


ECONOMIC-GEOGRAPHICAL CHARACTERISTIC OF BEEKEEPING IN THE RUSE REGION

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Abstract. Beekeeping and the production of bee products is a specific activity in which heterogeneous factors interact. The main factors of competitiveness in beekeeping are formed at the regional level, but they are realized on a supra-regional basis, which is why a marketing strategy is needed to develop the potential and competitiveness of beekeeping in the Ruse district, the starting point of which is the economic and geographical characteristic of the area. There is a discrepancy between the natural zoning of the Danube plain and the administrative and territorial structure of the Ruse region. The aim of the study is the interdependence between the triad "natural conditions - natural resources - economy". One of the specific tasks is related to the analysis of beekeeping by administrative-territorial units in Ruse district, and the second is focused on the economic and market characteristics of regional beekeeping.

The hilly nature of the relief, the relatively low altitude and the great biodiversity are the factors determining the variety of beekeeping grazing in the region of Ruse in terms of quantity and quality. The analysis revealed that it is more professionally oriented and managed by the national, with more efficient territorial organization and development, and with a higher relative share of organic beekeeping. These advantages determine its higher competitiveness. Now the district of Ruse forms more than 10% of the national production of honey (over 1000 tons per year), respectively and in proportion to the economic effect of pollination - over BGN 100 million / year. The district offers very good opportunities and optimal conditions for the development of api-tourism, which will diversify the beekeeping farms and provide them with more stable and higher incomes. It has significant production, educational and innovative potential, a solid base for the formation of a regional beekeeping cluster.

Keywords: geographic and regionalization, administrative structure, cluster.

JEL code: Q10, Q13, R12

Introduction

Beekeeping is a traditional activity in the Bulgarian lands. Its results are directly dependent on the state of nature, the degree of its anthropogenic load and the ways of organization and management. In recent years, it has been faced with great challenges - pollution of nature, fluctuations in the production of honey and bee products, controversial state policy for its development, lagging behind in the implementation of modern forms of organization and management (Lyubenov L., 2018). There are no specific economic-geographical studies by districts and regions in the country, as well as attempts to reveal the interdependencies between the triad "natural conditions - natural resources - economy". These attitudes and problems determine the purpose of the study.

The main characteristics of each region and for Ruse district are the starting point for achieving competitiveness by differentiating based on regional uniqueness, which is very difficult to be copy. The distinction on a regional basis is achieved through: 1) natural and ecological factors (climate, relief, natural environment), 2) economic factors (economic development of the region), 3) territorial specialization based on the previous two factors. Ruse region distinguished by its unique characteristics - nature, economy, culture, history and specialization in organic beekeeping, as a basis for forming a positive image of the region and branding.

In beekeeping, the main factors of competitiveness are formed at the regional level, and through the market realization of the produced regional bee products are manifested at the supra-regional level. The development of the potential and competitiveness of beekeeping in Ruse region requires a marketing

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strategy, the starting point of which is the economic-geographical characteristics and analysis of the region. One of the specific tasks related to the analysis of beekeeping by administrative-territorial units in Ruse district, and the second focused on the economic and market characteristics of regional beekeeping. This regional analysis can be useful not only for beekeeping in Ruse region, but also for other regions in Bulgaria and the EU.

Research methods include the complex combination of grouping, comparison, analysis, synthesis, mathematical and graphical. The sources of information are national and regional institutions, regulatory framework and research on the analysed problem. The spatial boundaries of the study are determined by the study region - Ruse district, and the time scope of the study is from the last decade.

Research results and discussion

According to the goal, the research is focused on the analysis of the tasks with the help of which it will be achieved. That is why a two-part structure has been created. The first is focused on nature, administrative-territorial organization and geographical zoning of Ruse district, and the second concerns the economic and market characteristics of the district.

1. Nature, administrative-territorial structure and geographical zoning of Ruse district

The two zones of NUTS-1 (North and South-Eastern Bulgaria, South-West and South-Central Bulgaria), as well as the six regions of NUTS-2 (South-West, South-Central, South-East, North-East, North-Central and North-West) do not constitute administrative-territorial units, and serve statistical purposes. The regions of the third hierarchical level NUTS-3 correspond to the districts in Bulgaria (National Statistical Institute, 2018). Since by 2018 the population of North Central and others. Regions are below the minimum threshold of 800,000, the Ministry of Regional Development and Public Works, taking into account the geographical characteristics proposes the formation of the Danube region with Vidin, Montana, Vratsa, Pleven, Lovech, Gabrovo, Veliko Tarnovo, Ruse, Targovishte, Razgrad and Silistra, which was not formed due to a potential reduction in EU funding, which is detrimental to the Ruse region in terms of opportunities for fuller utilization of its economic and geographical characteristics.

The North Central Region (NRC) includes the districts of Veliko Tarnovo, Gabrovo, Razgrad, Ruse and Silistra. Its territory is 13.49% of the country's area, and GDP in 2017 is 7.8% of the national (National Statistical Institute, 2018). Socio-economic, environmental and cultural activities in the region are planned and coordinated by a regional council for the development of the SCR, which is chaired on a rotating basis by the district governors. The strategic planning is implemented through the Regional Development Plan of the North Central Region 2014 - 2020, which treats it as an integral part of the Danube area. Its main strategic goals are aimed at economic, social and territorial cohesion through integrated and sustainable development of the territory and settlements, including 36 municipalities. This administrative-territorial structure makes it difficult to integrate the region into the EU Danube Strategy.

Ruse District is one of the 28 districts of Bulgaria, including the municipalities of Borovo, Byala, Vetovo, Dve Mogili, Ivanovo, Ruse, Slivo Pole, and Tsenovo - Fig. 1. It is one of the middle districts in terms of territory and population in Bulgaria - its area is about 3%, and the population and GDP about 2.5% of the national indicators (National Statistical Institute, 2018). Over the last decade, the population and its contribution to the national economy have been steadily declining. The district has a significantly higher than the national average share of agricultural areas (76% vs. 56%) and settlements and urban areas - 6.5% vs. 3.7%. It has a significantly lower share of forest areas (14% vs. 34%) and a much lower share of the average share of mining areas - 0.3% vs. 2.9% at the national level.

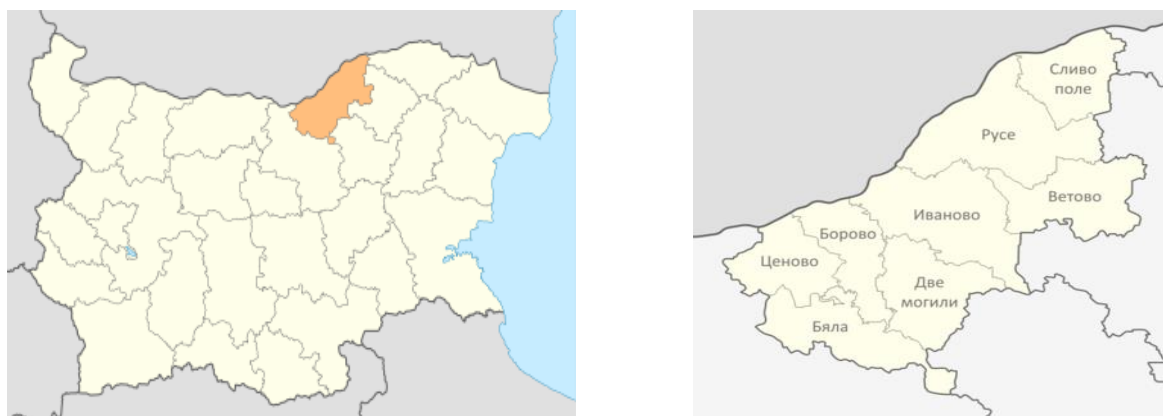


Fig. 1. **Geographical location and administrative-territorial structure of Ruse district**

Ruse region is in the top 5 of the districts with the largest number of bee families - Burgas, Dobrich, Silistra and Pleven. The registered beehives in the district are about 43,000 (Table 1). It is established that the beekeeping around the administrative centre of Ruse has the highest territorial concentration. With 1185 registered farms in the district, the average number of hives per farm is 36.3. This shows the existence of a dual structure in regional beekeeping - the presence of a group of large and professionally oriented farms raising more than 150 hives, as well as a large group of small apiaries with less than 50 hives per farm. In the beekeeping of Ruse district there are processes of transition to organic beekeeping and at the same time an increase in the number of hives on the apiaries.

Ruse District produces over 1,000 tons of honey, which is over 10% of national production, respectively and a similar part of the realized economic effect of pollination - BGN 100 million / year (Lyubenov L., 2018). The average yield of honey from one hive for the district is higher than at the national level, due to the larger relative share of semi-professional and professional apiaries, favourable geographical conditions and better organization and management. In addition, it is noteworthy that larger cities and market centres have a greater appeal in the territorial location of apiaries, because they provide access to resources, information and sales. They offer better conditions for training and qualification, as well as access to consulting, medical, financial and other services.

Table 1

Territorial structure of beekeeping in Ruse district

Municipalities	Average number Bee colonies	Relative shares,%	Ranking by municipalities
Dve Mogili	3919	9.1	6
Biala	5588	13.0	4
Cenovo	3048	7.1	7
Ivanovo	6786	15.8	3
Ruse	11031	25.7	1
Slivo pole	6241	14.5	2
Vetovo	3955	9.2	5
Borovo	2431	5.7	8

Σ 43 000

Σ 100.0

Source: author's calculations based on Lyubenov L., 2018

About 17.000 bee families die from pesticides in Bulgaria every year (Green technologies, 2017). Given the large number of unregistered bee families, this number is even higher - over 20.000. By analogy with

over 10% contribution of beekeeping in Ruse district in the national, it follows that every year in the area die from poisoning over 2.000 bee families.

It is important to note that part of the regional beekeeping can be successfully developed in urban conditions. Studies of beekeeping in urban areas show that their honey is many times cleaner (Honey produced in urban areas, 2019), as plants in cities are not treated with pesticides and fertilizers than in rural areas. Areas and polluted air and exhaust fumes from cars are not such a serious obstacle, as bees have the unique ability to filter and purify the nectar they collect. That is why there are beehives on the roofs of the Bundestag, the Paris Opera, Vienna, London and the green roofs of megacities such as New York, Tokyo and others. There are beehives on one of the terraces of the National Palace of Culture, as well as in the yard of the University of Ruse. Peaceful coexistence with bees requires respect for space and their work, which is why they are located mainly on the roofs.

Bees are social insects and it is not a problem for them to live even in densely populated urban areas. That is why in most cities around the world there are not only bee colonies, but also free-living bee colonies. There is a tendency towards sustainable growth of beekeeping in urban areas worldwide. The microclimate of urban areas is in some respects more favourable than in the wild and bees overwinter better and with lower mortality. Unlike modern agriculture, which relies on huge monofloral areas, in urban conditions the diversity is much better. Beekeeping in urban areas will not replace the field, because it has different goals, advantages and disadvantages, but it is an alternative given the global trend of declining bee populations. The entry of beekeeping in the urban areas of Ruse district and specifically in its administrative centre is an additional alternative for its development, which has many positive aspects. Reduction of transport and other costs in the sale of manufactured bee products. Pollination and conservation of plant species, respectively the provision of cleaner air, as well as combating the desertification of certain areas and maintaining their biodiversity. A socially responsible cause regarding the biological role of bees in ensuring biodiversity, a varied table and a cleaner environment. Beekeeping in urban areas also hides some risks for residents, mainly related to the dangers of stings and allergies. Smaller quantities of honey and pollen plants in some of the urban areas may also be a disadvantage.

Ruse region has a leading position in Bulgaria in terms of organic beekeeping. The relative share of organically raised bee families in the district is higher than at the national level, i.e. over 33% (. Ministry of Agriculture, Food and Forestry, 2018). Organic beekeeping in Ruse region is concentrated mainly in the group of professional apiaries with over 150 bee colonies, and there are also those with over 1000 bee colonies. This is due to the favourable geographical conditions for the development of organic beekeeping, the lack of major industrial pollutants in the area, as well as the financial incentives provided by the Rural Development Program and the National Beekeeping Program. The expansion of organic crop production in Ruse district will further increase the territorial opportunities for organic beekeeping.

Ruse region is part of the Danube plain, which occupies about 1/3 of the territory of Bulgaria. The natural area of the Danube Plain is divided by the Yantra River into two parts - Western and Eastern (Koprlev et al., 2002). Along the southern bank of the Danube, Rouse region is located between the delta of the Yantra River and the Brashlyanska lowland, the so-called the coast. The southwestern part of the Ruse region falls in the Western and the rest in the Eastern part of the Danube plain. In the district of Ruse is located the basin of the river Rusenski Lom, which is differentiated as a physiographic subregion (Vaptsarov I., S. Kiradzhiev, Ts. Mikhailov et al., 1980). The coast is the largest Danube Bulgarian lowland (Vaptsarov I., S. Kiradzhiev, Ts. Mikhailov et al., 1980). It stretches along the right bank of the Danube River, from Ruse to Tutrakan for a length of 60.7 km and its width varies from 10 to 15 km. The influence of the Danube on the climate is local.

The subregion in the basin of Rusenski Lom is deeply cut by the valleys of the rivers Cherni Lom, Beli Lom, the main river Rusenski Lom and their tributaries. In some places, some of these canyon-like valleys, and especially those of Beli Lom, have a significant depth, ranging from 100 to 180 m. These parts of the valleys have the character of deeply cut meanders. The most common deciduous trees are dracaena and acacia. In addition, there are species of cer, blagun, winter oak, hairy oak, linden, maple, ash, acacia, walnut, black pine, maple, summer oak, lilac, sumac, hawthorn, sage and others. More than 700 species of higher plants have been identified, incl. and honey. Since 1970, the basin of Rusenski Lom has been declared a nature park, as a natural complex with ecological, historical and cultural value (Executive Environment Agency, 2020). In the Rusenski Lom Nature Park there are plants from the Red Book of Bulgaria - 10 species (7 with rare category and 3 with endangered category). One species is included in the European list of rare, endangered and endemic plants with a category of vulnerable. Such an endangered new, rare species for our flora, discovered in 1997, is the Siberian heifer. Another critically endangered Balkan endemic in the park is Diekianov mullein. The treasure of the park are the birds - there are about 110 species, 17 of which are included in the Red Book of Bulgaria or endangered on a European scale - black stork, rusty angel, bald eagle, small bald eagle, white-tailed buzzard, wasp. The great diversity of birds is based on the excellent conditions for the development of insects and honey bees, respectively.

The climate of the Coast is temperate-continental with an average January temperature of -2.5°C , and an average July temperature of $23-24^{\circ}\text{C}$. The average annual rainfall is 550 mm, which is insufficient for the development of agricultural crops, and for this purpose was built the so-called. Braslianska irrigation system, which does not function today. In addition to the main cereals and sunflowers, large areas in the area are occupied by vineyards and orchards, and along the coast there are moisture-loving grass and forest species - acacia, linden, willow and poplar, which are honey and pollen. The natural resources in the area in combination with the bioecological features of beekeeping provide optimal conditions for its effective development.

The altitude not only determines and models the climatic features, but also has a basic role for the development of beekeeping. The optimal altitude for cost-effective beekeeping with high yields is up to 200 meters. From Table. 2., it is established that the average altitude in the district is 176.3 m, the relief is predominantly flat-hilly, with optimal conditions for beekeeping. In the area, the leadership positions of the municipalities of Ruse and Slivo Pole confirm this. The relatively small differences in altitude between the individual municipalities show the presence of good, optimal conditions for the development of beekeeping throughout the district.

Table 2

Altitude and relief in Ruse region

Municipalities	Max Altitude., m	Min Altitude., m	Average	Relief
Borovo	309.7	17	163.35	plain-hilly
Biala	430.4	28	229.2	plain-hilly
Vetovo	413	88	250.5	hilly
Dve Mogili	399.9	90	244.95	hilly
Ivanovo	353	16	184.5	plain-hilly
Ruse	233.1	15	124.05	plain-hilly
Slivo Pole	147.7	13	80.35	hilly
Cenovo	252.7	15	133.85	plain-hilly

Source: author's calculations based on <https://nsi.bg/nrm/>, 27.03.2022

Greater continental dryness and pronounced temperature amplitudes, monthly and annual, characterize the climate and climatic resources in the Eastern Danube Plain in comparison with the Western Region. The dissection of the relief, its exposure, the pronounced hilly character and the plant richness are conditions providing diverse and quality grazing for the bees. The district has a significantly higher average annual temperature amplitude - 25 ° C, which is higher than the national one. The natural conditions in Ruse district are a determining factor for the development of agriculture and cultivation of honey plants - fruit species, rapeseed, sunflower and others. The district has a rich forest vegetation with acacia and linden in the park Lipnik near Ruse and the municipality of Borovo, which are of important economic for organic and conventional beekeeping in the region.

The territory of the whole Ruse region is rich in honey and pollen plants, among which predominate Willow, Poplar, Dzhanka, Peach, Pear, Apple, Cherry, Cherry, Blue plum, Rozhkov, Acacia, Gledichia, Linden, Vine, Phy, Clover, Alfalfa, Corn, Sunflower, Rapeseed. The afforestation with acacia and linden, as well as the increase of the forest territories in the district, will improve the conditions for the development of the regional beekeeping. The relatively small difference in altitude and developed transport infrastructure form very good conditions for the development of mobile beekeeping, in order to make full use of the potential of plants and to multiply the average yields. Mobile beekeeping increases the quantity, quality and variety of bee products, respectively the profitability of apiaries.

2. Economic and market characteristics of the district

While in Germany, Austria and even in Serbia some of the richest regions are on the banks of the Danube, in Bulgaria it is just the opposite - GDP per capital in 2017 at the national level is BGN 14.3 thousand, and in Ruse BGN 11.15 thousand, which shows the lag of the region compared to the national average. Although there is a strategy for the Danube region from 2011 at European level, which includes the Ruse region, it is not actually implemented. One of the reasons for the difficult planning is that the regional division of Bulgaria does not unite the northern regions into one large Danube region - an idea that remained unfulfilled by the regional ministry. The region is also less competitive with neighbouring Romanian regions, and trade ties with them are weak, incl. and in the field of beekeeping, which further reduces the demand for beekeeping, etc. products at regional level.

In 2016 in Northern Bulgaria, where the Danube Plain geographically dominates, about ¼ of the country's GDP is created, and the remaining significantly larger part of ¾ is generated in Southern Bulgaria, where the capital of the country, Sofia, which administratively dominates, creates 40% of the

country's GDP (Capital journal, 2018). It is followed by the districts - Plovdiv 8%, Varna 6.5%, Stara Zagora 5.6%, Burgas 5%, Sofia 3.3%, Blagoevgrad 2.7%, and Ruse 2.5%. Compared to the leaders, Northern Bulgaria is represented by the districts of Varna and Ruse. Varna district, which geographically belongs to the Black Sea region, has 2.6 times higher GDP than Ruse. Before 1990, Northern Bulgaria was more industrially developed than the South, but nevertheless there were not so significant imbalances in the regional development of the country. They occurred after 1990, when the economic model was changed, which relied mainly on administrative division, without taking into account the leading role of the economic and geographical characteristics of the regions.

In Ruse district there are negative economic and regional trends, which indicate a decrease in its competitiveness compared to other regions in Bulgaria. Ruse is the fastest depopulating regional city, and in terms of average salary it ranks 10th in the country. For a regional city in terms of population after the regional cities of Sofia, Plovdiv, Varna and Burgas, Ruse performs worse than the next Stara Zagora. Ruse District lags behind all of these districts in terms of GDP, GDP per capita, agreed EU funds, foreign direct investment, GVA, average wage, depopulation and foreign investment per capita. The population and the share of the region in the formation of the country's GDP tend to decrease, i.e. and its competitiveness compared to the most developed Bulgarian regions.

Ruse region has significant biological, production and educational potential - there are two universities with agricultural orientation and the Institute of Agriculture and Seed Science at the Agricultural Academy (Lyubenov, 2018a). There are very good conditions for the formation of a regional beekeeping cluster. The cross-border nature of the district and the cross-border transport corridors, incl. and the Danube River, provide easy access to foreign markets. The area has a rich history and centuries-old traditions, crafts, holidays, culture etc., including beekeeping. The Rusenski Lom river valley is an established international tourist destination due to its unique nature, registered UNESCO World Heritage sites and developed tourist routes.

Beekeeping in Ruse region offers good opportunities for the development of api-tourism. Healthy bee products combine very well with tourism, which allows the formation of more complex products with higher added value, less dependence on seasonality and achieving higher and sustainable prices (Lyubenov, 2018b). Api-tourism forms local markets and short supply chains for bee products and services. It diversifies beekeeping farms, providing them with more stable and higher incomes. Api-tourism will contribute to the preservation and development of small settlements with limited employment opportunities, creating an additional one. Api-tourism has the potential to significantly increase the consumption of regional bees and others products in the local economy.

The district, like the country, specializes mainly in the production of nectar honey, and at the national level there is no data on the regional production of other bee products. Regional organizational, consumer and online markets have a similar structure to national ones. The subject and technological specialization are similar to the national ones, and the economic specialization has a greater concentration in the professional and organic farms, which makes them more profitable. The apiaries in the district are mostly family and small, and are not united in cooperatives, organizations and producer groups. Ruse district does not have unique geographical characteristics to ensure the production of unique bee products, on the basis of which to form a geographical indication, as in the Strandzha region with the Protected Designation of Origin "Strandzha Mann Honey".

The food industry for processing honey in Rouse district is poorly developed - there is only one registered workshop under Ordinance 9 for conventional honey in the village of Svalenik, and there is no bio-licensed shop in this district under this ordinance. The nearest one is in the town of Loznitsa, 73 km

from the town of Ruse, in the neighbouring district - Razgrad. According to Ordinance 26 in Ruse district there are 24 registered apiaries, (Regional Directorate for Food Safety – Ruse, 2019) which is 2% of the total number of apiaries in the district - 1185. This limits the possibilities for realization of the organic and conventional honey produced in the field, etc. bee products on regional, national and international markets. Ruse district is a net exporter of honey, but a net importer of means of production - hives, centrifuges, detergents and inventory.

Crop production in Ruse region has a larger relative share than animal husbandry however, it is a net exporter of meat and honey, and forms products with higher added value. When considering the importance of beekeeping in Ruse, given its relatively low share in the local economy, we must take into account its links with many industries and activities - consulting, education and science, food, trade and others. Its biggest contribution is pollination, which maintains biodiversity and provides a variety of products and food security. Beekeeping and related businesses provide additional jobs and increase yields in crop production. It is an alternative to the mass orientation towards grain production.

Conclusions, proposals, recommendations

- 1) There is a discrepancy between the natural regionalization of the Danube plain and the administrative-territorial structure of Ruse district. The European strategy for the Danube region, which includes Ruse district, is not implemented at the district level due to difficult planning and coordination caused by the regional division of Bulgaria, which does not unite the northern regions into one large Danube region and does not take into account their economic geography.
- 2) Ruse district has a great biodiversity, including honey and pollen plants, which is typical for Bulgaria as a whole. Favourable altitude and markedly hilly nature of the terrain are conditions for providing a variety of quantity and quality of pasture for bees.
- 3) Beekeeping in Ruse region is more professionally oriented than the national one, as well as with a larger relative share of organic beekeeping. Ruse district forms about 10% of the national production of honey (about 1000 tons), respectively a similar part of the realized economic effect of pollination - BGN 100 million / year.
- 4) The district with its natural-ecological, economic and cultural-historical factors, as well as territorial specialization on their basis, is the bearer of unadulterated uniqueness, which is the basis for competitive differentiation, branding and positioning of bee and other products produced on its territory.
- 5) Ruse district offers very good opportunities for the development of api-tourism, which will diversify beekeeping farms and provide them with more stable and higher incomes. The district has significant production, educational and innovative potential, which are a solid basis for the formation of a regional cluster for beekeeping.
- 6) The entry of beekeeping in the urban areas of Ruse is an additional alternative for its development, which has positive sides - production and sale of quality products in the "heart" of large markets with developed infrastructure, socially responsible cause for bee protection, biodiversity and the environment. The disadvantages concern the smaller quantities of honey and pollen plants and the dangers of stings and allergies.
- 7) Ruse region has a serious potential in the export of bee products. The limiters for the development of this potential are the markets of bee products - regional, national, international. The development of the potential and the competitiveness require the development of marketing strategies for the regional beekeeping in Bulgaria, the starting point of which are the economic-geographical characteristics.

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