Qualitative state improvement of public and courtyard areas in terms of Rostov-on-Don

L A Seferyan 1*, T N Kondrateva 2, V E Morozov 1, I V Leusenko 1

1Don State Technical University, 1, Gagarin Square, Rostov-on-Don, 344000, Russia
2Deputy Director of Rostov Institute (branch) of All-Russian State University of Justice (RPA, Ministry of Justice of Russia), 26, Soborniy lane Rostov-on-Don, 344002, Russia

E-mail: luiza.seferyan@mail.ru

Abstract. Today the most important task in the development of modern Russian cities is the environment formation and maintenance that is favorable and comfortable for the population. The authors of the article revealed the main state problems of public and courtyard territories in Russian cities. Programs analysis of the urban areas improvement for the period from 2018 to 2022, aimed at the development of the urban environment provides an example of its successful implementation as applied to the city of Rostov-on-Don.

Introduction
The intensive urbanization, the cities growth and their population characterize the current stage of the society social-economic development. Relevant expansion of the vehicle pool, accompanied by the gas pollution increase and the air dustiness high in adverse substances to atmosphere and the need for asphalt covering of streets and squares. In addition, green plantings within the city are becoming a rare phenomenon due to the hotspot construction; concrete high-rise buildings take their place. Reducing green areas problem overnight has become one of the most acute in Russian cities as a banal result of the space lack. Under these conditions, the existing social and courtyard territories are the most socially significant problems and their development needs substantial investment.

Urban garden improves the microclimate, creates favorable conditions for residents and protects the soil and buildings from temperature and other physical and chemical effects. Therefore, the environment formation of a municipal district with active use of plant components, elements of the improvement and landscape territory organization as well as the maintenance of the created or initially existing natural environment are the integral development part of the municipalities territory. Anyone prefers to pass on park roads among neatly groomed shrubs and flowerbeds rather than intermediaries building and household waste or fallen trees. The priority decision of the municipalities administration is the creation of the unified system that ensures the welfare and gardening of public and courtyard territories. [1]

However, at present there are no general rules governing these activities in public and courtyard areas.

Materials and methods
This problem is especially pronounced in large cities of Russia. Our city Rostov-on-Don with a population of over 1.1 million people is not an exception. In large populated cities, the distance from nature is extremely strong when there is only a small amount of greenery usually in the old central part of the city. As was already mentioned, in Rostov-on-Don, the greenery area decreases every year in places where there used to be a park or a square, multistorey buildings or shopping centers are being built. This trend made state to take emergency measures for the entire territory of the country and began implementing the project “Formation of the comfortable urban environment” as early as 2017. The main project objective is to create the conditions necessary for the systematic improvement of the urban environment quality through the state programs implementation for the courtyard areas improvement (from 2017 to 2020). Conducting the priority measures complex for the formation of a modern comfortable urban environment in constituent entities of the Russian Federation including 400 complex improvement projects to be implemented until 2020. The question of holding major events in the field of landscaping courtyards has arisen in the Council of Federations in early 2018. During the representative meeting on the regional and municipal authorities effectiveness in the improvement field in each municipality it was decided that it was necessary to create uniform rules for holding and organizing an event in the public and courtyard improvement area. These events should have a positive impact on the state of public and courtyard territories in large Russian cities. The creation of uniform rules for organizing landscaping and gardening events has improved the urban areas quality.

Results
The sub-program "Improvement of the city of Rostov-on-Don” is carried out in Rostov-on-Don. As part of this sub-program, part of the necessary types of work to improve access roads the courtyard territory supply with benches and garbage cans, planting of shrubs and young saplings has already been completed.

The World Cup was one of the most important events in 2018 for Rostov-on-Don. Improvement works were carried out in the city territory on the eve of Mundial. The pedestrian zone in Levoberezhnaya street opposite the Rostov-Arena stadium is one of such works. Over 670,000 thousand rubles were allocated for its improvement from municipal funds. More than 390 million rubles from the federal budget and about 85 million rubles from the regional budget were allocated for the courtyard areas improvement. At the same time, the municipal program “Formation of the modern urban environment” 2018-2022 is being held, which target indicator is the comfortable territories increase in the city of Rostov-on-Don. The fact that Rostov-on-Don has become one of the cities where the World Cup matches were held, a worldwide event made it possible to hold a large number of events to improve the situation with the landscaping and gardening of the city. These events were the first step in improving situations in the urban environment for comfortable living of people in Rostov-on-Don.

Improvement organization of public and courtyard areas in the city of Rostov-on-Don will be carried out in accordance with the municipal program "Formation of the modern urban environment” 2018-2022, which target indicator is the landscape areas increase in the city of Rostov-on-Don. This program includes two sub-programs. The first sub-program focuses on the yard areas improvement in the city of Rostov-on-Don [Administration decree of Rostov-on-Don dated November 27, 2014 No. 1338 (as amended on 05.23.2017) “On the approval of the municipal program“ sphere development of housing and communal services and improvement of the city of Rostov-on-Don”]. Yards improvement (542 units):
Second subprogram has a direction for the public areas improvement in the city of Rostov-on-Don.
According to the cities list for improvement on January 1, 2019, the total area of the city of Rostov-on-Don is 35,595 hectares, the total area of greenery is 12,562 hectares. In turn, the length of the streets, passages, embankments, which are provided with lighting devices, is 1,438.4 km.

To assess the implementation effectiveness of the program let us calculate the following indicators: the achievement degree of target indicators of the sub-programs and the municipal program as a
whole; the degree of expenditures compliance with the planned level of expenditures and efficient use of funds from budgets of all levels.

The achievement degree of target indicators of the municipal program is carried out according to the formula (1):

$$ E_i = \frac{AV_i}{PV_i} \cdot 100\% $$

where:
- $E_i$ is the implementation effectiveness of the target indicator of the municipal program;
- $AV_i$ is the actual value of the target indicator achieved during the municipal program implementation;
- $PV_i$ is the planned target value approved by the municipal program.

The overall assessment of the achievement degree of target indicators in the municipal program is carried out according to the formula (2), and corresponds to a value of 72.86.

$$ A_o = \frac{\sum_{i=1}^{n} E_i}{n} $$

where
- $A_o$ is the overall assessment of the achievement degree of target indicators in the municipal program;
- $E_i$ is the implementation effectiveness of the target indicator in the municipal program;
- $i$ is the index number of the municipal program;
- $n$ is the targets number of the municipal program.

The budget implementation efficiency of the municipal program is calculated by the formula (3), and corresponds to the value 70.63.

$$ CD_{pl} = \frac{B_a}{Bp} \cdot 100\% $$

where:
- $CD_{pl}$ is the compliance degree with the planned expenses level;
- $B_a$ are the actual budget expenditures for the implementation of the municipal program in the reporting year;
- $Bp$ are the planned budget allocations for the implementation of the municipal program in the reporting year.

The implementation effectiveness of the municipal program as a whole is estimated by the formula (4), and corresponds to the value 72.

$$ Ei = E_o \cdot 0.5 + CD_{pl} \cdot 0.5 $$
Let us calculate the final effectiveness of the municipal program implementation by the formula (5):

\[ III_{pr} = \frac{\sum_{i=1}^{n} II_{pr,y}}{n} \]  

where:

- \( II_{pr} \) is the implementation level of the municipal program in the reporting year;
- \( y \) is each reporting year of the municipal program implementation;
- \( n \) is the total years number of the municipal program.

The final efficiency of the program implementation is assessed as satisfactory [Administration decree of Rostov-on-Don dated December 25, 2017 No. 1361 (as amended on April 22, 201) “On Approval of the municipal program “Formation of the modern urban environment of the city of Rostov-on-Don ”]. [5]

Discussion

Events on the area improvement, the environmentally comfortable zone organization around the house (creation of parks, playgrounds in the yard, etc.) and the greening standards provision in the absence of conditions for ordinary long-term landscaping can be carried out using the mobile landscaping. Qualitative changes in courtyards can not be done without an integrated approach, which includes multi-directional actions and activities aimed at obtaining the holistic pre-conceived result. The environment formation that is comfortable for living in a big city is an indispensable condition. [6]

Improvement combines issues of both technical and sanitary nature and includes various sectors that ensure a normal level and the population life quality. The concept of "improvement" implies the measures commonality for engineering improvement, social and domestic improvement, for external improvement (landscaping, traffic and pedestrian organization, the territory equipment with small architectural forms and elements of improvement).

Up to the present time, the improvement of courtyards and public territories was carried out separately by work categories without mutual systematization of improvement elements. In the absence of the improvement project, it is not possible to get a multifunctional flexible in the adaptive sense environment for living. In the works accomplishment period, the residents’ opinion and the existing specificity of the courtyards territory should be taken into account in order to determine the functional areas and carry out other activities. Integrated approach allows covering the entire scope of the problems more fully and at the same time particularly, which solution can provide comfortable living conditions in the urban environment. These include clean streets, well-developed districts, courtyards and houses, green spaces, the required level of courtyard lighting at night. [7]

Territory improvement events include a wide range of works. It all starts with a plan that allows rationally zoning the site. All work is carried out in accordance with sanitary norms and rules. However, one of the fundamental improvement directions is the structures installation and erection that facilitate movement. These include sidewalks, ramps and pedestrian bridges, refined support structures and stairs.

It is important to ensure comfortable movement for all segments of the population, including people with disabilities. Well-organized road and footpath network not only creates comfortable conditions for movement, but also allows combining various forms of relief on the territory into a single whole.

Green plantings occupy an important role in the territory improvement. They improve the ecological situation, make the site aesthetically pleasant, and have a positive effect on the human nervous system.

Consequently, the use of landscaped recreational area in urban improvement can solve the green areas lack problem and will favorably affect the city appearance.
Summary
Territory improvement is an important part of creating the comfortable human environment. Thanks to it, a person is safe, that contributes to his recovery, both physically and mentally. In the modern world, it is necessary to pay more attention to beautification and gardening organizations of the urban environment as every day they begin to build another multi-storey building at the place where trees used to be.

The state program for the formation of the modern urban environment should have a significant impact on the Russian cities transformation by 2022, including the city of Rostov-on-Don, these changes can be seen now. During the period from 2018 to 2019, the city authorities noticeably landscaped Bolshaya Sadovaya street, a large number of freshly planted trees and shrubs appeared, completely replaced paving slabs, all of these events significantly transformed one of the central streets. [8]

According to the calculations results of various indicators kinds affecting the effectiveness of the municipal program implementation, it is recognized as satisfactory. Thus, the intermediate effectiveness of the municipal program implementation is generally assessed as satisfactory ($A_\varphi = 72.86; CD_{pi} = 70, 63; IL_{pr} = 72; III_{pr} = 71, 3$).

References
[1] Seferyan L A 2010 State Support for the Housing and Utilities Sector Reform (Resources Information Supply Competition. Moscow) 3 254 - 256.
[2] Seferyan L A, Bochko E E 2014 State Influence on the Price Policy in the Services System (Materials of International scientific-practical conference dedicated to the memory of Professor, Doctor of Technical Sciences, a major specialist in the field of design and construction of unique structures, Platov South-Russian State Polytechnic University (NPI), Novocherkassk).
[3] Seferyan L A 2016 Organizational and Technological Aspects of Ensuring Sustainable Development of the Housing Stock of the City (Engineering journal of Don) 1.
[4] Seferyan L A, Vasyutina O V 2017 Quality Control in Construction (Construction and Architecture – 2017: materials of the International scientific-practical conference, Don State Technical University, Rostov-on-Don).
[5] Sustainable Development of Territories, Cities and Enterprises (scientific monograph Part I), under general editorship of S.G. Sheina, Rostov on Don, Don State Technical University, 2018.
[6] Yaziyeva S B, Seferyan L A, Oparina L A, Golubeva A Yu 2018 Greening Technology, Greening Technology Organizing of Multistory Buildings, when Reconstructing Architectural and Planning Decisions with the Use of Modern Building Materials (Materials Science Forum) 931 883-888
[7] Zilberova I Yu, Petrov K S, Kiryanova A A, Seferyan L A 2019 Natural Compensatory Landscaping in the Conditions of Dense Urban Development (Bulletin of scientific engineering, Moscow) 3 (1015) 23-24.
[8] Babayan K D, Bobkina K O, Seferyan L A 2019 Statistics of Improvement Programs in the City of Rostov-On-Don (Engineering journal of Don) 3.