Socio-Economic Benefits of Iroko Trees (*Milicia excelsa* Welw C.C. Berg) in Ibadan Metropolis, Oyo State, Nigeria

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Abstract
A complete survey of Iroko trees in Ibadan metropolis was carried out with the view to determining their distribution and status. The entire of Ibadan City was considered for the study. The city was divided into sections and a reconnaissance survey was conducted to confirm existence of the tree species within each of the section. Direct observation of the already identified Iroko trees was then carried out during the actual data collection stage of the study. Permissions were sought before data collection was carried out on the identified trees. A total of 62 Iroko trees were surveyed; out of these, 33 (53.2%) stands were accessible while the remaining 29 stands (46.8%) were inaccessible. Many of the trees that could not be accessed were a result of restriction into the location where they exist. The most frequently observed benefit obtained trees are shade from direct sunlight and cool breeze it creates. Other uses of trees include peeling of the tree bark and used in preparation of local medicine, fetish activities on and around the tree, and use of the fallen branches as firewood. There is urgent need for appropriate protection strategies of these remaining indigenous tree species where they exist.
Keywords: *Milicia excelsa,* endangered species, urban forest, bark slashing, medicines, restriction, Ibadan

1.0. INTRODUCTION

Forests are recognized as being fundamental to our efforts to mitigate and adapt to climate change (Friend of the Earth, 2008). There is a growing understanding of the importance of the natural ecology in urban forests. An urban forest is a forest or a collection of trees that grow within a city, town, or a suburb (Wikipedia, 2012a). In a wider sense it may include any kind of woody plant vegetation growing in and around human settlements. Urban forests play an important role in ecology of human habitats in many ways: they filter air, water, sunlight; provide shelter to animals and recreational area for people; moderate local climate; slowing wind and stormwater; and shading homes and businesses to conserve energy (Wikipedia, 2012a). It is unfortunate to observe that many of the cities in developing countries are fast losing their tree components. This calls for urgent intervention in a bid to combat the impact of climate change.

Milicia excelsa (formerly *Chlorophora excelsa*) Welw C.C. Berg. is commercially known as Iroko. It is a threatened wind-pollinated dioecious African tree with typically low density (approximately 10 adults/km^2) (Bizoux *et al.*, 2009). *M. excelsa* is a member of the Meliaceae family, though it was previously placed in Moraceae family. The species is a large deciduous tree that grows up to 50 m in height, diameter at breast height (dbh) of 4 m, with high crown that is umbrella-like and growing from a few thick branches (Christine and Nestor, 2010). It is native to tropical Africa, mostly West and East Africa. The distribution of *M. excelsa* ranges from Senegal and Gambia in West Africa, through Central and East Africa to Mozambique (Keay, 1989).

M. excelsa was categorised as "near threatened" under the IUCN Red List (WCMC, 1998). Currently, the species is categorized as one of the endangered valuable timber species under the International Union for Conservation of Nature (IUCN, 2006) Red Data List. Some of the threats to the species include heavy exploitation, iroko gall (*Phytolyma fusca*) attacks especially at early growing stage, and the ease of lose of viability by the seeds. A number of countries have formulated policies toward its protection. For instance, it is protected by legislation in Ghana, Ivory Coast and Mozambique, while in Kenya, a Presidential ban on logging of indigenous timber was implemented in 1986 (CBD, 2002). The species is among the indigenous tree species under great threat in Ibadan and its metropolis. A reconnaissance survey revealed that more than half of all the tree stands exist in the University of Ibadan, and with considerable level of protection from felling. A high number of Iroko in other parts of Ibadan have been removed leaving scatter trees of the species in the city. The study is therefore a survey of existing Iroko trees in Ibadan metropolis with the aim of assessing their current status and location.

2.0. METHODOLOGY

The city of Ibadan ($7^0 23´47´´N$; $3^0 55´0´´E$), located in southwest Nigeria, was selected as the study site. Until 1970, Ibadan was the largest city in sub-Saharan Africa (Areola, 1994). The city is about 120 km east of the border with the Republic of Benin in the forest zone close to the boundary between the forest and the savanna. The city ranges in elevation from 150m in the valley area, to 275m above sea level on the major north-south ridge which crosses the central part of the city. Ibadan has a tropical wet and dry climate with a lengthy wet season and relatively constant temperatures throughout the course of the year. Ibadan's wet season runs from March through October. November to February forms the city's dry season, during which Ibadan experiences the typical West African harmattan (Wikipedia, 2012b).

Trees of different species are scattered all over the city of Ibadan (Fig. 1); with more of exotic species than the indigenous species. The map of the city of Ibadan was obtained and subsequently divided into sections. A reconnaissance survey was conducted at the preliminary stage of the study to confirm the existence of Iroko trees within each of the sections marked on the map. Direct observation of the already identified Iroko trees was then carried out during the actual data collection stage of the study.

Iroko tree is one of the trees with high esteem in the society due to its socio-cultural potentials. People are always prevented from carrying out unsolicited activities on the tree or near it. The research team was aware of this and therefore was very careful during the data collection. Once a tree was located from a distance, permission was sought to access it and if possible to conduct data collection. If the permission is granted, then necessary data like coordinates and altitude were collected, while observation on anthropogenic activities on the tree or around it was carried out. Trees that could not be accessed or permission not granted oor their assessment were noted for their locations. Questionnaire was designed and administered to people living close to any of the identified tree species. Questions contained in the questionnaire were designed to obtain information on the benefits of the trees to the people.

3.0. RESULTS AND DISCUSSION

3.1. Surveyed Iroko stands in Ibadan

A total of 62 Iroko trees were surveyed; out of these, 33 trees (53.2%) were accessible while the remaining 29 stands (46.8%) were inaccessible. Restriction by the property owner and physical barrier such as fence ranked topmost of the reasons why the trees could not be accessed. Pictures of some of the trees are presented in Plate 1(a) to 1(d). The remaining 26 stands (44.1%) that could not be accessed as well as their location and reasons for inaccessibility are presented in Table 1.

Recently, settlements and sprawl development are becoming large active land use changes especially in the developing regions of the world (Oluseyi, 2006). Nigeria has been experiencing increased urbanization over the last five decades. The proportion of the population living in the urban centres has risen from 15% in 1960 to 43.3% in 2000. Human use of land has altered the structure and functioning of the ecosystem (Turner *et al.,* 1994). The fact that Ibadan was established in a forest region and once occupied by trees is evidenced in the names of some of the streets and areas within the city given after the trees formerly or still standing in those areas. These include *Idi-Ose* (*Ose* is local name for *Adansonia digitata*), *Idi-Ayunre* (*Ayunre* is local name for *Albizia odoratissima*), *Idi-Oro* (*Oro* is local name for *Irvingia gabonensis*), *Idi-Osan* (*Osan* is local name for oranges, *Citrus* spp), *Idi-mangoro* (*mangoro* is local name for mango, *Mangifera indica*), *Idi-Ishin* (*Ishin* is the local name for *Blighia sapida*). In like manner, there is *Idi-iroko* which signifies that *Iroko* once inhabit such a location before removal.

3.2. Surveyed Iroko trees and their uses in Ibadan

Iroko is a hardwood tree of great socio-economical and cultural importance in Sub-Saharan Africa. It is also one of the most important timber trees of tropical Nigeria. The heartwood is durable, workable and resistant to termites and marine borers. It is also extremely resistant to preservative treatments where- as the sapwood is permeable. The gravity is about 0.55 g/cm^3 (Dorthe, 2005). It is mainly used for outdoor construction work, furniture, boats, cabinet-work, panelling, frames and floors. The bark, its ashes, leaves and latex are used in local medicine and the trees play a major role in many local cultures where they are considered sacred, or parts of the tree serve ceremonial purposes (Putheti and Okigbo, 2008).

Information on the sited and enumerated Iroko trees in this study is presented in Table 2. A considerable number of the surveyed trees have straight or fair bole. Most of the Iroko trees are scattered around the city, with many existing in residential areas, government agencies, and research or academic institutions. Few of the trees were located along the road or streets. In most of the situations where the trees occurred along road or street, it is either owned by an individual or a family who prevented it from being felled. Sometimes, felling of the tree could pose great danger to life or property.

More than 50% of the respondents informed that the major benefit they obtained from the Iroko trees were shade from direct sunlight and cool breeze when the weather is hot. As a result of this, it is a common occurrence to observe business activities around the trees within the city. Some of the business activities observed around the trees were automobile mechanics, traders selling commodities that ranged from provisions to cooked food.

Among the major uses that the trees are subjected to include bark peeling for medicine, nailing of fetish

materials on the tree stem, and placing of sacrificial materials under some of the trees. Fallen branches of the trees are also used as firewood. The use of the dried branches of the tree as fuelwood confirms earlier reported publications that large parts of the urban population of Africa are still heavily dependent on fuel wood (Kuchelmeister, 1998). Wood fuel provides between 25 and 90 percent of urban household energy supplies; it is particularly important as a source of energy in smaller urban centres in developing countries, especially in dry zones (Kuchelmeister, 1998).

Iroko tree is held in high regard with respect to its uses in preparation of local medicines as well as other fetish activities. Various medicinal utilisations of the tree species have been reported by Ofori (2007). Preparations from the bark are taken to treat cough, asthma, heart trouble, lumbago, spleen pain, stomach pain, abdominal pain, oedema, ascites, dysmenorrhoea, gonorrhoea, general fatigue, rheumatism, sprains, tonic and purgative. Preparations from the bark are externally applied to treat scabies, wounds, loss of hair, fever, venereal diseases and sprains. The latex from the stem is applied on burns, wounds, sores and against eczema and other skin problems. Leaves are eaten to treat insanity, and are externally applied to treat snakebites and fever (Ofori, 2007). It is believed that a "spirit" called *oluwere* resides in the tree; this therefore makes the people to consider the tree as sacred. Many people are therefore scared of going under the tree at some particular hour of the day; most especially at night. Other minor uses of the tree include posting of banners and posters on the trunk of some of the trees.

4.0. CONCLUSION

The study shows that some Iroko trees still exist in the city of Ibadan. Except few of the trees that are protected and their accessibility restricted, others are faced with the threat of being fell any moment from now. The most frequently benefit obtained from the tree is shade from direct sunlight and cool breeze it generates. Some people peel bark of the tree and used in preparation of local medicine, while the fallen branches are used as firewood. Other feltish activities are also carried out on and around the tree. There is urgent need for appropriate protection strategies of these remaining indigenous tree species which has been categorized as *endangered valuable timber species* by IUCN.

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Fig. 1: Cross section of Ibadan with scattered trees of different species

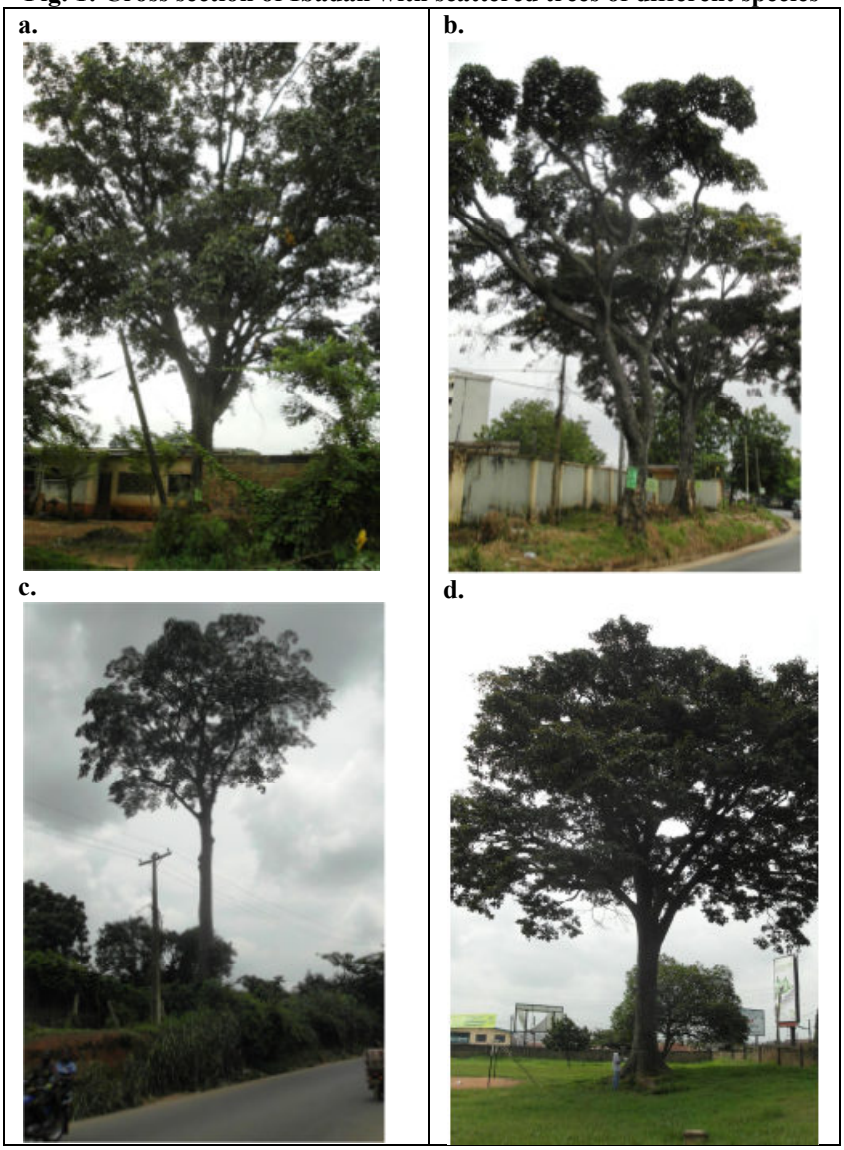

Plate 1: Some Iroko (*Melicia excelsa*) stands in Ibadan, Oyo State, Nigeria
[Locations: (a) All Souls' Church, Bodija (b) Custom-Federal Secondary Road (c) Greespring (d) Maryhill Convent School, Agodi]

Table 1: Iroko trees sited but not accessible for enumeration

S/N	Locations	Quantity	Reason for inaccessibility
1	Inside Nigerian Breweries, New Ife Road	5	Fenced
2	Yidi Islamic Praying ground, Agodi	2	Restricted
3	Agodi Gardens	3	Commercialized
4	Oyo State Secretariat area	1	Restricted
5	Church street, Sanngo	1	Fenced
6	NIHORT, Jericho	1	Restricted
7	Ikolaba GRA	1	Fenced private property
8	Maryhill Convent School	1	Restricted
9	Apata – Omi Adio	1	Restricted
10	Onireke	3	Restricted
11	Immanuel College, Samonda	3	Restricted
12	Moor Plantation	1	Restricted
13	Joyce B' Road	2	Restricted
14	High Court/Oni & Sons, Ring Road	1	Restricted
15	Ibadan Polo Club	2	Restricted
16	Osuntokun Avenue, Old Bodija	1	Restricted
	Total	29	

Table 2: Accessed and enumerated Iroko trees (*Melicia excelsa*) in Ibadan, Oyo State, Nigeria

S/N	Location	Coordinate / Altitude	Physical observations and utilisations
1	All Souls' Church, Bodija	N 07º 25.161′ E 003º 54.087′ 214m	Big tree, solitary, with many dried branches, forked. Bark slashing. Colony of birds converges of the tree.
2	Custom-Federal Sec. Road (1)	N 07º 24.771′ E 003º 54.823′ 204m	Dry branches at the crown, debarking and bark slashing observed. Orchids growing on the tree, bole forked above DBH. Excessive branching.
3	Custom-Federal Sec. Road (2)	N 07º 24.773′ E 003º 54.810′ 225m	Bark slashing observed, branching. Fetish materials nailed to the tree.
4	NACGRAB (1)	N 07º 23.315′ E 003º 50.465′ 165m	Fairly straight bole. Orchids observed on the branches.
5	NACGRAB (2)	N 07º 23.273′ E 003º 50.341′ 166m	Relatively young tree. Bark slashing observed.
6	NACGRAB (3)	N 07º 23.211′ E 003º 50.323′ 184m	No physical defect
7	Forestry college – Idi Isin Road	N 07º 23.884′ E 003º 51.767′ 206m	No physical defect
8	Forestry College of Forestry, Jericho	N 07º 23.876′ E 003º 51.780′ 206m	No physical defect
9	Church Street, Sanngo	N 07º 25.856′ E 003º 53.704′ 220m	Main tree is felled, but another tree developed from coppice with excessive and crooked crown. Fetish materials found on the bole
10	Maryhill Convent School, Agodi	N 07º 24.215′ E 003º 55.527′ 252m	Straight bole with good crown shape. Orchids growing on the branches.
11	MFM, UMC, Molete	N 07º 21.784′ E 003º 53.233′ 188m	No physical defect
12	After Ikolaba Pry School	N 07º 24.487′ E 003º 55.102′	Straight bole, forked above 9m Bark slashing observed. Brown exudates at the DB.

		217m	
13	UCH (1)	N 07º 24.069´ E 003º 54.554´ 221m	Large buttress, old tree.
14	UCH (2)	N 07º 24.101´ E 003º 54.583´ 206m	Excessive branching, orchids growing on it.
15	UCH (3)	N 07º 24.131´ E 003º 53.952´ 188m	Excessive branching, orchids growing on it.
16	UCH (4)	N 07º 24.138´ E 003º 33.951´ 200m	No defect on the bole. Colony of scavenger birds lives on it.
17	UCH (5)	N 07º 24.215´ E 003º 53.981´ 210m	Forked, hollow and root rot observed at the base. Debarking observed.
18	UCH (6)	N 07º 24.219´ E 003º 54.177´ 208m	
19	UCH (7)	N 07º 24.254´ E 003º 54.340´ 214m	Human disturbance (burning) observed around it.
20	UCH (8)	N 07º 24.185´ E 003º 54.413´ 208m	Epiphytes growing on it, posters nailed on the bole.
21	UCH (9)	N 07º 24.135´ E 003º 54.533´ 214m	Fairly straight bole
22	Segelu bus stop, Iwo Road	N 07º 24.034´ E 003º 56.923´ 222m	Few debarking observed, named ‘igi anu’.
23	Adegbayi, Olode, New Ife Road (1)	N 07º 22.954´ E 004º 00.368´ 162m	Fairly straight bole, debarking observed, base infected by termites, a seedling observed close by infected by *Phytolyma fusca*
24	Adegbayi, Olode, New Ife Road (2)	N 07º 22.950´ E 004º 00.362´ 159m	Straight bole. Debarking observed.
25	Old Ife Road, beside Green Spring hotel	N 07º 23.443´ E 003º 56.004´ 223m	Debarking observed, termite infection at the base, straight bole. A lunatic used to live in the hollow at the base. Sacrifices and fetish substances observed at the base.
26	Government House, Agodi 1 & 2	N 07º 24.567´ E 003º 55. 028´ 258m	Forking at the base, so considered as two stands. Colony of birds observed on the crown.
27	Awolowo Road, Old Bodija	N 07º 24.969´ E 003º 54.264´ 224m	Bole is crooked, no bark slashing observed.
28	IAR&T, Moor Plantation	N 07º 22.471´ E 003º 50.771´ 165m	Forked, debarking observed.
29	Behind Mobil filling station, Iwo Road	N 07º 23.917´ E 003º 56.891´ 246m	Dry crown/branches, straight bole. Deep/intensive debarking observed.
30	Adegbayi, opposite Honors Filling station	N 07º 23.191´ E 003º 59.030´ 220m	A young developing tree with rapid growth.
31	NIHORT, Jericho	N 07º 24.468´ E 003º 50.836´ 173m	Hollow on the base of the bole

32	Gbekuba area	N 07º 23.640´ E 003º 50.416´ 159m	Deliberate ring barking of the tree to fell the young tree, possibly to allow for construction activities. Other trees around were also ring barked

Field survey, 2011

NACGRAB – National Centre for Genetic Resources and Biotechnology
UCH – University College Hospital
IAR & T – Institute of Agricultural Research and Training
MFM – Mountain of Fire and Miracle Ministry