and Nepal”. In: Konijnendijk, C.C., Schipperijn, J. and Nilsson, K. (eds.). COST Action E12 Urban Forests and Trees - Proceedings No. 2. Office for Official Publications of the European Communities, Brussels.
Tietze H.W. (2002). “Health and Fitness”. Harald W. Tietze Publishing Property Limited, Bermagui.
Tomicevic-Dubljevic, J. Živojinovic, I. & Tijanic, A. (2017). “Urban Forests and the Needs of Visitors: A Case Study of Košutnjak Park Forest, Serbia”. Environmental Engineering and Management Journal 16 (10): 2325-2335.
Tyrväinen L., Pauleit S., Seeland K., & Vries S. (2005). “Benefits and Uses of Urban Forests and Trees”. Pp. 81-114. In: Konijnendijk C.C., Nilsson K., Randrup T.B., Schipperijn J. (Eds.), *Urban Forests and Trees: A Reference Book*. Springer Verlag, Berlin.
USDA (2020). “Urban Forests”. https://www.fs.usda.gov/managing-land/urban-forests
Wikipedia (2020). “Urban forest”. https://en.wikipedia.org/wiki/Urban_forest
WRI (2001). “Earthtrends: the Environmental Informational Portal”. World Resources Institute,Washington D.C. http://earthtrends.wri.org/