 Preliminary inventory of the vegetation at the proposed site of Ekiti State University Botanical Garden

Otoide Jonathan Eromosele
Department of Plant Science and Biotechnology, Faculty of Science, Ekiti State University, Ado-Ekiti, Ekiti State, Nigeria
E-mail address: jonathan.otoide@eksu.edu.ng

ABSTRACT
A preliminary inventory of the vegetation at the proposed site of the botanical garden of Ekiti State University was carried out with a view to providing baseline information about the richness, distribution, economic and medicinal importance of the available plant species. This is to serve as fundamental knowledge for a periodical assessment of impact as the garden is fully established. The proposed site measures 1944 m² in size. With the aid of a geographical compass, the entire land area was divided into four axes (i.e. north-, south-, east- and west-wards) to serve as guide for enumerating the plant species and assessing their pattern of distribution. Plant collections were made from the four axes by means of secateurs and vasculum and thereafter prepared as herbarium specimens which were stored in the University Herbarium. Forty plant families, comprising eighty-four species were noted for the inventory. The economic and medicinal importance of the plant species was recorded. As at the period of the exercise, five plant species were abundant, twenty-three were occasional, while fifty-six were rare. It was deduced that the site is a secondary forest, rich in plant species and would be less costly to be prepared for the establishment of a botanical garden. Goals of sustainable development and species conservation was set for the management of the said garden.

Keywords: inventory, proposed site, plant species, botanical garden, goal
1. INTRODUCTION

According to Wyse and Peter (1999) a botanical garden is an institution holding documented collections of living plants for the purposes of scientific research, conservation, display and education. It is a garden dedicated to the collection, cultivation and display of a wide range of plants labelled with their botanical names. It may contain specialist plant collections such as cacti and other succulent plants, herb gardens, plants from particular parts of the world, and so on; there may be greenhouses, shadehouses, again with special collections such as tropical plants, alpine plants, or other exotic plants. Visitor services at a botanical garden might include tours, educational displays, art exhibitions, book rooms, open-air theatrical and musical performances, and other entertainment.

Botanical gardens are often run by universities or other scientific research organizations, and often have associated herbaria and research programmes in plant taxonomy or some other aspect of botanical science. In principle, their role is to maintain documented collections of living plants for the purposes of scientific research, conservation, display, and education, although this will depend on the resources available and the special interests pursued at each particular garden.

The origin of modern botanical gardens is generally traced to the appointment of professors of botany to the medical faculties of universities in 16th century Renaissance Italy, which also entailed the curation of a medicinal garden. However, the objectives, content, and audience of today’s botanical gardens more closely resembles that of the grandiose gardens of antiquity and the educational garden of Theophrastus in the Lyceum of ancient Athens.

The early concern with medicinal plants changed in the 17th century to an interest in the new plant imports from explorations outside Europe as botany gradually established its independence from medicine. In the 18th century, systems of nomenclature and classification were devised by botanists working in the herbaria and universities associated with the gardens, these systems often being displayed in the gardens as educational "order beds". With the rapid rise of European imperialism in the late 18th century, botanic gardens were established in the tropics, and economic botany became a focus with the hub at the Royal Botanic Gardens, Kew, near London.

Core to any botanic garden is its living plant collections. An important characteristic that differentiates botanic gardens from ornamental gardens or parks is the scientific under-pinning of its living plant collections (Borsch and Lohne, 2014). Plant collections need to meet defined quality control standards, which are usually governed by a comprehensive Collections Policy (Rae, 2011). Hohn (2008) identified three documents that guide well-managed collections insuring adherence to the institution’s mission –a collections management policy, a collections management manual and a collections plan. As institutions grow, it becomes necessary for each garden to rethink their collections management and expansion policies, prioritizing whether they are for research, conservation, and/or educational purposes based on space availability, staff resources and fiscal sustainability (Delmas et. al. 2011). This will encourage better management and utility of unfocused collections that may represent inefficient resource use. In particular, the pool of both internal and external researchers utilizing collections should be expanded so as to reverse trends in the dwindling support and use of living collections (Dosmann, 2006). Effective collections management is key for the accessibility and utility of living collections for research, conservation, horticulture and education (Cibrian-Jaramillo et. al., 2013). Plant Records in a botanic garden will help ensure that the plant collections are
named and labelled accurately and documented and tracked in a plant records database. Periodic plant name verification is conducted in order to confirm an existing name, change an existing name to another name or to determine the identity of an unknown plant. This involves checking validity of names according to the code of botanical and horticultural nomenclature representing accepted taxa. Though slow and time consuming, verification is a fundamental task of curating and maintaining the integrity of a botanic garden collection (Rae, 2011), especially since the explosion of molecular genetic research has elucidated phylogenetic relationships between species and driven taxonomic corrections. Living collections serve a complementary role for field-work and herbarium studies. For plants not easily pre-served as herbarium specimens, the study of living collections is valuable for the development of monographs and floras. They are also valuable for systematic, molecular and phylogenetic studies and enable the study of plants whose original locality has been destroyed or is inaccessible (Delmas et al. 2011). In addition, they also serve as an excellent source for research in biogeography, plant physiology, pharmaceutical biology, conservation and restoration research (Borsch and Lohne, 2014) and can be executed by gardens of varying size (Dosmann, 2006).

Botanic gardens are well positioned to provide a leadership role in climate change research and education because of their diverse plant collections from wide geographic areas and their knowledge and data on plant systematics, distribution and physiology (Primack and Miller-Rushing, 2009; Ali and Trivedi, 2011). Primack and Miller-Rushing (2009) identified five unique characteristics of botanic gardens that provide important contributions to climate change research: 1) by growing a wide variety of plant species together in one place, botanic gardens represent valuable common garden experiments; 2) by growing diverse species together from different geographic regions of the world that would not be found growing together under natural conditions representing diversity and broad taxonomic representation, these collections facilitate comparative ecological, evolutionary and phylogenetic studies; 3) the meticulous record keeping of phenology and horticultural attributes combined with systematics research help track spring flowering and leafing out times and their links to temperature and climate change; 4) plant trading among the global network of botanic gardens has resulted in the growing of genetically similar or identical specimens at various locations throughout the world helping track growth characteristics under a wide range of conditions; and 5) knowledgeable staff at botanic gardens make valuable members of interdisciplinary research teams and are in a special position to convey the impacts of climate change to the public. In addition to living collections, herbarium collections and photographs are also valuable tools for studying climate change and plants’ responses. Responses of plants to changing climate can be documented by examining past flowering information from herbarium specimens and comparing them with present flowering information (Primack and Miller-Rushing 2009). Dated photographs when compared with current observations can also be informative in examining impacts of temperature on flowering times to see if plants are now flowering earlier than in the past. Education and Outreach Botanic gardens play an important role in raising public awareness about threats to plant diversity and the con-sequences of biodiversity loss on human well-being (Borsch and Lohne, 2014).

Botanic gardens worldwide reach over 200 million people each year and represent a huge opportunity for providing informal education to a broad spectrum of society about the crucial role of plants in supporting ecosystem and human health (Schulman and Lehvavirta, 2011; Borsch and Lohne, 2014). Programs targeting specific audiences such as children, adults and professional educators should continue to be developed and advanced. Education in botanic
gardens can come in a variety of forms: children’s summer camp, family programs, school programs such as field trips, teacher training and development, adult education and certification programs as well and student internships. Programming, or mediating visitor experiences, is influenced by the quality of the program and the opportunity for the participants to make personal connections. Features influencing the success of programs include: place-based programs that relate to a particular location motivating interest; project-based programs that use hands-on, interactive approaches; developmentally appropriate programs that meet the needs of the specific audience served; internal collaborations utilizing the expertise of multiple departments within the gardens; programs linked to local school curricular standards; and periodic program evaluation to ensure the programs are meeting intended goals (Benveniste and Schwarz-Ballard, 2011).

With the urbanization of our society, knowledge about agricultural systems and growing food plants is waning. Located predominantly in urban areas, botanic gardens are well placed to play a critical role in addressing the issue of food security (Miller et al., 2015). Display of agricultural plants in botanic gardens is not a new concept. In fact, the role of botanic gardens as field museums of agriculture was proposed in the early twentieth century (Blakeslee, 1910). Today, many botanic gardens display individual food plants, often in the tradition of the Victorian exotic aesthetic, though few botanical institutions display food crops in the context of production agriculture. Nonetheless, botanic gardens are well positioned to educate the public by providing the full picture of the agricultural landscape through presenting crop plants and agricultural technologies common on farms such as agrochemical use, conventional and sustainable cropping systems, biotechnology and mechanization.

Over the years, botanical gardens, as cultural and scientific organizations, have responded to the interests of botany and horticulture. Nowadays, most botanical gardens display a mix of the themes mentioned and more; having a strong connection with the general public, there is the opportunity to provide visitors with information relating to the environmental issues being faced at the start of the 21st century, especially those relating to plant conservation and sustainability (Krishnan and Novy, 2016).

Botanic gardens have aspects of nature and leisure offering unique experiences that may impact visitors’ individual well-being (Kohlleppel et al., 2002). As aesthetically pleasing physical environments, gardens can be utilized to reduce social challenges brought about by various societal stresses, thereby increasing the well-being of people such as increased life expectancy (Schulman and Lehvavirta, 2011). Kohlleppel et al. (2002) cite work by Owen in 1994 who measured the blood pressure of visitors to the Wichita Gardens in Kansas and found a decrease in the systolic blood pressure significantly after their visit and by Bennett in 1995 who found a decrease in perceived stress by most visitors to the Brooklyn Botanic Garden and the New York Botanical Garden. The study by Kohlleppel et al. (2002) conducted at three botanic gardens in Florida found that botanic gardens could be places for coping with the effects of stress. The literature on the curative impacts of exposure to green spaces and plants continues to grow with meaningful advances in relation to cognitive health (Berman et. al., 2008), mental health (Shaw, 2015), depression (Rappe and Kivela, 2005) and recovery from surgery (Ulrich, 1984).

According to Durugbo et. al. (2012) Plants are of great importance in the environment. They help in conserving soil fertility, prevention of erosion, recycling of oxygen and water. They also provide shade, seeds, fruits, timber, vegetables and medicines for man and his livestock. Since the first earth summit in Rio de Janeiro, there has been a sustained global
awareness of the importance of the superfluity of biodiversity and natural resources from tropical forests for several purposes. This stems not only from the derivable forest products but also from the potent ethno-botanical and ethno-medicinal uses of the plants in these forests. The world’s tropical rain forests are especially rich in biodiversity but there is rapid depletion of these natural resources in Nigeria and possibly worldwide (Ayodele, 2005). These pressures which arise from degradation, unsustainable arable land use, urbanization and industrialization are taking their toll as well (Obute and Osuji, 2002; Ayodele, 2005). The plant genetic resources of Nigeria, according to Gbile and Adesina (1986), are a veritable source of pharmaceuticals and therapeutics. According to WHO (2001) 80% of the world population or roughly two thirds of the world's population, rely almost exclusively on traditional medicines using natural substances mostly derived from plants in the treatment of diseases. In African countries, this rate is much higher (OMS, 1983).

All over the world, studies of the vegetation of different areas are undertaken to document the flora, especially in these days of remarkable genetic losses due to over exploitation of forests and its products (Oren et al., 2007; Uyar et al., 2007; M’endez et. al., 2008; Betti and Lejoly, 2009).

Soladoye et al. (2005) had studied the angiosperm community in the permanent site of Olabisi Onabanjo University, Ago Iwoye, Ogun State, Nigeria with the aim of conserving them for posterity especially during the development of the new University campus. They listed one hundred and thirty eight species (138) belonging to fifty-five families. There were one hundred and twenty seven dicotyledonous species while monocots were eleven. Leguminosae appeared the dominant family followed successively by Rubiaceae and Euphorbiaceae. Furthermore, they encountered fifty four trees, forty three shrubs, ten climbers, twenty eight herbs and three grasses/sedges.

Ubom (2010) documented the ethnobotanical and biodiversity conservation of plant resources in the Niger Delta Nigeria and listed about three hundred and thirty nine plant species which are used by the Niger Delta dwellers for purposes such as medicinal, food/condiments, fuel, commercial uses (fruits, beverages, timber, spices, thickeners etc). Commonest among these were Acanthus montanus, Anthocleita vogelii, A. djalonensis, Antiaris africana, Alstonia boonei, A. congoensis, Elaeis guinensis, Raphia hookeri, Dacryodes edulis, Cocos nucifera, Irvingia gabonensis, Hevea brasiliensis, Pterocarpus santalinoides, Lonchocarpus cayanescens, Milicia excelsa, Daniellia ogea, Newbouldia laevis, Napoleoona vogelii, Mimosa pigra, Nauclea diderrichii, Musanga cecropioides, Paullinia pinnata and a host of others.

2. MATERIALS AND METHODS

Study site: The proposed site for the establishment of the Botanical Garden of Ekiti State University is on 7º42’13” North, 5º15’14” East. This falls within the moist equatorial/tropical rainforest belt of Nigeria known for its rich reserve of economic and medicinal plants. The site is 1944sqm in size.

Preparation of herbarium specimens: The site was divided with the aid of geographical compass into four geographical axes i.e. the North, East, West and South. Plant parts such as leaves, flowers and fruits were collected using a secateurs and vasculum. Parts of tall trees were got using a wooden pole. These collections were made from each of the four axes and the
samples were taken, poisoned and pressed. The papers were changed daily until well dried. The dried samples were preserved in the Herbarium of Ekiti State University.

**Plant identification:** Identification was done using Flora of West Tropical Africa (Hutchinson and Dalziel, 1968); Nigerian Trees (Keay et al., 1964); Guide to West African Weeds by Akobundu and Agyakwa (1987) and Handbook of African Medicinal Plants by Iwu (1993). The plants were identified to families, genera and species.

**Plant authentication:** Authentication was done by Mr. Omotayo Felix of the Ekiti State University Herbarium Ekiti State.

**Period of research:** The research work was carried out during raining season of the months of April till August in the year 2018.

**Plant species enumeration:** Enumeration of the species was by counting on sight.

**Relative abundance:** The relative abundance of the species was reported as abundant, frequent, occasional and rare. Plants less than 5 individuals were taken as Rare while 5-10 individuals were taken as Occasional, 11-30 individuals were taken as Frequent and over 30 individuals were taken as abundant.

### 3. RESULTS

The results of the inventory have been summarized in Tables 1-6. Forty (40) different plant families comprising 101 species were identified. Their habits, relative abundance and distribution across the four (4) geographical axes were considered.

In general, the plant families identified were Acanthaceae, Amaranthaceae, Amaryllidaceae, Anacardiaceae, Apocynaceae, Aracaceae, Bignoniaceae, Clusiaceae, Combretaceae, Commelinaceae, Convovulaceae, Cucurbitaceae, Cyperaceae, Dioscoreaceae, Euphorbiaceae, Fabaceae, Icacinaceae, Lecythidaceae, Loganiaceae, Loranthaceae, Malvaceae, Marantaceae, Melastomataceae, Moraceae, Musaceae, Onagraceae, Passifloraceae, Poaceae, Portulacaceae, Rubiaceae, Sapindaceae, Simaroubaceae, Solanaceae, Spigeliaceae, Sterculiaceae, Thelypteridaceae, Tiliaceae, Ulmaceae and Vitaceae (Table 1).

Asystasia gangetica, Indigofera hirsuta, Sida garckeana, Brachiaria spp. And Panicum maximum were abundant in the proposed site. Contrariwise, the rare species were Amaranthus spinosus, Anacardium occidentale, Mangifera indica, Pseudospondias microcarpa, Alstonia boonei, Rauwolfia vomitoria, Newbouldia laevis, Spathodea campanulata, Harungana madagascariensis, Combretum racemosum, Quisqualis indica, Aneleima spp, Commelina spp, Lepistemon owariensis, Mariscus alternifolius, Dioscorea cayennensis, Dioscorea esculenta, Acalypha indica, Alchornea cordifolia, Ricinodendron heudelotii, Albizia ferginea, Baphia nitida, Brachystegia eurycoma, Dalbergia saxatilis, Dialium guineense, Dioeclea reflexa, Lonchocarpus cyanescens, Lonchocarpus sericous, Piptadeniastrium, africanum, Pterocarpus santalinoides, Icacinia tricantha, Napoleona vogeli, Anthocheista djalonensis, Anthocheista vogeli, Tapinanthus dodoneifolius, Hibiscus spp., Marantochloa spp, Ficus exasperate, Ficus microsco, Ficus sur, Milicia excels, Musa spp, Adenia cissampeloides, Bambusa vulgaris, Olyra latifolia, Opisimenus burmannii, Portulaca quadridita, Sarcoccephalus latifolius, Blighia sepida, Lecaniodiscus cupaniodes, Quassia undulate, Corchorus olitorius, Glyphea brevis, Trema orientalis, Cissus spp. and Cissus quadrangularis. Similarly, the frequent species were
Aspilia africana, Chromolaena odorata, Tithornia diversifolia, Ipomea involucrata, Scleria verrucosa, Euphorbia heterophylla, Centrosema pubescens, Gliricidia sepium, Sida rhombifolia, Urena lobata, Chloris pilosa, Paspalum notatum, Talinum fruticosum, Chassalia kolly, Spigelia anthelmia, Sterculia tragacantha and Pneumatopteris afr. Furthermore, the occasional species were Crinum glaucum, Spondias mombin, Elaeis guineensis, Vernonnia amygdalina, Momordica charantia, Dioscorea rotundata, Alchornea laxiflora, Margaritaria discoidea, Albizia zygia, Tapinanthus bangwensis, Melastomastrum capitatum, Antiaris toxicaria, Ludwigia abyssinica, Adenia lobata, Passiflora foetida, Macroshyra longistyila, Allophylus africanus, Deinbollia pinnata, Paullinia pinnata, Capsicum frutescens, Triumfetta cordifolia, Triumfetta rhomboidea and Cissus aralioides.

Some of the economic and medicinal plants noted at the proposed site were Adenia cissampeloides, Adenia lobata, Amaranthus spinosus, Aneilema spp., Aspilia africana, Asystasia gangetica, Brachiaria spp., Capsicum frutescens, Centrosema pubescens, Chloris pilosa, Chromolaena odorata, Combretum racemosun, Commelina spp., Corchorus olitorius, Dalbergia saxatilis, Dioscorea cayenensis, Dioscorea esculenta, Dioscorea rotundata, Euphorbia heterophylla, Hibiscus spp., Icacinia tricantha, Indigofera hirsuta, Ipomea involucrata, Lepistemon owariensis, Maranthochloa spp., Melastomastrum capitatum and Mormodica charantia (Table 2).

Table 1. Plant species at the proposed site and their relative abundance.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Family name</th>
<th>Botanical name &amp; authority</th>
<th>Common name</th>
<th>Abundance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Acanthaceae</td>
<td>Asystasia gangetica. L. T. Anderson</td>
<td>Asystasia</td>
<td>Abundant</td>
</tr>
<tr>
<td>2</td>
<td>Amarantheceae</td>
<td>Amaranthus Spinous. L.</td>
<td>Spiny Amaranth</td>
<td>Rare</td>
</tr>
<tr>
<td>3</td>
<td>Amaryllidaceae</td>
<td>Crinum Glaucum A. Chev</td>
<td>Bulbulias Crinum</td>
<td>Occasional</td>
</tr>
<tr>
<td>4</td>
<td>Anacardiaceae</td>
<td>Anacardium occidentale. L. Mangifera Indica. L.</td>
<td>Cashew tree</td>
<td>Rare</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pseudospondias microcarpa. (A. Rich.) Engl.</td>
<td>Mango Tree</td>
<td>Rare</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spondias Mombin. L.</td>
<td>False spondias</td>
<td>Rare</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yellow mombin</td>
<td>Occasional</td>
</tr>
<tr>
<td>5</td>
<td>Apocynaceae</td>
<td>Alstonia Boonei Rauvaltia vomitoria Afzel.</td>
<td>Cheese wood</td>
<td>Rare</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Poison devil’s pepper</td>
<td>Rare</td>
</tr>
<tr>
<td>6</td>
<td>Arecaceae</td>
<td>Elaeis guineensis. Jaca</td>
<td>African oil palm</td>
<td>Occasional</td>
</tr>
<tr>
<td>7</td>
<td>Asteraceae</td>
<td>Aspilia Africana. Pers. C. D Adams</td>
<td>Wild sunflower</td>
<td>Frequent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chromolaena odorata. L. R.M. King &amp; H. Rob</td>
<td>Siam weed</td>
<td>Frequent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tithornia diversifolia Hemsl. A. Gray</td>
<td>Mexican sunflower</td>
<td>Frequent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vernonia amygdalina. Del.</td>
<td>Bitter leaf</td>
<td>Occasional</td>
</tr>
</tbody>
</table>
| 8 | Bignonaceae | *Neubouldia laevis.* P. Beauv  
*Spathodea campanulata* | Chieftaincy leaf  
African tulip tree | Rare  
Rare |
| 9 | Clusiaceae | *Harungana medagascariensis.* Lam. Ex poir. | Dragon’s blood tree | Rare |
| 10 | Combretaceae | *Combretum racemosum.* P. Beauv  
*Quisqualis indica.* Linn. | Christmas rose  
Rangoon creeper | Rare  
Rare |
| 11 | Commelinaceae | *Aneilema ssp.* R. Br.  
*Commelina spp.* L. | Aneilema  
Day flower | Rare  
Rare |
| 12 | Convolvulaceae | *Ipomoea involucrate.* P. Beauv  
*Lepistemon owariensis.* P. Beauv.  
Hallier. F ex De wild | Frog’s gourd  
lepietemon | Frequent  
Rare |
| 13 | Cucurbitaceae | *Momordica charantia.* L. | Bitter melon | Occasional |
| 14 | Cyperaceae | *Mariscus alternifolius.* Vahl.  
*Scleria verrucosa.* Wild. | Mariscus  
Rice weed | Rare  
Frequent |
| 15 | Dioscoreaceae | *Dioscorea cayenensis.* Lam.  
*Dioscorea esculenta.* Lour.  
*Dioscorea rotundata.* Poir. | Yellow yam  
Potato yam  
White yam | Rare  
Rare  
Occasional |
| 16 | Euphorbiaceae | *Acalypha indica.* L.  
*Alchornea cordifolia.* (Schum. &  
Thornn.) Mull.-Arg  
*Alchornea laxiflora.* Benth. Pax  
& K. Hoffm.  
*Euphorbia heterophylla.* L.  
*Margaritaria discoidea.* (Baill.)  
G.L. Webster.  
*Ricinodendron heudelotii.* Baill. | Indian acalypha  
Christmas bush  
Lowveld bead-string  
Milk weed  
Pheasant berry/  
margaritaria  
African nut-tree | Rare  
Rare  
Occasional  
Frequent  
Occasional  
Rare |
| 17 | Fabaceae | *Albizia feruginea.* Guill. & Perr.  
*Albizia zygia.* DC. JF Macbride.  
*Baphia nitida.* Lodd.  
*Brachystegia eurycoma.* Harms.  
*Centrosema pubescens.* Benth.  
*Dalbergia saxatilis.* Hook. F.  
*Dialium guineense.*willd. F.  
*Dioclea reflexa.* Hook. F.  
*Gliricidia sepium.* (Jacq.) Walp.  
*Indigofera hirsuta.* Linn.  
*Lonchocarpus cyanescens.* (Schum. Thonn.) Benth.  
*Lonchocarpus sericeus.* (Poir.)  
HB & K  
Piptadenastrum africanum.  
(Hook. F.) Brenan.  
Pterocarpus santalinoides.  
L’Herit. Ex DC. | Albizia  
West African walnut  
Camwood  
Naga wood  
Butterfly pea  
Dalbergia  
Black timber  
Marble plant  
Quick stick  
Hairy indigo  
Yoruba indigo  
Senegal lilac  
African greenheart  
Pterocarpus | Rare  
Occasional  
Rare  
Rare  
Frequent  
Rare  
Rare  
Frequent  
Abundant  
Rare  
Rare  
Rare  
Rare |
| 18 | Icacinaceae | *Icacina tricantha*. Oliv. | Icacina | Rare |
| 19 | Lecythidaceae | *Napoleona vogelli*. Hook. & Planch. | Napoleona | Rare |
| 20 | Loganiaceae | *Anthocleista djalonensis*. A. Chev.  
*Anthocleista vogelli*. Planch. | Cabbage tree  
Cabbage tree | Rare  
Rare |
| 21 | Loranthaceae | *Tapinanthus bangwensis*. Engl. & Krause.  
*Tapinanthus dodoneifolius*. (DC.) Danser | African mistletoe  
African mistletoe | Occasional  
Rare |
| 22 | Malvaceae | *Hibiscus sabdarifa*. L.  
*SIDA garckeana*. Polak.  
*SIDA rhombifolia*. L.  
*Urena lobata*. Linn. | Wild Hibiscus  
Wire weed, iron weed  
Broom jute  
Caesar weed | Rare  
Abundant  
Frequent  
Frequent |
| 23 | Marathaceae | *Marantochloa spp.* Brongn. ex Gris. | Maranthochloa | Rare |
*Ficus exasperata*. Vahl.  
*Ficus mucoso*. Welw.  
*Ficus sur*. Forssk.  
*Milicia excelsa*. (Welw.) C.C. Berg. | False iroko/upas tree  
Native sand paper tree  
The ‘Oguro’ tree  
Cape fig  
African teak/Iroko tree | Occasional  
Rare  
Rare  
Rare  
Rare |
| 26 | Musaceae | *Musa spp*. L. | Banana/plantain | Rare |
| 27 | Onagraceae | *Ludwigia abyssinica*. A. Rich | Ludwigia | Occasional |
| 28 | Passifloraceae | *Adenia cissampeloides*. (Planch.) Harms ex Hook  
*Adenia lobata*. (Jacq.) Engl.  
*Passiflora foetida*. L. | Wild granadilla/monkey rope  
Adenia  
Stinking passion flower | Rare  
Occasional  
Occasional |
| 29 | Poaceae | *Bambusa vulgaris*. (Schrad.)  
*Brachiaria mutica*. (Irwin) Griseb.  
*Chloris pilosa*. Schumach. & Thonn.  
*Olyra latifolia*. L.  
*Oplismenus burmannii*. (Retz.) P. Beauv.  
*Panicum maximum*. Jacq.  
*Paspalum notatum*. Flugge. | Common bamboo  
Brachiaria grasses  
Chloris  
Carrycillo  
Burmann’s basket grass  
Buffalo grass  
Bahia grass | Rare (at least 300 per stand)  
Abundant  
Frequent  
Rare  
Rare  
Abundant  
Frequent |
<table>
<thead>
<tr>
<th>S/N</th>
<th>Botanical name &amp; authority</th>
<th>Local name (Yoruba)</th>
<th>Uses (economical &amp; medical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Albiza feruginea</em> (Guill. &amp; Perr.) Benth.</td>
<td>Ayinre ogo</td>
<td>It is used in preparing arrow poison. Saponin in leaves are used as fish poison</td>
</tr>
</tbody>
</table>

**Table 2.** Uses of plant species at the site and their local names.
<table>
<thead>
<tr>
<th></th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Use and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td><em>Alstonia boonei</em> De Wild.</td>
<td>Awun</td>
<td>Shoot is used in treating respiratory diseases</td>
</tr>
<tr>
<td>3</td>
<td><em>Bambusa vulgaris</em> Schrad.</td>
<td>Oaprun</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><em>Blighia sepida</em> K. D. Koenig.</td>
<td>Ishin</td>
<td>It is used in treating sores and boils</td>
</tr>
<tr>
<td>5</td>
<td><em>Lonchocarpus cyanescens</em> Schum. &amp; Thonn.</td>
<td>Elu</td>
<td>The bark is used as a laxative. The stem is used in furniture making</td>
</tr>
<tr>
<td>6</td>
<td><em>Lonchocarpus sericeus</em> (Poir.) HB &amp; K</td>
<td>Ekikan-uro</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td><em>Milicia excelsa</em> (Welw.) C.C. Berg.</td>
<td>Igi iroko</td>
<td>It is an economical wood tree</td>
</tr>
<tr>
<td>8</td>
<td><em>Neubouldia laevis</em> P. Beauv</td>
<td>Iruru, Akoko</td>
<td>Used in treating eye infection</td>
</tr>
<tr>
<td>9</td>
<td><em>Piptadinastrum africanum</em> (Hook.f) Bernan</td>
<td>Abonyin</td>
<td>Use in treating headaches and toothache. Source of valuable timber</td>
</tr>
<tr>
<td>10</td>
<td><em>Pseudospondias microcarpa</em> A. Rich</td>
<td>Ikanyere</td>
<td>Used in beads making Bark is used in treating eye ailments</td>
</tr>
<tr>
<td>11</td>
<td><em>Anthocleista djalonesis</em> A. Chev</td>
<td>Sapo, Alaara</td>
<td>Used in treating skin infection and general pain.</td>
</tr>
<tr>
<td>12</td>
<td><em>Anthocleista vogelli</em> Planch</td>
<td>Apa-oro, alapara</td>
<td>Used in treating skin infection and general pain.</td>
</tr>
<tr>
<td>13</td>
<td><em>Antiaris toxicaria</em> Lesch.</td>
<td>Ooro</td>
<td>Fruit is edible Bark is medicinal</td>
</tr>
<tr>
<td>14</td>
<td><em>Elaeis guineensis</em> Jacq.</td>
<td>Igi ope</td>
<td>Used economically in producing palm oil and soap. Used medicinally in treating malaria</td>
</tr>
<tr>
<td>15</td>
<td><em>Mangifera indica</em> L.</td>
<td>Igi mangoro</td>
<td>Bark is used in treating dysentery</td>
</tr>
<tr>
<td>16</td>
<td><em>Pterocarpus santalinoides</em> (L’Herit). ex DC</td>
<td>Gbengbe</td>
<td>Harvested from the wild for food and medicinal preparation</td>
</tr>
<tr>
<td>17</td>
<td><em>Quassia undulata</em> (Guill. &amp; Perr.) D. Dietr.</td>
<td>Igi efo</td>
<td>Used in treating fever</td>
</tr>
<tr>
<td>18</td>
<td><em>Riccinodendron heudelotti</em> Baill.</td>
<td>Erinmado</td>
<td>Edible oil is extracted from the seed</td>
</tr>
<tr>
<td>19</td>
<td><em>Spathodea companulata</em> P. Beaiv.</td>
<td>Akoko</td>
<td>Used in treating chronic ulcer and also for skin eruption.</td>
</tr>
<tr>
<td>20</td>
<td><em>Alchornea cordifolia</em> (Schum &amp; Thonn) Mull.-Arg</td>
<td>Ewe Ifa</td>
<td>Used in the production of black dye. Used in treating hypertension</td>
</tr>
<tr>
<td>21</td>
<td><em>Alchornea laxiflora</em> (Benth.) Pax &amp; K. Hoffm.</td>
<td>Esinyin</td>
<td>Used in treating infectious disease. Branch is used as chewing stick (local tooth brush)</td>
</tr>
<tr>
<td>22</td>
<td>Anacardium Occidentale L.</td>
<td>Kasu</td>
<td>Used in treating stomach ache.</td>
</tr>
<tr>
<td>23</td>
<td>Baphia nitidia Lodd.</td>
<td>Iyerosun</td>
<td>Roots are used in making red dye. It is used as an ornamental shade.</td>
</tr>
<tr>
<td>24</td>
<td>Cissus aralioides (Welw.) Planch.</td>
<td>Adapopo</td>
<td>Fruits is edible raw or cooked.</td>
</tr>
<tr>
<td>25</td>
<td>Cissus quadrangularis L.</td>
<td>Ogbakiko</td>
<td>Used medically for obesity, diabetes and heart diseases.</td>
</tr>
<tr>
<td>26</td>
<td>Cissus quadrangularis Linn.</td>
<td></td>
<td>Use for treatment of bone diseases and joint pains.</td>
</tr>
<tr>
<td>27</td>
<td>Dialum guineense Willd.</td>
<td>Iredi</td>
<td>Bark and leaves are medicinal. It is a source of useful timber.</td>
</tr>
<tr>
<td>28</td>
<td>Ficus exasperata Vahl.</td>
<td>Opoto nla</td>
<td>An economic wood tree</td>
</tr>
<tr>
<td>29</td>
<td>Ficus Mucoso Welw.</td>
<td>Opoto</td>
<td>An economic wood tree</td>
</tr>
<tr>
<td>30</td>
<td>Ficus sur Forssk.</td>
<td>Opoto igbo</td>
<td>An economic wood tree</td>
</tr>
<tr>
<td>31</td>
<td>Gliricidia sepium (Jacq) Walp.</td>
<td>Agunmaniye</td>
<td>Cures bruises and burns</td>
</tr>
<tr>
<td>32</td>
<td>Glyphaea brevis (Spreng) Monachino</td>
<td>Atorin</td>
<td>Stem bark is used in wound dressing.</td>
</tr>
<tr>
<td>33</td>
<td>Harungana madagascariensis Lam. Ex Pior</td>
<td>Adidun, Arunje</td>
<td>Leaf is used in treating dysentery. Bark used in treating leprosy.</td>
</tr>
<tr>
<td>34</td>
<td>Lecaniodiscus cupanioides Planch</td>
<td>Okika</td>
<td>Used in medically for treating fever.</td>
</tr>
<tr>
<td>35</td>
<td>Margaritaria discoidea (Baill.) G.L. Webster.</td>
<td>Awe</td>
<td>Wood is used locally mainly for poles, planks and shingles.</td>
</tr>
<tr>
<td>36</td>
<td>Mariscus alternifolius Vahl.</td>
<td>Alubosa eranko</td>
<td>Use as insecticides, treatment of wounds.</td>
</tr>
<tr>
<td>37</td>
<td>Musa spp. L.</td>
<td>Ogede</td>
<td>Used in the treatment of epilepsy. It is a food crop.</td>
</tr>
<tr>
<td>38</td>
<td>Napoleona vogelli Hook &amp; Planch</td>
<td>Ito or Gbogbori</td>
<td>Leaf, bark, and fruit rind are used in treating cough and cartarrh.</td>
</tr>
<tr>
<td>40</td>
<td>Spondias mombin L.</td>
<td>Iyeye</td>
<td>Used to treat infertility</td>
</tr>
<tr>
<td>41</td>
<td>Adenia cissampeloides (Planch.) Harms.ex Hook</td>
<td>Arokeke</td>
<td>Used in treating wounds.</td>
</tr>
<tr>
<td>42</td>
<td>Adenia lobata (jacq) Engl.</td>
<td>Ajadigi</td>
<td>Leaves are prepared as soup to treat fever. Other part are also used in preparing treatments for gastrointestinal problems, cough and malaria.</td>
</tr>
<tr>
<td>43</td>
<td><em>Amaranthus spinosus</em> L.</td>
<td>Tete elegun</td>
<td>Root is an effective diuretic. Decoction of roots is used to treat gonorrhea, excessive menstruation, snake bite etc.</td>
</tr>
<tr>
<td>44</td>
<td><em>Aneilema acuminatum</em> R.Br.</td>
<td>Itopere</td>
<td>Used in treating skin disorders.</td>
</tr>
<tr>
<td>45</td>
<td><em>Aspilia africana</em> Perss.</td>
<td>Yunriyun</td>
<td>Used in treating injuries.</td>
</tr>
<tr>
<td>46</td>
<td><em>Asystasia gangetica</em> (L.)</td>
<td>Sekeri</td>
<td>Leaves are eaten as vegetables. It is used in management of asthma</td>
</tr>
<tr>
<td>47</td>
<td><em>Brachiaria mutica</em> (Trin.)</td>
<td></td>
<td>It is cultivated for forage</td>
</tr>
<tr>
<td>48</td>
<td><em>Capsicum frutescens</em> Linn.</td>
<td>Ata were</td>
<td>Fruit, raw or cooked is hot and used for flavoring. It is used medicinally as gastrointestinal detoxifiers</td>
</tr>
<tr>
<td>49</td>
<td><em>Centrosema pubescens</em> Benth.</td>
<td>Ewa ahun</td>
<td>It is widely used as forage and a good source of protein to cattle.</td>
</tr>
<tr>
<td>50</td>
<td><em>Chloris pilosa</em> schumach &amp; Thonn.</td>
<td>Gbegisono</td>
<td>It is widely used for forage</td>
</tr>
<tr>
<td>51</td>
<td><em>Chromolaena odorata</em> L.</td>
<td>Akintola, awolowo</td>
<td>Leaf is used in treating dysentery</td>
</tr>
<tr>
<td>52</td>
<td><em>Combretum racemosun</em> P.Beauv.</td>
<td>Ogan-ibule</td>
<td>It is used in wound dressing</td>
</tr>
<tr>
<td>53</td>
<td><em>Commelina spp.</em> L.</td>
<td>Ileke opolo</td>
<td>It is a medicinal herb. Dye obtained from petals are used in painting.</td>
</tr>
<tr>
<td>54</td>
<td><em>Corchorus olitorius</em> Linn.</td>
<td>Ewedu</td>
<td>It is an edible vegetable. It is used medicinally as a blood purifier.</td>
</tr>
<tr>
<td>55</td>
<td><em>Dalbergia saxatilis</em></td>
<td>Elemoso</td>
<td>It is used in treating of cough, small pox and toothache</td>
</tr>
<tr>
<td>56</td>
<td><em>Dioscorea cayenensis</em> Lam.</td>
<td>Isu olo</td>
<td>It is a food crop. It is used as an anti-diarrhea</td>
</tr>
<tr>
<td>57</td>
<td><em>Dioscorea esculenta</em> Lour.</td>
<td>Isu ewura</td>
<td>Tuber is used as food</td>
</tr>
<tr>
<td>58</td>
<td><em>Dioscorea rotundata</em> Poir.</td>
<td>Kukundu</td>
<td>Tuber is used as food</td>
</tr>
<tr>
<td>59</td>
<td><em>Euphorbia heterophylla</em> L.</td>
<td>Egele</td>
<td>It is taking as purgative and laxative to treat stomach ache and constipation.</td>
</tr>
<tr>
<td>60</td>
<td><em>Hibiscus sabdariffa</em> L.</td>
<td>Abiskosi igbo</td>
<td>Flowers and other parts of plant are used to make medicine for conditions such as high blood pressure, high cholesterol and many others.</td>
</tr>
</tbody>
</table>
4. DISCUSSIONS

Ekiti State University is the only State-owned University in the State and has not got a Botanical Garden since inception. Recently, it got a proposed site.

Before it commences operation, the present researcher taught it wise to carry out a preliminary inventory of the vegetation at the site proposed for the establishment of the garden. This is with a view to providing baseline information about the site that would be useful for the day to day research and impact assessment activities in the garden.

Given the results of the present inventory, it suffices to infer that, the proposed site is a secondary forest that has suffered less from anthropogenic and agronomic impacts. The number of families, genera and species of plants captured in the present inventory makes the site recommendable for the establishment of a Botanical garden. This is because the plant resources/diversity characteristic of the site are assets for academic activities such as teaching and research in the fields of plant taxonomy, plant morphology, plant conservation, plant ecology, ethno-botany and horticulture. It will also be a useful source of raw materials for the management of the university herbarium. These assertions are in line with those of Wyse and Peter (1999), Hardwick et. al., (2011), Williams (2011) and Spencer and Cross (2017).

When fully established, it is expected that education programs that could create awareness of the threat to earth’s ecosystems from human overpopulation and its consequent need for biological and physical resources would be floated among others. This opinion supports the ones made by Heywood (1987) that Botanical gardens provide an excellent medium for communication between the world of botanical science and the general public. And that, education programs can help the public develop greater environmental awareness by understanding the meaning and importance of ideas like conservation and sustainability.
The presence of a gentle flowing stream at the proposed site would assist, to a large extent, the horticultural activities that will likely be taking place at the garden such like the raising of ornamental plants, tendering of medicinal plants and vegetable seedlings, establishment of screen house e.t.c. These proposed tasks laid ahead of the operations of the garden are worthwhile as these are part of the activities in well managed botanical gardens such as the Royal Botanical Gardens, Kew, England; Jardim Botanico, Rio de Janeiro, Brazil; Brooklyn Botanic Garden, New York, United States; Singapore Botanic Garden, Singapore; Berlin-Dahlem Botanical Garden and Botanical Museum, Berlin, Germany; Kirstenbosch National Botanical Garden, Cape Town, South Africa; Montreal Botanical Garden, Montreal, Canada; Nong Nooch Tropical Botanical Garden, Chonburi Province, Thailand; Denver Botanic Gardens, Denver, United States and Acharya Jagadish Chandra Bose India Botanic Garden, Kolkata, Indian.

Based on the results of the present inventory, it suffices to point out that the proposed site for the Botanical Garden is rich in species notable for medicinal values. Examples of some of the medicinal plants are Vernonia amygdalina, Melastomastrum capitatum, Mormodica charantia, Chromolaena odorata, Combretum racemosum, Dalbergia saxatilis, Corchorus olitorius, Adenia lobata, Alstonia boonei, Piptadeniastrum africanum, Pseudospondias microcarpa, Lonchocarpus cyanescens, Antiaris toxicaria etc. The task of conserving these medicinal plants also lies ahead of the operation of the proposed garden.

Also worthy of report is the occurrence of economic trees in the proposed site. Examples are Elaeis guineensis, Mangifera indica, Riccinodendron heudelotti, Ficus exasperata, Dialum guineense, Ficus mucoso, Ficus sur, Margaritaria discoidea, Alcornea laxiflora, e.t.c. These could be conserved for useful purposes.

5. CONCLUSION

The preliminary inventory of the vegetation of the site of the proposed botanical garden has been produced. Hence, the need for sustainable development of the site and conservation of the species in order to meet the standard of top best ten botanical gardens of the world should be the goal of the management of the garden. It will be commendable if more species of plants are tendered and added to the existing ones and the size of the garden enlarged in the nearest future.

References


