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**REGIONAL SETTLEMENT SYSTEM**

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**Abstract.**

The study examined a regional settlement system in respect of the aspect of the interaction between economics, sociology, geography, urban planning and development of regional management system. Regional settlement system is an open space system which variables can be described as a mixed way (quantitatively and qualitatively). Subsystems of a regional settlement system (natural and historical-cultural framework, transport, economy, population) are identified. The dynamics of the historical development of subsystems and their interaction are considered by the example of the Belgorod region which is a regional settlement system. A regional system is complex and interrelated by its elements and satisfies to the system concept of functional integrity. Changing the configuration properties of a territory leads to a change in its target function.

**Keywords:** regional settlement system, sustainable development, transport infrastructure, economy, population, natural framework, historical-cultural framework, Belgorod region.

**Introduction.** Successful territorial development of a country depends on rates and prospects for the development of regional settlement systems. Regional settlement system is considered in respect of the aspect of the interaction between economics, sociology, geography, urban planning and development of regional management system [1]. So far, a unified approach to determination of essence and content of a region as an object of study has not been developed yet. This is largely due to the complexity, multidimensionality, and large number of aspects of this category, which does not allow to develop an only accurate and comprehensive definition.

Many researchers around the world have been involved in studies of settlement systems, but now attention to the processes of their development escalates once again. Since the 60s, research areas have been developed that are related to

formation of settlement systems and conversion of residential areas of various sizes and an economic profile into structural and functional elements of these systems. Those are works by N.V. Baranov, V.N. Belousov, Yu.P. Bocharov, I.A. Fomin, P. Hall, V.A. Shkvarikov, A.G. Rochegov, V.Y. Lyubovny, I.M. Smolyar, G.I. Lavrik [2, 3, 4].

Global problems of urbanization and urban development were reflected in the works by V.L. Glazychev, V.V. Vladimirov, Y.V. Pivovarov, I.M. Smolyar, Z.N. Yargina, I.G. Lezhava, G.V. Esaulov, A.G. Bolshakov, and others [5].

Scientific works of prominent economists - urbanists, particularly N.N. Baransky, A.E. Gutnov, V.G. Davidovich, I.A. Ilyin, G.M. Lappo, E.N. Pertsik, B.S. Khorev, A.G. Granberg were devoted to a decision of questions on formation of effective urban economy.

Different authors have different interpretations of the settlement system phenomenon itself. For example, I.M. Smolyar gives such definition: "A settlement system is understood as the spatial organization of a group of residential areas with various sizes and economic profiles in a natural landscape sphere based on their ever-growing interaction, various links of the population, combined integrated use of inter-urban areas, and common planning pattern" [2]. According to P.S. Cherkasov, a region should be considered as a complex system characterized by a large set of properties and having many link-forming elements [6]. Based on the principles of spatial approach, N.E. Kolesnikov emphasizes that "the most important "internal" aspect of a social cohesion for a regional space are its relationships, interactions, interdependence between structural elements of a regional social reality (public health service, education, resource and labor, welfare, spiritual and cultural spheres, and others) [7]. To date, it is hard to answer the question of how settlements will develop in connection with the transition of humanity to the stage of post-industrial development. No industrial production which largely led to the emergence of large cities will dominate, but the production in the so-called third sphere: production of various services, including intellectual ones.

**Main part.** The study suggests that there are general laws of development of regional settlement systems as a structural organization of a spatial form of urban facilities interconnected with configuration properties of a territory and socio-economic factors linked by certain rules. [8] A small town in a regional settlement system is a central point ("node") of a dot-and-node structure [4]. Over the past fifty years, principles of urban structures formation have been revised. The purpose and the basic principle of the planning system is the achievement of sustainable development that meets the present needs without compromising the ability of future generations to meet their needs [9]. For example, in England,

urban development is conducted on a scale of urban formations, or a "unitary unit" of multicenter cities being "growth areas" formed on the principle of the "new zoning". The principle is based on benefits of an administrative integration of surrounding cities, small towns, villages, and free territories. Most of the "unitary units" in England were formed in the period from 1995 to 1998, the other in 2009. First of all, "unitary units" have been formed from losing money towns and villages in the North and West of England. [10] Russia today is going through the process that can be called a new regional self-defining. The study examines the Russian regional settlement system. In the most general terms, it can be assumed that a "region" is a unit of organization of development processes and reproduction processes, or a unit where the processes of historical development activities should form a closed circle aimed at stability of reproduction of human life, cultural forms, natural and labor resources, livelihoods and manufacturing material, etc. Establishment of holistic reproductive mechanisms and structures in the context of development generates "regions" of various levels of complexity. In the study, by the regional settlement system is meant such subject of the Russian Federation as the territory of the Belgorod region. It is necessary to mention that not every subject of the Russian Federation could be called a region, just as the boundaries of the federal districts do not always coincide with the boundaries of regions. A necessary precondition for formation of a region in a particular area is a presence of a specifics of the economic, ethnographic, religious and socio-cultural composition. However, there is also a psychological aspect of the problem. It should be noted that the determining factor in the viability of a settlement system is a high percentage of indigenous population preserving traditions, life principles, norms of behavior of previous generations. To form a region, it is insufficient to have a regional specificity' it is necessary to position it. Thus, formation of the region is related to the ideological and practical self-identification of a certain territorial community [1]. According to the author, in this respect the Belgorod region can be seen as a regional settlement system, as it has the relative integrity, characteristic specifics of economic, religious and socio-cultural composition, and availability of a high percentage of indigenous population. Regional settlement system is an open space system, which variables can be described in a mixed way (quantitatively and qualitatively). According to the system operation law (laws) description type, this system can be referred to non-parameterized in general with a separation of different types of subsystems, in particular, various descriptions. Subsystems of a regional settlement system can be spatial, socio-economic, and ecological frameworks:

1. "Natural and historical-cultural frameworks" subsystem.

2. "Transport" subsystem.
3. "Economy" subsystem.
4. "Population" subsystem.

The system under consideration can be called great, because its research and modeling is difficult because of its large dimensions, i.e., a set of states of the system S has a larger dimension. The described system can be called a territorial socio-economic system.

System studies include a series of sequential steps:

- 1) identification of system components (subsystems);
- 2) finding of the internal structure of the system (identification of the functional structure and subsystems of lower rank);
- 3) identification of links (substantial, including backbone and non-essential links and their subordination) between elements of the system;
- 4) the objective function definition for the regional settlement system of the territory.

We studied bilateral relations both in terms of conditionality of the system by external factors (in particular, geopolitical) and from the point of impact of the system being studied on other formations and determination of a place in the higher rank system; A region as a system was described also by academician A.G. Granberg who is one of the founders of the regional economy theory. He interpreted a region as a certain territory which is different from the other areas by a number of features and has some integrity and interconnectedness of its elements. On the basis of an analysis of a region as a socio-economic category and systematization of its existing interpretations, a region should be regarded as complex spatially integrated system represented by a geographically localized complex of inter-related socio-economic subsystems determined by a certain structure of production, peculiarities of social infrastructure and human capital, as well as a place and a role of the region itself in a social and economic complex of the country. [6] Therefore, when considering such systems, it is necessary to rely on the system concept of functional integrity and orderliness of a territory (the plurality of interconnected components of a nature ordered in relation to each other and is characterized by unity "... which is reflected in the integrated features and functions of the set" [3]). The specificity of regional systems is that subsystems and their elements can be heterogeneous, but interrelated. A regional territorial system combines

different quality subsystems which are based on the interaction of simultaneously occurring natural, technological, and social processes, economic, demographic, environmental, cultural and political factors. We consider it appropriate to study spatial development of a region taking into account such development factors (conditions, causes, parameters, indexes) as natural, spatial, economic, social and geopolitical. *Natural factors* include the potential of a territory on the basis of its sustainable development. Spatial factors suggest availability of spatial relationships enabling both to interlink the various functional areas of a regional system, and to provide inter-regional cooperation. In the market economy conditions, the socio-economic development space factor should be accounted for by another way than it was done in the Soviet planning system. To date, there is the problem of systemic socio-economic policy, including regional one. There is a "point" model of economy that is more or less suitable for Germany or France, but it does not work in Russia, as the inter-regional differentiation is significant, and most of the subjects of the Federation are subsidized. However, to date there is no articulate system of forecasting and programmed tools for strategic management in the regional aspect. [11]

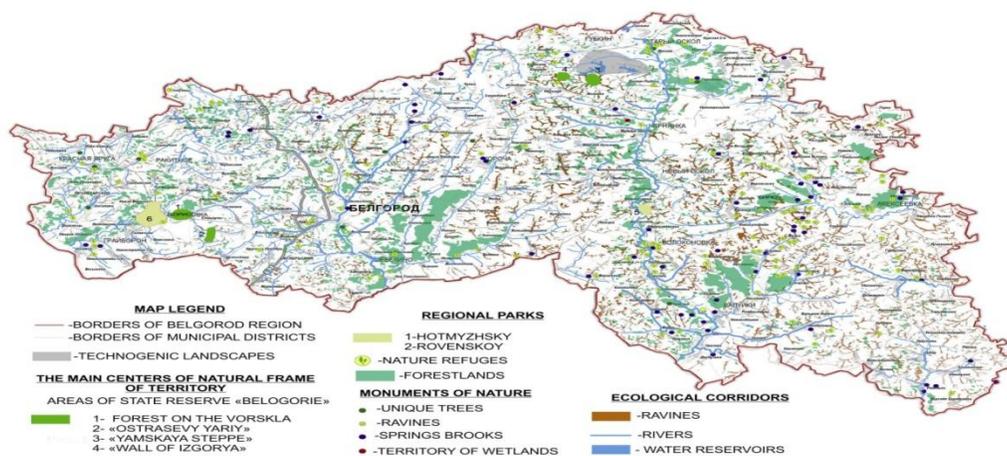
*The geopolitical factor* determines an influence of the established political conditions in the territory for the period of time being under consideration or a projected period (especially for regions along the borders with other states). *The economic factor* should be considered from the standpoint of the creation of a relatively integrated economic entity characterized by availability of a complex of differently oriented city-forming enterprises and various urban service industries capable of providing economic stability and development of the regional settlement system and the availability of essential commodities. *The social factor* implies ensuring such conditions of society existence where the fundamental is to ensure the development of society and the public processes of life in the conditions of contemporary society.

Regional settlement system covers the totality of the population and settlements within a particular region, in the process of socio-economic structure of which sustained interaction between settlements in the territory takes place. Let's consider the Belgorod Region as a regional settlement system.

#### ***Subsystem "Natural and historical-cultural framework"***

Natural framework forms a socially and hygienically necessary spatial inhabitable environment for living and recreation of population. It promotes preservation of genetic resources of plants and animals, protection of other natural resources (including water and forest), a natural and cultural heritage, as well as meeting the many essential needs of the functioning of human settlements. Natural framework of urban settlements (suburban areas), to the utmost, meets the

traits of biosphere environment-forming and resource saving functions; it is the basis of many types of urban planning and economic activities (recreation, forestry, agriculture, and others) increasing their efficiency and contributing to the improvement of the urban environment. The Belgorod region is located in the south-western and southern slopes of the Central Russian upland in the basins of Dnieper and Don rivers. In connection with this, its characteristic type of relief is the following: hilly gently undulating erosion plain with an average height of 200 meters (above sea level) rugged with ravines and gullies (catchments) where are scattered oak forests. In the south-east there are mostly plowed forb meadow steppes. In the Belgorod region black soils are dominated: ashed and leached in the north-west, the typical rich in the central part, ordinary in the south-east; gray forest soils in forested areas, and alluvial deposits in river valleys. The Belgorod region relates to dry lands (rivers, lakes, swamps of the region occupy about 1% of the territory). The regional hydrography is determined by the presence of more than 480 small rivers and streams in length from 3 to 140 km. In the Belgorod region there found groundwater supplies, including medicinal (mineral). The largest number of forests is located in Shebekinsky district. The area is a part of Central Black Earth region. This determines the basic recommended type of activity: crop production, as black soils and such climate are good for growing crops (Fig. 1). The territory of the Belgorod region belongs to moderately urbanized and highly urbanized areas. In this regard, there is a need to "strengthen" its natural framework, creating a network of buffer zones capable to support ecological balance in the territory. A special mode of use should be developed in the territories exposed to formation of gullies and degraded areas that emerged after extraction of minerals on them.



**Fig. 1.** Natural framework of the Belgorod region.

Compiled by E.I. Krushelnytska, M.V. Perkova [12]

Historical and cultural framework allows the identity of the regional environment to reveal. Distribution of recreation and tourism over the territory of the Belgorod Region has a dispersed structure corresponding to natural conditions and historical and cultural framework. The system of territories for leisure and tourism in the Belgorod region includes compact and linear zones of accumulation of recreation and tourism facilities. Compact zones are areas of accumulation of territories and facilities for tourism and recreation. After analyzing the distribution of facilities for recreation and tourism over the region we can see that the areas of their compact layout tend to gravitate toward historical settlement centers that have high historical and cultural potential and at the same time are centers of recreation demand and the areas of the best transport accessibility. Linear areas include recreation and tourism facilities formed along the banks of rivers and main transport routes (Figure 2).

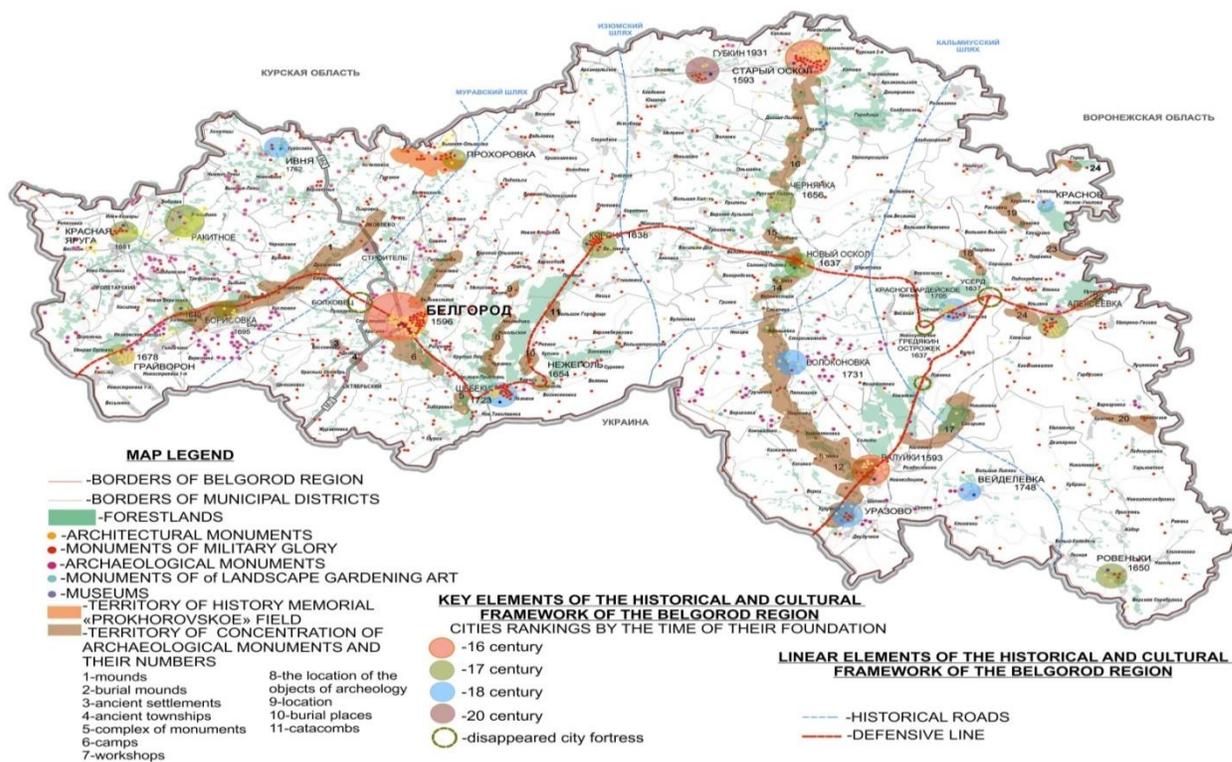


Fig. 2. Historical and cultural framework of the Belgorod region.

Compiled by E.I. Krushelnytska, M.V. Perkova [12]

### Subsystem "Transport"

The spatial relationships are defined by the transport skeleton interrelated the network of populated localities of the region and the objects of economic activity. The main elements of the transport infrastructure are mainly road and rail transport and, consequently, federal and regional motor roads, as well as the transport interchange nodes (Fig. 3). [8]

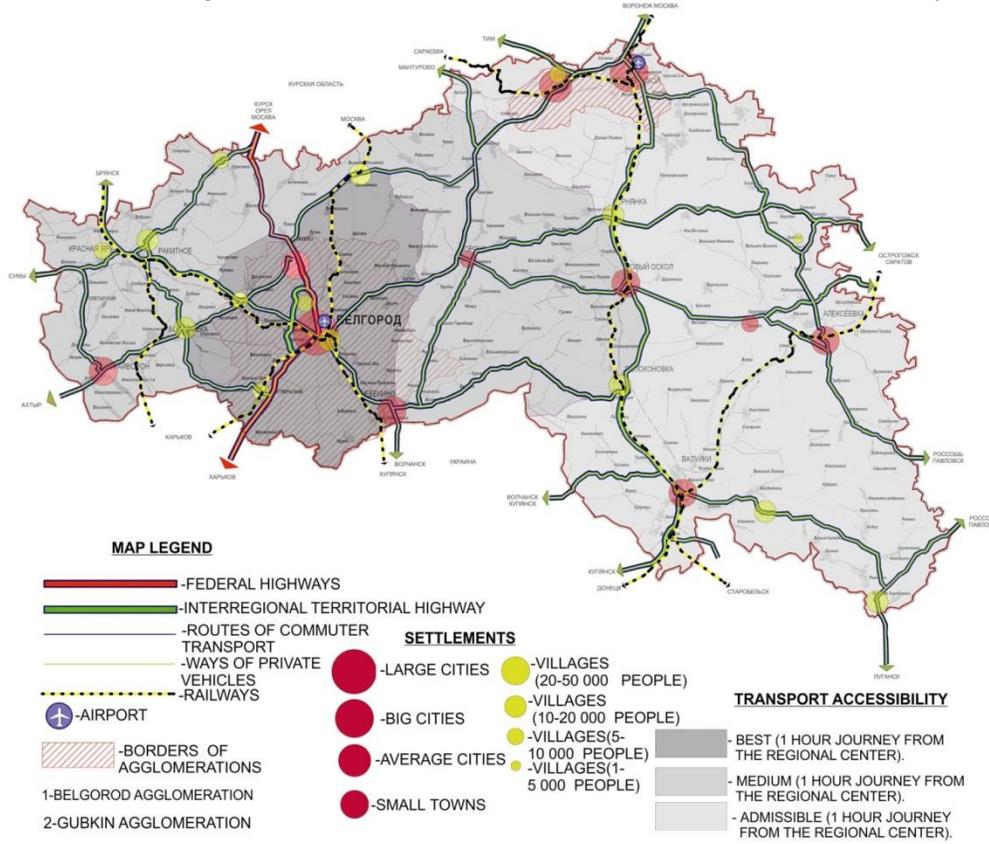


Figure 3. The transport framework of the Belgorod region.

Compiled by E.I. Krushelnytska, M.V. Perkova [12]

The most important interstate rail and road roads connecting Moscow with the southern regions of Russia, and Ukraine pass through the Belgorod region. The motor road network has rapidly developed since the establishment of the Belgorod region, and railway transport has not been developed over the past 60 years (Figure 4) [13-21].

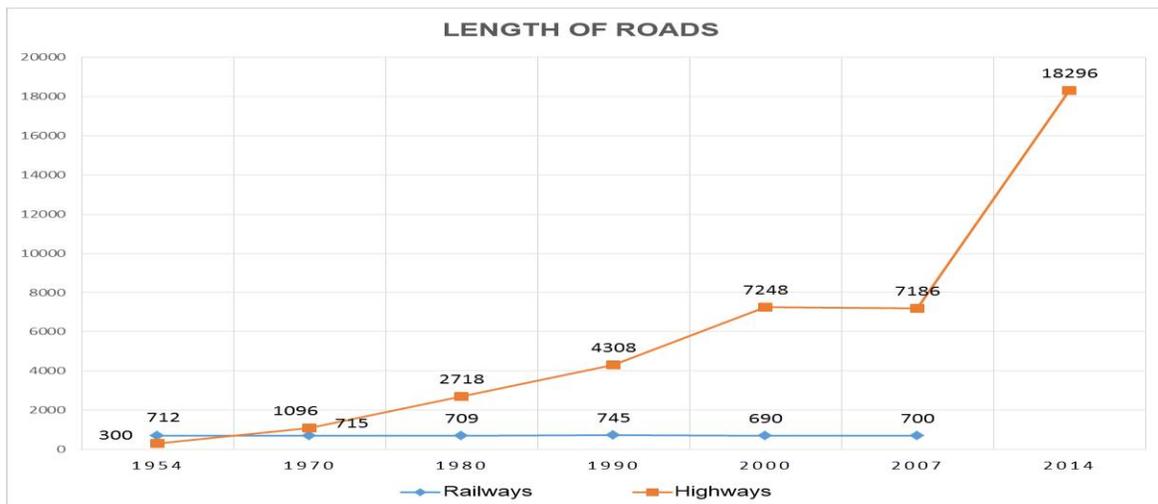
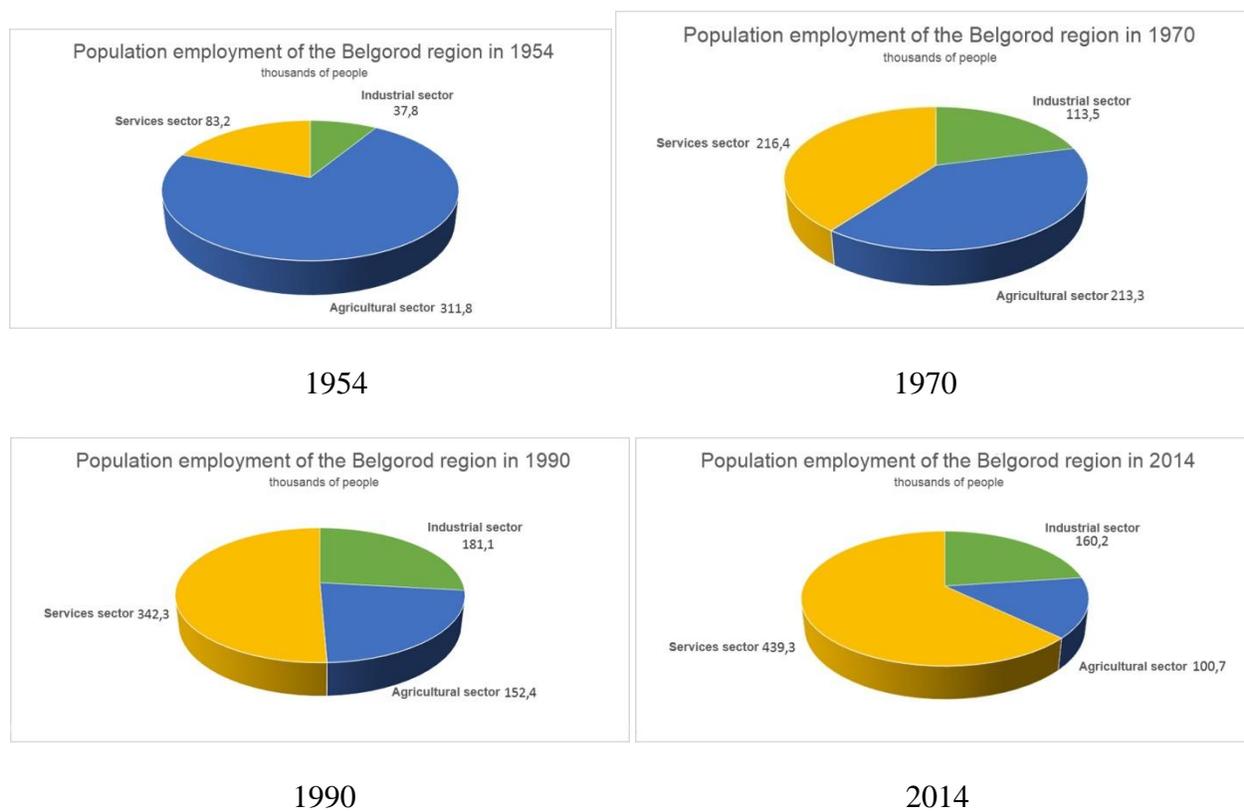


Fig. 4. The dynamics of the transport network development in the Belgorod region.

Compiled by M.V. Per'kova, O. Litvinova [13-21]

## Subsystem "Economy"

When considering the structure of gainfully occupied group employment in the Belgorod region in historical dynamics, we can conclude that since the establishment of the region, it has undergone significant changes. The processes of post-industrial society development affected the Belgorod region, too. Over the past 60 years since the establishment of the region in the current administrative borders, the number of gainfully occupied groups of the population employed in the service sector has increased dramatically, and employment of population in agriculture decreases (5). In part, this may be supported by the automation of technological processes in animal husbandry.



**Figure 5.** Employment structure for the gainfully occupied group in the Belgorod region over time. Compiled by M.V.

Perkova, O. Voloshina [13-21].

The structure of the Belgorod region territorial-industrial complex gravitates towards balanced development and includes:

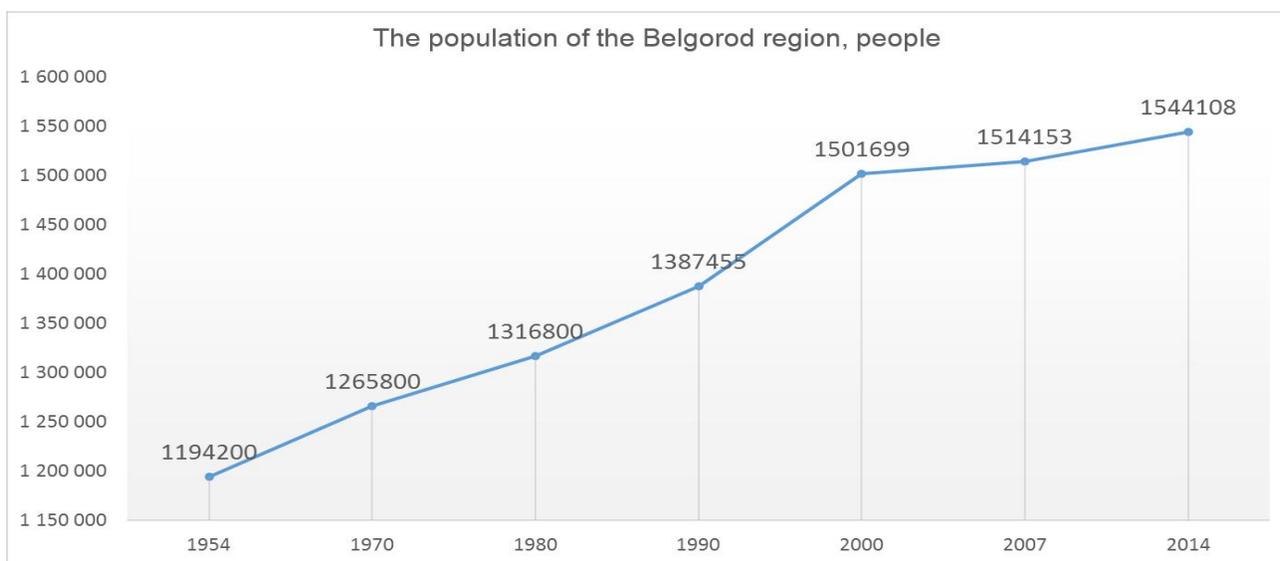
- Mining,
- Manufacturing
- Agricultural production (crop and livestock production).

The main areas of intensive economic development in the Belgorod region and transition to its innovative socially oriented type are: human development; creating a highly competitive institutional environment that encourages entrepreneurial activity and attraction of capital into the economy, structural diversification of the economy based on innovative technological development; strengthening and expansion of competitive advantages in the traditional areas of the region (agriculture, processing of natural resources); expansion and strengthening of external-economic positions, transition to a new model of spatial development of the economy.

Formation of prerequisites for transition to innovative socially-oriented type of development requires a search for new management solutions as a result of self-organization processes in the region contributing to the creation of conditions to further improve of life quality.

### Subsystem "Population"

In general, the population in the region is distributed relatively evenly. The highest population density is in the agglomeration area: Belgorod and Stary Oskol - Gubkin. Considering the population dynamics, it can be stated that in spite of fluctuations in migration processes, the population of the region grows steadily (Fig.6, 7).



**Fig. 6.** Population Dynamics of the Belgorod region.

Compiled by M.V. Perkova, O. Voloshina [13-21].

As a result of the social infrastructure study, we can note that there are implemented regional target socially-oriented programs in the sphere of health service, education, culture, youth policy, physical culture and sport, and in the area of

"Education" and "Health" (ris.8,9) [22].

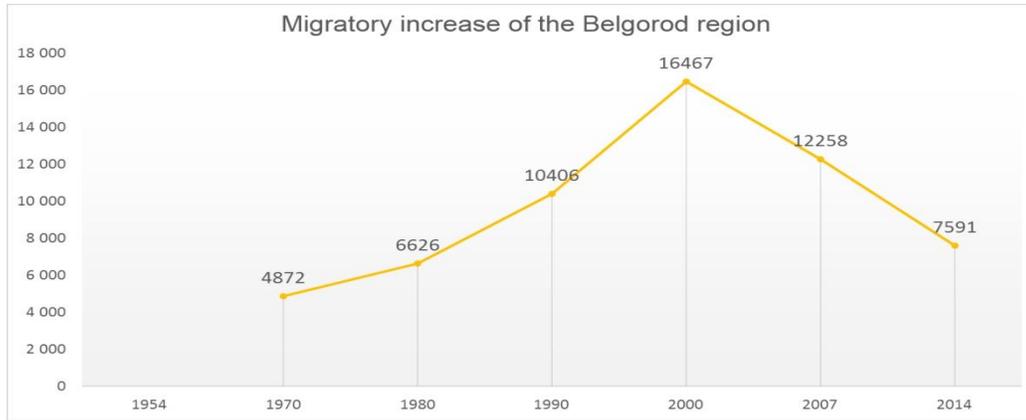


Figure 7. The dynamics of migration increase in the Belgorod region. Compiled by M.V. Per'kova, O. Voloshina. [13-21].

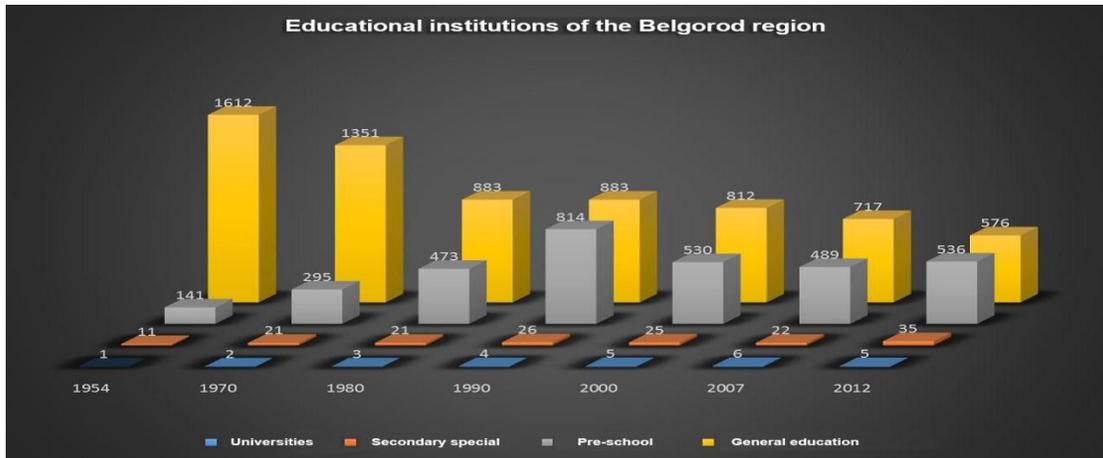


Fig. 8. The dynamics of social infrastructure development in the territory of the Belgorod region. Compiled by M.V. Per'kova, O. Voloshina. [13-21].

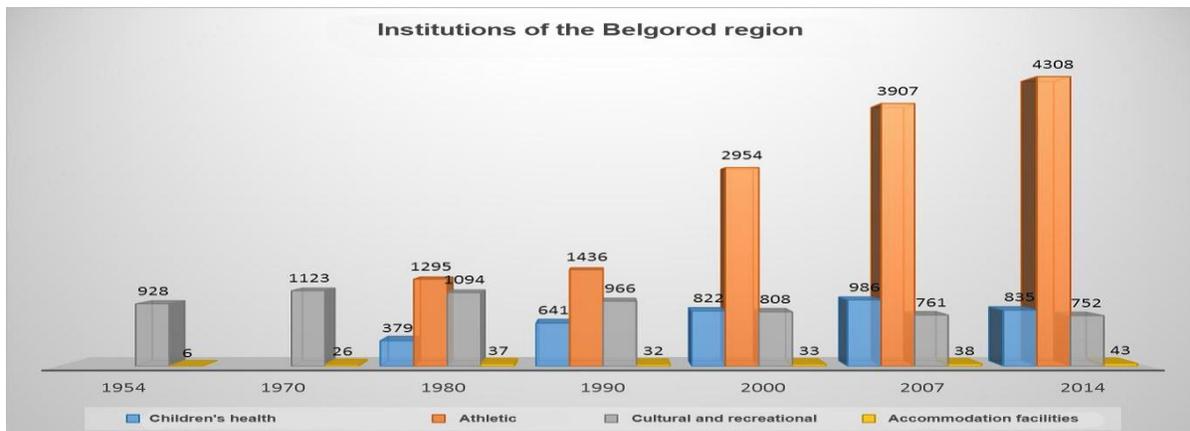


Fig. 9. The dynamics of social infrastructure development in the territory of the Belgorod region. Compiled by M.V. Per'kova, O. Voloshina. [13-21].

**Resume.** In summary, we can note that the region is characterized by a favorable geographical position. On its territory, there are strategically important interstate rail and motor roads connecting Moscow with the southern regions of Russia, South Caucasus, and Ukraine. A rich and varied natural resource and recreational potential evidences of the region's development in the following sectors of the economy: mining, energy, industrial, agricultural, tourism. All this contributes to the effective development of both inter-regional and foreign business, trade, and cultural relations.

The development of small towns as the administrative and economic centers of the regional settlement system takes place on the basis of the decentralized settlement principle. Agglomerations (Belgorod and Stary Oskol) have significant economic potential for effective development, but only under the condition of sustainable development of small towns and all settlements of the region. To date, it is important to perform the following:

- 1) Integration of the southern transport routes into the regional transport network;
- 2) Formation of large regional level transportation hubs in the regional settlement centers: Novy Oskol, Korocho, Biryuch, Volokonovka;
- 3) Creation of a system of high-speed rail transport between the regional center and small cities.

**Conclusions.** The study has showed that:

- 1) A spatial system includes several elements: natural, historical and cultural framework, transport framework, population, and economy.
- 2) Spatial relationships between elements of the system are a transport framework,
- 3) An internal structure of the regional settlement system characterized by subsystems of lower rank (municipal districts with a network of settlements and small town as a central "hub") is set.
- 4) A regional system is the external environment for other economic entities.

Consideration of regions as systems can identify specific approaches to their classification according to their degree of:

- Openness / closeness; in this case, classification units may be identified depending on the intensity of the exchange of natural product flows;
- Stability / instability; basis of classification is the intensity of internal and external relations of the regional system;
- Functional integrity of development. In this case, it refers to the degree and nature of each of the regional subsystems.

A regional system is complex, interconnected by its elements, and self-developing (according to the regional management solutions upon active creative role of the state in the territorial development) in satisfying the system functional integrity principle.

Changing in the configuration properties of the territory leads to a change in the target function. \*

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