

## THE CHANGING ROLE OF BOTANIC GARDENS AND THE EXPERIENCE FROM ABROAD AND POSSIBILITIES FOR ETHIOPIA

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**ABSTRACT:** Ethiopia is trying to establish botanic gardens with the first one in place being the recently inaugurated Gullele Botanic Garden in Addis Abeba. In order to develop this newly established garden as well as any other future botanic garden, Ethiopia needs to gather information from the experience of other botanic gardens that have been on the scene for many years. An attempt is here made to review the origin, role and status of botanic gardens of the world. The published literature on gardens is enormous and begins with what are known as ancient gardens and continues with formal gardens. A cursory look into this literature is made. Emphasis is particularly placed on the changing role of botanic gardens in the major population centers of the world, its impact on the lives of people and what Ethiopia can learn from their experience. Although not covered in as much depth in the literature as botanic gardens, other types of gardens, i.e., the home, urban, or community gardens, as special gardens, and “Liberty and Victory gardens,” as emergency situation gardens, are discussed. Home gardens are not new in Ethiopia, but victory gardens, instituted in Europe and America to ward off starvation during the First and Second World Wars could be established in the country as emergency or instructive measures during times of food scarcity or shortage.

**Key words/phrases:** Botanic Garden, Ethiopia, Gullele, History, Importance, Possibilities, Role.

### INTRODUCTION

In order to know about the modern day botanic garden, it is necessary to understand the history and the factors that allowed its establishment and progress. An attempt is made to outline the origin and subsequent development of botanic gardens through the years. Because of the vastness of the subject, only the major events and developments starting from ancient (Egyptian, Greek and Roman gardens), mediaeval (Europe and Asia) to recent times are highlighted. This is followed by an account of the types of research as well as other activities currently performed by or in the major botanic gardens. The authors' experience from visiting and, to a certain extent also, from working in some of the major botanic gardens and associated facilities (herbaria, green houses) of the world since 1975 is

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reflected in this account. Based on the observations made in these institutions in the last thirty five years and also the changes being made by some of them, the author presents a set of recommendations for gradual implementation by concerned authorities in Ethiopia when attempting to establish botanic garden or gardens.

## **Origin and kinds of gardens**

### **Ancient gardens: Paradise gardens**

Paradise gardens, according to Wethered (1933: 1-8) are the “most ancient of gardens” and the formal garden “made its appearance in Egypt centuries before it became established in Europe” and to understand paradise gardens, he wrote, we need to look at Greek mythology:

We must revert to the age of make-believe in which moderns must be admitted to be less proficient than were the ancients. After all, make-believe is an indispensable occupation of the imagination in all periods of life, and it was especially so before science supplied us with accumulating and material facts. Poetry preceded science, and mimic worlds had to be created in the imagination before astronomical science opened up vaster spheres and deprived us of many delightful fallacies. ...

Mythological paradises therefore show how fully the art of make-believe was understood and enjoyed. Until the seventh century B.C., the fairy tales of Greece were a collection of literary inventions founded partly on tradition and partly on the inventive genius of Homer. ..

Greek mythology treated the processes of nature poetically by presenting the first earthly garden (or paradise) as constituting a Golden Age in which truth and right, innocence and happiness reigned together and were universal. The earth brought forth all that was necessary for the use of man without the labour of ploughing. It was a garden of universal spring. Flowers grew without the agency of seed, and rivers flowed with milk mingled with the honey distilled from the leaves of the oaks ... Life was one perpetual holiday...

But the garden of Eden is by general consent the great classic example of all paradises (p. 8). The most modern of all the paradises connected with religion in the East is that of Mohammed, which is pictured as a celestial region ... (p. 10).

While the paradise garden of Mohammed offered “... contemplative idleness” to its followers, that of the western world “... was drawn towards

the definite, the practical and the realistic. It sought to build on a material and solid base” (Wethered, 1933: 11). Hence, all the poets of the day painted the picture of a paradise garden as one located on “... high ground, with wide prospects over the surrounding country, carrying with it the religious atmosphere with which all high places have been associated from the earliest times” (Wethered, 1933: 12).

### **Formal gardens**

Although not clearly spelt out in the literature, the origin of botanic gardens seems to lie within what are generally described as formal gardens. Formal gardens are here grouped into three types: individual, public and private. In the following discussion, emphasis will be placed on gardens that started as private in Europe and developed into the modern botanic gardens. However, brief notes on individual and private gardens in Greece and Iran are also provided.

In some of the early literature, the distinction between gardens and botanic gardens is not clearly established. However, all gardens seem to share two important features, i.e., symmetry and shape. In order to understand the meanings that gardens convey to people, a conference organized in 1987 came up with the view that they “...can only be understood today as a whole, as an ecology of interrelated and connected thoughts, spaces, activities, and symbols (Francis and Hester, 1990).

In his book “The Art of Gardening through the Ages” Wengel (1987) described [botanic] gardens starting from the “Gardens of the Pharaohs” and up to those of the “villa gardens and public parks” of today. In describing the first garden, Wengel (1987: 10) wrote “we find the first description of a garden in the tomb of Methen, a viceroy of King Sneferu (ca. 2600-2576 B.C.).” He also wrote that the oldest gardens were probably orchards, vineyards and vegetable gardens and that during 1580 - 945 B.C., “... there was more systematic arrangement and grouping of different plants” (Wengel, 1987: 10) Among the plants depicted on the tomb walls were trees of tamarisks [*Tamarix*], on the tomb of Osiris (God of the Dead) and frankincense [*Boswellia*], on the burial temple of the Egyptian Queen Hatshepsut. The later plant, obtained from present day Ethiopia or Somalia, probably represents the first attempt at long distance and cross-border plant introduction, a practice soon to be emulated by the whole of Europe. The layout of Egyptian gardens was either a square or a rectangle and this plan was followed by the Greeks and the Romans with changes made to the types of plants grown, i.e., fig, olive, vine, pear, apple.

**Individual gardens.** The first written evidence about formal gardens in Greece comes from the description provided by Homer in the 8<sup>th</sup> century B.C. (Wengel, 1987: 31). The ancient Greeks had only wooded groves where they were also growing fruit trees, vines and vegetables. Some of the plants mentioned are: fig, olive, pear, grape, apple, pomegranate, plum, cherry, myrtle, and nymphaea. The purpose of these gardens, according to Wethered (1933: 23) is "... to be the sanctuary of the living" and they "... were conceived either to keep unseen presences in or to keep them out." People wanted to keep the spirits of the dead in enclosed areas "... to ensure against their wandering abroad and interfering unduly with the lives of the living." So, the churchyard or the ceremonial tomb was the ancient garden. Plants and particularly flowers symbolized spiritual associations or connections with the past. In many burial places in the past as well as today, there are barriers to the sites and they are strictly protected or supervised.

**Public gardens.** In Greece, the change to an ornamental garden type with much vigor than hitherto happened with the construction of what are known as public gymnasia (in the 5<sup>th</sup> century B.C.) where games and competitions took place. These gymnasia were of various designs and sizes and the plans were soon adopted in Rome, e.g., the circular Temple of Vesta at Tivoli, an ancient Italian town, ca. 30 km from Rome. The plants in and around the gymnasia, then considered public gardens, were also of differing designs and sizes. It is reported that the art of gardening in Rome began declining starting in 476 A.D. and lasting until about 1476 A.D. This coincided with the fall of the Western Roman Empire. The gardening culture was, however, maintained in the Eastern Roman Empire until its conquest by the Turks in 1453.

**Private gardens.** The educated or "well-bred" class in Greece, as it is categorized in the literature, was dissatisfied with public gardens and started erecting its own gardens. These types of garden are known as "philosopher's gardens" and were the only private gardens in Greece then as "the democratic principles underlying Greek government precluded any such luxurious houses with gardens or grounds" (Wengel, 1987: 45).

The ruins of the earliest surviving garden, dating to 550 B.C., and built by Cyrus the Great, are found on the plains of Marydasht, in present day southern Iran (Hobhouse *et al.*, 2004). The plan incorporates architecture, trees, herbs, water rills and shade-giving pavilions. This plan seems to offer the background to all later garden developments in the Middle East and India. Thus, the Persian gardens with their fountain traditions, coloured

glazed tiles and summer houses and the well sculptured Roman gardens which emulated them were considered superior to those built in Greece as they combined utilitarian properties with aesthetic qualities.

### **The Mediaeval gardens**

During the Mediaeval period, gardens known as “kitchen gardens,” maintained by monks in monasteries, were “regarded as the main bearers of a newly developing cultural phase” of gardening (Wengel, 1987: 54). Often vegetable gardens were interspersed between graveyards which also served as orchards with apple, pear, plum, laurel, sweet chestnut, pine, fig, peach, hazelnut, almond, mulberry, etc., as the main fruit trees. The vegetable gardens were called herb gardens or *herbarium* while the medical-herb gardens were called *herbularis*. Both of these consisted of “medical plants and kitchen herbs” and the following were among the species growing there: onions, leek, coriander, dill, poppy, garlic, shallots, parsley, lettuce, cabbage, carrots, sage (*Salvia officinalis* L.), rue (*Ruta graveolens* L.), southern wood (*Artemisia abrotanum* L.), gourd (*Cucurbita lagenaria* L.), the melon (*Cucumis melo* L.), wormwood (*Artemisia absinthium* L.), common mugwort (*Artemisia vulgaris* L.), fennel (*Foeniculum vulgare* L.), mentha (*Mentha piperita* L.), celery (*Apium graveolens* L.), radish (*Raphanus sativus* L.).

These activities emboldened the monks to write descriptions of the plants that they were growing and also poems about them. Hence books, called *herbals*, started appearing around 1410 A.D. The monastery gardens gradually transitioned in to castle gardens or pleasure gardens. Increasing trade, development of the art of book printing and growth of the middle class led to the proliferation of herbal books with pictures of medicinal and aesthetic plants. Small gardens gave way to larger and more diversely populated gardens with these mostly established as a show piece of status. With the rise of the middle class the monasteries gradually also lost their educational monopoly and the art of gardening became the hobby of the rich merchants and scholars. Higher educational institutions, then called Colleges, which focused on increasing the knowledge about plants began to encourage the construction of botanic gardens, e.g., Salerno in 1330, Venice in 1333, Prague in 1350, Padua in 1545, etc.

After the fall of the Roman Empire in 476 A.D., many authors write that there was a decline in the art of gardening in Europe with the exception of that in Spain which was partly ruled by the “Arabs and the North African Moors” for nearly 800 years. According to Wengel (1987: 51), “during this

period, they [the Arabs] created artistic garden establishments which still remain living proof of a high and original culture, to this very day.” The Arabs had also introduced the art of terraced gardens with water rushing through halls and courts and pouring over cascades. The Arabs introduced such ornamental plants as Jasmine, oleander, violets, narcissi, red roses, white lilies, blue iris, mallows, water-lilies, marguerites, poppies, lavender and lupines and aromatic plants as thyme and mint. Myrtle and laurel were also planted as pot or decorative plants.

Ancient China, like Greece, had gardens only as groves with trees. One of the oldest groves lies around the tomb of the philosopher Confucius (551-478 B.C.). In respect to their beloved philosopher, the Chinese built similar temples and memorials in other towns and planted similar trees. The Chinese art of gardening differs from that of the European due not only to the differing topography of the land but also due to their distinctive expressions of nature. The Chinese express gardens as a miniature of the natural world around them with everything copied as if “untouched by the human hand.” Animals and islands, for example, were portrayed in their garden plans by stones. Stones were used as symbols of the infinite or immortality. Lake and island gardens were popular schemes. Painting on silk also became popular with lotus, magnolia, chrysanthemums, plums, peaches, almonds, apricots appearing in many of them (Cowell in Wengel, 1987: 188). In China, during the Ming Dynasty, which lasted until 1644, gardens “tended towards romance and sentimentality and had plenty of stones” (Wengel, 1987: 201). Gardening in China, however, remained unchanged and consisted of mountains, stones, buildings, flowers and trees.

Unlike the Chinese gardens, “flowers are not very widely represented in Japanese gardens” while the design and quality of the gardens in India “leaned towards the Persian style” (Wengel, 1987: 207). In Japan, the oldest “gardens” were also sacred groves or ‘paradises’ found in temple grounds. The “first references to a garden culture in India are contained in two heroic epics, the *Mahabharata* (4<sup>th</sup> century B.C.) and the *Ramayana* (4<sup>th</sup> or 3<sup>rd</sup> century B.C.)” with artificial ponds (Wengel, 1987: 206). Many of these gardens were properties of “prosperous citizens” and often they were also described as “parks”.

In Africa, graves were, and still are, situated away from the dwellings of people and also away from cultivated fields. In Christian African societies, they are often placed behind churchyards but there is no record of use of any type of associated plants with these graves although many of the original

trees are left untouched. In some ancient Sudanese communities burial sites were in the desert. So, just like in Asia and ancient Greece, burial sites are in groves associated with locally available plants.

### **Modern gardens**

Modern botanic gardens, nowadays properties of mainly universities and other educational institutions, are offshoots of the private gardens of the past, and particularly those known as castle gardens. The first modern botanic garden was established in 1543 in Italy by the University of Pisa (Bedini *et al.*, 2003). Wengel (1987: 74), however, wrote that the circular botanic garden in Padua “served as a model for many other similar ones.” Many of the plants being maintained and propagated in Italy as well as elsewhere in Europe, e.g., France (Montpellier Hérault) which established its first garden in 1593, were medicinal plants, also brought from the “Orient” and India, as these were the primary sources of maintaining health and wellness.

Following Buddhist garden models, many gardens were constructed in China, Japan, Korea and India. The garden palace of Dig in Rajasthan, India, for instance, stretches along the waterside. The rivers on the mountains in Kashmir are directed through the garden of Shalimar to supply the fountains and gargoyles. The Taj Mahal of India is an example of the integration of a memorial and a garden.

In 18<sup>th</sup> century England, a new feeling for nature enabled the creation of what are known as landscape gardens or English gardens replacing the symmetrical gardens of the 17<sup>th</sup> century gardens ostensibly spearheaded by France. These were large areas which usually included a lake, rolling meadow with groves of trees, temples, Gothic ruins, bridges, and other picturesque architecture, designed to recreate an ideal pastoral landscape. William Chambers (1726-1796) is considered as the person who introduced elements of landscape gardening from China in 1757 into England (<http://www.kew.org/heritage/people/montage/index.html>). This type of garden spread throughout Europe in the 19<sup>th</sup> century and the search for and acclimatization of foreign plants intensified in Europe. Special houses for tropical plants were constructed in many of these large landscape gardens. One of the first is what was known as the “hothouse” that was built in 1761 in the Royal Botanic Gardens at Kew. Today, they are replaced by the Palm House (built 1844-1848) in which many of the vulnerable tropical tall palms are preserved (<http://www.kew.org/heritage/places/palmhouse.html>).

As shown above, the early focus on medicinal plants in Europe changed in the 17<sup>th</sup> century to an interest in economic plants from both the new and the old world. Thus, botany gradually made itself independent of medicine. In the 18<sup>th</sup> century, systems of plant nomenclature and classification were devised by botanists working in herbaria and universities associated with the botanic gardens. These systems were often displayed in the gardens as educational "order beds". With the rapid rise of European imperialism in the late 18<sup>th</sup> century, botanic gardens began to be established in the tropics, the New World, South Africa and Australia and economic botany became a focus with the hub at the Royal Botanic Gardens, Kew, near London.

Today, there are 800 botanic gardens in over 118 countries (<http://www.bgci.org>) and they are places in which well-cared for plants (mostly ferns, gymnosperms and flowering plants) with often also their botanic names are displayed mainly as research, conservation and educational samples obtained from all over the world.

Some people might like to consider botanic gardens as parks or recreational parks but, as shown above, there is more to botanic gardens. State and national parks are areas with little or no modification to the natural vegetation of the area. Often footpaths or paved cycle paths, laid down to enable people walk or ride leisurely so that the original vegetation does not get damaged, are part of the infrastructure of these types of park. Parks around castles and cities are often laid out for purposes of representation of history and recreation, respectively. Contrary to botanic gardens, plants are not normally documented in parks.

### **Special gardens**

Other types of garden which cannot easily be categorized with the above are home, household or backyard and urban or community gardens. These are utilitarian in nature and place no or little emphasis on symmetry and shape. Home gardens in Ethiopia are more developed in rural areas particularly in the south and southwest (Zemedede Asfaw and Ayele Nigatu, 1995; Zemedede Asfaw, 2001) than in the northern parts of the country. A recent study indicated that "in 2006, only 16 households in Kossoye [Gondar] had gardens, compared with nearly 300 household gardens in 2011 ..." (Lorber, 2012). The increase is attributed to a program known as the Kossoye Development Program, which, although active in the health field in the area since the 1960s, only recently added household vegetable gardening initiatives to its program. Each household grows mainly vegetables and root crops for consumption as well as for sale in local markets. But, the



household may also cultivate “mixed gardens of trees, shrubs and herbaceous species ... that provide food, fodder, firewood, medicines, ornamental plants and construction materials” (Zemedu Asfaw, [www.members.multimania.co.uk/ethiopianplants/docs/agrobio.rtf](http://www.members.multimania.co.uk/ethiopianplants/docs/agrobio.rtf)).

Urban or community gardens, which became popular in Europe and America after about 1960, are common occurrences today throughout the world. They are considered as offshoots of the community involvement programs called “Liberty Gardens” and “Victory Gardens” during the First and Second World Wars, respectively (see under Functions below). The First World War Liberty Gardens (1917-1919) in the United States were community gardens that sprang up “as a response to the cuts in [food] consumption” ([www.sidewalksprouts.wordpress.com/history/vg/](http://www.sidewalksprouts.wordpress.com/history/vg/)). The main function of community gardens is to serve as sources of organically grown vegetables, fruits, medicinal and decorative herbs, shrubs and trees. These are often communally operated, managed and accessed plots of land. They may also be under the jurisdiction of local governments or they may be run by not-for-profit organizations. Sites often selected for urban or community gardens are degraded, neglected or abandoned areas. Many such areas in the developed world have been restored to good use. In connection with these developments new disciplines that attempt to integrate various educational programs and models have evolved, e.g., civic ecology – first aired by Poole (1995: *Civitas Oecologie*) and later on espoused by Krasny and Tidball, 2009 (see Shava *et al.*, 2010; Tidball and Krasny, 2010, as examples). Community gardens as areas that can foster the development of multiple types of learning have also been proposed (Krasny and Tidball, 2009).

### **Functions of botanic gardens**

In the past, gardens had mainly religious and ceremonial (burial) functions. They were also places where medicinal and edible plants or fruit plants were grown. Currently many botanic gardens offer various types of services to the public and these may be grouped under the categories of science, research and entertainment. All in all, they are regarded as cultural and scientific institutions of any country. During the First and Second World Wars, some botanic gardens have also been used as places to grow food. This is mentioned under special gardens and discussed under emergency functions of gardens.

**Science and education.** Currently botanic gardens are administered by universities or scientific research institutions and often have associated herbaria, laboratories and research programs in plant taxonomy, plant

systematics or some other aspect of botanical science. In principle their role is to maintain documented collections of living, as well as preserved plants, in some cases, for the purpose of scientific research, conservation, display and education, although this will depend on the resources available and the special interests pursued at each particular garden or institution. Many botanic gardens attract thousands of people, both domestic and international visitors. Some have gained wide recognition as being centres of environmental education and conservation.

The functions of botanic gardens as an institution that encourages science includes garden tours (for groups or schools), educational displays (of rare, threatened, exotic and exciting plants), educational classes (such as art, culinary and garden classes), and exhibitions (such as new books, art glass blowing or glass work, carnivorous plants, century plants). In addition to ordinary plants, one also finds unusual plants such as those that bloom after many years of no flowers. Blooming every 7 years is considered a long period of time for some plants, e.g., *Amorphophalus titanus* (Becc.) Becc. (originally from Sumatra) – a plant producing one of the tallest axis of flowers (technically called inflorescence) that reaches a height of up to 2.4 metres (Mabberley, 2008), a corm diameter of up to 50 cm and weighing 50 kg; *Rafflesia arnoldii* R. Br. (also originally from Sumatra, now an endangered species), with a diameter of up to 80 cm and a weight of up to 7 kg, is considered as the world's largest flower (Mabberley, 2008). These types of plants are often well protected and out of the reach of the ordinary citizen. They are displayed only on special days and circumstances. Some botanic gardens, particularly those in the temperate world, may also have green or glass houses, where tropical and other exotic plants are maintained, propagated and displayed.

**Research and development.** Botanic gardens support a variety of research projects starting from documenting the plant life of a small area to that of a large country or even a continent, e.g. Flora of Tropical Africa (supported mainly by Kew, London), Flora of North America (supported by many institutions in North America). Currently, they also participate in providing either seats (office, laboratory space, greenhouse facilities, support staff, etc.) or materials for molecular types of work by resident scientists or others working in universities or other higher learning institutions. Many, either independently or in association with regional or national herbaria, have also embarked on digitization projects which will make the collections available on line for free, provide an illustrated history of gardens, make rare botanic literature available for botanists as well as art historians, make plant images

and associated data available, also on line. A number of botanical gardens in Europe, Scandinavia, UK and the USA (Missouri Botanical Garden) have established a network, International Plant Exchange Network (IPEN), to allow access to their genetic resources with a concomitant share of the benefits, based on the protocols in the Convention on Biological Diversity (CBD).

**Leisure and entertainment.** Botanic gardens are regarded as important venues for many cultural events and activities. As entertainment and relaxation places in the temperate world, they provide open-air (during the summer) or closed (in winter) theatrical and musical performances, weddings, birthday celebrations, etc. Some botanic gardens such as the British, Chinese and Japanese gardens are emulated elsewhere for their unique qualities.

**Special or Emergency functions.** During World Wars I and II in Europe (Britain and Germany) and North America (Canada and the United States), palace lawns, city parks, vacant lots in cities, private backyards, etc., were set up as places where food and other vegetable products were grown. In the United Kingdom, “the palace lawn was ploughed in 1918, preparatory to planting it with potatoes. Whatever had survived of Nesfield’s garden in front of the Palm House disappeared under a bed of onions, the flower plots along the Broad Walk yielded to cabbages, lettuces and root vegetables.” (Desmond, 1995: 309-210). During the Second World War, “the lawns in front of Kew Palace (now part of the Royal Botanic Gardens at Kew, London) were ploughed and planted with potatoes as in the First World War. Demonstration vegetable plots offered practical advice to the public” and there is a section on “Kew’s assistance in finding alternative sources and substitutes for important vegetable products” (Desmond, 1995: 319). Not only were the Kew Garden used for emergency food production, but its staff was also deployed to do work elsewhere: “the First World War upset routine maintenance. Women Gardeners who replaced conscripted men had expanded to a work force of more than 30 by 1917,” (Desmond, 1995: 309-310) and “Melville helped identify species, varieties and hybrids of native British roses whose hips were then analyzed for their vitamin C content (it was discovered that the richest hips were produced by the roses of northern England and Scotland)” (Desmond, 1995: 319-320).

In the UK, this effort was called the ‘Dig for Victory’ campaign (Blomfield, 2004) and in Hyde Park, central London, “sections of lawn were publicly plowed for plots to publicize the movement” (Wikipedia: Victory Garden;

extracted on 11/13/2012). The Berlin botanical garden was “nearly destroyed in World War II” ([www.britannica.com](http://www.britannica.com)) and victory gardens “began to emerge again” in and around the garden ([www.wordpress.com](http://www.wordpress.com), - see the large and partially destroyed building in text).

In the United States, gardens were set up as farm, village, and home gardens. Each family grew food for its own use as well as to feed the army and other people in war-torn areas. These were called ‘Victory Gardens.’ The purpose of the victory gardens in the U. S. A. during the Second World War was described as first to feed the “fighting men to endure hardship and win battles,” second, to feed the “workers at home who are making the munitions, planes, tanks, and other supplies ...,” third to feed “the rest of the civilian population ... so that they can do their part on the home front,” fourth to feed “the members of the United Nations ... because they have been fighting longer, have lost more of their manpower, ...,” and fifth to feed “... our allies, the liberated peoples of formerly subjugated countries” (Seymour, 1943).

### **The future of botanic gardens**

Botanic gardens have been regarded as both cultural and scientific organizations, preserving the culture of an area but serving the broader community of humanity. They have accommodated the interests of botany and horticulture. Nowadays most botanic gardens display a mix of the themes mentioned above. By having a strong connection with the general public, there is the opportunity to provide visitors with information relating to environmental issues especially those relating to plant conservation and sustainability. However, the challenges of the 21<sup>st</sup> century, which include “rising energy costs, changing demographics, escalating extinctions, global economic shifts and climate change” (<http://www.edenproject.com/>) are not or cannot be addressed by botanic gardens because of their narrowed down values, missions and their structures. According to BGCI, rising energy costs, changing demographics and global economic shifts are outside of the missions of botanic gardens and hence they cannot do much about them. Botanic gardens, however, attempt at bringing solutions to the ever escalating species extinctions through educating the public but they consider climate change as a technical or environmental concern.

Botanic gardens, particularly in the developed world, have stated values, specific audiences and missions. Were the objectives for which they were established met? What did they learn from studies they conducted on public perceptions of the role of gardens and the public’s awareness of

environmental issues? How are they trying to change or cope?

Gallagher (cited in Connell, 2004: 232) cited the methodological difficulties in finding which aspects of gardens attract visitors. Connell (2004) stressed the need to find the characteristics of garden visitors and to find exactly who visited gardens and why. This was not done until relatively recently and botanic gardens started taking census or visitor information and periodical assessment of the logged data as an essential task. Gallagher's studies in 1981 and 1983 (cited in Connell, 2004: 229) accounted for 94 'historic' gardens. Connell (2004) studied "the characteristics, behaviour, and motivation of a sample of 546 visitors to 13 gardens in Great Britain" and reported the following categories of visitors: age over 40 (84.6%), high income (80.2%), garden owners (94.8%), and the reason provided for visiting were pleasure-derived leisure. Other expressed interests were visiting cultural and natural attractions such as historic houses. Table 1 provides a summary of the category of people who visited three major gardens in the UK and the reasons provided by the visitors.

Table 1. Visitors and reasons for visits of three botanic gardens in the UK (Connell, 2004).

Name of Botanic Garden	Visitors	Reason for visit
Westonbirt (National Arboretum)	Disabled people (16%); High Society (84%); over 55 (53%); children and young people (2%)	-
Royal Botanic Garden Edinburgh	Over 55, women; retired (48%)	Explore the gardens (78%); look at plants (79%)
Royal Botanic Gardens Kew	White, middle class	Enjoy the gardens (50%); learn about plants or gardens (15%); learn on issues of conservation (8%)

The reported data revealed that the visitors of botanic garden in England were often white, middle class and older people, and the reasons given, by most, for their visits were: "to have a nice day, to enjoy the peace the gardens offer, to relax, to maintain wellness through leisurely walking; and, by few, to search for educational or conservation-linked activities" (Connell, 2004). Ballantyne *et al.* (2008) made a survey of 150 visitors to the Mt. Coot-tha Botanic Gardens in Brisbane, Australia, and found many visitors to be "... less interested in and committed to conservation issues, less motivated to learn, than visitors to other free-choice learning settings such as museums, zoos, aquariums, heritage sites, natural areas and wildlife tourism activities." Similar reasons were provided for visiting gardens as those in the UK, i.e., "to enjoy oneself, to admire the garden's scenery, to spend quality time with family or friends, and to enjoy being outdoors." Based on this "exploratory study", Ballantyne *et al.* (2008) suggested

“interpretive strategies targeting conservation issues” that could be applied by managers of botanic gardens, e.g., placing provocative signage or leaflets at the entrance to the garden “to prompt interest in environmental issues,” encouraging visitors “...to reflect upon the aesthetic beauty of the gardens” to highlight the importance of environmental conservation, “encouraging a more reflective response to conservation issues” by including activities such as “music concerts, art and craft lessons, poetry readings, butterfly spotting and bird watching ...”

In 2000, an educational charity, called the Eden Project ([www.edenproject.com](http://www.edenproject.com)), came up with an approach different from those employed by traditional botanic gardens in addressing issues of the environment and how to engage people in bringing about changes. It remarked that botanic gardens must become more ‘socially responsible organizations’ and must work with organizations that have programs and projects with social relevance. The Botanic Gardens Conservation International proposed co-operations between botanic gardens and redefinition of their roles (<http://www.bgci.org/>).

The Eden Project in Cornwall, England, focuses on children and the young who, it reports, are often muted in botanic gardens, as well as colleges and universities. It also conducts national campaigns. The objectives of this Project are to “engage, entertain and inspire the imagination of people.” It collaborates with a large number of like-minded programs and projects that a) engage children to learn about growing edible food plants in school gardens, b) involve socially excluded groups (e.g., homeless, offenders and excluded young people), small businesses in greening projects, prisoners in growing food plants in prison compounds and elsewhere in communities, people to improve waste management, and c) promote good landscape restoration practices, and emotional and physical wellbeing in people with disabilities. After comparing traditional botanic gardens with the Eden Project, people have come up with the need to address a “socially relevant botanic garden” meaning a garden that takes the interest of the larger segment of any society to task.

Some botanic gardens are doing the following to broaden their activities and audience:

- Target and reach all school children.
- Make their publications available widely (community notice boards, coffee houses, libraries, newspaper stands, mailed to individuals,

etc.)

- Engage in public programs (e.g., urban or community gardening).
- Organize picnic programs including drama, music, story-telling artworks, theme-based family-oriented activities such as growing vegetables.
- Open garden gates during public holidays.
- Establish geo-caching projects where families will work together to navigate through the garden achieving something in return, e.g., hidden money, treasure items, etc.
- Organize activities for people excluded from botanic gardens, e.g., people in drug rehabilitation facilities, young people who are unemployed, not in training or without formal education.
- Offer life-long learning, i.e., adult and professional courses on the environment.
- Display images of plants from around the world to attract minority ethnic groups (e.g., Kew did this for Afro-Caribbean and Indian communities).
- Organize food festivals of selected community groups in order to attract the non-traditional visitors; this worked well in multi-cultural settings where the interests of different ethnic groups are addressed at regular intervals or in succession. The Franklin Park Observatory in Columbus, Ohio, organizes Asian week every year.
- Create gardens of “world medicines” so that people from various geographical backgrounds could discuss their heritage.

### **Botanic gardens in Ethiopia**

Ethiopia established a botanic garden in Addis Ababa in 2005. This is a major stride forward for the country in environmental education. It is important to provide support to the institutions that began this effort. Based on the performance of this newly established environmental centre, Ethiopia may be able to institute more botanic gardens in other parts of the country. Many may argue that botanic gardens are only for the ‘well to do’ societies. Caring for the environment, in many societies, has until recently, been considered a ‘luxury item’ that the more affluent and secure classes only can afford or choose to do and that it means very little, or none at all, for those

that have not yet sorted out how to meet their basic life necessities. Even in the affluent society there are many that do not care, or care enough to know, about their immediate surroundings. Do developing countries need botanic gardens? The answer, according to the author, is, certainly, in the affirmative but what type of botanic garden should be in place?

First, what should the mission and services of botanic gardens in a developing country, such as Ethiopia, be? What has Ethiopia learnt from the developed world where not only botanic gardens but also urban or community gardens are becoming common? In response to questions like these, probably the best approach would be to consider the needs of communities and attempt to address them, obviously also engaging the communities.

To satisfy the needs of the Nation as well as its communities, Ethiopia needs to:

1. Establish botanic gardens as a “centre for environmental studies” based on ecologically and functionally sound criteria. Since funding for any institution, albeit a new one is critical, establishing it as such will increase its chances of receiving priority status. It should be constituted as a place where research and education on plants and plant products will occur to satisfy the needs of development in areas of environmental awareness, conservation and protection. This entails the establishment of a national or regional repository of the plant resources of the country, a herbarium, and associated facilities (laboratories, green or glass houses, reference libraries, demonstration plots, etc.).
2. Diversify resources and activities for sustainability, particularly funding.
3. Identify habitats to be conserved: open areas as parks, nature reserves (forests, woodland, grassland, rivers, streams, etc.).
4. Focus on socially relevant activities: organize community gardens at various levels (farm, village, city); community gardens will produce a range of products including vegetables, fruits, seedlings, plants (medicinal, aromatic, landscaping) and flowers. The benefits will be increased or improved income, economic development, self-reliance, and green space in the community. Efforts like that of the USAID’s Urban Gardens program which supports HIV victims in Ethiopia needs to be encouraged and supported. In 2004, DAI started the



USAID-funded program “on how to set up and maintain household and community nutrition gardens as a means to improve overall household nutrition and increase household incomes” (<http://www.changemakers.com/nutrition/entries/usaid-ethiopia-urban-gardens-program>).

5. Do research with and for communities within and without the garden: Set priorities through consultations and participation, identify and help communities to conserve disappearing species, work with communities in selecting appropriate plants for planting or cultivation, identify and develop/propagate drought resistant indigenous plants, medicinal and other locally useful plants, identify the constraints to better seed production, storage and germination (and also support efforts already underway).
6. Focus on school children: Make formal and informal encounters with school children since they are the future of any society; focus on contemporary issues: sustainable living, impact of climate change on biodiversity, and the human-animal environment, get them engaged in and let them become active citizens.
7. Emergency situations: Gardens similar to the victory gardens of Europe and America, instituted during the Second World War to ward off starvation, can be set up as emergency measures during periods of food scarcity or shortage, with support or input from GO's and NGO's.

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#### REFERENCES

- Ballantyne, R., Pakcer, J. and Hughes, K. (2008). Environmental awareness, interests and motives of botanic garden visitors: Implications for interpretative practice. *Tourism Manage.* **29**: 439–444.
- Bedini, G., Garbari, F. and Tosi, A. (2003). Museums and collections of Pisa University: An archive of arts and sciences. *Atti Soc. Tosc. Sci. Nat. Mem. Serie B* **110**: 195–

199.

- Berlin-Dahlem Botanical Garden and Botanical Museum. Oldest botanical garden in Germany. [www.britannica.com/.../Berlin-Dahlem-Botanical-Garden-and-Botani...](http://www.britannica.com/.../Berlin-Dahlem-Botanical-Garden-and-Botani...) (extracted, 13 November 2012).
- Blomfield, D. (2004). **Kew Past**. 2<sup>nd</sup> ed. Phillimore, Chichester, 144 pp.
- Botanic Gardens Conservation International. The role of botanic garden in plant conservation. [http://www.bgci.org/resources/bgs\\_in\\_conservation](http://www.bgci.org/resources/bgs_in_conservation) (extracted, February 2010).
- DAI-USAID Ethiopia Urban Gardens Program. Changemakers. <http://www.changemakers.com/nutrition/entries/usaaid-ethiopia-urban-gardens-program> (extracted, 19 November, 2012).
- Connell, J. (2004). The purest of human pleasures: The characteristics and motivations of garden visitors in Great Britain. *Tourism Manage.* **25**: 229–247.
- Desmond, R. (1995). **Kew: History of the Royal Botanic Gardens**. Harvill Press & Royal Botanic Gardens, Kew, 466 pp.
- Francis, M. and Hester, R. T. Jr. (1990). **The Meaning of Gardens**. The MIT Press, Cambridge, Massachusetts.
- Hobhouse, P., Hunningher, E. and Harpur, J. (2004). **Gardens of Persia**. Kales Press, Inc., Hong Kong.
- Royal Botanic Gardens, Kew, London. Kew, history & heritage. Who's who at Kew: William Chambers. <http://www.kew.org/heritage/people/montage/index.html> (extracted, 13 November 2012).
- Royal Botanic Gardens, Kew, London. Kew, history & heritage. The Palm House. <http://www.kew.org/heritage/places/palmhouse.html> (extracted, 13 November 2012).
- Krasny, M. and Tidball, K. (2009). Community gardens as context for science, stewardship and advocacy learning. *Cities and the Environment* 2(1): article I, 18 pp. <http://escholarship.bc.edu/cate/vol2/iss1/8> (extracted, 13 November 2012).
- Lorber, A. (2012). Graduate student combats malnutrition in Ethiopia through gardening. *Compass*. <http://www.ohio.edu/compass/stories/11-12/2/Ethiopia-Bilecki-2012.cfm> (extracted, 13 November 2012).
- Mabberley, D. J. (2008). **Mabberley's Plant Book**. 3<sup>rd</sup> ed. Cambridge University Press, Cambridge.
- Poole, K. (1995). Civic ecology: Infrastructure in the dynamic city, critical urbanism. Proceedings of the Association of Collegiate Schools of Architecture Northeast Regional Conference. 1995. <http://www2.iath.virginia.edu/backbay/kp/html/pubs/hrvd01.html> (extracted, 13 November 2012).
- Seymour, E.L.D. (1943). **Victory Garden Supplement**. The New Garden Encyclopedia. Wm. H. Wise & Co., New York.
- Shava, S., Krasny, M. E., Tidball, K. G., and Zazu, C. (2010). Agricultural knowledge in urban and resettled communities: Applications to social-ecological resilience and environmental education. *Environ. Educ. Res.* **16**(5-6): 575–589.
- The Eden Project. Challenges of the 21<sup>st</sup> century. <http://www.edenproject.com/> (extracted, February 2010).
- The Eden Project. What's it all about? The Eden Project does much more than offer a memorable day out in Cornwall. Eden is also a charity and social enterprise. <http://www.edenproject.com/> (extracted, February, 2010).
- Tidball, K.G. and Krasny, M. E. (2010). Urban environment education from a social-

- ecological perspective: Conceptual framework for civic ecology education. *Cities and the Environment* 3(1): article 11, 20 pp. <http://escholarhsip.bc.edu/cate/vol3/iss1/11>.
- USAID Ethiopia Urban Gardens Program. ([www.changemakers.com/.../usaid-ethiopia-urban-gardens-program](http://www.changemakers.com/.../usaid-ethiopia-urban-gardens-program)) (extracted, 13 November, 2012).
- Wengel, T. (1987). *The Art of Gardening through the Ages*. Leipzig. (Translated from the German by Leonard Goldman).
- Wethered, H. N. (1933). **A Short History of Gardens**. Methuen & Co., Ltd., London.
- Wikipedia, the free encyclopedia. Victory Gardens. [en.wikipedia.org/wiki/Victory\\_garden](http://en.wikipedia.org/wiki/Victory_garden) (extracted, 13 November 2012).
- Wordpress.com. 3. First World War Liberty Gardens: 1917-1919. Sprouts in the side. [www.sidewalksprouts.wordpress.com/history/vg/](http://www.sidewalksprouts.wordpress.com/history/vg/) (extracted, 13 November 2012).
- Wordpress.com. 5. World War II: Victory Gardens the second time around ... Sprouts in the side. [www.sidewalksprouts.wordpress.com/history/vg/](http://www.sidewalksprouts.wordpress.com/history/vg/) (extracted, 13 November 2012).
- Zemedé Asfaw and Ayele Nigatu (1995). Home-gardens in Ethiopia: Characteristics and plant diversity. *Sinet: Ethiop. J. Sci.* **18**(2): 235–266.
- Zemedé Asfaw (2001). Origin and evolution of rural homegardens in Ethiopia. *Biol. Skrif.* **54**:273–286.
- Zemedé Asfaw. Interaction and interdependence between agrobiodiversity and wild biodiversity. [www.members.multimania.co.uk/ethiopianplants/docs/agrobio.rtf](http://www.members.multimania.co.uk/ethiopianplants/docs/agrobio.rtf) (extracted, 13 November 2012).