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Conceptual Approaches to the Formation of Comfortable Urban Environment and Tools for Practical Implementation

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Abstract

The article is based on a multidisciplinary study of socio-economic and environmental development and aims at proposing an approach promoting the accelerated formation of a comfortable urban environment and effective tools for its practical implementation. The authors use general scientific methods for analyzing soft systems (analysis; synthesis; monographic, logical, analogy method; content analysis; comparative analysis). The results show that in the Vologda Region (Russia) only four out of 15 cities of have a favorable urban environment in 2019 and six in 2022. Eight cities have green spaces assessed as favorable for population to live in. The share of green spaces varies from 10.7% to 24.2% in 2019 and from 10,0 to 23,4% in 2022. A survey of Vologda residents shows that 54% of respondents rank the destruction of green spaces and adjacent forests third on the list of ten environmental issues. To preserve and create favorable conditions for life in cities, the authors propose a comprehensive system of measures that ensures the development of a comfortable urban environment based on the formation of an adaptive ecological culture.

Keywords: urban green spaces, urban environment quality index, living standards, ecological structure, introduction

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1. Introduction

The current socio-economic and political situation imposes strict requirements to ensuring the country's competitiveness in all spheres of the society functioning. During this process, particularly close attention is paid to the quality of life, which includes indicators of living comfort of the population. Comfortable urban environment is one of these indicators. This logically implies the search for directions, methods, and tools that ensure high environmental quality indicators. Already at this stage, the key contradiction, which poses a particular challenge within the practical solution of the problem, stands out – the environmental component falls out of the influence scope of economic regulation due to its specificity (Mishon, 2015). Unfortunately, economic instruments that have proven themselves well in various industries and spheres have almost no effect on managerial influence in the environmental sphere. Due to this, special attention is paid to ecological culture as an effective alternative to administrative or economic impact on the quality of the environment and, accordingly, the comfort of existence of the population of a particular territory (Mishon & Zlobina, 2010). As anthropogenic pressure on the environment increases, natural relationships change, which leads to environmental crises on various levels (local, regional, etc.). In such conditions, the citizens' quality of life becomes an object of interdisciplinary research, since it involves an expanded search for comfortable living conditions within the competence of a wide range of sciences: from economic theory to biology, ecology, medicine.

Historically, the foundation of any settlement is associated with the human desire to refine the space where they live. Unfortunately, it is not always possible to achieve the desired results due to various socio-economic and political reasons. One of the main reasons, in our opinion, is the contradiction between the economic and environmental

components, which underlies any production and economic activity.

In modern conditions, the city as a socio-economic phenomenon is in the focus of a significant number of representatives of various scientific disciplines, schools, and trends. As an integral system, the city has been studied since the 20s of the last century. Thus, Robert Park, Ernst Burgess, Roderick Mackenzie, and Louis Wirth consider the city from the point of view of consistency, paying special attention to its socio-ecological components (Kasatkina, 2019).

In the 1980s, K. Lynch laid the foundations of the environmental study of the city. He considered the city from the layman's standpoint, saying that the city should be understandable to an ordinary person. In *The Death and Life of Great American Cities*, Jane Jacobs criticized the American urban planning system, advocating for the urban environment diversity, convenience of using it, and its safety, thus laying the foundation of "new urbanism" (Kasatkina, 2019). Green spaces play an important role in sustainable urban development, mitigating the negative effects of urbanization, having a positive impact on the quality of the residents' life, and providing them with numerous environmental and social benefits to improve their well-being and to maintain biodiversity of urban ecosystems and identity of cities (Chernyshenko, 1999; 10; Jim 2004; Xu et al., 2018). Nevertheless, spatial distribution of green spaces is uneven in most cities and urban areas, which is often regarded as environmental injustice (Wüstemann et al., 2017; Xu et al., 2018; Luz et al., 2019). Accessibility of green spaces is becoming an increasingly important aspect of urban environment planning, being an important indicator of the complexity of urban life in terms of solving the problems of improving human health and well-being, although it is considered as only one of the components of complex socio-ecological interactions in cities (Kabisch et al., 2016). The global practice offers diverse approaches to assessing this criterion. European Union municipalities use various indicators in this area: some cities define certain thresholds for the area of urban green spaces per inhabitant, others issue recommendations regarding the minimum distance to green spaces, and others offer no recommendations at all (Badiu et al., 2016; Kabisch et al., 2016). Urban green areas play a key role in creating the ecological well-being of cities. When created properly, they perform a wide range of life-supporting functions that support and improve the ecological quality of the city and are crucial for a successful human life in the anthropogenic environment. They participate in forming the microclimate: regulate the temperature, purify the air of pollution (Zalyvskaya et al., 2008; Kabisch et al., 2015;), reduce the wind speed, dampen the noise (Bertram & Rehdanz, 2015), produce oxygen and promote ionization, inhibit the growth of pathogenic microorganisms (Zalyvskaya et al., 2008 48), thus being beneficial for human health (Nath et al., 2018; Gozalo et al., 2019; Wang et al., 2019), and, most importantly, beautify the urban landscape, mitigating the environmental impact caused by urbanization and giving each area a unique charm. The size, diversity of species and sanitary condition of the green areas play an important role in the residents' emotional state and psychological health (Gozalo et al., 2019; Labib et al., 2020; Meyer-Grandbastien et al., 2020) as evidenced by the ever-growing number of studies focusing on the connection between the urban environment and well-being of its residents (Kabisch et al., 2016; Nath et al., 2018).

According to the conducted research, along with such indicators as income, employment and marital status, health, type of housing, and safety, urban residents note that they feel happier if they live in areas with a large number of green spaces, adding that they are less susceptible to psychological stress and have a stronger sense of prosperity (Kabisch et al., 2015).

For urban residents, green spaces are the main and often the only contact with nature. Back in the twentieth century, natural territories within cities were considered mainly as an element of architectural and planning solutions dominated by rigid rationalism that completely ignored the psychological effects the environment would have on its inhabitants. But amid the modern development of society, the emphasis is shifting towards strengthening the social, environmental, and economic functions of urban green spaces. The culture and aesthetics of the surroundings are a very important factor for people who move around the city often and a lot. Based on the ideas of a modern comfortable living environment, agents of the new economy are interested in having the fitting urban landscape. Thus, there is a demand for bright diverse surroundings with a unique historical, cultural, and socio-ecological concept of the place. If innovations in the city emerge "from the bottom up," their creativity allows combining all the elements into a single harmonious space filled with life (Boykova et al., 2011). Therefore, the urban green spaces are increasingly perceived as an important factor in the quality of life and a key aspect of the sustainable urban development (Xu et al., 2018). In fact, nature acts as the main condition for keeping the urban environment prosperous through performing its main functions related to forming the environment and protecting the nature (Zakharov, 2018). Therefore, the preserved natural territories and green spaces attract increasingly more attention from specialists, working in various scientific fields.

With the development of industry and agriculture, the issue of the environment quality and its impact on all spheres of human life is being raised more and more often. Increased anthropogenic pressure on the natural environment became the key trigger for the globalization of environmental problems in the twentieth century. Various manifestations of these problems led to a significant deterioration in the environment quality, especially for urban residents, which causes understandable concern among both specialists and the society as a whole, thus requiring a new level of conceptual understanding and solution of the problem. Today it is necessary to realize that the favorable ecological situation and the environment quality are interrelated and largely depend on the development level of the ecological culture, ecological consciousness, ecological attitudes, and ecological behavior of the entire population and individual socio-demographic groups. In this regard, it is extremely important to educate the population on social ecology issues in order to "understand the need to solve environmental issues and reduce anthropogenic pressure on the natural environment, as well as skills required to improve the environmental situation" (Ivanova, 2019).

According to the modern researchers, the existing ecological culture of the society can be called consumption-centered, focused not on the general arrangement of the habitat, but on the implementation of individualistic

utilitarian attitudes. At that, "the ecological consciousness of the majority of Russians is characterized as the environmental dependency and personal exclusion from solving the problems" (Ivanova, 2019). The complex nature of the situation arises from the fact that the consumption-centered ecological paradigm is not a recent invention: it was outlined during the Renaissance, Reformation, and Enlightenment. This paradigm continues to develop within the spiritual matrix of the technogenic civilizational development, which is characterized by the concept of "human domination over nature and managing social processes like objects" (Guseynov et al., 2016). Withing this approach, nature is opposed to humanity as a soulless object of exploration and economic activity, as an inert force, which grants no favors, but has to be conquered and controlled by means of science and technology. In accordance with this paradigm, which persisted until the middle of the twentieth century, nature was viewed exclusively from the consumer standpoint – as an inexhaustible source of material resources essential for humankind, thus leading to humanity's predatory attitude toward nature and emergence of global environmental problems. For example, it is known that "in nine months, humanity currently consumes the amount of resources that our planet produces in twelve months" (Lektorskiy et al., 2012). Despite the fact that humanity's consumption-centered attitude to nature has established itself as a dominant vector of the civilizational development, alternative ways of understanding it have also emerged. First of all, it is necessary to note the ideas of Russian cosmism, in particular, N. F. Fedorov, who believed that "nature comes to self-awareness inside human, and this awareness requires that management and regulation be gradually extended to everything that remains uncontrolled" (Fedorov, 2008). In the 1920s, philosophers and scientists proposed the concept of the noosphere, which Academician V. I. Vernadsky later developed into a theoretical concept. In the middle of the twentieth century, this concept entered the scientific vocabulary of representatives of various scientific fields, primarily ecologists (Vernadsky, 1978). Vernadsky's main point, stating that in the twentieth century mankind became the leading geological force and, therefore, is responsible for the reproduction of the Earth's biosphere, has been repeatedly confirmed by historical practice. The ideas of Russian cosmists and the consonant ideas of such Western philosophers as I. G. Herder, A. Bergson, and P. Teilhard de Chardin that humanity is able to overcome many obstacles and imperfections with the power of its mind and to achieve universal perfection and salvation in harmony with nature, which seemed utopian, too contradictory, and, according to some authors, "crazy, recommended for a mature audience" (Young, 2012), are perceived completely differently today and are universal heritage. Modern researchers note that the cosmists' undoubted merit is that "they were among the first to pay attention to the global problems of humankind; they saw their solution as a planet-scale task, called for unification of all living people's efforts for the future prosperity of our planet, spoke about the common responsibility of humankind for the fate of the Earth and Cosmos" (Tumarkina, 2020).

Today, the awareness that the steady increase in the anthropogenic load on the Earth and the deepening ecological crisis will eventually lead to an anthropological catastrophe is seemingly growing. Much has been written and said about it. In fact, humanity faces the problem of realizing this new imperative of responsibility for limiting its activities with "reasonable boundaries that prevent the destructive impact of technogenic processes" (Bodrunov, 2018). But humanity stubbornly continues to accelerate its pace in the same direction, easily displacing reports of the most egregious instances of ruining the natural environment from its consciousness. Moreover, the ecological matrix of the technogenic civilizational development is not just preserved, but gets stronger due to not only economic, but also ideological reasons. Today we observe that the economy is increasingly becoming "a space for producing not so much real-use values that satisfy real needs, but a sphere of creating simulacra goods satisfying simulated needs artificially created by means of marketing, PR, and other techniques that have become so widespread amid the increasing use of information technologies" (Bodrunov, 2018). According to the researchers, the material foundations of the recent expansion of simulated production and consumption lies in "rampant growth of the service sector, on the one hand, and on the other – de-industrialization, feeding all this virtualization of everything" (Bodrunov, 2018), which resulted from changes in the social production structure that occurred in the late 1970s-1980s, when "the world was overcome with post-industrial economy myths" (Bodrunov, 2018). The flourishing of the post-industrial economy and the corresponding consumer society created an unprecedented anthropogenic burden on the environment, which aggravated the environmental problems, giving birth to a real threat to the preservation of humanity as a biological species and a social community.

2. Materials and methods

This work aims to propose a conceptual approach based on a multidisciplinary study of the contradiction between socio-economic and environmental development that ensures the accelerated formation of a comfortable urban environment, as well as effective tools for its practical implementation. This work is a multidisciplinary study based on the authors' approach that stems from the principle of consistency. Within this approach, general scientific methods intended for analyzing soft systems (analysis and synthesis, monographic, logical, analogy method, substantive content analysis, comparative analysis) are used. Domestic and foreign scientists' works in the field of philosophy, sociology, ecology, economic theory, economics, and production organization serve as a theoretical base (Vernadsky, 1978; Fedorov, 2008; Jacobs, 2011; Lektorskiy et al., 2012; Adinolfi et al., 2014; Mishon, 2015; Yagodka, 2015; Guseynov et al., 2016; Bodrunov, 2018; Kasatkina, 2019; Tumarkina, 2020).

A distinctive feature of the approach is that the analysis results are viewed taking two significant points in the account:

- the urban environment is a soft socio-economic system that is hard to quantify, but has a significant impact on the socio-economic and political processes taking place in it;
- the formation of a comfortable urban environment is significantly influenced by ecological culture with greening being one of its manifestations.

3. Results and Discussions

With the release in 2009 of the Report by the Commission on the Measurement of Economic Performance and Social Progress by Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi, when using the concept of "quality of life," the emphasis has shifted from measuring economic production to measuring human well-being, taking into account the sustainable development concept (Lebedeva, 2018). In the report, the authors propose the key components of the "quality of life" concept, including "the current and future state of the environment," as well as "health," which is determined by this state. In 2018, for the first time in the Russian Federation, the urban environment quality index was calculated for 1114 cities of various types. "Eco-friendliness and health" is the most important criterion of the index (https://индекс-городов.рф/#/methodology.). This criterion is designed to evaluate the current state of the environment in the city, as well as to determine to what extent using the urban infrastructure meets the tasks of preserving, maintaining, and, if necessary, restoring the environment. When determining the criteria, the following indicators are evaluated: the share of green public areas (parks, gardens, etc.) in the total area of the green spaces; the level of greening; condition of the green spaces; appeal of the green areas; variety of services at the green areas; the share of the total population having access to the green areas (parks, gardens, etc.).

Many cities created according to standard projects and often under a specific state order have similar layouts and building systems. And from an ordinary resident's point of view, the existing settlement infrastructure does not always meet their requirements and demands. Table 1 shows data on the urban environment quality index for Vologda Region cities. Of 15 Vologda Region cities, only four, or 26.7%, have a favorable environment. In 2022, cities with a favorable environment began to include Tot'ma and Belozersk. В 2019 году at the same time, a larger number of cities – eight or 53.3% – have green spaces assessed as favorable for the population. The share of green spaces in the city index ranges from 10.7% (Cherepovets) to 24.2% (Belozersk). In 2022, this figure ranges from 10.0% to 23.4%. Nine cities have seen a decrease in the share of green space over the past three years. The currently popular theory of "intelligent urbanism" proposed by the American scientist and architect Christopher Charles Benninger is based on ten principles, including the principle of "balance with nature" (Benninger, 2001). According to it, an ecological balance should be observed in the urban environment; one of the conditions of this balance is the sustainability of urbanized ecosystems. In addition, the created and existing green spaces should be "friendly" towards the residents, creating conditions for their interaction with each other, for establishing communication. It is necessary to strive to answer the following questions that play a key role in decision-making: what people actually need and what natural environment is optimal. The European North of Russia is located in the area with rather harsh climatic conditions. The natural and climatic specifics of the territory are decisive in creating green spaces with high decorative properties and resistance to environmental factors. The urban environment, in turn, acts as an additional stress factor for trees and shrubs used in the green construction of cities (Andronova, 2019). In urban and rural settlements, in accordance with the requirements of the set of rules "SP 42.13330.2016 "Urban development. Urban and rural planning and development," the area of public green spaces (parks, gardens, squares, boulevards) located on the territory of urban and rural settlements should be calculated based on the requirements presented in Table 2. According to the 2019 statistics, the total share of green spaces in the structure of urban lands in the region is 11.7%; one urban resident is provided with 16.4 m^2/ person of public green spaces, which meets the requirements of the regulatory documents. However, these norms are not met in the individual municipalities (Table 3).

One of the ways to solve the issues of improving the ecological well-being of cities is the creation of sustainable green spaces, taking into account their decorative, sanitary, and hygienic functions and ability of individual species to have a beneficial effect on people's physical and mental state. The plant diversity plays a crucial role in the functioning of urban ecosystems and sustainable provision of ecosystem services (Zhang & Jim, 2014). In order to improve the well-being of city residents, it is important to understand, evaluate, and optimize the diversity of plant species that create urban green spaces. Ornamental plants are often introduced into green spaces to enhance their diversity and cultural services (e.g., aesthetic, recreational, educational, and inspirational) of urban districts (Ren et al., 2017). Despite certain concerns regarding the environmental risks associated with introduced species, such as exacerbation of the biological invasion, displacement of native species, and biotic homogenization (Qian et al., 2016), the process of species introduction in cities never slows down (Babich et al., 2012). The introduction of ornamental plant species can directly increase the species diversity of urban green spaces (Babich et al., 2012; Ren et al., 2017). According to a population survey conducted in Vologda, out of ten proposed items (including pollution of rivers, drinking water, atmospheric air, noise in cities, expansion of landfills, disappearance of mushrooms, berries, animals in nearby forests, etc.), the problem of "Deterioration of green spaces in settlements and adjacent forests" ranks third and worries more than half of the respondents (54%), lagging behind "Pollution of drinking water" and "Littering of settlements". These figures are in line with the data of the annual sociological survey of Russian city residents conducted by the real estate portal Domofond.ru. According to this survey, the problem of "Poor landscaping of public places and parks" ranks third after the poor quality of roads and poor cleaning of streets and sidewalks. The survey also measured the residents' satisfaction with the environmental situation in their city. At the same time, as some authors note (Kabisch et al., 2015), the lack of public interest in green spaces is expressed in a sharp decline in cultivated plants in both public and private territories.

In *The Death and Life of Great American Cities*, Jane Jacobs writes: "Let us... consider city parks deprived places that need the boon of life and appreciation conferred on them. ...for people do confer use on parks and make them successes – or else withhold use and doom parks to rejection and failure. Parks are volatile places. They tend to run to extremes of popularity and unpopularity. They can be delightful features of city districts, and economic assets to their surroundings as well, but pitifully few are… They can be loved and appreciated more and more over the years – although, alas, few of them are characterized by such longevity.

Table 1. Rating of small cities of the Vologda Region according to the urban environment quality index in 2019, 2022.

No. p/p	City	Population, thou. people	Rating of cities in descending order		Assessment of green spaces on the city's territory		Share of green spaces in the city index, %	
			2019	2022	2019	2022	2019	2022
Climate characteristics – conditionally comfortable								
1.	Cherepovets	316.5	197	226	21	27	10.7	11.9
2.	Veliky Ustyug	31.2	179	225	31	32	17.3	14.2
3.	Vologda	311.8	206	221	44	40	21.4	18.1
4.	Tot'ma	9.7	172	213	20	38	11.6	17.8
5.	Kharovsk	8.9	187	206	39	42	20.9	20.4
6.	Sokol	36.7	192	201	44	47	22.9	23.4
7.	Belozersk	8.7	165	193	40	35	24.2	18.1
8.	Gryazovets	14.8	168	180	20	18	11.9	10.0
9.	Kadnikov	4.5	162	180	39	35	24.1	19.4
10.	Ustyuzhna	8.5	160	180	33	29	20.6	16.1
11.	Vytegra	10.3	149	178	28	37	18.8	20.8
12.	Kirillov	7.5	151	177	25	37	16.6	20.9
13.	Babaevo	11.3	148	169	18	32	12.2	18.9
14.	Nikolsk	8.0	143	166	24	25	16.8	15.1
15.	Krasavino	6.0	153	163	33	32	21.6	19.6

Source: The index of the quality of the urban environment is a tool for assessing the quality of the material urban environment and the conditions for its formation https://индекс-городов.рф/#/methodology. Accessed: 11 December 2023 (In Russian)

Table 2. Norms of green spaces for cities

Green spaces of common use	Area of green spaces of common use, m^2 per person		
	Largest, large and big cities	Medium-sized cities	Small-sized cities
Citywide	10	7	8 (10)[1]
Residential area	6	6	-

Note: [1] The sizes for small cities with a population of up to 20 thousand people are shown in parentheses. In medium-sized and small cities surrounded by forests or located in coastal areas of large rivers and reservoirs, it is allowed to reduce the area of public green spaces, but not by more than 20%.

Source: SP 42.13330.2016. Urban planning. Planning and development of urban and rural settlements. Updated edition of SNiP 2.07.01-89. Moscow: Standartinform Pub, 2017. 90 p. (In Russian)

Table 3. Provision of urban residents of the Vologda Region with public green spaces in 2019

Municipal district	Urban settlements	Total area of urban land in the city area, ha	Share of green spaces of total area of urban, %	Availability of green spaces, m^2 per person	
				Total	Public areas (parks, gardens, squares, boulevards)
Vologodsky	Vologda	11,671	7.0	22.4	9.3
Cherepovetsky	Cherepovets	12,988	18.0	73.8	17.5
Babayevsky	Babaevo	1484	26.9	352.2	11.5
Belozersky	Belozersk	585	9.2	62.3	19.6
Velikoustyugsky	Veliky Ustyug Krasavino Kuzino urban settlement	4792	7.1	89.7	22.0
Vytegorsky	Vytegra	1383	8.3	111.9	22.4
Gryazovetsky	Gryazovets Vokhtoga urban	2220	15.9	175.1	17.4

	settlement				
Kirillovsky	Kirillov	2410	11.7	376.8	8.0
Nikolsky	Nikolsk	792	7.9	79.1	74.1
Sokolsky	Sokol Kadnikov	3469	1.5	12.9	12.4
Totemsky	Totma	638	37.1	243.8	4.11
Ustyuzhensky	Ustyuzhna	830	11.3	110.5	64.6
Kharovsky	Kharovsk	1769	24.8	493.4	36.0

Source: compiled according to the statistical reports of the Vologda Region

For every... their loved equivalents in other cities, there are dozens of dispirited city vacuums called parks" (Jacobs, 2011). Thus, the diversity of woody plants used in the landscaping of Vologda parks is represented by 59 taxa. Fifty-one species of woody plants have been registered in public green areas of small towns of the Vologda Region. The research was conducted in nine small towns and two administrative centers of the Vologda Region. Forty-four parks, squares, and gardens were studied. Overall, a fairly wide range of wood species is used in greening. There is a total of 30 out-of-region woody plant species in parks, squares, and gardens of small towns: 11 of them are trees, 19 are shrubs (Andronova, 2019). Thus, 40 introduced species have been noted in public green spaces in Vologda (Sokolova et al., 2010).

The biological diversity of green areas is important. Moreover, the psychological and aesthetic effect of green spaces on residents intensifies with an increase in the number of trees and flowers (Adinolfi et al., 2014; Wang et al., 2019). The authors of a number of works conclude that the visitors prefer heterogeneous green spaces with a complex composition of green plants (Roovers et al., 2002; Adinolfi et al., 2014). In addition, urban residents consider the need to communicate with nature a priority. The residents' desire to influence the environment of their current or future habitat is becoming more noticeable; more and more preference is given to a comfortable environment (Boykova et al., 2011 8; Zakharov, 2018). Urban green spaces not only contribute to social well-being, but can also be considered as a tool to increase social cohesion and identity of the population (Benninger, 2001). At the same time, studies of the Russian civil society indicate low activity of citizens, unwillingness of local authorities to encourage civic initiatives and actions on a parity basis, including public participation in the territory improvement and development of the urban environment (Mersiyanova & Korneyeva, 2015; Smoleva, 2019). Thus, N.N. Yagodka (2015) points out the permanent nature of the interaction between the state and civic society institutions in modern Russia, noting that its quality and effectiveness are the subjects of numerous scientific disputes and discussions.

Engaging residents of cities and rural settlements in solving economic, environmental and social problems is becoming one of state policy priorities, which is confirmed by the adoption of a number of federal programs and projects (priority project "Formation of a comfortable urban environment," program "Integrated development of rural settlements," "Integrated development of single-industry cities," etc.), the participation of the population in which is stipulated by law.

City residents can join local communities, develop horizontal ties, and discuss what their yard, district, or city should look like. They can influence the decision-making by participating in public hearings and public discussions of plans for reconstruction, construction, improvement, that is, further development of the city. They can beautify urban spaces by independently planting flowers, trees, and shrubs and turning abandoned sites into cozy green areas.

4. Conclusions

Based on the conducted study of the problem of improving the city population's quality of life through the prism of ecological and economic analysis with research tools of such scientific branches as economics and ecology, we propose the concept of development of green spaces in northern settlements, which relies on the widest possible use of such an instrument of practical implementation as the strategy of development of greening in northern settlements. The proposed Strategy involves the development and implementation of forms of active participation of the population in discussing and performing practical actions aimed at the territory greening and improving the comfort of living. In turn, we consider ecological culture, which should be formed by the state, to be the key tool of the strategy. The algorithms developed by the authors for the practical implementation of the proposed concept and strategy are given below. The concept of the development of green spaces in northern settlements includes:

- activation of initiatives of the civil society, self-government bodies, and businesses within the new public relations;
- expansion of the green space areas to meet the standards;
- prevention of the green space fragmentation due to economic activity;
- maintaining the ability of green spaces to self-regulate and compensate for the consequences of anthropogenic activities;
- designation of specially protected historical monuments of green construction and preservation of the introduced heritage;
- biodiversity conservation and expansion measures;
- organization and improvement of biological monitoring.

The strategy of development of greening in northern settlements includes:

- formation of a conscious public perception of the social and environmental aspects of the problem of greening in small northern cities;

- attracting public attention to the problems of landscaping by holding broad and open discussions on enriching the species diversity of urban green areas with participation of authorities, industry, public organizations, and science;
- reduction of threats to the species diversity;
- optimization of the correspondence between human needs and the biological potential of urban green spaces;
- voluntary public participation in preservation and expansion of species diversity;
- prioritized improvement of the urban environment comfort and beautification of urbanized areas, in particular by enriching the species diversity of all categories of green spaces;
- formation of an ecological worldview, culture and moral and aesthetic attitude of the population to nature through expanding the information and educational activities of the mass media – television, radio, press;
- promotion of sustainable development ideas;
- enrichment of green spaces with introduced species that have been successfully naturalized and feature a wide range of positive characteristics in terms of aesthetic, social, sanitary, hygienic and other functions, while having no invasive properties.

Thus, urban green spaces that perform certain environment-forming functions and offer environmental benefits to the population play an important role in the structure of settlements. Urban residents' attitude to the green spaces is changing toward the interest to improving their condition and increasing their socio-ecological significance. A balanced approach should be used when planning and developing urban green spaces, since their role in improving the population's quality of life is becoming increasingly noticeable. In this case, the civic approach through increasing public participation in urban planning should be used. Sustainability of urban ecosystems and active participation of residents in their development can lead to replacing the current consumption-centered perception of the ecological situation in the settlement, the country, and the world as a whole with the socially responsible one, as well as to establishing an ecological culture, which will enhance the comfort of living in cities, including through participation of citizens in territory greening.

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