

THE ROLE AND SIGNIFICANCE OF DATABASE CREATION IN THE DEVELOPMENT OF "SCHEME OF PUBLIC GREEN SPACES" IN THE CITIES OF BELARUS (ON THE EXAMPLE OF BARANOVICHI CITY)

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Abstract: The green areas of the city of Baranovich are considered a significant element of its urban planning structure. An analysis of the state of green spaces in the city has been conducted. The specifics of creating a database of green areas in the city have been studied, and a model for its implementation has been developed, emphasizing its role and significance in the development of the urban planning project "Scheme of Green Areas of Baranovich." The results of the study allow systematizing and analyzing the data necessary for effective management of green areas.

Keywords: green spaces, green areas, green spaces scheme, green areas database.

The city of Baranovich is a young, multifunctional, rapidly developing settlement with a population of 172,000 people, serving as a major industrial and railway center in Belarus. Its structure and dynamics are characterized by high socio-demographic and socio-economic potential. The city has more than 195 industrial enterprises, including 27 large ones (www.baranovich-gik.gov.by). With population growth, the city has faced the problem of limited green spaces, essential for organizing recreational activities for the population, fulfilling environmental functions, and improving the state of the environment. The total area of existing landscaped public green spaces in Baranovich is 79.83 hectares. However, approximately 5 hectares of them are located in zones with excessive sanitary impact, such as sanitary protection zones, road and cemetery buffer zones. Without relocating them from these zones, the full use of green areas for recreational purposes is impossible.

Provision of public green areas for the current number of population in Baranovich is 3.78 m.²/person, which is significantly below the normatively justified area, which should be at least 245.07 ha with a standard of 14 m.²/person. Thus, currently there is a deficit of landscaped public green spaces in Baranovich, which requires attention and improvement measures. The maintenance and further development of green areas is becoming a key necessity to ensure the ecological balance and well-being of the population. In this regard, the creation of a scheme of green spaces becomes an urgent objective for the city.

"Scheme of public green spaces" is a special urban planning project developed for optimization and management of green and natural areas of cities. It includes information on the location, square, vegetation types and planned measures for the development and protection of these areas. The main goal of this project is to create a system of green areas that contributes to a favorable urban environment, recreation of the population and nature maintenance [1]. The development of the scheme is a complex and multifactorial process that requires consideration and integration of information from a variety of sources, including data provided by agencies, field surveys, urban planning projects, environmental data and regulatory requirements. Considering all these indicators allows for the creation of a scheme that optimally addresses the needs of the urban environment, ensures that the recreational and environmental enhancement needs of the population are met, and promotes the preservation of natural and cultural values.

Public green areas are the main subject of the scheme. They are designed to organize various types of recreation of the population and include multifunctional and specialized parks, squares, boulevards, forest parks, hydro parks and meadow parks, as well as areas of short-term recreation near water, green areas of public city centers [2].

Green areas of Baranovichi city have a scattered location. In the central part, they are represented by two small parks along Komsomolskaya Street, boulevards and city center squares. In the north of the city, a water-green system has been formed along the banks of Svetilovskoye Lake. For the eastern part, plans have been developed to organize a park zone around Zhlobinskoye Lake. The inclusion of the suburban forest park "Gai" and the green zone around the reservoir on the Myshanka River has increased the level of greenery, but their level of improvement does not yet meet the requirements for recreational areas. A short-term recreation zone is beginning to form near the reservoir on the Myshanka River. However, a significant portion of green areas is in a neglected state or poorly developed, and there are unused public-use areas.

It is also worth noting that the quality of greenery and landscaping varies significantly between the central areas and more remote sites. The city has a huge amount of green spaces provided by private owners. The landscaping makes extensive use of cobblestone to pave pedestrian walkways and summer plants are planted in surrounding areas. An important aspect is the improvement, reconstruction and landscaping of existing parks, public gardens and streets of the city in accordance with landscaping standards. The development of green areas in the city of Baranovichi involves the formation of a natural framework, creation of new parks and squares, pedestrian alleys, boulevards, green areas of public facilities, residential yards, street plantings and special protective landscaping. There are also plans for the development of a water-green system in the adjacent areas, including the floodplains of the Myshanka River with a reservoir, Zhlobin and Svetilovskoe lakes, as well as other waterways and forested areas.

The green areas of Baranovichi, from the point of view of functional zoning and the General Plan, are part of the recreational zone of the city and are under the special rules of use and development. The protection zone regimes of historical and cultural values in part affect the allocation of sub-types of zoning and the use of public green areas. In accordance with the project of protection zones of historical and cultural values within the boundaries of the protection zone and on the territory of historical and cultural values, construction of buildings and facilities is forbidden, landscaping and gardening works are allowed. In the zone of building regulation, it is necessary to ensure maximum preservation of the existing landscape. All this should be taken into account when developing the scheme, to preserve the historical objects of the city through landscaping, while complying with the laws and requirements regarding the protection of cultural heritage.

When analysing the environmental constraints influencing the greening system in Baranovichi, it is important to distinguish their two main types. The first are protection zones from objects that are sources of technogenic impacts (sanitary protection zones and buffers of industrial, municipal, agricultural and transport facilities, as well as engineering infrastructure). On the territory of Baranovichi city there is a significant number of industrial, engineering and transport facilities that violate the established sanitary protection and buffer zones. This affects the existing and planned public green areas. Significant constraints are also associated with transportation and engineering lanes such as the M1 freeway, railways, roads and gas pipelines. These infrastructural facilities limit the development of green areas in the adjacent territory [3].

When developing a system of green areas in Baranovichi city to protect natural objects and resources from negative environmental impacts, it is also necessary to take into account environmental constraints in the form of zones of protection of natural complexes. These zones cover natural complexes and resources such as surface water bodies and watercourses, water intakes and others.

As a result of the subject area analysis covering the development of the special urban planning project "Public Green Space Scheme", various factors and aspects affecting urban green spaces were taken into consideration and analysed. This process has provided and systematized the data and information necessary to create a conceptual understanding of the subject area. The main elements of the conceptual model are objects and relations. First, there is an object set "Public green areas". The set of its entities includes all public green areas, which are located within the boundaries of the city and meet the area requirements.

Based on the results of the analysis, the following groups of entities can be defined to describe this primary set:

1. Source data, including materials from the General Plan and other detailed planning projects.
2. Entities related to data obtained from various agencies and organisations, environmental constraints, materials from the Land Information System and the National Cadastral Agency.

3. Entities describing the vegetation in public green areas: they are considered cumulatively and individually to characterise their spatial and morphological, environmental features.

4. Regulatory requirements, Maximum Allowable Emissions, greening norms, green areas accessibility radius norms, planting norms.

5. Specific entities associated with the project itself including information on employees, surveys, approvals and pictures that are relevant to the Green Spaces Scheme.

6. The Green Spaces Scheme project as a separate entity.

As a result, a visual representation of the subject area entities and interrelationships between them was created. One of the versions of the Entity-Relationship diagram has been used as a tool [4].

The model is based on a reconsideration of the approaches of analysis and modelling of the subject area. Various aspects including regulatory requirements, zoning and environmental constraints have been taken into account in the study process. It is also important to take into account the results of field surveys and communication with local authorities and the communities. The analysis has shown that the consideration of specific green spaces and their characteristics limits the ability to adequately take into account and integrate a diverse range of information. These prerequisites lead to the conclusion that the central essence of the system should be not only the consideration of specific green areas and their characteristics, but also the analysis of green spaces in the city as a whole, as well as the consideration of the green space scheme project as a separate entity with its links to other entities. This allows not only to characterize and take into account the green spaces and directly related entities (zoning, composition of plants, etc.), but also to integrate all this information into a unified system.

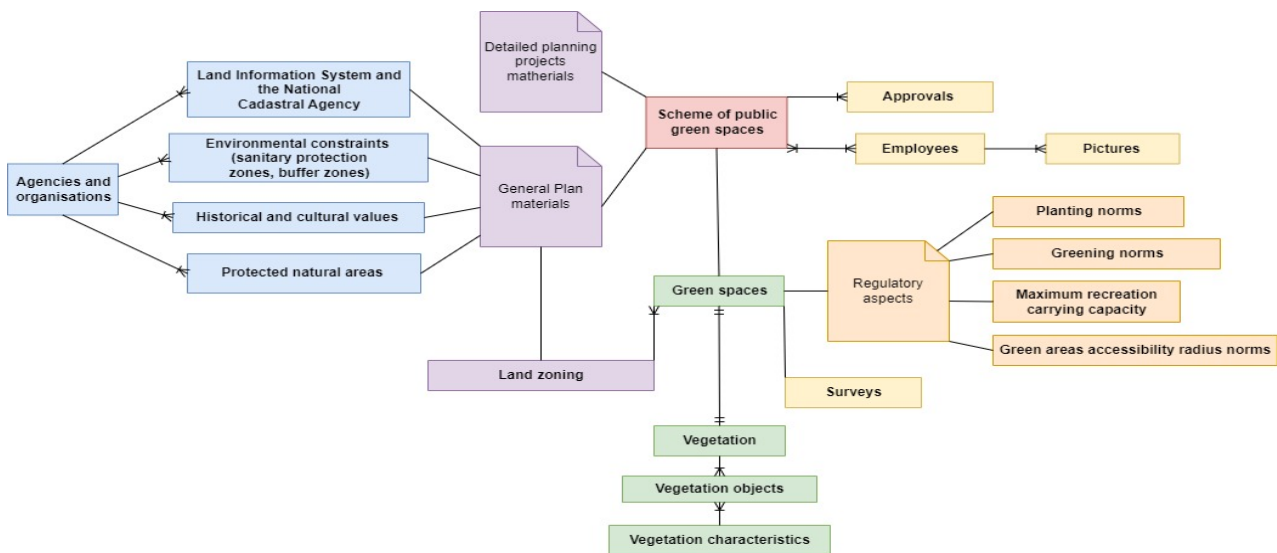


Figure - Diagram of the ER-model of the scheme of public green spaces of Baranovichi city.

Thus, the extension of the data concept to the level of modelling of the "Baranovichi Green Space Scheme" ensures data integrity, relevance and interrelation. This approach represents the real state of the subject area, making it the preferable method for consideration and modelling. The creation of a database based on this model can be considered as a first step towards improving environmental conditions in the urban environment.

In the process of implementation of the urban-planning project "Scheme of green areas of Baranovichi city", green spaces were analysed, their structure was determined and their current state was studied. It was determined that there is a sufficient number of green spaces in the city, but there are territorial differences in their condition and a lack of landscaped areas. When creating the scheme of green areas, much attention was paid to the creation of a database. Various factors and aspects affecting urban green spaces, such as regulations, planning restrictions, historical and cultural values and natural features, have been taken into account and analyzed. All of them are included in the ER-model, which was the basis for characteristics of the green areas of Baranovichi city and aimed at the development of an optimal greening system.

The proposed approach can be used for effective management of green spaces in Baranovichi and considered when developing schemes of green spaces in other cities of Belarus, which will help to improve the state of the urban environment and increase the quality of life for people in these urban settlements.

References

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