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POSSIBLE WAYS FOR FORMING THE ECOLOGICAL FRAMEWORK OF THE KAZAN CITY AGGLOMERATION

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Abstract:

The analysis of ways for development of anecological framework of the Kazan city agglomeration is given in the paper. Currently, about1.7 million people live in this territory. The Kazan urban agglomeration has amonocentric structure and includes the city of Kazan, its satellite towns, as well as 6 municipal districts. Sustainable development of this territory requires mandatory consideration of the environmental component. The most important role in the ecological component belongs to the ecological frame work of agglomeration.

Currently, the basis for the formation of the ecological frame work of the Kazan urban agglomeration is existing natural ecosystems: water objects, and forested areas. The work defines nuclei that are considered fundamental points of the natural ecological framework. It is the Volga-Kamsky state natural biosphere reserve in Laishev sky and Zelenodol sky districts, the State nature reserve of regional significance" Sviyazhsky" in Verkhneuslonsky district; the monument of nature of regional importance "Semiozer sky forest" in Vysokogor sky district; the State Nature Reserve of Regional Importance of the Landscape Profile " The Old Mill " in the Pestrechinsky District, and the Lenino-Kokushkin sky State Nature Reserve of Regional Importance and the Integrated Profile.

Keywords: *urbanization, ecological framework, Kazan urban agglomeration*

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INTRODUCTION:

In the last century, the urbanization process has become widespread. Urbanization leads to a variety of consequences:

- To the transformation of natural landscapes.
- To the transformation of land, water and forest resources.
- To the qualitative and quantitative production of various wastes that enter the air, water and terrestrial environments.

Today, the share of urbanized areas accounts for about 5% of the land area. Currently, there is a rapid growth of urban areas. This process
Is accompanied by the development of million-strong cities with a parallel increase in environmental pollution near industrial and manufacturing centers, as well as a decline in the quality of life in regions beyond their borders. [1]

Recently, an important position in the planning of the city's territory was occupied by sanitary-hygienic and town-planning standards. Environmental issues were not given with a due attention. Planning and design of urban areas was conducted according to the standards that define the requirements for certain areas of a city, different from each other in terms of functions: industrial zones, residential areas, but not to the city itself. As a result of this approach, the planning structure of the city of Kazan does not meet today the requirements of preservation, as well as sustainable development of urban systems of various functional statuses[2].

It is possible to solve the vast majority of the problems of a city and an urban agglomeration if to take into account the environmental requirements for the planning and design of urban areas. These requirements should be executed at all levels. One of the most important tasks in solving this issue and ensuring a stainable development of the territory of the city is the creation of a natural ecological framework.

This paper is devoted to the analys is of the ways for development of the Kazan urban agglomeration and the ecological frame work of the city in the near future.

The work was carried out at the Department of Environmental Engineering and Water Management in the Institute of Management, Economics and Finance of the Kazan (Privolzhsky) Federal University.

MATERIALS AND METHODS

The material for this work was information on the planning structure of the city of Kazan. Search, selection and analysis of cartographic materials was carried out with the purpose of revealing the elements of the natural ecological framework; differentiation of information on different types of planning structures was also carried out.

Classification of urban planning was carried out according to the history of urban development [3].

RESULTS AND THEIR DISCUSSION:

Today Kazan city agglomeration is the largest agglomeration in the Republic of Tatarstan. It is located in the north-western part of the region on the left bank of the river Volga. The population of this territory is about 1.7 million people. Kazan urban agglomeration have monocentric structure comprises of the city of Kazan, the satellite cities of Zelenodolsk, Innopolis, Salavat Kupere and Kazan Smart City. Also, the Kazan urban metropolitan area includes six municipal districts: A tninsky, Verkhneuslonsky, Vysokogorsky, Zelenodolsky, Laishevsky and Pestrechinsky districts.

The city of Kazan plays a leading and paramount role, as significant projects are being conceived and implemented here, both at the federal and international levels. By its industrial potential, the city of Kazan is in no way inferior too the major cities of our country.

Strengthening of various inter relationships between near by settlements favors the transformation of a large city into anagglomeration.
An urban agglomeration is a complex spatial group of urban territories and populated areas combined into a single local structure by numerous developed links: industrial, recreational, nature preservation, socio-economic and cultural. Also, these links have joint access to the consumption of various natural resources in this area.
This concept includes the space, types and sizes of urban and sub urban areas. Consequently, agglomeration is a highly urbanized zone with an abundant network of peripheral territories comprising a single joints suburban area.
The fundamental elements of the spatial network of the urban agglomeration are the following components of the natural frame work [4]:

1. A historical urban core where the maximum population and various kinds of vital activity of people are concentrated;
2. The central part which includes the center and the near by intensively built-up zone;

3. External zone with a continuous, but to a lesser extent intensively built-up zone;
4. The first peripheral zone which includes forest park territory and neighboring satellite cities;
5. The second, more remote peripheral zone with satellite cities;
6. Zones with expanded urban space.

The first three elements form the urban area directly, the first four forma large city, five form the urban agglomeration, and, finally, all six components of the spatial network of the urban agglomeration constitute an entire urbanized territory.

In the course of agglomerating process, a new spatial and functional complex is formed which is a compact association of spaces, especially urban ones, sometimes coalescing and formed by developed industrial, transport, socio-cultural and economic links. This complex is usually referred to as agglomeration.

The development strategy of Kazanis directly dependent to a mutually beneficial relations with near by cities,which are also part of the Kazan city agglomeration. In the republic today, intensive work on the Tatarstan 2030 development program is underway. In this program, Kazan plays a leading, paramount role, as her significant projects offederal and international levels are being conceived and implemented. By its industrial potential, Kazanis in no way inferior too the major cities of our country.

The space of the Kazan urban agglomeration territory is a specific configuration that unites the material environment with nature and society. An urbanized ecosystem develops in the process of urban growth; the ecosystem can simultaneously exist both in the natural environment and in the urban environment. Kazan needs to be classified as an urbanized ecosystem. The essence of the urban ecosystem lies in the interaction between the natural and anthropogenic components that form it, and the components are located on a certain terrain[5].

The ecological frame work of the urban agglomeration is one of them most important components for sustainable development of the territory. The formation of anecological framework can significantly reduce the effect of fragmentation of wild life habital areas for plants and animals [6],what leads to the formation of "island" ecosystems[7] in those conditions, including cities.

Sustainable development of the structure of plantations should include measures to increase the area of the plant world with its complex structure, the functioning of vertical and multi-species landscaping of the terrain, diversified replacement of abandoned and in accessible urban areas with plantings of various species.

The formation of anecological framework in the natural environment is away for integration of several methods intended for sustainable development of the territory, optimizing the natural landscape of the urban environment. This term should be understood as a system of combined water bodies and green areas that ensure quality and sustainable development in an urban environment. The main function of the frame work is to ensure the development of natural processes in an unregulated regime, which is the determining factor in the existence of landscapes and ecosystems, as well as in increasing the biological diversity of flora and fauna[2].

We have identified possible nuclei for the formation of the ecological frame work of the Kazanur ban agglomeration.

It is the Volga-Kamskystate natural biosphere reserve on the Saralovsky site in the Laishevsky and Zelenodol sky municipal districts of the Republic of Tatarstan, the Sviyazh sky state nature reserve of regional importance in the Verkhneuslon sky district; amonument of nature of regional importance "Semiozer sky forest" in Vysokogor sky district; the State Nature Reserve of Regional Importance of the Landscape Profile" The Old Mill" in the Pestrech in sky District, and the Lenino-Kokushk in sky State Nature Reserve of Regional Importance of the Integrated Profile. Sites that have the status of specially protected natural areas are included in the formation of ecological framework. Their inclusion is dictated by the need for spatial continuity of the ecological framework [8].

The key component of the metropolitan agglomeration is the city of Kazan which has a mixed type of urban planning. The core of the natural ecological framework in the city of Kazan is located in the central Gorky Park of culture and leisure and Arskoye cemetery adjacent to it. In general, the city of Kazan has favorable conditions of the urban natural environment; the city is surrounded by numerous woodlands.
The most important indicators characterizing the geographic allocation of the Kazan city agglomeration are listed below [9]:

1. Coast allocation of three municipal districts-Verkhneuslonsky(Volga River), Zelenodolsky(Volga River), Laishevsky(Volga River and Kama River).
2. Objects of the natural ecological framework, including specially protected natural territories, namely, theVolga-Kama State Nature Biosphere Reserve within the Zelenodolskaya and Laishevskaya municipal zones of the Kazanurban agglomeration.

The natural resources that give advantage to the city of Kazan include a significant number of water bodies. Favorable physical and geographical position on the Volga River stipulates not only the territorial structure and stretching of the city along its left bank, but also extends to the Kazan agglomeration: the most intensively functioning are the Zelenodol sky and Laishev skymunicipal districts. In addition to the Volga River, a huge role in creating the natural environment of the city is played by the river Kazanka which flows through a number of urban areas, as well as a considerable number of lakes. But it is necessary to take into account the fact that water bodies are substantially polluted.

Within the Kazan agglomeration, its western direction forms the main part of the production, natural-resource and infrastructural potentials of the territory. The operators of the further functioning of the city in the western direction are the Kirov and Moscow districts of the city Kazan, which are of exceptional importance; they are considered the most important element determining the future development of the most important direction of the Kazanurban agglomeration.

The fundamental task of the master plan for the natural environment of the Kazanurb anagglomeration is the rational organization of the urbana area, which determines formation of a favorable environment for the life of the city's population. The rational use of absolutely all types of natural resources, the development of social, engineering and transport infrastructures and economic activities, maintaining a balance between built-up urban and natural areas, including specially protected natural areas, as well as historical and cultural land scapes should be taken into account. Functioning of the urban zone in Kazan is considered in conjunction with a near by agglomeration and peripheral territory. Thus, with the help of the master plan of urban space,it is possible to form the prerequisites for the stable functioning of all the territories of the Kazan agglomeration.

The further main industry is the functioning of the ecological and natural frame work of urban space. The ecological framework is formed of waterbodies and forests. The valley of Kazanka river with park and reserved areas, beaches, and embankments forms the central part of the ecological framework. The natural ecological frame work is the most important internal part of the intra city layout network. The presence of the ecological framework, assessment to fits condition and the possibility of functioning determine the natural safety of the urban space. The task is to form a continuous frame work for the urban territory from urban forest and forest park areas, specially protected natural areas and natural-recreational complexes and to bring the ratio of built-upand open landscaped spaces to55%and 45%, respectively.

SUMMARY:

In accordance with the development strategy of Tatarstan-2030, the agglomeration develops mainly in the western direction (Zelenodol sky Municipal District). In this context, the primary role is played by the agglomeration development path, which represents the development and functioning not to far particularcity, but of the urban agglomeration as a whole.

The development of Kazan directly depends on mutually beneficial cooperation with a number of near by located urban spaces that are part of the Kazan urban agglomeration. In-depth work on the target program for the development and operation of Tatarstan-2030 is performed at full steam in the Republictoday.

So,one of the most ambitious projects that are currently being implemented within the city of Kazan is the gardening of urban spaces. In recent years, the variety of targeted programs that are held in the city of Kazan and the Kazan agglomeration-"Green Record"," Blooming Kazan","Year of Parks and Squares" and many others-had a positive effect on the urban environment and the quality of life of the population. However, the implementation of these projects is nothing more than an attempt to restore the earlier greening of the city territory. As a result, their effectiveness to date cannot be considered sufficient[10;11].

CONCLUSIONS:

Based on our research, we can draw the following conclusions:

1. The fundamental task of the master plan for the natural environment of the Kazan urban agglomeration is the rational organization of the urban area, which determines the formation of a

favorable environment for the life of population of the city.

2. The main nuclei for the development of the ecological frame work of the Kazan urban agglomeration are the Volga-Kam sky State Nature Biosphere Reserve (Laishev sky and Zelenodol sky Districts),the Sviyazh sky State Nature Reserve (in the Verkhneuslon sky District); a monument of nature of regional importance "Semiozer sky forest" (in Vysokogor sky district); State natural reserve of regional importance of the land scape profile" Old Mill"and the Lenin-Kokushk in sky state nature reserve of regional importance of a complex profile (in Pestrechin sky district).

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