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## ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК  
РЕСПУБЛИКИ КАЗАХСТАН

## NEWS

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OF THE REPUBLIC OF KAZAKHSTAN

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## NEWS

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**VERTICAL GARDENING OF THE BOKEYKHAN CAMPUS**

**Abstract.** The environmental situation is the subject of special attention of social movements, mass media and general public for cities of the Republic of Kazakhstan. The ecological situation of cities is a «mirror» which reflects the level of the socio-economic situation of the country, therefore it is no accident that information on the environmental situation in Kazakhstan is widely available and occupies one of the leading places in the political and public life of the society.

**Key words:** vertical gardening, thuja, juniper, parthenocissus, piestany.

**Introduction.** The environmental situation is the subject of special attention of social movements, mass media and general public for cities of the Republic of Kazakhstan. The ecological situation of cities is a «mirror» which reflects the level of the socio-economic situation of the country, therefore it is no accident that information on the environmental situation in Kazakhstan is widely available and occupies one of the leading places in the political and public life of the society.

The problem of protecting the environment, creating normal conditions for life and human activity becomes increasingly difficult with the growth of the city of Semey and the development of its industry. In recent decades, the negative impact of human on the environment and, in particular, on green plantations has increased. The problem of green massifs (city parks, forests, gardens, meadows) is one of the most important environmental problems in the city. The relevance of the topic being developed is also conditioned by the fact that landscaping and gardening is the most important area of activity of the city Local Administration. It is in this sphere that those conditions are created for the population which ensures a high standard of living. Thus, conditions are created for a healthy, comfortable and convenient life as for an individual in the place of residence.

**Work objective:** is to generalize the theoretical foundations on organizing the management of landscaping and gardening of the city of Semey, to study the experience of foreign countries in this area, and to develop recommendations for improving the management of landscaping and gardening at the city level.

The authors set the following tasks to achieve this purpose:

- to determine the role of city landscaping in the formation of the urban environment;
- to study the main directions of gardening and landscaping of the city of Semey;
- to develop proposals for improving the management organization of landscaping and gardening of urban areas.

The *object* of study is the Bokeykhan Campus of the Shakarim State University of Semey.

The *subject* of study is measures for the landscaping and gardening of the territory of the Bokeykhan Campus of the Shakarim University of Semey.

The *scientific novelty* of this study is, first of all, the analysis of the management organization of the system of landscaping and gardening of urban areas.

Features and problems of the management organization of gardening and landscaping are investigated on an example of the city of Semey. In this work, the materials of sociological research obtained as a result of the survey of Semey residents are involved in the scientific circulation. Also the specific

recommendations on management optimization of landscaping and gardening of Semey are offered in the work.

**Methods.** Consists in the possibility of using the results and conclusions in improving the management system of landscaping and gardening of the city.

The work is based on a systematic approach in which the following methods were used: historical that examined the history of the centuries-old experience of urban development, landscaping and gardening, comparative.

**Gardening system of a modern city.** It is very important in modern conditions to preserve and improve the environment surrounding the person in the city, to create conditions in the city that have a beneficial effect on the person's psychophysical state which is especially important in the period of intensive urban growth, development of all kinds of transport, increase of tone of urban life every year. Green plantations affect the temperature and humidity regime: even a small green massif reduces the temperature in the summer by several degrees, not only inside itself, but also in the surrounding areas. Green plantations affect the ionization of air, and plantations have a large evaporation capacity [21]. Green plantations play important role during the gas exchange: they absorb carbon dioxide and release oxygen. Their this property is used in urban conditions. Green plantations participate in this process in different ways. For example, a poplar almost 7 times larger than a common tree, it absorbs carbon dioxide and releases oxygen, the oak leaves 4,5 times, the large-leafed linden 2,5 times. We should take into account the activity of green plantations in this process when selecting trees and shrubs for urban conditions.

**Management of landscaping and gardening in the city of Semey.** Issues of local importance include organization of landscaping and gardening of the settlement, use, protection, prevention, reproduction of urban forests, forests of specially protected natural areas located within the population locality of settlements.

Currently, the areas of green plantations in almost all large cities and other population localities of the Republic of Kazakhstan do not correspond to urban planning standards. In connection with the intensive construction, development of outdoor advertising, street trade, as well as in the absence of planned materials for urban development, the areas of greenery are being reduced everywhere leading to a deterioration in the quality of the environment. At the same time, it is the green plantations that are one of the perfect and relatively cheap methods of optimizing the urban environment. Gardening of cities and other population localities was carried out and continues to be carried out by outdated methods, without taking into account the state of the environment and the environmental protection properties of green plantations.

Considering the management of landscaping and gardening of the city of Semey.

The city of Semey is an industrial and cultural center of the Republic of Kazakhstan. The population of the city on January 1, 2017 was 298,1 thousand people.

Some of the main indicators and criteria are:

- implementation of programs of social and economic development of the city (district center, village, rural area);
- implementation of the housing and communal services reform program;
- implementation of the energy conservation program;
- implementation of a program to adapt social and industrial infrastructure for access to disabled people;
- the amount of funds from all sources of financing for improving the city's amenities (district center, village, rural area);
- level of provision of the population with green plantations;
- level of provision of children's and sports playgrounds;
- state of sanitary maintenance of the city (village, rural area);
- volume of completed housing and communal construction;
- level of improvement of the housing stock by the main types of engineering equipment;
- state of transport services for the population and road safety;
- architectural appearance and preservation of historical heritage and other indicators and criteria that determine the qualitative level of improvement and the state of the infrastructure of the city (village, rural area), etc.

Carrying out of such competitions is one of the effective elements of management, since it allows to evaluate the work of local self-government bodies in different fields of activity.

The inspection of outdoor advertising, information and improvement of the city in accordance with a specific statute aims to perform the following functions [20]:

- control over the precise and timely implementation of standard rules for external improvement of the city;
- control over the observance of cleanliness and order by enterprises, institutions and citizens;
- combating violations of established norms and rules in the construction and production of excavations;
- control over the installation and placement of outdoor advertising and information;
- installation and placement of outdoor advertising and information;
- provision of services for the laying, processing and maintenance of gardens, parks and other green plantations;
- improvement of cemeteries;
- demolition of green plantations;
- organization of registration of children's playgrounds and New Year trees;
- architectural activity;
- construction of sports facilities, etc.

The Environmental Protection Department coordinates the work to ensure a favorable environment for the population, ensuring the implementation of environmental legislation in the city of Semey.

One of the main ecological tasks of the city of Semey is:

- creation of protective forest plantations (continuous forest massifs, stump forests, forest belts) on degraded lands;
- increase of areas under green plantations of common use;
- carrying out accounting and inventory of the green fund with the establishment of town planning regulations in terms of their use and creating a register of green spaces.

A special role in gardening should be given to the removal of trees and shrubs which is made in accordance with the Rules. The main developers of these Rules are specialists of the Environmental Protection Department whose powers include issuing permits for the seizure, pruning, transplanting of trees, shrubs, lawn and flower beds.

**Analysis of the main directions of landscaping and gardening in the city of Semey.** It is very important in modern conditions to preserve and improve the environment surrounding the person in the city, to create conditions in the city that have a beneficial effect on the person's psychophysical state which is especially important in the period of dynamic urban growth, development of transport and improving the tone of urban life.

The landscaping and gardening of population localities becomes particularly important in conditions of increased technogenic load of the territory, pollution of the air environment by emissions from motor vehicles and industrial enterprises. They are able to significantly improve the ecological status and appearance of the city, create more comfortable microclimatic, sanitary and hygienic and aesthetic conditions in the streets, in residential apartments, public places when implementing a set of measures.

The need to maintain air purity and improve the human environment is enshrined in the Constitution of the Republic of Kazakhstan. The gardening plays an important role in solving this problem.

The urgency of the theme being developed is due to the fact that landscaping and gardening is the most important area of urban development. It is in this sphere that conditions are created that ensure a high level of the quality of population life. Thus, conditions are created for a healthy comfortable, convenient life both for an individual in the place of residence, and for all residents of a city, district, or microdistrict.

Semey belongs to a group of dynamically developing cities. It is becoming more attractive for investors, for the implementation of industrial, town-planning, cultural and recreational, sports, scientific, educational projects that contribute to the formation of the image and prospects for the city development.

The activities for the landscaping and gardening of the city of Semey deserve special attention considering the large industrial load on the territory.

The concept of «urban area improvement» includes the work on the construction, reconstruction, repair and maintenance of the city road network, bridges, tunnels, overpasses, maintenance and development of lighting networks, recreation zones, landscaping of urban areas, maintenance of public toilets, maintenance and development of storm sewage facilities, organization of sites for dog walking, integrated development of intra-forest territories.

The following hypotheses were put forward during the research:

The main hypothesis of the study is that there are problems in the work of state institutions, enterprises in matters of landscaping and gardening of the territory.

Additional hypotheses of the study:

– participation of the population in the landscaping and gardening of residential yards will improve the condition of the courtyard territories, and increase the degree of social satisfaction, microclimate;

– the urban residents are ready to take part in landscaping and gardening of Semey.

The following tasks were set to confirm or refute the hypotheses put forward:

– to study the legal documents on the subject of the research;

– to analyze reports, certificates and information about landscaping and gardening of the «city of Semey»;

– to study the opinion of the population on the landscaping and gardening of the city of Semey;

– to determine the level of landscaping and gardening of the city;

– to determine the willingness of the population to participate in works on landscaping and gardening of yards;

– to identify the most important problems of landscaping and gardening.

The respondents agreed that landscaping and gardening is very important for the city. Given the man-caused strain on the city of Semey.

The most exciting problems of landscaping and gardening for the population are street lighting, the maintenance of the road arrangement of recreational areas with benches, urns. Cleaning the territory, arranging lawns and flower beds and planting trees and shrubs is less problematic. This is due to the fact that the city is actively working in these areas from the city services.

Indeed, good conditions have been created for the active involvement of the population in the landscaping and gardening of the urban area. These are held in the city on an annual basis: voluntary Wednesday and Saturday works; tree planting, etc. The participation of the population in the creation of landscaping, tree planting will help to bring up in a person a sense of responsibility, a desire to protect and multiply the created cosiness.

The respondents were also asked about what facilities are lacking in the city. And the list of objects of a landscaping was offered. The most popular response was the lack of green areas for recreation and urban gardens. It is obvious that the population is preoccupied with a small number of places intended for rest and walking.

In order to reduce the impact of harmful anthropogenic factors the need to increase the area of green plantations is increasing: the arrangement of cultural and mass recreation facilities for the population, parks and squares, the extension of the protective strips of plantations of main roads along the city streets, forbidden plantations along rivers and reservoirs, and the strengthening of sanitary protective plantations around the city.

These recommendations reflect all the strengths and weaknesses of the problem of landscaping and gardening of the yard area, showed the attitude of the residents of the city of Semey to the problems of landscaping and gardening of the urban area.

The branch of green economy in the city of Semey is rapidly developing. First of all, it is connected with a complicated ecological situation, pollution of harmful substances in the city's production of air and soil which has a disastrous effect on plants, but meanwhile they are able to quickly and effectively improve the quality of the urban environment.

Thus, the following conclusions can be drawn after studying the current state of landscaping and gardening «City of Semey».

Works on the landscaping and gardening of the city are being conducted quite intensively. But there are problems of landscaping and gardening which require timely solutions. Financing for the maintenance and improvement of roads is allocated relatively less than planned. Due to inadequate financing during the



last 5 years communal equipment of utility companies has not been renewed, and without that it is difficult to rely on high-quality maintenance of streets, roads, timely removal of domestic waste. The parking problem also does not see its full solution. Car owners need parking spaces, pedestrians do not want to experience the inconveniences associated with cars. A significant number of green plantations in the city planted with violations of building codes and regulations. It is necessary to develop measures for the implementation of optimal development of the territory of the population localities having studied the system of landscaping and gardening of Semey, and highlighting the main problems of this area.

The properly selected and completed landscaping of the site is of great importance when performing the ennobling of the territory. Today we would like to stop our attention on vertical gardening. Such gardening is especially important because it has a large sanitary and hygienic value. We all know that perennial trees and shrubs will help create shade and moisture in the summer. And especially this is actual in the heat when trees are able to protect the building walls from overheating, they will help reduce the warm radiation. It becomes possible to increase the humidity of the air in virtue of the evaporation created by the climbing plants. And all this will help create the most favorable conditions for people to relax in the heat in the park zone of the campus. Foliage of plants will help to detain dust, it will help reduce city noise which will not enter the house.

In addition to the fact that vertical gardening fulfills its functional purpose, it also efficiently copes with its decorative and aesthetic function. It became possible to hide blind surfaces with the help of vertical landscaping, also it is possible to emphasize different architectural details of buildings and structures.

Vertical gardening by living plants is an original interior solution for planting a facade. Living plants create a cozy microclimate, emphasize the individuality of the owner and will probably surprise the guests, each product individually, the assembly of manual work, the module is autonomous and automated, requires minimal maintenance.

All the diversity of green walls was conventionally divided into 2 groups according to climatic criteria:

forexterior design (facades)

for interior design (green walls)

This technique (exterior design (facades) was first applied in the conditions of the East Kazakhstan region. Vertical gardening is a new direction in phytodesign.

Thujas of Brabant variety have been planted for the greening of the facade of the building on the lawn.

Height 165 cm – we propose to plant thujas on a lawn opposite each pilaster on both sides of the main entrance. Thujas will grow in width and form a beautiful fringing of the building. They tolerate our climate well, grow fast and tolerate the cutting well.

The central entrance is decorated with two ornamental plants, either conifers or myrtles. Or flowering bougainvilleas placed in beautiful vases of a composition from boxwood, ivy and flowering annuals.

#### **Advantages of natural vertical gardening of the office building facade**

- effective design
- will stand out against the background of ordinary buildings with an individual style and originality
- will attract attention of people surrounding with natural charm and comfort
- protection against overheating in hot weather
- plants on the surface of the walls and roof of the house will contribute to creating the most comfortable microclimate in the room in any weather moistening the air and cleaning it from harmful elements

- aesthetic appearance for a long time;
- year-round operation;
- high resistance to deterioration, natural factors (temperature changes, sunlight, does not burn out in the sun, does not freeze);

- does not allow to breed weeds; hygrosopicity;

- no need to water, mow, fertilize, sow.

#### **The main drawback of natural vertical gardening**

- danger of destruction of the building facade

- dampness of walls

- penetration of shoots of climbing plants in the facade slit
- do not smell
- do not moisten the air clearing it of toxins
- flammable

**Basic rules for care.** Once a week we need to slightly moisturize, if it's dry weather it improves the coupling with the base.

Once every two weeks we need to make small punctures in the lawn. This will improve the aeration, help avoid decay of the substrate from the condensate and prevent accumulation of water.

**Conclusions.** The authors proposed to develop an electronic map of Semey with the application of all green spaces with their quantitative and qualitative characteristics on the basis of the available inventory data having studied the system of landscaping and gardening in Semey city, and highlighting the main problems of this area. The presence of such a map will allow to optimize the work of the services coordinating the work on landscaping and gardening of the city territory.

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#### **СЕМЕЙ ҚАЛАСЫНДАҒЫ БӨКЕЙХАН АТЫНДАҒЫ КАМУСТЫҢ АЛДЫҢҒЫ БЕТІН ТІГІНЕН ЖАСЫЛДАНДЫРУ**

**Аннотация.** Қазақстан Республикасының қалалары үшін экологиялық жағдай әлеуметтік қозғалыстарға, бұқаралық ақпарат құралдарына және жұртшылыққа ерекше көңіл бөледі. Қалалардың экологиялық жағдайы - елдегі әлеуметтік-экономикалық жағдайдың деңгейін көрсететін «айна», сондықтан Қазақстандағы экологиялық жағдай туралы ақпарат кеңінен қолжетімді және қоғамның саяси және қоғамдық өміріндегі жетекші орындардың бірі болып табылады.

**Түйін сөздер:** тік көгалдандыру, боз арша, арша, қызжүзім, фитоқабырға.

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**ВЕРТИКАЛЬНОЕ ОЗЕЛЕНЕНИЕ ФАСАДА КАМПУСА  
ИМЕНИ БОКЕЙХАНА ГОРОДА СЕМЕЙ**

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**Ключевые слова:** вертикальное озеленение, туя, можжевельник, девичий виноград, фитостены.

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