# The task of University Botanic Garden in education and plant conservation

**John C. Onyango[1], M.O.A. Onyango[1] and W. Freund[2]**

**[1]University Botanic Garden, Maseno University, Kenya**
**[2]Zoologisches Forschungsmuseum A. Koenig, University of Bonn, Germany**

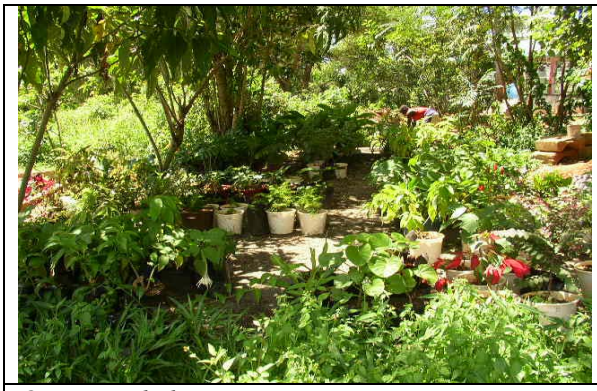
## Abstract

Biological conservation is a complex undertaking especially in the developing countries where large populace still relies on the forest products for their daily survival. Majority of these people live below the poverty line of less than a dollar per day. Hot biodiversity spots are more often associated with humid and sub-humid regions in the tropics but not limited to them. The University Botanic Garden, Maseno is located right on the equator in Western Kenya some 20 Km from a large fresh water mass – Lake Victoria and 30 Km from Kakamega forest – the only surviving tropical rain forest left in Kenya. The region is inhabited by the Luo and Luhya communities whose life rotates more on agriculture and fisheries. The local communities have wealth of indigenous knowledge on the ethnobotany of the region and through their taboo system have succeeded in protecting some of the rare plant species. They also use plant products extensively for health care and cultural practices. The scientists working at the garden have successfully developed a collaboration system with the communities where they bring into the garden seeds or seedlings of rare plant species of high value for conservation. The garden on the other hand is advocating the principles of conservation for efficient utilization to the community. The collections are conserved based on scientific thematic arrangement at the garden. The conservation ideas are shared with the school children and students from primary to tertiary education levels. The children or students take the message and learnt principles to their parents hence improving our conservation strategies among the communities. The downward approach in our research findings dissemination approach has also brought the gardens activities closure to the people. The primary objective of our activities is to reverse the lose of plant species through communities engagement and polishing for we believe they are better placed to protect their environment, than even the policy makers will do. We are also advocating benefits sharing from forest products and recognition of the use of herbal medicine for health care without considering the practice as repugnant. The introduction of *ex situ* conservation of plants of high value in the garden has changed the landscape and created aesthetic environment for recreation by students and local community. We believe that through this collaborative approach the garden will be able to achieve its role in the global strategies for plant conservation and the millennium development goals. These achievements will be sustainable since the communities who are beneficiaries of the conservation have been involved and their participation remains pertinent in the whole process and planning. The overall mission of the garden is to support study, Education and research activities at a university and contribute to the overall improvement of the university community. Nurture the spirit of conservation and strive to improve the life and culture through conservation and utilization power, link the plants life with society and expand the circle of nature through conservation.

## Introduction

The University Botanic Garden, Maseno is a protected area where plant of various types are grown and protected for scientific conservation, aesthetics and research. The garden is about 9 hectares in size and was established in 2001 through the Biota East Africa research funding from the German Federal Ministry of Education and research. Therefore, the plants are grown *ex situ* in the Botanic gardens. Plants under

conservation are from a wide range of habitats and have different ecological characteristics such as, aquatic and dry land plants. Ponds are dug in the gardens for aquatic plants growth and other habitats are mimicked in the botanic garden for different ecological plant establishment and growth. The most important resource in the Botanic garden is the herbarium, which stores dried plant specimens for identification purposes. These are well labeled and identified plant samples or voucher material used for comparison when identifying new fresh plant collection. The garden is useful in the protection of the endangered plant species for their continued survival. Some plants which may be extinct from the public areas may be found in the garden, hence conserving the biodiversity of a region. Botanic gardens provide an opportunity for plants to be grown for research. Certain plant features such as height, growth habits and organ structures cannot be observed in the herbarium specimens. The *ex situ* plant conservation give clear knowledge on the species habit and growth habits necessary for ecological studies.



*Ornamental plants nursery*

*Londiani High School students visit*

## Herbarium

Herbarium is a place where dried plant specimen are kept and referred to for future use by botanists and other interested people such as researchers and students. Herbaria were original places where herbs for medicinal value were kept and that are where the name herbarium is derived from. The importance of the herbarium includes: Storage of dried plant specimens, which are treated and poisoned to prevent their destruction by storage pests such as insects and fungi. The stored specimens always have a well detailed description of the plant including its local name, botanical name and locality where it was collected including the collectors details. These descriptions help in plant taxonomy in that they can be referred to and compared with new specimens on first collection for scientific identification purposes. Comparison characteristic include the shape, size colour, texture of vegetative parts and floral parts. Also fruits and seeds where present are compared. The new specimens should have all the characters listed above but especially both vegetative and reproductive characters. The specimen with only vegetative characters is referred to as sterile specimen and should be replaced with full specimen when next available. Through such comparison the new specimen can be identified, placed in appropriate family, genera and species.

In herbarium flora and monographs are drawn and published. Flora of the plant in a particular region is present in herbarium and is arranged as such depending on the family. Each dried specimen has their ethnobotanic use indicated. This is used to find out which plants have particular use to the community such as food crop, medicinal plants, ornamental or plants of high woody value. Herbarium is used as source of information on endangered and extinct plants species. This information is important to plant taxonomists in order to know which plants need special protection due to their availability status. This will lead to recommendation on the conservation strategy for such species threatened with extinction. Herbaria contain several plant specimens collected over a long period of time and by different collectors. Herbaria are the first

stations to be visited by plant taxonomist when they come across new specimen in their live collection, especially those cannot be identified fully in the field during collection or vegetation study.

## Plant conservation

Botanic gardens provide planting materials to the public for aesthetics, domestic or park re-habilitation. The gardens can be used for horticultural purposes to produce ornamental plants, fruits and vegetables. The products of these plants may be harvested when mature and old hence providing revenue for the garden maintenance. Botanic gardens provide a missing link between herbarium and ecology. The gardens are necessary as sanctuary for confisticated plants that has been harvested illegally. Different types of plants can be propagated in the garden, especially for conservation but extra propagates can be sold to the community for their home garden conservation strategy or public landscaping in urban areas. The ornamental and medicinal plants make a great contribution to the significance of the garden and their economic value. The garden has contributed positively towards the understanding of ethnobotany, which is the study of human and plants. It involves the use of plants and plants products by human for sustainable development.

*Medicinal trees stand*

*Community education excursion*

## Community education

The botanic garden is a useful tool for plant taxonomic studies in Luhya and Luo communities in western Kenya through their folklore and traditional taboo beliefs. Plant taxonomy is the study, identification, classification and naming of plants. These can be demonstrated with the following statements: botanic gardens have a vital role in plant taxonomy since they are a collection of different live plant specimens. They have publications on many plants specimens present in the garden. This information can be used by plant taxonomists. Information on the soil nature, habit and plants associated with particular plants can be obtained from botanic gardens and therefore used in plant taxonomy. Botanic gardens are used for leisure and recreation purposes. The garden is very popular with the students especially during weekends and more so it acts as study library for serious students during examination season at the end of semester. This demonstrates the interlinkage of the garden and the society leisure requirements. The garden has been developed as self sustaining unit but which needs actual association with other university units for maximum operation and utilization. It is a useful tool for linking the community around the university and can provide an avenue for out reach and voluntary teaching of members of the community on the importance on having the university amongst them. Other short term academic programmes can be offered at the garden, since the basic infrastructures have been put in place as research facilitating venture. Both Primary and secondary schools students are our main clients and they get good exposure and explanation on the importance of the garden. The local communities have benefited from the garden activities through the teaching of modern technologies

in plant conservation. The garden staff aim is to reach a wide population of the communities and sensitize them on the conservation needs for sustainable development.

## Conclusions

As we progress through the millennium we hope to maintain all our collaborators in research and development while at the same time we will acquire new partners and joining others in the free world, which with the current technological development can be referred to as a global village. The development of Botanic Garden at Maseno University will form a centerpiece contribution in East Africa on research infrastructure development and enhancement of higher education. The biodiversity of the tropics is diminishing at a faster rate but we believe that together we will succeed in our research and development endeavours and contribute to the sustainable beauty of our institutions and the World for the future generation.

## Acknowledgements

We are grateful to the German, Ministry of Education and Research through Biota – East Africa (E01 &E12) for the financial support and Maseno university for space and time.

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