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Original Article

Analysis of activity structure in Szabolcs-Szatmár-Bereg County

Análise da estrutura de atividades no condado de Szabolcs-Szatmár-Bereg

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Abstract

Agriculture has become multifunctional, its task is no longer only the production of healthy food, but it has also expanded with the functions of regional development, landscape management, environmental protection and tourism. This research seeks to explore the multifaceted nature of agriculture, extending beyond traditional food production, by investigating the interconnectedness of various functions, including energy conversion, utilization, and job creation, within the cohesive framework of rural development. According to another claim, agriculture cannot solve the problems of employment and job creation, but at the same time, it forms an economic basis for the quality of the cultural environment. Food production, energy conversion, use, and job creation systems form the unified structure of rural development. Their properties and characteristics, which are embodied in projects, can be interpreted in a system. This way of thinking prevails and strengthens even more when we examine spatial environments adjacent to borders since the connecting role and nature of development processes can be demonstrated for different social, economic and natural environments and its validity can be examined in adaptive solutions.

Keywords: systems approach, rural development, multifunctional agriculture, spatial environment, production.

Resumo

A agricultura tornou-se multifuncional, e sua tarefa deixou de ser apenas a produção de alimentos saudáveis para também expandir-se com as funções de desenvolvimento regional, gestão paisagística, proteção ambiental e turismo. Esta investigação procura explorar a natureza multifacetada da agricultura, indo além da produção alimentar tradicional, investigando a interligação de várias funções, incluindo a conversão de energia, a utilização e criação de emprego, no quadro coeso do desenvolvimento rural. De acordo com outra afirmação, a agricultura não pode resolver os problemas de trabalho e de criação de emprego, mas, ao mesmo tempo, constitui a base econômica para a qualidade do ambiente cultural. Os sistemas de produção de alimentos, conversão de energia, utilização e criação de emprego formam a estrutura unificada do desenvolvimento rural. Suas propriedades e características, incorporadas nos projetos, podem ser interpretadas em um sistema. Esta forma de pensar prevalece e fortalece-se ainda mais quando examinamos ambientes espaciais adjacentes às fronteiras, uma vez que o papel de ligação e a natureza dos processos de desenvolvimento podem ser demonstrados para diferentes ambientes sociais, econômicos e naturais, e a sua validade pode ser examinada em soluções adaptativas.

Palavras-chave: abordagem sistêmica, desenvolvimento rural, agricultura multifuncional, ambiente espacial, produção.

1. Introduction

Agriculture is Hungary's most significant economic resource based on its capabilities and capabilities. The totality of the features and the system approach determine its importance (Csete and Láng, 2005). Hungarian agriculture (expertise, land quality, climatic and topographical conditions) has significant potential even when compared internationally (Romány, 2002). Compared to countries with more developed economies, sustainable, quality, landscape and environmental protection rural development can be the key to the challenges facing our agriculture (Nagy and Kith, 2014), its practical use can become appropriate in interpreting and solving multifaceted problems and avoiding their consequences (Soltész et al., 2005). The rapidly changing economic and natural environment, technological knowledge transfer and demographic changes can cast doubt on paradigms believed to be definitive (Dinya, 2018).

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2. Literature review

2.1. Overview of the development policy of Hungarian agriculture

The farmland is our country's most valuable natural treasure (Nagy, 2012; Várallyay, 2012; Harsányi et al., 2005), it is synonymous with Hungarian (Harsányi et al., 2006), and the basis of sustainable farming (Kátai, 2012). To successfully meet the challenges of a fundamentally changing world, our primary task is to assess the available renewable resources, which make up 30% of the national wealth, and to create a framework for their protective use, striving for social consensus (Nagy, 2005; Nagy, 2019). The energy needs of technology and the protection of resources that are part of nature can only be realized from a systems approach (Nagy and Sinóros-Szabó, 2014) and in the resolution of short- and long-term, micro- and macro-level conflicts (Kovács, 2018). It is necessary to develop a new complex agricultural strategy (Fári et al., 2005). Among the potentials, competitiveness and the need for developments aimed at improving this capability are also seen as important by agricultural policy leaders (Nagy I., 2018). The potential and processes of social, economic, environmental and settlement network processes must be consciously and systematically analyzed (Rechnitzer, 2006). The task of agricultural policy is to collect and evaluate information related to competitive advantages. Its correct interpretation at the level of economies and national economies should become the cornerstone of development (Mizik, 2019).

The growth of small and medium-sized enterprises provides the basis for the economic situation of market economies (Csizmazia et al., 2005). It can be analyzed in the context of regional development and agriculture (Sinóros-Szabó, 2012a). Its results define the state of economic, technological and social development. Through the focus on solutions and activities that protect the natural environment. The use of this close relationship is based on methods that can be well applied to economic, social and natural environments and are defined in its entire structure (Sinóros-Szabó, 2018; Takács and Sinóros-Szabó, 2019), and in this way, technological, economic and social development can be correctly interpreted point of view (Sinóros-Szabó et al., 2005). This way of thinking prevails and is strengthened even more when we examine border-neighbouring spatial environments since the connecting role and nature of development processes can be demonstrated for different social, economic and natural environments and its validity can be examined in adaptive solutions (Sinóros-Szabó, 2012b). In Hungary, "the rural area is not only the scene of agricultural production but also a biological and social living space" (Ángyán, 2005, p. 23), in addition to its primary production task, agriculture must embrace and manage in an integrated manner social, environmental and employment tasks (Ángyán, 2005). The most important task is to increase the diversification of production. To promote the production of semi-finished and finished products representing added value within agricultural production. As an agricultural region, the Northern Great Plain is at the mercy of changes in demand for products. The research aim appears to be focused on examining the multifunctionality of agriculture and its role beyond food production. Additionally, the research seems to aim at understanding the interconnectedness of food production, energy conversion, use, and job creation within the unified structure of rural development. The study also appears to consider the impact of these agricultural functions on employment, job creation, and the quality of the cultural environment, with a particular emphasis on examining spatial environments adjacent to borders and the connecting role of development processes in different social, economic, and natural contexts. This study's performance first time in Hungary.

3. Material and method

3.1. Methodology of quantitative data collection

My research, which examines the changes in the results of agriculture, focuses on the analysis of the crop production results of agricultural enterprises operating in the Northern Great Plain and within in Szabolcs-Szatmár-Bereg County. I carried out my work to one county (Szabolcs-Szatmár-Bereg County) and examined specific businesses within that county.

3.1.1. Primary data source

The basic population of the sample and the characteristics of the sampling:

The basic population of the investigation is the agricultural entrepreneurial world of the county, to which I gained access through the sixty village farmers of the National Agrarian Chamber (NAC) operating in the Szabolcs-Szatmár-Bereg County, with their active cooperation, so that the opinion of the widest possible range of farmers could appear in the survey. I contacted them electronically with the help of NAC's county board, using a closed questionnaire using the Google Forms program, as well as a closed questionnaire (created with Microsoft Excel). I sent the questionnaires to the village farmers in electronic form, by email, and they sent back the answers in electronic form. This helped the fast and efficient processing incredibly.

In this way, in terms of competence, I obtained adequate data for the research, about the decisions and farming culture of the producers involved in agriculture. The farmers had the opportunity to answer the questions on a multiple-choice, numeric value and a 5-point Likert scale (a measurement scale between two extreme values), with 1-less, 5-extremely textual explanations. I worked with a five-point value scale, where 1 represented the least and 5 the most answers.

3.1.2. Dimensions of quantitative research

With the help of the village farmers, I also contacted the farmers of the county with an open-ended questionnaire. My goal is to collect data on cultivation costs.

The main topics covered by the questionnaire:

1. Specifying the respondent's age, education, gender, agricultural qualification and the district where they typically farm;
2. Specifying the size of the farm and the production volume.

I asked the questions of the closed questionnaire in the form of answers to be decided or given on a grade scale.

In addition, our research fills a gap and provides new insight into a previously less investigated issue. Our empirical results can also contribute to the preparation of a larger volume of research.

3.2. Geographical framework of the research

The position of the Szabolcs-Szatmár-Bereg county and the North Great Plain region

The Northern Great Plain region is located in the eastern part of Hungary. It borders Ukraine, Slovakia and Romania. It consists of three counties (Jász-Nagykun-Szolnok, Hajdú-Bihar and Szabolcs-Szatmár-Bereg) (Nagy et al., 2014). Szabolcs-Szatmár-Bereg County is also called the "Triple Border Corner" because it borders three countries - Romania, Slovakia and Ukraine (Jánosy et al., 2014). As the center of the region as the largest city and thanks to its central location, Debrecen (Nagy et al., 2014), which is a powerhouse has become the educational, transport and cultural leader of the Northern Hungary region and the area beyond the border (Csatári, 2006; Vincze, 2016), densification point in employment and geographical location (Baranyi, 2016).

"The Alföld with the largest area of the Carpathian Basin is located on more than 100,000 km^2, occupying 54% of the territory of our country" (Krajnc, 2019). This is the most productive area of agriculture in the country.

Hungary is located in the temperate zone and the continental climate is decisive. Droughts often occur in summer due to the abundant sunshine, and frosts also occur in the second half of spring. The Alföld area is poor in precipitation.

Bodrogköz is an area with low flood plains, Hajdúság is a flood-free loess plain, Nyírség is an area with quicksand, and the Northern Alföld is an area containing alluvial cone plains. During the rainy season and floods, the marshland of Nagy- and Kis-Sárrét between Békéscsaba and Debrecen is a difficult area to walk. Movement outside the freeways is hindered by the sticky soil in the clayey areas in rainy weather. Dust formation is significant in loess and sandy areas, which is why many trees were planted in these areas.

Hungary's strategic area in terms of agricultural potential is the Northern Alföld region. 21.7% of its agricultural area is located here, making it the second largest region after the Southern Alföld. Almost 60% of its area is suitable for agriculture (Nagyné, 2008). Its agricultural potential is significant. Compared to other regions of the country, the performance of agriculture within the GDP is almost double. It is not abundant in natural resources, but it has a significant amount of hot water, fresh water and good quality farmland (Harsányi et al., 2005), the evaluation and development of its economic potential based on these two criteria will make it a rich region, appropriate developments and value-preserving, systems-oriented, conscious technological and resource development, which is an epoch-making issue of our society (Nagy and Sinóros-Szabó, 2014).

The natural features of the region are favourable for agriculture in all three counties (Nagyné, 2008). The three counties are traditionally among the country's largest grain-producing areas. Corn or wheat was grown on eight to nine-tenths of the grain area. Maize occupies a large proportion of the arable land of individual farms in the three counties. The cropping structure also makes the agriculture of the region vulnerable. The entrepreneur takes into account the strong and weak points of his business, as well as the expected events of the future. After estimating the positive and negative effects of the environment in advance, he prepares to exploit and mitigate them (Varsányi, 1996). The average gold crown (Gc) value of the region's agricultural land is 16.26 Gc. In Szabolcs-Szatmár-Bereg County, it is around 12.31 Gc, in Hajdú-Bihar 17.08 Gc, in Jász-Nagykun-Szolnok County 19.41 Gc. The national average is 18.15 Gc (Marosi and Somogyi, 1990).

Szabolcs-Szatmár-Bereg County is specifically an agricultural county, the weight of agriculture is more than twice the national average. Most of the county is a backward peripheral area (Baranyi, 2006; Beluczky, 1990; Barta, 1990). It is typically a peripheral, economically and socially deprived area (Nemes-Nagy, 1990, 1996; Szűcs, 1981). Cross-border collaborations did not or did not develop effectively (Takács, 2010), the role of the national border is characteristic (Enyedi,1996). It differs from the other two counties of the region (Hajdú-Bihar, Jász-Nagykun-Szolnok) in its production characteristics. Based on employment data and gross added value, the central issue in the region is agriculture, which is starting to recover after two decades of declining employment (Nagyné and Balcsók, 2006).

4. Results

4.1. The results of the questionnaire data collection

4.1.1. Presentation of the sample

4.1.1.1. Age of farmers

The average age of the farmers interviewed in the survey was 49.06 years. The number of elements in the sample is 59 people. The age of the farmers is between 25 and 65 years, and the standard deviation of the age is 9.7 years. Within the target group, I divided the farmers into two groups based on their age. The proportion is 81% over 40, and 19% under 40. It can be seen that the average age is high. During the interviews, the aging of the profession and the difficulties of the generational change were identified as the biggest problems.

4.1.1.2. Education level of farmers

The farmers interviewed by the questionnaire were categorized into four groups according to their educational level. The figure illustrates that the participants in the survey mostly have a medium degree of fate (Figure 1). The group is characterized by a medium proportion of

higher education. The proportion of people with a basic degree or no education is low.

It is characteristic of the group of farmers participating in the survey that they have almost a complete degree in agriculture. I illustrate the data of my survey in a diagram (Figure 2). The existence of professional knowledge was also described as important in the interview. Without it, it is not possible to grow competitively.

Based on the data provided by the group, according to educational level and age classification, there are farmers in the county with secondary education and over forty years of age (Figure 3). The largest number of farmers over the age of 40 had a secondary education (33 people), and the lowest proportion was represented by farmers with no education under the age of 40.

4.1.1.3. Gender of farmers

The gender distribution of interviewed farmers shows a male predominance. I illustrate the data of my survey in a diagram (Figure 4). There were almost four times as many men as women among the respondents. In agriculture as a whole, a higher proportion of men work and manage the farms.

4.1.2. Characteristics of farms

During the presentation of the characteristics of the participating farms in the survey, the quality and size of the land, the activity structure, the sowing structure and the headquarters were the focus of my investigation.

4.1.2.1. Geographical location of farms

The responding farmers selected nine districts as the main territorial classification of their farming (Figure 5).

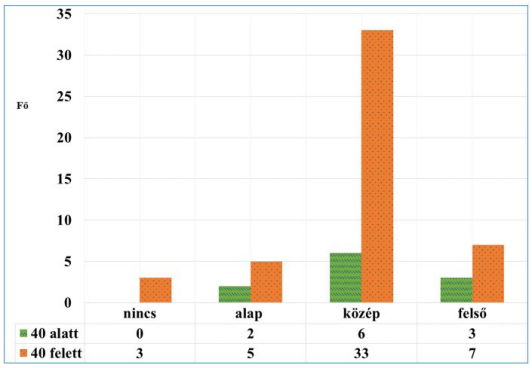

Figure 3. Age and education of the respondents (2019)
Source: own editing.

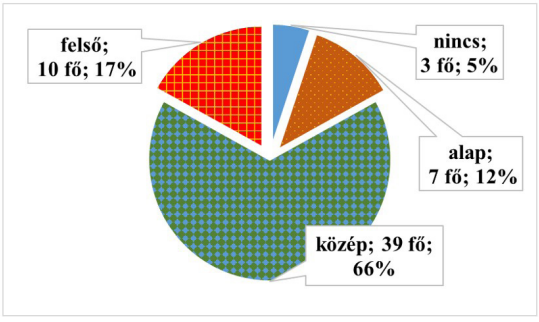

Figure 1. Distribution of respondents by educational level (2019)
Source: own editing (Felso: Upper, nincs: none, alap: basis, Kozep: middle).

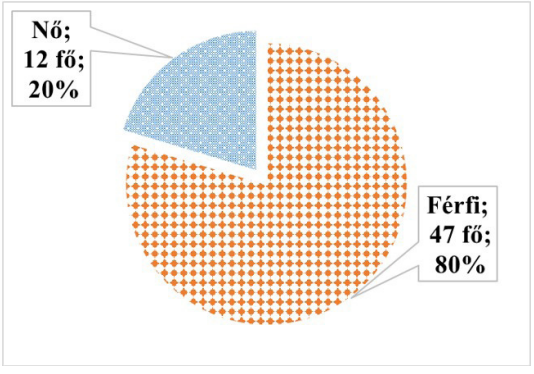

Figure 4. The gender of the respondents (2019)
Source: own editing.

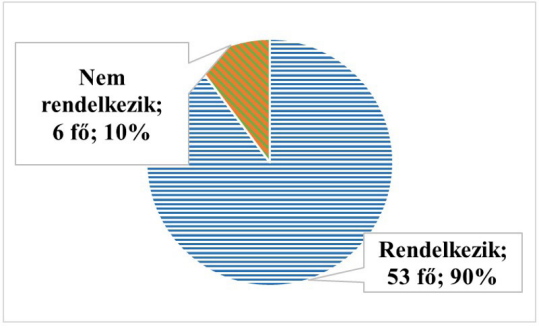

Figure 2. Agricultural education of those filling in (2019)
Source: own editing.

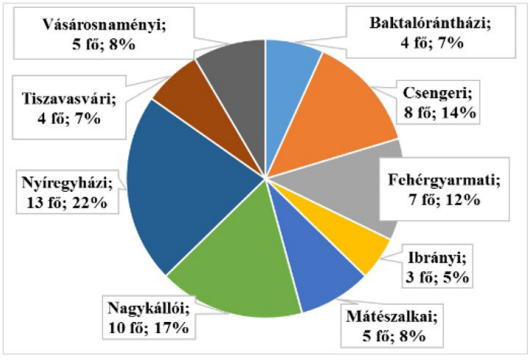

Figure 5. District location of farmers' headquarters (2019)
Source: own editing.

In the county of Szabolcs-Szatmár-Bereg, the participants in the survey took part in the number and percentage shown in the figure from the various districts. In the survey, the highest proportion is represented by the Nyíregyháza district (13 people, 22%), and the lowest by the Ibrány district (3 people, 5%).

4.1.2.2. Categorization of farmland according to size and quality

The area size of the farmers ranges from 1 to 470 ha, on average they farm in an area of 40.16 ha, and the standard deviation of the area size is 72.7 ha. The size of privately owned arable land ranges from 0 to 380 ha. An average of 31.48 ha is privately owned, with a standard deviation of 57.6 ha. The size of the area belonging to the other cultivation branch is between 0-200 ha, on average 9.07 ha, with a standard deviation of 28.3 ha. In the figure, I illustrate the size of the arable land given by the respondents, expressed in hectares, grouped by district (Figure 6). Tiszavasvári (700 ha) has the largest total area, and Baktalórántház district (42.12 ha) the smallest.

The farmers participating in the survey have arable land holdings that exceed the national and county average (Figure 7). The respondent farms with the largest arable area are located in the Tiszavasvár district. The estates with the smallest area in the Ibrány district.

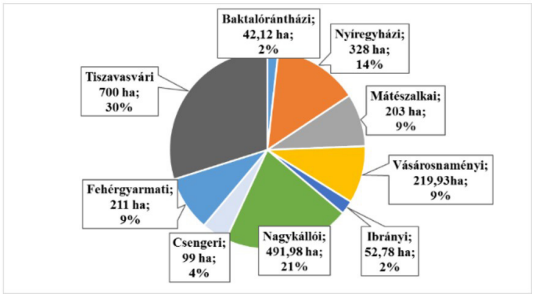

Figure 6. The size and location of the arable land (2019)
Source: own editing.

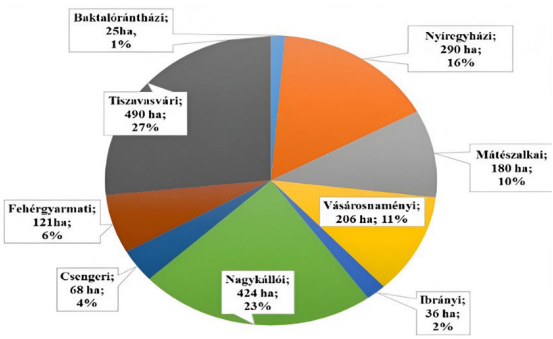

Figure 7. Size, proportion and district location of privately owned arable land (2019)
Source: own editing.

The amount of non-arable land given by the respondents, expressed in hectares, per district (Figure 8).

The results of my investigation show that the farmers are engaged in other agricultural activities in addition to growing crops in the fields. From this point of view, the district of Tiszavasvári (220 ha) represents the largest proportion, while the district of Ibrány (7 ha) represents the smallest proportion. The survey confirms that there is significant non-arable agricultural activity in the county, typically fruit (15 people), lawns (5 people), horticulture (3 people), and forestry.

The typical average golden crown (Gc) value of the specified arable land is 16.24 Gc. The Tiszavasvári district has the best areas (Figure 9). A significant difference in this value can be seen between the cultivated arable areas. The typical golden crown value of the arable land given by the participants in the survey ranges between 4-29 Gc in the districts. The average value of the golden crown for the fields is 16.24 Gc, with a standard deviation of 5.2 Gc. The Tiszavasvári district has the best value, and the Baktalórántháza district has the worst.

The gold crown value of the land exceeds the average value of the county by 3.93 Gc. The gold crown value is close to the regional average value, the difference is only -0.02 Gc. The average GC value of the farms participating in the survey is significantly worse than the average of Jász-Nagykun-Szolnok County (-3.17 Gc). It is -0.84 Gc less than the average Gc value of Hajdú-Bihar.

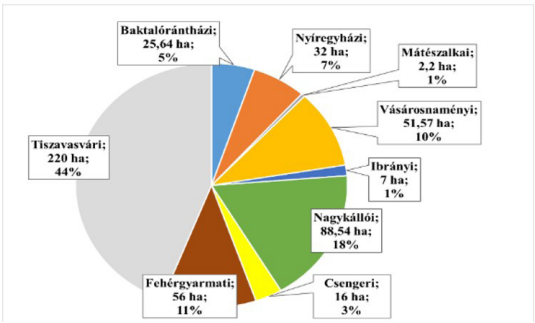

Figure 8. The size and proportion of areas belonging to other cultivation branches in district division (2019)
Source: own editing.

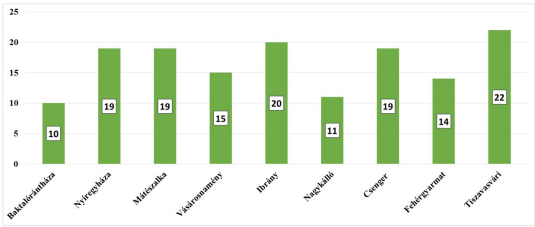

Figure 9. Average golden crown value of farmers' arable land, per district (2019)
Source: own editing.

Based on the values received from the nine districts of the county, the farms of the farmers participating in the survey mostly farm on brown forest soil. I illustrate the data of my survey in a figure (Figure 10). The two most important soil types (brown forest soil and meadow soil) are present to a decisive extent (908.06 and 533.98 ha) among the cultivated areas of the farms. The smallest proportion is represented by cast soil (58.3 ha).

Distribution of farmers' areas used for wheat cultivation by soil type in the sample (Figure 11). The following results can be deduced from the data in the figure: the farmers participating in the survey primarily use meadow soil and secondarily brown forest soil for wheat cultivation.

It shows the soil type of the areas used for corn cultivation by the farmers involved in the study (Figure 12). Maize is mostly grown on brown forest soil and meadow soil.

4.1.2.3. Activity structure of farms

Among the crops produced, the share of corn is almost 100%. Maize is dominant in the cropping structure of all farms. Wheat appears in less than half of the farms' activities (Table 1). The results of my research project are a monoculture of corn production. The distribution shows the percentage of farms that produce the given plant.

Based on the results, when reviewing the cropping structure of farmers grouped by district, we can see that corn is found in all districts as the main cultivated field crop. Only half of the wheat appears in the crop structure. I illustrate the results of my survey in a table (Table 2). The result of my investigation is that the hegemony of corn production is enormous even in the district breakdown. Wheat cultivation is concentrated in the most suitable areas.

How many farmers were involved in the cultivation of different plant crops in each district during the research period (Table 3). When breaking down the group according to geographical location, it is clear that the largest proportion of corn is grown in the county. In the district of Baktalórántháza, no data on the cultivation of other crops was provided. In the Csenger district, the cultivation of corn and wheat is the most characteristic. The Fehérgyarmat district has similar characteristics. In the Ibrány district, the proportion of wheat cultivation is much lower.

In the Mátészalka district, the largest proportion is corn and sunflower seed cultivation, while the proportion of wheat cultivation is smaller. In the Nagykálló district, the most typical cultivation is corn and sunflower seeds, the proportion of wheat cultivation is small. In the Nyíregyháza district, corn also represents the largest proportion. In the Tiszavasvári district, the largest proportion is corn and

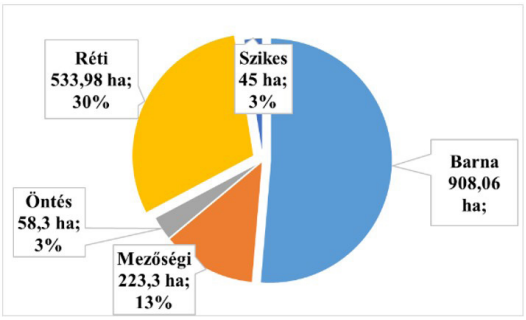

Figure 10. Typical soil types of farms (2019)
Source: own editing.

Table 1. Sowing structure typical of Szabolcs-Szatmár-Bereg County (2019).

Plant culture	Distribution	Number of person
Corn	94.9%	56
Sunflower seed	69.5%	41
Wheat	44.1%	26
Triticale	23.7%	14
Rapeseed	13.6%	8
Alfalfa hay	8.5%	5
Potato	3.4%	2
Autumn barley	3.4%	2
Rye	3.4%	2

Source: own editing.

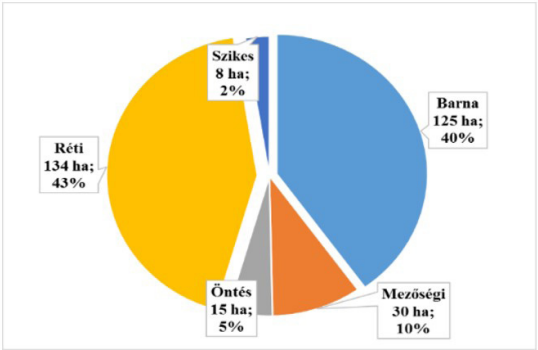

Figure 11. Soil types used by farms for wheat cultivation (2019)
Source: own editing.

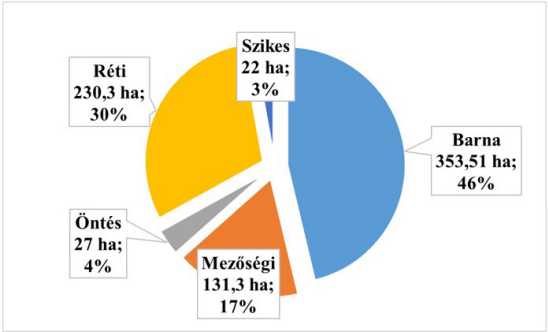

Figure 12. Soil types used by farms for corn cultivation (2019)
Source: own editing.

Table 2. Seasonal cropping structure in % (2019).

District	Plant cultures								
	Corn	Wheat	Autumn barley	Rye	Triticale	Potato	Sunflower seed	Rapeseed	Alfalfa hay
Baktalórántháza	100	0	0	0	50	0	0	0	0
Csenger	100	100	13	0	25	0	88	0	0
Fehérgyarmat	100	86	0	0	29	0	71	29	0
Ibrány	100	33	0	0	0	0	100	0	0
Mátészalka	100	40	0	20	20	0	100	0	0
Nagykálló	100	20	0	10	40	10	100	10	20
Nyíregyháza	92.3	7.7	0.0	0.0	7.7	7.7	38.5	7.7	7.7
Tiszavasvári	100	75	0	0	0	0	75	50	0
Vásárosnamény	60	60	20	0	40	0	60	40	40

Source: own editing.

Table 3. Farmers engaged in plant crops by district (2019) (person).

District	Plant cultures								
	Corn	Wheat	Autumn barley	Rye	Triticale	Potato	Sunflower seed	Rapeseed	Alfalfa hay
Baktalórántháza 4 person	4	0	0	0	2	0	0	0	0
Csenger 8 person	8	8	1	0	2	0	7	0	0
Fehérgyarmat 7 person	7	6	0	0	2	0	5	2	0
Ibrány 3 person	3	1	0	0	0	0	3	0	0
Mátészalka 5 person	5	2	0	1	1	0	5	0	0
Nagykálló 10 person	10	2	0	1	4	1	10	1	2
Nyíregyháza 13 person	12	1	0	0	1	1	5	1	1
Tiszavasvári 4 person	4	3	0	0	0	0	3	2	0
Vásárosnamény 5 person	3	3	1	0	2	0	3	2	2
Sum: 59 person	56	26	2	2	14	2	41	8	5

Source: own editing.

wheat cultivation. This rate is lower than average in the Vásárosnamény district.

5. Evaluation of results, discussion, and conclusions

Agriculture has more versatile functions than before. It plays a significant role not only in food production but also in regional development, environmental protection and tourism. It is also an important player in rural development, as it provides an economic basis for the quality foundation of the cultural environment and creates opportunities in terms of employment and job creation.

The characteristics and properties of rural development and agriculture are interrelated and take the form of projects. Such projects can be, for example, ecological farming, landscape protection plans, the introduction of energy-efficient technologies or the development of tourist attractions.

The analysis of spatial environments adjacent to the border further strengthens the adaptive nature and connecting role of rural development. Examining the interrelationships of the processes between different social, economic and natural environments, it is possible to develop adaptive solutions and develop sustainable rural development strategies.

6. Summary

In addition to food production, energy conversion and use has also become an important element in rural development. Agricultural products, such as biomass, solar energy and wind energy, can be the energy carriers

of the countryside and thus contribute to making energy systems more sustainable.

Based on the results, it can be concluded that agricultural activity and rural development have an important role in terms of sustainable development and improving the quality of life. During the development and implementation of rural development strategies, agricultural activity and the actors of the rural economy can, in close cooperation, be able to achieve sustainable development, preserve jobs and create new jobs, as well as preserve and renew cultural and natural heritage.

The connecting role and adaptive nature of rural development are also extremely important when analyzing spatial environments adjacent to borders, where by examining the correlations of processes between different social, economic and natural environments, it is possible to develop adaptive solutions and sustainable rural development strategies.

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