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Human Capital and Social Capacity of the Regional Space of Arctic Karelia

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Abstract. The development of the Russian Arctic in the strategic perspective will require the attraction of significant labor resources. However, currently the population outflow trends prevail. The creation of territorial conditions for the expanded reproduction of human capital is of crucial importance in this context. The purpose of the study is to identify the territorial specificity of the conditions for the reproduction of human capital in Arctic Karelia in aspects reflecting the social capacity of the territory. The first task is to study the territorial conditions of human capital reproduction related to its social aspect: health care system, education system, culture, leisure and entertainment. The second task is to assess the possibility of applying the concept of social capacity of space to study the social component of the conditions of human capital reproduction. Complex economic and sociological tools are used. Information bases: Rosstat data, SPARK data, results of the population survey (autumn 2023). A comparative analysis of spatial aspects of the distribution of conditions for the reproduction of human capital and population estimates was carried out. According to the population's estimates, the most important problems in the health care sector are the shortage of specialists, lack of modern equipment, inaccessibility of complex types of medical care and a narrow range of laboratory tests. The key problems in the field of education are lack of specialists and institutions of higher professional education, decline in the level of education and poor condition of school buildings and kindergartens. The conclusion is made about the structure of indicators of the prospective concept of social capacity of territories and the necessary addition of information bases in accordance with its conceptual logic. The practical significance of the research lies in the formation of analytical bases for ensuring the expanded reproduction of human capital in the territories of the Russian Arctic.


Keywords: *Russian Arctic, Arctic Karelia, human capital, social capacity of space, healthcare*

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Introduction

Achieving a balance between the needs of economy and strategic objectives of its development on the one hand and a sufficient volume of labor resources on the other requires creating conditions for the sustainable reproduction of human capital [1, Govorova N.V., p. 53]. The key aspect of these conditions is their spatial relativity: better conditions attract labor from outside the territory and restrain the outflow of available labor resources as part of migration processes [2, Rybakovsky L.L., pp. 55–58; 3, Lee E.S., pp. 49–51], which is one of the factors of expanded reproduction of human capital. In addition, as studies show, intraregional conditions for the reproduction of human capital restrain the outflow of population for intergenerational reasons: the need to ensure the future of children occupies a significant place in migration attitudes [4, Volkov A.D., Tishkov S.V., pp. 26–27; 5, Volkov A.D., Simakova A.V., Tishkov S.V., p. 177]. Relatively worse conditions for the reproduction of human capital in spatial terms cause the outflow of labor resources. The key conditions of human capital reproduction include those spatial and temporal circumstances in which a person receives payment for the realization of ability to work, acquires everything necessary for its renewal for this payment (health care, education, leisure, purchase of food, clothing, other goods and services) and again implements his/her ability to work.

Consumption of health care and education services is considered by researchers as one of the key forms of investment in human capital in private [6, Pishnyak A.I., Goryainova A.R., Nazarbayeva E.A., Khalina N.V., pp. 71–73; 7, Guo Ju., Qu Xi.] and public levels [8, Paczos W., Sawulski J., Leśniewicz F., p. 1327; 9, Chen B-L., Liang F-C., p. 25]. However, the specifics of territorial conditions and local limitations of opportunities to receive or purchase services in these areas may lead to limited opportunities for investing in human capital [10]. Taking into account such peculiarities of the space of the Russian Arctic regions as sparseness and peripherality, ensuring the sufficiency of conditions for the reproduction of human capital in the spheres of health care and education is a pressing and problematic issue [11, Sinitsa A.L., pp. 23–24; 12, Toropushina E.E., pp. 118–119; 13, Toropushina E.E., pp. 102–103; 14, Konyshhev V.N., Lagutina M.L., pp. 101–103].

The category of space capacity, which is divided into structural and functional components: social, economic, environmental, socio-cultural, etc., is a category that has, in our opinion, a promising value for analyzing the relationship between reproduction processes in the economy, and, first of all, the relationship between the reproduction of human capital and reproduction processes within spatial economic structures of different scales. This concept has not yet been fully developed in the scientific literature. The works by Tatarkin A.I. and Gershanok G.A. consider a similar concept of territory capacity, divided into ecological, economic and social capacity. The authors associate the ecological capacity of the territory with the functionality of preserving the habitat as the basis of life activity of the population; economic capacity — with the functionality of implementing economic activity as the basis of expanded reproduction in the region; social capacity — with maintaining and increasing the standard and quality of life of the population [15, Gershanok G.A., pp. 167, 174–175; 16, Tatarkin A.I., Gershanok G.A., pp. 43–44]. The social capacity of the

territory is associated with the concept and indicators of the quality of life, within the framework of which two groups of criteria are used: statistical and sociological. The key areas and assessments of the quality of life of the population are the provision of the population with educational and medical institutions, housing, the average monthly salary, cash income and expenses of the population of the territory [15, Gershanok G.A., pp. 174–175].

In our opinion, in the context of the relationship between reproduction processes at the levels of “individual human capital” — “spatially localized socio-economic system”, income and wages are more likely to be related to the economic component of the capacity of space and are directly related to the level of development of productive forces. While the provision of educational and medical conditions relates directly to the social subsystem of reproduction, to which it is reasonable to include the sphere of leisure, culture and entertainment, as well as the sphere of consumption.

A much more developed and established concept is the ecological capacity of the territory [17, Bezgubov V.A., Chasovnikov S.N.; 18, Zhang Y., Fan J., Wang S.; 19, Kopylov I.S., Krasilnikov P.A., Kletschina O.V.]. Its general conceptual content reflects “the limit, the excess of which in the process of economic activity, natural anthropogenic impact, will cause a crisis state of the region’s ecosystem” [17, Bezgubov V.A., Chasovnikov S.N., p. 751]. Being an important aspect of sustainable development of the territory, the ecological capacity of space relates to the process of reproduction of human capital indirectly, affecting issues of health and recreation. In turn, the aspect of recreation is considered in terms of the recreational capacity of territories [20, Ermakova A.A.]. The concept of the demographic capacity of a territory is considered by a number of authors as similar in meaning to the ecological capacity [21, Rybkina I.D., p. 1437]. However, traditionally it has a broader and more multidimensional content [22, Fauzer V.V., Smirnov A.V.]

Thus, the consideration of social conditions for the reproduction of human capital is most closely related to the economic capacity of space (covering the totality of infrastructural, production and financial factors of reproduction of the socio-economic system) and the social capacity of space. In this division, the social capacity of space includes factors of provision with medical and educational conditions, conditions in the field of culture, leisure and entertainment, as well as consumption.

The object of this study is the Arctic territories of the Republic of Karelia, including the Loukhskiy, Kemskiy, Kalevalskiy municipal districts, Segezhskiy and Belomorskiy municipal okrugs, Kostomuksha urban okrug (Fig. 1).

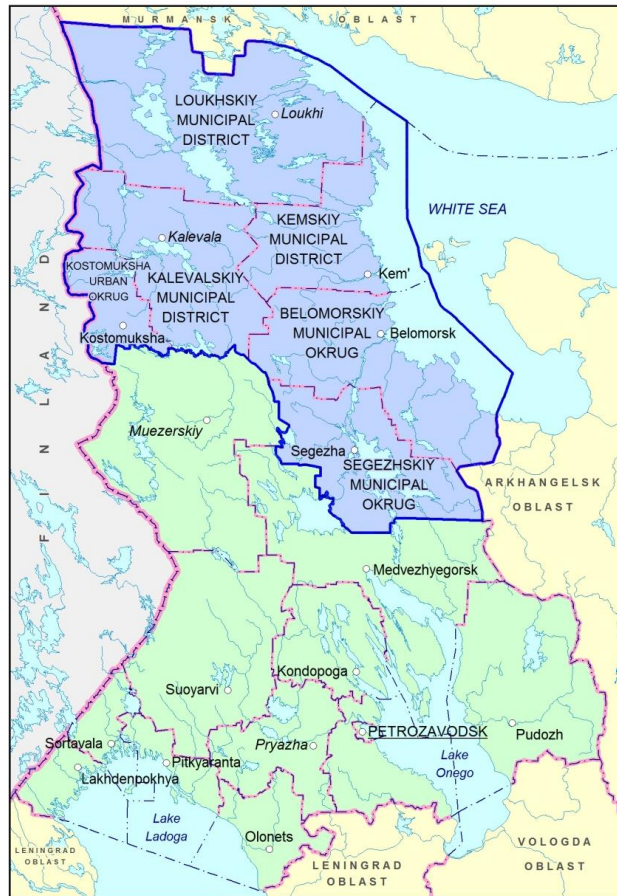


Fig. 1. Arctic Karelia — the region of the study.

The purpose of the study is to identify the territorial specifics of the conditions for the reproduction of human capital in aspects reflecting the social capacity of the territory.

The conceptual objective of the article is a prospective analysis of the territorial conditions for the reproduction of human capital in the context of further correlation with aspects of regional reproduction processes and consideration of the possibility of integrating sociological and statistical data in the framework of measuring the social capacity of the territory. The practical objective of the article is to analyze the conditions for the reproduction of human capital in the Arctic Karelia region, forming the analytical basis for regulating socio-economic processes at the regional and federal levels.

Methods and data

The information basis of the study was official and departmental statistics, SPARK system data and the results of a questionnaire survey of the population of the specified territories, conducted in August–September 2023. The sample was formed according to age and gender quotas reflecting the structure of the general population. Representatives of the permanently residing population aged 15–72 years took part in the survey. The average age of respondents was 43.9 years. The sample size was 1042 people. All respondents were informed about the purpose of the study and expressed their willingness (consent) to cooperate. A mixed method of data collection was used: personal interviews using a formalized questionnaire prevailed, for some respondents

the questionnaire was left for independent completion at their place of residence with a preliminary instruction and subsequent verification of completion (taking into account the continuing relevance of the epidemiological situation with COVID-19).

The survey instruments included a number of thematic blocks corresponding to such conditions of human capital reproduction as the healthcare system, the education system, the leisure, entertainment and culture spheres, as well as workplace conditions. The main emphasis in the study was placed on the analysis of the assessments of the state of these spheres by the population in various territories of Arctic Karelia.

Respondents were asked questions in three blocks:

- Block 1. Assessment of the state of the healthcare system by the population of Arctic Karelia;
- Block 2. Assessment of the state of the education system by the population of Arctic Karelia;
- Block 3. Assessment of the state of the leisure, entertainment and culture spheres by the population of Arctic Karelia.

Respondents' answers were summarized and analyzed both for the Arctic Karelia region as a whole and for municipal entities of the sub-region. The data of the population survey were compared separately with the information on the spatial specifics of the development of conditions for reproduction of human capital.

The characteristics of the sample and the correspondence between the sample parameters and the structure of the general population are presented in Table 1 and Table 2.

Table 1

Spatial distribution of the sample in the context of the study areas

Karelia region	Female		Male		Both genders	
	Number of respondents	Average age	Number of respondents	Average age	Number of respondents	Average age
Belomorskiy municipal okrug	74	48.6	68	43.4	142	46.1
Kalevalskiy municipal district	58	49.0	42	47.7	100	48.5
Kemskiy municipal district	67	46.0	57	43.2	124	44.7
Kostomuksha urban okrug	144	40.9	115	40.3	259	40.7
Louhskiy municipal district	80	46.2	65	44.3	145	45.3
Segezhskiy municipal okrug	160	42.5	112	43.5	272	42.9
Total	583	44.4	459	43.2	1042	43.9

Table 2

Correlation between the sampling and general population structures within the framework of the population survey in the territories of the Karelian Arctic

Age	Gender	Population, people	Population structure by age	Sample size, people	Sample structure	Deviation of sample structure from the general population
15–29 years	Male	7 645	8.4%	102	9.8%	1.4%
	Female	7 217	7.9%	123	11.8%	3.9%
30–44 years	Male	12 621	13.9%	146	14.0%	0.1%
	Female	9 502	10.4%	168	16.1%	5.7%
45–59 years	Male	11 950	13.1%	124	11.9%	1.2%
	Female	12 741	14.0%	162	15.5%	1.5%
60–72 years ¹	Male	10 182	11.2%	87	8.3%	2.8%
	Female	19 122	21.0%	130	12.5%	8.5%
Total		90 890	100.0%	1042	100.0%	Average 3.2%

The obtained data were analyzed using the SPSS software package. The data were interpreted in accordance with the objectives and purpose of the study.

At the second stage of the study, the data on the spatial localization of healthcare and educational institutions were compared with the data of the sociological survey. A coefficient of satisfaction with the state of the healthcare system / education and advanced training / culture, leisure and entertainment was introduced, calculated on the basis of sociological data using formula (1):

$$K_i = \frac{\sum_{j=1}^5 (N_{ij} \times w_j)}{\sum_{j=1}^5 N_{ij}} \quad (1)$$

For an objective display of the results of the answers to the question “How satisfied are you with the state of the healthcare system / education and advanced training / culture, leisure and entertainment in your place of residence?”, the values of the scale “absolutely dissatisfied — rather dissatisfied — neutral — rather satisfied — completely satisfied” were assigned corresponding values from “-1” to “+1”, and a formula calculating the weighted average values of the final assessments of the population's satisfaction with a particular sphere was introduced (1):

where N_{ij} — number of responses corresponding to a certain value of the j scale, respondents in the area of residence i ;

w_j — score of the degree of satisfaction of a person with the state of a particular area under consideration (“not at all satisfied (-1 point) — not satisfied (-0.5 points) — do not attach importance (0 points) — satisfied (+ 0.5 points) — completely satisfied (+ 1 point)”);

K_i — criterion of satisfaction of the population with the state of a particular area under consideration in the area of residence i .

¹ The data are estimates, since official statistics are kept within the age range of 60–69 years.

As part of the study, a coefficient of the dynamics of the state of the health care system (D_i) was also introduced, calculated on the basis of responses to questions about improvements in this area in recent years² using the following formula (2):

$$D_i = \frac{N_{ij}}{N_i} (2)$$

where N_i — total number of responses from respondents in the area of residence i .

The coefficients for the remaining components of the conditions for the reproduction of human capital are calculated using a similar formula.

Within the framework of the review of existing official and collected data, the authors made conclusions about the sufficiency of information bases for the prospective development and operationalization of the concept of social capacity of space in process, infrastructure and reproduction dimensions.

The final conclusions were based on a combination of methods of spatial economics, the theory of sustainable development and the dialectical approach.

Research results

We have analyzed the conditions for the reproduction of human capital in the blocks presented in the Methods and Data section.

Block 1. Population assessment of the state of the healthcare sector and spatial features of its development

One of the most important conditions for the reproduction of human capital is the state of the healthcare system. In order to identify the respondents' assessments of the state of this sphere, they were asked the following questions:

- 1. How satisfied are you with the state of the healthcare system in your place of residence?*
- 2. What are the most serious and important problems in the healthcare system in your place of residence?*
- 3. Have any important problems in the healthcare system been resolved in your place of residence in recent years? Are there any improvements?*
- 4. If there have been improvements, describe them briefly.*

Population satisfaction with the state of the healthcare system in the Arctic Karelia sub-region is shown in Fig. 2.

² Question "Have any important problems in the healthcare system been resolved in your place of residence in recent years? Are there any improvements?"

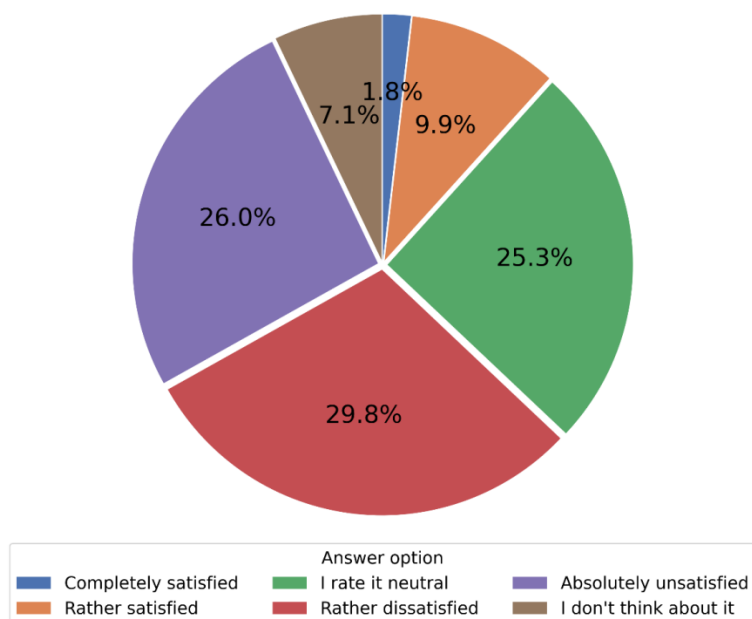


Fig. 2. Distribution of responses of the population of Arctic Karelia to the question "How satisfied are you with the state of the healthcare system in your place of residence?"

More than half of the respondents are not satisfied with the state of the healthcare system (55.8%). Of these, 26% are completely dissatisfied. In terms of territory, the least satisfied with the health care sector are residents of the Segezhskiy municipal okrug (64%, of which 31% are completely dissatisfied), Kemskiy (62%, of which 31% are completely dissatisfied) and Loukhskiy municipal districts (59%, of which 33% are completely dissatisfied). The largest share of the population satisfied with the state of the health care system is observed in the Kalevalskiy municipal district (16%) and the Kostomuksha urban okrug (15%).

The most serious and important problems in the health care sector, according to the population of Arctic Karelia, are the lack of specialized specialists (63.2%), the lack of modern diagnostic equipment (50.4%) and the inaccessibility of complex types of medical care (36.4%). Such problematic aspects as a narrow range of laboratory tests (28.4%), long waiting times to see a therapist (21.9%) and low qualifications of medical personnel (21.4%) are less pronounced. A positive aspect is the small proportion of respondents who noted the problem of low qualifications of ambulance crews (4.0%) — in general, this is the least pronounced problem in the healthcare sector of Arctic Karelia.

A number of problems are more obvious in terms of territories. For example, in the Kalevalskiy municipal district the problem of shortage of profile specialists is noted by 87% of respondents, while in the Belomorskiy municipal okrug — only by 52.8%. The issue of low qualifications of therapists is most relevant for the Segezhskiy municipal okrug (18.4%) and for the Kemskiy municipal district (16.9%), this problem affected the Kostomuksha urban okrug to the least extent (noted by only 1.9% of respondents). Long waits for an ambulance were reported by 26.1% of residents of the Belomorskiy municipal okrug and only by 1.9% of residents of the Kostomuksha urban

okrug. The problem of long waits for a therapist's appointment is most relevant for the Segezhskiy municipal okrug (33.5%), and least relevant for the Kemskiy municipal district (7.3%) (Fig. 3).

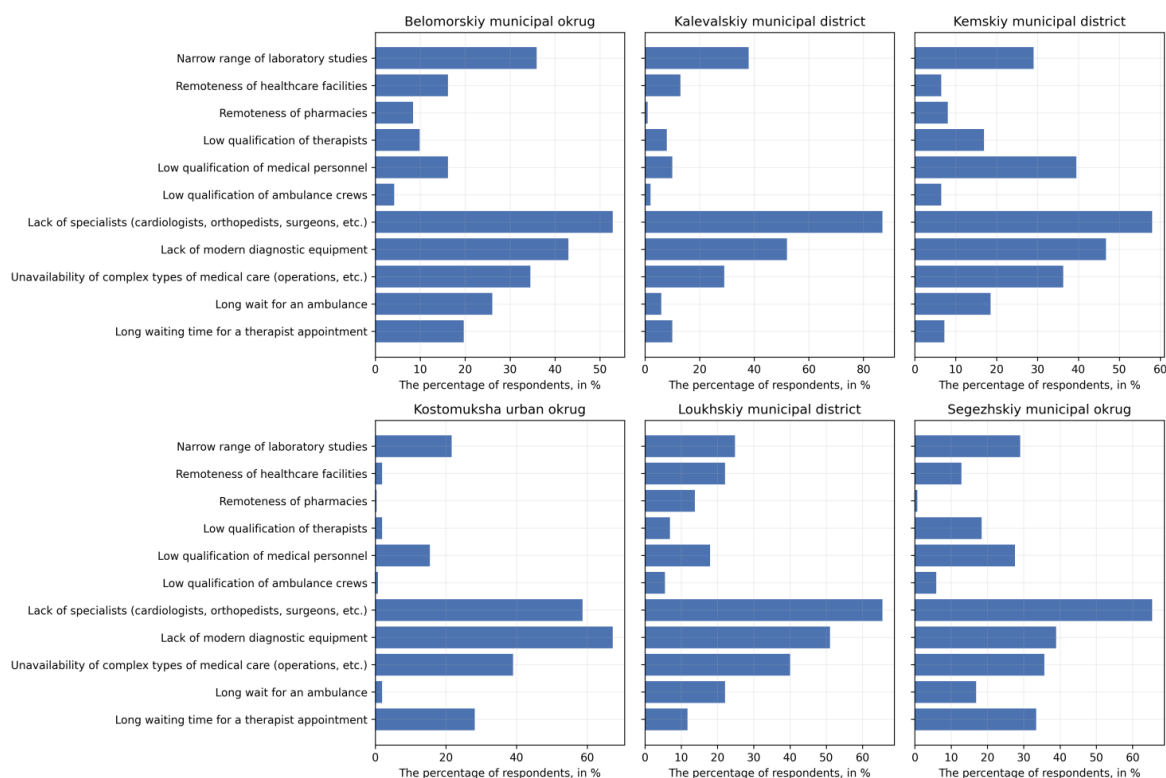


Fig. 3. Distribution of responses of the population of Arctic Karelia to the question “What are the most serious and important problems in the healthcare system in your place of residence?”

When answering the question “Have any important problems in the healthcare system been resolved in recent years in your place of residence? Are there any improvements?”, only 15% of the surveyed population of Arctic Karelia gave a positive answer. In spatial terms, this value changes relatively little — from 18% in the Kostomuksha urban okrug to 11% in the Segezhskiy municipal okrug. The most frequently noted improvements include: new equipment, renovation of hospital premises, new feldsher-midwife station, emergence of highly specialized doctors and a number of others. The spatial conditions for the development of the healthcare system in the Arctic territories of the Republic of Karelia are reflected in Fig. 4.

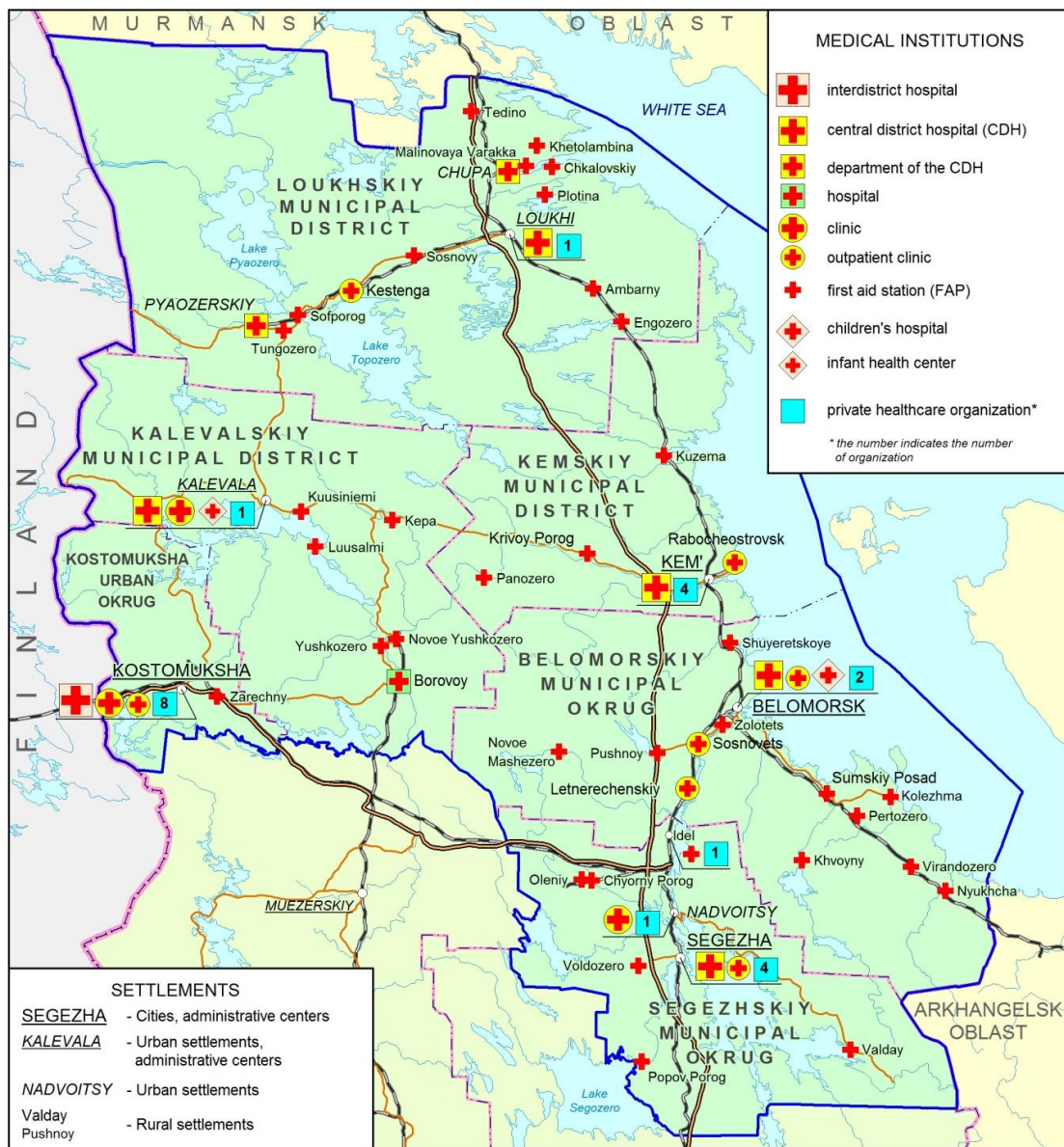


Fig. 4. Spatial features of the development of the healthcare system in Arctic Karelia.

In total, 8 hospitals and their departments, 39 feldsher-midwife stations (FMSs), of which 4 are private, 4 separate polyclinics, of which 1 is private (Russian Railways), are localized in the territory of Arctic Karelia. There are also polyclinics at district and inter-district hospitals. Private health care institutions are represented primarily by dental surgeries and institutions belonging to Russian Railways (polyclinic in Kemi and a number of FMSs). The spatial localization of healthcare institutions demonstrates the heterogeneity of the distribution of conditions for the reproduction of human capital associated with healthcare (Fig. 4). In addition, most FMSs in peripheral areas do not have permanent medical staff, and reception is carried out by a specialist coming from the district center, with a frequency of several times a week to several times a year, depending on the territory. FMSs in Nyukhcha and Virandozero (in neighboring Malenga the FMS is abandoned and reception is carried out in a private apartment) of the Belomorskiy municipal okrug, Cherny Porog and Olenye of the Segezhskiy municipal okrug, Tedino and Hetolambina of the Loukhskiy municipal district, Kuusiniemi of the Kalevalskiy municipal district and a number of other places operate in this mode.

The Kostomuksha urban okrug, the Belomorskiy and Segezhskiy municipal okrugs are the most endowed in terms of the breadth of medical services.

Summary economic and sociological information on the health care conditions in Arctic Karelia by municipalities is presented in Table 3.

Table 3
Summary information on the state of the healthcare system in the territories of the Arctic Karelia in 2022³

Indicators	Municipal districts					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of health care center	16	2	6	10	9	12
Number of medical hospital facilities	1	1	1	1	1	1
Number of private health centers	1	1	2	0	4	8
Number of hospital beds (per 10,000 people)	52	65	35	33	55	51
Provision of population with doctors (per 10,000 people)	27	27	32	20	31	39
Provision of the population with average medical personnel (per 10,000 people)	98	108	109	85	76	109
K_i for health care	-0.38	-0.28	-0.42	-0.47	-0.43	-0.25
D_i for health care	0.12	0.17	0.16	0.14	0.11	0.18

The highest rate of public satisfaction with the healthcare system is observed in the Kostomuksha urban okrug, as well as in the Kalevalskiy municipal district, the lowest rate is in the Loukhskiy and Kemskiy municipal districts, Segezhskiy municipal okrug. At the same time, the coefficient of the dynamics of the state of the education system has the highest values in the Kostomuksha urban okrug and Kalevalskiy municipal district, the lowest ones — in the Segezhskiy municipal okrug. There is no obvious correlation between the assessments of satisfaction with the state of the healthcare system and the provision of the population with hospital beds, doctors and paramedical personnel.

Block 2. Population assessment of the state of the education sector and spatial features of its development

The education system as a component of the spatial conditions for the reproduction of human capital is the second key aspect that requires consideration. Within the sociological part of the study, it was revealed through the following questions and assessments of the respondents:

1. *How satisfied are you with the state of the education and advanced training system in your place of residence?*
2. *What are the most serious and important problems in the education system in your place of residence?*

³Compiled by the authors on the basis of field research data and official statistical information

In the Table: (1) Belomorskiy municipal okrug; (2) Kalevalskiy municipal district; (3) Kemskiy municipal district; (4) Loukhskiy municipal district; (5) Segezhskiy municipal okrug; (6) Kostomuksha urban okrug.

3. Have any important problems in the education sector been resolved in your place of residence in recent years? Are there any improvements?

4. If there have been improvements, describe them briefly.

The assessment of satisfaction with the education and advanced training system by the population of Arctic Karelia is shown in Fig. 5. In general, the values indicate more positive assessments compared to those for the healthcare system. At the same time, a relatively large proportion of respondents noted that they do not think about the state of the education system (15.1%). The percentages of satisfied and dissatisfied respondents are equal, but the structure of assessments is somewhat more negative (6.4% of absolutely dissatisfied versus 3.6% of completely satisfied) (Fig. 5).

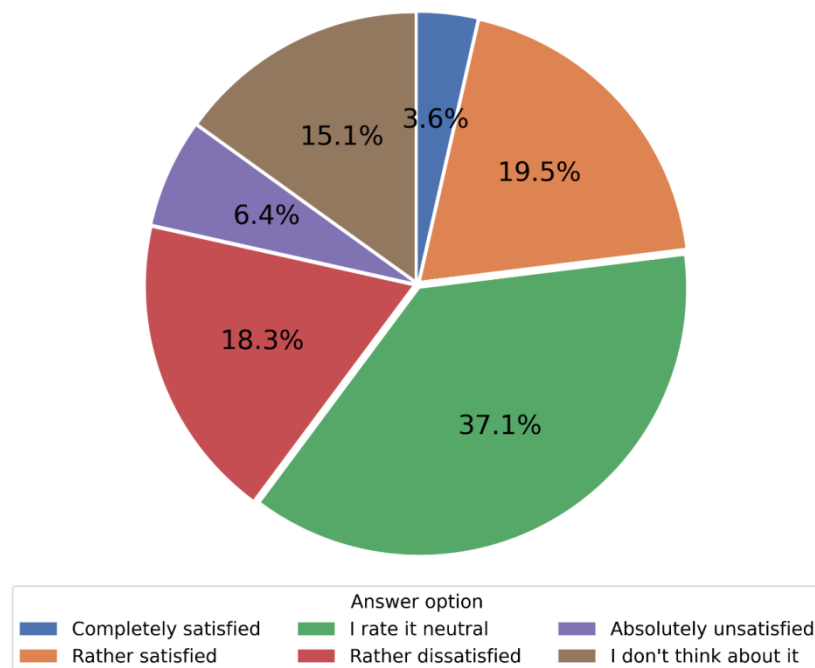


Fig. 5. Distribution of responses of the population of Arctic Karelia to the question "How satisfied are you with the state of the education and advanced training system in your place of residence?"

In terms of territories, the largest share of positive assessments is in the Kostomuksha urban okrug (35.5%, of which 3.9% are completely satisfied), the smallest one — in the Loukhskiy municipal district (15.2%, of which 2.1% are completely satisfied).

The most serious and important problems in the education system, according to the population of Arctic Karelia, are the lack of specialists (48.2%), the absence of higher professional education institutions (33.6%), the decline in the level of education (25.5%), the poor condition of school and kindergarten buildings (25%) and the absence or small number of sections and clubs (23.5%). As a positive phenomenon, it should be noted that the problems of shortage of places in kindergartens (2%) and schools (1.2%) are minimal.

Taking a closer look at the situation in individual districts, it should be noted that the issue of poor condition of school and kindergarten buildings is most acute in the Kalevalskiy municipal district (44%) and the Kemskiy municipal district (32.3%). The decline in the level of education is of

greatest concern to the population of the Segezhskiy municipal okrug (33.1%), and the lack of higher professional education institutions as a problem is primarily noted by residents of the Kostomuksha urban okrug (51.7%) and the Belomorskiy municipal okrug (48.6%). The problem of absence or small number of sections and clubs is most pronounced in the Loukhskiya municipal district (36.6%) and the Belomorskiy municipal okrug (35.9%), and to the least extent — in the Kostomuksha urban okrug (7.7%). The shortage of specialists in education is most acute for the population of the Loukhskiya (62.8%) municipal district and Segezhskiy (57.7%) municipal okrug (Fig. 6).

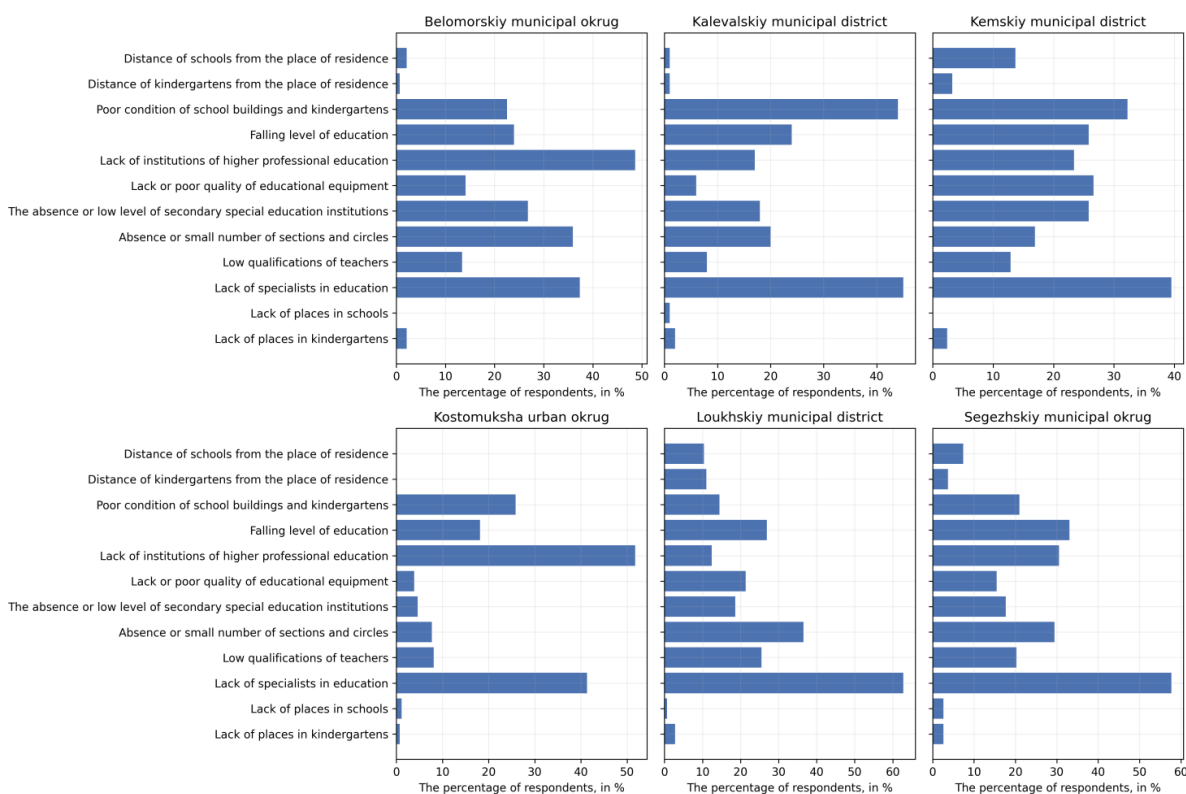


Fig. 6. Distribution of responses of the population of Arctic Karelia to the question "What are the most serious and important problems in the education system in your place of residence?"

Only 12% of respondents in Arctic Karelia gave a positive answer to the question about improvements in the field of education, which is lower than the level of assessments of positive changes in the field of healthcare. The highest share of those who noted positive changes is seen in the Kalevalski municipal district (22%), the smallest one — in the Belomorskiy municipal okrug (6%).

The list of improvements and positive changes that affected the education and advanced training system in the place of residence of the population of Arctic Karelia is extremely diverse and includes school renovation, opening of "growth points", construction of new schools, sections/clubs, etc.

The spatial conditions for the development of the education system of the Arctic territories of the Republic of Karelia are reflected in Fig. 7.

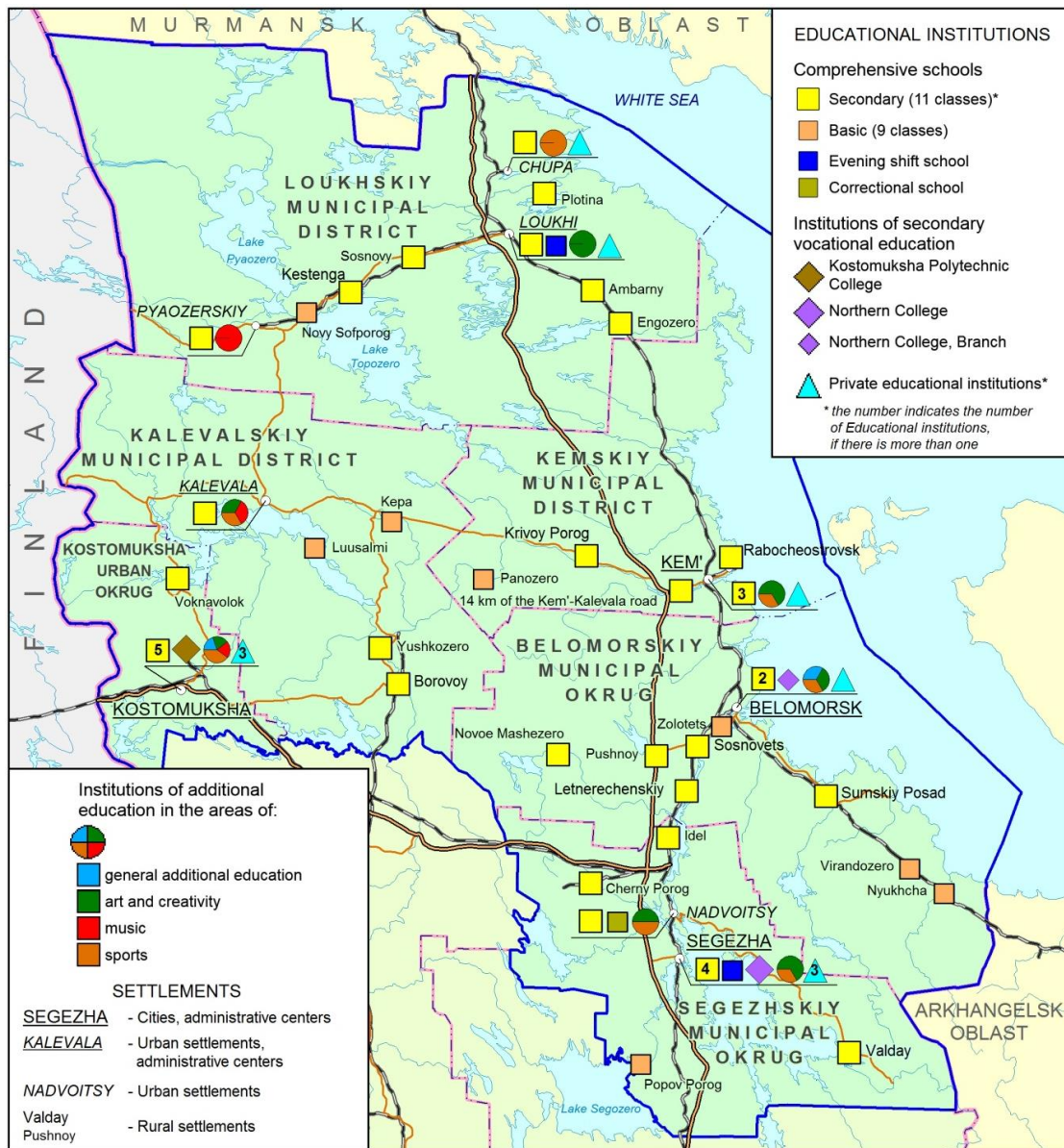


Fig. 7. Spatial features of the education system development in Arctic Karelia.

In total, 2 colleges and 1 branch of a college, 45 general education institutions, 22 institutions of additional education are localized on the territory of Arctic Karelia. A significant part of private institutions of additional education are represented by organizations operating driver training schools. Spatial localization demonstrates the heterogeneity of the distribution of the conditions for the reproduction of human capital associated with the education system (Fig. 7; Table 4).

Summary economic and sociological information on the spatial conditions of the education system is presented in Table 4.

Table 4

Summary information on the state of the education system on the territories of Arctic Karelia in 2022–2023 academic years⁴

Indicators	Municipal districts					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of general education institutions	10	5	7	9	9	5
Number of additional education institutions	3	3	3	3	5	5
Number of vocation education institutions	1	-	-	-	1	1
Number of teachers per 10,000 population	171	151	118	115	76	87
Number of teachers per 100 students in general education institutions	11.6	10.9	7.6	10	6	5.9
Number of teachers per 100 students in vocation education institutions	26.1	-	-	-	7.7	6.6
K_i for education	-0.11	0.04	-0.07	-0.14	-0.07	0.12
D_i for education	0.06	0.22	0.18	0.12	0.12	0.1

The highest coefficient of satisfaction with the education system is observed in the Kostomuksha urban okrug, as well as in the Kalevalskiy municipal district, the lowest one — in the Loukhskiy municipal district and the Belomorskiy municipal okrug. At the same time, the coefficient of dynamics of the state of the education system has the highest values in the Kalevalskiy and Kemskiy municipal districts. There is no obvious correlation between the assessments of satisfaction with the education system and the number of teachers per 10,000 population and 100 students.

Block 3. Population assessment of the state of the sphere of culture, leisure and entertainment and spatial features of its development

The most important component of the conditions for the reproduction of human capital is the state of the sphere of culture, leisure and entertainment. In the territories under consideration, this aspect was studied through the analysis of population assessments obtained in the framework of answers to the following questions:

1. How satisfied are you with leisure and entertainment in your place of residence?
2. What are the most serious and important problems in the sphere of leisure, entertainment and cultural institutions in your place of residence?
3. Have there been any improvements in the sphere of leisure, entertainment and culture in your place of residence in recent years?
4. If there have been improvements, describe them briefly.

In assessing the state of the sphere of culture and leisure, the most common attitude is neutral, however, negative assessments prevail over positive ones (32.5% and 21.6%, respective-

⁴ Compiled by the authors on the basis of field research data and official statistical information.

In the Table: (1) Belomorskiy municipal okrug; (2) Kalevalskiy municipal district; (3) Kemskiy municipal district; (4) Loukhskiy municipal district; (5) Segezhskiy municipal okrug; (6) Kostomuksha urban okrug.

ly). At the same time, 13.9% of respondents are absolutely dissatisfied with the state of the leisure sphere, and 5.0% are completely satisfied (Fig. 8).

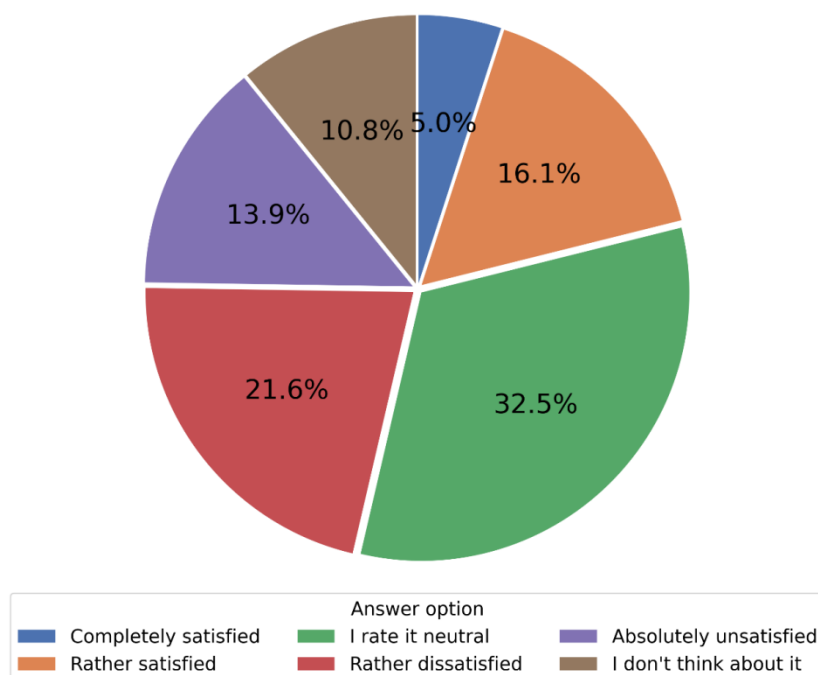


Fig. 8. Satisfaction of the population of Arctic Karelia with the state of the sphere of culture, leisure and entertainment.

In the territorial context, the lowest assessments of the state of this sphere are seen in the Kemskiy municipal district — 52.4% of respondents are not satisfied with its state (21.8% of them are absolutely dissatisfied). The highest assessments of the population characterize the state of the leisure sphere in the Kostomuksha urban okrug: 29.0% of respondents express satisfaction (5.0% are absolutely satisfied) and only 17.8% are dissatisfied (3.9% of them are absolutely dissatisfied). In the rest of the districts, negative assessments prevail over positive ones and their distribution occupies an intermediate position between the two indicated territories.

The key problems in the leisure sector, according to residents of Arctic Karelia, are the absence or small number of hobby groups (noted by 29.9% of respondents), the shortage or absence of movie theaters (20.9%), the absence or poor condition of libraries (20%), the low quality of available leisure services (19.5%), and the small number of interesting people with whom one would like to spend leisure time (17.3%).

The situation varies significantly across the territories (Fig. 9). If the predominant problem for the Kostomuksha urban okrug is the low quality of available leisure services (32.4%), then for the population of the Segezhskiy municipal okrug this problem (30.9%) is joined by the small number or absence of sports facilities (swimming pools, gyms, etc.) (31.3%). The peripheral areas are characterized by the severity of problems associated with the lack of leisure and cultural institutions: in the Belomorskiy municipal okrug — the absence or poor condition of libraries (52.8%) and the absence or small number of hobby groups (38%); in the Kalevalskiy municipal district — the absence or poor condition of libraries (28%) and the high cost of available leisure services (28%); in

the Kemskiy municipal district — the absence or small number of hobby groups (60.5%) and the lack or absence of cinemas (29%); in the Loukhskiy municipal district — the absence or small number of museums, exhibitions (49%), the absence or small number of hobby groups (37.9%).

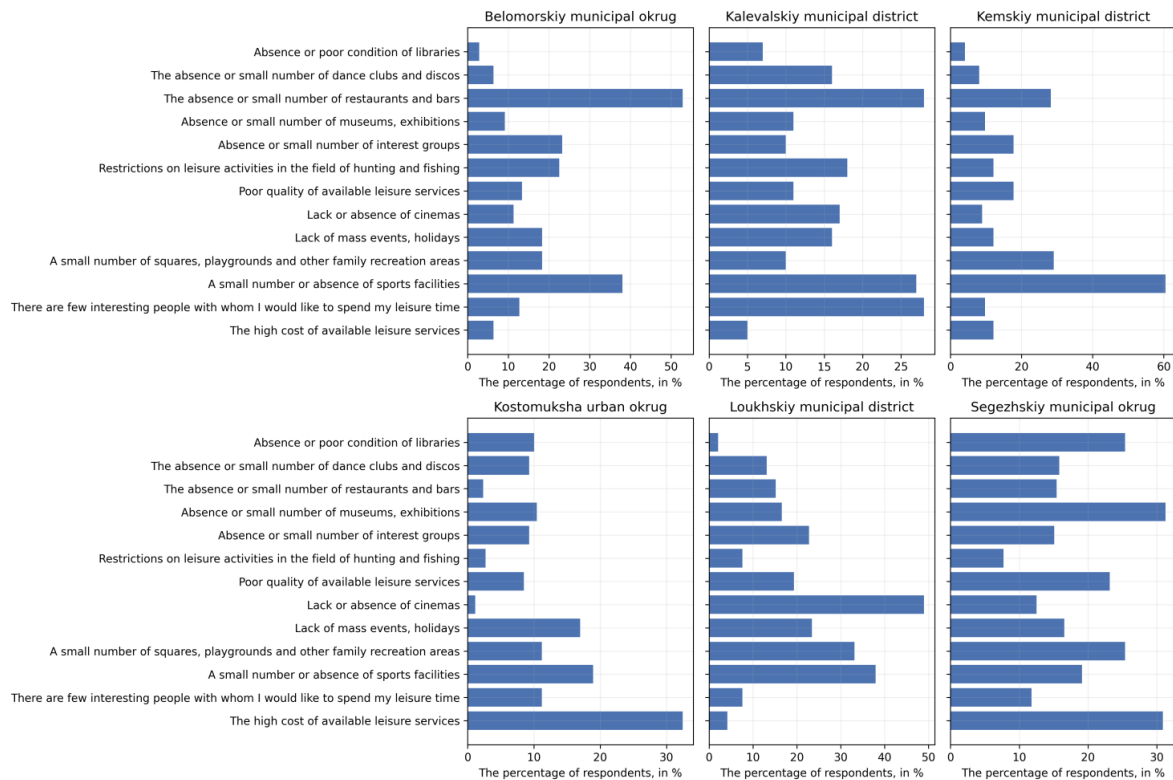


Fig. 9. Distribution of responses of the population of Arctic Karelia to the question “What are the most serious and important problems in the sphere of leisure, entertainment and cultural institutions in your place of residence?”

The improvements that have occurred in the sphere of leisure, entertainment and culture were noted by 19.8% of respondents. The largest share of positive assessments was in the Kemskiy municipal district (31.3%) and Kalevalskiy municipal district (28.0%), the smallest one — in the Loukhskiy municipal district (10.3%).

Improvements in the leisure sector noted by the population of Arctic Karelia include the appearance of a cinema, cultural events, the construction of a playground, the emergence of recreation areas, etc.

Considering the spatial localization of cultural, leisure and entertainment institutions, the greatest provision of conditions for recreation can be seen in the Kostomuksha urban okrug and Segezhskiy municipal okrug (Table 5).

Table 5

Summary information on the state of the culture, leisure and entertainment system on the territories of Arctic Karelia in 2022⁵

Indicators	Municipal districts					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of cultural institutions	4	5	7	9	5	3
Number of leisure and entertainment facilities	2	2	0	1	10	16
Number of cultural institutions per 10,000 population	3.39	9.43	6.25	10.34	1.72	1.21
Number of leisure and entertainment facilities per 10,000 population	1.69	3.77	0	1.15	3.44	6.45
K_i for culture, leisure and entertainment sector	-0.28	-0.07	-0.29	-0.20	-0.16	0.07
D_i for culture, leisure and entertainment sector	0.15	0.28	0.31	0.1	0.18	0.21

The highest rate of population satisfaction with the culture, leisure and entertainment sector is observed in the Loukhskiy and Kalevalskiy municipal districts, the lowest one — in the Kemskiy municipal district and Belomorskiy municipal okrug. Moreover, the coefficient of dynamics of the state of the education system has the highest values in the Kemskiy and Kalevalskiy municipal districts.

Conclusion

In conclusion, it should be noted that of the three considered components of the conditions for the reproduction of human capital, which we associate with the category of social capacity of space, the health care sector is characterized by the most critical assessments of the population. Despite the sufficient prevalence of institutions in spatial terms, one of the problems is the limited mode of their operation, associated with a shortage of specialists (often there is one paramedic or doctor for several FMSs) and lack of equipment. This aspect is reflected both in objective data on the number of medical and nursing personnel and the operating mode of institutions, and in the population's assessments of the most important problems in the health care sector in the place of residence. The key problems for the population of Arctic Karelia are the shortage of specialists (noted by 63.2% of respondents), shortage of modern equipment (50.4%), inaccessibility of complex types of medical care (36.4%) and a narrow range of laboratory tests (28.4%). This list allows talking about another aspect of the healthcare sector, which determines the completeness of its functionality in terms of the conditions for the reproduction of human capital — the ratio between the range of needs of the population and the range of healthcare services provided.

⁵ Compiled by the authors on the basis of field research data and official statistical information.

In the Table: (1) Belomorskiy municipal okrug; (2) Kalevalskiy municipal district; (3) Kemskiy municipal district; (4) Loukhskiy municipal district; (5) Segezhskiy municipal okrug; (6) Kostomuksha urban okrug.

Negative assessments prevail with regard to the dynamics of solving problems in the health care sphere: only 15% of respondents note that improvements have occurred in recent years.

Considering the state of the education and advanced training system in Arctic Karelia, several key aspects should be noted that are important in terms of the reproduction of human capital: the absence of higher vocational education institutions or their branches in the sub-region, the limited number of secondary vocational education institutions, as well as the spatial unevenness of the placement of private educational institutions. For example, the absence of driving schools or their branches in the remote Kalevalskiy municipal district significantly limits the ability of local businesses to hire drivers and is an additional impetus for entrepreneurs to leave the territory. The key problems in the sphere of education and advanced training, according to the population, are lack of specialists in education (48.2%), absence of institutions of higher professional education (33.6%), decline in the level of education (25.5%) and poor condition of school and kindergarten buildings (25%). In general, satisfaction with the state of the education sector is assessed by respondents much higher than satisfaction with the health care system: neutral assessments prevail; in the Kostomuksha urban okrug, positive assessments even prevail over negative ones. However, the dynamics of the state of the education sphere is characterized by lower assessments: only 12% of respondents in Arctic Karelia note improvements.

In the sphere of culture, leisure and entertainment, there is a pronounced spatial unevenness in the placement of recreational conditions. High provision of the population with cultural facilities is typical for Kalevalskiy, Kemskiy and Loukhskiy municipal districts (more than 6 units per 10,000 people), while this value for Segezhskiy municipal okrug and Kostomuksha urban okrug is less than 2 units per 10,000 people. This position of Segezhskiy municipal okrug and Kostomuksha urban okrug is compensated by the relative development of the leisure and entertainment sphere. Against this background, Belomorskiy municipal okrug stands out — the population there is provided with both cultural and leisure institutions at a relatively low level. The key problems in the sphere of culture, leisure and entertainment, according to the population, are the absence or small number of hobby groups (noted by 29.9% of respondents), the absence of cinemas (20.9%), the absence or poor condition of libraries (20%) and the low quality of available leisure services (19.5%). However, the dynamics of the state of the sphere of culture, leisure and entertainment is characterized by the highest ratings of the considered components of the conditions for the reproduction of human capital: improvements are noted by 20% of respondents.

Summarizing the considered components of the conditions for the reproduction of human capital in the territory of Arctic Karelia in the context of the concept of social capacity of space, it should be noted that its substantive content should be divided into the following components, based on conceptual logic and available data:

- 1) infrastructural aspect: spatial distribution of objects;
- 2) functional aspect: completeness of the implementation of the functionality of objects;

3) reproduction aspect: the ratio between the range of services provided and the range of needs of the population.

For a more detailed analysis of the components of the social capacity of space, it is necessary to introduce into the system of indicators parameters reflecting the density of space and its connectivity in relation to the implementation of health care, education and culture, leisure and entertainment institutions of their social functions.

Thus, supplementing the information presented in this study with the values of the specified indicators will allow forming sufficient information bases for the prospective development and operationalization of the concept of social capacity of space in functional, infrastructural and reproduction dimensions.

The practical significance of the study lies in the formation of information and analytical bases for managing the territories of the Arctic regions of Russia in terms of creating conditions for the consolidation of the population and the transition to expanded reproduction of human capital.

The development of research in this subject area will focus on the development of economic and sociological tools for measuring the social capacity of space and expanding the geography of the research to other territories of the Arctic Zone of the Russian Federation.

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