BIOLOGIA (PAKISTAN)
June, 2016, 62 (1), 111-119

PKISSN 0006 – 3096 (Print)
ISSN 2313 – 206X (On-Line)

Identifying and Mapping the Elements of Botanic Garden in a Public Park: Case Study of Jillani Park, Lahore

***LAILA SHAHZAD, AMIN-UL-HAQ KHAN, FAIZA SHARIF, ASMA MANSOOR, & RABIYA NASIR**

Sustainable Development Study Center, G.C. University, Lahore-Pakistan

ABSTRACT

Public parks are places of recreational amenity which play vital role as urban green spaces for improving quality of citizen's life whereas botanic gardens are the centers of education, research and conservation of plants diversity. This paper has tried to appreciate Jillani Park, Lahore in view of elements of botanic gardens. A checklist of public facilities and botanic garden's elements was developed for the park to assess the need of improvement in characteristics of botanic gardens. Park provides range of public facilities and has sufficient potential to attract its visitors for promotion of plant conservation but at the moment no such activities are taken in consideration. Therefore, an improvement plan was proposed to designate this park as first example of a Botanic-cum-Public Park in City Lahore which will help in promoting and conserving native plant species.

Key Words: Public Park, Botanic gardens, Public facilities, plant conservation.

INTRODUCTION

In developing countries, there is little research done on the contribution of urban green spaces as botanical gardens. These gardens provide plentiful benefits in terms of conservation, education and recreation but integrating the concept of botanic gardens into public parks can develop awareness among general public regarding importance of biodiversity too. Throughout the world, it is noted that there is an increasing turn towards social relevance in all realm of education and research; botanic gardens have made tentative steps towards broadening their audiences and engaging with community concerns (Dodd & Jones, 2011). We are currently living in a society where most of us are almost disconnected from the natural world but where species extinction, climate change and deforestation are well documented and predicted for future, botanic gardens can play a vital role in reconnecting local people with Plant's world, creating awareness and educating them to live sustainably (Vergou & Willison 2013, BGCI 2010; Ward *et al.,* 2010).

Green spaces: It is a known fact that the green spaces serve as an important social, psychological, aesthetic, health and ecological functions within congested and adulterated urban areas (Forsyth, 2003; Chiesura, 2004) and their environmental services include wind and noise filtering, air and water purification, microclimate stabilization, water table enhancement, habitat provision, erosion control, water flow and mitigation of storm (Chiesura, 2004; Knuth, 2006; Grove *et al*., 2006). The need of more green spaces has been well recognized by the citizens of urban areas. In this way, botanic gardens and other institutions like arboreta have potential to play an important role.

Botanic Gardens: Botanic gardens are the inimitable public green spaces because they are known to be the "shop windows of biodiversity" (SANBI 2006). These green spaces serve as homes for many indigenous plant species. The Botanic Gardens Conservation International (BGCI) of UK defines botanic gardens as "institutions holding collection of documented and living plants for the purposes of scientific research, conservation, display and education" (IUCN-BGCS and WWF 2006). These gardens serve as reference centers for plant identification, nomenclature, and cultivar registration and plant exploration (BGCI, 1995).

The actual gratitude of botanic gardens recounts to their benefits in form of psychological & recreational delight (Connell, 2004). However, some visitors value botanic gardens more as place of the learning and opportunities to view rare flora (Ballantyne *et al*., 2008). Literature has supported visitors those value role of botanic gardens in maintaining community identity and their local traditions (Kuzevanov & Sizykh, 2006) whereas the management and staff of botanic gardens typically highlighted their role in education and conservation of plant species. (Miller *et al*., 2003; Ballantyne *et al*., 2008). In developed countries, many national gardens progressing more because of connecting

Author's Contribution: L.S., Data collection, analysis and interpretation of results; **A.U.K., & F.S.,** Designed and planned the research work; **R.N., & A.M.,** Manuscript writing. **Corresponding Author: lailagcu@yahoo.com*

their societies with nature and supporting research programs ranging from horticulture, conservation, preservation to climate change (Primack & Miller-Rushing, 2009). The concept of botanic gardens has the mistaken imprint that these are parks devoid of fun and play, only areas of plant communities with their phylogeny and unpronounceable names. However an age of ecological crisis, the botanic gardens are global treasures. Today, globally more than 2000 gardens are places dedicated to the study, culture, and exhibition of living plants. Additionally these Gardens are favorite spots to visit being the centers of research and conservation which is acknowledged by different class and age group of people (Ward *et al*., 2010).

Public Parks: On the other hand, the public parks are the places open to public for recreational purposes. As the green spaces, public parks provide manifold benefits to human well-being including stress reduction, health improvements, livelihood provision, sense of peace and recreational activities. Most importantly in time of stress and crises, these places provides inner stability and harmony (Chiesura, 2004; Saz-Salazar *et al*., 2008). These public parks attract more audience and therefore can be considered as effective medium for creating awareness and educating in the general public about conservation of plant diversity which is one of the key elements of botanic gardens. There are many benefits of parks (Table-I) as green spaces ranging from social, economic, environmental to health of individuals and communities (Kumble & Christopher, 2009).

Table I: Multiple Benefits of Public Parks

Health Benefits	**Social Benefits**	**Economic Benefits**	**Environmental Benefits**
Physical activity increases public health	Recreation opportunities	Increased value of property in vicinity	Pollution reduction
Access to parks provide better chance to exercise	Creating stable neighborhoods with strong community	Economic revitalization	Control storm water overflow
Exposure to nature and greenery makes people healthier		Tourism benefits	Local climate mitigation-Cooling

The present study was done to assess the botanic gardens elements in the public park and to propose an improvement plan in the existing landscape of the garden. In this context, Jillani Park popularly known as "Racecourse Park" was selected to study the different elements of a botanic garden present in this urban park. The park after its completion was inaugurated by Lt. Gen. Ghulam Jillani Khan, Governor Punjab, on October 3, 1985 and thereafter the name of racecourse was replaced by Jillani park. The park is located on Jail Road, Lahore and it is currently under the management of Parks and Horticulture Authority (PHA) of Lahore. The layout of the park includes trees, shrubs, and horticultural plantation. It also has sunken gardens, flower beds, plant nursery, jogging tracks, a lake at the foothill, and a big polo ground as shown in Figure 1. The broader objectives of the study are to assess the current status of the public park,

to highlight the use of public park as a botanic garden and to propose an improvement plan for botanic cum public park.

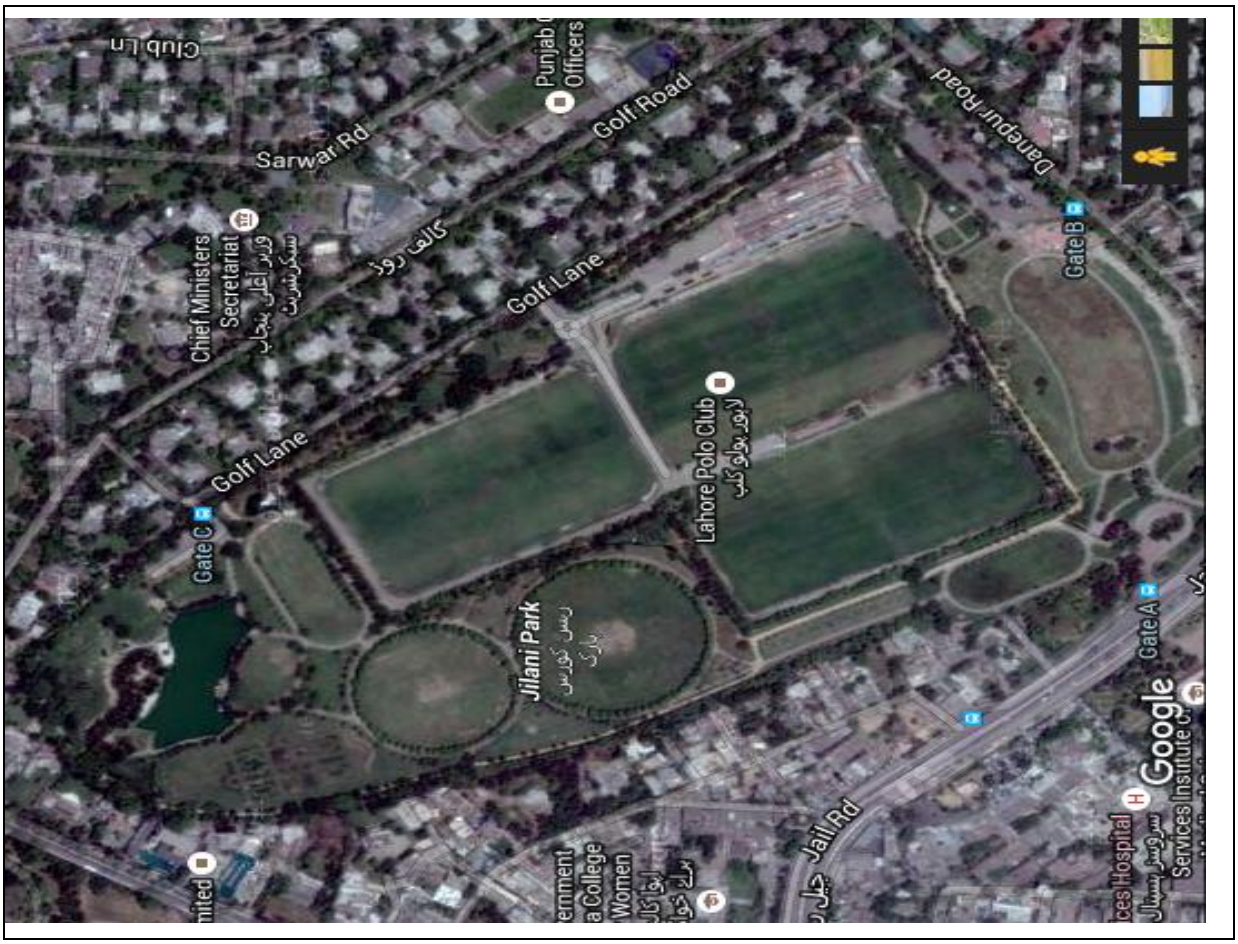

Fig., 1: Layout of the Jillani Park, Lahore

METHODOLOGY

An observation-based study has been conducted in Jillani Park, Lahore to identify the elements of botanic Gardens in a public park. The park has many plots which are randomly planted with trees, fruiting plants, horticultural plants and evergreen shrubs. The assessment study was conducted on the basis of two methods: the first is based on the characteristics elements of botanic garden given by IUCN & WWF and the second is providing a proposed plan to incorporate identified elements in park.

For this study, park was surveyed several times by a team of botanists and environmentalists to assess the plant diversity and other features of a botanic garden as well the facilities offered by the park.

After the collection of required information, a plan was proposed for introducing the elements of botanic garden in the Jillani Park. The proposed plan identified how in the current landscape of the park, botanic elements can be introduced, making the site a first example for **public-cum-botanic park.** The park was observed for its public facilities and photography was done to keep record of all observation. A checklist was developed to assess features of landscape, public facilities and biodiversity of park (Table-II). The evaluation of botanic gardens' elements in Jillani Park was done on the basis of Characteristics given by IUCN-BGCS and WWF (2006); the list of characteristics is shown in first column of Table- II.

Table II: Checklist for the Elements of Botanic gardens and Public Park in Jillani Park

Elements of Botanic Gardens		**Characteristics of Public Park**	
Adequate labelling of the plants	×	Open for public	✓
An underlying scientific basis for the collections	×	Good gardening/ shade trees	✓
Communication of information to other gardens, institutions, organizations and the public	×	Lakes/ Fountains/ Waterfall	✓
Exchange of seeds or other materials with other botanic gardens, arboreta or research stations	×	Play area for children	✓
Long term commitment to, and responsibility for, the maintenance of plant collections	✓[1]	Canteen / Toilet facility	✓
Maintenance of research programmes in plant taxonomy in associated herbaria	×	Benches for sedentary	✓
Monitoring of the plants in the collection	✓[2]	Spacious lawns with grasses	✓
Open to the public	✓[3]	Information boards for visitors of park	✓
Promoting conservation through extension and environmental education activities	×	Jogging tracks / exercise arena	✓
Proper documentation of the collections, including wild origin	×	Dustbins for waste disposal	✓
Undertaking scientific or technical research on plants in the collections	×	Safe and free parking area	✓

[1] most of the plants present in the garden are in good condition, and have good diversity

[2] based on the overall monitoring of the garden, information is collected from the gardeners

[3] 6 am to 10 pm, 7 days of the week.

RESULTS AND DISCUSSION

Park's Amenity Elements

The Park offers adequate facilities for the visitors in terms of a good public park. The area is about 85 acres of land, of which about 35 acres are in use of the polo garden where the rest of area which is 50 acres includes other parts of garden. A big sunken garden is present near polo garden. Three parking zones have been allotted near three main gates of the park. There are benches placed in all plots of garden, Good gardening has provided lush green grass and beautiful blossoms of *Albizia lebbeck* on last track of garden. The garden provides ample area for sitting, playing and two round plots have been designated to play cricket only. There is a scenic waterfall in the main lawn of the park, which remains center of attraction for

people of all age groups. It provides great opportunity for leisure, sports and recreational

activities, with boating at one end and children play areas at the other (Figure. 2). There are a few information boards containing information what "not to do" inside the park. Besides this, there are ladies and men fitness clubs separately with no fee or nominal charge on some equipments, this can contribute to the promotion of public health by encouraging physical and mental fitness and by providing an effective antidote to the stress of urban living. The park has a nicely maintained lake where visitors come for boating, and a beautiful waterfall near main entrance of the park making its landscape distinct from other gardens of Lahore. Some of the facilities have been shown in Table-1. Therefore, the park ranked high considering public services and maintenance of quality gardening.

Fig., 2: Proposed plan of botanic cum Public Park

SYMBOLS	LEGEND
✸	Mission Statement
1	Orientation Centre / Plant Nursery
2	Education And Research Centre
A	Tropical Rainforest Exhibits
B	Native Trees/ Conservation Plants
C	Japanese Garden
D	Botanical Garden

Elements of Botanic Garden

In case of botanic garden, the study survey has considered biodiversity of the park, naming of existing plants, their pattern of plantation, collection of native species etc. As described in the methodology, the park was surveyed many times to develop plant inventory and GC botanic garden guide (Khan, 1996; Ali & Qaiser, 2009) was used to identify plants and their names (Table-III). The plants were planted randomly and naming was done for only two tree species which were planted by Director General of PHA. There was no other plant in the park that was identified and named properly. There was no underlying scientific basis for planting a tree in the park. There was an informal nursery near the main entrance; it was informed by a gardener that "no plant is for exchange, it is maintained only for the jillani park". Further there was no concept of education and research for conservation purpose and plant taxonomy of the park.

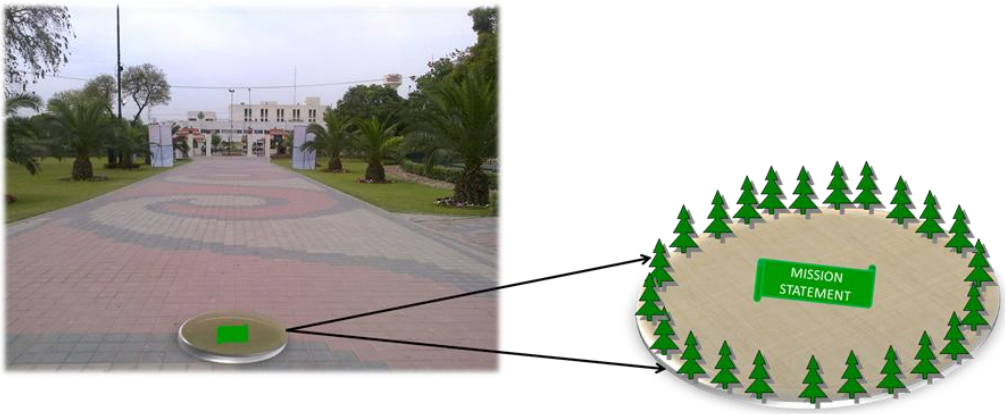

Fig., 3: Mission statement at the entrance of the park

Table III: List of Abundant Plant species at Jillani Park Lahore

Plant name	Family	Plant name	Family
Acacia alata	Mimosaceae	*Ficus infectoria*	Moraceae
Acacia nilotica	Mimosaceae	*Ficus religiosa*	Moraceae
Alstonia scholaris	Apocynaceae	*Hamelia patens*	Rubiaceae
Albizia procera Benth.	Mimosaceae	*Hibiscus-rosa-sinenis*	Malvaceae
Albizia lebbeck (L.)	Mimosaceae	*Jasminum arborescens*	Oleaceae
Artabotrys hexapetalus	Annonaceae	*Lantana camara*	Verbanaceae
Bauhinia purpurea L.	Caesalpiniaceae	*Melia azedarach*	Meliaceae
Bauhinia variegata L.	Caesalpiniaceae	*Mimusops elengi L.*	Sapotaceae
Butea monosperma	Papilionaceae	*Morus alba*	Moraceae
Bougenvillea spectabilis	Nyctaginaceae	*Murraya exotica*	Rutaceae
Callistemon lenceolatus	Myrtaceae	*Phoenix dactylefera*	Palmae
Cassia fistula	Caesalpiniaceae	*Pinus roxburghii*	Pinaceae
Caryota urens L.	Palmae	*Polyalthia longifolia*	Annonaceae
Citrus acida	Rutaceae	*Populus alba*	Salicaceae
Cycus revolute	Cycadaceae	*Putranjiva roxburghii*	Euphorbiaceae
Cypress spp.	Cupressaceae	*Rosa indica*	Rosaceae
Dalbergia sissooRoxb.	Papilionaceae	*Roystonea regia*	Arecaceae
Eucalyptus citriodora	Myrtaceae	*Sterculia alata*	Sterculiaceae
Ficus benjamina	Moraceae	*Syzygium cumini*	Myrtaceae
Ficus bengalensis	Moraceae	*Tabernae-montana-dichotoma*	Apocynaceae
Ficus lyrata	Moraceae	*Terminalia arjuna*	Combretaceae

On the basis of the observation gathered, a plan is proposed for the park which will include botanical guidelines (Kumble & Christopher, 2009) as follow:

1. Mission Statement of the botanic garden cum Public Park;
2. Exhibits of tropical rainforest;
3. Education and Research;
4. Presentation of native plants &
5. Naming of the plants already existed.

Improving the site for botanic gardens' elements will provide an opportunity to conserve native plants more effectively and create awareness among natives to know about their indigenous plants. This will bring people closer to nature. The improvement scenario in the jillani park is shown in Fig., 3. On the main entrance pathway of the park, the mission statement will be placed, this will inform public about the importance of botanical elements and conserving indigenous plant species, most importantly about the need of introducing idea of botanic garden in a public park. The mission statement for the park will be based on its new objective of education and awreaness of local plants in general public. The specific mission statement "carefully spells out what conservation activities the garden will pursue". The other arrangement includes development of an orientation center and a plant nursery. The proposed suitable place is near the entrance, where at the present a cafeteria is present. Jillani park is holding four cafeterias currently, and altering one into an orientation center will not affect available public facilities. This center will help in introducing and informing the visitors about the history of park. When and why this park was created, who governs it and what are potentials of park. A brief introduction of biodiversity can be given through oral lecture or with help of multimedia once in a day or once in a week (Legend "1" in the purpose plan).

The park will also aim to promote research and education activities considering the site as "live classroom", this aim will be accomplished by designating a small area to the "Education and research center". Research work should emphasize on the conservation of native species and their habitat, and role of green spaces in improving quality of life living in an urban stressful area. Whereas education activities can be done by engaging different school and college students in conservation and creating awareness by celebrating biodiversity day, earth day, environment day, dry flower arrangement, fresh flower arrangement, cactus week, native plant day etc. One example can be "Chrysanthemum show" which is held in jillani park every spring which will help in bringing society closer to nature and will as well enhance aesthetic sense of public. By using this public park to address the issues of species extinction or loss of biodiversity can help mobilize the local community to play their vital role in preserving natural plant habitats and creating new ones for them (Legend "2" in the Proposed plan). Legend A explains importance of different habitats and tree types, one plot is allocated to the rainforest exhibits which represent the highest biodiversity in the World biomes. At present, this is rose plot which is one of most common occurring flowering plant in Pakistan. The plot B is given to native species of Pakistan; here plants endemic to this region will be plotted with their origin, history, spread, uses and medicinal importance if any. Currently there are two big cricket grounds in the park as shown in Layout (Fig., 1).

However, in new proposed plan, one out of these cricket grounds has been given to the native species and habitats as plot B. Therefore it will encourage conserving local and regional plants by providing habitats and showcasing the beauty of native plants. Hence providing education about plants and the need to protect them, and allowing visitors many opportunities to have personal contact with plants.

The Plot C and Plot D already exist in the old plan too, but their maintenance is required. Plot C is a space allotted to Japanese garden and Plot D to the botanic garden. Although in reality, nobody was familiar with their names even. During the survey, it was asked to the gardeners of the park, do you have any Japanese garden in the park and their response was simply "No". Further it was also inquired about botanic garden, none of the workers were aware of the name. This condition calls for action, by proposing the plan to the authority of the garden to implement properly what was initially planned by them. Therefore, the current scenario only asks for the improvement of Plot C and D in accordance with their original plan which will enhance the beauty of the garden too. At present, these sites provide a sight of unplanned green part of land where random plantation and long grass provide a muddle.

Last suggestion which is ranked high in botanic garden proposal is correct naming of existing plants. It is, therefore, suggested that all plants present in jillani park should be properly identified and afterwards named with their scientific and local names. This will create awareness among all age groups as visitors will be interested to know more about their own local plants and different habitats too. E.g. xerophytic plants, hydrophytes, epiphytes, fruit trees etc. Such naming and differentiation can attract foreigner tourist too.

CONCLUSION AND RECOMMENDATIONS

From the overall assessment, it is concluded that a green space is multifunctional in its approach. One can visit a park in leisure time or this visit can be made more effective by utilizing the same site with improving its botanical aspects too.

Jillani Park has good facilities for its visitors as it offers adequate water and toilet services, canteens, play areas, boating etc. but in context of evaluating the botanic garden's elements, the park can be improved for its conservation theme with adequate labelling of plants, promotion of research and educational programmes, development of plant nursery, and promoting local flora. It is also observed that the users of public green space are mostly attracted to attributes such as the flora and fauna, diversity of natural scenes, functions, safety, accessibility and the overall aesthetic quality of an urban green space. Such improvement scenario can improve the tourist activity too. In addition the goal of conserving natural vegetation will be met. In short, following recommendations have been proposed for the improvement of the site:

- Conserve natural vegetation and deliver conservation message to the general public
- Use public gardens as instrument for education and research
- Attract tourists through sign boards, orientation centers etc.
- Naming of all plants should be done so to create awareness among young generation especially about their native plants and their importance should be highlighted on demonstration boards.

REFERENCES

Ali, S.I., & Qaiser, M. (Eds.) 1993-2009. Flora of Pakistan. No. 194-216. Department of Botany, University of Karachi, Karachi-Pak.

Ballantyne, R., Packer, J., & Hughes, K., 2008. Environmental awareness, interests and motives of botanic gardens visitors: implications for interpretative practice. *Tour. Manage*., **29**, 439–444.

BGCI, 1995. A Handbook for botanic Gardens on the reintroduction of Plants to the Wild. Botanic Gardens Conservation International and IUCN Species Survival Commission, UK.

BGCI, 2010. Redefining The Role of botanic Gardens: Towards A New Social Purpose. Research Centre for Museums and Galleries (RCMG) School of Museum Studies, University of Leicester, UK.

Chiesura, A., 2004. The role of urban parks for the sustainable city. *Landscape Urban Plan*., **68**, 129–138.

Connell, J., 2004. The purest of human pleasures: the characteristics and motivations of garden visitors in Great Britain. *Tour. Manage*., **25**, 229–247.

Dodd, J. & Jones, C. 2011. Towards a new social purpose: The role of botanic gardens in the 21st century. Botanic Gardens Conservation International (BGCI), UK.

Forsyth, A., 2003. People and urban green areas: perception and use. University of Minnesota, Design Centre for American Urban Landscape, Minneapolis.

Grove, J. M., Troy, A. R., O'Niel-Dunne, J.P.M., Burch Jr., W. R., Cadenasso, M.L., & Pickett, S.T.A., 2006. Characterization of households and its implications for the vegetation of urban ecosystems. *Ecosystems*., **9**, 578–597.

IUCN-BGCS & WWF, 2006. Botanic Gardens Conservation Strategy. IUCN Botanic Gardens Conservation Secretariat, Kew Richmond UK and WWF and IUCN Gland, Switzerland.

Khan, A. U., 1996. Catalogue of plants. Botanic Garden, Government College Lahore-Pakistan.

Knuth, L., 2006. Greening cities for improving urban livelihoods: legal, policy and institutional aspects of urban and peri-urban forestry in West and Central Asia (with a case study of Armenia). Food and Agriculture Organization of the United Nations, LSP Working Paper 37, FAO, Rome, pp: 1–60.

Kumble P.A., & Christopher C. H., 2009. The elements of a conservation botanic garden for ecotourism: Belize botanic Garden as a case study. *J.Landscape Studies*. **2**, 1 – 15.

Kuzevanov, V., & Sizykh, S., 2006. Botanic gardens as resources: tangible and intangible aspects linking biodiversity and human well-being. *Hiroshima Peace Science*., **28**, 113–134.

Miller, B., Conway, W., Reading, R. P., Wemmer, C., Wildt, D., Kleiman, D., Monfort, S., Rabinowitz, A., Armstrong, B., & Hutchins, M., 2003. Evaluating the conservation mission of zoos, aquariums, botanical gardens, and natural history museums. *Conserv. Biol*., **18**, 86–93.

Primack, R. B., & Miller-Rushing, A.J. 2009. The role of botanical gardens in climate change research. *New Phytol*., **182**, 303–313.

Saz-Salazar, S. D., Rausell, & Koster, P., 2008. A double-hurdle model of urban green

areas valuation: dealing with zero responses. *Landscape Urban Plan*., **84,** 241–251.

South African National Biodiversity Institute (SANBI), 2006. In: Annual Report 2005–2006. SANBI, Claremont.

Vergou, A. & Willison, J., 2013. Communities in Nature: Growing the Social Role of Botanic Gardens. Botanic Gardens Conservation International. Richmond, Surrey, UK

Ward, D. C., Parker, C. M., & Shackleton, C. M., 2010. The use and appreciation of botanical gardens as urban green spaces in South Africa. *Urban For Urban Gree*., **9**: 49–55.

Received: 05-10-2015 **Revised: 15-01-2016** **Accepted: 07-03-2016**