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**Botanic gardens  
and food security**



**BGCI**

*Plants for the Planet*

# BOTANIC GARDENS AND FOOD SECURITY – THE RESULTS OF BGCI’S SURVEY



Vine species being tested at the Kemper Home Gardening Centre (Missouri Botanical Garden)

## Introduction

Achieving global food security whilst reconciling demands on the environment is considered by many to be one of the greatest challenges facing humankind today. By 2050 it is likely that we will need to feed 9 billion people, with the increasing population also demanding a more varied, protein-rich diet.

All this means we need to grow more food on less land, with limited access to water and increasing costs for fertiliser and fuel. The impact of increasing food prices has already been felt in many countries, with associated riots and civil unrest. A less well-known fact is that more people die each year from hunger and malnutrition than from AIDS, tuberculosis and malaria combined (World Food Programme<sup>1</sup>). The World Bank estimates that compared to production in 2000, cereal production needs to increase by 50% and meat production by 85% to meet demand in 2030<sup>2</sup>.

## The role of botanic gardens

Botanic gardens are already involved in a wide range of activities that have relevance to the growing food security crisis. It is important that these activities are recognized, promoted and enhanced.

For example, using improved crop varieties with enhanced resistance to pests, diseases and environmental stress is key to developing a food system that has a lower impact on biodiversity and uses less land and water. Producing such varieties relies on the deployment of genes often found in the wild plants conserved in botanic garden collections. At a local level, growing suitably adapted food plants in community and school gardens can have a significant impact on the quality of diets, especially for those in poor and deprived areas. The horticultural and outreach skills found in botanic gardens are invaluable to support such initiatives.

In order to identify and understand how botanic gardens are addressing food security issues, BGCI carried out a survey in May 2013. The results of this survey are presented below.



Green Corps urban-farming programme (Cleveland Botanical Garden)

## The survey respondents

The survey was made available on the BGCI website during the month of May 2013. The survey was advertised in Cultivate (BGCI's regular e-bulletin) and emails were sent to botanic gardens via national and regional networks. A total of 88 responses were received from botanic gardens in 40 countries around the world. The responses covered a range of types, ages and sizes of botanic gardens (Figs. 1-3).

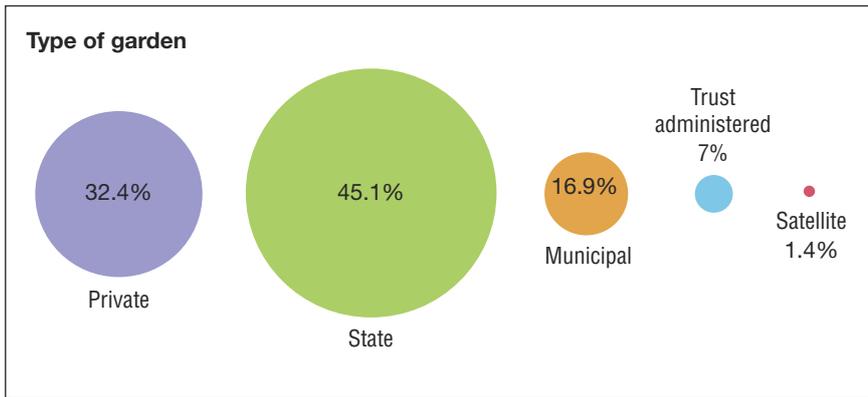


Figure 1

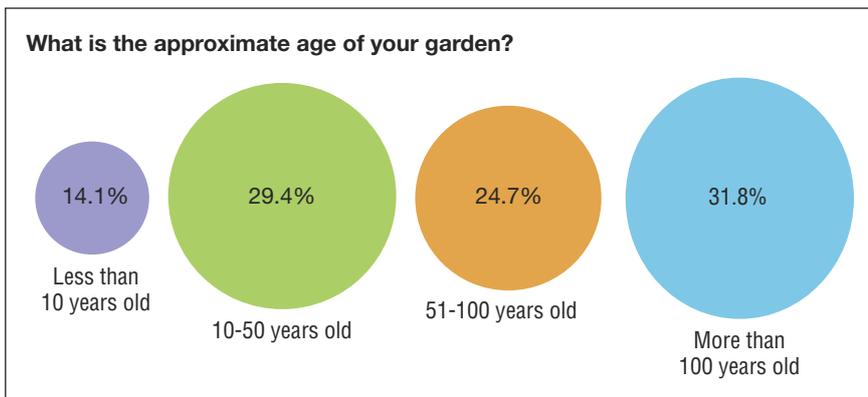


Figure 2

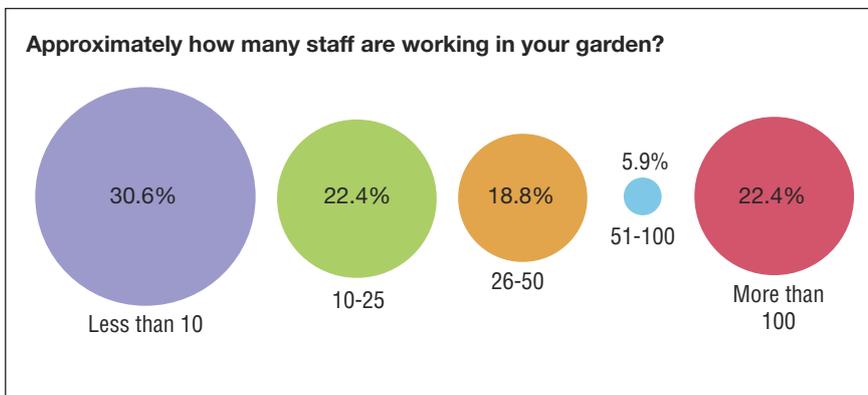


Figure 3

## Food security activities in botanic gardens

### Food production

Botanic gardens are involved in the growing of food crops both within the garden and working outside the garden walls. Within the garden, activities focus around demonstration food/vegetable gardens and gardening projects with local communities, as well as the conservation and promotion of local varieties of food plants (Figure 4). Fewer

gardens reported activities outside the garden itself – but here the focus appears to be more on providing advice to enhance local food production, with some gardens also working with local schools and community groups on food production activities (Figure 5).

Working with local communities on food production projects is clearly a very important part of the work of many botanic gardens and Box 1 provides some examples.

## Box 1: Urban agriculture

**Botanic Gardens of Adelaide, Australia:** addresses food security mainly through outreach work, such as the Green Infrastructure project in collaboration with external partners, including the community garden and kitchen garden initiatives. They are working to facilitate and promote green infrastructure throughout the urban environment, and this includes productive plants in urban agriculture, community gardens, edible verges, backyards etc. It also includes the greater vision of connecting and linking all green spaces and water systems. Food is a part of this bigger vision<sup>3</sup>.

**Real Jardín Botánico Juan Carlos I, Spain:** has recently started a project on Organic Vegetable Gardening in which the local communities can grow their own organic vegetables in plots provided by the botanic garden. The garden also provides them with advice, plants, seeds and tools. In this project, charities and organizations of people with special needs are learning and working and they are supported by the staff of the Garden.

**Chicago Botanic Garden, USA:** runs more than \$1 million of urban agriculture projects outside the garden itself, ranging from four youth development garden sites (Green Youth farm) to a 9-month certificate in sustainable urban agriculture for adults (Windy City Harvest, in collaboration with the City Colleges of Chicago) to an incarceration phase gardening training and post-release Transitional Job program for alternatively sentenced inmates<sup>4</sup>.

**Cleveland Botanical Garden, USA:** the “GreenCorps” program operates 5 urban farms within the city of Cleveland, which teach and employ 60 high school youths every summer, growing vegetables and other edibles for sale at on-site farm markets, as well as a booth at a large neighborhood Farmer’s Market. One of the farms includes a community fruit orchard and community garden plots. The staff also offer classes on food gardening and nutrition<sup>5</sup>.



The student vegetable plots at the Royal Botanic Gardens, Kew (Suzanne Sharrock)

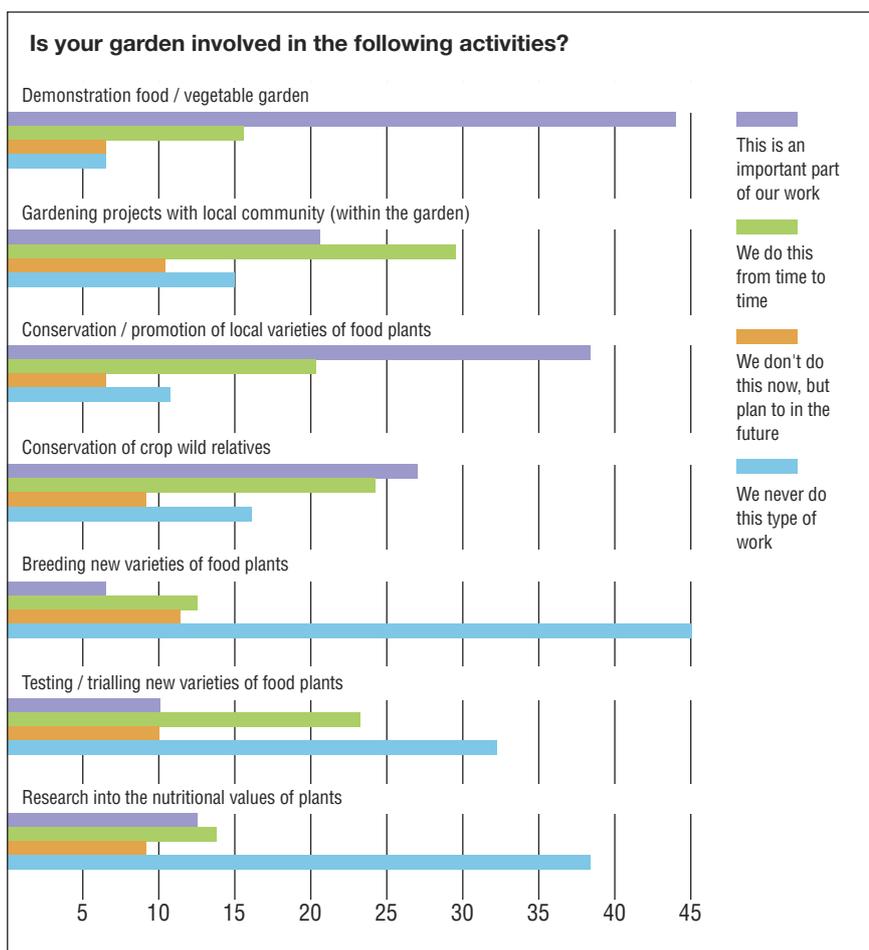


Figure 4

### Conserving local varieties and crop wild relatives

A number of gardens reported being involved in the conservation of local varieties of food plants and crop wild relatives (Figure 4). A particularly significant example of this is provided by the National Tropical Botanic Garden in Hawaii, which is home to the Breadfruit

Institute which manages the largest and most extensive collection of breadfruit species and varieties in the world and is preserving some varieties that no longer exist in their native lands. The collection contains 226 accessions and approximately 120 varieties from 34 islands in the Pacific, as well as Indonesia, the Philippines, the Seychelles and Honduras.

Another example comes from Purwodadi Botanic Garden in Indonesia which provided the following information:

*“As a botanic garden, our activities are specifically designated for the ex situ conservation of plant species from typical habitats of low and dry areas, throughout Indonesia. Musaceae and Dioscoreaceae are the focus of our research programmes in 2012-2017. We have been collecting many wild species, local varieties / landraces of bananas and yams. We conduct exploration and collect materials, and carry out characterization and documentation of the accessions.”*

### Developing improved varieties

Very few gardens appear to have any involvement in research, breeding or testing of new varieties of food plants. (Figure 4). However, the following information was provided by Missouri Botanic Garden:

*“We recently planted out a research vineyard to compare and identify genes associated with precipitation and temperature stress in two native Missouri grapevine species. Although these grapes are not used to make wine per se, they are used as rootstocks in the global grape industry. The two species are adapted to different environments in nature and we are curious whether or not they respond to abiotic stress in similar ways in a common garden environment. Our research vineyard is being planted in the Kemper Home Gardening Center of the Missouri Botanical Garden.”<sup>6</sup>*



Collecting Musa planting materials in Indonesia (Purwodadi Botanic Garden)

**“In a time of global change: rising population, climate change and overuse of natural resources and loss of biodiversity all these issues have to be faced and challenged. We need to develop robust solutions to feeding the world population using less resources and causing less pollution. We have a role to play - not many yet take it seriously - but I believe it is of the most importance.”**

Kevin Frediani, Paignton Zoo

### Engaging the public

Not surprisingly, the most common way respondents reported engaging the public is through providing interpretation in the garden that addresses food security issues. Almost half of the gardens who responded to the survey also organize lectures and debates on food security, and a significant number sell seed and/or plants of food crops (Figure 6).

Interestingly, despite the fact that some 80% of gardens reported having demonstration food gardens in place in their gardens, at least part of the time, relatively few (22%) use fruit and vegetables grown in the garden in their cafes / restaurants.

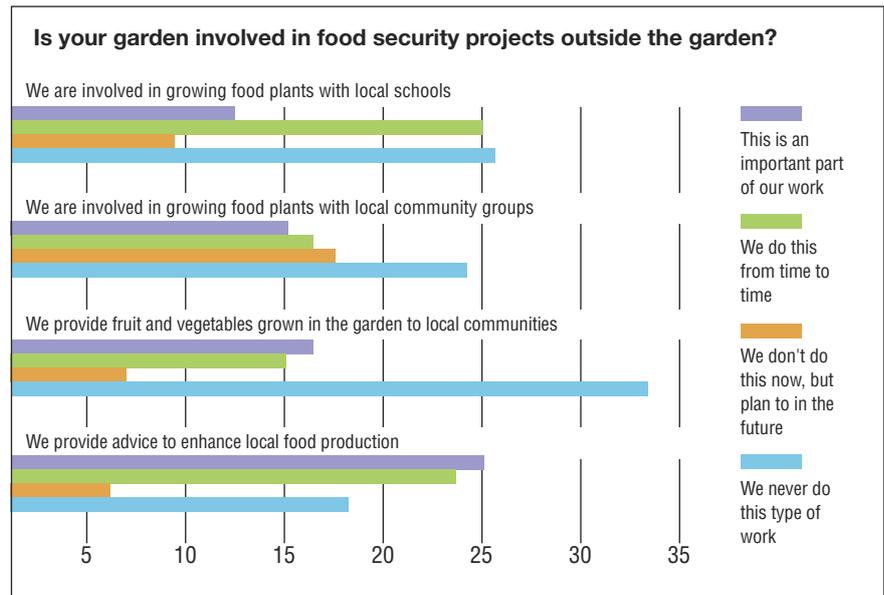


Figure 5

### Box 2 – Engaging the public – special events

**Missouri Botanical Garden, USA: Foodology: Dig In.** Throughout 2013, the Garden is inviting its visitors to dig deep into the roots of food, think about plants on their plate in whole new ways, connect and share with others and get inspired. Through a series of exhibits, events and fun activities the garden is helping people to learn about the plants that feed us.

**Royal Botanic gardens, Kew, UK: IncrEDIBLES – A voyage through surprising edible plants.** This summer and autumn, Kew celebrates the amazing bounty of the plant world, inviting visitors to experience first-hand a selection of the 12,000 species we humans can feast on. As well as a wide range of activities, talks and workshops in the garden, a staff blog on the website shares their behind-the-scenes experiences as well as shedding light on the wonderful world of edible plants.



Above: The student vegetable plots at the Royal Botanic Gardens, Kew (Suzanne Sharrock)  
Left: Halifax Street Children's Centre (Botanic Gardens of Adelaide, Australia)

Activity	“Very important” or “Important” (% of respondents)
Working with local communities to enhance food production	80%
Conserving local crop varieties and crop wild relatives	69%
Raising awareness of food security issues with the public	65%
Providing seed and planting materials of food crops	52%
Producing food crops in the garden for local use	40%
Breeding new varieties of food crops	35%

Table 1 - How important do you think the following activities are for botanic gardens

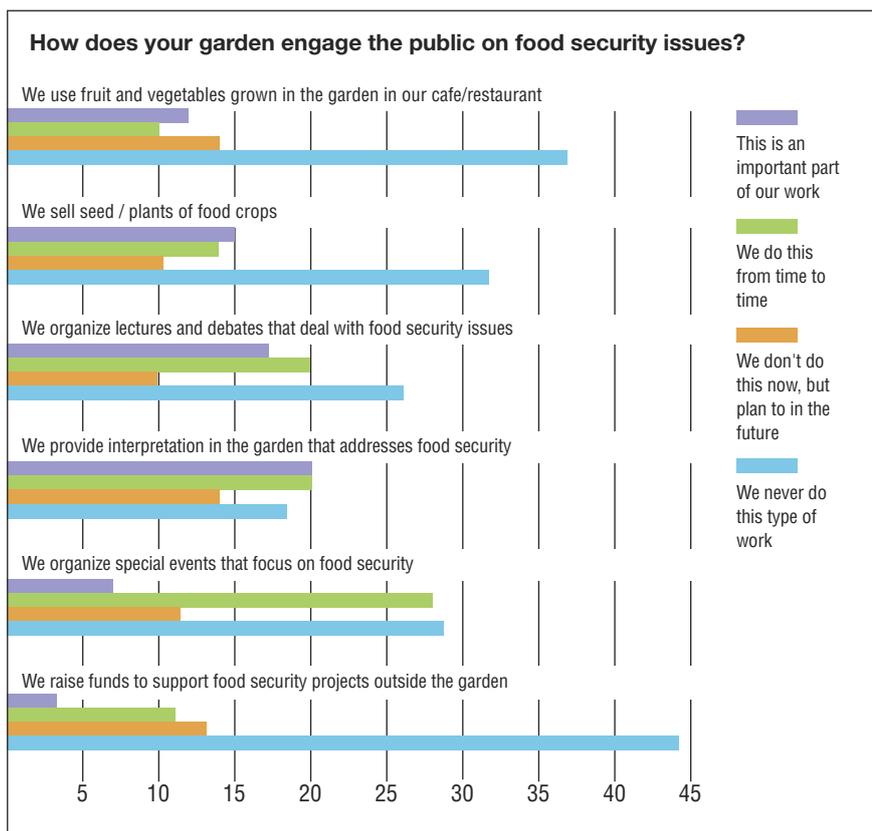


Figure 6



Engaging children (Botanic Gardens of Adelaide)

### Looking to the future

Survey respondents were asked to rank how important they thought a range of activities are for botanic gardens. The responses are provided in Table 1

### Role of BGCI

Survey respondents were asked to comment on the role of BGCI in supporting the work of botanic gardens in relation to food security. The majority of respondents felt that “Collecting and sharing information and best practice examples” was the most important role for BGCI, while “advocating and raising awareness of the work of botanic gardens on this topic” was also highly ranked.

“Botanic gardens have been somewhat overlooked as ‘players’ in the area of food security. Their roles are particularly important in relation to wild plant diversity and also for their educational / awareness activities. Raising the profile of these aspects of botanic garden work may help to attract significant new support for botanic garden work in this area from development agencies, in particular if they are seen to be relevant to addressing poverty issues and sustainable livelihoods.”

Peter Wyse Jackson,  
Missouri Botanical Garden



Pumpkin festival (RBG Kew)

“Organizing meetings/ workshops at regional/global level” and “supporting specific food security related research in botanic gardens” were felt to be of some importance, whereas “highlighting botanic garden food security projects on our website”; “Representing botanic gardens in the wider food security community” and “developing partnerships with other international organizations involved in food security” were considered to be the least important roles for BGCI.

### Acknowledgements

BGCI is extremely grateful to all those who took the time to complete our survey. The information you have provided will help us to fulfill the roles you propose for BGCI – that is, sharing best practice examples and raising awareness of the work of botanic gardens.