

Environmental significance of botanical gardens in megacities and their role in Education for Sustainable Development

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Botanical gardens in a modern city

Botanical gardens went a long way, evolving from small medicinal herb plots to modern natural science centres. At first they were small kitchen gardens, often cultivated by hospitals and pharmacies, growing only medicinal herbs. As contacts with Europe became more extensive, starting in the 1730s, rare and exotic plants started being grown for amusing the city public. Gradually collections the gardens possessed grew, and their principal function became categorization of plant communities, often in relation to a specific region. During that period many gardens evolved in this way, but only two of them still exist in Russia: the Apothecary Garden in Moscow and the botanical garden at the Botanical Institute of the Russian Academy of Sciences in St. Petersburg. The gardens' activities were purely botanical for over a hundred years. In mid-twentieth century, as molecular biology and genetics evolved, selective breeding and in-depth study of plant morphology became one of their main functions. The gardens become institutions doing research only.

As cities grow and natural ecosystems retreat for dozens of miles, botanical gardens, which are now located virtually in city centres, acquire a totally different significance for city residents. For many of them it is the only opportunity to go "back to nature".

However, in modern megacities botanical gardens should be not only recreational centres, but also research and education facilities in natural science. These days botanical gardens are historical sites of horticulture and park design, with the widest variety of plants and diverse plant groupings; they are biodiversity focal points, key areas of the city ecosystem. Municipal botanical gardens, due to their location, functions, substantial track record, are exceptional objects of comprehensive study, not only botanical, but faunal, pedological, ecosystem and even sociological. Such studies are of vital importance for the municipal economy, as botanical gardens consistently confirm the feasibility of sustainable development under strong anthropogenic stress.

As municipal recreation centers, the gardens can be effective means of outreach on environmental technologies and nature protection. Their principal goal is to ensure preservation of natural communities while developing the recreational capacity of the site. This task should be performed while providing information content for the gardens, to enable visitors to access significant amount of easy-to-grasp additional information which forms part and parcel of environmental literacy.

Moscow's know-how in environmental education

Making the public environmentally literate is a significant and tangible step towards increasing the number of concerned stakeholders. Environmental literacy should be a must, just as the ability to read and write. Citizens with a proactive stance can design the city image and participate in its life. An example of such activities is the annual Flowers by Your House competition held by the Department of Environment Protection of Moscow city for apartment house residents landscaping the territory near their houses. Each year prizes go to 30 houses and hundreds of people who contributed to developing the territory. Competition results are highlighted in publicly displayed photos of the best yards created by Muscovites. Such competitions are just one of the methods of reminding the residents what nature actually is.

The Moscow city authorities make promoting environmental education one of their priorities. The Young Environmentalist Club has been working in the Moscow State University Botanical Garden (retaining its

ancient name Apothecary Garden) for over eight years. The club is also running a training program for school teachers, thus extending its coverage. The first city ecological trail was laid in the Vorobyovy Gory nature reserve in 2005, and since then over 100 000 people have visited it. Projects for establishing other trails are being drafted in other specially protected nature sites. Management of the specially protected nature sites is setting up young environmentalist clubs, which can compensate inadequate out-of-school education.

Botanical gardens, active in the international Education for Sustainable Development programme, should serve as focal points in developing the environment clubs system. This would make a two-tier system, with botanical gardens as regional centers, and environment clubs as components of the territorial education centers system.