

Analysis of the implementation of the National project "Housing and Urban Environment" of the Tobolsk city

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Abstract. With large-scale urbanization of natural-territorial complexes there are a number of ecological, social and economic problems associated with increasing the density of urban development, reducing the level of urban improvement, increasing air pollution, water basins and urban soils; flooding, waterlogging, etc.; dilapidated housing; accumulation of household waste; loss of vegetation cover and, ultimately, reduced comfort of the urban population. In this regard, the authors of the article propose methods of developing tools for the implementation of the strategy of sustainable development of the city of Tobolsk with its approbation in a number directions, factors and indicators.

1 Introduction

Urban land use is the most complex man-made and anthropogenic system, in which a multitude of loops of forward and backward linkages arise in the process of development and improvement of the natural and territorial complex, as well as the development of this system. In this regard, cities disrupt and restructure natural landscapes, thereby reducing the functionality, comfort and sustainability of the urban environment. This led to a scientific study concerning the integrated assessment of the state of all subsystems of the city of Tobolsk, to identify the inadequacies of its land use and to propose a number of mechanisms, ensuring the implementation of the Russian concept of sustainable development within the framework of the National Project "Housing Urban Environment".

2 Materials and methods

Bearing in mind that the solution of the problems of urbanized territories covers the Federal level, it may be emphasized that:

1. Their significance and turn to the scientific search for their resolution, based on the scientific potential of Russian scientists in the field of urban planning of sustainable territories: Sidorchuk V. L., Lappo G. M., Volodsky G. V., Milkov F. N., Zalesska L., Vergunova A. P., Bolshakova A. G., Bogovoy I. O. and many others.

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2. The level of demand for these developments caused by the following problems in the current state and perspective development of cities:

1) Legal (regulatory, legislative) and administrative, more reflecting the economic status of the city, its urban planning decisions, demographic situation, without focusing on the state and preservation of the natural-territorial complex as a whole. And it should be assumed that the spatial and operational basis of the city - the basis of the location and operation of all urban objects, land plots, components of the urban landscape, engineering and transport infrastructure without exception [3, 5-10].

2) Socio-economic, as a result of violation of the laws of natural resources management during urban development of the territories [1, 3-6, 8, 11].

3) Environmental effects caused by [2, 3, 8-10]:

- First of all - not fully understanding the role of environmental factors (external and internal), their assessment, as well as the possibility of manifesting environmental risks in the formation of the urban environment, the use of natural and resource potential of territories.
- The second - not observing the existing procedure (phasing) of the development of materials of master plans, namely, the inadequacy (or exclusion) of a set of measures for integrated assessment of the territories, and as a consequence - violation of the classical principles in the proposed for a certain city rules of land use and development, which is difficult to change when the territory is already developed under construction, communications.
- Third, failure to monitor the introduction of housing complexes in bankrupt developers, and as a consequence, the often expanding of flooded urban areas, the destruction of the foundations of buildings and structures causing discomfort to the urban population, as well as economic damage.

The research is based on scientific developments of scientists in the field of nature management, ecology, geography and urban development: Dobrovskiy G. V., Zalesskaya L. S., Lappo G. M., Sevostyanova A. V., Sidorchuk V. L., Reimers N. F., Milkov F. F. as well as materials of the National Project "Housing and Urban Environment" (including four Federal projects) aimed at sustainable development of the city of Tyumen (Table 1).

3 Results

The choice of the concept of sustainable territorial development of urban land use is impossible without a correct assessment of the features of the conditions of formation and functioning of the studied territory as a system, its natural and resource potential, environmental and social Economic conditions, as well as the degree of influence of both external and internal factors, followed by the identification of possible options for the socio-economic optimization of urban land use. This involves the imposition of a number of restrictions and burdens on the use of urban land (natural resources) and the development of a set of activities to implement them.

In considered concept, the process of transition to the most sustainable development of modern urban land use is more related to the ecological component, natural resource potential (Figure 1).

Table 1. Purpose and direction of the National Project "Housing and Urban Environment".

Project	Purpose and directions of project implementation
Federal project "Mortgage"	1. Aims to create opportunities for the purchase of housing using a mortgage loan. 2. Provision is made for the transfer of the mortgage market into electronic format, as well as the formation of a liquid market for mortgage securities.
Federal project "Housing"	1. Aimed at increasing the volume of housing input, including: - by introducing risk-free instruments for citizens to invest in housing construction, effective land involvement, support for infrastructure construction in housing projects; - due to modernization of the construction industry and optimization of administrative procedures.
Federal project "Formation of a comfortable urban environment"	1. Envisages the implementation of comprehensive urban environment development projects to create decent living conditions for citizens and competitive cities. 2. The principle condition for implementation remains the maximum involvement of citizens in the solution of urban development issues. 3. Widespread use of digital technologies. 4. Preservation of the identity and culture of our country.
Federal project "Ensuring sustainable reduction of unsuitable housing stock"	1. It involves the creation of a permanent mechanism for the settlement of the emergency fund with precise parameters for the recognition of the house as an emergency on the basis of the successfully implemented programmes for the resettlement of citizens from emergency housing in 2013-2017. 2. It is planned to form directions in the implementation of programs: the purchase of housing, rent, subsidies for acquisition, development of built-up areas, rental houses.

Analyzing the focus of federal projects, the authors of the article propose:

Transition to sustainable urban development	
BLOCK ONE. <ul style="list-style-type: none"> • 1. Environmental improvement through greening. • 2. Preservation of natural landscapes within the city boundaries. • 3. Preservation of internal dynamic development of the natural-territorial complex. • 4. Environmental management, prevention (mitigation) of environmental risks). • 5. Compliance with urban landscape planning principles. • 6. Management and protection of land and natural resources. 	BLOCK TWO. <ul style="list-style-type: none"> • 1. The territorial basis for the functional and ecological state of urban land use shall be established. • 2. The natural-ecological-economic framework of urban land use is formed. • 3. Determine the measure of possible use of specific natural, economic conditions with strict observance of environmental restrictions. • 4. Development of a set of environmental measures, including protection against environmental risks: natural, anthropogenic and technogenic. • 5. The concept of urban land improvement and engineering is being developed. • 6. An integrated approach is being implemented, involving residents, State and municipal administrations

Fig. 1. Algorithm of transition to sustainable development of urban area.

In our view, the natural and anthropogenic system and conditions of spatial planning should be closely correlated (Figure 2) [7-10].

1. Consider the urban land use of the city of Tobolsk from the perspective of the socio-economic system.

2. Take into account external and internal factors of its prospective development.

3. To study the internal relationships of all its subsystems, including the natural-territorial complex, using system, landscape-ecological and integrated approaches, thus justifying that (Figure 1):

- Sustainable development of urban land use is possible only if legal, economic, social and environmental problems are addressed in an integrated manner.

- A smooth transition to productive, balanced, economic growth will ensure the harmonization of all structural subsystems of the land and property complex of urban land use.
- Harmonisation in the development of "nature" and "society" will be established by observing the restrictions in the use of natural resources, while creating a comfortable residence of citizens (Figure 3).

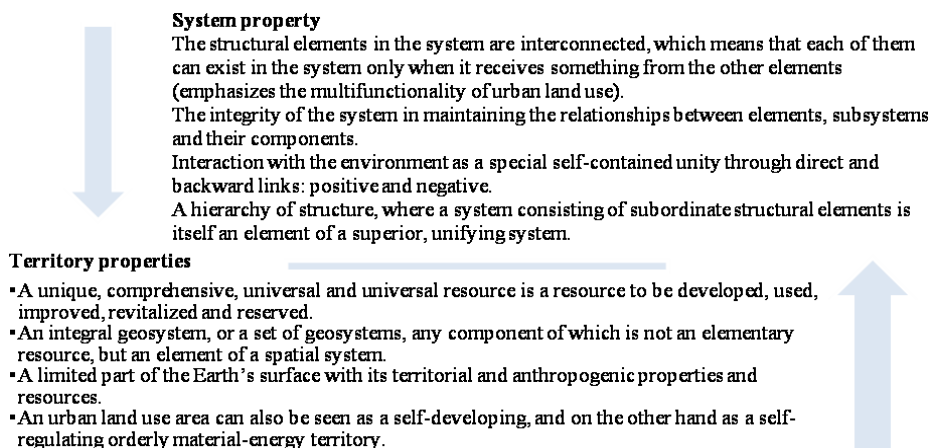


Fig. 2. Properties of the study area and the system of urban land use of the city of Tobolsk.

Development of tools for the implementation of the strategy of sustainable development of urban land use of the city of Tobolsk within the framework of the National project "Housing and Urban Environment" presented by the author's method (Figure 3) [2, 4, 6, 11-15].

How to develop tools to implement sustainable urban land management strategy	Analysis of the Concept of Sustainable Development of Territories, National Projects on Creating a Comfortable Urban Environment	Analysis of scientific concepts that provide integrated socio-economic and economic development of urban land use
Analysis of materials on socio-economic development of the city of Tobolsk	Justification of complex assessment of the city area. Development of its methodology	Analysis of integrated assessment of urban land use
Analysis of the purpose of the national project «Housing and Urban Environment» in ensuring sustainable development of the city	Analysis of the housing stock of Tobolsk on the accepted system of indicators	Determining the degree of comfort of the urban environment of Tobolsk
Conclusions on the implementation of the national project «Housing and Urban Environment»		

Fig. 3. Development of tools for the implementation of sustainable urban land management strategy (based on the materials of the city of Tobolsk).

Table 2. Mechanism for the implementation of the national project "Housing and Urban Environment" for the Russian Federation.

Sales on indicator (Russian Federation)	Basic significance (2018 year)	I stage	II stage	III stage	Modern state (march 2023 year)
		target for 2019 year	target for 2021 year	target for 2024 year	
Federal project "Mortgage"					
Average mortgage interest rate (%)	10.6	8.9	8.5	7.9	11.47
Number of mortgage loans granted (millions. of units)	1.10	1.56	1.60	2.26	1.11
Average cost 1 sq. m of housing on the primary market (ths. rub.)	64.7	68.9	81.5	88.0	83.4
Federal project "Housing"					
Volume of housing construction (mln. m ²)	79.2	88.0	94.0	120.0	79.1
rea of land involved in the turnover for housing construction (ths. hectares)	38.4	40.0	43.6	50.3	42.2
Term of obtaining a permit for construction and commissioning of the facility (working days)	7	5	5	5	7
Updated existing legislation for the introduction of advanced technologies (Unit)	-	88	87	104	91
Federal project "Formation of a comfortable urban environment"					
Average value of the urban quality index for the Russian Federation, growth relative to the baseline (%)	-	+2	+10	+30	+14
Share of enabling cities in total cities (%)	-	25	40	60	+43
Share of citizens who took part in the decision on the development of the urban environment from the total number of citizens aged 14 years or older (%)	5	9	15	30	16,1
Federal project "Ensuring sustainable reduction of unsuitable housing stock"					
Number of square meters of settled unsuitable housing stock (mln. m ²)	-	0.14	2.14	9.54	10.36
Number of citizens settled from unsuitable housing stock (thousands. of people)	-	8.2	117.4	530.9	291.80

Analyzing the level of implementation of the second stage of the Federal projects, it should be concluded that:

1. Weighted average mortgage rates are 11.07% for new buildings and 11.19% for the secondary housing market. The value of the rates reflects the insufficiency of the measures taken to facilitate the issuance of mortgages, which is confirmed by the performance of the indicator "Number of mortgage loans granted" and indicates that the actual level did not reach the target value for 2019.

2. The implementation of the Federal project "Housing" did not reach the 2021 targets. This provision is explained by objective conditions. On the assumption that the implementation of the plan requires the construction of modern large residential complexes at the expense of expansion, and in the conditions of the historical urban development is impossible to expand.

On this basis, point-to-point housing is the most popular and may eventually lead to a loss of landscape, ecological, structural and morphological links between the components of natureterritorial complex of the land use city and urban planning order [1, 3, 4].

3. Federal projects "Formation of a comfortable urban environment" and "Provision of sustainable reduction of unsuitable housing stock" are implemented in accordance with the plan of implementation of the National Project.

The integrated approach to the implementation of projects required the implementation of a comprehensive assessment of the city's territory on all assessment factors and indicators of comfort of the urban environment of Tobolsk [2, 4, 11, 12, 14, 15].

The assessment of the territory is proposed to be carried out by typological clusters. The basis of the development of typological clusters is a tool of spatial planning and scientific method of cognition (which has determined this classification of the urban area by essential features, including zones with special conditions of use of the city area (SCUCA), see Figures 4-5.

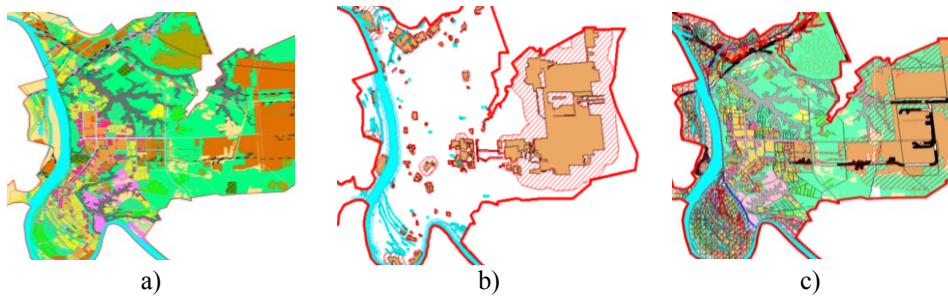


Fig. 4. Urban zoning and planning of the urban area of Tobolsk: a) zoning scheme of the city of Tobolsk; b) layout of industrial city cluster; c) map-scheme SCUCA of Tobolsk city area.

The comprehensive assessment of the socio-economic development of the Tobolsk area includes the following indicators:

- Dwellings and adjacent spaces (share of the area of dwellings, equipped simultaneously with water supply, sanitation (sewerage), heating, hot water, gas or floor heating, in the total area of dwellings).
- Green spaces (level of greening (%))
- Public-business infrastructure and adjacent spaces (diversity of services in public-business areas of the city (%)).
- Social and leisure infrastructure and adjacent spaces (diversity of cultural, leisure and sports infrastructure (dimensionless coefficient)).
- Street and road network (share of the total length of streets provided by storm drains (underground drains), in the total length of streets, passages, embankments (%)).
- Urban space (accessibility of public transport stops (%)).

For clusters, the results of the integrated assessment are as follows (Figures 5 and 6).

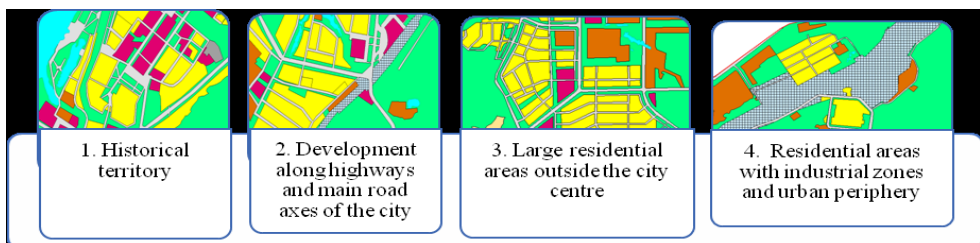


Fig. 5. Typological clusters of the city of Tobolsk.

Sustainability in the development of urban land use is characterized by our established spatial and territorial organization of planning areas of Tobolsk. and by the criterion value of all indicators reflecting the state of the urban environment, expressed by the composition and location in the spatial planning areas of Tobolsk (Table 3).

Table 3. Urban spaces and their share in spatial planning areas Tobolsk city.

1. Housing and adjacent spaces.	The Podgorod part - 77%; the Upland part - 89%; n. Irtysh - 52%; n. Mendeleevo - 61%; Southeast region - 68%; Left Bank - 58%; n. Dučino - 54%; Eastern industrial zone - 10%.
2. Green urban space.	The Podgorod part - 38%; the Upland part - 44%; n. Irtysh - 31%; n. Mendeleevo - 12%; Southeast region - 28%; Left Bank - 20%; n. Dučino - 27%; Eastern industrial zone - 60%.
3. Public-business infrastructure and adjacent spaces (diversity of services in public-business areas of the city (%)).	The Podgorod part - 44%, the Upland part - 78%, n. Irtysh - 8%, n. Mendeleevo - 5%, the Southeast region - 7%, the Left Bank - 7%, n. Dučino - 9%, the Eastern industrial zone - 0%.
4. Social and leisure infrastructure and adjacent spaces (diversity of cultural, leisure and sports infrastructure (dimensionless coefficient)).	The Podgorod part - 56%, the Nagorny part - 61%, n. Irtysh - 14%, n. Mendeleevo - 8%, Southeast region - 13%, Left Bank - 10%, n. Dučino - 11%, Eastern industrial zone - 5%.
5. Street and road network (share of the total length of streets provided by storm drains (underground drains), in the total length of streets, passages, embankments (%)).	The Podgorod part - 68%; the Upland part - 83%; n. Irtysh - 70%; n. Mendeleevo - 47%; Southeast region - 52%; Left Bank - 39%; n. Dučino - 42%; Eastern industrial zone - 92%.
6. Общегородское пространство (доступность остановок общественного транспорта (%)).	The Podgorod part - 94%; the Upland part - 97%; n. Irtysh - 61%; n. Mendeleevo - 22%; Southeast region - 36%; Left Bank - 10%; n. Dučino - 14%; Eastern industrial zone - 5%.

Based on the analysis of the results of the assessment carried out for the cities of the South of the Tyumen region, it can be noted that the city of Tobolsk has a potential for comfortable living conditions and sustainable development of the territory in many indicators (Table 3, Figure 6). Tobolsk takes second place after Tyumen in the quality of the urban environment.

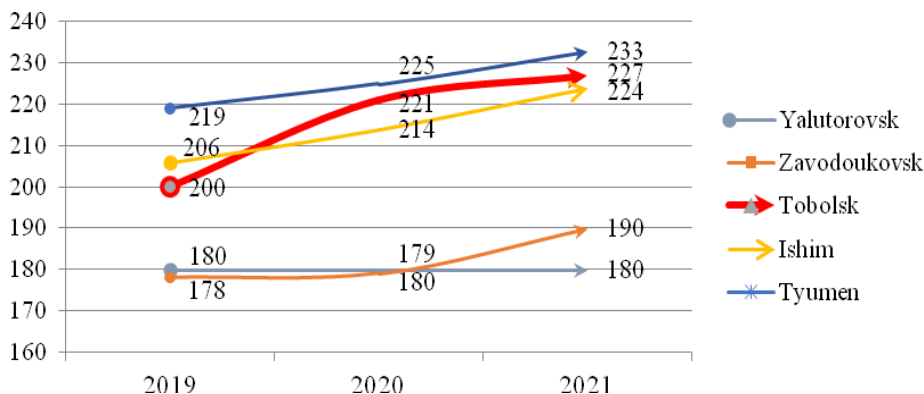


Fig. 6. Values of Urban Environment Quality Indices (ICGS) of South Tyumen Cities Area (from 2019 to 2021).

4 Discussion

However, a number of ecological and socio-economic conditions indicate the expediency of development and implementation of a complex of works on development and improvement of the city territory. By way of example, this applies to public infrastructure. The most comfortable planning areas of the city are Podgornaya and Nagorny parts (territory of the Eastern Industrial Zone and Left Bank District), see Table 4 [1, 3, 4].

Table 4. Degree of comfort of the urban environment of Tobolsk by its planning areas.

Planning area	Piedmont part	upland part	Irtyshsky settlement	village Mendeleevo	southeast region	left bank	Sumkino village	Eastern industrial area
Degree of comfort, %	72	66	39	34	45	28	29	18
Demotion at expense of zones with special conditions of use of the city area, %	-	-	-	-	-	-5	-	-5
Reduction of part of houses from the emergency fund, %	-5	-	-	-	-	-5	-	-
Total factor, %	67	66	39	34	45	18	29	13

Thus, the study found that the most comfortable planning area of the city is Podgornaya and Upland part of the city (respectively: 67 % and 66 %), and the least comfortable area is the Left Bank district (18 %) see Figure 7.

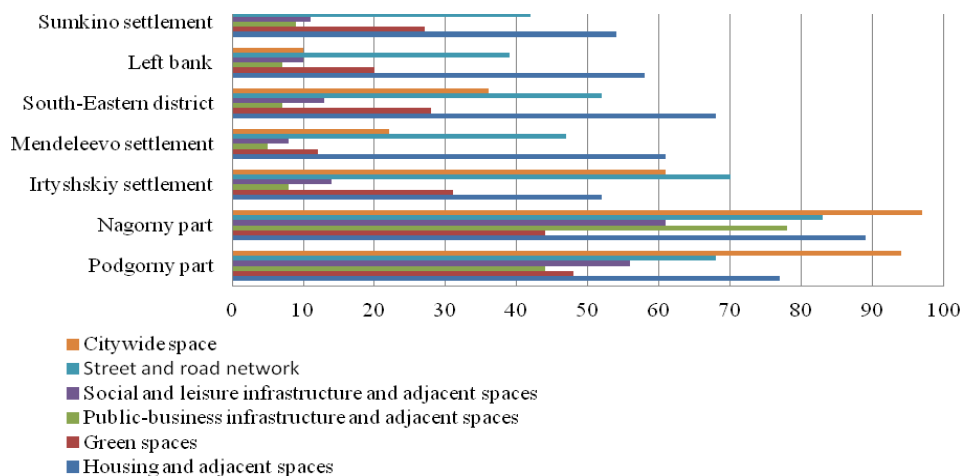


Fig. 7. The value of the degree of comfort of the urban environment of planning areas of t. Tobolsk on the criteria of comfort.

The degree of comfort and sustainability of urban space in several planning areas is reduced by:

- Negative physical and geographical processes associated with waterlogging, flooding, formation and development of the gully and girder network.
- Increased density of urban development and insufficient provision of urban land use with social engineering and transport infrastructure.

5 Conclusion

The study required the development and implementation of a methodology for assessing and creating comfort of the urban environment of Tobolsk. It covered a wide range of its factors and indicators reflecting social, economic and environmental aspects. The comfort of the urban environment is determined by the typological clusters - planning areas of the city. The value of the specific comfort index varies from 13% to 67%. The weighted average is 59.4%. The study has allowed:

1. Establish the relationship and interdependence between the comfort of the urban environment, the socio-economic development of the city and the preservation of the internal dynamic balance of its natural-territorial complex.

2. Perform a systematic and comprehensive analysis of existing planning mechanisms (National project "Housing and Urban Environment") and the implementation of urban planning decisions of the Tobolsk City Master Plan to create comfortable conditions of the urban environment according to the methodology proposed by the authors of the article.

3. Confirm the significance and implementation of the National Project "Housing and Urban Environment", providing:

- Reduction in the proportion of emergency housing in the city of Tobolsk.
- Creating more comfortable living conditions for citizens in all planning areas of the city.
- The introduction into the economic turnover of the city (municipality) of territories with their non-use.

Along with this, in order to implement the Federal project "Formation of a comfortable urban environment" and ensure regulation of key socio-economic tasks in the development of the city, it is proposed to include a section in this project "Urban environment as a cultural urban landscape", which will allow at the stage of its implementation to ensure the preservation of its natural and resource potential and sustainable integrated development of urban land use for the future.

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