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ROLE OF THE SETTLEMENT NETWORK IN THE FORMATION OF TERRITORIAL COMMUNITIES IN THE KOLOMYIA DISTRICT OF THE IVANO- FRANKIVSK OBLAST

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Abstract

This article examines the peculiarities of the settlement network of the established Kolomyia district (Raion) of Ivano-Frankivsk Oblast and its importance in the formation of territorial communities (hromada). We analyzed the peculiarities of the functioning of local settlement systems through the indicators of transport accessibility to the center of the community and administrative service centers, as well as the concentration coefficient of the

population. We identified strengths and weaknesses, as well as threats and opportunities during the SWOT-analysis.

Key words: settlement system; settlement network; Kolomyia district settlement system; territorial community; decentralization.

ОСОБЛИВОСТІ ВРАХУВАННЯ ПОСЕЛЕНСЬКОЇ МЕРЕЖІ ПРИ СТВОРЕННІ ТЕРИТОРІАЛЬНИХ ГРОМАД КОЛОМІЙСЬКОГО РАЙОНУ ІВАНО- ФРАНКІВСЬКОЇ ОБЛАСТІ

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У даній статті розглянуто особливості поселенської мережі створеного Коломийського району Івано-Франківської області та її значення при утворенні територіальних громад. Проаналізовано особливості функціонування локальних систем розселення через показники транспортної доступності до центру громади та центрів надання адміністративних послуг, а також коефіцієнту концентрації населення. Виокремлено сильні та слабкі сторони, а також загрози та можливості під час проведеного SWOT-аналізу.

Ключові слова: система розселення, поселенська мережа, Коломийська районна система розселення, територіальна громада, децентралізація.

The relevance of the research topic. Today the settlement network of Ukraine is gradually transformed under the influence of a complex system of contradictory socio-political relations caused by changes in forms of ownership, processes of decentralization of economic management, as well as the significant strengthening and activation of self-regulatory principles of settlement processes. The historically developed network of settlements in Ukraine is significantly affected by these transformations and the consequences of the demographic crisis, which, unfortunately, mostly limit their development and only strengthen the disintegration processes in the unified national system of settlement. The formation of a sustainable settlement network, the socio-economic conditions of its development under the influence of natural, social and historical factors is one of the main tasks of economic development of the state and its individual administrative units. Therefore, the topic of scientific research is rather relevant, has scientific novelty and practical importance.

Aims and tasks of scientific research. The aim of the scientific research was to assess the current condition and ways of further formation and development of the settlement network of territorial communities of Kolomyia district of Ivano-Frankivsk oblast, taking into account decentralization in Ukraine. According to the aim the following tasks were set: to analyze the theoretical and methodological aspects of the socio-geographical study of the settlement network of the Kolomyia district of Ivano-Frankivsk oblast; to identify the main reasons for the formation of the settlement network; to analyze the framework of the settlement network of the Kolomyia district and trace the peculiarities of its current condition; to evaluate the settlement network of the Kolomyia district under the conditions of the new administrative-territorial system.

Preliminary results of the study. The methodological basis for the study of the problems of formation and development of rural networks and united territorial communities was based on the works of scientists and specialists, including: Y.I. Pityurenko, O.H. Topchiyev, O.I. Shabliy, Y.B. Oliynyk, V.O. Dzhaman, K.V. Mezentsev, V.P. Krul, V.V. Yavorska, I.I. Kostashchuk, N.V. Zablotska and many others. However, it should be noted that none of the scientists studied the Kolomyia district settlement system under the new administrative-territorial system, which is in effect in Ukraine since January 1, 2021.

Methodology of research. In the process of research we used dialectical methods of knowledge of processes and phenomena, empirical (comprehensive assessment of the current state of the object of research), comparative analysis (identified problems and causes of differences in the dynamic development of the settlement network of territorial communities),

GIS-technology, abstract-logical methods (theoretical generalization and formulation of conclusions) and others.

The population concentration coefficient was calculated using this formula:

$$K_{tk} = \frac{p \times S}{P \times s}$$

where K_{tk} is the coefficient of territorial concentration of population; p - the number of population of the territorial community; S - area of the district; P - the number of the population of the district; s - area of the territorial community.

When $K_{tk} < 1$ we can talk about a low concentration of the population; K_{tk} is close to 1 - the optimal ratio of the indicator under study; when $K_{tk} > 1$, then there is a high concentration of population in the corresponding territory.

The best method of transportation accessibility research is GIS technologies, such as Open Route Service and QGIS geographic information systems. QGIS is one of the most dynamically developing functional and easy-to-use desktop geographic information systems. The main purpose of these systems is the processing and analysis of spatial data, the preparation of cartographic products. Openrouteservice - uses a wide range of services based on OpenStreetMap data, which can be used in all types of programs and under various scenarios. Openrouteservice currently implements the following services: directions; time distance matrix; point of interest; Pelias geocoding; elevation; isochrones.

To study the transport accessibility of community centers, we suggest using the method of constructing isochrones (accessibility zones), which will help to determine from which points the population can reach community centers at a certain distance. The construction of isochrones takes into account the steepness of slopes, types of roads, types of pavement, road complexity, etc.

Accessibility zones can be constructed for cars and trucks (including buses), bicycle and pedestrian traffic, and wheelchair traffic. You can build polygons by distance or time, which is quite convenient and allows you to take into account the age-related rates of movement. Open Route Service GIS allows us to determine one of the most important indicators of the territorial location of administrative service centers - the accessibility factor. The accessibility coefficient can take values from 0 (worst accessibility) to 1 (best accessibility).

Summary of the main material. Population settlement is the result of the processes of distribution and redistribution of the population on the territory of the country in the form of a network and system of settlements. At the same time, settlement is estimated:

✓ as an element of the integral territorial structure of the economy (society as a whole) of the country;

✓ as one of the leading factors in the formation of the socio-economic space of the country.

Public geography has developed two approaches to the study of settlement: 1) morphological; 2) functional. According to these approaches, the concepts of "settlement network" and "settlement system", qualitatively characterizing different sides of the process and state of settlement, were established.

Settlement network - the total of all settlements located in any region (including countries), characterized by the configuration of the population, density, location and habitat.

Settlement system - settlements, territorially integral and functionally related to each other, developing with the advancement of production and service systems within the network of settlements. The strength of the connection is the main criterion for determining its boundaries and development.

During the historical development of the territorial structure, networks of settlements can reach such a level of maturity that stable connections are formed and the settlement begins to function as a single entity. This is a precondition for the transition from a network to a settlement system, and it is a qualitative leap in the territorial organization of society.

The preconditions for the development of the population and the formation of the settlement network itself include factors for the formation of population conditions, which at the regional level can be divided into:

✓ historical and geographical (development and dynamics of the population of the region over time, the peculiarities of the geopolitical position of the region, the peculiarities of settlement and economic development, the formation of the settlement system and its structure, the representation of historical development, in the nature of the formation of the demographic situation etc.; the influence of historical events on demographic processes is twofold: the nature of the differences lies in the speed with which the different elements of the population system respond to them, and their capacity for self-renewal, the influence of long-standing traditions, on population processes);

✓ socio-geographical location of the region (determination of local-geographical factors: the socio-geographical location of the territory under study at all levels of organization);

✓ natural-environmental environment (complex influence on the nature of population and density of the settlement, the development of the region, demographic

processes, compliance of the population with the natural-resource characteristics of the territory of the settlement, the influence of the terrain and climate, etc.).

✓ socio-economic factors (socio-economic factors, namely their impact on the population living in comparison with other regions of the country, the socio-economic development of the region and the impact of demographic processes of internal development of the region, the economic system of livelihood, etc.).

Therefore, the prerequisites of population development of regional-geographic systems allow us to reveal the peculiarities of this or that region on the basis of its geographical reference. The study of population reproduction within a regional-geographic system is the main component of population development, and both external and internal factors should be studied.

The newly formed Kolomyia district includes 13 territorial communities: Kolomyia, Horodenka, Sniatyn urban settlements, Chernelytsia, Hvizdets, Otyniia, Pechenizhyn, Zabolotiv urban-type settlements, Korshiv, Mateivtsi, Nyzhnii Verbizh, Pidhaichyky, Piadyky rural settlements (hromadas).

The totality of settlements on a certain territory together with the network of communications creates a supporting framework of settlement (Fig. 1). Three types of frameworks are characteristic of the Kolomyia district: multinuclear, linear-nodal and a radial-circular, which were formed under the influence of various factors: roads, forest cover territory, agricultural land, orography, etc.

Three territorial communities have a radial-circular type of settlement framework (Piadyky, Korshiv, and Hvizdets territorial communities), four are multinuclear (Nyzhnii Verbizh, Sniatyn, Horodenka, and Pechenizhyn communities) and six are linear-nodal (Kolomyia, Chernelytsia, Pidhaichyky, Mateivtsi, Zabolotiv, and Otyniia communities).

To assess the settlement network of the Kolomyia district, we chose such parameters as the population concentration coefficient, which can be used to see the distribution of the population by administrative units in relation to the overall evenness of the population of the territory and the territorial accessibility coefficient, by which we can trace the distance from community centers to other settlements.

The largest number of population is in the urban territorial communities of Kolomyia district, namely Kolomyia (74.7 thousand people), Horodenka (44.7 thousand people) and Sniatyn (41.4 thousand people). Rural territorial communities such as Chernelytsia and Pidhaichyky - 5 thousand people and 6.6 thousand people, respectively, stand out with the smallest number.

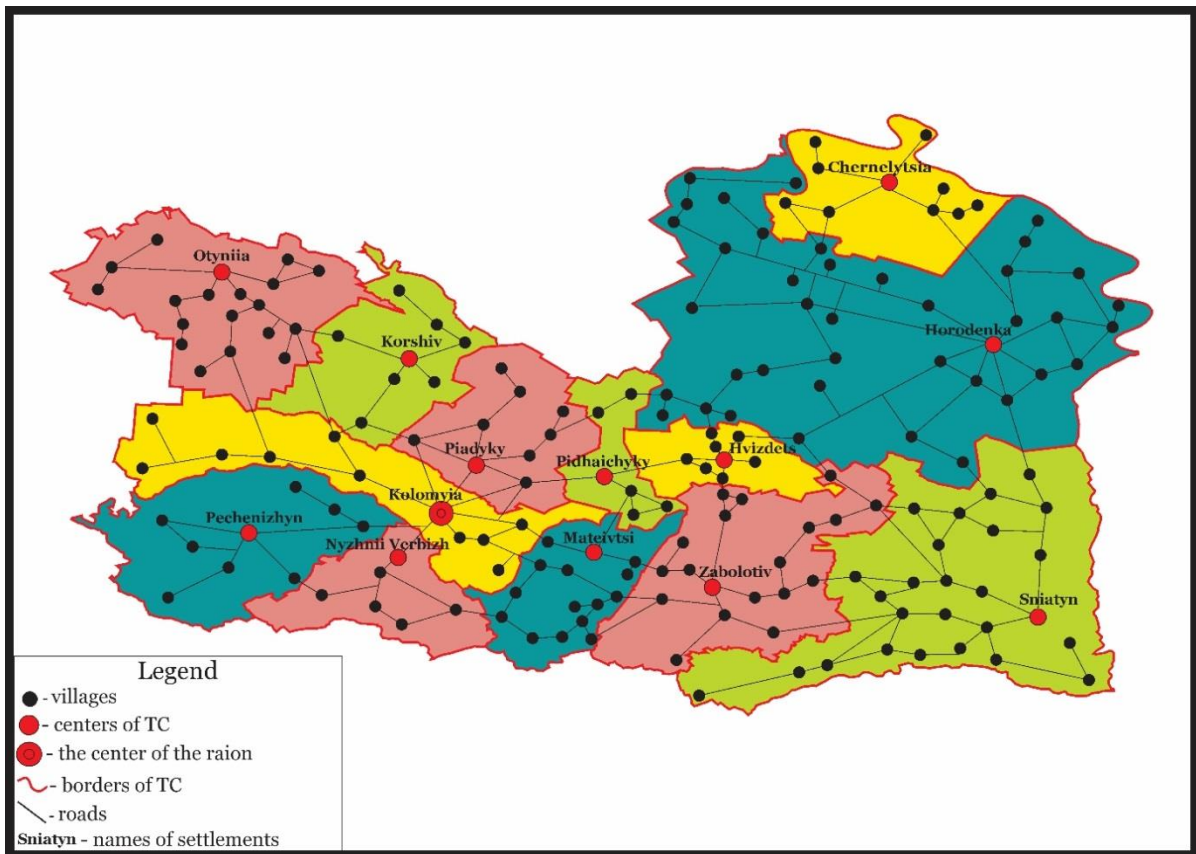


Fig. 1. The basic framework of the network of settlements of the Kolomyia district

Having analyzed the coefficient of territorial concentration of the population, we were able to find out that only in 2 territorial communities of Kolomyia district, the coefficient is optimal. These communities include Hvizdets urban-type and Sniatyn urban settlements. The highest territorial concentration of population is also found in two communities - Nyzhni Verbizh rural settlement and Kolomyia urban, where this indicator is 1.2 and 3.9, respectively. In the rest of the territorial communities of the Kolomyia district, the population concentration is low (Table 1, Fig. 2).

According to the methodology of formation of well-functioning territorial communities [1], accessibility zones of administrative centers of territorial communities are defined at a distance of no more than 20 kilometers by public roads. The geographic information systems Open Route Service and QGIS were used to construct isochrones of accessibility to the centers of territorial communities, which allowed us to draw certain conclusions.

Table 1

Indicators of the settlement network development in the Kolomyia region

Name of territorial community	Territorial community center	Coefficient of territorial concentration of population	Territorial accessibility coefficient (20 km)
Horodenka	Horodenka	0,6	0,63
Zabolotiv	Zabolotiv	0,8	0,63
Otyniia	Otyniia	0,9	0,65
Chernelytsia	Chernelytsia	0,5	0,29
Sniatyn	Sniatyn	1,0	0,6
Kolomyia	Kolomyia	3,9	0,65
Korshiv	Korshiv	0,6	0,63
Pechenizhyn	Pechenizhyn	0,8	0,49
Pidhaichyky	Pidhaichyky	0,8	0,64
Hvizdets	Hvizdets	1,0	0,69
Piadyky	Piadyky	0,8	0,68
Mateivtsi	Mateivtsi	0,7	0,57
Nyzhnii Verbizh	Nyzhnii Verbizh	1,2	0,6

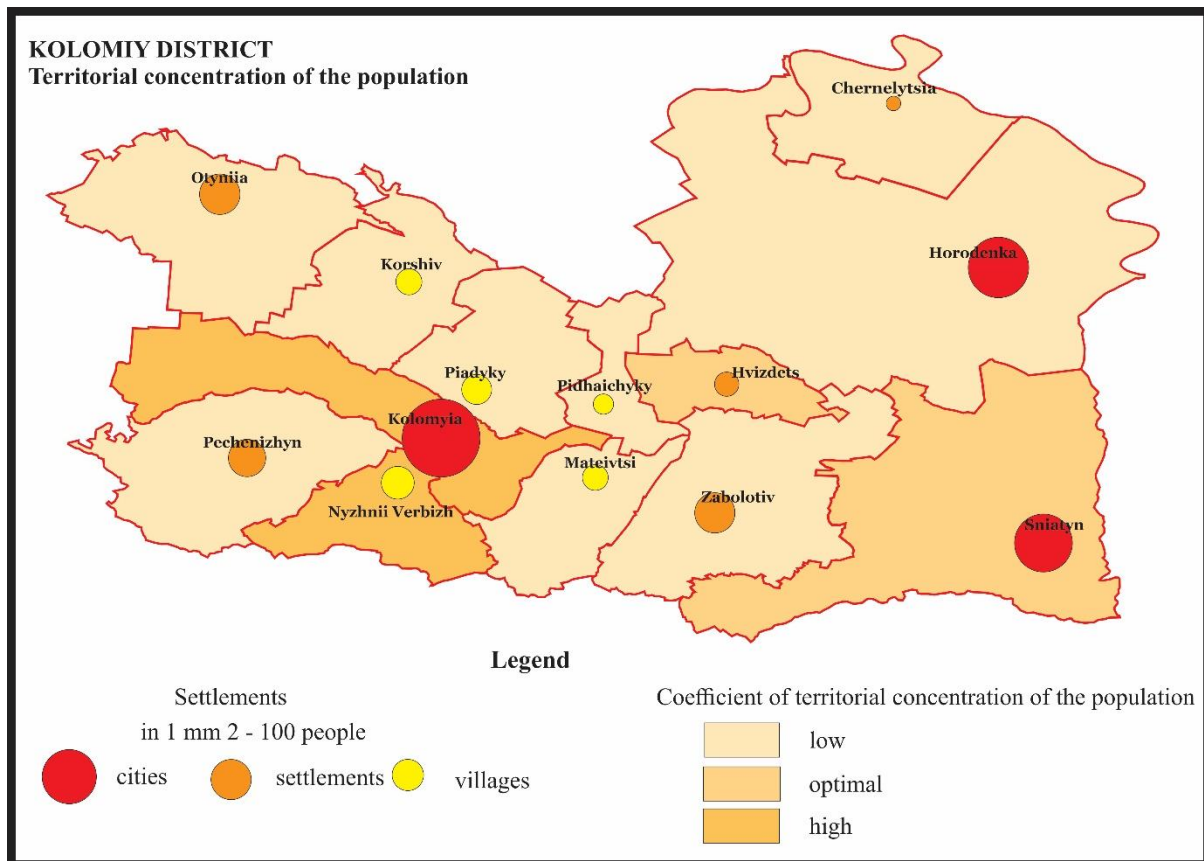


Fig. 2. Territorial concentration of the population in the Kolomyia district

Within the Kolomyia district, all community centers were formed in accordance with the methodology of formation of well-functioning territorial communities approved by the Cabinet of Ministers of Ukraine. However, there are certain parts within the Horodenka urban, Pechenizhyn and Chernelytsia urban-type settlement, which do not cover this zone of 20 km accessibility to the center of the community (Fig. 3).

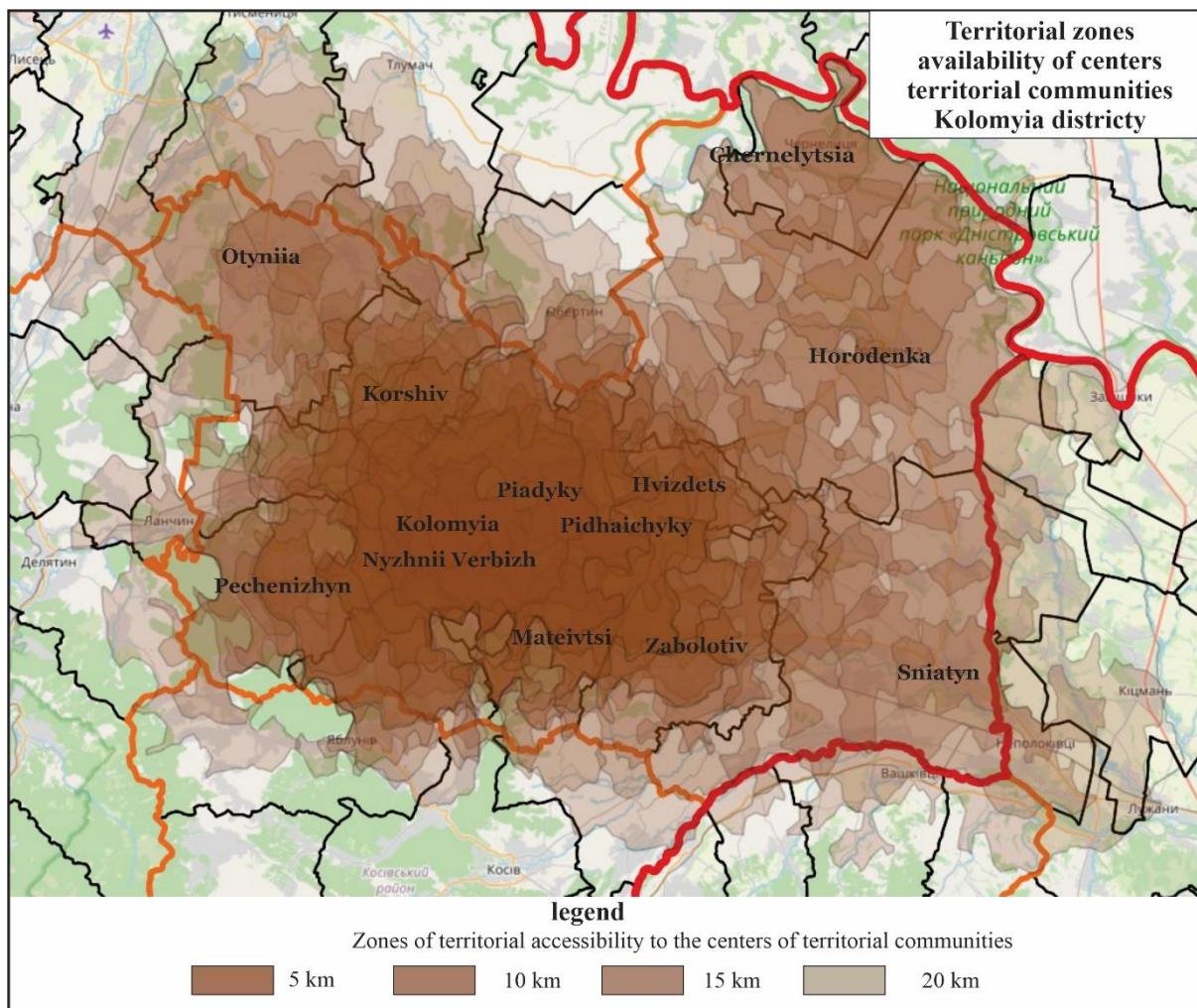


Fig. 3. Zones of transport accessibility to the centers of the territorial communities of the Kolomyia district

The best territorial accessibility have such centers as Otyniia, Kolomyia, Piadyky and Hvizdets, where the coefficient of territorial accessibility exceeds the mark 0.65. The lowest figure is in Chernelytsia and Pechenizhyn and is 0.29 and 0.49, respectively.

The Cabinet of Ministers of Ukraine developed methodological recommendations on the criteria of territorial accessibility of the administrative services center, including its territorial subdivisions and remote (including mobile) workplaces of administrators from June

2, 2021. According to these recommendations, "the distance to the access point should be no more than 14 kilometers. In the case where the territorial accessibility of the access point is determined by applying the criterion of time spent on the way to it, such time should not exceed 30 minutes if there is a developed transport infrastructure. The center, typically, is formed in a settlement - the administrative center of a rural, urban-type or urban territorial community. By decision of the local government, the center may be formed in another location within the territory of a rural, urban-type or urban territorial community, which is located closer to the geographical center of the territory of the relevant territorial community or has a larger number of people, more suitable premises for the location of the center, and developed infrastructure of the settlement (banking institutions or other organizations, transport services)"[3].

In total, there are 8 centers providing administrative services in Kolomyia district, three of which are located in the district center - the city of Kolomyia and one center each in Sniatyn, Horodenka, Pechenizhyn, Zabolotiv and the village of Piadyky.

After analyzing the territorial accessibility of these Administrative Service Centers, we concluded that the best transport accessibility has the territorial communities located around the district center and Zabolotiv urban-type community. At the same time, Otyniia and Chernelytsia communities are beyond transport accessibility to Administrative Service Centers. Only a small part of the Korshiv and Hvizdets territorial communities falls within the 14-kilometer accessibility zone of the nearest Administrative Service Centers. Also, less than half of the Horodenka urban territorial community is out of reach. Sniatyn, Kolomyia, Pechenizhyn, Piadyky, Mateivtsi, and Nyzhnii Verbizh territorial communities also have insignificant parts that are not covered by the accessibility zone to the Administrative Service Centers (Fig. 4).

Summarizing the above, we conducted a SWOT-analysis of the settlement network of the Kolomyia district. SWOT-analysis methodology involves identifying strengths and weaknesses, opportunities and threats to its functioning. The results of this analysis were presented in Table 2.

Thus, it was found that the strengths of the functioning of the settlement network of the Kolomyia district are much greater than the weaknesses, and there are more opportunities than threats. This suggests that this settlement network has effective management in order to develop a clear strategy to overcome crisis phenomena in the region, which allows to solve all existing problems and maintain the network in good condition.

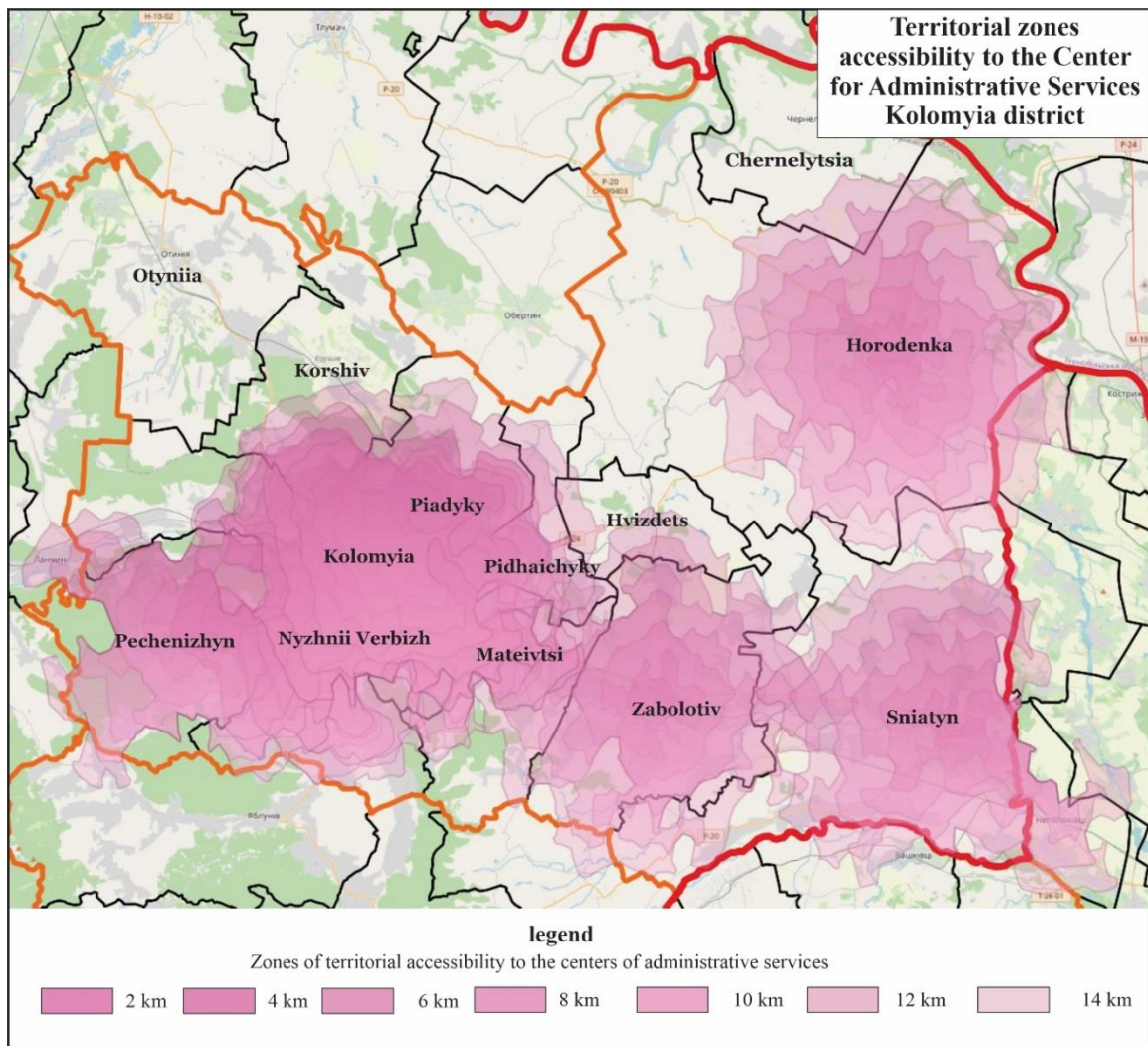


Fig. 4. Zones of territorial accessibility to the Administrative Service Centers of Kolomyia district

Table 2

SWOT-analysis of the settlement network

Strengths	Weaknesses
1	2
<ol style="list-style-type: none"> 1. Close proximity to EU borders. 2. Location in the western part of the country in close proximity to existing and promising rail and road international corridors: "Crete corridor №5", "Europe-Asia", "North-South" and others. 3. Extensive network of roads allows us to cover more than 2/3 of the natural and historical and cultural attractions of the region with excursion and tourist routes. 4. Investment attractiveness. 	<ol style="list-style-type: none"> 1. The condition of road infrastructure in some of the united territorial communities. 2. High labor migration, outflow of working-age population and qualified personnel outside the district, reduction of the district's population. 3. Lack of or outdated territorial planning schemes in most communities.

1	2
Opportunities	Threats
1. Development of villages and agricultural production. 2. Increasing the mobility of the population in the Kolomyia district with the allocation of the most comfortable areas to live and work. 3. Prospective construction of bypass roads near large settlements of the district. 4. Growth of small and medium-sized businesses, including in the secondary and tertiary sectors. 5. Increased powers of local authorities due to the decentralization of power.	1. The increase of labor migration to European countries. 2. Strengthening of socio-economic disparities in the development of territorial communities. 3. Growing social issues in communities remote from the district center (Kolomyia city).

Conclusions. The Kolomyia district settlement system is characterized by quite noticeable territorial differences in the formation of the settlement network of individual territorial communities. The 13 territorial communities functioning in the district are characterized by three types of support frameworks: multinuclear (4 communities), linear-nodal (6 communities) and radial-circular (3 communities), which is associated with various factors, namely the natural features of the territory, among which the most prominent influence have orographic features, forest cover of the territory, the length of roads, agricultural land, demographic and ekistic indicators, features of the historical development of the territory, etc.

To estimate the level of development of the settlement network of communities, we used three main indicators, namely, the coefficient of territorial concentration of the population, transport accessibility to the centers of communities and the district center, and transport accessibility to the centers of administrative services, which allowed us to trace certain territorial differences in the development of communities and identify the main opportunities and threats, strengths and weaknesses.

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