

G.T. Sitpayeva

RSE “Institute of Botany and Phytointroduction” of CS of RK MES, Almaty, Republic of Kazakhstan  
[sitpaeva@mail.ru](mailto:sitpaeva@mail.ru)

## CONCEPT OF DEVELOPMENT OF THE ASTANA BOTANICAL GARDEN

**Abstract.** To date, the steppe ecosystems of the Republic lacked research institutions that develop theoretical and applied issues of introduction and green construction in the region. The basis for the design of the Botanical garden in the territory of Northern Kazakhstan was the Protocol of the meeting with the participation of the First President of Kazakhstan N. A. Nazarbayev on April 11, 2012. In 2012, the RSE on the ECC "Institute of Botany and Phytointroduction" of the SC at Kazakh MSE presented a natural-scientific justification for the creation of a Botanical garden in Nur-Sultan. The official opening ceremony of the Astana Botanical garden with the participation of the First President of Kazakhstan N. A. Nazarbayev was held on July 2, 2018.

In accordance with the Law "On protected areas" of Kazakhstan (2006), the main activities of the state botanical gardens is the development of scientific fundamentals of preservation, reproduction and use of fauna of Kazakhstan, development of the flora of Kazakhstan, of global significance [article 58]. State Botanical gardens are used in accordance with the established procedure for scientific, cultural, educational and educational purposes.

The developed Concept of development of Nur-Sultan Botanical Garden of is aimed at laying the foundations for its development as a multifunctional leading research, educational, cultural, educational and environmental institution in Northern and Central Kazakhstan. Botanical Garden of our capital should become a testing ground and demonstration of "green technologies", technologies of preservation of the genetic Fund of plants, modern agricultural technologies, training technologies and "mass media" propaganda.

The studies formulated the concept of development of Nur-Sultan Botanical Garden, set objectives, direction and prospects of the Botanical Garden in Nur-Sultan in accordance with the Law "On protected areas" of Kazakhstan (2006), while illustrating effective ways in implementing educational, cultural and social activities.

**Keywords:** Botanical garden, Nur-Sultan, collections, research direction, social and educational objectives.

**Introduction.** To date, in North Kazakhstan, and in general in the steppe zone of the Republic, there has been no introduction research institution developing theoretical and applied issues of green construction in the region. The Protocol of the meeting with the participation of the First President of Kazakhstan N.A. Nazarbayev on April 11, 2012 was the basis for the design of the Botanical Gardens of the capital of our Republic.

In 1999, the Ministry of Natural Resources and Environmental Protection of the Republic of Kazakhstan published “The National Plan for Action for the Conservation and Balanced Use of Biological Diversity”. This plan included the project 2.2.1 "Development of a scheme for the development of specially protected natural territories and the Establishment of reserves, national parks and of the Botanical garden in the city of Astana." On August 15, 2001, the Resolution of the Bureau of the Mazhilis of the Parliament of the Republic of Kazakhstan “On the Master plan of the city of Astana, providing for the establishment of a botanical garden in the city of Astana” was adopted [1].

In 2003, the Institute of Botany and Phytointroduction of the Ministry of Education and Science of the Republic of Kazakhstan performed the research, titled “Development of Inventory of Green Spaces and of the Integrated Scheme for the Layered Nature Conservation of Astana” (Implemented by S.V. Chekalin,

Ph.D). Based on the results of this research, an opinion was formed that “for the purposes of holding of introduction research of plants the establishment of the botanical garden in Astana is expedient (Report of RSCE “Institute of Botany and Phytointroduction” of the RK MES, 2003). This opinion was taken into account by the SE “Astanagenplan” and the issue of establishment of the botanical garden in the city of Astana was included in the priority design projects for the years 2004-2005. In the 2012 we produced a feasibility report for the establishment of the botanical garden in the city of Astana.

In 07.01.2018 in Nur-Sultan was held on an International Academic and Practical Conference with the participation of leading scientists from Russia, Belarus, Ukraine, Germany, France, “Establishment and development prospects of the botanical garden of Astana in the conditions of the sharply continental climate. "Theory and Practice" at which a decision was made to establish an International Scientific and Technical Council for the development of a new botanical garden. The establishment and opening of a botanical garden are a unique event not only for an individual state, but also an event that has major international implications [2].

The official opening ceremony of the Astana Botanical Garden with the participation of N. A. Nazarbayev, the First President of Kazakhstan was held during the celebration of the 20th anniversary of the new capital of the Republic of Kazakhstan (July 2, 2018).

#### Land area of Nur-Sultan and its zoning

The total area of the botanical garden is 47.7 hectares. In accordance with paragraph 1 of Article 63 of the Law of the Republic of Kazakhstan "On Specially Protected Natural Territories" the following zones shall be specified in the state botanical gardens:

- 1) Exposition - for plant cultivation and visitors' access;
- 2) Scientific - for the performance of scientific research and preserving collections of the plant gene pool; the zone includes introduction nurseries, plantations of plants for replication, experimental plots and reserve territories for the development of the above-mentioned plantations and collection plots.
- 3) Public - to serve visitors; the zone includes the parterre of the botanical garden adjacent to the main entrance, the administrative building and the stock greenhouse.
- 4) Administrative and production and economic zone - the zone includes protective plants, a machine and tractor fleet, a road network of the botanical garden.

At present, the balance of areas broken down by the zones in the botanical garden of Astana has not yet been finally established. Speaking about the use of land, they usually mean its functioning in the field of production [3], the lands of the state botanical gardens of the Republic of Kazakhstan have a special purpose aimed at introducing tests of new plant species and for their further use in landscaping of regions.

**Objectives and Focal Areas of Research.** In accordance with the Law "On Protected Areas" of the Republic of Kazakhstan (2006) [4], the main activities of state botanical gardens shall include the development of academic fundamentals for the conservation, reproduction and use of the plant world of Kazakhstan, the use of Kazakhstan's flora resources of global importance [Article 58]. The State botanical gardens shall perform academic research on the introduction and selection of natural, cultural, domestic and global flora, as well as on the study, conservation and effective use of the plant world of Kazakhstan ... "[Article 61]. In the state botanical gardens, there shall be established collection and experimental plots, herbaria, nurseries and seed funds [article 60] ...

The state botanical gardens are used in the established procedure for scientific, cultural, educational and educational purposes. In addition to it, the State Botanical Gardens of Kazakhstan are deemed to be the institutions entrusted with the task of implementing the Global Strategy for Plant Conservation adopted within the framework of the International Convention for the Conservation of Biodiversity, ratified by Kazakhstan in 1994.

The development concept of the Botanical Garden of Astana is aimed at laying the foundations of its development as a leading multifunctional research, educational, cultural, educational and environment protection institution in Northern and Central Kazakhstan. Astana Botanical Garden should become a testing ground for the testing and demonstrating “green technologies”, technologies for preserving the plant genetic pool, contemporary agricultural technologies, educational technologies and “mass media” propaganda.

The provisions of this Concept shall determine the following main focal areas of development of the Astana Botanical Garden:

- studies of the natural flora of Kazakhstan as a whole, and in particular the regional flora of Northern, Central, Eastern and Western Kazakhstan (inventory, taxonomic studies, genotyping);
- introduction of plants of natural and of global flora;
- preservation of plant diversity using all forms and methods: creating a collection of living plants of open and closed soil, in vitro plant collections; development of technologies for long-term storage of seeds in different conditions;
- development of technologies for the conservation and rational use of plant resources of Northern and Central Kazakhstan, the use of genetic resources of the global flora in enhancing and developing the economy of Kazakhstan (not only agricultural issues, but also medicine, industry based on plant materials);
- development of the role of the Botanical Garden in the landscaping of the capital of the Republic of Kazakhstan and of the region as a whole;
- Ecological and botanical education of the population of different age and social groups; increasing the effectiveness of the Botanical Garden as a base for professional training of specialists;
- organization of environmental and recreational activities;
- development of the material and technical base of scientific laboratories of the Botanical Garden.

For ensuring educational work the following shall be necessary:

- The formation of the center of field practices of students of the Faculty of Biology of ENU named after Gumilyov and of other universities of the city of Nur-Sultan;
- development of focal areas of use of the collection and scientific resources of the Botanical Garden in the training of students on bachelor university courses, masters and PHD doctoral students in biological specialties of universities and other educational institutions of higher and secondary special education in the capital of the Republic of Kazakhstan and, possibly, other regions of Kazakhstan;
- development and implementation of new forms of using the resource base of the Botanical Garden for the implementation of additional educational programs, continuing training courses for school teachers, forestry specialists, specialists in green building, etc .;
- Establishment of complexes of teaching materials for various purposes

**Improving the effectiveness of the system of environmental education of citizens, including students:**

The implementation of “Zhangyru-Yel” programme of the RK President shall allow to improve the work for environmental education and training in the region up to an entirely new, high level, consistent with the needs for sustainable social and economic development of the region.

In doing so, the following is planned:

- introduction of a set of environmental and educational events for various population groups, including thematic guided tours, scientific, methodological and cultural educational seminars and the implementation of training programs;
- Creation of new and replenishment of existing demonstration exhibitions, laying of ecological paths;
- Establishment of the Museum of Nature of the region;
- expansion of work with educational institutions of Nur-Sultan and the region on the formation and study of ex-situ populations of rare plants of local flora in school areas;
- the revival of the SAS (Small Academy of Science for Schoolchildren), the establishment of "Green Schools", the station of young naturalists on the basis of the Astana Botanical Garden, etc.

Organization of environmental and recreational activities

Due to its location in the center of the cosmopolitan city, the Botanical Garden of the capital needs, in addition to implementing its main objectives, to build a certain system of relations with various categories of visitors and direct interaction with the urban population. For guaranteed preservation of collection funds under these conditions, there shall be necessary an effective and reliable system for regulating recreational workload, including:

- adjustment of the functional zoning of the territory of the Botanical Garden and a differentiated approach to zone-making taking into account the modern requirements;
- the establishment in the area with increased frequency of visits (in the public and exhibition areas) of the material and information infrastructure conforming with its objectives (road and path network, fences);

- the establishment of an effective system for the protection of collection funds using modern information technology;
- commercialization of environmental and recreational activities;
- arrangement of the buffer (security) zone of the Botanical Garden to reduce the intensity of recreational and other urbanistic workload related to the specially protected natural area (status not known yet);
- the formation of a system of interaction with the media in the interests of developing environmental and legal and cultural and aesthetic consciousness of citizens.

Currently, the Astana Botanical Garden performs research within the framework of targeted funding for scientific and technical progress: “Implementation by the State Botanical Gardens of Kazakhstan's priority of academic and practical tasks of the Global Strategy for Plant Conservation as a sustainable system for maintaining biodiversity” (2018-2020), aimed at solving methodological issues, related to the creation and laying of collection funds in the state botanical garden of Astana.

A grant project is being implemented: “Academic support for the establishment of a state botanical garden in the city of Astana: development of prospective lists of collection funds of arboreal plants, and mobilization of reproduction material for their establishment” (AR05133161) for 2018-2020.

The activities of the Botanical Garden of Astana shall be an integral component in ensuring sustainable social and economic development of the region. For its effective provision, there shall be necessary the adoption and implementation in 2020-2023 of a special targeted state program ensuring the sustainable development of the botanical garden of the city of Nur Sultan.

***Selection of the most suitable and effective administrative and organizational structure of the garden:***

- The selection or the availability of administrative structure of the botanical garden must be dictated by a combination of complex interrelated social and practical realities, with the obligatory consideration of potential sources of funding and support from interested parties.
- The organizational structure of the botanical garden must reflect the main directions of the garden: the development of science, education, working with visitors, the maintenance of the territory of the garden and of the collection fund, administrative facilities.

***Conformity of the Botanical garden to international quality standards:***

At present, an international academic and technical council for the development of the Astana Botanical Garden has been created, which, along with scientists from Kazakhstan, includes leading scientists from Russia, Belarus, Ukraine, Germany, France.

The Botanical Garden of Nur-Sultan is a member of the Council of Botanical Gardens of Kazakhstan and from the first days of its establishment it has maintained and developed cooperation with more than 30 botanical gardens of the world (Russia, Belarus, Ukraine, Botanical Gardens of Central Asia, China, South Korea, USA, France, Germany, Italy, Hungary, Bulgaria). The methodological fundamentals of its activities are determined by the Council of Botanical Gardens of Russia, Belarus and Kazakhstan, and the International Council of Botanical Gardens for Plant Protection (BGCI - Botanic Gardens Conservation International, Kew, U. K.).

***The social role of the Botanical Garden on local, regional and national levels:***

- aesthetic appeal, accessibility, comfortable environment for visitors;
- creation of new jobs;
- expanding the profitability of ecological tourism with the engagement of the local community (souvenir products and other products based on local crafts, folk phytomedicine, etc.);
- assisting or assisting the local population in fulfilling Kazakhstan's international obligations (for example, implementing environmental education of citizens in the context of “Education for Sustainable Development program” programme)
- development of plant genetic resources for landscaping the region and the city of Nur-Sultan (development of nurseries);



- social and recreational importance for residents and visitors of the city and region; The Botanical Garden - as an object of national and local pride, the participation of the Botanical Garden in the cultural activities of the cosmopolitan city and of the Republic as a whole;

- the availability of information on the activities of the botanical garden for the conservation of plants and their habitats.

**The Closest Prospects:**

1. In accordance with world trends, the Herbarium Fund, the Seed Bank of Kazakhstan's Natural Flora and paleobotanical collections will be created. The Institute of Botany and Phytointroduction of CS of RK MES is ready to transfer part of these collections, more than 70 thousand samples out of herbarium fund and about 3 thousand samples of seeds.

2. We have a unique paleobotanical collection of plants that were discovered for the first time in the world in Central Kazakhstan in 1890. Their transfer to the Astana Botanical Garden is symbolic - they will return to their "native land".

3. Development of introduction research, development of prospective lists and laying of collection funds and expositions of plants of natural and global flora;

4. Creation of scientific laboratories,

5. Creation of an information and educational center. For the development of excursion related activities, a mobile application "Electronic Guide" shall be designed. Astana Botanical Garden should become a place of attraction for citizens where they can not only relax, but also have the opportunity to take master classes and receive training in gardening. The creation of the Botanical Garden in Nur Sultan will increase the prestige of the capital of Kazakhstan as one of the tourist centers.

**Medium-term and Long-term Development Prospects:**

1. Establishment of collection funds of live plants of natural and global flora;

2. Development of effective range of plants for green planting in Northern and in Central Kazakhstan;

3. Development of new concept of green planting in the city of Astana;

4. Construction in the botanical garden of Astana of a greenhouse with differentiated climatic conditions with the involvement of both public funds and private investment.

5. Construction of the Tourist centre (from Kabanbai batyr street) which will house: a tour desk, a conference room, a library, classrooms for working with schoolchildren and students; Museum of Nature (a steppe biome can become the main line of a museum exposition, which can be organized as a story about the history of its formation, as the evolution of steppe species (including animals), the current condition and factors supporting the functioning of the system.

The main provisions of this Concept and the appropriate set of measures aimed at its implementation are aimed at implementing the main objectives of the development of the Astana Botanical Garden:

- development of a comprehensive plan of regional events for the development of the Botanical Garden of Nur-Sultan as a unique multifunctional academic and educational center of Northern and Central Kazakhstan in the system of higher professional and additional education;

- Establishment of a regional center for the conservation of genetic resources of the global and of regional flora in a cultural setting;

- Establishment of a regional educational and academic center for environmental education on the basis of the Botanical Garden;

- commercialization of the results of academic activities of the Astana Botanical Garden for the purposes of ensuring sustainable social and economic development of Kazakhstan.

A little over a year has passed since the opening of the Astana Botanical Garden, but we have already implemented some of the most important objectives of the developed concept:

1. Development and approval of the Master Plan for expositional, collection and academic sites and introduction nurseries of the botanical garden with the determination of the area of each of them;

2. Development of prospective lists of plants for all areas, designed as part of the botanical garden;
3. Mobilization of seed and planting material of plants provided for by prospective lists;
4. Organising introduction nurseries and beginning of performance of initial plant tests on them;
6. The initial formation of collection sites and continuing of primary introduction tests.

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**Г.Т. Ситпаева**

ҚР БҒМ ҒК РМК «Ботаника және фитоинтродукция институты»

### **АСТАНА БОТАНИКАЛЫҚ БАҒЫНЫҢ ДАМУ КОНЦЕПЦИЯСЫ**

**Аннотация.** Қазіргі уақытқа дейін Республиканың дала экожүйелерінде жерсіндіру мен жасыл құрылыстың теориялық және қолданбалы мәселелерін құратын ғылыми-зерттеу мекемелері өңірде болған жоқ. Солтүстік Қазақстан аумағында ботаникалық бақты жобалауға 2012 жылғы 11 сәуірдегі Қазақстан Республикасының Тұңғыш Президенті Н. Ә. Назарбаевтың қатысуымен өткен кеңестің хаттамасы негіз болды. 2012 жылы ҚР БҒМ ҒК "Ботаника және фитоинтродукция Институты" ШЖҚ РМК Астана қаласында ботаникалық бақ құрудың жаратылыстану-ғылыми негіздемесін жасады. Қазақстан Республикасының Тұңғыш Президенті Н. Ә. Назарбаевтың қатысуымен Нұр-Сұлтан қаласының ботаникалық бағының ресми ашылу рәсімі 2018 жылдың 2 шілдесінде өтті.

ҚР "ЕҚТА туралы" Заңына сәйкес (2006 ж.) мемлекеттік ботаникалық бақтардың негізгі қызметіне Қазақстанның өсімдіктер дүниесін сақтау, өсіру және пайдаланудың ғылыми негіздерін жасау, әлемдік маңызы бар Қазақстан флорасының ресурстарын игеру жатады [58 бап]. Мемлекеттік ботаникалық бақтар белгіленген тәртіппен ғылыми, мәдени-ағарту және білім беру мақсаттарында пайдаланылады.

Нұр-Сұлтан қаласының ботаникалық бағын дамытудың әзірленген Концепциясы оның Солтүстік және Орталық Қазақстандағы көпфункционалды жетекші ғылыми-зерттеу, білім беру, мәдени-ағарту және табиғат қорғау мекемесі ретінде дамуының негізін қалауға бағытталған. Нұр-Сұлтан қаласының ботаникалық бағы "жасыл технологияларды", өсімдіктердің генетикалық қорын сақтау технологияларын, заманауи агротехнологияларды, "масс-медианы" насихаттау және оқыту технологияларын сынау полигонына айналуды тиіс.

Зерттеу нәтижесінде Нұр-Сұлтан қаласының ботаникалық бағы дамуының Концепциясы тұжырымдалды, ҚР "ЕҚТА туралы" Заңына сәйкес Нұр-сұлтан қаласындағы ботаникалық бақтың міндеттері, бағыттары мен даму перспективалары анықталды (2006 ж.), білім беру-ағартушылық және мәдени-әлеуметтік қызметті жүзеге асырудың тиімді жолдары көрсетілді.

**Түйін сөздер:** Ботаникалық бақ, Нұр-Сұлтан к., коллекциялық қорлар, зерттеу бағыттары, әлеуметтік және білім беру міндеттері.

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**Г.Т. Ситпаева**

РГП «Институт ботаники и фитоинтродукции» КН МОН РК

### **КОНЦЕПЦИЯ РАЗВИТИЯ АСТАНИНСКОГО БОТАНИЧЕСКОГО САДА**

**Аннотация.** До настоящего времени в степных экосистемах Республики отсутствовали научно-исследовательские учреждения, разрабатывающие теоретические и прикладные вопросы интродукции и зеленого строительства в регионе. Основанием для проектирования Ботанического сада на территории Северного Казахстана послужил Протокол совещания с участием Первого Президента Казахстана Н.А. Назарбаева от 11 апреля 2012 года. В 2012 году РГП на ПХВ «Институт ботаники и фитоинтродукции» КН МОН РК было сделано Естественно-научное обоснование создания ботанического сада в столице Республики Казахстан. Официальная церемония открытия Ботанического сада в г. Нур-Султан с участием Первого Президента Казахстана Н.А. Назарбаева состоялась 2 июля 2018 г.

В соответствии с Законом «Об ООПТ» РК (2006 г.), к основной деятельности государственных ботанических садов относится разработка научных основ сохранения, воспроизводства и использования растительного мира Казахстана, освоение ресурсов флоры Казахстана, имеющих мировое значение [статья 58]. Государственные ботанические сады используются в установленном порядке в научных, культурно-просветительских и учебных целях.

Разработанная Концепция развития Ботанического сада г. Нур-Султан направлена на то, чтобы заложить основы его развития как многофункционального ведущего научно-исследовательского, образовательного, культурно-просветительного и природоохранного учреждения в Северном и Центральном Казахстане. Ботанический сад столицы должен стать полигоном испытания и демонстрации «зеленых технологий», технологий сохранения генетического фонда растений, современных агротехнологий, технологий обучения и «масс-медиа» пропаганды.

В результате исследований сформулирована Концепция развития определены задачи, направления и перспективы развития Ботанического сада г. Нур-Султан в соответствии с Законом «Об ООПТ» РК (2006 г.), показаны эффективные пути в осуществлении образовательно-просветительской и культурно-социальной деятельности.

**Ключевые слова:** Ботанический сад, коллекционные фонды, направление исследований, социальные и образовательные задачи.

**Information about author:**

Sitpayeva G.T. - academician of KazNANS, doctor of biological sciences, general director of RSE “Institute of Botany and phytointroduction” CS MES RK, Almaty, Kazakhstan, [sitpaeva@mail.ru](mailto:sitpaeva@mail.ru), <https://orcid.org/0000-0003-4614-6155>

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