The system of landscaping and improvement of Rostov: problems and prospects

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Abstract. At present, the environment of a large modern city is technologically saturated to the limit, urbanized, and the most important task is a competent system of improvement and greening of urban areas. The article discusses the key projects of the city of Rostov-on-don to improve the quality of the urban environment from 2007 to the present. Existing projects included in the system of Federal projects operate only on small sections of the city territory, and do not solve the entire set of tasks within the entire city budget. This study shows that in urban planning there is no unified system of improvement and landscaping, implemented throughout the city according to a single plan. The article points out that modern systems and technologies are not used in the city, and if they are used, they are not used in a complex way, but only in fragments. The article focuses on the prospects for the integrated application of modern systems. The final part contains conclusions based on research materials. A comprehensive solution based on the collaboration of science and technology, all existing problems in the city territory will improve the main indicators of comfort and investment attractiveness of Rostov-on-don.

1 Introduction

The problems of large cities are mostly similar: over-urbanization and the lack or insufficiency of green areas; increased CO² emissions and environmental degradation, as a result of an increase in the number of cars and the result of human activity; degradation of individual urban spaces in the process of urban development; the constantly increasing cost of land in the central areas of cities, which hinders the development of socially important urban development objects before commercial ones, increasing social stratification of society. In cities with coastal zones, citizens' access to water is restricted. The relevance of the research topic is determined by the fact that today a modern city is rapidly developing, which leads to the development of both new territories and the transformation of existing territories of the city. Today, the experience of the Soviet years is not taken into account or simply forgotten, due to the greater urbanization of the modern city. The environment of a large modern city is saturated to the limit with buildings, structures and vehicles. Its environmental disadvantage is now rated as "high" and "very high". Components of "urban landscape" perceive and accumulate such a number of harmful and toxic substances that the

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reserves of its self-purification are almost exhausted. Today, many experts are interested in studying the specifics of a modern city, based on the conditions of comfort of the environment. Until 2015, researchers in their work did not consider the system of improvement and landscaping of individual cities, the emphasis in such works was mainly on improving the comfort of the living environment and the environmental situation. Most of the works after 2015 are devoted to the system of landscaping and landscaping in General, environmental friendliness of the environment and architecture, for example, Oksana Seroka-Stolka [1] or Angel M. Dzhambova, Donka Dimitrovab, Elena Dimitrakova [2]. Only narrow specialists such as Oksana Paramonova, Ekaterina Lysova, Natalia Yudina [3] and S. G. Sheina and K. V. Chubarova [4] dealt with the issues of urban greening in Rostov-on-don. None of the scientists conducted research in the direction of comparing the Soviet system of improvement and landscaping of the city of Rostov-on-don and modern trends and master plans for development at various stages of modern Russia. Thus, the purpose of the study is to retrospectively study the features of the formation, development and functioning of the system of improvement and landscaping of the city of Rostov-on-don in Soviet times and in the conditions of modern urbanization.

The purpose of the study is to analyze the existing system of improvement and landscaping of the city of Rostov-on-don over the past 50 years.

The hypothesis of the study: a systematic program solution to the issue of landscaping and greening of large industrial cities leads to the improvement of the urban area and the formation of a comfortable environment.

2 Materials and Methods

During the research was examined and analyzed the data on greening of Soviet cities in the last quarter of the XX century. According to statistics, Rostov-on-don was one of the ten greenest and well-developed cities in the Soviet Union, especially in the South of the country. The total area of green spaces according to the development plan was about 1000 hectares, i.e. almost 50% of the entire territory of the city.

Currently landscaping in modern cities is being studied and investigated by various parameters such as the index of the quality of the urban environment - a tool for assessing the quality of the material urban environment and the conditions of its formation, allowing to use the assessment results to create recommendations for improving the environment, the rate of planting is a certain amount of landscaping area, m^2 , required to meet the needs of the guests, and also to improve the conditions of human life, site landscaping - elements of landscaping and landscape organization of the territory, ensuring the formation of the environment of the municipality with the active use of plant components, as well as maintaining the previously created or initially existing natural environment on the territory of the municipality. The urban environment quality index is based on an assessment of six types of urban spaces in accordance with six criteria for the quality of the urban environment. The issue of improvement and greening of modern cities at the beginning of the XXI century is considered both at the state level and at the regional level. At the state level, a Federal project is being implemented to develop the urban environment in Russian cities. Rostov-on-don was included in this project, along with other Russian cities. At the regional level, a number of programs have been adopted, such as "the program for greening the city of Rostov-on-don for 2005-2007", "the General plan of the city of Rostov-on-don for 2007-2025", and the regional program "Environmental improvement of the Temernik river basin and development of its coastal territory".

Methods such as general scientific and private scientific methods were used as scientific and cognitive tools and techniques. General scientific methods: analysis, comparison,

historical, logical, and system methods. Private scientific methods - comparative legal. Scientometric methods were used: content analysis and thesaurus method.

The research sources are:

- Documents of a public legal, regulatory, organizational and administrative nature, legal acts in the field of urban planning, program documents of state organizations;
- Research of thesis and monographic genres, information web-resources of organizations and centers, reference and encyclopedic materials.

3 Results

In Soviet times, the landscaping system was centralized, and general principles of landscaping cities were developed. According to the Soviet master plan for the development of the city of Rostov-on-don, the landscaping system took into account all geographical features of the area. The periphery of the city is a powerful green belt that protected the city from strong North-Eastern steppe winds, creating protection from dust and sand. The green belt was supported by a system of parks and city gardens, which had three stages in the city plan from North to South and also protected the city from East winds. Parks and wide avenues were created on the banks of the Don river, and landscaping was also carried out. Reclamation work was carried out on ravines such as Kiziterinka, Nameless beam and the river Temernik. There were landscaped areas for recreation, sports and playgrounds. The city streets themselves were also green, and industrial enterprises were separated by wide protective green strips. The city received a Botanical garden with an area of 260 hectares.

At the time of implementation as the "program for landscaping the city of Rostov-on-don for 2005-2007", the area of the city complex is about 11856 hectares, including 8416 hectares - landscape areas of all categories and 3440 hectares - urban forests. In addition, of the 3440 hectares of forests in Rostov-on-don, 226.7 hectares have already been built up by various objects, and this process continues to this day. At the same time, not before the implementation of the program, not immediately after it, no projects were developed for planting forests in the city, most of the projects implemented during the program concerned only the cutting of forest plantations for the purposes of production and economic activities.

After the adoption of the General plan of the city of Rostov-on-don for 2007-2025, until 2017, there were no distinct projects to step up the improvement and landscaping of the city. Until 2017, the Federal urban development project monitored forty Russian cities and six types of urban spaces in accordance with six criteria for the quality of the urban environment, and an urban environment quality index was obtained for each city, where Rostov-on-don, among similar cities, received only 17 points for the landscaping of space (Table.1).

Table 1. The quality index of the urban environment in major cities.

№	City	Urban environment quality index– common indicator	Urban environment quality index– green spaces
1	Saint-Petersburg	238	44
2	Ufa	179	40
3	Nizhny Novgorod	190	33
4	Moscow	276	32
5	Kazan	190	30
6	Perm	153	29
7	Novosibirsk	161	27
8	Samara	163	27
9	Krasnoyarsk	189	26

10	Chelyabinsk	160	25
11	Voronezh	154	18
12	Yekaterinburg	191	17
13	Rostov-on-don	178	17
14	Omsk	104	16
15	Volgograd	116	9

The Project in Rostov-on-don is being implemented by Design Bureau “Strelka” and the architectural Bureau “Project”, which have proposed a project to improve the main street of Bolshaya Sadovaya in Rostov. According to this project, it is proposed to narrow the lanes for transport and use the resulting space to expand the pedestrian zone and arrange bays. This solution does not solve the overall problem of improving the environmental climate in the city. In addition to the Bolshaya Sadovaya Street, the Federal project in Rostov-on-Don plans to improve the Gorky Park, Pokrovsky square, Park named after May 1, Park named after Vitia Cherevichkin and Theater square. These projects will certainly improve the quality of public spaces and the urban environment. But the anthropogenic loads from functioning urban systems are so intense that the quality of the environment of the outer urban space becomes environmentally aggressive. This is especially true in areas of the historical center of the city, as well as in actively urbanized areas saturated with roads, buildings, infrastructure institutions, production facilities, etc. In this environment, almost all living components of the environment, including humans, are intensively degraded, and the only natural and ecological alternative - vegetation -is "steadily" disappearing. Therefore, the use of traditional technologies and methods of improvement to step up the quality of the urban environment is not enough, and the emergence of such a phenomenon as Urban gardening can be an addition to the implemented programs. Urban gardening is a common area that allows you to plant and grow fruit trees, vegetables, and other plants for harvesting, aesthetic, architectural, recreational, and psychological purposes [5, 6, 7, 8]. Developing and ennobling the urban environment from within by the efforts and activity of the citizens themselves. Spontaneous urban gardening existed in the cities of the Rostov region long before it became a global trend.

A problematic ecological object in Rostov is the riverbed of the Temernik river. The Temernik river is one of the most important "arteries" of the city: it forms a water-green diameter and has great prospects for development. The government of the Rostov region has adopted a regional program "Environmental improvement of the Temernik river basin and development of its coastal territory" and will allocate 1.5 billion rubles for this purpose. As a result of the program implementation, it is expected to improve the water basin of the Temernik river and create a continuous ecological park in the coastal zone of the water body.

According to reports from the Department of housing and energy of Rostov-on-don for 2018, the total area of green space within the city limits was recorded within 12.02 thousand hectares, which is less than 50% of the normative indicator of forest supply of 27.99 thousand hectares. To bring this indicator into line with the General plan of the city of Rostov-on-don for 2007-2025, the changes have already been made that provide the possibility of increasing the area of urban forests for 1,440 hectares by reserving territories of several districts of the city. Implementation of measures to increase green spaces is constrained by insufficient funding.

4 Discussion

Currently, the city does not have a single customer to perform the entire range of works on planting and demolition of plantings, care for green spaces. The work is carried out by various organizations: Municipal Office "Department of roads and Traffic Management",

Municipal Office "Department of construction", Municipal Office "Department of culture", Municipal Office of city districts, etc. The Problem of increasing the number of public spaces is becoming the most urgent today. According to the updated edition Russian Standard Code 2.07.01-89*, which says that in the largest cities existing patterns of urban forests should be transformed into urban parks and to carry them further to the green territories of common use based on no more than 5 m² per person, the proportion of green areas for various purposes within the city (level of planting of trees and shrubs in the area of construction) must be at least 40%. In Rostov-on-Don, the level of landscaping of the territory is on average about 34%.

According to the planning proposals of the City master plan, the total area of green spaces to the end of the settlement period will increase almost twice and will reach more than 900 hectares, or 6.7 m²/person. Standard provision 10 m²/person will be achieved through the improvement of grassland areas [9], which corresponds to applicable edition Russian Standard SP 42.13330.2011 Urban development. Planning and development of urban and rural settlements.

Despite the adopted long-term City master plan of Rostov-on-don, a general concept of improvement and landscaping of urban areas with the formation of a single responsible body with the authority to implement the required measures is necessary.

We need a comprehensive typological analysis of recreational areas, their classification is not only by size and location, but also by functional specification and style orientation. This will make it possible to create a comprehensive plan for the improvement of the territory in accordance with the already existing natural framework and develop measures and a set of measures for long-term planned program transformation of the entire city.

To implement measures for improvement and landscaping of the city, systematic monitoring of environmental and natural indicators of the urban environment should be introduced, as well as accounting and systematization of elements of improvement and greening [10, 11, 12]. This will allow for unified management of natural resources to secure the legal status of green spaces [13]. The creation of a unified database of green spaces and resources and its digitalization will significantly facilitate and accelerate the implementation of these activities and the introduction of new data in the context of changing legislation, requirements and regulations.

The modern system of landscaping and greening of urban areas requires the use of new techniques and technologies for green urban construction, in addition to the mastered method of vertical gardening [14], collaboration of all participants in the ecological transformation of the urban environment, which implies the interaction of science and production [15]. Territories, climatic conditions and the current system of gardening in the city of Rostov-on-Don contributes to the introduction of such a global trend as Urban gardening in the territories of public easement, to increase the indicators of greening the territory and the level of environmental comfort of the urban environment.

Rostov-on-Don has always been and remains an attractive investment city. Increasing the level of development and landscaping will increase its competitiveness among the largest Russian cities in terms of living comfort and environmental safety.

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