

THE REPUBLIC OF AZERBAIJAN

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ABSTRACT

of the dissertation submitted for the Degree of
Doctor of Philosophy

**RESEARCH OF THE CHARACTERISTICS OF THE
INFRASTRUCTURE COMPLEX AND PREPARATION OF
ITS DEVELOPMENT MODEL IN THE SHAKI-ZAGATALA
ECONOMIC-GEOGRAPHICAL REGION**

Specialty: 5401.01 – Economic geography

Sphere of science: Geography

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BAKU – 2022

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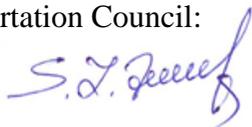
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INTRODUCTION

Rationale and level of development of the research topic.

After gaining independence, all spheres, including the territorial organization of the infrastructure of the Republic of Azerbaijan, have undergone substantial changes. These changes can be clearly seen in the example of mountainous regions. In this connection, studying the economic and geographical potential of the territorial organization of the infrastructure network in the Shaki-Zagatala economic and geographical region is of great importance for the geographical sciences. Thus, the production and social infrastructure ensure the mutual interaction of all economy systems in a continuous and complex manner. The market infrastructure carries out the sale and diversification of all types of goods. It becomes clear that infrastructure is vital for all areas. Along with representing several objects, it serves as a base for any type of economic and social activity.

Infrastructural areas play an essential role in the socio-economic and demographic development of the Shaki-Zagatala economic-geographic region. In recent years, the settlement of the population and the intensive appropriation of territories have resulted in several regional differences. These differences have caused certain shortcomings and problems, because of which the regional infrastructure has developed at a level, which is extremely low compared to modern requirements.

A number of nationally significant measures have been taken to develop infrastructure areas in the state programs implemented in connection with the socio-economic development of the regions of the Republic of Azerbaijan. Several research works were carried out on ways of territorial organization and optimization of infrastructure in the Shaki-Zagatala economic-geographical region. The regional characteristics and internal differences in infrastructure were also studied. Although the work on the preparation of the economic-geographical information base of the development of this field has been carried out, the current problem has not been solved completely and comprehensively. From this point of view, the territorial organization and internal differences of the infrastructure in the Shaki-

Zagatala economic-geographical region, the identification of important priorities for its development, the evaluation of the potential opportunities of the infrastructure, its economic-geographical diagnosis, as well as the scientific-theoretical and experimental justification of the perspective development of the infrastructure, taking into account the local natural-geographical conditions and economic potential, are very relevant. In addition, there is still a need for a complex and systematic analysis of the development of infrastructure areas and territorial organization in the Shaki-Zagatala economic-geographical region from an economic-geographic point of view.

Purpose and objectives of the research. The primary purpose of the research is to study the infrastructure areas in the Shaki-Zagatala economic-geographical region comprehensively, to determine their development trends, directions for service improvement, and network expansion, as well as to prepare an infrastructure development model. To achieve the set goal in the dissertation work, the following objectives are planned to be implemented:

- studying the natural and socio-economic factors in the formation of infrastructure areas;
- developing the infrastructure development model and examining regional characteristics;
- finding the internal differences between the administrative districts according to the territorial organization of the infrastructure and the level of development;
- finding out the location of residential areas along the height zones and the regional differences in the territorial organization of infrastructure areas in them; and
- determining the prospective development directions of infrastructure areas.

Research methods. A systematic approach, structural-functional analysis, generalization, historicity, economic and statistical analysis, statistical-mathematical, cartographic (GIS technologies), and other methods were used during the research.

The main provisions of the dissertation submitted for defence:

1. Studying the territorial organization and functions of the infrastructure in the economic-geographical aspect.
2. Working out the infrastructure development model and analyzing the economic-geographical development features.
3. Determining the regional differences and prospective development directions in the development of infrastructure areas.

The scientific novelty of the research:

- The economic-geographical problems of the territorial organization of infrastructure in the Shaki-Zagatala economic-geographical region were comprehensively studied and scientifically substantiated;
- The infrastructure development model was developed, and its characteristics in the region were comprehensively analyzed from an economic-geographic point of view;
- Regional differences in territorial organization and development of infrastructure areas in the Shaki-Zagatala economic-geographical region and ways of their regulation have been determined;
- The current state of infrastructure areas was comprehensively analyzed, and the territory has been divided into zones according to the dynamics of development;
- The economic-geographic diagnosis of the infrastructure was conducted, the geographical functionality of the role of state policies and programs was justified, and prospective development directions were provided.

Th theoretical and practical significance of the research. The results of the dissertation work have significant practical importance in terms of developing infrastructure areas in the Shaki-Zagatala economic-geographical region and increasing the efficiency of this process. The materials of the dissertation work can be used in the implementation of State Programs regarding the socio-economic development of the regions of the Republic of Azerbaijan, as well as in the issues of infrastructure development and territorial organization by local executive authorities.

Approbation and application of the dissertation. The content and results of the dissertation work were presented at the republican scientific conference on “Geographical problems of Regions of Azerbaijan” (Baku, 2016), the scientific conference on “Demographic development in the Republic of Azerbaijan: prospects of population settlement and regional problems” (Baku, 2016), the 8th Bacsa International conference, “Climate changes and chemicals-the new sericulture challenges”, “Cliseri” (Shaki, 2017), the scientific conference on the “94th birthday anniversary of H. Aliyev” (Baku, 2017), and Materials of the international scientific-practical conference of students, postgraduates, and young scientists “Region - 2020: public-geographical aspects” (Kharkiv, 2020).

Thirteen scientific articles and theses were published on the topic of the research work.

The recommendations reflected in the content of the research work, including the suggestions given in the final part, can be applied in the territorial organization of infrastructure areas in the economic-geographical region and the perspective development of the region.

The name of the institution where the dissertation work was carried out. The dissertation work was carried out at the “Economic and political geography of Azerbaijan” Department of the Institute of Geography named after academician H.A. Aliyev of ANAS.

The structure, content, and scope of the dissertation. The dissertation work consists of an introduction, three chapters, a conclusion, and a literature review. The scope of the work is 135 pages. The work consists of 3 pictures, 10 tables, 5 maps, 8 charts, and a literature review of 113 names. The introduction consists of 4 pages, Chapter I - 20 pages, Chapter II - 66 pages, Chapter III - 30 pages, the conclusion - 2 pages, the literature review - 10 pages. The dissertation contains 210525 symbols without tables, graphs, pictures, and a literature review.

THE MAIN CONTENT OF THE RESEARCH

The **introduction** defines the relevance of the topic, level of study, purpose and objectives, theoretical and methodological bases, information base, scientific novelty, and practical importance.

The first chapter covers the “**Theoretical and methodological foundations of the infrastructure complex in modern conditions**”. This chapter explains the concept of infrastructure. It also describes the social and economic-geographic aspects of the concept.

Playing an essential role in the development of society, infrastructure is a crucial component of the production and social spheres. It is a means of ensuring the normal development of the economic activity. In this regard, many scientists consider infrastructure a research object of economics. However, many studies on infrastructure are economic-geographic in nature. These studies are used to study regional territorial differences. When infrastructure is classified, it is categorized as a functional system and sometimes according to different characteristics.

I.H. Ibrahimov and N.M. Mammadov combine infrastructure in three forms: production infrastructure (participating in the process of goods production), social infrastructure (services provided for the life activity of the population), and market infrastructure (objects used in the delivery of products and services)¹. M.M. Mahmudov and I.M. Mahmudova emphasize that infrastructure is an auxiliary element of other fields. They determined the regional infrastructure elements and the differences between them by studying the infrastructure's material and technical base, production resources, functional-production structure, and service sphere². According to M.A. Abramov, the location of infrastructure facilities is related to the development of productive forces at the current level, as in any field of the economy. He systematically studied the features of the territorial organization of infrastructure areas and the close relationship between the specifics of their location, has compiled service areas, which are the main driving

¹Mammadov, N.M. Economy of Azerbaijan / N.M. Mammadov, A.M. Maharramov, S.E. Ahmadova. - Baku: Azernashr, - 2011. - 522 p.

² Mahmudov, M.M. Regulation of socio-economic development of regions / M.M. Mahmudov, I.M. Mahmudova. - Baku: Economic University, - 2011. - 370 p.

force of infrastructure, in 3 types: fixed stationary (people seek services), mobile (service providers go to consumers), and distant (shipment of goods by order of the consumers). He has also justified the role of service areas in economic and social development and put forward a comparative economic-geographical method to determine the level of service provided to the population in the regions³. Z.A. Samadzade studied the ways of efficient use of labor resources in service areas and increasing the role of infrastructure in public production⁴, A.A. Salmanov researched the territorial organization of social infrastructure, mainly service areas, recreation, and resort economy⁵. Besides, R.Kh. Shaulov has extensively studied the issues affecting the service sphere and the development of this sphere of territorial-production complexes⁶. A.G. Alirzayev studied the planning of infrastructure by territory and area in accordance with the deployment of productive forces and the development strategy for the region⁷, N.A. Babakhanov, A.A. Gurbanzade, T.G. Hasanov, and Y.S. Karimli developed the sustainable development strategy of residential areas, considering the territorial organization and design features of infrastructure in the planning system of villages, regions, and cities⁸. E.M. Hajizade stated that the social infrastructure is developed based on the requirements of the social policy line, and the socio-economic activity is manifested on the basis of two sub-systems - proactive (improving the economic situation of the population) and reactive (changes in market economy conditions) models⁹. Z.N. Eminov investigated the role of social infrastructure objects in the development

³ Abramov, M.A. Service geography / Abramov M.A. - Moscow: Mysl, - 1985. - 255 p.

⁴ Samedzade Z.A. Structure and efficiency of social production / Z.A.Samedzade. - Baku: Elm, - 1980. - 210 p.

⁵ Salmanov A.A. Territory organization of social infrastructure // In: Constructive geography of Azerbaijan. - Baku: Elm, - 2000. - p. 46-58

⁶ Abramov M.A. Territorial and production complexes of the Azerbaijan SSR / M.A. Abramov, R.Kh. Shaulov. - Moscow: Znanie, - 1980. - 48 p.

⁷ Alirzayev, A.G. Economy and management of the social sphere / A.G. Alirzayev. - Baku: University of Economics, - 2010. - 326 p

⁸ Hasanov, T.G. Planning of regions and cities / T.G. Hasanov, Y.S. Karimli. - Baku: Cooperation, - 2014. - 330 p.

⁹ Hacızadə, E.M. Sosiallaşan iqtisadiyyat / E.M.Hacızadə. – Bakı: Elm, – 2006, – 226 s.

of settlements and emphasized the great importance of social infrastructure in the settlement system¹⁰. M.M. Ahmadov has considered the service market, which develops in line with the rules of the market economy, a type of commodity market, and has stated that it has specific characteristics¹¹.

As a result of our research, we have concluded that infrastructure development is mainly related to political, economic, and social stability. This also serves to raise the level of cultural development of the regions and increase the demographic potential of the population. Otherwise, the resulting problems complicate the operation of the infrastructure.

To solve the above-stated problems, we have developed an infrastructure development model (Figure 1). The model entails the main directions of industrial, social, and market infrastructure. Thus, despite the fact that the infrastructure is multi-sectoral, these sectors, holding a leading position in its development, ensure both material and moral needs in the territorial organization of facilities serving the population by exercising various functions.

Based on the infrastructure development model, infrastructure can be studied at the level of a country, region, city, district, industrial sphere or enterprise. The analysis of the infrastructure problem can be conducted within the territorial and production complex, industrial hub, and economic zone.

The second chapter of the dissertation work covers the aspects of the **“development of infrastructure and current state of territorial organization in the Shaki-Zagatala economic-geographical region”**. This chapter studies the role of natural factors in forming the infrastructure areas, estimates the socio-economic potential of infrastructure areas, and defines the territorial organization and internal differences of the infrastructure areas of the region.

Shaki-Zagatala economic-geographical region has big differences in population placement in vertical zones. Such a difference depends on the natural-geographical conditions of vertical zones - the diversity

¹⁰ Eminov, Z.N. Population of Azerbaijan / Z.N. Eminov. - Baku: - 2005, - 560 p.

¹¹ Ahmadov, M.M. Marketing of service areas / M.M. Ahmadov. - Baku: University of Economics, - 2015. - 372 p.

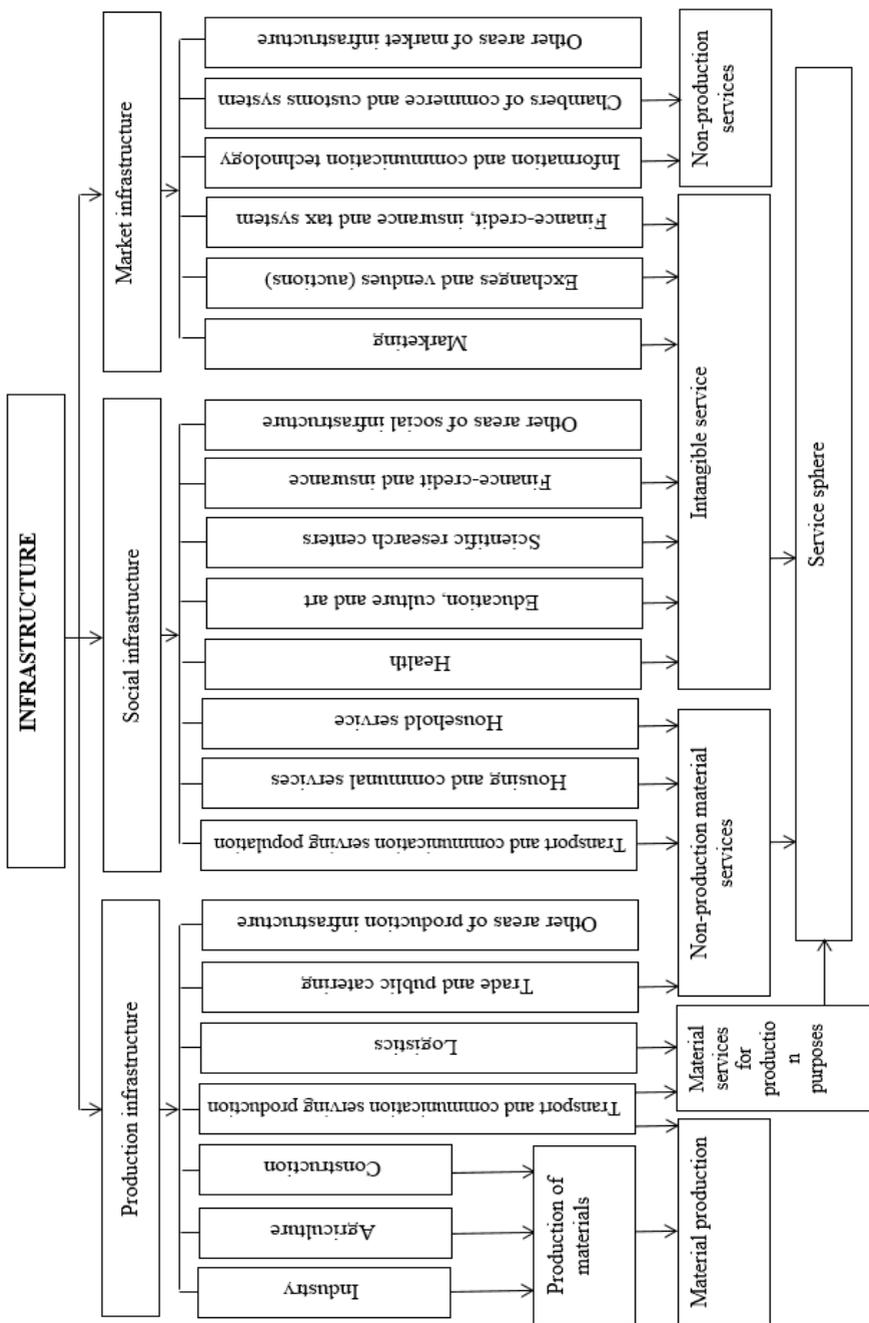


Figure. 1. Infrastructure development model

of climate, soil, and vegetation, the degree of fragmentation of the relief, etc. It is also related to the socio-economic development characteristics of those zones at different levels¹². This factor also reveals itself in the placement of infrastructural areas. That is, differences in population settlement and land use are strongly pronounced in mountainous regions, where the network of infrastructural sites is reduced. As the areas along the tectonic fractures and cracks in the mountainous regions and plain belts of the economic-geographical region are rich in water sources, settlements were built here in a specific order. In some cases, this fact has led to establishing rural agglomerations.

The area usually has a mild and humid *climate*, and it receives a lot of solar energy and radiation throughout the year. The annual amount of precipitation is relatively less in Shaki, Gakh, and Balakan, while it is more in Gabala, Zagatala, and Oghuz administrative districts. Possible evaporation makes 680-871 mm throughout the year. The Gabala and Oghuz administrative districts have the highest number of snowy days (45 days), based on which the Tufandag winter-summer tourism recreation complex operates in Gabala.

The *rivers* in the studied Shaki-Zagatala economic-geographical region are the left tributaries of the Ganikh River. They have a favourable water balance structure. Nevertheless, the lower mountainous areas experience a water shortage in the summer months. This factor places an obstacle in the irrigation of agricultural fields; the population mainly meets their water demand at the expense of underground water. However, in mountainous areas, the population uses water from rivers and springs¹³. The main rivers of the area include Balaken, Kurmuk, Katekh, Kish, Mazim, Mukhakh, Tala, Ayri, Shin, Demiraparan, Agh and other rivers. Their nutrition is made up of snow, rain, and underground water. These rivers are the most

¹² Mammadov, Z.S., Ayyubov, N.H. Some issues of socio-economic development of the mountainous economic regions of the Greater Caucasus // - Baku: Azerbaijan national economy, - 1984. No. 10, - p. 47-51.

¹³ Aliyev, F.Sh. Underground waters, use of resources and geocological problems of the Republic of Azerbaijan / F.Sh.Aliyev. - Baku: Chashioghlu, - 2000. - 326 p.

turbulent and flooded rivers in the region. The materials they bring settle in flat areas and form sediment cones.

Although the rivers in the Shaki-Zagatala economic-geographic region have excellent energy potential (the average slope of the longitudinal profile of the rivers makes 0.08-0.17⁰), these resources are poorly utilised. Nevertheless, these areas have great opportunities for the construction of small hydroelectric power stations (HPS). There were seven small HPSs in this region - namely Shaki, Balakan, Zagatala, Saribash, Bash Goynuk, and Matsek before the construction of Mingachevir HPS. At present, only Shaki HPS operates here.

One of the natural factors influencing the formation of infrastructure areas is *natural disasters*. Although there are pauses in the recurrence of natural disasters with destructive power, their occurrence should be considered as a constantly active factor in the designing and placement of various objects and facilities in the future¹⁴.

Shaki-Zagatala economic-geographic region is considered as a classic *flood* region. During the intense floods, observed mainly in summer and autumn in Shin, Kish, Kurmuk, Tala, Tikanli, Mukhax, Demiraparan, and other rivers, bring more than 1 m³ of coarse materials (stone, sand, and gravel). This situation can reach 10 million m³ every 20 years¹⁵.

Along with flooded rivers, most of the Katekh, Mazim, and Balakenchay basins in the area are located in the area of the Zagatala State Reserve. Therefore, the erosion process here is slow, and flood events are rarely observed, as the meadows and forests are well protected here.

Steep slopes and easy erosion of rocks in the area of Shaki-Zagatala economic-geographical region cause *landslides*. Landslides are mainly observed in Mazim, Balaken, Kish, and Shinchay basins.

¹⁴ Babakhanov, N.A. Natural disaster events and the territorial organization of the economy in the Azerbaijan SSR // VI Congress of the Geographical Society of the Azerbaijan SSR, - Baku: Elm, - 1990. - p. 12-15.

¹⁵ Rustamov S.G. Mudflow phenomena in Azerbaijan and their hydrological nature // Proceedings of the 5th All-Union Conference on the study of mudflows and measures to combat them. - Baku: Academy of Sciences of the Azerbaijan SSR, - 1962. - p. 6-12

In this context, forest-reclamation measures should be taken to prevent landslides and weaken their movements in the future.

The economic-geographic region has a high (with magnitudes of up to 8-9) seismic activity. Displacement processes occur periodically along the faults, which are accompanied by *earthquakes*. Shaki underwent an earthquake (with magnitude of 7) in 1903, Zagatala (with magnitude of 7) in 1924 and (with magnitude of 8) in 1936, Oghuz in 1953 (with magnitude of 7), and Zagatala (with magnitude of 6.5) in 2012. 250 buildings were completely destroyed, more than 2,000 buildings were damaged, infrastructure areas were severely damaged during the last earthquake. Luckily, no deaths were recorded¹⁶. 609 million manats were allocated from the state budget to eliminate the consequences of the earthquake. Manat funds have been allocated. The major part of the funds was spent on the construction of houses, schools, and kindergartens, while the rest was spent on the restoration of the roads and transport infrastructure, along with providing compensation to the population.

When the socio-economic potential of the infrastructure areas is estimated, some factors are taken into consideration as the provision of the population with housing conditions, communal and household services, cultural and educational institutions, education, health, communication, trade, tourism, as well as the analysis of the transport infrastructure that creates economic relations between the production areas.

Housebuilding in Shaki-Zagatala economic-geographic region is poorly developed in comparison with other regions of the Republic. However, the region is rich in construction materials. The region has deposits such as Dashbulag, Kokhmug, and Zeysite for the production of marble chips, Garabulag and Tikanli for the production of building stone and gravel. In addition to these, clay deposits and sand materials are also widespread in the area. While analyzing 2010 and 2020, we will observe that the total area of the housing fund in the Shaki-Zagatala economic-geographical region has increased by 1297.5

¹⁶ Pashayev, N.A. Economic-geographic assessment of the impact of natural disasters on the economy in the Republic of Azerbaijan / N.A.Pashayev. - Baku: Europe, - 2018. - 372 p.

thousand m², which means an increase of 11.8% in the analysis of the respective years.

Housing and **communal services** are among the most important areas of social infrastructure. The population's power demand is not fully met in the Shaki-Zagatala economic-geographic region. Interruptions in the electricity supply have been reduced to a minimum, and the newly built Shaki modular power station has played an auxiliary role in supplying demand¹⁷. Currently, 219.6 million kWh of electricity is produced in Shaki and 1.16 million kWh in Balakan¹⁸.

“Azerenergy” and “Azerishiq” OJSCs have conducted pertinent works within the framework of the “State Programs on Socio-Economic Development of Regions” to continue relevant works in the field of improving the power supply, including the construction and reconstruction of electricity transmission lines in the Shaki-Zagatala economic-geographical region. Thus, 110 and 35 kWh substations were rebuilt in Shaki city and Zagatala administrative district, 9,205 km of SIP cable line was laid in Zagatala, 35 kWh substation was built in Gakh and Oguz administrative districts. Besides, a Bioenergy Thermal Power Station with a capacity of 2 MWh was constructed in Shaki city, while Hybrid type (wind, solar, and biogas) power and thermal stations with a capacity of 10 MWh have been built in the Oghuz and Balakan administrative districts¹⁹.

As an important area in the structure of social infrastructure, **household services** are among the relatively declining areas in the Shaki-Zagatala economic-geographical region. The main reason for the backwardness is that most of the area has a mountainous relief, as well as individual clothes and furniture making, chemical cleaning, and other domestic service facilities are poorly developed or don't function at all.

¹⁷ Population settlement and problems of demographic development in the Shaki-Zagatala economic-geographic region / Ed. chairman R.M. Mammadov. - Baku: - 2016. - 184 p.

¹⁸ Industry of Azerbaijan: (statistical collection) / prep. ed. T. Budagov - Baku: SSCRA, - 2021, 242 p.

¹⁹ The socio-economic development of the regions (2014-2018) / vol. ed. T. Budagov. - Baku: SSCRA, - 2018. - 700 p.

Household services provided to the population in the Shaki-Zagatala economic-geographical region made 16,487.6 thousand manats, while the volume per capita was 28.24 manats in 2010. In 2019, the public services to the population increased to 30,447.8 thousand manats, while the volume per capita was 47,89 manats. However, this indicator decreased sharply in 2020, making the household service provided to the population 22,174.1 thousand manats, and the volume per capita fell to 34.63 manats²⁰. The reason stemmed from the pandemic restrictions.

Cultural and educational institutions are among the critical factors in meeting the spiritual needs of the population and in the efficient organization of leisure time. 2922 libraries, 2231 clubs, and 240 museums operate in Azerbaijan, and 205 libraries (2619 copies per 1000 residents on average) – in the Shaki-Zagatala economic-geographical region since 2020. 22 of them fall to the share of Balakan (1641 copies), 33 - Gakh (5032 copies), 20 - Gabala (1194 copies), 24 - Oghuz (3805 copies), 61 - Shaki (2869 copies), and 45 - Zagatala (2717 copies) administrative districts. In addition, 20 out of 178 clubs in the region are located in Balakan, 24 - in Gakh, 17 - in Gabala, 21 - in Oghuz, 53 - in Shaki, and 43 - in Zagatala administrative districts. 2 out of the 22 museums in the region (47 visitors per 1000 people) are in Balakan (21), 4 - in Gakh (40), 3 - in Gabala (8), 2 - in Oghuz (10.9), 8 - in Shaki (61), and 3 - in Zagatala (95) administrative districts. However, these indicators are quite small compared to the Republic. Thus, 7.0% of libraries, 8.0% of clubs, and 9.2% of museums fall to the share of the Shaki-Zagatala economic-geographic region²¹.

²⁰ Regions of Azerbaijan. Baku: (statistical collection) / prep. T. Budagov - Baku: SSCRA, - 2021, 844 p.

²¹ Regions of Azerbaijan. Baku: (statistical collection) / prep. T. Budagov - Baku: SSCRA, - 2021, 844 p.

Table 1

The main indicators of medical service in the Shaki-Zagatala economic-geographical region

	Number of doctors, people	The number of doctors per 10,000 people	Number of nursing staff, people	The number of nursing staff per 10,000 people	Number of hospitals	Number of hospital beds	Number of hospital beds per 10,000 people	The number of treatment facilities providing ambulatory polyclinic services	Capacity of ambulatory polyclinics	Capacity of ambulatory polyclinics per 10,000 people
Republic of Azerbaijan - total	31815	31,8	54786	54,8	518	44461	44,5	1723	105057	105,1
Baku city - total	20734	90,1	22737	98,8	161	19739	85,8	295	34047	148
Shaki-Zagatala economic- geographical region - total	1033	16,4	3452	54,8	10	1773	28,1	106	6454	102,4
Balakan district	135	13,5	394	39,5	1	187	18,8	16	1060	106,4
Gakh district	110	19,1	411	71,5	1	154	26,8	13	639	111,2
Gabala district	167	15,4	464	42,7	2	387	35,6	19	862	79,3
Oguz district	61	13,5	278	61,7	1	96	21,3	10	489	108,6
Shaki district	323	17,1	1179	62,3	3	724	38,3	20	1706	90,2
Zagatala district	237	18,2	726	55,6	2	225	17,2	28	1698	130,1

Source: Regions of Azerbaijan. Baku, 2021

Health care has undergone many positive changes in recent years. A new Psychiatric Hospital was built in the city of Shaki, and a Treatment and Diagnostic Center was built in Gabala. Besides, a Central Hospital was renovated in the cities of Balaken, Gakh, Shaki, and Zagatala, a polyclinic - in Gakh, a doctor's station in the villages of Katex, Lekit, Gandakh, Goyam, and Car, and a medical station was renovated in the villages of Kapanakchi, Lahic, and Ashagi Tala.

In addition to the work done, certain problems remain. Thus, the region deploys only 3.2% of doctors in the republic, 6.3% of secondary medical workers, 1.9% of hospitals, 4.0% of hospital beds, 6.2% of outpatient polyclinics, and 6.1% of the capacity of ambulatory-polyclinic institutions (Table 1).

One of the most important areas providing social services to the residents is **communication service**. The demand for communication services has increased in recent years in the Shaki-Zagatala economic-geographical region. Currently, 160 post offices and 196 ATH operate in the economic-geographic region. From 2010 to 2020, the number of postal shipments in the territory increased by 2.3 times to 534.1 thousand. During these years, the number (45 units) and total capacity (9584 units) of ATHs have recorded an increase.

Trade service in the Shaki-Zagatala economic-geographic region has considerably improved in recent years. The trade network within the region has been dramatically expanded, while the wholesale points have been established in each administrative district. These measurements have been taken considering the size of the settlements and the needs of the population.

In 2020, the retail trade turnover in the Shaki-Zagatala economic-geographical region amounted to 1323.9 million manats, with a specific weight of 3.3% for the country. Commodity turnover per capita was 2067.37 manats. This indicator was 2366.67 manats in Balakan, 2198.89 manats in Gakh, 1837.49 manats in Gabala, 1892.39 manats in Oghuz, 2279 manats in Shaki, and 1725.69 manats in Zagatala.²²

²² Regions of Azerbaijan. Baku: (statistical collection) / prep. ed. T. Budagov - Baku: SSCRA, - 2021, 844 p.

The *tourism* industry serves as one of the main factors in assessing the socio-economic potential of infrastructural areas. Hotels are considered the most optimal means for accommodation, feeding, and recreation of tourists, as well as organizing their leisure time. According to the statistical data of 2020, 655 hotels operated with tourism activities in the republic, which an overnight capacity was 50,687 places. Comparing the number of overnight stays in hotels in 2018 and 2020 reveals that this indicator has decreased by 3 times in the Republic, and by 3.1 times in the Shaki-Zagatala economic-geographical region. This decline can be mainly attributed to the COVID-19 pandemic.

In 2020, 86.3% of the tourists visited the region for recreation and entertainment, 7.1% for business, 4.2% for treatment, and 2.4% for other purposes. Tourists mainly preferred 1-3 days stay, making up 98.8% of the total tourists, which is a very low indicator. Thus, the long-term stay of tourists serves both the socio-economic development of the region and the increase of income in the tourism industry. Sadly, only 1.1% of tourists visit the region for 4-7 days and 0.1% for 8-27 days.

Considering the number of new jobs, this indicator was 128,979 in the republic in 2020, 1989 in the economic-geographic region, 700 in Balakand, 173 in Gakh, 557 in Gabala, 94 in Oghuz, 277 in Shaki, and 188 in Zagatala²³. Analyzing 2010 and 2020, it becomes clear that the main part of the new jobs opened in 2010 was in Zagatala (26.5%) and Shaki (31.4%). In 2020, this indicator changed, and the main part of the new jobs fell to the share of Balakan (35.2%) and Gabala (28.0%) administrative districts.

Transport infrastructure serves as a leading factor in the territorial organization of infrastructural areas in the Shaki-Zagatala economic-geographical region. Baku-Yevlax-Balakane railway, Baku-Yevlax-Balakan, and Baku-Ismayilli-Gabala-Balakan highways passing through the territory of the region play an important role in establishing domestic and foreign economic relations. This road

²³ Regions of Azerbaijan. Baku: (statistical collection) / prep. ed. T. Budagov - Baku: SSCRA, - 2021, 844 p.

provides access to Black Sea ports from the Republic of Georgia, which is our strategic partner.

The length of the railway, put into use in 1986 in the Shaki-Zagatala economic-geographical region, is 162 km, which makes up 7.8% of the total railway lines in the territory of the republic. It accounts for approximately 20-25% of cargoes and 12-15% of passengers in the economic-geographic region. The railway line mainly passes through four administrative regions - Shaki, Zagatala, Gakh, and Balakan. 62 km or 38% of the railway line in the territory of the economic-geographic region falls to the share of Shaki, 40 km or 24.5% - Gakh, 38 km or 24% - Zagatala, 22 km or 13.5% - to Balakan districts²⁴.

A new railway line and a railway station were built on the route of Laki-Gabala, i.e. Gabala airport in the territory of the economic-geographic region. The 20 km distance of this line passes through the mountainous area of the Gabala administrative district.

7.4% of the total highways in the republic falls to the share of the region, while 31.4% - of Shaki, 17.9% - of Balakan, 16.3% - of Zagatala, 13.2% - of Gakh, 12.3% - of Gabala, and 8.9% - of the Oghuz administrative districts. 11.4% of the roads are asphalt-concrete, 25.8% are black-paved, 55.3% are gravel-coated, and 7.5% are ground roads²⁵.

The availability of air transport is of great importance in the socio-economic development of the Shaki-Zagatala economic-geographic region. Recent-years reforms in this sector have helped to achieve progress in this area. In 2008, the Zagatala airport, with a runway length of 3000 m and a width of 60 m, was put into operation. Besides, Gabala airports with a runway length of 3600 m and a width of 60 m were commissioned in 2011. These ports have the ability to operate Airbus A319, A320, A340, Boeing-757, and other large aircraft of this type. Balakan airport serves amateur aviators and those who want to jump from a parachute.

²⁴ Mammadov, Z.S. The 21st century: transport factor of economic development / Z.S. Mammadov. - Baku: Azernashr, - 2002. - 386 p

²⁵ Transport in Azerbaijan: (statistical collection) / prep. ed. T. Budagov - Baku: SSCRA, - 2021. - 84 p.

Summarizing all the above-mentioned factors, infrastructural areas were planned within each administrative region, and their advantages were determined to determine the territorial organization of infrastructural areas in the Shaki-Zagatala economic-geographic region and their internal differences. At that time, the analysis of the population, social and production infrastructure areas, transport and communication routes connecting them, and tourism objects considered more promising for the region were carried out, and the regionalization method was applied. At the same time, the infrastructural planning and design of the settlements in the mountainous areas of the economic-geographical region, and their unique zoning were also carried out to understand the internal differentiation and to regionalize future problems.

Based on the analysis, three zones were determined in the research region according to the level of development, the sphere of influence, and the perspective of the cities. The first zone includes Shaki, the second zone comprises Gabala and Zagatala, while the third zone includes the center of the Balakan, Oghuz, and Gakh administrative regions and their adjacent areas (Figure 2).

In general, the cities that are the administrative district centers of the Shaki-Zagatala economic-geographical region are located in a favorable economic-geographical position with natural opportunities. They play a central role in terms of improving the socio-economic development of each administrative district. However, rural settlements, far from the center, are not able to benefit fully and efficiently from these opportunities. In addition to affecting population settlement (migration), this factor limits the involvement of the potential and existing opportunities of mountainous areas in the economic cycle. Therefore, the pace of socio-economic development of the villages should be at the same level as the administrative districts to ensure the stable settlement of the population in these areas,

The examination of infrastructural areas in the Shaki-Zagatala economic-geographical region revealed several regularities:

- developing the territorial system of the infrastructure determined the sharp differences in the level of services provided to the population within the region;

- the infrastructure is better organized in the regional centers, and there is close interaction among areas;
- the connection among rural settlements and the level of infrastructure development and territorial organization is poorly organized; and
- the potential opportunities of the region are not fully utilized.

The third chapter of the dissertation covers the **“Perspective development directions of the infrastructural areas in the Shaki-Zagatala economic-geographic region”**. This chapter studies the role of state policies and programs in the improvement of infrastructural areas of the region, as well as the development prospects of infrastructural areas.

The development of regional policy is one of the leading directions ensuring sustainable economic and social development of the state. The ultimate goal of the economic and social policy of the state is to raise the standard of living of the population and improve the supply of jobs. Thus, the standard of living of the population is the primary indicator of economic development, requiring the improvement of the field and territorial structure of the country's production areas, the improvement of the service level of the infrastructure, the reduction of the poverty threshold, etc. In this connection, sustainable socio-economic development of regions is estimated as an integral element of a state policy.

The Shaki-Zagatala economic-geographic region plays a crucial role in fulfilling tasks in this field. Thus, the region has potential opportunities for sustainable socio-economic development. They include fertile lands located in the low and medium mountainous areas in the Ganikh-Eyrichay valley for the development of agriculture and animal husbandry, which are the basis of the economy, meadows in the Ajinohur foothills and high mountains, favourable climatic and balneological conditions for the improvement of the tourism-recreational economy, and mineral springs. The transition to the sustainable development of the region could be ensured by effectively using the rich economic and socio-cultural potential in the economic-geographical region.

The employment of labour resources is of particular importance to raise the living standard of the population, regulate demographic development, increase the specific weight of the urban population, and ensure the maintenance of the demographic potential. The construction of new economic facilities and the commissioning of production and service facilities based on private ownership during the economic reforms implemented in the studied region helped to create a large number of new jobs in the region. However, there is still a significant gap between the number of available labour resources and jobs, and the provision of jobs remains a problem. At the same time, several measures should be taken towards opening of new workplaces, efficient organization, and improvement of the structure of employment in the process of expanding existing enterprises.

Since the first years of gaining independence, a number of measures have been taken to increase the level of services provided to the population, to organize the facilities related to infrastructure, and to reduce the differences between cities and villages in this area. State programs have been adopted for their forecasting and regulation, and for determining the financial sources of the implemented measures. The “State Program on the Socio-Economic Development of Regions” comprises the most important stage of them.

The *State Program for 2004-2008* covers all areas of people's economic, social, and cultural life, requiring a different approach depending on the current level of development and existing potential of the regions. Thus, scientifically-practically justified complex sub-measures should be implemented for the efficient placement of production and social infrastructure areas depending on natural conditions, natural resources, and economic opportunities.

Works on the reconstruction of social spheres hold a special place among the measures envisaged in the State Program. In this connection, large-scale works were also conducted in the Shaki-Zagatala economic-geographical region. Repair of educational facilities, construction of new schools, and educational buildings were carried out in the economic-geographic region. Much work has been done regarding the reconstruction of the material and technical base of schools, supplying them with equipment, computers, and textbooks.

Secondary general education schools, meeting modern requirements, have been built in most of the villages located in the administrative districts. Measures in this direction were also carried out in the field of repair of secondary and technical-vocational educational schools. However, it should be mentioned that at present, the work in the field of repairing preschool educational facilities and building new ones in the region is not at the required level. New enterprises should be constructed in this area.

During the implementation of the State Program, a lot of work was done to restore the energy and water supply of residential areas and the sewerage system. In this regard, water lines are built in villages, existing lines are repaired, and artesian wells are dug. To improve water supply in cities and towns, water intakes are built, water is purified, and supplied to consumers.

Large-scale works were carried out in the economic-geographic region for the repair of highways, inter-village, intra-district, and highway roads connecting villages with administrative district centers. Fundamental reconstruction works have been implemented for the restoration of the Yevlax-Balakand highway, which passes through the territory of the economic district. Over the past 5 years, 33.8 km of highways have been fundamentally repaired in Balakand, 31.9 km in Gakh, 91.9 km in Gabala, and 55.3 km in Zagatala. Most of them are rural roads.

The region enjoys favourable natural-geographical, balneological, and climatic resources for the development of the tourism industry. Based on their use, a strong potential has been created. However, building roads, installing a heating system, providing natural gas, electricity supply, advertising, and tourism-information centers that meet modern requirements are among the important tasks. In this connection, Shaki Regional Tourism Information Center was established.

During the implementation of the *second State Program for 2009-2013*, important steps were taken in the field of economic, social, and cultural development of the regions. During the implementation of the state program in the Shaki-Zagatala economic-geographical region, several measures were taken to create new areas of

infrastructure facilities in the economic-geographical region, rebuild existing facilities, and improve the level of existing services. Small HPSs with a total capacity of 20 MWt have been constructed in the economic-geographic region. Besides, new water reservoirs were built to supply the population and the economy with fresh water.

Subartesian wells were dug, and water pipelines were laid from them to improve the water supply of farmlands and villages. In addition, sewerage and embankment works were carried out in the Demiraparan River bed, and concrete walls were built to protect the city from floodwaters. Works have been carried out in the field of health, cultural, and educational facilities, and construction of new facilities in the territory of the administrative district.

During the implementation of the ***third State Program for 2014-2018***, the Yevlax-Balakén highway was fundamentally repaired in the region. At the same time, a lot of work has been done in the field of repairing locally important roads in the administrative districts. The works on the development of the tourism sector and the construction of new tourist facilities and the improvement of services were continued, and artesian wells were dug to improve the water supply of the population in the facilities. Repair and restoration works were carried out in the Albanian temple in the village of Nij. “Tufandağ” mountain-skiing summer-winter tourism recreation complex was established as well.

A number of important infrastructure projects have been implemented within the framework of the latest “***State Program for Socio-Economic Development of Regions***” for 2019-2023. For example, the Automatic Management Center of “Azerishiq” OJSC, the “ASAN service” center, the Children's art school have been rebuilt in the Balakan administrative district, while secondary school No. 11 has been constructed in the city of Shaki and the secondary school in Baltali village of Shaki city.

As a part of ***production infrastructure*** during 2019-2020, “Balakan Foods” operated for making fruit juice and dried fruit in Balakan, hazelnut warehouse in Turacli village in Gakh, ASPI AGRO - alcoholic beverage production facility in Gabala, a hazelnut processing workshop, tobacco drying stations in Bujak and Sinjan

villages in Oghuz, and butchery in Shaki city. Besides, Agroservis OJSC provided agrotechnical services to local farmers and villagers, and representative offices of “Azgübra” and “Sara Group” LLCs were established within the production infrastructure in the Shaki-Zagatala economic-geographic region.

Regarding the *transport infrastructure*, Ghullar-Tulu-Talalar-Ajilighbina-Qaysa highway has been construction in Balakan, Gakh-Ilisu in Gakh, Amirvan-Vandam and Bum-Tikanli-Abrikh in Gabala, Shirinbulag in Shaki, Mukhakh-Zayam-Yukhari Chardakhlar-Gargay in Zagatala, and a new bridge over the Bum River in Gabala to improve the functioning of the production and social infrastructure in the territory of the economic-geographical region.

In order to improve the utility sphere of the population and raise the standard of living, a number of measures have been taken in regards to *communal service infrastructure*. For example, one 110 kWt hydroelectric plant was reconstructed in Balakan, Gakh, Gabala, and Shaki; three 35 kWt substations were reconstructed in Shaki, 2 in Gabala, one in Oguz and Zagatala. Besides, subartesian wells have been dug Saribulag village of Balakan, Almali, Baydarli, Gulluk, Ibakli, and Turajli villages of Gakh, Ashagi Tala and Goyam villages of Zagatala. The subartesian pump was renewed in Kusnet water source and Mikhligovag village of Gabala. Regarding the communication service, 1.35 km of fiber optic cable was laid in Balakan, 3.80 km in Fistigli village of Gakh, 12.5 km between Oghuz-Gabala, and 48 apartment buildings were built in Gakh city.

Regarding the *social infrastructure*, one of the main and leading areas of infrastructure, Garakli high school was built for 264 students in Balakan and Vandam village high school for 360 students in Gabala. Tasmalı high school in Gakh was repaired for 264 students, Alibeyli high school for 216 students, and Gum village high school for 480 students. Amanli village modular elementary school for 20 students.

Amanli village modular elementary school was repaired for 20 students, Women's Counseling Center in Gabala, Regional Rehabilitation Center for the Disabled in Shaki, and new 200-bed Psychiatric hospital, Kichic Dahne, Ashagi Goynuk village hospitals were built and put into use, as well as Consultative Polyclinic in

Zagatala, Mukhakh village culture house, and Dagli village folklore house were renovated.

Although a number of works were carried out for the development of infrastructure areas, construction and repair of infrastructure facilities, and improvement of the living conditions of the local population in the Shaki-Zagatala economic-geographical region in 2019-2020, they were not sufficient. The works envisaged under the State Program have not been carried out in many spheres. This is mainly associated with the pandemic. However, the measure taken for the last two years cannot be considered satisfactory. We believe that there is still work to be done in this area.

Thus, the implementation of the “State Program on the Socio-Economic Development of Regions” was of special importance in attracting natural conditions and natural resources in the regions to the economic cycle, improving the economic structure, and opening new jobs. At the same time, large-scale measures were taken to establish the activity of service facilities at the level of modern requirements and to improve the services provided to the population.

RESULTS

1. The role of infrastructural areas in the economy and their importance in improving the quality of life of people, in the appropriation of territories, and in urban planning work have been determined. The “Infrastructure development model” was developed, taking into account the main directions of production, social and market infrastructure, which are its leading areas.

2. The role of natural factors in the formation and placement of infrastructure areas in the Shaki-Zagatala economic-geographical region, settlements and the location of the population in high altitude zones, as well as natural disasters were studied. It was determined that there are regional differences in the territorial organization and development of infrastructure areas. These differences are mainly manifested in the location of the production infrastructure, the employment of the population and the provision of social infrastructure.

3. The current state of infrastructure areas in the Shaki-Zagatala economic-geographical region was comprehensively analyzed and the region was divided into three zones according to the rate of development. The first zone includes Shaki, the second zone includes Gabala and Zagatala, while the third zone includes the center of Balakan, Oguz, and Gakh administrative regions, and adjacent areas. A map presenting “territorial organization of infrastructure areas and internal differences in the Shaki-Zagatala economic-geographical region” was compiled, and the locations of infrastructure objects that are more promising and planned to be established in the future were determined based on the map.

4. Although certain progress in the development of the infrastructure network has been noticed in the Shaki-Zagatala economic-geographical region in recent years, the proportion between the service areas and the growth rate and demand of the population is weak. During 2010-2020, the volume of investments allocated to the socio-economic development of the region increased by 2.5 times, and to construction and installation works - by 1.8 times. Although this increase had a positive effect on the housing fund, the number and construction of post offices, the capacity of ATHs, and the road-transport infrastructure, it led to a decline in employment. That is, the number of personnel in postal and communication institutions, doctors, and medical workers has decreased.

5. Although sufficient funds have been allocated for the improvement of the tourism-recreation economy, more promising in the Shaki-Zagatala economic-geographical region, certain problems are evident in the service infrastructure. That is, 57.3% of the overnight capacity in hotels, and 84.6% of the overnight guests fall to the share of the Gabala administrative district. Improper pricing policy in the service infrastructure, high prices, and extremely low service levels raise difficulties in developing this area.

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The defence will be held on October 7, 2022 at 14.⁰⁰ at the meeting of the Dissertation Council ED 1.23 operating under the Institute of Geography named after academician H.A. Aliyev of ANAS.

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The dissertation is accessible at the Library of the Institute of Geography named after academician H.A. Aliyev of ANAS.

Electronic versions of the dissertation and its abstract are available on the official website www.igaz.az

The abstract was sent to the required addresses on September 5, 2022.

Signed for print: 02.09.2022

Paper format: A5

Volume: 41994

Number of hard copies: 20