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Improving the methodology for creating economic and institutional mechanisms for improving the level of urban areas

The purpose of the research is to study the renewal of the spatial and territorial environment of a city using the example of Barnaul. The key point of urbanized urban space is the concept of greening, since it is the most important component of the sphere of housing and communal services.

The issues of creating, preserving and improving the quality of green areas are relevant not only for the municipality, or the city of Barnaul, but also for each urban settlement of the Russian Federation. Intensified activities, abundant information, and a high pace of urban life lead to constant overstrain among city residents. In this regard, the presence of a well-groomed urban forest, landscaped parks, and ennobled river banks is of great importance. Currently, their condition is of concern to urban residents and there is a need to clean garbage, reconstruct the green zone, create reservoirs, make new alleys, restore fountains, clean the banks of urban rivers.

The objectives of the urban greening system are to create healthy, appropriate and favorable living conditions for the urban population, so the conceptual methodology will serve to calculate greening standards and the system of criteria for selecting green spaces. The comparative analysis of expert opinions on this relevant issue and the study of the cases of other Russian cities enable the co-authors to devise a method for calculating greening standards. Measures to improve the landscaping system in cities can be developed through the analysis of the current situation in the main sub-sectors of landscaping. In the future, this will allow us to design an "efficient" and, most importantly, socially-oriented urban space.

Keywords: landscaping concept, landscaping norm, green site selection criteria

INTRODUCTION

In the future, attention to urban regulation will inevitably increase, involving both management specialists and representatives of the research community in the process. [1] According to Wikipedia, the concept (from Lat. conceptio "system of understanding") is a system of ways to solve a problem¹. Increasing the level of greening of the territory is a vital problem for every city in the Russian Federation. First of all, the degree of greening of the territory allows not only to create comfortable conditions for the population, but also enriches the air with oxygen. Especially when cities become more boring, dull, and uninteresting due to industrialization [2].

One of the problems of landscaping in the city of Barnaul is lack of unified approaches. Some of the most exciting and effective plans take advantage of new ideas about what a plan should contain and how it can be presented [3].

One of the ways to get the population involved in solving urban development problems is the publication of important materials in newspapers and on the Internet, as well as television addresses to be made by government officials.

One of the forms of public involvement in landscaping is charity. It used to be a customary practice in the life of municipalities. Green spaces are planted randomly, not always taking into account such criteria as the soil composition, humidity and air temperature, the percentage of landscaping within the block, pests, landscape design of existing plantings, etc. The main

factor in choosing the breed composition of green spaces is the price of the seedling and the cost of planting. Sometimes green spaces are oversimplistic because it is more convenient for the urban authorities to take care of them in the future, despite the fact that the degree of greening of the site exceeds the established norms at times. At the same time, other areas have no greenery contrary to the norms of legislation. According to researcher Jacobs J, "urban spaces that are publicly owned were not always considered preferable, and property was not a basic factor for the perception of quality" [4].

Thus, the main objective of the work will be the creation of a unified concept of landscaping in the city, taking into account the landscaping criteria

MATERIALS AND METHODS

Urban population increases over time due to the fact that the birth rate and immigration exceed the death rate and emigration [5].

Throughout the history of urban development, a wide variety of ideas has been put forward to include green areas into the planning structure of the city. Experts distinguish three main periods that differ in the approach to this problem. The first of them originated together with the cities and vanished in the 19th century. Systems of green spaces had regular geometric (circular, concentric, etc.) outlines (Zh. Perret, G. Sharpe, S. Fourier). No account was taken of the external environment of cities.

The second period is associated with the emergence of large industrial centres and formation of agglomerations (late 19th – the first half of the 20th century). New architectural and planning solutions

¹ Wikipedia : [electronic resource]. URL: <https://en.wikipedia.org/wiki>

► required the creation of systems of green areas in the form of green belts, green wedges, diameters, etc. (T. Fritsch, E. Howard, R. Envin, S. Shestakov, I. Leonidov, Le Corbusier, P. Abercrombie, etc.). At this time, the search for a rational balance between built-up and green areas was underway. Attention was paid to the sanitary and hygienic, aesthetic, and recreational role of green spaces. Suburban green areas were included into master plans of urban development.

The third period (the second half of the 20th century) differs from the previous ones by an integrated approach to the design of the city and the surrounding area.

Such authors as Velikhov V.A., Gaddafi M., Teodoronsky B.C. dealt with the issues of urban improvement and increasing the area of green spaces in cities.

A number of cities of the Russian Federation have already developed the concept of landscaping. For example, Nizhnevartovsk has a continuous system of landscaping, that has green corridors; it will have four large forest zones around the built-up part of the city; it will strengthen its landscaping by creating and reconstructing boulevards and pedestrian alleys along the planned pedestrian routes. For the rehabilitation and creation of new public landscaping facilities, the concept recommends to create a linear garden or a system of squares along the Ob River embankment. The idea is to create a cultural and historical walking trail that starts from the embankment in the old part of the city, runs through Pobedy Avenue, Neftyanikov Square, the city centre, Komsomolsky Boulevard, and Lake Komsomolskoye.

The direction of the pedestrian path is determined by the significant territories of the city and it should have distinctive signs along the way in the form of decorative signs with the names of urban landmarks; paved sites, and areas full of lighting.

In Novosibirsk, the concept proposes the creation of a single green space of the metropolis. Each urban park, square, and boulevard has received its own development scenario that meets the needs of citizens.

The concept consists of three parts: the study of green areas, the concept of their development and the passport of territories. The main goal is to create a comfortable urban environment, taking into account social, economic and environmental factors.

Three green zones, including Zaeltsovsky Park, Narymsky Square, Birch Grove, which show differences in the purpose of these territories and, accordingly, in their development programs. Thus, Zaeltsovsk park is considered a recreational park of citywide significance with a focus on sports, Narymsky Square is a transit and recreational square known for its high public activity of citywide significance, the Birch Grove is a universal park of citywide significance that accommodates a memorial, it is focused on family recreation.

The concept of the city of Magadan is aimed at improving the spatial environment of the city, increasing the environmental functions of green spaces, improved coverage of roads and sidewalks, landscaped courtyards and public areas. As a result of the complex improvement of the territories, the city of Magadan will implement the following urban projects: the restoration of the monument "Mask of Sorrow" and the strengthening of the lower slope of the Steep Hill; reconstruction of Victory Square; reconstruction of the central city park; improvement of the social and business territory in 60 Karl Marx Avenue; the project will entail the display of modern functional art objects for the comfortable pastime for children and adults, etc.

Some cities have just started to create the concept of landscaping. For example, Vladivostok has asked its residents to file

their proposals, so that the urban authorities can make a decision concerning urban green areas. Vladivostok urbanists also believe that the concept should fit into the architecture of the city and depend on the microclimate of each district. The concept of landscaping has problems to be tackled by architects and biologists. The plan should be integrated into existing architectural solutions. But in the field of landscaping, as well as in construction, place-focused solutions prevail². Plants, deep shadows prevail, there is not enough greenery in the city. There are not enough coniferous plants.

Kurgan has no culture of lawn planting, and this is the reason for the dirt and dust on the roadways. Kurgan has neither a research based urban greening concept, nor a construction plan. Sustainable urban planning authorities explore the most advanced urban planning practices and approaches, discuss existing constraints and conflicts, and identify innovative approaches that are more responsive to urbanization bottlenecks [6].

The city of Barnaul also needs a concept of landscaping. The lack of the landscaping concept affects green spaces, and, as a result, reduces the number of green areas for citizens. As of 01.01.2020, the total area occupied by the green spaces in Barnaul was 10,098.2 hectares, including forest parks occupying 547 hectares, urban forests of 4063 hectares, public plantings of 2,022.9 hectares³.

Many organizations and residents of the city address the authorities with the initiative to landscape urban districts. Some of them plant trees and shrubs, others organize flower beds. However, the share of these activities is disproportionately small. In order to get the population involved in the improvement process, it is necessary to generate awareness to attract the population on the voluntary basis in the absence of funding.

In Barnaul, more than 500 dead trees are removed, about 400 trees are rejuvenated and molded, and the same work is performed in respect of about 1,000 shrubs every year. In addition, dry seedlings are removed within the framework of warranty obligations each spring.

If we talk about flowers, then every year flower seedlings occupy the area of 16,619 square meters (432 thousand items), where 45,500 bulbous crops (tulips), 542 perennials are planted and vertical gardening is performed.

The authority responsible for the municipal green zones is the Committee for Road Management, Transport and Communications of the City of Barnaul. The committee has 21 green zones, 66 squares, and 71 public areas on its balance sheet.

The development of street lighting systems significantly contributes to improving the landscaping, comfortable living in the city, as well as ensuring the safety of residents and guests. Since 2017, existing networks of outdoor lighting lines have been upgraded at the expense of the regional budget. In 2020, the expenditure (4 million rubles) allowed to increase the share of LED lamps to 46.28 %, the share of self-supporting insulated wire to 48.1 %.

Every year, within the framework of the allocated funding, the construction of green areas of district significance is carried out (in 2017 — 15 units, in 2018 — 21 units, in 2019 — 13 units), flower

² The concept of greening Vladivostok for 2020 is being developed according to the proposals of citizens : [electronic resource]. URL: <https://www.news1.ru/vlad/2019/12/05>

³ Form 1-KX for the results of 2019 in Barnaul, approved by the order of Rosstat No. 462 of 27.07.2020.

seedlings are planted (in 2017 — 626,134 m²; in 2018 — 689,390 m²; in 2019 — about 600,000 m²).

The number of territories serviced by MBU "Landscaping and Landscaping" is growing. The green zone at the intersection of Sergei Uskov street and Vzletnaya street; the old section of the Embankment of the river Ob; a sidewalk in the Korolenko street; a green area in Avanesova Street.

It is planned to gradually switch to the replacement of perennials; thus, 4,072 perennials and 410,802 annuals will be planted in the city.

Researchers from the Altai State University have already proposed the draft "New Green Wave" concept. This concept proposes a survey of urban green spaces, the development of GIS technologies, where green to red colours will show the degree of greening of the city of Barnaul. In the future, the vital state of woody plants will be analyzed in the city, and the city will be split into zones. However, the proposed draft concept does not take into account a number of important points. First of all, it does not pay attention to the criteria for selecting territories to be converted into green spaces (soil, pests, air environment, landscape design of existing plantings). This will lead to chaotic planting efforts.

In addition, the project does not specify the method of calculating the number of plants within blocks and districts.

RESULTS

Urbanization processes, which are manifested in the growth of population and the scale of consumption, growing built-up areas, environmental pollution due to the operation of industrial and municipal enterprises, rapid growth of transport loads, development of the service sector, end in the unfavorable urban environment for the population [7].

The problem of protecting nature from the influence of human waste is becoming more and more urgent every day. The state is taking measures to restrain the pressure exerted on the environment by the ever-growing flow of various types of waste. New legislative acts are being developed, tightening requirements are being imposed on enterprises, and waste utilization charges go up.

According to the standards of urban planning of the Altai Territory, approved by the Administration of the Altai Territory on 09.04.2015, land management projects developed in residential areas need landscaped areas having the size of at least 6 sq. m. per person, respectively, when landscaped sites are planned, it is necessary to take into account natural and social conditions according to the following method (formula): $k_1/k_2 = g$, where k_1 is the number of residents living in the neighborhood, k_2 is the area of grassy and woody areas.

In the concept of landscaping of the city of Barnaul, it is necessary to reflect the system of criteria for selecting territories for landscaping, depending on the level of alkali in the soil, humidity and air temperature, pest contamination, and the landscape design of existing plantings. This information should be collected by land surveyors on site, and the same about the land surveying and the number of pests. Humidity and air temperature values should be provided by the weather services.

The assessment table for the areas for planting green spaces should look like this (Table).

Barnaul landscaping concept shall encompass:

- calculation of green areas in each microdistrict according to the above formula: $k_1/k_2 = g$;

Criteria for evaluating territories for planting green spaces

No	Name of the criterion	Indicator level	Species recommended for green spaces
1	The level of alkali in the soil	From 10...50 % From 50...100 %	Coniferous plants/ Deciduous plants
2	Air humidity and temperature level	From 10...50 % From 50...100 %	Coniferous plants/ Deciduous plants
3	The number and type of pests	From 10...50 % From 50...100 %	Coniferous plants/ Deciduous plants
4	Landscape design of existing plantings	Existing species	Coniferous plants/ Deciduous plants (similar to existing species)

- a methodology for selecting future green territories pursuant to Table. It will allow to develop integrated approaches to the landscaping of the territory of the city of Barnaul.

DISCUSSION

In cities, a unified system of parks, squares, boulevards and other types of landscaping should be designed. A special effect is achieved if the continuity of the green network is ensured, so in the concept of greening the city of Barnaul, in addition to the above methods, we propose to reflect the mechanisms of greening parks, squares, green areas along highways, house territories, and pay attention to the creation of eco-parks, vertical gardening. The implementation of these methods in the practice of planning and designing urban space will contribute to the preservation of the safety of the functioning of cities and the rational use of natural resources [8].

CONCLUSION

The reflection of the two above-mentioned methods will lead to the absence of "chaotic" planting on the territory of the city of Barnaul and compliance with the current legislation in terms of landscaping neighborhoods.

The variety of ornamental plants opens up wide opportunities in the formation of the architectural and artistic appearance of parks, gardens, squares, and also allows you to add variety and painting to the architecture of urban ensembles.

The search for new approaches in the implementation of environmental protection measures will improve the management of the improvement system, which will ultimately lead to an improvement in the lives of the population.

The concept outlines the basic principles, the basic concepts that should serve as the basis. The next step should be a targeted program for the development of green zones. It is advisable to develop the program by a working group with the participation of representatives of the relevant committees of the Barnaul city administration, the deputy corps, scientists, agronomists, landscape designers. Achieving a favorable comfortable environment, and, accordingly, increasing the urban environment index of the city of Barnaul is one of the priorities among the environmental protection measures of the city of Barnaul [9]. By implementing the concept, it is possible to increase the area of greening the territory of the city of Barnaul in the future.

The proposed approach allows us to study the dynamics of environmental comfort of a particular urban area [10].

► The paper proposes a scientific and methodological apparatus for the management of housing and communal services, which allows for a qualified ranking of geo-objects by environmental hazard levels [11].

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Совершенствование методики создания экономических и институциональных механизмов развития городских территорий

Цель настоящего исследования — изучение способов восстановления окружающего городского пространства и территорий на примере города Барнаула. Ключевая проблема урбанизированного городского пространства заключается в концепции озеленения, поскольку оно является самой важной составной частью жилищно-коммунальной отрасли.

Вопрос создания, сохранения и повышения качества зеленых территорий важен не только для города Барнаула и его муниципалитетов, но и для каждого поселения на территории Российской Федерации, как городского, так и сельского. Интенсификация деятельности, изобилие разнообразной информации, а также высокая скорость городской жизни приводят к тому, что жители городов испытывают регулярные перегрузки. В этой связи наличие ухоженного городского леса, благоустроенных парков, а также благоустроенных берегов рек обладает исключительной важностью. В настоящее время их состояние вызывает обеспокоенность у жителей города. Необходимо провести работы по очистке территории от мусора, реконструировать зеленую зону, создать водные объекты, проложить новые аллеи, восстановить фонтаны, очистить реки в черте города.

Задачи системы городских зеленых насаждений — создание здоровых и благоприятных условий для жизни городского населения, поэтому в концепции необходимо отразить методику расчета стандартов озеленения микрорайонов, а также систему критериев отбора зеленых территорий. Предлагается метод расчета стандартов озеленения, разработанный на основе сравнительного анализа мнений экспертов по данному актуальному вопросу и изучения опыта городов Российской Федерации. Меры по совершенствованию системы благоустройства городов могут разрабатываться на основе анализа текущей ситуации, сложившейся в системе благоустройства. В будущем это позволит проектировать эффективное и, что более важно, социально-ориентированное городское пространство.

Ключевые слова: концепция благоустройства, нормы благоустройства, критерии отбора площадок для озеленения

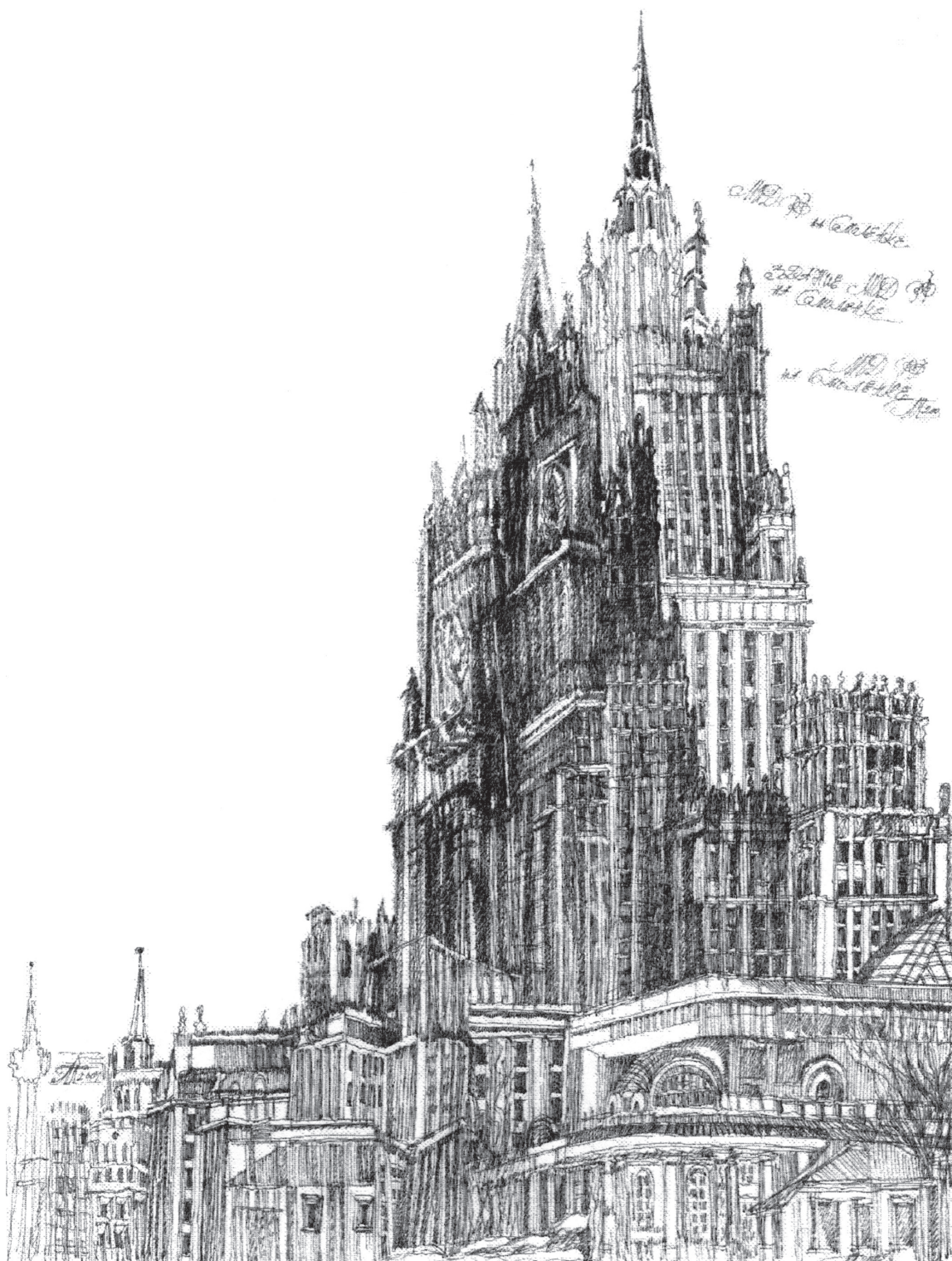
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