INSTITUTE OF AGRICULTURAL ECONOMICS, BELGRADE, SERBIA

SUSTAINABLE AGRICULTURE AND RURAL DEVELOPMENT II

Thematic Proceeding

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PREFACE

The Thematic Proceeding is prepared as the result of the scientific research supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

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In the Thematic Proceeding are included articles from Serbia, along with the invited and other articles from abroad, prepared by foreign authors, which are IAE, Belgrade associates, and whose institutions have close scientific, professional and technical cooperation with the IAE, Belgrade.

The Thematic Proceeding addresses the wider audience by being scientifically and practically focused on all segments of sustainable agriculture and rural development.

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PLENARY SECTION

PLENARY SECTION

***First day*, 16th December 2021**

ORGANIZATIONAL STRUCTURAL CHANGES IN BULGARIAN AGRICULTURE: REGIONAL DIMENSIONS AND ASSESSMENTS

Albena Miteva,[1]*Ivan Kanchev*[2]

Abstract

In recent decades, there have been dynamic and significant changes in the number, average size and characteristics of agricultural holdings. The speed of change has increased since our country's accession to the EU. The purpose of the report is the analysis of the changes in the average sizes and characteristics of the agricultural holdings in the country by districts of the country.

The analysis and assessments are made on the basis of statistical data from the censuses of agricultural holdings in the country (2003, 2010, 2020) and expert assessment of the changes in the development and distribution of agricultural holdings by planning districts and regions in Bulgaria. 163 specialists in agrarian economics and regional development from all districts of Bulgaria participate in the expert assessment.

Key words: *agricultural holding, structural changes*

Introduction

After the accession of our country to the European Union there were significant changes in the number, size, organizational characteristics, specialization of Bulgarian farms related to the new environment and adaptation to the requirements of the Common Agricultural Policy of the European Union. The process of adaptation is related to the application of requirements aimed at bringing Bulgarian agriculture closer to the European model of agriculture. This has led to significant changes in the development of agriculture, which are identical to those in the former and other new member states, regardless of the year of their accession to the EU.

Studies of these processes in our country come to the conclusion that despite the general positive trend in the development of Bulgarian agriculture, the

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changes in product and production structures limit the added value (Ivanov and team, 2017), affect rural areas and do not use production potential of agriculture in many regions of Bulgaria (Stoyanova Harizanova-Bartos, 2019; Doitchinova et al., 2017; Doitchinova, Kanchev, 2020;) and slow down the transition to the desired model of agriculture (Doitchinova et al., 2019).

The purpose of the report is to analyze and assess the changes in the average sizes and characteristics of the agricultural holdings by districts in the country.

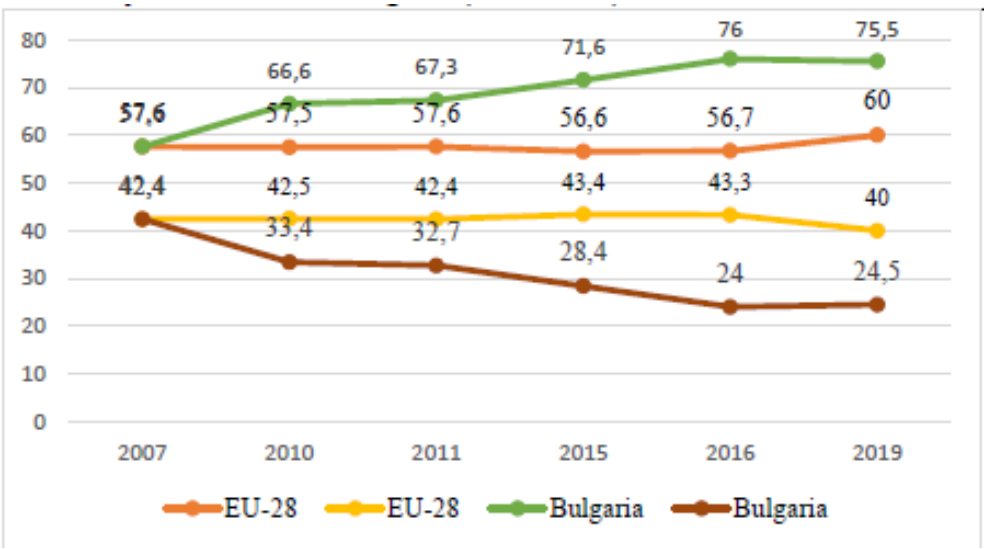
Methodological issues

The analysis and assessment of the processes in Bulgarian agriculture and their impacts on rural areas are carried out using data from the National Statistical Institute, the Ministry of Agriculture, Food and Forestry and expert assessment of specialists from regional directorates of Agriculture, municipal services and regional offices of National Agricultural Advisory Service. A five-point positive Likert scale was used to assess experts‘ opinions. The study involved 163 specialists from all regions of the country.

Changes in production structures

In the period of membership of our country in the EU, the importance of agriculture for the Bulgarian economy gradually decreases (from 8.5% in 2006 and 6.2% in 2007, reaching 3.8% of gross added value in 2019). . The value of production compared to 2007 increased by 33%. There are very big differences in the changes of plant and animal production. The first increases by over 80%, and the livestock with some fluctuations over the years - maintains its level. All these changes logically lead to a threefold increase in the factor income per annual work unit with a significant change in the ratio between crop production and animal husbandry. At the beginning of the period in 2007, the ratio between them was close to the formed average ratio of the EU-28 (Figure 1), namely about 58% for crop production and 42% for the EU-28 and Bulgaria. In 2019, if the relative share of crop production for the EU-28 increased by only 2% (reaching 60%), then for Bulgarian agriculture its share has increased by 75.5%.

Figure 1. Ratios between the values of crop production and animal husbandry in the EU and Bulgaria (2007-2019).



Source: Eurostat, 2021.

During the period under review, the most significant is the increase in the production of cereals and oilseeds, which in 2019 formed 51.1% of the final production. In some parts of the country, cereals and oilseeds use 90% or more of the used agricultural land, with all the resulting adverse effects on the environment, soils, employment and farmers' incomes. The most serious decline in the GVA of the agricultural sector is observed in vegetables, whose relative share decreased from almost 12% in 2007 to 4% in 2016 and 5.6% in 2019.

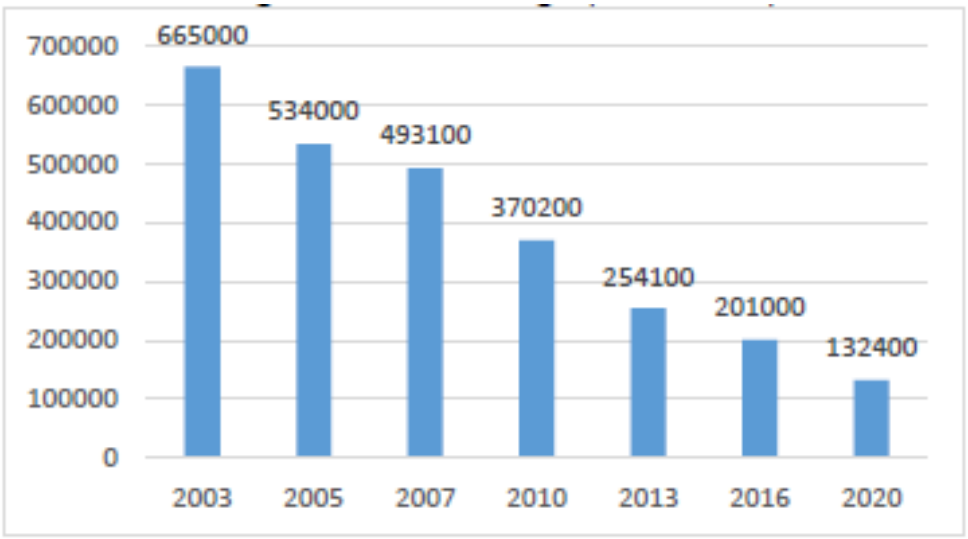
The changes in animal husbandry are also significant. For the whole period from 2007 to 2019 there is a decrease in the number of most species of animals. The most significant is the decrease in goats (more than 2 times), pigs (80.8%), sheep (19%), cattle (18%) and after a serious decline a gradual recovery to 1% in cows. Significant growth is observed only in the number of buffaloes (by 85%). A logical result is a reduction in the amount of produced milk and a reduction in its relative share to 7.4% of final production. The importance of other productions ranges from 4.4% for sheep and goat breeding to 2.1% for egg production and others. Along with the economic changes, such are also observed in the applied technologies. The stimulation of organic production has contributed to a 19-fold increase in the number of organic operators, which in 2019 reach 6,405. Of

these, 5,942 are agricultural producers, 237 processors of organic products and 226 traders. In practice, these are 7.3% of the registered farmers with 4.5% of the used agricultural land in the country. Changes are also observed in the use of pesticides, fungicides and insecticides. The information from 2016 compared to 2010 shows that these areas are increasing, as 70.5% of the used agricultural land is treated with pesticides.

Changes in organizational structures

Dynamic changes are found in the number of agricultural holdings. From 493133 in 2007, they decreased to 201014 in 2016 and to 132400 in 2020. This means a 3.7-fold reduction in the number and even more of those employed in them and of people with employment and income from agriculture. The data show a sharp decline in the number of agricultural holdings over the last two decades. According to preliminary data from the 2020 census compared to 2003, the number of farms has been reduced 5 times. Compared to the first year of our membership (2007) in 2020, 26.85% of the farms continue to operate. Most significant is the change in the group of the smallest farms with economic size up to 2 economic units. / Figure 2 /

Figure 2. Number of agricultural holdings (2003-2020).

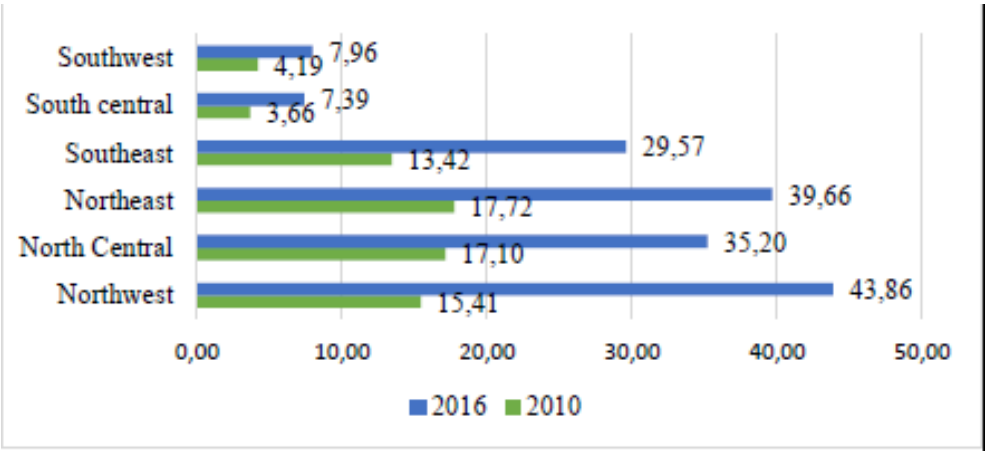


Source: MAFF, 2021

The changes in the number also led to serious changes in the average size of the used agricultural land in the country. In 2020, the UAA used by the agricultural holdings reaches 3 957 thousand ha and increases by 9% compared to 2010 and by 36% compared to 2003. For the period there is a significant increase in the average size of the UAA from one farm - from 4 ha in 2003 to 33 ha in 2020 or 8.25 times. According to this indicator, Bulgaria is ahead of many EU countries.

The information at NUT-2 level (Figure 3) presents the big differences in the changes by regions and their big dynamics. The highest dynamics and degree of concentration of production is observed in the North-West region (increase by 28.45 ha compared to 2010) and the lowest in the South-West and South-Central - by 3.73 ha and 3.77 ha, respectively. In practice, the agricultural holdings in the three northern regions have a significantly higher average size and a high relative share of land leased by commercial companies compared to the South-West and South-Central regions, where family farms predominate.

Figure 3. Changes in the average size of UAA on agricultural holdings (hectares).



Source: MZHG, 2018

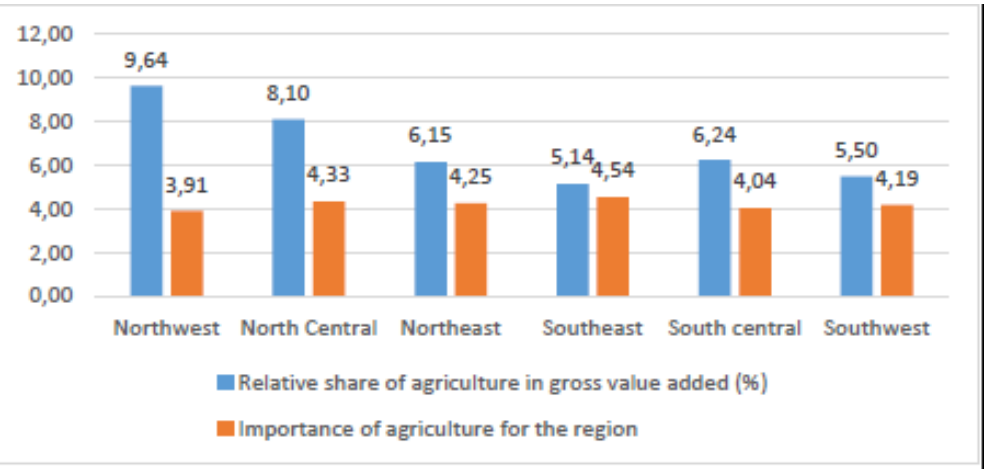
Despite the very high relative share of small farms in our country and the measures to stimulate their association in all implemented programs (SAPARD, RDP 2007-2013 and RDP 2014-2020), the process is slow and the achieved results are far below the planned calculations. Data from the Register of these organizations show that 66 organizations have been registered in four years, which is 7 times

more than in the previous period (2007-2013). Most active are the associations in the "Livestock" sector (273 farmers participate in 16 producer groups and 4 organizations of milk and dairy producers). Next are 148 producers in the meat and wool sector, included in 3 groups and 1 organization. The third position is in the fruit and vegetables sector. The gradual reduction of the requirements for registration of producer groups and organizations, on one hand, has become a prerequisite for dynamizing the process of their creation, but on the other hand - has led to a reduction of their potential market advantages.

Rural Agriculture Impact Assessment

Agriculture has different economic significance for the regions of the country. Highest is the relative share of agriculture in the gross added value of the North-West region (9.64%), followed by the North-Central region (8.10%). The least important is agriculture for the economy of the Southeast region (5.14%). Despite these differences, expert assessments are close in value. The formed estimates are of 4.54 (on a five-point scale) for the South-Eastern planning region, followed by 4.33 from the North-Central region, and the lowest is the assessment for the North-Western region - 3.91 (Figure 4).

Figure 4. Importance of agriculture for rural development

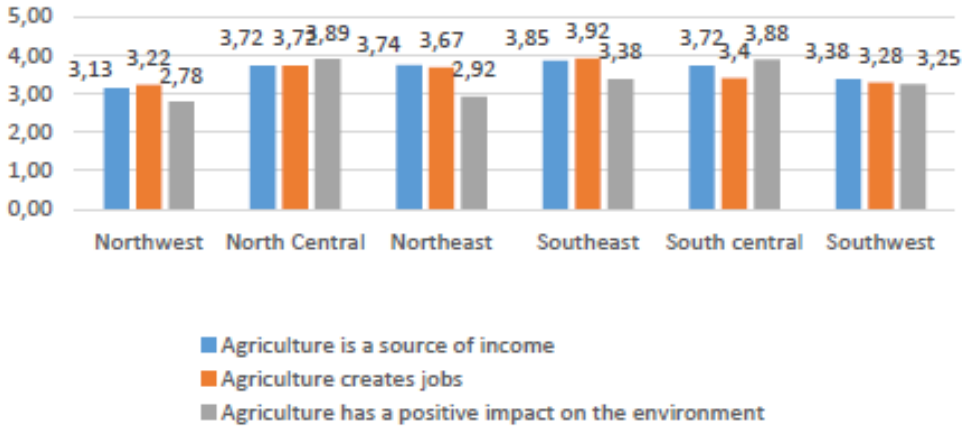


Source: Own study

The social role of agriculture as a source of income is rated highest in the South East (3.85) and lowest (3.13) in the Northwest region (Figure 5). In the same areas are the maximum and minimum estimates of the ability of

agriculture to create jobs - respectively 3.92 and 3.22. A logical explanation for these differences is the different production specialization of the two regions and the significantly higher distribution of livestock, vineyard and vegetable farms in the Southeast region. Experts estimate highest the positive impact of environmental agriculture in the North Central and South Central regions - 3.89 and 3.88, respectively. The lowest scores are in the Northwest (2.78) and Northeast regions (2.92).

Figure 5. Social and environmental role of agriculture in rural development



Source: Own study.

Regarding the production specialization, two statements were evaluated - (1) the specialization is suitable for the conditions in the region and (2) the conditions are more suitable for productions with higher income per unit of resource. In five of the regions, comparisons between responses showed that there was potential for improving production specialization. The largest differences in estimates are in the Northwest and Southeast regions. Only in the South Central region is the current production specialization identified as appropriate, albeit with a score of only 3.02 (Table 1).

In all areas, respondents confirmed the understanding that insufficient irrigated land and labor resources are the reason for the reduction of traditional cultures, and the estimates for irrigated areas are over 4, and the shortage of labor resources is highest in the Southeast region (4.95) and the Northwest (4.59) and the lowest in the Northeast (3.66).

Table 1. Assessment of the production specialization of the farms in the region.

Regions	Specialization of farms is suitable for the conditions in the region	The conditions are suitable for productions with a higher income per unit of resource	Insufficient irrigated areas are the reason for the reduction of some productions	The lack of labor resources is the reason for the reduction of traditional productions
Northwest	2,33	3,36	4,59	4,59
North-central	3,63	3,94	4,0	3,89
Northeast	3,32	3,33	4,28	3,66
Southeast	3,71	4,43	4,33	4,95
South-central	3,02	2,9	4,4	4,16
Southwest	3,2	3,65	4,27	3,78

Source: Own study.

The results of the expert evaluation show their positive attitude towards most of the ongoing changes. The growth of farms having direct sales has received higher marks in the southern regions of the country. These estimates are more than 0.5 higher than in the northern regions. The increase in organic producers has the highest score in the North Central and the lowest - in the Northwest region - only 1.82. At the same time, the number of farms applying for agri-environmental schemes is growing, according to experts in the South Central, North Central and South-East regions. The tendency to increase the distribution of farms that diversify their activity is rated the lowest. Estimates are above 3 only in the South Central and Southwest regions. In the three northern regions, the experts chose values between 2.09 (Northwest region) and 2.29 (Northeast region).

Table 2. Assessment of trends in the development of agricultural holdings

Regions	The number of farmswith direct sales is growing	The number of organic farms is growing	The number of holdings applying for agri-environmental schemes is growing	The number of farms that diversify their activities is growing
Northwest	3,0	1,82	1,95	2,09
North-central	3,0	3,31	3,42	2,22
Northeast	3,09	3,09	2,29	2,29
Southeast	3,73	3,04	3,34	2,84
South-central	3,72	3,0	3,69	3,5
Southwest	3,55	3,1	3,0	3,0

Source: Own study.

Conclusions

The analysis gives grounds for some main conclusions:

- Bulgarian agriculture is developing upwards. The changes in the product structure show an increase of productions with relatively lower added value.
- The strong reduction of irrigated areas, the significant decrease of the labor force in the rural areas, the market problems of the small producers and other organizational problems became the reasons for instability and contraction of a number of traditional productions.
- The rate of reduction of agricultural holdings continues to be very high - most often small family farms from the first three groups by economic size.
- Slowly and with great difficulty are the processes of association and creation of organizations and groups of producers.
- Despite the developed national measures and programs to support the so-called vulnerable sectors after 2010, it is difficult to restore production which has greater potential for creating added value, jobs and income from activities such as storage, processing and sales of products in rural areas.
- Supported directions of development of agricultural holdings to shorten supply chains and sales, greening of production and diversification have led to positive changes, but the processes are slow and still affect a limited number of farms.

These conclusions show the dynamic changes in the development of agricultural holdings and their impacts on rural areas and in general prove the transformations to the desired model of agriculture. Successive efforts are needed for the development of policies and programs by the Bulgarian state to increase the competitiveness of traditional products for Bulgarian agriculture and thus to create prerequisites for enlarfing the employment and entrepreneurship of more rural inhabitants.

Acknowledgements

The research leading to these results has received funding from the Bulgarian Science Fund - project "Sustainable multifunctional rural areas: rethinking agricultural models and systems with increased requirements and limited resources" (2017-2020).

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STUDY ON TOMATO CONSUMERS BEHAVIOR DURING THE COVID-19 HEALTH CRISIS - CASE STUDY ROMANIA

Ancuța Marin[1], Rozi Berevoianu[2], Steliana Rodino[3]

Abstract

With a strategic importance for agriculture and for European consumers, the vegetable sector, with around 1,000,000 horticultural farms in the EU, can generate many direct and indirect jobs in many regions of the continent. Romania ranks 3rd in the hierarchy of vegetable growing countries in Europe, producing 3.2% of the quantity of vegetables produced in the EU, on an area that represents 9% of the total EU's vegetable areas. According to statistical data, the average annual consumption of vegetables per capita in Romania is around 158.5 kg, of which 38.4 kg of tomatoes, which represents 24.22% of total vegetable consumption. This necessitated the granting of state financial aid to increase tomato production and extend the harvest period (for tomatoes produced in protected areas), so that imports cover only the winter months (December, January and February). The present study is focused on the drivers of the decision to purchase tomatoes and tomato products and the degree of satisfaction of buyers with tomatoes and canned tomatoes purchased. The study provides results on consumers criteria for selecting tomatoes (variety, taste, price, origin), and on the changes in their hierarchy during the COVID-19 health crisis.

Key words: *consumer behavior, vegetables, tomatoes, Covid -19, Romania*

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Introduction

The vegetable sector is a key sector for many EU Member States, especially in the Mediterranean region and in Northern and Eastern European countries. Vegetables are key agricultural products of the European Union (EU), with an annual production of over EUR 57 billion in 2018, of which about 60% is vegetables. The sector's production accounts for a quarter of the value of total EU crop production and 14% of total agricultural production, an increase of 30% in the last decade (Rosi, 2019).

The harmonization of the production seasonality is achieved through stocks. The storage period of the products is differentiated according to the species, the time of harvest and the conservation possibility. In the case of tomatoes, a vegetable with accentuated seasonal production flow, the consumers demand is permanent, being requested on the market all year round.

In Romania, vegetable production is obtained mainly in protected areas, due to specific climatic conditions, with frosts in spring or heavy rains or drought in summer. The harvest is generally obtained on small areas, family-type farms, in which the family's labor force is involved, and the harvest is commercialised along long supply chains through wholesale traders (Ecoruralis, 2020).

Under the conditions imposed by the new European strategic documents, and by the growing demand of consumers of healthy, nutritious and pesticide-free food, producers must orient their production techniques towards environmentally friendly technologies, while maintaining quality and ensuring that the harvest will withstand storage for a long time (Rodino et al., 2017; Samoggia et al. 2021). Moreover, logistics, packaging and marketing strategies need to be reshaped in order to survive in the marketplace. The marketing standards in force at European level for fruit and vegetables address consumer and producer expectations in terms of product quality and production and marketing conditions (European Parliament; OECD 2020).

Studying the preferences of consumers of tomatoes and canned tomatoes is very important, with the aim of identifying the consumption patterns and trends, drivers that trigger purchasing decision. The results help to design a proper producing and marketing strategy for farmers, aiming to reduce losses in the supply chain, supplying the market without syncope and, last but not least, increasing vegetable growers' incomes.

Material and working methods

The data was collected by quantitative survey and the investigation was performed by an opinion poll, in the form of a questionnaire-based survey. In order to identify the behavior of consumers of tomatoes and canned tomatoes, the research team applied, between June and September 2020, a questionnaire among 800 tomato consumers.

In order to establish the research objectives, hypotheses were formulated both based on the results of previous research and a previous documentary study on the demand analysis in longitudinal section (Marin et al., 2020; Marin et al. 2021).

The objectives and hypotheses of our research were:

- identification of the average frequency of consumption of tomatoes and canned tomatoes;
- identifying the average consumption of tomatoes and canned tomatoes;
- identifying the place of purchase of tomatoes and canned tomatoes;
- identification of consumer preferences regarding the origin of tomatoes and canned tomatoes: imported or domestic;
- ranking the criteria for choosing tomatoes and canned tomatoes: taste, origin and price;
- the influence of the health crisis on consumption habits.

The percentage quotas method was chosen as a sampling method. This method involves the representativeness of the sample related to the total researched community. The questionnaire included 19 closed questions and it was pre-tested on ten people, for collecting feedback on the coherence of the questions and thus improving understandability and the quality of the research. On average, each interview lasted ten minutes.

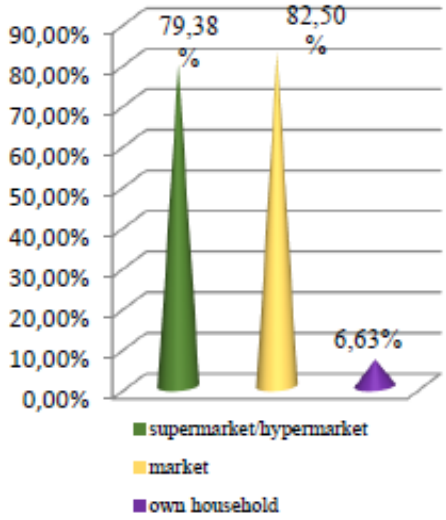
Results and discussions

The impact of the sanitary crisis on the tomato consumption in Romania was evaluated. More than half of the respondents were women, respectively 71%. Related to age, most of the interviewed were aged between 26-60 years (77.50%), which is natural, given that this age segment coincides with the active period of the citizens.

The sample includes all categories of professional status from student to retiree. 87.13% of the interviewed subjects are active people (employees and entrepreneurs), 90% of them having above average education. Tomatoes and canned tomatoes are purchased in proportion of 74% of people with a family income higher than 3,000 lei / month (617.70 euros, at an exchange rate of 4.8567 lei / euro), and the families are generally composed of 2-4 members (over 85% of those interviewed).

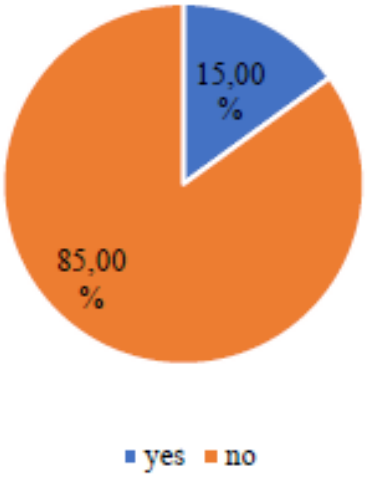
Of the total respondents, 96.25% frequently eat tomatoes, either for health reasons or because they appreciate their special taste, while 3.75% do not even occasionally consume tomatoes and canned tomato products. A significant part (81.25%) of those surveyed consume fresh tomatoes all year round, regardless of price or origin, while 18.75% consume these products only in season. A significant part (81.25%) of those surveyed consume fresh tomatoes all year round, regardless of price or origin, while 18.75% consume these products only in season.

Figure 1. Origin of tomatoes and tomato products consumed.



Source: data processed from the questionnaire

Figure 2. Fidelity regarding the supply of a certain producer.



Source: data processed from the questionnaire

As shown in Fig. 1, 660 people (82.50%) buy tomatoes and tomato products from the supermarket/hypermarket appreciating that in these locations there is a higher degree of product control, but 635 (79.38%) of subjects continue to go on the classic option - purchasing from the market. Only 53 people (6.63%) consume tomatoes and canned tomatoes produced in their own garden.

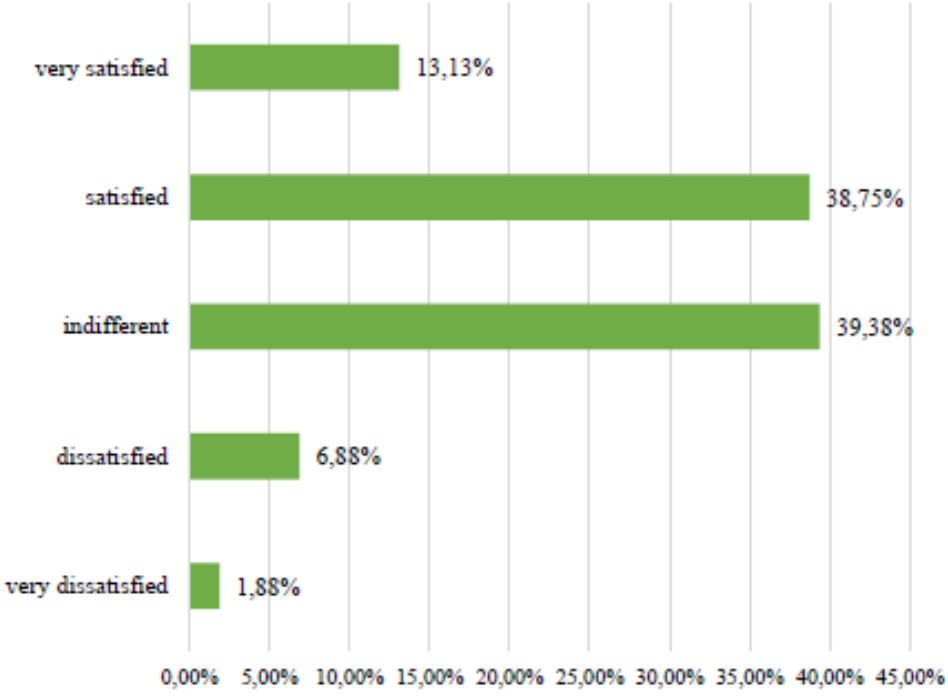
Those who constantly supply themselves with tomatoes and canned tomatoes did not form a habit of purchasing products from a specific producer (85% of those interviewed) – Fig. 2.

The degree of satisfaction regarding the tomatoes and canned tomatoes purchased is over 50%, consumers having their own selection criteria: variety, taste, price, origin (Fig. 3 and Fig. 4).

If in the previous year the most important criterion was the taste, this year this does not happen again. The main criterion in the purchase decision is the price, regardless of whether the tomatoes are bought from the market or from supermarkets/hypermarkets.

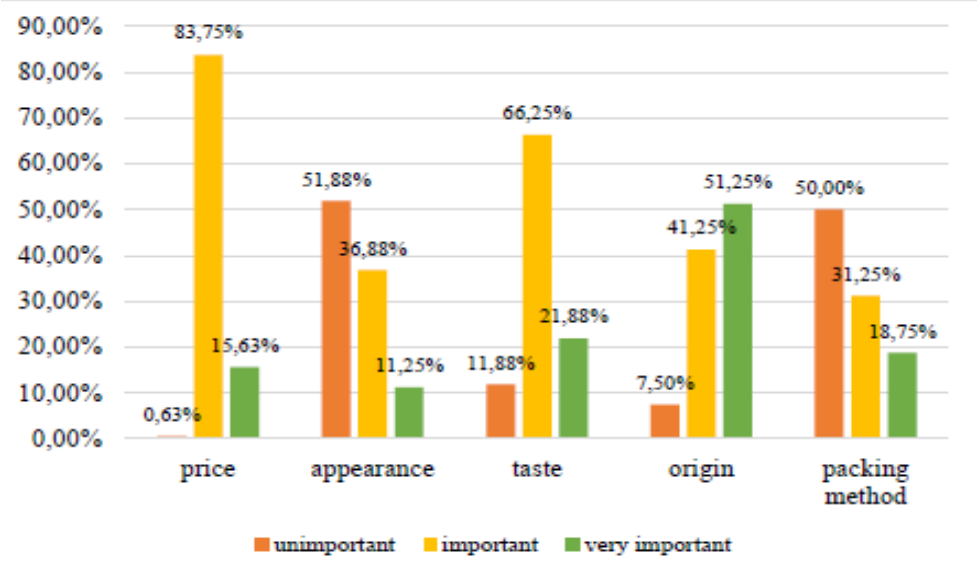
As shown in Fig. 5, a quarter of respondents consume tomatoes daily, while two-thirds of respondents (535 people) consume tomatoes 2-3 times a week.

Figure 3. Satisfaction with purchased tomatoes.



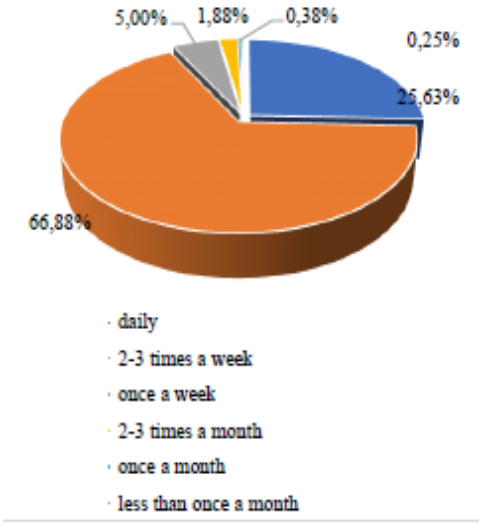
Source: data processed from the questionnaire

Figure 4. Criteria underlying the decision to purchase fresh tomatoes and tomato products.



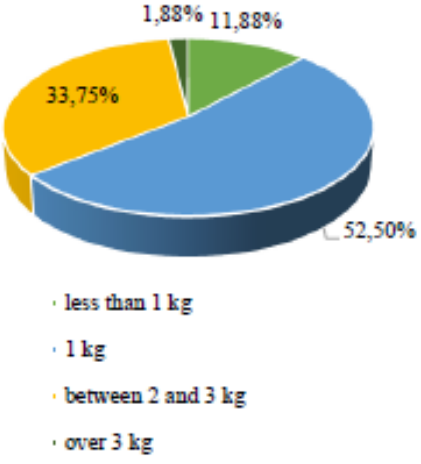
Source: data processed from the questionnaire.

Figure 5. Frequency of consumption of tomatoes.



Source: data processed from the questionnaire

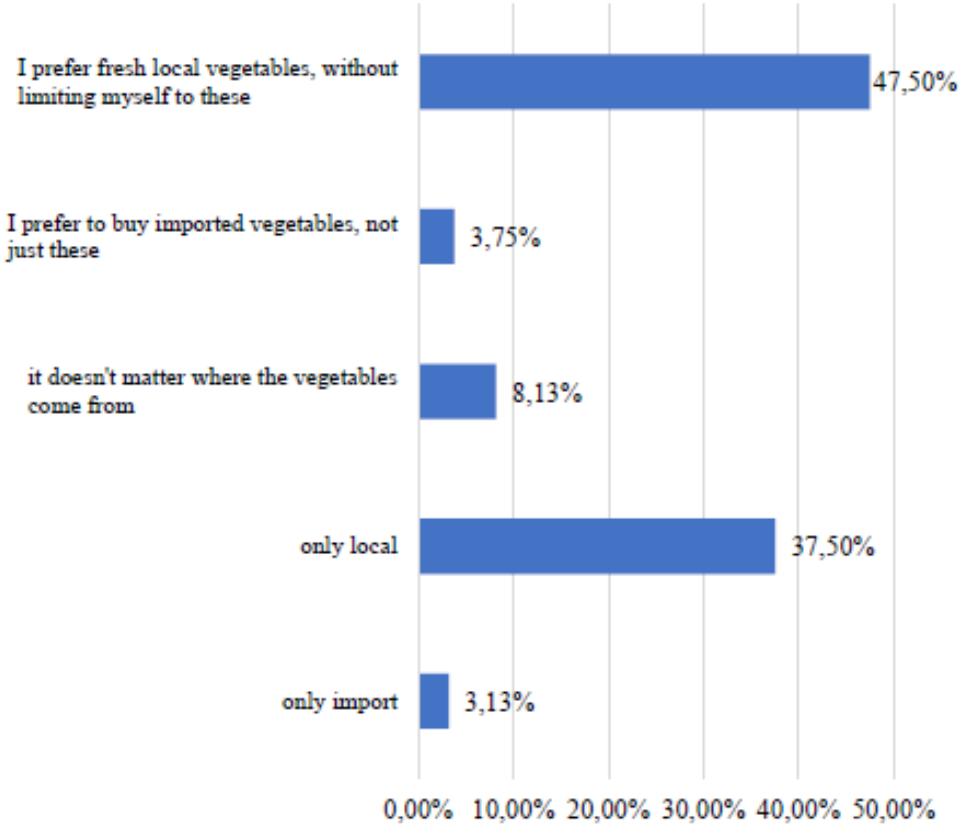
Figure 6. Quantities purchased on a purchase



Source: data processed from the questionnaire

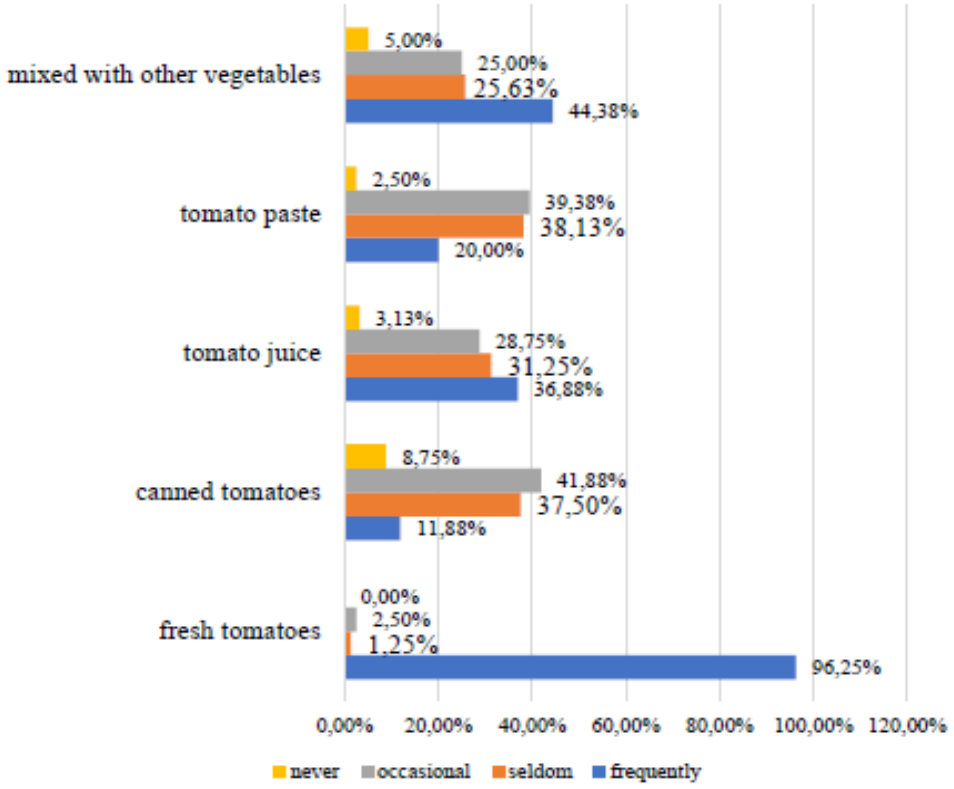
The frequency of consumption is also found in the quantities supplied, over 86% (690 people) of those surveyed buying between 1-3 kg per purchase (Chart 6). A share of 71.88% (575 people) are dissatisfied with the prices of tomatoes this year, considering that they are exaggerated. If in 2019, Romanians particularly appreciated the tomatoes of local origin (94% of those surveyed in 2019), in 2020 the situation is much changed. The share of those who prefer Romanian tomatoes, regardless of the price paid, decreased to 47%, practically half compared to the previous year. Despite all the problems raised by the health crisis, the economic crisis of 2020, Romanians prefer to buy tomatoes directly from producers in the market (usually) or from supermarkets / hypermarkets because it is safer, the products being more controlled (Fig. 7 and Fig. 8).

Figure 7. Preferences for the origin of tomatoes supplied



Source: data processed from the questionnaire.

Figure 8. Consumer preferences regarding the condition of tomatoes consumed.

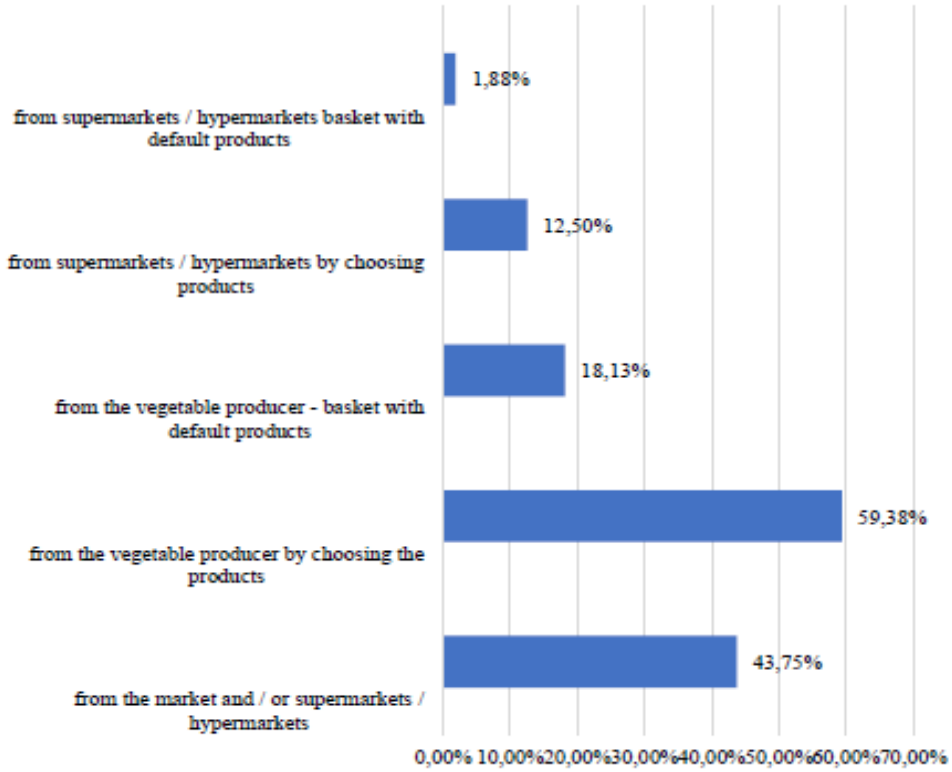


Source: data processed from the questionnaire.

Obviously more than half of the consumers surveyed (96%) prefer fresh tomatoes, 44% prefer to eat tomatoes mixed with other vegetables, 37% prefer tomato juice, and 39% use tomato for home made recipes.

In March 2020, the state of emergency was established on the Romanian territory. Thus, Military Ordinance no. 1 provided for the reduction of public catering activities, but allowed the direct delivery to the customer of agri-food products, which allowed major changes in the supply behavior of the population. Among the interviewed subjects, 475 people (60%) would order vegetables from the producer by choosing the products, 12.50% would order from the market, supermarket or hypermarket by choosing the products. Only 15 people (1.88%) would prefer to order a predefined basket of products at the supermarket/ hypermarket (Fig. 9).

Figure 9. Ways to order fresh vegetables.



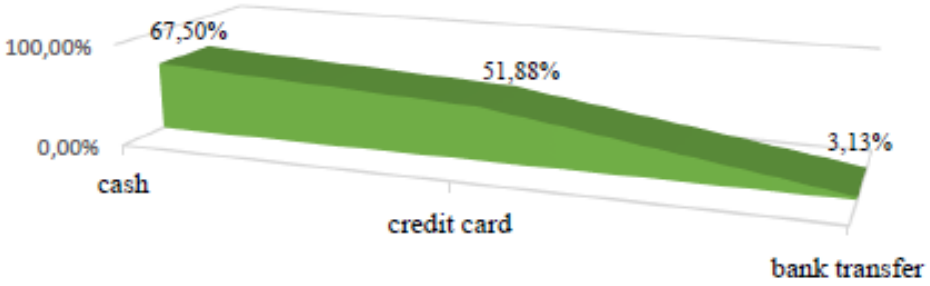
Source: data processed from the questionnaire

A share of 70% of those interviewed do not think about a subscription to buy vegetables, preferring to make a spontaneous decision based on needs.

The key issues created by the COVID-19 crisis are related to changes occurred in consumers behaviour and their modified consumption patterns. In the same time, the retail market is facing specific problems related to increased stock of fresh products and decreased sales due to restrictions on citizens movement. (Toderiță A. et al., 2020; Anastasiadis, F et al., 2021; Trentinaglia et al. 2021).

The change in consumption patterns has led to a change in payment methods. As can be seen from Chart 10, payment by bank card became increasingly important, with 52% (475 people) of respondents preferring this method, most (540 people) still preferring cash payment. Only 25 people opted for bank transfer with payment order.

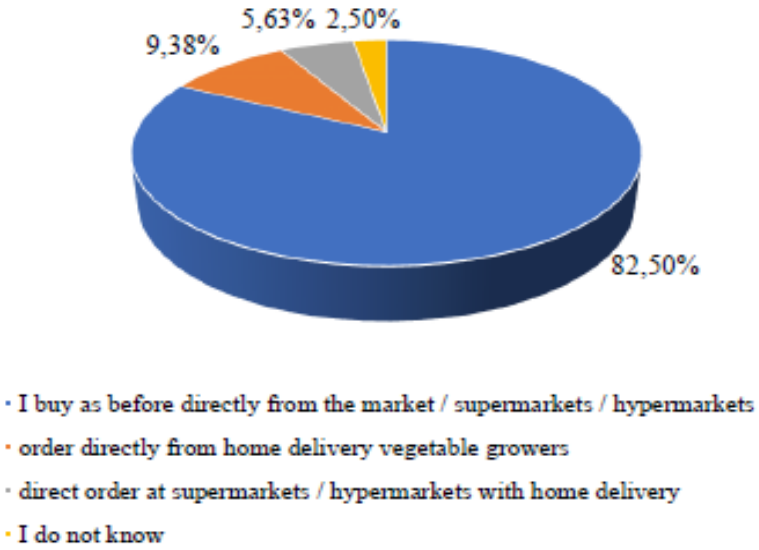
Figure 10. Payment methods.



Source: data processed from the questionnaire.

In terms of purchasing behavior, 82.5% buy the same as before the COVID-19 health crisis, directly from the market/supermarket /hypermarket. 15% of respondents (120 people) order directly from producers or supermarkets /hypermarkets. A number of 300 people (37.5%) of those surveyed categorically expressed their opinion that they will continue to order vegetables instead of direct purchase from the market/supermarket /hypermarket and after the end of the health crisis. A number of 155 people have categorically expressed that they prefer direct purchase, while 345 people are undecided (Chart 11).

Figure 11. Purchasing behavior during the COVID-19 health crisis.



Source: data processed from the questionnaire

Regarding the proposals made by consumers on increasing the consumption of tomatoes and tomato products, there are two suggestions: increasing the promotion of Romanian producers and supplying supermarkets/hypermarkets with Romanian products to a greater extent even if this involves a considerable logistical effort.

Conclusions

Tomato consumers are generally women, aged between 35-60 years, employees, with higher education and a family income of over 4,500 lei / month (3 people / family). Tomatoes are frequently consumed products, both fresh and canned. Most respondents (635/800) prefer the classic purchase option (directly from the market), buying between 1-3 kg per purchase.

If in previous years taste and origin were basic criteria in the purchase of tomatoes, the economic crisis caused by the health crisis Covid-19, brought the price in the first place, due to the decrease of buyers' incomes or other financial problems. The prices of tomatoes in supermarkets / hypermarkets are high, the imported tomatoes price being lower than the local ones.

The establishment of the state of emergency has brought about behavioral changes among both producers and consumers. The latter began to focus on direct orders to manufacturers (online, telephone / website), payment being made by bank card. The need for consumption / family, however, did not suffer, the quantities supplied being comparable to those of previous years.

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ASSESSMENT OF TOURISM INDUSTRY AND PROSPECTS FOR RURAL TOURISM DEVELOPMENT (USING THE EXAMPLE OF THE SELECTED COUNTRIES)

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Abstract

This article is a brief overview of the situation in the tourism industry in some countries of the world, global trends in the development of the industry, as well as some practical examples of successful practices, with a separate sample devoted to the policy in the field of rural tourism. The article examines global trends that determine the development of the tourism industry, with an emphasis on sustainable tourism as the most important global trend in the period of COVID-19. The place of rural tourism among the identified global trends in tourism development is determined. The research is based on abstract-logical, statistical and comparative methods using the analysis of official statistical information and expert opinions. Recommendations for the development of rural tourism in Russia are proposed.

Key words: *sustainable development, tourism industry, sustainable tourism, rural tourism, specially protected natural areas (SPNA).*

Introduction

Tourism in Russia is recognized as a promising industry with a potentially significant contribution to the economy, which is why it is necessary to know and take into account global trends when developing strategies and practical steps.

The Organization for Economic Cooperation and Development (OECD) regularly publishes an analytical document on current trends and existing policies for the development of the tourism industry in the OECD member countries and partners. The report, published in 2020, emphasizes in a special way the importance of the transition to more sustainable forms of tourism and corporate

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responsibility, as well as the importance of intersectoral and interregional/inter-ethnic cooperation in order to better adapt the industry to the rapidly changing situation in the world [1].

Tourism, based on the active participation of the maximum number of stakeholders and the aspects of sustainable development, in addition to the direct economic effect, can contribute to the comprehensive development of both urban and rural areas, promote social integration, with a competent approach – contribute to more effective work of specially protected natural areas (protected areas) [3].

However, such tasks are practically impossible with "classical mass tourism", which is why many countries of the world support and develop such areas of tourism as, for example, ecological, niche, rural, etc., which also meets the needs of today's modern tourists. Modern trends, conscious consumption, etc. force industry specialists to look for new approaches, compromise solutions and more sustainable forms of tourism, despite the fact that the share of mass tourism prevails. [3].

If you follow the path of development of the tourism industry in European countries and Russia, you can notice a significant number of similar stages, in particular, it is obvious for rural tourism. Lagging behind many Western European countries by about 20-25 years, the Russian Federation, nevertheless, is following a similar path of development, and besides, in the modern world it is impossible to be on the sidelines and not take into account global industry trends [4].

Methods of the research

The theoretical and methodological basis is the modern economy, scientific works of domestic and foreign scientists in the field of tourism development and rural tourism, in particular. The study was conducted on the basis of abstract-logical and comparative methods using the analysis of official statistical information.

Results

It can definitely be noted that in each country there is a department responsible for the development, promotion and management of tourism. In some countries, for example, Brazil, Greece, Mexico, the Philippines, there is a dedicated ministry of tourism. It is often found that tourism is subordinate to the Ministry of Economy or a similar department for trade and business.

Among such countries, Canada, Chile, the Baltic states, Denmark, Germany, USA and others should be noted. In Australia, France and Hungary, tourism is under the jurisdiction of the Ministry of Foreign Affairs, and in Austria, Iceland and Spain it is in conjunction with departments responsible for sustainable development, innovation or technology. For example, in Spain, a new Ministry of Energy, Tourism and Technology has recently started working, while in Austria a Federal Ministry of Sustainable Development and Tourism has been established. In some countries, tourism is associated with culture (Italy, Korea, Romania, the Russian Federation, Turkey and the United Kingdom) or transport (Ireland, Slovakia) and sports (Korea, Poland). Thus, there is no single scheme of industry-specific linking of tourism, each country has its own logic and justification of industry divisions at the state strategic level, but almost everywhere there are national tourism organizations (NTO), most often subordinate to the relevant department, and engaged in marketing and promotion of tourist products of different nature and level. In some cases, such NTOs also have a budget to support the development of the industry.

The complex nature of tourism requires the same integrated approach for the most effective development of the industry, therefore, in many countries there is a practice of interdepartmental commissions and working groups dealing with tourism issues.

The need for such an approach was confirmed at the OECD High-level Meeting on Tourism and Security in 2017, at which the countries signed a Statement on a Tourism Policy based on the Principles of Sustainability and Versatility. The Statement emphasizes the importance of tourism as an engine of comprehensive sustainable economic growth, based on clearer coordination and cooperation of different departments and stakeholders [3].

At the same time, it is important to coordinate both “horizontal” – interdepartmental, and “vertical” - between central and local authorities..

Let’s look at examples of coordinating organizations for tourism.

Denmark has a National Tourism Forum, which is headed by the Ministry of Industry, Business and Finance and includes the Chairman of VisitDenmark, two members from the regions of Denmark, one member from the local Government of Denmark, two members representing the tourism industry, and a representative of the scientific sector responsible for research activities in tourism.

In Finland, the interdepartmental working group on tourism meets several times a year. In 2016, a group for cooperation in the field of tourism was established, which included 35 industry leaders representing various tourism sectors.

In France, the Interdepartmental Committee on Tourism was established in 2016 and regularly holds meetings under the leadership of the Prime Minister with specific agendas planned in advance. This approach allows you to mobilize various departments around priority projects.

In the USA, the Advisory Council on Tourism and Travel includes up to 32 representatives of the business sector, whose task is to convey the political demands of industry professionals to the Minister for Commercial Activities. The Council for Tourism Policy is an interdepartmental organization, the creation of which is enshrined in law.

The Council ensures that the interests of the country in the field of tourism are respected when making federal decisions, coordinates national policies and programs of federal agencies that affect tourism issues.

Many countries practice the creation of Tourism Management Organizations "in specific territories" (Destination Management Organization – DMO), which operate at the level of regions and municipalities, ensuring maximum involvement of all industry participants, as well as ensuring the exchange of experience and best practices between territories. The law on the creation of such DMOS was recently adopted in Romania, in many Western European countries such organizations have been operating for more than one year.

The most important task in the development of tourism is to support initiatives coming from "below", guaranteeing the right to vote to regions and municipalities in the development of national policies and programs in the field of tourism. Most countries include regional representatives in national tourism coordination structures. There are frequent cases when non-tourist organizations can provide coordination and support in the field of tourism – for example, in Sweden, the Association of Local Authorities and Regions (SALAR) is increasingly interacting with the tourism industry and supports the work of its members through thematic networks and conferences.

Consider the financing of the industry.

In general, the largest part of the tourism budget is usually spent on marketing and promotion, including on the activities of NTO, as well as on the support of the business sector. In some countries, large sums are allocated for projects and programs aimed at improving infrastructure and developing tourism products in regions with weak infrastructure, but with the potential for tourism development.

In most countries, a significant share of tourism financing comes from the budgets of the central Government. The structural funds of the European Union are also an important source of financing in the respective countries. Other sources include funds from taxes and fees for accommodation, air travel, and the use of other resources. Businesses can also make contributions for the services provided. These may be mandatory contributions from travel service providers, income from the use of state brands related to tourism, fines imposed on travel service providers for offenses [3].

Consider the support of the tourism business and investment attraction schemes

Australia: Tourism Australia (State Tourism Committee) and Austrade (Trade and Investment Commission) have developed a comprehensive program in partnership: A specialized Project Support Department helps authors of selected projects at the stages of finalizing and approving project plans and documentation, as well as provides information support in finding and receiving investments. An investment specialist works with territories whose development is strategically important. The program for the development of tourism infrastructure, based on the principle of priority of demand, finances projects that are consistent with the strategic goals of state and regional policy.

In Austria, the Austrian Tourism Development Bank provides profitable loans and encourages new business projects. The country has a targeted subsidy program that supports landmark innovative tourism projects; twice a year the prize for innovation in tourism is awarded. There are other initiatives that stimulate investment in the tourism business, for example, the online crowdfunding platform "we4tourism".

In Italy, there is a system of tax benefits "Art Bonus Decree", which was refinanced in the amount of 460 million euros until 2020, with special attention to projects for the reconstruction and modernization of tourist facilities.

In Peru, the Turismo Emprende (Entrepreneurship in Tourism) program provides grants for the development and expansion of existing tourism business companies, as well as for the creation of new tourist enterprises whose activities are based on the principles of careful use of resources, preservation of historical and cultural heritage, as well as sustainable development. The "Single Window of Tourism" is an initiative that uses modern technologies to streamline administrative procedures related to investments in tourism.

Tourism industry development strategies and practical activities.

Most countries have development strategies for 5 or 10 years, which are regularly reviewed and adjusted. Among the issues that receive attention in most countries, the following can be listed:

- support healthy competition, while understanding the importance of sustainable development of the sector;
- improving the quality of infrastructure and service provision;
- strengthening the country's position at the international level with the promotion of unique tourist offers;
- improvement of the investment climate, development and support of innovations;
- solving the problem of seasonality in tourism;
- expansion of the geography of tourist destinations, development of potential destinations and regions;
- solving the problems of shortage of professional personnel, vocational education;
- entering new markets and studying customer demand and behavior;
- solving problems of transport accessibility and infrastructure;
- professional work on the study of the tourism sector and a comprehensive analysis of the current state and prospects.

Let's consider three groups of global trends affecting the development of the tourism sector.

Social:

- the growth of the middle class in different countries, especially in emerging economies;
- the aging of the population and, as a result, an increase in the percentage of older travelers;
- Millennials and Z generation are future travelers, it is important to take into account the peculiarities of these generations: the importance of the Internet, the influence of social networks, travel is one of the priority values;
- affordable tourism - for people with different physical abilities;
- groups of travelers, including representatives of different generations;
- sharing economy.

Technological:

- the continued rapid growth of technology, automation of processes, including the robotization of some professions;
- virtual and augmented reality, artificial intelligence, online platforms supporting the sharing economy;
- specialized different mobile applications for travelers.

Economic and environmental:

- Tourism is one of the fastest growing economic sectors;
- awareness of the negative consequences of the rapid and uncontrolled growth of the tourist flow, the transition to sustainable tourism, including a more gentle and efficient use of resources, more effective management models;
- transition from "mass" tourism to more personalized models of travel organization;

- sustainable development of territories: tourism is not only a business, but also a tool for increasing the sustainability of territories, improving the quality of life of the local population through tourism, uniting local communities, creating jobs - in general, increasing the importance of the social component;
- climate change;
- reducing the bureaucratic burden on small businesses in tourism;
- new approaches: from the classical housekeeper to the closed-loop economy and search
- balanced management decisions that ensure the sustainable development of the territory;
- attention to security issues in popular tourist areas.

These global trends in the development of the industry will require new strategies, new approaches, new specialists (for example, on sustainable development, IT in tourism, etc.) - both at the strategic management level and "on the ground", in particular, with comprehensive knowledge and the ability to see global changes and prospects [1].

In practice, these global trends are already forming new challenges within the industry

For example, online platforms, which currently occupy a leading position in the market of information services for tourist accommodation, as well as additional tourist services, are generally welcomed in many countries, as they have allowed people to start their own small business and reduce the shortage of accommodation facilities. However, the rapid large-scale development of this direction requires competent regulation of this type of services, contributing to further development, but at the same time stimulating quality and safety for both locals and tourists. If you do not see such a trend, do not immerse yourself in the situation professionally and do not take measures for timely support and regulation of the situation– it is likely to get a negative effect.

The lack of qualified personnel in the tourism sector, including in the hospitality sector, has been identified as one of the main problems of the tourism industry in many countries. And the issue of qualified personnel without due attention to this trend will only increase [1]. To solve the problem today, or-

ganizations responsible for the development of the sector develop and implement programs and specific activities, including, for example:

- development of modern training programs subsidized by the state;
- analytical research of the tourism market in order to identify the main directions of development and advance training of personnel, for example, IT specialists, specialists in sustainable tourism, etc.;
- encouraging employers to train staff;
- revision and improvement of the structure of tourist qualifications, certification and accreditation system of professional personnel;
- increasing interest in a career in the tourism industry through a career guidance system, the development of specialized educational programs;
- cooperation with higher and secondary specialized educational institutions on personnel training programs and a number of other activities and projects.

General trends of modern tourism policy in European countries.

Cultural heritage and nature are at the center of the tourist attraction of the territory, so the preservation and support of these two resources are an extremely important task of tourism policy.

As the experience of many countries shows, domestic tourism often makes a greater contribution to the economy than inbound or outbound tourism. In addition, domestic tourism, with the availability of high-quality infrastructure, allows reducing the environmental burden on the most popular tourist territories of other countries, diversifying the sector, expanding geography and contributing to the development of territories, including reducing dependence on international markets, thereby becoming part of the social tourism policy [5].

For example, tourism in protected areas is one of the priority areas that many countries are actively developing. At the same time, it is important to develop high-quality infrastructure for eco-travel: trails for walks of different lengths and for tourists with different levels of physical fitness, bike trails, networks of cycling and hiking trails are popular among tourists and serve as a basic element around which other infrastructure elements are built for a full active recreation, it is he who is popularized in most countries. In particular, natural

or ecotourism has also successfully established itself as a tool for sustainable development in rural areas, in connection with which it receives considerable attention and strategic support [5]. UNWTO called 2020 the year of rural and ecological tourism.

European countries are also very actively developing rural tourism, which makes it possible to develop domestic tourism and create interest around the unique life in the countryside, and also serves as a tool for sustainable development of territories. Currently, rural tourism is developing in most countries of the world, which is also facilitated by modern tourist requests [4].

Alternative unusual routes, thematic tours based on the cultural, historical and natural landscape features of specific territories that were not previously considered popular, contribute to the emergence of new unique tourist offers, increase the tourist season, and give a chance for the sustainable development of such territories.

Event tourism, which includes all types and scales of events – large and local gastronomic, musical, folklore, craft festivals, sports events, environmental actions, business forums – is another type of tourism that continues to be popular.

Sustainable tourism is one of the most important global trends.

The directions for the development of sustainable tourism and the practice of managing this development are applicable to all types of tourism in all types of tourist destinations, including various segments of tourism, including classical mass tourism [2].

Sustainability in this case is understood broadly – it is the sustainable use of available resources, especially natural landscape, as well as the sustainable development of territories, implying the ability of the territory to exist as independently as possible.

The development of sustainable tourism requires both the informed participation of all relevant stakeholders and strong political leadership to expand the circle of participants and reach agreement.

Ensuring the sustainable development of tourism is an ongoing process and requires constant monitoring of its impacts to take preventive and/or corrective measures whenever necessary.

Sustainable tourism should also maintain a high level of tourist satisfaction and ensure that they gain significant experience by increasing understanding of sustainability issues and promoting sustainable tourism methods.

Most countries are aware of the need to switch to sustainable tourism, for which they carry out a number of activities. For example:

- raising awareness of sustainability in general in the tourism industry among professional communities;
- maximum popularization of ecological sustainable tourism;
- certification and support schemes for companies implementing new approaches to work with special attention to sustainability and environmental friendliness;
- development of the domestic tourism market and promotion of short-distance travel;
- the use of financial instruments to support "green energy" – the most careful forms of use of natural resources of the area.

The World Tourism Organization (UNWTO) has formulated the following twelve priority goals for sustainable tourism development [2]:

1. *Economic viability* - to guarantee the viability and competitiveness of tourist destinations and enterprises so that they are able to continue their prosperity and ensure their benefits in the long term.
2. *Local prosperity* - to maximize the contribution of tourism to the prosperity of destinations, including maintaining the proportions of the tourist load on the region.
3. *Quality of employment* - to increase the number and quality of local jobs created and supported by tourism, including the level of wages, conditions of service and accessibility to all without discrimination on gender, race, disability or other reasons.
4. *Social justice* - to achieve widespread dissemination of the principle of distribution of economic and social benefits from tourism throughout the host community, including improving opportunities, income and services available to the poor.

5. *Affordable tourism* - to provide safe and comfortable tourism for all visitors regardless of gender, race, physical abilities, etc.

6. *Local controls* - involve local communities in planning and empower them to make decisions on the management and future development of tourism in the region (after consultation with other stakeholders).

7. *Welfare of society* - to maintain and improve the quality of life in local communities, including social structures and access to resources, amenities and life support systems, avoiding any form of social degradation or exploitation.

8. *Cultural wealth* - to respect and enhance the historical heritage, authentic culture, traditions and peculiarities of host communities.

9. *Physical integrity* - to preserve and improve both urban and natural landscapes, to prevent their visual or physical destruction.

10. *Biological diversity* - to support the conservation of natural areas, habitats and wildlife and to minimize the damage caused to them.

11. *Resource efficiency* - to minimize the use of insufficient and non-renewable resources in the development of tourism and tourism activities.

12. *Ecological cleanliness* - to minimize waste production and pollution of air, water and land by tourist enterprises and visitors.

These goals make it possible to formulate the problem and the subject of research and development, to take the necessary measures for the sustainable development of tourism. They also allow us to maintain a high level of satisfaction of tourists and their awareness of sustainability issues. The Goals are a confirmation that the main objective of sustainable tourism is to achieve a balance between the host, the tourist and the environment. However, finding a balance in order to protect and conserve resources, taking into account the needs of all participants (current and future) is a complex task.

Policy in the field of rural tourism in Europe

Rural tourism is not only one of the most famous and integral segments of the tourism industry, the peculiarities of its organization and the integration of various types of activities determine a special role in achieving sustainable development, primarily rural areas and tourism.

Therefore, the complexity of the phenomenon of rural tourism requires a systematic approach to regulation and management based on the principles of sustainable development [6].

According to Klaus Ehrlich, Secretary General of the European Federation for Rural Tourism EuroGites, in general, there are two approaches to policy in the field of rural tourism in Europe [7]:

1) There are specific decrees and regulations for "rural tourism" (sometimes only for farming or agrotourism, which represent about 20% of the "branch" of rural tourism) separately from the general legislation in the field of tourism. For example, this approach is common in the south of Europe, for example, in Spain (17 different documents), Italy (for agrotourism), Greece (adopted recently);

2) In most EU countries there is no specific legal framework for rural tourism.

"Rural tourism" is a term that is used, rather, for the purposes of advertising and promotion, but from the legal side, entrepreneurs in the field of rural tourism work in the same way as all other enterprises in the tourism business sector. This approach is used by the United Kingdom, Scandinavia, Germany, Austria, etc. However, in these countries, some specially developed additional criteria for services that can be conditionally called "services in the field of rural tourism" may work, but most often these criteria relate to issues of promotion and advertising [4].

Possible support can be provided through various departments and ministries, depending on the specifics of each individual country, and may include the promotion of tourism facilities in the sector, sometimes with small financial resources to support projects in rural areas. Most often, financial resources will be allocated through ministries responsible for the development of rural areas. As a rule, in the EU, these are ministries of agriculture responsible for Rural Development Funds (EARDF). In addition, ministries in charge of labor and vocational education, culture (heritage), environment (natural, national parks, etc.), and economic development in general may be involved.

The overall assessment of the effectiveness of rural tourism is positive: it is recognized that tourism in rural areas has a relatively high positive economic effect, however, detailed separate statistics on rural tourism are not always presented due to various circumstances, in particular the fact that rural tourism includes hundreds of additional services and types of business, which according to some estimates can be considered "indirectly" related to tourism.

There is no single definition of the term "rural tourism" in the European Space due to the fact that political, economic, social, cultural and historical contexts vary greatly, often even within the borders of one country, and there is also no generally accepted concept of "rural territory". Nevertheless, there is a general notion that "rural tourism" is tourism in a rural area (plus some concretizing nuances that differ in different countries), as well as some parameters that actually define "rural territory". Somewhere, this is determined in quantitative terms (for example, depending on the population of the municipality), or in qualitative terms (features of a particular space) [7]. For example, in some countries, such as Luxembourg, most of the territories are "rural", except for the capital; in the UK, the countryside is associated with the landscape and the number of inhabitants; in Italy, the rural term is associated with the occupation of the population by agriculture, and so on.

Let's look at some programs to support the development of rural areas and rural tourism in the EU.

First of all, it is worth mentioning the EU Common Agricultural Policy (CAP), adopted in 1962 and funded by the EU, which is based on a partnership between agriculture and society, as well as between Europe and its farmers.

European Fund for Agriculture and Rural Development (EAFRD) - The main focus of the EAFRD is on the agricultural sector, projects offering innovative agroecological and climatic methods.

The LEADER Program is an initiative of the European Union to support projects aimed at rural development initiated at the local level.

Many countries have used the funds of the LEADER program allocated on a competitive basis, making powerful progress in the development of rural areas. One of the most important results of the program is a stable network of local initiative groups that continue to develop their territories over time, becoming the core of local communities.

Conclusion

Tourism is to a large extent work on the ground, therefore, when adopting any regulatory documents by central authorities, it is extremely important to understand the situation in the regions, to strive to give maximum powers to local authorities. This point is of particular key importance when developing

a strategy and developing rural tourism. There are a number of strong experts in this field in the country, and their experience and opinion are extremely important to take into account for the successful development of the industry.

1. *Partnership and coordination*. The most important success factor on the way to the development of rural tourism in Russia is partnership and coordination of the activities of all stakeholders (government and local authorities, business community, research institutes + experts, public organizations and activists).

2. *Quality and cooperation = initiative groups = sustainable development*. Rural settlements where communities (voluntary associations of residents, initiative groups of residents-businesses-authorities) purposefully work to improve the entire settlement as a whole, and not just individual estates - should be encouraged, perhaps financially. One of the options is a state support program and/or a competition implemented by a specialized NGO.

3. Competent analysis of the rural tourism market, qualitative research of the industry, study of the experience of rural tourism development in the countries of the world and understanding of global trends in the industry is an effective strategy that allows you to effectively use time and money.

Regular real statistical data and high-quality marketing research of the sector is an obligatory element of development, which allows identifying trends, clearly understanding the situation, and, as a result, setting a competent vector of strategic development, consciously managing both the development of the sector and consumer behavior.

In rural tourism, the complexity and inseparability of this sphere from such spheres as transport, environment, security, education, culture, agriculture, modern digital technologies and broader economic policy at all levels is important.

4. Sustainable development is the main global trend and the defining framework for the development of all sectors of the economy, especially tourism. In this regard, it is necessary to take into account one of the key benchmarks in the transition to sustainable tourism – Sustainable Development Goals / sustainable Development Goals, including in terms of the tourism industry. In this regard, it is important to encourage the development of sustainable forms of tourism at all levels, especially those projects that involve effective and careful treatment of natural and cultural resources.

Rural tourism is a driving force for the development of territories, a tool for creating jobs, new opportunities for small and medium-sized rural businesses.

5. It is important to understand the threats from the development of tourism in a timely manner at the stage of strategic planning (which is greatly helped by studying the experience of some countries and territories of the world) and to take preventive measures to reduce negative effects (mass tourism, a huge amount of garbage, environmental degradation, price increases, etc.), maximizing the positive potential.

6. *Quality is more important than quantity* – this is a general global trend that should already be taken into account when developing the sector, especially rural tourism. This also applies to such a topic as the classification of accommodation facilities. It should take into account the peculiarities of rural accommodation facilities, but nevertheless encourage owners to improve the quality level, stimulate the development and improvement of the territory as a whole.

7. Competent professional marketing and branding of territories, a high-quality tourist product that meets international standards and requirements is the basis of a cost-effective strategy.

8. Special attention should be paid to the training of industry professionals and the involvement of industry experts with practical experience.

9. The creation of a public organization specializing in the development of rural tourism (by analogy with the Belarusian NGO "Rest in the Village") with targeted financial support, bringing together strong practical industry experts, can become an effective tool for the development of rural tourism in the country, be a link between the authorities and industry practitioners, be responsible for the strategy, event plans, organization and conduct of major events, interaction with relevant associations and European organizations.

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PERSPECTIVES ON CAPITALIZATION THE RURAL COMMUNITIES' POTENTIALS IN ROMANIA AND IN SOME EUROPEAN COUNTRIES: CHALLENGES, CONSTRAINS AND SYNERGIES

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Abstract*:*

In contemporary economies, rural communities represent a major and highly important component from multiple perspectives, but insufficient capitalized and valorized. In this context rural communities face numerous challenges and constrain dealing with a major lack of perspectives, being in the same time suppliers of raw materials, cultural services, food and labor for the economy. The main aim of this research is to present and analyze the current status of the rural communities in Romania and some former communist countries from the European Union framework approach and identify the challenges, constrains and possible synergies which may occur. It were chooses for analysis some of the post-communist countries. The main results may represent a further step in understanding the challenges, constrains and synergies developed in the rural communities and rural areas in Romania, compared to other post-communist, form the perspective of the European agricultural paradigm.

Key words: *rural communities, sustainable development, productivity, synergy, territorial perspective.*

Introduction

The rural communities represent an essential component of the Romanian rural economy, still insufficiently capitalized from the perspective of generating gross value added and latent potentials, much diversified but still gravitating around the agricultural activities. Thus, the accentuated depopulation of rural communities,

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migration, limited access to certain specialized services, including health, low levels of household income, but also low employment rates are just some of the most actual challenges facing rural communities and rural development in Romania. Nevertheless, as it is argued in some recent European documents (European Commission, 2021), the depthening of negative demographic phenomena in rural areas, coupled with the lack of connectivity or the limited access to the communication network, doubled be a precarious infrastructure and the challenges implied by the reduction of the productivity level constitute factors that may contribute even more to diminishing or even reducing the attractivity of the rural areas as inhabited places or employment providers.

The analysis of the potential of the rural communities in Romania has often constituted a major topic of interest in literature (Lupancescu, 2021; Petrescu-Mag et al, 2021; Pavel and Moldovan, 2019; Ionescu et al, 2019; Galluzzo, 2018), taking into account the necessity of valuing the considerable potential of the rural communities and areas within the emergent economies, as in the case of Romania, that are still insufficiently exploited and emphasized. Understanding the challenges, constraints and synergies of the Romanian rural communities and rural space will contribute in a more profoundly analysis of the role of the workplaces, security, environmental life and new possibilities of spatial, economic and social revitalization that the rural areas may have within a type of economy like that in Romania.

A superior capitalization of the rural communities 'potentials in Romania implies designing an inclusive approach and a global and renewed territorial perspective focused on sustainable development and financing policies. From this perspective, the capitalization and development of the Romanian rural communities' potentials implies not only the achievement of a complementarity between rural and urban areas but also a better integration of potentials and policies to achieve competitive levels of social and economic cohesion and ecological sustainability of all these territories.

The global economic transformations, the social changes, beside the numerous challenges related to the translation of the rural paradigm impose redefining the place, role and impact that the rural areas and economies have within the global economies. Therefore, as there is presented in (De Toni et al, 2021), the different level of the progress degree in achieving the rural development is based on the local barriers and determining factors, considering the premise argument in literature (Olsen and & McCormick, 218, Brayden, 2019), that the rural policy itself started at the level of the European Union as a territorial cohesion policy and not as a component part of the Common Agricultural Policy.

Globalization, gradual urbanization, internal migration, demographic aging are just a part of the issues that the rural areas and communities confront with and which they have to find solutions for. In this context, as (Konecny, 2019) states that "the neo-endogenous approach of rural development has become a pan-European one and has to be internalized by the European political decision factors beginning with the year 2004, after the expansion, in the first wave, of the European Union, with ten former communist countries".

At the European Union level, as (Adamowicz and Zwolinska-Ligaj, 2018) also notice, the rural areas are subject to a constant change, both of the paradigms and of rethinking of the character and functions exercised by these. From this perspective, diminishing the agricultural function in the rural areas leads to a de-agrarization phenomenon, but also to the appearance of a new function of consumption, production or diversification of the non-agricultural activities and services. At the same time, there is a noticeable fact that the rural area in general does not define a united space, not only at European level, but also at a national level, as (Perlin et al, 2010) also emphasizes. On the other hand, as (Cowie et al., 2020) points out, within the process of development and application of digitalization also appear and are created new socio-technical systems that can marginalize even more the importance of the rural areas.

If in the case of a classical, traditional meaning, the rural areas and communities were recognized from the determining perspective of the valorization of the agricultural potential, starting from the role of the determinant economic branch of agriculture, their role has diversified, exceeding the area of natural resources and natural landscapes management, getting an aspect of multi-functionality. Though we assist at an under- appreciation of the role and importance of the rural areas and to an insufficient rewarding of these, the rural areas can change into development opportunities and economic growth poles as they gradually manage to adapt to the new development exigencies. Thus, the role of the rural areas cannot be limited to just the capitalization at a large scale of the food production, but also as spaces of manifestation of traditions and culture, becoming, in a lot larger context, active actors in promoting and internalizing the green transition and the digital one.

Considering the evolution and the recent changes of the rural areas on the one hand - and the new opportunities generated by digitalization, resilient development, renewable energy, the green and digital transition on the other hand, there is imposed that the superior valorization of the potential needs the application

of some integrated territorial strategies, aiming at making the rural areas more attractive from the social and economic point of view.

The present manuscript is structured into three complementary parts; the first part is analyzing the rural constrains and synergies in European Union, the second part is making a transfer from general to particular by presenting the dimension of the rural communities in Romania and some EU-MS taking into consideration the socio-demo-economic dimension of the rural areas, (Gross Domestic Product (GDP), gross value added (GVA) and employment) and the last part is dedicated to the perspectives on capitalization the rural communities' potentials from the perspective of the business capacity and attractiveness. In this regard, it was considered indicators as the population of active enterprises, births and deaths of enterprises in predominantly rural areas are analyzed. The manuscript enclosed with the conclusions and references sections.

Rural constrains and synergies in European Union

The Common Agricultural Policy (CAP) represent for rural communities and areas a determinant instrument and tool of intervention in developing and increasing the valuing process of the economic, social and natural potential available in providing balanced territorial development, including the support to social inclusion and wellbeing.

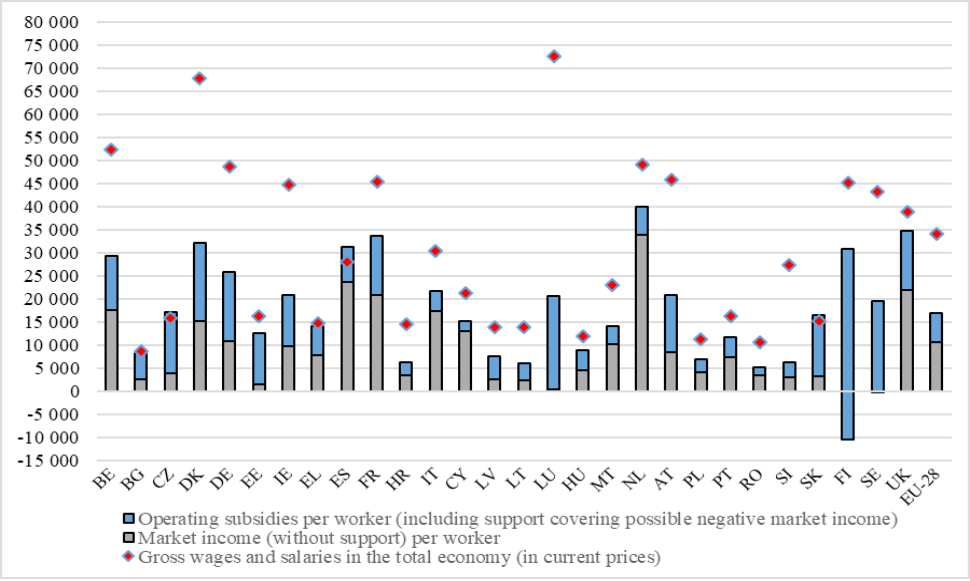
In numerous cases CAP acts as the only financial fund support in certain remote areas and less viable as in case of areas with permanent natural or demographic handicaps. If the Pillar I of the CAP provides and enhance mainly the farm income by using the direct payments as a core instrument of the this targeted policy, the second Pillar which included and it is dedicated to the rural development policy includes a variety of number of priorities and focus areas targeting the balanced territorial development of rural areas in the member states. Valuing the rural potential is straight connecting with the rural development component which may provide valuable insights and financial support in diversifying the rural activities and reduce agricultural dependence.

The direct payments stabilize the farm income and contribute in supporting farm competitiveness and economic viability and also may increase the large dependence of the rural households of the agricultural activities. The disparities in distribution of direct payments, among the EU farmers reduce significantly the initiatives regarding the agriculture in rural areas and increase the attractiveness for tertiary activities.

As it is argued in (European Commission 2021b), the unfair distribution of support has major implications on accentuating the feeling of being left behind, and discriminated which affects the rural development tendency, farmers willingness to conform, and producers to extend their activities to other nonagricultural activities. The redistribution of financial support for the farms highlights the need to increase productivity as well as market revenues, and extend their activities in tertiary sector. Many of the farms affected by the financial redistribution as is recognized in (European Commission 2021b) are located in states as Romania, Poland and Greece and are often specialist farms without mixed or integrated production process.

As it is shown in (World Bank, 2018), the agricultural income has represented less than half the wage in the rest of the economy, despite the fact that through the CAP support the income gap was reducing significantly since the 1990s. Despite the fact that the gap between predominantly rural regions and urban areas has decreased significantly, there are still massive income and wellbeing discrepancies. The average of the income in predominantly rural regions in 2019 represented according to Eurostat (online data table: urt_10r_3gdp) almost 77% of the EU average income, increasing with 9% compared to 2013. In Romania the income and wellbeing discrepancies in rural areas are more accentuated then in EU but in a reduction tendency. In fig.1 is presented the income GAP between agriculture and the overall economy, 2017-2019 average.

Figure 1. Income gap between agriculture and the overall economy, 2017-2019 average.



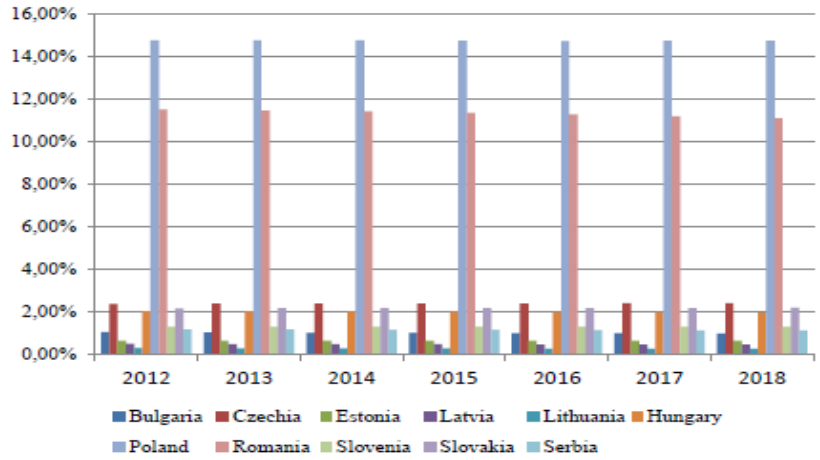
Soruce: European Commission (2021b)

The law levels of agricultural productivity and poor sectorial competitiveness of the agriculture determines the most frequently drawbacks in achieving comparative sustainable development in rural areas and communities. These predominantly rural regions are generally characterized by the predominance of the agricultural activities, with law levels of income and revenues, subsequent shortages of skilled labor and also aged, strong migratory patterns, which diminish the possibility to reduce both the dependency and increase the wellbeing status. As Giannakis and Bruggeman, (2020) and Mack et al., (2021) highlight the European rural areas have a large share of older population than registered in towns and suburbs and especially cities. This negative situation affects the possibility in developing new nonagricultural activities. Usually the older population is straight connected with agriculture and farming. All these aspects presented above may represent rural constrains but could also provide synergies in a competitive economic environment.

Dimension of the rural communities in Romania and some EU-MS

The rural communities define, in the contemporary economies, a determinant component in the functioning manner of the national economies in general and at the same time constitute equally a viable instrument of valorization of the rural potential, including one of welfare of a significant part of the population living in these areas. The rural areas concentrate an important population at the level of the European Union, including Romania that can be observed in the data in Fig.2 and Map 1.

Figure 2. Average annual rural population in some EU-MS, 2012-2018 (EU=100).



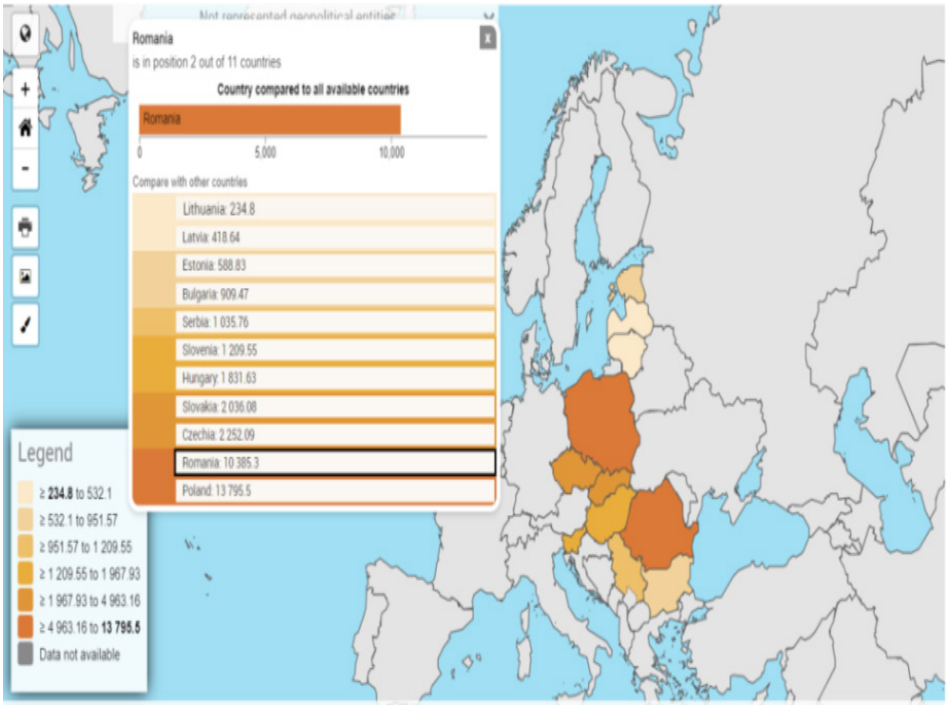
Source: Authors own computation based on Eurostat, (2021).

As is can be remarked from the data in Fig.1, for the period 2012-2018, we assist to a relatively significant reduction of the population volume in the rural and peri-urban areas, the registered values highlight the increased demographic importance these areas have in the assembly of the national economy. The demographic importance of the rural areas emphasizes thus the need of the achievement and application of some adequate demographic policies, taking into account the progressively descending trend registered. As there is mentioned in (European Commission, 2021), European Union (EU) population is already affected by the aging process and will start recording a slow decrease in the next decade; moreover, the rural population is already older-aged than the population in the urban areas and this phenomenon will be felt in a much more ascending rhythm.

Taking these into account (Eurostat, 2021), during 2012-2018, there is observed a dramatic decrease of the population in the rural areas, by percentage as compared to the year 2012. Thus, at the level of EU-27, the decrease percentage recorded per the whole interval is a minor one of just (-0.95%) as compared to those recorded in Lithuania (11.43%), Latvia (-8.47%), Bulgaria (-6.65%), Serbia (-6.17%).

In the case of Romania, the decrease is (-4.51%) and Hungary (-3.85%). There are also two states among the analyzed ones that record positive values, Slovakia (0.23%) and the Czech Republic (0.72%) according to Eurostat, (2021). To have an overall picture over this situation, in Map1 there is presented the average annual rural population in 2018.

Map 1. Average annual population in predominantly rural regions, 2018.

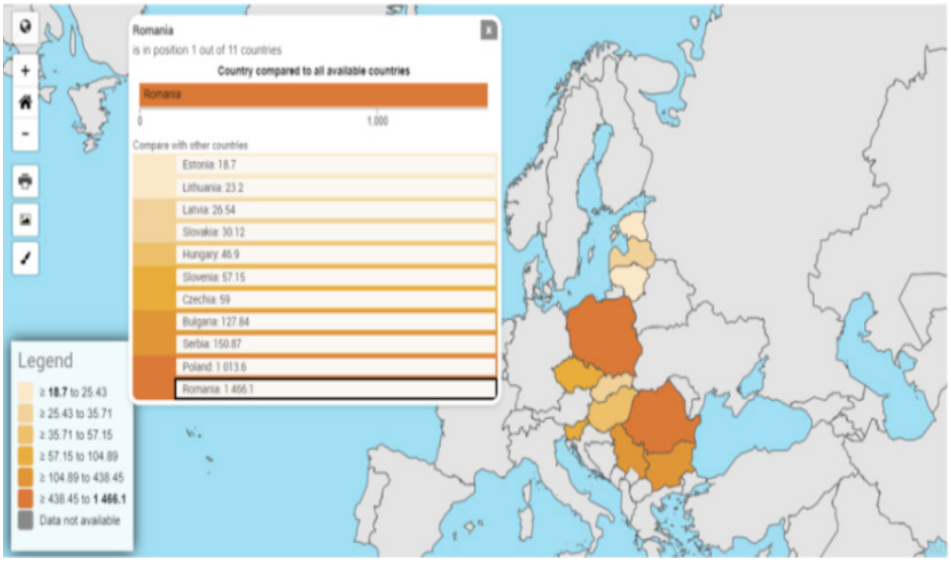


Source: Authors based on: Eurostat [URT_10R_3PGDP].

In 2018, as can be seen from the data displayed in Map1, Romania occupies the 2nd position out of the 11 states analyzed with a population concentrated in the rural and peri-urban areas of 10385.3 thousand persons, being surpassed just by Poland (13795.5 thousand persons).

Starting from the premise, though usually met and often similar, that "rural" means agriculture, complementary to this situation, as there is presented in Map 2, a significant rate of this population is occupied in agriculture.

Map 2. Employment in agriculture in predominantly rural regions, 2018.

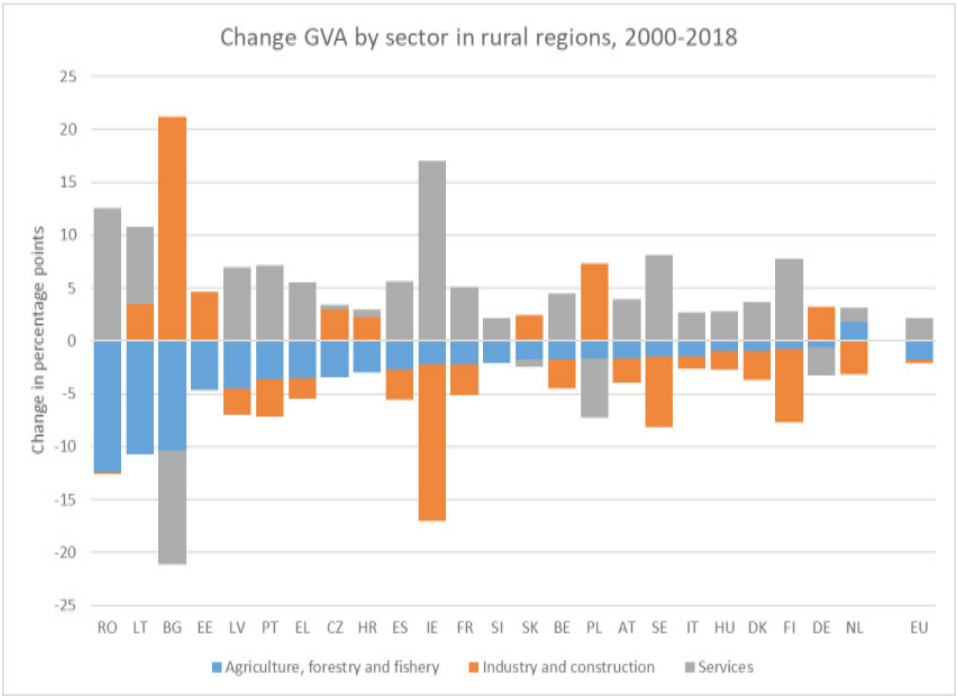


Source: Authors based on: Eurostat [URT_10R_3EMP].

The relatively high population rate in the predominantly rural regions is observed in the former communist states, where agriculture continues to remain an activity with a significant impact, activating, as there is often mentioned in some studies (Mihalache, 2010), as a "safety net" for a poor population, with reduced economic possibilities. Still, the decreasing trend of the population in the predominantly rural regions may be also interpreted as having a positive meaning as well.

This extra work resource liberated from agriculture may be consequently redirected at least towards the labor-intensive economic branches. In order to understand better the role of the rural communities from the perspective of the challenges these have to find solutions to, as well as from the perspective of the potential synergies, a general picture is offered by gross value added (GVA) change by sector in rural regions, 2000-2018. In fig.3 is presented the change GVA by sector in rural regions, 2000-2018.

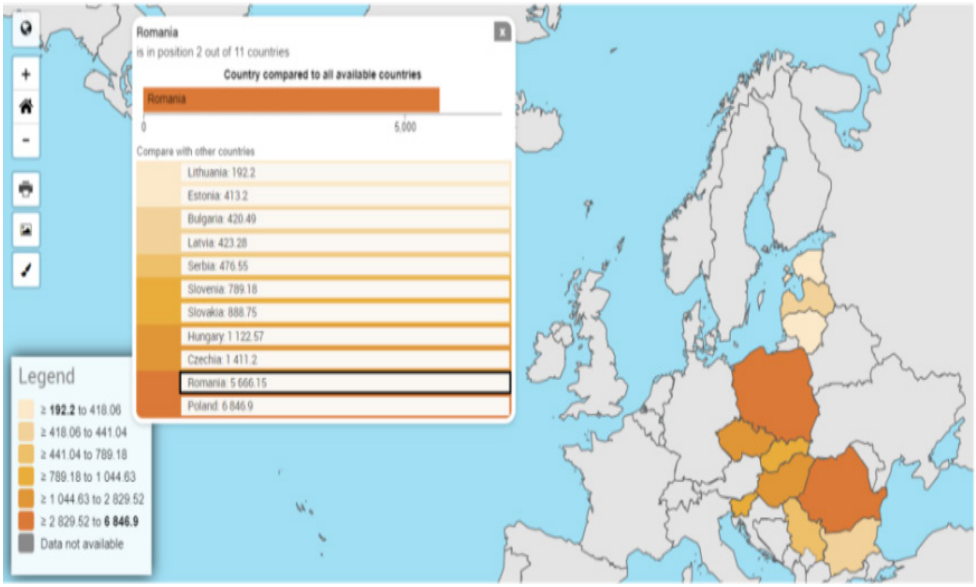
Figure 3. Change GVA by sector in rural regions, 2000-2018.



Source: European Commission, (2021a).

The capacity of the rural areas and communities of generating GVA and welfare, respectively, has often been underestimated. In Figure 2 there can be seen that in the period 2000-2018 the influential economic branch in the predominantly rural regions is represented by agriculture in the case of the former communist states that adhered to EU (Bulgaria, Lithuania, Romania, Hungary, Latvia), with some exceptions, but in Spain and France, where it detains a significant rate, though much more diminished as compared to the previously mentioned countries, points out a significant agricultural character. Figure 4. displays the Gross value added value at basic prices in agriculture in predominantly rural regions, in 2018.

Figure 4. Gross value added at basic prices by other typologies agriculture, 2018.



Source: Authors based on Eurostat [URT_10R_3GVA].

The rural communities and the business initiatives

The superior valorification of the capital from the rural areas and communities cannot be achieved at a high level without the existence of some valid economic instruments that should mobilize the available production factors and resources. If in the previous section we took into consideration the presentation and the analysis of some aspects regarding the population component and the capacity of the rural areas to generate GVA, this section is dedicated to the analysis of aspects related to demography and business, starting from the population of active enterprises, as factors and instruments of capitalization of the capital from the rural areas and potentiating the synergies from the rural areas.

Table 1. Population of active enterprises, in some EU-MS, 2010-2018. - number in predominantly rural regions -

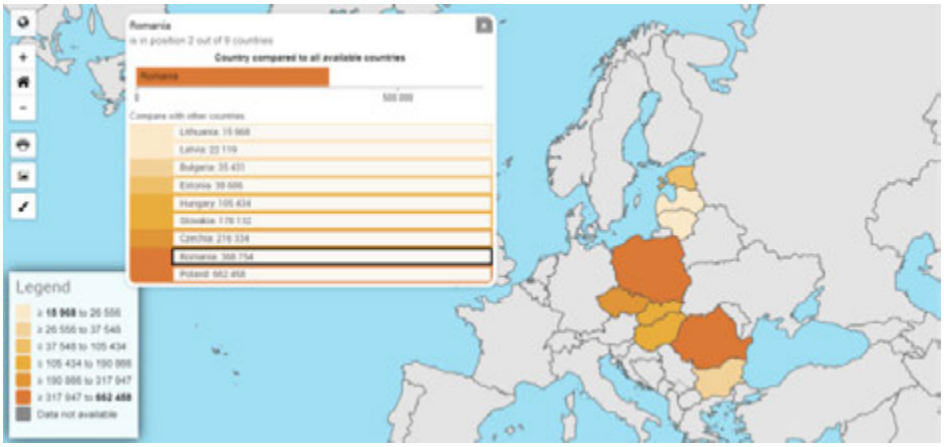
TIME	2010	2012	2014	2016	2017	2018
Bulgaria	33,944	33,770	33,943	35,104	34,933	35,431
Czechia	210,267	NA	213,789	214,589	213,023	216,334
Estonia	20,705	NA	NA	35,654	37,099	38,606
Latvia	NA	NA	NA	23,504	22,376	22,119
Lithuania	NA	NA	3,668	14,463	15,548	15,968
Hungary	101,720	92,910	92,730	94,682	98,551	105,434
Poland	NA	NA	NA	670,029	699,572	662,458
Romania	188,987	321,317	336,305	350,755	361,716	368,754
Slovakia	136,962	146,390	156,477	159,934	170,196	178,132

Note: "NA-no data available"
Source: Author's based on: [URT_BD_HGN2__custom_1665738].

From the Table 4 there can be observed an increase of the demography and a high growth of active enterprises in predominantly rural regions along the analyzed period. Therefore, in the case of Bulgaria in 2010, 33,944 active enterprises were active. The situation is similar in the case of the other analyzed EU-MS. The highest growth is registered in the case of Romania, of 195.12%, respectively, from 188,987 enterprises in the year 2010 to 368,754 which means a (+179.77) enterprises throughout the 8 years in the analyzed interval.

The increase of the business demography and the high growth of active enterprises in the predominantly rural regions along the observed period may also emphasize the attractively of the rural areas for the business initiative. Companies are viable instruments both in keeping the rural workforce and the increase of the living standard of the population in these areas, having an essential role in diversifying the economic activities and the valorification of the rural capital, different from the agricultural activities which tend to be and are dominant in these communities. The situation is presented in a more visible manner at the level of the year 2018 in Figure 5, where there are displayed the business demography and the high growth of enterprises by population in active enterprises in 2018.

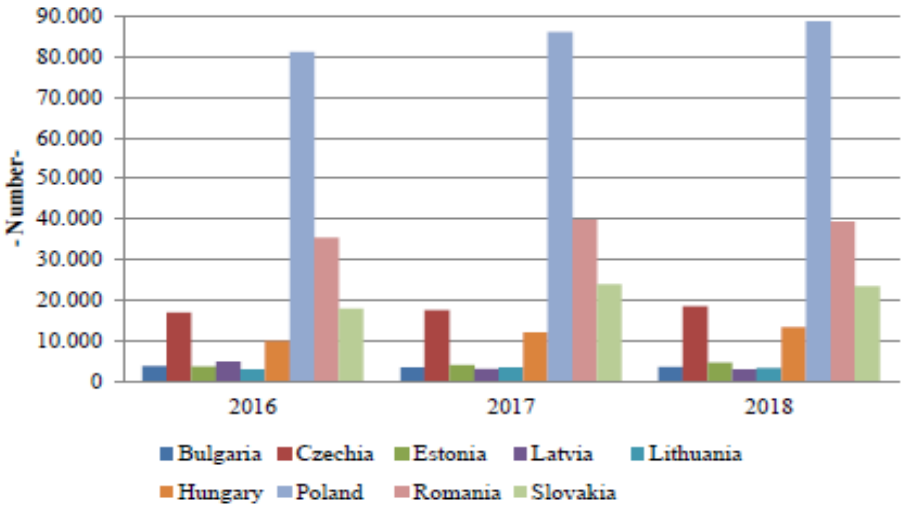
Figure 5. Business demography and high growth enterprise, in predominantly rural regions in 2018.



Source: Authors based on: Eurostat [URT_BD_HGN2__custom_1665738].

From Figure 5 there can be observed that Romania occupies second place concerning the business demography and high growth enterprises in 2018. However, in order to understand if companies may constitute solid instruments in valorizing the potential and creating local synergies, in Fig.6 there is presented the evolution of the enterprises since their birth, for the period of the last 3 years from the interval subject to analysis.

Figure 6. Births of enterprises in predominantly rural areas, 2016-2018.



Source: Authors based on Eurostat [URT_BD_HGN2__custom_1665768]

Figure 6 demonstrates a positive evolution of the phenomenon of rural potential capitalization by the rise of business demography and high growth enterprises, by the population of active enterprises in the period 2016-2018. Nevertheless, in the case of the second EU-MS there are observed decreases: Bulgaria (-281 enterprises) and Latvia (1937 enterprises). The evolution of founding new enterprises may thus confirm a phenomenon of slow increase of the rural space attractivity and of the business initiative in the rural areas, though in a great deal the rural areas and communities confront ample negative demographic phenomena.

Referring to (Meijer and van Der Wouw, 2019), they state that the rural regions are not and don't have to pose in unhappy victims, lacking in potential in the confrontation with the tendencies that lead to the "urban triumph", but these have the huge potential to collect themselves the benefits of agglomeration and to diversify themselves, respectively. To preserving the symmetry in the Table 2, there is presented the evolution of the death of enterprises in some EU-MS, 2011-2017.

Table 2. Deaths of enterprises in some EU-MS, 2011-2017. number in predominantly rural regions -

TIME	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Bulgaria	3,884	3,674	3,016	3,022	3,111	3,585	2,892
Czechia	19,489	20,011	16,546	16,278	16,040	16,838	17,099
Estonia	NA	NA	2,746	2,301	2,504	2,756	3,448
Latvia	NA	NA	NA	NA	2,453	4,268	2,659
Lithuania	127	384	321	190	2,269	2,401	3,116
Hungary	14,557	11,068	8,384	8,199	7,636	7,868	9,265
Poland	NA	NA	NA	70,897	61,023	58,676	71,729
Romania	50,871	18,402	51,493	24,406	27,239	27,983	27,323
Slovakia	21,756	14,134	16,888	16,543	14,925	14,152	17,087

Note: "NA-no data available"
Source: Author's based on: Eurostat [URT_BD_HGN2__custom_1665777].

From the Table 2 there is observed a decrease of the phenomena of death of enterprises in some EU-MS, in the period 2011-2017. The reduction in the death of enterprises reflects a maturity of the European rural space. The entrepreneurs from the rural environment have adapted to the rural exigencies and specificity. Though this phenomenon is achieved through a trend of

decreasing the deaths of enterprises in predominantly rural regions, it is still maintained at high levels. As there is stated in (Garcia-Alvarez-Coque et al.,) the development of businesses in the rural areas may constitute in the local development as an engine of competitiveness, especially as many of the rural regions are characterized by new technology-intensive activities.

Conclusions

In the contemporary economies, the rural communities and areas constitute spaces with a competitive economic, social and cultural potential, but which are insufficiently valorized. The global economic transformations highly affect the rural communities and the transformation of the rural paradigm imposes not only a redefinition of their role, place and importance, but also a massive adaptation to the new realities.

In spite of their importance, the rural regions continue to be neglected in the strategies of development and integration, though at their level there are born synergies capable of improving the population's living standard. As can be observed from the realized analysis, though the rural areas still face negative phenomena, such as depopulation, insufficient occupation of the human resources, limited access to quality public services, yet they manage to mobilize the business component.

The European rural areas become active factors in the green transition and in the digital one and the adaptation of the Romanian rural paradigm have to consider these new realities and to internalize them. The rural areas are not mere spaces, but actors and factors in the new type of development as well.

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THE ECONOMIC EFFECTS OF COVID-19 IN THE DEVELOPMENT OF RURAL AREAS AND AGRICULTURE IN POLAND: FROM GLOBAL MARKET TO LOCAL SOCIETY

Marian Podstawka[1], *Adam Wasilewski*[2], *Marek Wigier*[3]

Abstract

The COVID-19 pandemic caused an economic shock that was noticeable on both the demand and supply sides of many markets. The demand shock resulted mainly from changes in consumer preferences and the reduction of their incomes, and the supply shock resulted from the limited availability of certain resources. The occurrence of these phenomena was most visible in the financial markets. Nevertheless, the effects of COVID-19 were felt in virtually all sectors of the economy, including the development of agriculture and rural areas. Changes at the global level had negative effects at the local level, in the form of a slowdown in the development of Polish agriculture and the pace of investments of local self-governments.

Key words: *economic effects, COVID -19, rural areas, development, market, local society*

Introduction

The COVID-19 pandemic, which is faced by the whole world, including the agri-food sector, is a catastrophic event, the consequences of which we feel and will probably overcome in the next few years. The observations so far show that the Polish food economy has been relatively mildly able to bear the consequences of all economic restrictions. In the world food economy, the situation was more complex. World food security was the most affected by disruptions of supply caused by market uncertainty and income shocks. At the same time, the

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first year of the pandemic has shown that agricultural markets have responded less to this unusual situation, as opposed to non-agricultural commodity markets and financial markets. Local governments are also feeling the negative impact of the pandemic on development. In the following years, the effects of the pandemic will be derived from the possibility of controlling it and the involvement of public funds in eliminating its unfavorable economic effects.

Theoretical background

The COVID-19 pandemic caused a negative economic shock in all countries of the world (Codagnone et.all, 2020). The literature review shows that its main cause was the uncertainty regarding, inter alia, the socio-economic development, political decisions and investor behavior (Altig et all, 2020). The consequence of operating in conditions of increased uncertainty was a change in the well-established patterns of behavior of producers, consumers and institutions.

Pandemics, which are a mix of demand and supply shocks, cause the inflation (Baqaee and Farhi 2020). The extent to which this happens depends on the extent to which national governments intervene as well as on the adaptability of the economy. All over the world, fiscal and monetary authorities have reacted to the pandemic with great force by engaging financial resources to stimulate the economy on a large scale. Monetary policy, on the other hand, was extremely lenient and did not cause a sharp tightening of credit conditions (Bonam, Smădu (2021). This policy probably mitigated the negative economic effects of the pandemic, but as a consequence led to an increase in inflation (Daly, Chankova 2021).

The state of uncertainty and restrictions successively introduced by governments, including those related to international transport, caused negative supply shocks (Rio-Chanona et. All, 2020). As a consequence, there were strong changes in the prices of goods and services, not related to the increase in demand. In turn, the decline in GDP was related to the decline in population income, which in turn led to a negative demand shock, including in the food sector and in a local development (Ewing, Forbes, Payne 2003).

The research conducted so far shows that the resilience of the business sector varies from country to country (Eichenbaum, Rebelo, Trabandt 2020). The closures of retail stores and workplaces had a detrimental effect on sales in some sectors. Other sectors have adapted more easily due to the possibility of working from home or finding alternative ways of doing business. In the food

economy, food security has become the main problem. It was influenced by both the economic recession and disruptions in the supply chains of agri-food products, especially where the supply chains were less integrated (Swinnen, Vos, 2021).

The decline in GDP as a result of the Covid-19 pandemic also resulted in the reduction of budgetary revenues of local governments in Poland, and consequently the reduction of financing of investments related to the development of municipal infrastructure. Restrictions on infrastructure investments, in turn, have a strong impact on reducing the competitiveness of territorial units (Blakely, 1989).

Actions taken to limit the negative effects of a pandemic will result, in the short term, in a reduction in the level of consumption and production, and an increase in unemployment. In the longer term, the current crisis may result in destabilization of public finances, primarily with a strongly growing debt (Wąsiński, Wnukowski, 2020).

Discussion of results

Changes in the global market

In the first stage of the COVID-19 crisis, concerns arose about global food security. Fortunately, however, supply chains in the global food market have proved to be relatively resilient, although there have been changes in the structure of food consumption. This was expressed in, inter alia, decrease in demand for meat, increase in demand for plant products, increase in demand for staple food easy to store. Food importing countries increased their purchases, incl. cereals and flour. An intensification of protectionist practices was also observed. Russia limited export sales of cereals in the second quarter of 2020, while in the first quarter of 2021, it introduced export taxes in fear of rising food prices on the domestic market.

The fall in meat prices in 2020 was accompanied by an increase in the prices of plant products, mainly cereals and oilseeds, as well as energy raw materials (mainly crude oil). The year 2021 brought a clear revival in agricultural markets, heralding an improvement in the economic situation in agriculture. The FAO Food Price Index in March reached its highest level in more than 7 years. The highest growth rate was still recorded in the prices of cereals (26.5% year on year) and vegetable oils (86.2%). A noticeable tendency was

the increase in the prices of dairy products (15.7%) and the slowdown in price declines on the meat market. In Central and Eastern Europe, the situation of the food industry was more favorable due to the low dependence on the import of raw materials and semi-finished products.

The pandemic also accelerated the development of new consumer trends, such as: more frequent choices of organic products, local shopping, and online food purchases. One of the trends visible among food producers and processors is also the rapid acceleration of digitization and automation processes, which is directly related to a shortage of seasonal workers.

Changes in Polish agriculture

In Poland, the pandemic resulted in the introduction of various types of territorial restrictions, including the introduction of an epidemiological emergency throughout the country. Restrictions on the functioning of business entities included, among others: the movement of people and goods and services, or restrictions on the functioning of entities in the HoReCa sector. The resulting decline in demand for catering services and the deterioration of the situation on the labor market resulted in a decrease in income, and consequently in expenses.

The impact of the COVID-19 pandemic in agriculture was smaller than in other sectors due to the relatively low income elasticity of food demand. However, the situation on the agricultural commodity market was very diversified internally. The smallest or even minimal impact of the pandemic on the production and economic results was recorded by sectors supplying the basic raw materials necessary for food production. In the initial period of the pandemic, the negative effects were particularly felt by producers of fresh soft fruits used for direct consumption and products that are only marketed seasonally, e.g. cut flowers, ornamental plants. In livestock production, the negative effects affected mainly producers of poultry, pigs, beef used by institutions providing hotel and catering services (Wigier, Wasilewski and others, 2020). The initial decline in the prices of raw materials and semi-finished products, mainly due to reduced sales to the HoReCa sector, was slowed down in 2021, which results in an improvement in the economic situation in agriculture.

The value of global agricultural production in 2020 increased by 4 percentage points compared to the previous year and by nearly 13 points compared to 2015. In plant production there was an increase by 12 and 16 points, respectively, while in animal production it decreased by 3 points compared to in 2019 and an increase by 9 points

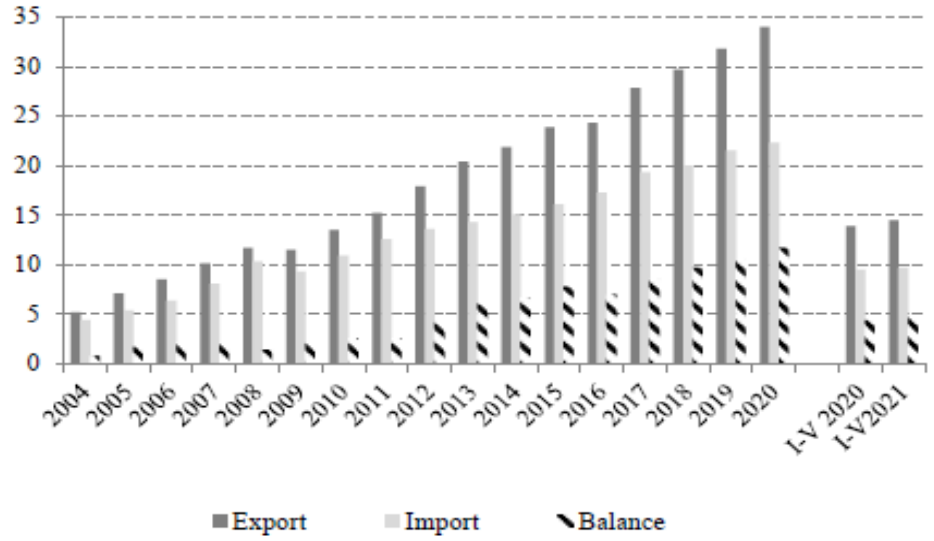
compared to 2015. At the same time, in 2020 the ratio of prices of agricultural products sold to the prices of goods and services purchased by agriculture deteriorated compared to the previous year, in the so-called "price scissors" opened (Table 1).

Table 1. Indexes of changes in the value of agricultural production in constant prices.

	2015	2016	2017	2018	2019	2020
Global agricultural production						
previous year = 100	96,1	107,1	103,1	101,5	96,6	104,2
year 2015 = 100	100,0	107,1	110,4	112,1	108,3	112,8
Plant production						
previous year = 100	89,1	110,3	100,6	100,3	93,2	112,1
year 2015 = 100	100,0	110,3	111,0	111,3	103,7	116,2
Animal production						
previous year = 100	103,4	103,8	105,7	102,6	99,8	97,1
year 2015 = 100	100,0	103,8	109,7	112,6	112,4	109,1
"Price scissors" in agriculture						
	98,8	99,0	110,0	94,4	112,1	99,7

Source: GUS Data „Roczne wskaźniki makroekonomiczne", date of access 30.09.2021 https://stat.gov.pl/wskazniki-makroekonomiczne/

Figure 1. Polish foreign trade in agri-food products (in billion euro)



Source: own study based on data from Ministry of Finance, years 2020–2021.

The increase in demand for Polish food in the world markets is based on, inter alia, on price competitiveness and on high quality of polish food. It is also supported by the zloty exchange rate against the euro, which is favorable for exporters. During the pandemic, these factors strengthened the position of Poland as an exporter of food to world markets, mainly to European markets (Figure 1).

Changes in rural development at the local level

Local investments by local governments are a measure of the impact of the COVID-19 pandemic on local economic development. The determinant of their changes is the change in communes' incomes correlated with changes in Poland's GDP. The adoption of such an assumption results from the strong dependencies that exist between the economic situation of the country and local development, despite the existing regional differences.

According to data from the Central Statistical Office[4], in 2019 rural and urban-rural communes achieved general budget revenues of EUR 24.5 billion, of which nearly EUR 13.7 billion constituted the general income of rural communes, and the remaining EUR 10.8 billion - rural. 40.7% of the total budgetary income of rural and urban-rural communes was their own income, i.e. from corporate and personal income tax, agricultural tax, real estate tax or other. The share of own income in the total budget income was slightly lower in rural communes and amounted to 37.7%, and in urban-rural communes 44.4%. Thus, the budgets of rural communes were more dependent on subsidies than the budgets of urban-rural communes.

COVID-19 had the greatest impact on reducing municipalities' incomes due to their share in the income tax from natural persons and revenues from the tax card. In 2019, the budgetary revenues of urban-rural and rural municipalities from the above taxes totaled nearly EUR 3.9 billion. Their share in total budget revenues was 15.9%. The share of these incomes in the budgets of the incomes of urban-rural communes was 17.4%, and in the budgets of rural communes - 14.8%. For this reason, urban-rural communes will experience a relatively greater decrease in income.

The conducted analyzes show that the investment expenditure of rural and urban-rural communes in 2019 was on average at the level of about 41.5% of own income (47.2% in rural communes, 35.4% in urban-rural communes).

4 Bank Danych Lokalnych GUS, dochody budżetowe, https://bdl.stat.gov.pl/BDL/dane/podgrup/temat (data dostępu: 17.11.2020).

Thus, the investment expenditure of rural and urban-rural communes totaled approximately EUR 4.1 billion, including EUR 2.4 billion in rural municipalities and approximately EUR 1.7 billion in urban-rural municipalities.

The communes 'own revenues and investment expenditures presented at the national level do not fully reflect the possibilities of financing or co-financing the communes' investments. The reason for this is intra-regional differentiation. The actual possibilities of engaging one's own resources may be slightly different, both at the level of the country and individual voivodeships. This is confirmed by the performed regression analysis, in which the level of own (absolute) income was assumed as the explanatory variable (x), and the level of investment expenditure (absolute) as the explanatory variable (y). As a result of this analysis, a regression function was determined for all urban-rural and rural communes, which can be written as:

$$y=494066,5+0,31x$$

where:

- x – commune's own revenue in EUR,
- y – commune's investment expenditure in EUR.

The regression function shows that in all urban-rural and rural communes in Poland, an increase in own revenue by EUR 1 in 2019 led to an increase in investment expenditure by 31 EUR cents. The regression function shows that in communes 31% of own revenue is actually used for investments. The presented model can be considered reliable because the coefficient of determination (R2) reached the value of 0.63, which means that this model explains the relationship in 63%, and the commune's own revenue is statistically significant for the model, where the dependent variable is investment expenditure, because p- value = 0.

In 2019, Poland's GDP amounted to EUR 532.3 billion. The state budget revenue in 2019 was at the level of EUR 93.2 billion, which accounted for approximately 17.5% of GDP. According to the information from the Ministry of Finance, the decline in GDP in Poland due to COVID-19 in 2020 amounted to 3.4%. Which meant that GDP would fall to around EUR 514.2 billion. Moreover, the budget act indicated that the state budget revenues in 2020 should reach the level of nearly EUR 73.8 billion, and their share in GDP would amount to 14.3%. With such assumptions, the state budget revenues would decrease by approx. 20.9%. However, the data of the Ministry of

Finance[5] showed that in the period January-May 2020, PIT income decreased by 8.6%, and CIT income decreased by 19.2%.

The following assumptions were made for the assessment of changes in the income and investment expenditure of urban-rural and rural communes:

- the amount of subsidies will be kept at the level from 2019,
- revenues from the share of municipalities in PIT taxes will decrease by 8.6%,
- revenues from the share of municipalities in CIT taxes will decrease by 19.2%,
- other own revenues of communes will decrease by 20.9% (same as the revenues of the state budget).

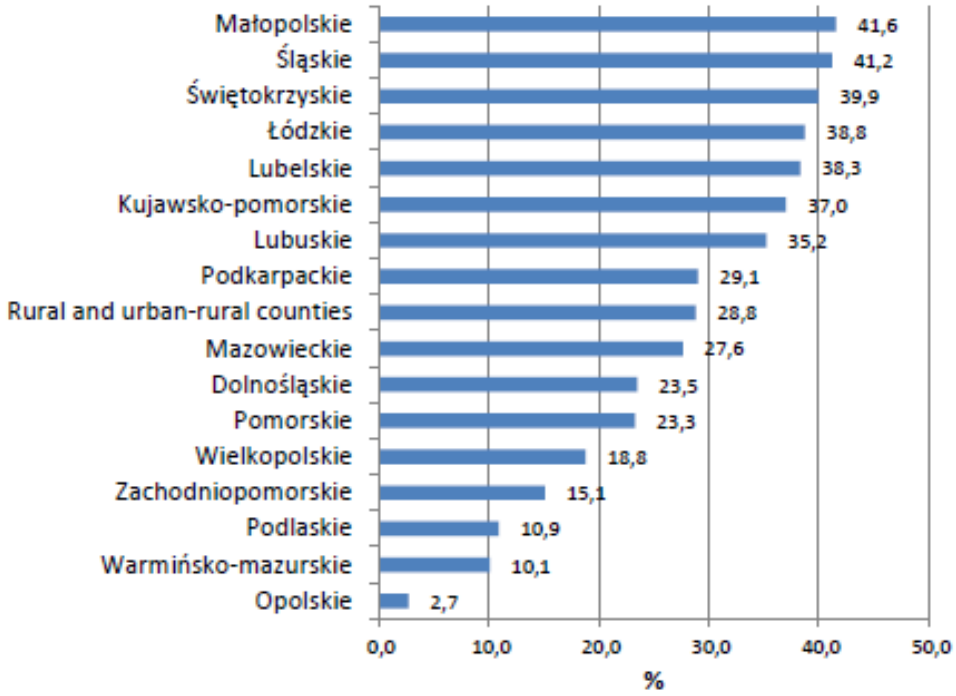
If we assume this scenario of reducing the budget revenues of urban-rural and rural communes, the total revenues would decrease by 4.1%. Nevertheless, their reduction would only result from the decrease of communes' own incomes by 10.1%. In 2020, urban-rural and rural municipalities would have their own revenues of EUR 9 billion, i.e. EUR 1 billion lower than in 2019.

The regression model presented above shows that the investment expenditure of municipalities in 2020 would decrease to the level of approximately EUR 2.7 billion. This means a decrease in capital expenditure by over EUR 1.4 billion, i.e. by over 33.4% compared to the expenditure in 2019. It should be noted, however, that the scale of this decline will be conditioned by the decline in budget revenues.

However, decreases in the level of investment expenditure may proceed with a different intensity in individual voivodeships. This is due to the fact that in each of the voivodships the relationships between own income and investment expenditure are different. Regression parameters, in which the independent variable is own income, and the dependent variable, investment expenditure for individual voivodships, therefore, reach slightly different values than on the national scale. Nevertheless, they oscillate around the values set for the whole of Poland.

5 https://www.gov.pl/web/finanse/szacunkowe-wykonanie-budzetu-panstwa-w-okresie-styczen---maj-2020-r

Figure 2. Relative decline in investment expenditure of rural and urban-rural communes in 2020 by voivodships.



Source: own calculations based on Central Statistical Office data.

The regression analysis carried out by voivodships shows that, assuming a steady decline in own budget revenues and the adoption of estimated parameters, the investment expenditure of urban-rural and rural communes in 2020 will be at the level of EUR 3 billion. This amount is the sum of investment expenditures of communes estimated for individual voivodeships. The level of investment expenditures estimated with the use of this method will be higher by EUR 0.2 billion than in the case of applying regression parameters obtained for the entire country.

The analysis of changes in investment expenditures by voivodship shows that their reduction in the scale of the entire country will amount to approximately EUR 1.2 billion. The reduction of capital expenditure will, however, be regionally differentiated. The performed regression analysis in the voivodship system also shows that in relative terms, the scale of investment expenditure in rural and urban-rural communes may decrease by 28.8% in 2020 (Figure 2).

Conclusions

The COVID-19 pandemic has sparked an increase in economic uncertainty around the world. In the short term, the coronavirus limited the level of production and consumption, and contributed to an increase in unemployment. In the long run, it may lead to destabilization of public finances, mainly due to the strongly growing debt. The shock caused by the COVID-19 pandemic and numerous restrictions introduced by governments both in Poland and around the world resulted in a significant decline in economic activity. The social impact of the COVID-19 pandemic can also trigger deglobalizing processes. A positive side effect may be the acceleration of the development of the digital economy, including the services market.

The Polish agri-food sector, compared to the rest of the national economy, suffered relatively little losses due to the coronavirus epidemic, showed high resistance to its effects, quickly adapting to the challenges associated with it. As a result of the adjustments, there was an increase in food exports. The pandemic has accelerated the trends that will have the greatest impact on food production in the future. On the other hand, the prediction of the impact of the COVID-19 pandemic on the development on a local scale proves the decrease in investment opportunities of municipalities, which is a consequence of the economic slowdown.

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PUBLIC – PRIVATE PARTNERSHIP FOR IMPROVEMENT OF SUSTAINABLE DEVELOPMENT INFRASTRUCTURE IN RURAL AREAS (RUSSIA)

Natalia Staurskaya[1], Denis Parshukov[2], Lyudmila Stepanova[3]

Abstract

Sustainable territorial development, social services and economic goods availability is a state priority in terms of sustainability. Rural areas cover over 80% of Russian territory but their population is less than the country's total. More than 60% of rural territories are located in extreme environments that can hardly serve for the local people's welfare. This research aims at defining the rural needs related to suitability infrastructure and selection of the optimal PPP for their development. The research methodology is based on official statistics analysis to find out about the availability of sites of social, industrial, communal and production infrastructure. According to that a list of crucial infrastructure sites to be developed under PPP projects has been offered. The authors believe that PPP is the optimal cooperation mode for transportation infrastructure development, diversification of rural economy, enhancement of social entrepreneurship in rural areas.

Key words: *private-public partnership (PPP), sustainable development, rural areas, infrastructure*.

Introduction

Rural areas development is a priority in the concept of sustainable development of the Russian Federation. Due to the vastness of the territories, the functions performed, they are the most important constituent of the Russian economic, territorial, and public space [1, 2, 3]. Rural territories cover more than 80% of the Russian Federation's territory, but the population living there does not exceed 25% of the total population of the country. As a result, low population density, low density of rural settlements and vast territories cre-

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ate certain barriers for provision of necessary economic and social benefits. Moreover, over 60% of rural areas are located in zones with extreme living conditions, which creates additional difficulties in ensuring an acceptable welfare level for the population.

Sustainable development infrastructure can be classified into the following groups: industrial infrastructure, transport infrastructure, social infrastructure, housing and communal infrastructure. The vector of the state policy of the Russian Federation in relation to rural areas has been set by the Sustainable Development Strategy, according to which the following types are distinguished:

- the first type - territories with a predominantly agricultural specialization of rural areas, favorable natural and social conditions for its development;
- the second type - territories with a multifunctional rural economy, suburban agriculture and favorable social conditions for rural development;
- the third type - territories with unfavorable social conditions for rural development and vast zones of socio-economic depression;
- the fourth type - territories with poor focal development of rural areas and unfavorable natural and climatic conditions for its development.

For each type, there are both general and specific problems in providing infrastructure for sustainable development. The pool of problem of sustainable development of rural areas can be determined based on the results of the analysis of scientific works and official statistics. Studying the works and evaluating the opinions of the expert community, the following problems typical for rural areas of the Russian Federation should be highlighted:

- a demographic crisis in the countryside, expressed in a significant excess of mortality over birth rates, a massive outflow of rural population, and a rapid increase in the share of small rural settlements (thoroughly studied in works by T.V. Blinova [4], N.V. Mkrtchyan [5], O.G. Zubkova [6]).;
- a critical gap in the standard of welfare between the urban and rural population: in terms of income by 2-3 times; the total consumption of economic goods is 15-30% less in value terms [7. 8];

- high depreciation of social, housing and engineering infrastructure units, a widespread shortage of doctors and hospital beds, rural teachers and teachers of children's art schools, physical education and sports facilities, children's coaches, etc. [9];
- entrepreneurial activity of the rural population is constrained by low purchasing power of demand, a limited list of available types of economic activity, and a high share of the shadow sector in the rural economy [10].

A number of experts [10, 11, 12], argue that one of the ways to solve the problems of sustainable territorial development is a more active use of public-private partnership instruments. We share this opinion. In this regard, the purpose of this study is to determine the needs of rural areas in infrastructure for sustainable development and the choice of modes of implementation of public-private partnerships during their creation.

Methodology

The research methodology included the analysis of official statistical data on the availability and provision of rural areas with facilities for social, engineering, utilities, and production infrastructure. At the next stage of the study, an analysis of the development of the PPP institute in the Russian Federation at the current moment is carried out. The dynamics of the growth in the number of projects, statistics on the forms of PPP and the industries of their application are analyzed. Further, based on the results of the assessment, a list of key infrastructure projects was formed, for each of which the most acceptable form of public-private partnership was proposed.

Results

Analysis of the actual conditions of rural infrastructure

The data shown in table 1 allow estimate the amounts of infrastructure sites in Russian rural areas.

Table 1. Sustainable development infrastructure in Russian rural areas (as of 01.01.2021).

№	Index	Value
1.	**Housing and municipal infrastructure**	
1.1	Off-gas localities, %	42,1
1.2	Localities with no central running water supply, %	57,2
1.3	Localities with no central canalization, %	82
2.	**Road and transport infrastructure**	
2.1	Hard-top roads, %	64
2.2	Irregular roads, %	57,2
3.	**Social infrastructure**	
3.1	Number of hospital beds per 10 000 rural dwellers, items	27
3.2	Number of MPIs per 100 rural localities, items	28
3.3	Number of kindergarten places per 100 kids aged from 1 to 6, items	74
3.4	Number of kids and youth sport clubs per 100 rural localities, items	0,91
3.5	Number of collective accommodation facilities per 100 rural localities, items	5,3
4.	**Connectivity**	
4.1	Households with Internet access, %	63
4.2	Population aged from 15 to 72 taking state and municipal services via Internet, %	46
5.	**Industrial infrastructure**	
5.1	Small and medium-size businesses per 10 000 rural dwellers, items	278
5.2	Number of retailers per 100 rural localities, items	136
5.3	Number of farms per 100 rural localities, items	27,14
5.4	Number of personal auxiliary plots per 10000 rural dwellers, items	4 504,02

These data indicate problems in providing the rural population with basic infrastructure facilities. If water supply networks are partially represented in rural areas, then sewerage, heating and gas networks are practically absent. The construction and reconstruction of public and non-public highways is carried out to the most significant social facilities, mostly located in large rural areas, the share of which does not exceed 50% of the total settlement network. Low rates of renovation and repair of the road network should not be left unattended.

The following two problems have been identified in the preschool education system: lack of places in kindergartens and low level of coverage of preschool education in general in rural areas due to the low transport accessibility and the uneven distance of rural settlements. The state of the health care system in rural areas has reached critical importance: deterioration of health care facilities, lack of doctors in general and narrow specialties, low level of coverage with medical services, especially for remote and small settlements.

Cultural and leisure infrastructure is mainly represented in regional centers and large settlements. In other rural settlements, the main objects of cultural and leisure type are separate subdivisions of libraries and rural houses of culture. Of the sports infrastructure facilities, the main ones are flat sports facilities. Fitness gyms are mainly represented in regional centers. It should be noted the problems with the organization of recreational areas of public leisure: comfortable recreation areas near water bodies, public leisure spaces of general access.

Analysis of PPP institutional development in Russia

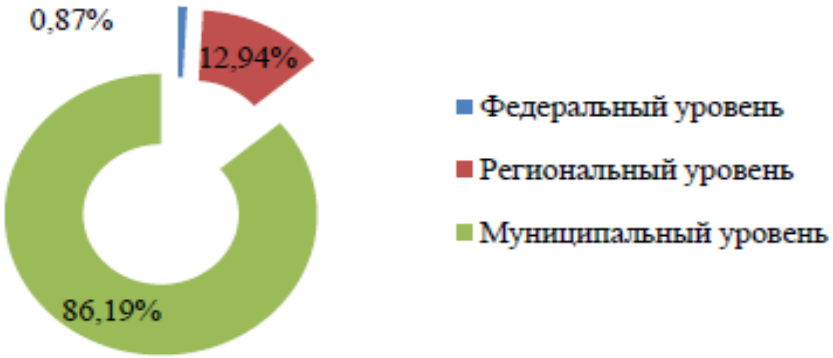
In total, 3562 infrastructure PPP projects were implemented in Russia by mid-2021, including in various forms of quasi-PPP. The total investment in them is 4.7 trillion. rub., of which 3.4 trillion. rub. (71%) - private [13]. The distribution of PPP projects by areas is shown in Figure 1.

Figure 1. Implemented PPP projects in various infrastructure areas.

In terms of number of commercial closings, projects in the utility and energy sector dominate on the market, and in terms of the volume of attracted financing, projects in the transport sector. As you can see, 75% of all projects are implemented in the transport sector, while about 59% of all investments are accumulated in the utilities and energy sector [13].

According to the forms and levels of implementation, the data are presented in Figure 2.

Figure 2. PPP Projects by Level of Implementation.



About 90% of all projects are being implemented at the municipal level, while the most capital-intensive projects are represented at the regional level. They account for 51.5% of all investments, the municipal level accumulates about 14% of all investments [14].

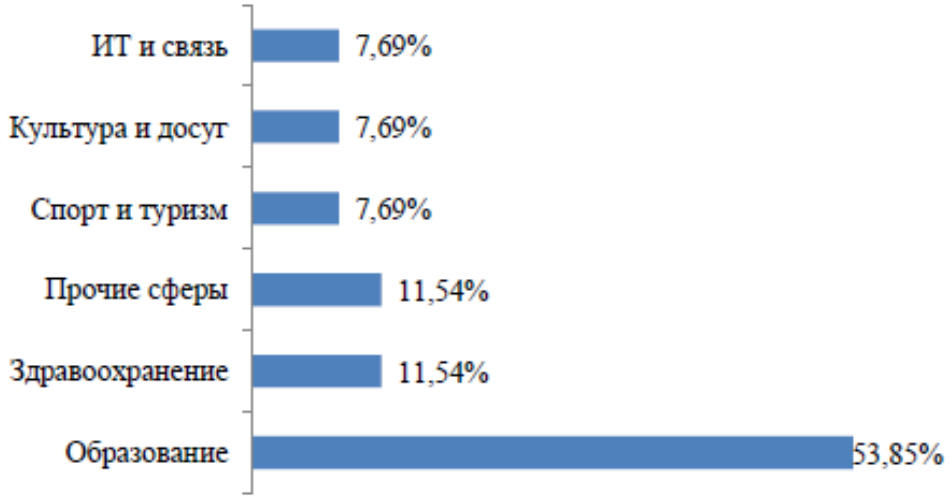
The classical forms of PPP (concession agreements and PPP / SME) account for 81% of implemented projects, of which 97% are concession agreements. At the same time, classical forms accumulate only two-thirds of total investments (Table 2).

Table 2. Data on the forms of implementation of PPP projects in Russia.

	Number of projects	**Total investments, billion rub.**	**Total private investments, billion rub.**
Concessions	2790	2324	1668
PPP agreements according to 244 Federal Law	95	785	657
Quasi-PPP	677	1582	1027

Municipal-private partnership deserves special attention, as the most relevant type of PPP for rural areas. Projects of this type are most in demand for the development of social infrastructure. Figure 3 shows statistics on the areas of implementation of MPP projects [14].

Figure 3. MPP project for different infrastructures.



More than 50% of MPP projects are implemented in the field of education, and most of them are related to preschool education. Health care accounts for about 12% of MPP projects.

It can be concluded that the institution of public-private partnership is gradually developing and acquiring stable forms. But at the same time, despite the widespread use of PPP forms at the municipal level, rural areas are not yet a direct sphere of investment interests of private agents.

Discussion

Thus, a set of measures and solutions is required to provide the rural population with infrastructure facilities, and to increase the coverage of the population with social services. For rural areas, the following key aspects need to be considered:

- economic growth, both through the development of agricultural production and through non-agricultural activities (agritourism, trades, crafts);

- the need to localize industrial processing facilities in rural areas within the municipal district: agricultural raw materials, timber, wild-growing raw materials;
- ensuring employment and income growth of the rural population should be carried out, including through the organization of seasonal jobs in the public sector;
- the environmental factor is one of the priorities in the development of territories. Activities in rural areas should be implemented from the principles of zero balance with the environment;
- institutional conditions should ensure equal rights and opportunities for all stakeholders of this process / system.

Taking into account these aspects, we consider public-private partnership to be an effective mechanism for the sustainable development infrastructure. The most common form of PPP in the Russian Federation is concession agreements. At the same time, the development of rural areas requires a detailed approach using all the possibilities of PPP. Table 2 presents an attempt to systematize the use of various forms of PPP in the implementation of projects for the development of infrastructure in rural areas.

Table 2. Various PPP modes for sustainable development of rural infrastructures.

Sustainable development goals	**Activities**	**Recommended PPP modes**
Capacity building for human capital development	Building of pre-school facilities	Concession, PPP agreement
	Development of rural healthcare system	
	Sports popularization	
Improvement of living conditions	Sustaining rural capital	Concession
	Communal infrastructure wear reduction	
	Clean water supply	
Job placement and welfare improvement	Diversification of rural economy	PPP agreement
	Development of rural industrial capacity	State purchase contract
Rural dwellers' mobility improvement	Building and renovation of rural roads	Concession

The most preferable is the use of PPP to attract investment in projects for the development of transport infrastructure, diversification of the rural economy, development of the institution of social entrepreneurship in rural areas. Let us outline the main barriers to the use of PPP mechanisms in the development of rural areas.

- Lack of a strategic goal-oriented approach to planning and development of rural infrastructure;
- Financing of rural areas on a leftover basis;
- Insufficient level of development of the regulatory and legal and methodological framework in the field of PPP at the local level;
- Insufficient level of development of budgetary and financial mechanisms of local self-government for the effective implementation of PPP projects
- Low level of development of the market of private operators in the field of PPP for rural areas;
- Unattractiveness of rural peripheral areas for large private PPP operators.

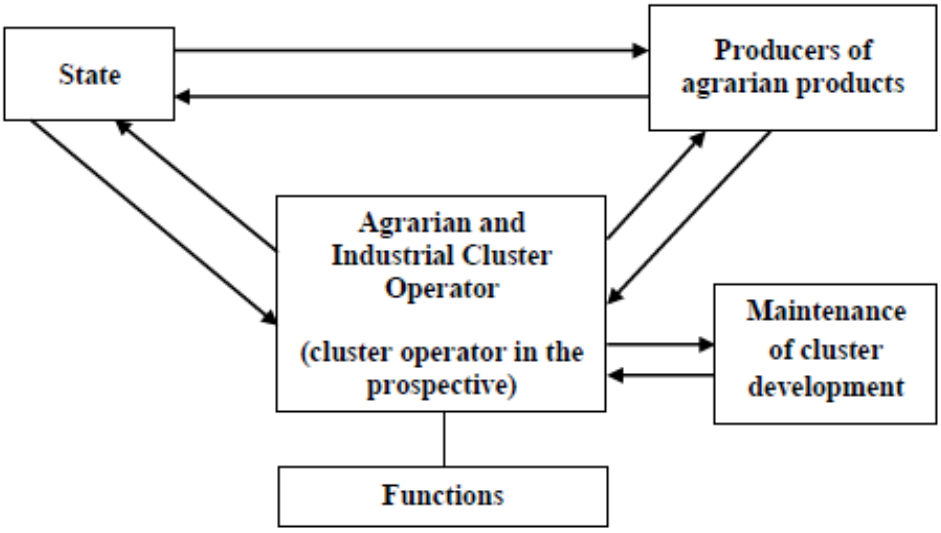
Thus, in the context of limited investment in rural areas, the mechanism of public-private partnership is one of the most obvious solutions. The development of the institutional environment, the empowerment of local self-government bodies, and the increase in the financial security of local budgets are required.

A PPP model for agriculture

We have developed a scheme for the implementation of PPP projects at agrarian enterprises of Krasnoyarsk Territory (Figure 4). In our opinion, the central element of the given system is the operator of the agrarian and industrial cluster, which in the prospective can transform into a fully-fledged cluster operator. For this purpose it is required to bring this structure to the qualitatively new level of development to perform the function of a dialogue ground for state authorities and agrarian producers. This organization is to accumulate the opinions of the estates producers of the agrarian and industrial products, develop a unified position and present it to the regional and municipal authorities. At the first stage it is important to provide for the support of administrative bodies of the promoted business initiatives. This is to prove the efficiency of the proposed model. The utmost attention is to be given to the proposals

in line with the cluster ideas: establishing cooperation relations, distribution of innovations and advances experience, development of the production and social infrastructure, etc. Such projects shall be a priority to be granted with organizational financial support, including via banks with state capita (especially OJSC "Rosselkhozbank").

Figure 4. The PPP project implementation chart for enterprises of the agrarian and industrial complex.



In the feedback mode the Agrarian and Industrial Cluster Operator shall provide the organizational and methodological support of the cluster development processes. The farm producers of agricultural products in the Territory shall have a clear understanding of the perspectives, logics and essence of the actions planned for the establishment of a regional cluster in the industry. Such work with the active involvement of scientists can be done as part of the periodic meetings of members of Agrarian and Industrial Cluster Operator at exhibitions, fairs and other events.

The development of mutually beneficial and productive relations with the regional scientific community shall also be attributed to a number of priority directions of the clusters development in the territorial agrarian and industrial complex. In Krasnoyarsk Territory three operate research institutions engaged into the research of various aspects of the agriculture business. Their contacts with agricultural producers have individual character and are largely limited to the technology. However, to form fully fledged regional clusters, the following aspects are urgently needed: additional specialized scientific researches in the field of building-up their organizational and economic structure, justifications of the list and layout of infrastructure facilities location, development of cooperative relations, etc. This topic is not of any interest for a particular farm, but is extremely acute for the cluster as a whole. Thus, the Agrarian and Industrial Complex Operator shall participate in the formation of terms of references, in the control over the course of the works execution and implementation of their results in economic practice.

If to consider from a perspective, the financing of the research works within the PPP can be organized on the principles of equity. Along with public funds allocated for these purposes there also may be private investors' participation. This will not only increase the budget for the clusters research programs but also strengthen the business interest in the research results, help strengthening the relationship between the science and the production sector in the region, as well as accelerate the creation and distribution of the innovations.

The participation of scientists in the implementation of international scientific and research programs is an important element of establishing cluster structures in the agrarian and industrial complex of Krasnoyarsk Territory. Such studies attract foreign entrepreneurs interested in expanding distribution markets for their products; thus, in the future we can expect an increased presence of foreign manufactured agricultural machinery, equipment, plant protection products in the Territory. The industrial potential and favorable geographical position of the region creates good conditions for the establishment of joint ventures and production localization in Krasnoyarsk Territory, which will be the basis for the fully fledged agricultural clusters formation.

The development of agricultural engineering in the region will encourage the modernization of the training system for agricultural specialists. The new technology samples can be submitted to educational institutions to allow young professionals mastering modern technology for their operation.

The Agrarian and Industrial Complex Operator on its part can formulate new requirements for the content of the educational process and organize field placements for students.

The PPP project development contributes to more efficient solutions of the unemployment problem in the region. The most important economic project under the PPP conditions in the potato and vegetable growing of Krasnoyarsk Territory is to attract private sector to the irrigation systems control. The transfer of reclamation facilities under control of a private investor will allow for a more efficient solution of the problems in this sector.

It is worth noting that one of the major difficulties in the preparation of the PPP projects is the proper legal registration of the reached agreements and arrangements. This is due to the fact that such projects are a complex structure comprising numerous elements that require specific coherence. The main concern is an agreement between the project authors; public authorities and project authors; project authors and external organizations (design, finance, etc.), and others. The most important requirement in this case is the most accurate fixation of the essence and parameters of mutual obligations, as well as establishing the principles for their change. Also it should be noted that the important aspect is efficiency estimation of the PPP-based innovative projects.

Main direction for the implementation of the innovations support program in the agrarian and industrial complex

The main objective to establish the regional system of the innovations support and technological development is to assist the large-scale technological refurbishment of the production on the basis of the newest scientific and technical developments, to create the competitive R&D sector that would grant the region's entering and getting the foothold in the Russian and world markets of the high-tech production.

This objective can be reached by realizing three main directions.

The first direction is the institutional formation of the regional innovation system in Krasnoyarsk Territory. This system is a combination of legal, financial, and organizational structures and mechanisms that support the creation and spreading of innovations, and mutually beneficial commercial implementation of knowledge and technology. To achieve this objective the following tasks shall be resolved.

- creating a favorable environment for the generation of knowledge by identifying priorities in the development of fundamental science, diversification of forms of science financing (increased financial support of the research projects, the development of the grants system to implement innovative projects), increasing the integration of scientific and educational institutions
- establishing the "innovative marketing" system in the region, i.e. identifying the needs of all economy sectors in the innovations by technological forecasting, specifying the priorities of the regional technological development and the list of critical technologies;
- creating conditions for the commercial use of the R&D results, improving the efficiency in the innovative information exchange;
- speeding up the reproduction of human resources capacity of the regional scientific sphere, increasing the average salary in the innovation sector to the level at least twice the average salary in the region;
- speeding up the development of the most important areas of the regional scientific sphere and technology on the basis of regional technological development forecasts;
- improving the competitiveness of the regional branch of applied scientific research through the implementation of project financing in the scientific organizations, forming a network of research centers in the region, refurbishment of the equipment in research centers; supporting small businesses in terms of innovation, motivating regional organizations to participate in international research projects;
- forming mechanisms for the intellectual property protection by establishing a regional system of accounting and control over the use of the rights on the results of scientific and technological activities financed from the budget;
- expanding regional innovation infrastructure by establishing the system of business incubators and technology parks, developing the mechanisms of venture financing, state support for the innovative companies at the stage of starting; providing risk insurance for the innovative companies during the technology investments;
- supporting for import of critical technologies and the purchase of foreign equipment;

- motivating the demand for innovative products from the regional production sector, creating mechanisms to support the export of high technology products.

The second direction if forming the system providing for the regional priorities in the technological development based on large-scale innovation projects implemented by the PPP.

These projects shall be focused on building up the scientific and technical capacity of critical technologies.

The third but one of the most important areas is visualization and encouraging the development of regional clusters. Such clusters shall form the ground to establish stable relations among the participants of the innovation system in the region. For this purpose the following is required:

- forming clusters on the territorial and production basis by stimulating the development of competitive complexes of interconnected productions within the specific area;
- forming and developing special economic zones of industrial and production type;
- coordinating development programs for system forming enterprises and sectors as part of long-term investment programs, as well as through the implementation of specific clusters;
- using in full the mechanisms and levers of development (including the PPP methods), which shall ensure the establishment of the infrastructure basis for the clusters formation (construction of power, network, transport, water and other infrastructures).
- improving the competitiveness of agrarian and industrial complex in Krasnoyarsk Territory.

Another important task to be resolved by the clusters is increasing the efficiency of the small and medium-sized businesses' participation in the agricultural sector. In Krasnoyarsk Territory, only about 9 percent of small businesses are engaged in the agriculture. To form the innovation cluster this percentage shall be 2.0-2.5 times increased.

In case such an innovation cluster is established in Krasnoyarsk Territory, it will be a powerful drive for the development of small and medium-sized

businesses, which in its turn will give an opportunity to develop agriculture in a new way, as well as to shift the regional economy on the innovation track.

Conclusion

The agrarian and industrial complex of Krasnoyarsk Territory has a high innovation potential due to the possibility to provide for the additionality of the sectors by the nature and climatic conditions, resources potential. Transport possibilities, as well as availability o own resources to guarantee the sustainable development of the territorial complex. However, there exists the real threat of depletion of the resources base for the agrarian and industrial complex of Krasnoyarsk Territory as well as increase in the expansion of the producers from other regions and their taking the key positions in the market.

The completed analysis resulted in our conclusion that it is necessary to increase the efficiency of the innovation projects in the agrarian and industrial complex of Krasnoyarsk Territory on the basis of the public and private partnership.

On the basis of the completed research we concluded that the public and private partnership is an effective mechanism for improving the competitiveness of the agrarian and industrial complex of Krasnoyarsk Territory due to the attraction of considerable investments for the modernization of existing and creation of new production facilities, for the development of new technologies, including the management ones as well.

We believe that at the present time in the Krasnoyarsk Territory it is possible to implement the public and private partnership on the basis of cluster approach as an instrument to increase the competitiveness of agricultural enterprises. We developed a scheme to implement the PPP projects for the producers of agricultural products in Krasnoyarsk Territory. The establishment of the PPP-based cluster in this sphere allows engaging numerous sectors: scientific, educational, banking, engineering, and increasing employment and life standards of the population.

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PLENARY SECTION

***Second day*, 17th December 2021**

POST-PANDEMIC TRAVEL INTENTIONS OF URBAN AND RURAL POPULATION

Drago Cvijanović[1], Danijela Pantović[2], Nataša Đorđević[3], Miljan Leković[4]

Abstract

The COVID-19 pandemic brought the whole world into a crisis period that caused sudden changes in the behavior and reactions of the entire world economic system, and the tourism industry was particularly affected. Such changes have especially led to behavioral changes in plans and actions related to travel and tourism. Considering this, the paper aims to investigate issues of perception and planned behavior of urban and rural residents in the Republic of Serbia after the COVID-19 pandemic. A questionnaire was applied and distributed through the Google Questionnaire Application. Data collection and processing was performed in SPSS statistical software package. The results of the research showed that the pandemic only temporarily stopped decisions regarding tourism and travel, and that they will be compensated immediately after the pandemic ends.

Key words: *tourism, COVID-19 pandemic, behavior, plan, Serbia, tourists*

Introduction

The fast growth and positive economic impacts of the tourism industry are the reasons why many countries have decided to plan and develop tourism. The basic condition for tourism growth is the increase in leisure time and household income of people who want to travel. Besides this, technological innovations have made travel planning easier. The tenth year of consecutive growth was 2019, in

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which 1.5 billion international tourist arrivals were recorded (UNWTO, 2020). This growth was interrupted by one of the biggest health crises, the pandemic of a novel coronavirus, which only in 2020 caused a fall of 74% in international tourist arrivals and a loss of USD 1.3 trillion in export revenues (UNWTO, 2021).

Health crises caused the change in tourist flows by reducing it or redirecting it to safer tourism destinations. The COVID-19 pandemic affects tourism globally, and the restrictive measures have left a small number of travel choices. International tourism flows were particularly halted, and domestic tourism is retained in some countries, but at a lower level than in the years before the pandemics. In Serbia, there were 934.440 reported cases of COVID-19 infected people by the 30th of September 2021 (Ministry of Health of the Republic of Serbia, 2021). The total number of tourist arrivals in the Republic of Serbia in 2020 declined by 50.7%; the number of domestic tourist arrivals decreased by 25.4%, while the foreign tourist arrivals fell by 75.9% (Statistical Office of the Republic of Serbia, 2020b). According to Cvijanović et al. (2020), residents of Serbia plan to visit domestic tourism destinations, especially rural tourism destinations, during the pandemic.

To understand the real consequences of the current health crisis, changes in tourist behavior and their plans for travel should be investigated. The pandemic has for sure interrupted tourist flow and changed them, but the question is how does the pandemic change the traveling plans and does that affect future travel decisions?

This paper focuses on plans and perceptions about traveling after the pandemic COVID-19 in Serbia. The aim is to investigate how did the pandemic affect the traveling plans of the urban and rural residents and does that affect their plans for traveling after the end of the pandemics.

Literature review

Since the outbreak of the new coronavirus around the world in 2020, researchers have begun to address these issues and the impact of the COVID-19 pandemic on all sections of society. Tourism is the core industry first and most affected by this virus (Folinas & Metaxas, 2020; Félix et al., 2020).

The pandemic affected both tourism supply and demand (Bakar & Rosbi, 2020). Restrictive measures included lockdowns and this prevents the tourism industry from prosperity. Fear was present even when the situation got better, i.e., when there were fewer people infected with the novel coronavirus, and people delayed and canceled their traveling.

According to research conducted in September 2021 by European Travel Commission (ETC), 35% of respondents plan to travel within the country and also 35% plan to travel to another country in Europe, making 70% of the respondents who plan to travel by January 2022. There are also respondents who hesitate about their traveling (17%), and respondents who are uncertain about short-term traveling. The COVID-19 vaccines encouraged people from Europe to travel during the pandemic (Schengenvisa, 2021). During the pandemic, factors that might be considered before planning a trip are the number of infected in the destination, safety, and hygiene of the tourism destination. Fear may be the main reason why people would not travel. The preference for traveling has changed and people are likely to choose less crowded destinations, and they might travel abroad if they have to visit friends and family (World Economic Forum, 2021).

Tourists from Serbia stated that they perceive as a travel risk COVID-19 pandemic and that safety is a priority during traveling, which is connected to their willingness to respect measures that prevent the virus from spreading (Bratić et al., 2021). Also, according to the study of Perić et al., (2021), the intentions for traveling among Serbian tourists are negatively affected by their risk perception, such as financial, health, and psychological, while a significant indicator for traveling abroad during the pandemic is monthly income.

Health crises are not new for the tourism industry. Like other crises and disasters, they may have huge negative impacts, but also new opportunities and chances for recovery must be found. The pandemic times may be seen as a time for tourism reset (Prayag, 2020). Tourism should be recovered not at previous levels, but to use this time for resetting, and reaching a more sustainable way of tourism development (Brouder & Redux, 2020). The current crisis creates opportunities for rural tourism. Rural areas usually have healthy environments and less population density, which is why domestic tourists opt for rural destinations during pandemics (Cvijanović et al. 2020; Vaishar & Šťastná, 2020).

Data and methodology

This research paper used a quantitative methodology that the authors implemented in the territory of the Republic of Serbia in the period March - October 2021. The aim of this paper is to understand the behavior of tourists after a COVID-19 pandemic. The paper focuses on assessing planned behavioral changes related to travel after a pandemic. The questionnaire was developed

on the basis of previous research into tourist post-pandemic planned behaviors (Li et al., 2020). Measurement items for three independent variables (Subjective Norm, Attitude, and Perceived Behavioral Control) were adapted from other tourism studies such as Chen & Tung (2014) and Wang & Ritchie (2012). Other variables such as Hospitality, Impression, and Post-pandemic Travel Intention were adopted from Li et al. (2020). In addition to specific destination-related questions, the questionnaire also includes socio-demographic issues such as gender, age, region in which the respondent lives, income, education, and area of residence (urban or rural). The results from the questionnaire were processed in the SPSS statistical package commonly used for analyzing the questionnaire. A questionnaire was applied and distributed through the Google Questionnaire Application. The overall profile of survey respondents is shown below (Table 1).

Table 1. Survey respondents' profile.

Variable	Total
Gender	
Male	49%
Female	51%
Age	
21-30	31%
31-40	22%
41-50	22%
51-60	20%
60 or more	5%
Area of residence	
Urban	79%
Rural	21%
Education	
primary education	0.5%
High school	7.9%
academic studies (bachelor's degree)	21.8%
master's degree	14.4%
PhD	55.6%

Source: Author's calculation

Descriptive analysis in Table 1 shows that the survey included mostly residents from urban areas (79%). Only 21% are from rural areas of Serbia. In terms of gender, the structure is almost the ideal half, with 49% of men surveyed and 51% of women.

Results and discussion

The confirmatory factor analysis (CFA) was used to assess the reliability of the model. In our case, the measurement model examines the validity of the theoretical model of tourist behavior after a pandemic.

The Cronbach's coefficient ά (Cronbach, 1951) was used to assess internal consistency. Cronbach's alpha factor for the total sample is 0.737 (Table 2). Nannally (1978) suggests that values ≥0.7 should be considered a priority, indicating that the internal consistency condition of the observed model is met. Table 2 shows the obtained values of model reliability.

Table 2. Reliability Statistics.

N. of Items	R	R Square	Adjusted R Square	Std. Error of the Estimate	Cronbach's Alpha
11	0.794[a]	0.630	0.613	0.55396	0.737
a. Predictors: (Constant), PBC2, I2, H1, H2, SN2, A2, I1, PBC1, A1, SN1					

Source: Author's calculation

Table 3 shows the descriptive statistics of the entire observed model. Table 3 illustrates 11 variables and a total of 229 valid responses. The values available to the respondents ranged from 1 (absolutely disagree) to 5 (absolutely agree). The variable *Impression* (I1 and I2) received the worst grades within the entire model. Thus, respondents generally disagree with the statement *My impression of the destination will be affected by its reported coronavirus recovery rate* (I2) and variable I1: *My impression of the destination will be affected by its number of coronavirus cases reported.*

The highest opinion was given to the variable *Attitude* (A1 and A2), where the highest grade expressed the opinion: *Once this epidemic is over, I believe it is still a good idea to go on holiday to the destination and I intended to visit*.

Table 3. Descriptive Statistics

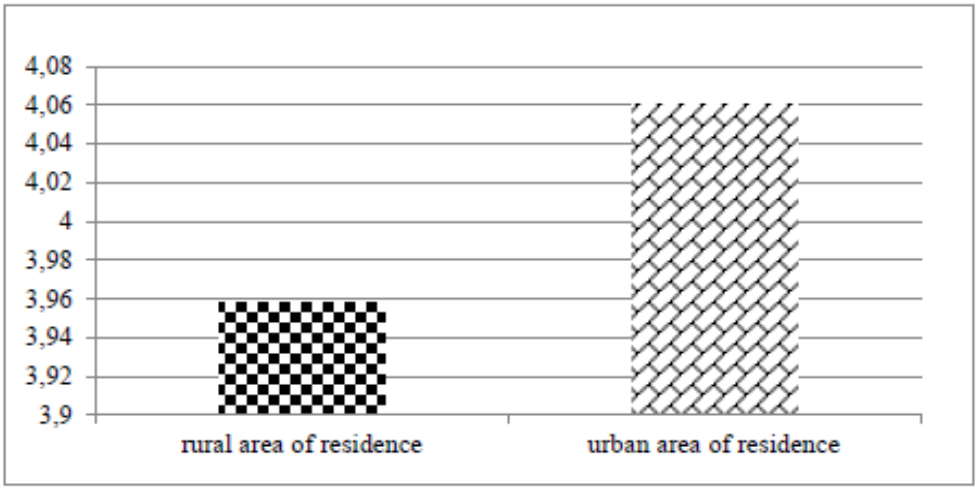
Observed variables	N	Min.	Max.	Mean	Std. Deviation
H1	229	1.00	5.00	3.3013	1.29813
H2	229	1.00	5.00	3.1048	1.19481
I1	229	1.00	5.00	3.2620	1.35122
I2	229	1.00	5.00	2.9127	1.27777
A1	229	1.00	5.00	4.4891	0.84090
A2	229	1.00	5.00	4.3275	0.95154
SN1	229	1.00	5.00	4.3624	0.91985
SN2	229	1.00	5.00	4.1266	0.95359
PBC1	229	1.00	5.00	4.0393	1.03586
PBC2	229	1.00	5.00	4.0175	1.07591
PPTI	229	1.00	5.00	4.3581	0.89010

*** Note: H – Hospitality, I – Impression, A – Attitude, SN – Subjective Norm , PBC - Perceived Behavioural Control , PPTI - Post-pandemic Travel Intention

Source: Author's calculation

In addition to the aggregate sample model, a multigroup analysis illustrating the opinions and behaviors of urban and rural populations during a pandemic is also interesting. In this sense, Figures 1 and 2 show the multigroup behaviors of the urban and rural populations.

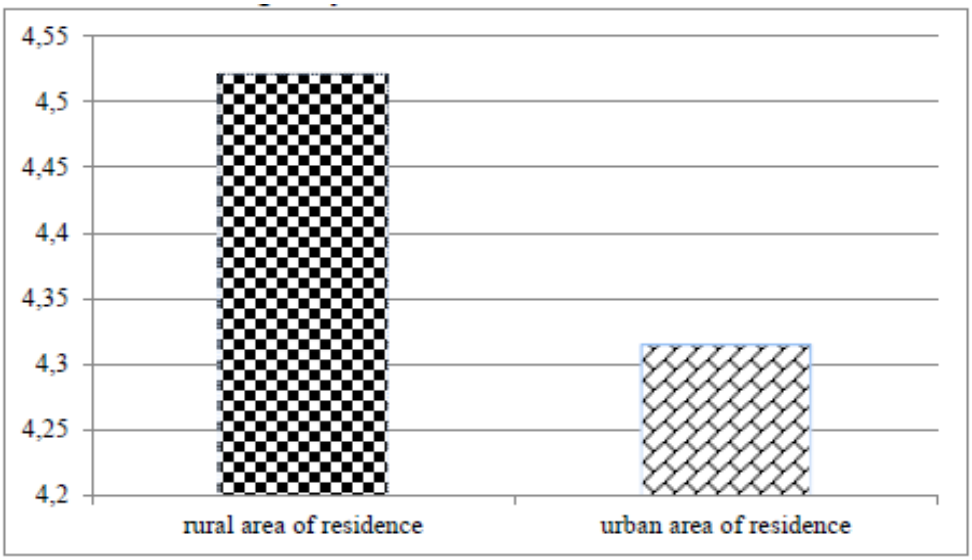
Figure 1. Once this epidemic is over, I will remain financially able to go on holiday in the destination I intended to visit.



Source: Author's calculation

If we look at Figure 1, we can conclude that the rural population will be in poorer financial condition after the pandemic. With that in mind, the question is whether they will be able to visit the intended destination after the pandemic.

Figure 2. After this epidemic, I will go on holiday to the destination I intended to visit originally.



Source: Author's calculation

Quite contrary to the previous Figure 1, the rural population still believes that they will persevere and visit the desired destination.

Conclusions

The current health crisis is testing the resilience of the tourism industry. The pandemic might be under control regarding vaccinations, but it seems to be that the fear regarding safe travel will still be present. On the other side, there is an opportunity for rural areas to attract more domestic tourists, as such areas are seen as less crowded destinations. Therefore, strategies for tourism recovery should consider rural tourism for domestic tourists during the pandemic, and for foreign tourists when travel abroad is possible.

Based on the conducted research, it can be concluded that the pandemic only temporarily stopped travel in the Republic of Serbia. Both the urban population and the rural population, to a large extent, intend to travel and compensate for the shortcomings in travel from the previous period.

For further analysis, it would be interesting to explore the behaviors of both urban and rural populations, as well as modeling the results with more advanced modeling techniques and tools.

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SELECTION OF SUSTAINABLE SUPPLIERS IN AN AGRICULTURAL COMPANY USING THE MULTI-CRITERIA DECISION-MAKING METHOD

Miroslav Nedeljković[1]

Abstract

The decision on selecting a supplier in a business entity represents a great challenge for decision makers. The aim of this paper is to demonstrate the success of deciding on the most suitable supplier in an agricultural company by applying the fuzzy logic of multi-criteria decision-making methods which is based on predefined criteria that included a set of criteria related to supplier sustainability. The subject of research and analysis was a local agricultural company on the territory of the municipality of Bijeljina, which in its everyday business encounters the problem of choosing a supplier of various raw materials. The results of the conducted research showed that after the ranking of the five alternatives offered by the experts in the field, the first supplier is the closest to the ideal solution.

Key words: *multi-criteria decision making, fuzzy logic, TOPSIS method, suppliers*

Introduction

Modern business requires the adoption of timely rational decisions, whether they concern the production process itself or the procurement of the necessary funds for the production process. In this sense, the selection of suppliers of the necessary funds plays a decisive role in the entire business system or one company. The success of the organization is directly affected by the entire supply chain organization, which again largely depends on the correct choice of suppliers (Stević et al., 2019).

Also, Kannan et al., (2013) state that supplier selection is a vital component of any organization.

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When choosing an adequate supplier, an increasing influence is exerted on the preservation of the environment. This primarily arises as a result of the pressure of legal regulations, the buyer and the competitor (Matić et al., 2019). In this way, the "green" criteria are integrated into the final selection of suppliers. The choice of a sustainable supplier implies the introduction of new (green) components in its process (Maksimović et al., 2017). Thus, we get a kind of economic, social and environmental integration in the conventional supply chain.

Sustainability and sustainable development are explained as a combination of economic, social and environmental criteria related to the problem of supplier selection (Nourmohamadi Shalke et al., 2018). Sustainable supplier selection requires the determination of different sustainability objectives and criteria and methods for measuring sustainability. Although there is a large body of research on supplier selection, the literature on sustainable supplier selection is not extensive (Er Kara et al., 2016).

In the recent period, in many papers we find many examples of choosing a sustainable supplier using one of the multi-criteria methods. (Ghadimi and Heavey, 2014; Zhou and Xu, 2018; Hussain and Al-Aomar, 2018; Nourmohamadi Shalke, et al., 2018; Matić et al., 2019, Puška et al., 2021, etc.)

From this brief review of some papers, it can be seen that there are different methods, models and methodologies used to solve the problem of sustainable supplier selection. When developing methodologies and models, multicriteria decision-making tools (MCDM) are mostly used. In the MCDM method, a decision is made based on the evaluation of alternatives according to defined criteria (Puška et al., 2018). The decision is made based on the assessment of alternatives with defined criteria (Rozman et al., 2017), which can be qualitative and quantitative (Rozman et al., 2016). When quantitative criteria are used then classical MCDA methods are used, and if the criteria values are qualitative then fuzzy MCDA methods are used (Govindan et al., 2013; Stević et al., 2019, Nedeljković et al., 2021a; Nedeljković et al., 2021b).

The subject of research in this paper is the procurement of mineral fertilizers as a necessary raw material for the functioning of production in an agricultural company located in the city of Bijeljina. The aim of the paper would be to apply fuzzy logic on the example of agricultural production to make an adequate selection in terms of ambiguity in the answers of experts in the field.

Methodology

The source of data in the paper was the relevant literature from the analysed area as well as the answers of five experts from the subject area. Five suppliers / alternatives of mineral fertilizers were selected, and 13 criteria were used for the selection in the following order: *price, quality, delivery, technical capacity, innovation, supplier reputation, information sharing, impact on the local community, safety and health safety (health), pollution control, waste management, recycling and green product*.

The paper uses TOPSIS as a multicriteria method. According to Yavuz (2016), the TOPSIS method is one of the best techniques for selecting orders based on similarities with the ideal solution, and their application is satisfactory in all areas. Hwang and Yoon were the first to develop this method (1981). Chen (2000) extended this method using triangular fuzzy numbers that replace numerical language scales for grading and weighting.

Using this method, i.e. its fuzzy logic, we have predicted the following steps in this paper:

1. *Create a decision matrix*

2. *Create the normalized decision matrix*

Based on the positive and negative ideal solutions, a normalized decision matrix can be calculated by the following relation:

$$\tilde{r}_{ij} = \left(\frac{a_{ij}}{c_j^*}, \frac{b_{ij}}{c_j^*}, \frac{c_{ij}}{c_j^*}\right);\ c_j^* = max_i\ c_{ij}; \textit{ Positive ideal solution}$$

$$\tilde{r}_{ij} = \left(\frac{a_j^-}{c_{ij}}, \frac{a_j^-}{b_{ij}}, \frac{a_j^-}{a_{ij}}\right);\ a_j^- = min_i\ a_{ij}; \textit{ Negative ideal solution}$$

3. *Create the weighted normalized decision matrix*

Considering the different weights of each criterion, the weighted normalized decision matrix can be calculated by multiplying the weight of each criterion in the normalized fuzzy decision matrix, according to the following formula.

$$\tilde{v}_{ij} = \tilde{r}_{ij}.\tilde{w}_{ij}$$

Where $\tilde{w}_{ij}$ represents weight of criterion c_j

4. *Determine the fuzzy positive ideal solution (FPIS, A*) and the fuzzy negative ideal solution (**FNIS**, $\boldsymbol{A^-}$)*

The FPIS and FNIS of the alternatives can be defined as follows:

$$A^* = \{\tilde{v}_1^*, \tilde{v}_2^*, \dots, \tilde{v}_n^*\} = \left\{\left(\max_j v_{ij} \,|\, i \in B\right), \left(\min_j v_{ij} \,|\, i \in C\right)\right\}$$

$$A^- = \{\tilde{v}_1^-, \tilde{v}_2^-, \dots, \tilde{v}_n^-\} = \left\{\left(\min_j v_{ij} \,|\, i \in B\right), \left(\max_j v_{ij} \,|\, i \in C\right)\right\}$$

Where $\tilde{v}_i^*$ is the max value of i for all the alternatives and $\tilde{v}_1^-$ is the min value of i for all the alternatives. *B* and *C* represent the positive and negative ideal solutions, respectively.

5. *Calculate the distance between each alternative and the fuzzy positive ideal solution* $\boldsymbol{A^*}$ *and the distance between each alternative and the fuzzy negative ideal solution* $\boldsymbol{A^-}$

The distance between each alternative and FPIS and the distance between each alternative and FNIS are respectively calculated as follows:

$$S_i^* = \sum_{j=1}^n d(\tilde{v}_{ij}, \tilde{v}_j^*) \qquad i=1,2,\dots,m$$

$$S_i^- = \sum_{j=1}^n d(\tilde{v}_{ij}, \tilde{v}_j^-) \qquad i=1,2,\dots,m$$

d is the distance between two fuzzy numbers, when given two triangular fuzzy numbers (a_1, b_1, c_1) and (a_2, b_2, c_2), e distance between the two can be calculated as follows:

$$d_v(\tilde{M}_1, \tilde{M}_2) = \sqrt{\frac{1}{3}[(a_1 - a_2)^2 + (b_1 - b_2)^2 + (c_1 - c_2)^2]}$$

Note that $d(\tilde{v}_{ij}, \tilde{v}_j^*)$ and $d(\tilde{v}_{ij}, \tilde{v}_j^-)$ are crisp numbers.

6. *Calculate the closeness coefficient and rank the alternatives*

The closeness coefficient of each alternative can be calculated as follows:

$$CC_i = \frac{S_i^-}{S_i^+ + S_i^-}$$

Results of the research

In this study there are 13 criteria and 5 alternatives that are ranked based on FUZZY TOPSIS method. The table below shows the type of criterion and weight assigned to each criterion.

Table 1. Characteristics of Criteria

	Name	Type	Weight
1	Price	-	(0.077,0.077,0.077)
2	Quality	+	(0.077,0.077,0.077)
3	Delivery	+	(0.077,0.077,0.077)
4	Technical capacity	+	(0.077,0.077,0.077)
5	Innovation	+	(0.077,0.077,0.077)
6	Reputation	+	(0.077,0.077,0.077)
7	Sharing information	+	(0.077,0.077,0.077)
8	Impact on the local community	+	(0.077,0.077,0.077)
9	Safety and health	+	(0.077,0.077,0.077)
10	Pollution control	+	(0.077,0.077,0.077)
11	Waste management	+	(0.077,0.077,0.077)
12	Recycling	+	(0.077,0.077,0.077)
13	Green product	+	(0.077,0.077,0.077)

Source: Author's calculation

The following table shows the fuzzy scale used in the model.

Table 2. Fuzzy Scale

Code	Linguistic terms	L	M	U
1	Very low	1	1	3
2	Low	1	3	5
3	Medium	3	5	7
4	High	5	7	9
5	Very high	7	9	9

Source: According to Kiani Mavi et al., 2016; Mijajlović et al., 2020.

The best alternative is closest to the FPIS and farthest to the FNIS (Table 3 and Table 4) The closeness coefficient of each alternative and the ranking order of it are shown in the table below. (Table 5)

Table 3. The positive and negative ideal solutions

	Positive ideal	Negative ideal
Price	(0.036,0.039,0.052)	(0.041,0.052,0.077)
Quality	(0.053,0.070,0.077)	(0.036,0.053,0.067)
Delivery	(0.046,0.063,0.077)	(0.029,0.046,0.063)
Technical capacity	(0.047,0.066,0.077)	(0.032,0.051,0.069)
Innovation	(0.044,0.065,0.077)	(0.035,0.056,0.073)
Reputation	(0.038,0.057,0.077)	(0.026,0.045,0.065)
Sharing information	(0.033,0.055,0.077)	(0.029,0.046,0.068)
Impact on the local community	(0.037,0.059,0.077)	(0.015,0.037,0.059)
Safety and health	(0.037,0.059,0.077)	(0.015,0.037,0.059)
Pollution control	(0.033,0.055,0.077)	(0.015,0.037,0.059)
Waste management	(0.035,0.056,0.077)	(0.015,0.031,0.052)
Recycling	(0.035,0.056,0.077)	(0.015,0.031,0.052)
Green product	(0.033,0.055,0.077)	(0.015,0.037,0.059)

Source: Author's calculation

Table 4. Distance from positive and negative ideal solutions

	Distance from positive ideal	Distance from negative ideal
Supplier 1	0.08	0.133
Supplier 2	0.13	0.086
Supplier 3	0.144	0.074
Supplier 4	0.114	0.1
Supplier 5	0.081	0.133

Source: Author's calculation

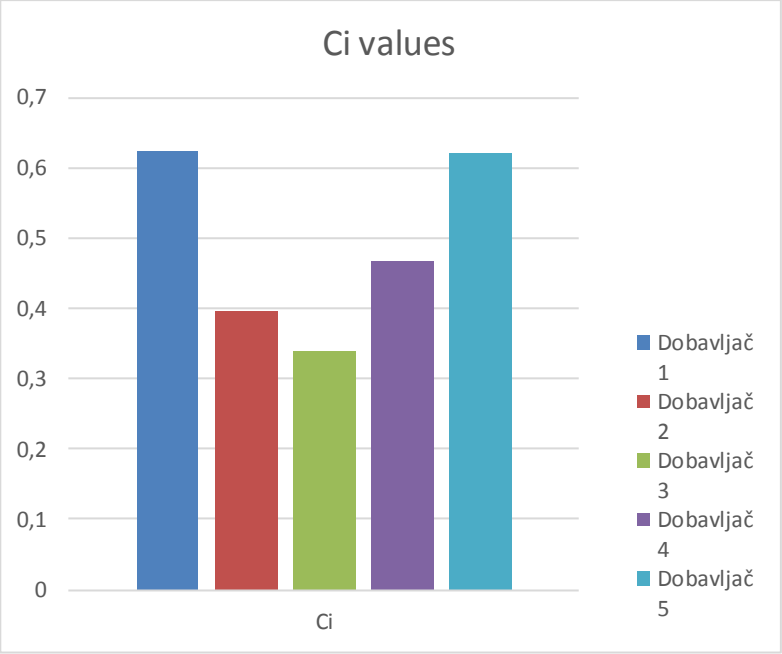
Table 5. Closeness coefficient

	Ci	rank
Supplier 1	0.623	1
Supplier 2	0.397	4
Supplier 3	0.338	5
Supplier 4	0.467	3
Supplier 5	0.621	2

Source: Author's calculation

The following graph shows the closeness coefficient of each alternative.

Figure 1. Closeness coefficient graph



Source: Author's calculation

Conclusion

According to the above, we can conclude the following:

The selection of suppliers is a complex process whose solution requires a rational approach and the use of modern methods of multi-criteria decision-making. Supplier sustainability is an important segment of his choice, especially when it comes to agricultural production and agribusiness. By setting the criteria that refer to it, the quality of the selected material is obtained.

In the case of qualitative value criteria, we should try to use the fuzzy logic of multi criteria decision-making, which gives us a more precise choice of the given alternatives.

According to the processed results by the multi-criteria TOPSIS method, i.e. its fuzzy logic, we conclude that supplier 1 is the most favourable for the selected agricultural company when it comes to the procurement of the raw materials in question. This is immediately followed by supplier 2 with slightly lower performance.

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QUALITATIVE EVALUATION OF FINANCING PROGRAMS IN AGRICULTURAL SECTOR IN SERBIA

Olivera Jovanović[1], *Jovan Zubović*[2]

Abstract

The incentive system is a part of agricultural policy. Activities of the agricultural policies in Serbia are msotly directed towards European integration and harmonized with the requirements of international organizations that assist in financing. In formylating the incentive system, policymakers are facing significant challenges. They include preserving social stability, improving living standards, achieving balanced regional development, and food security. Moreover, they face environmental issues and standards of sustainable development. The subject of this paper is to determine the current situation in the incentive system and estimate its effects on agricultural production in an empirical analysis of agricultural financing programs in Serbia. In the empirical analysis we use qualitative indicators calculated using publicly available secondary data from 2013 to 2019. We evaluate subsidies as an essential part of agriculture policy to estimate their impact. The results show that farmers had the highest interest for direct payments (the number of total approved requests was 20 times higher in 2019 compared to 2015). In addition, data and documents indicate that the incentive system in Serbia is not effective, because funds allocated for certain types of incentives were not claimed (especially in the group - Measures of Rural development). We have formulated several recommendations to agricultural policymakers based on the results of qualitative analysis and concluding remarks.

Key words: *agriculture, incentives, agricultural policy, qualitative indicators, Serbia*

Introduction

In agricultural and rural development of the Republic of Serbia there are three fundamental frameworks, the legislative, the financial and the strategic one (Jovanović, 2021). They are not dependant on each other, but there exists a

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certain level of mutual interaction. The interaction is reflected through financing policy (and consequently, by distributing budget funds) to improve agricultural regional and rural development. **The legislative framework** seems to be the basic framework for doing business in agriculture. It is impossible to achieve maximum results in strengthening agricultural production without legalizing business relations between entities, defining responsibilities, and obligations. Besides the legislative framework, financial and strategic frameworks are important for balanced rural development. **The financial framework** determines the possibilities for financing the rural and agricultural development, while **the strategic framework** determines the direction of future development activities (i.e., priority goals and their realization).

There is a two-way relation between the financial and strategic framework. The strategic framework determines investment priorities in agriculture. Tthey are considered essential for future economic development, based on the results and prioriteis in the past. The financial framework defines possible ways for financing these priorities and allcoates funds according to the type of incentive.

The financial framework of the agricultural and rural development in Serbia is determined on the one side by legislative acts and, on the other, by potential sources of financing. The crucial laws that shape the system of financing agriculture in Serbia are *the Law on Agriculture and Rural Development* and *the Law on Incentives in Agriculture and Rural Development. The Law on Agriculture and Rural Development* ("Official Gazette of the RS" No. 41/2009, 10/2013 - and other laws and 101/2016) is a legal act that regulates the forms of financing and the types of beneficiaries. In addition to incentives, this law has recognized the IPARD program as a form of support to agricultural holdings and companies paid from European Union funds.

The Law on Incentives in Agriculture and Rural Development ("Official Gazette of the RS" No. 10/2013, 142/2014, 103/2015 and 101/2016) relies on the Law on Agriculture and Rural Development. It presents a detailed explanation of forms of incentives, ways for their use, and entities that are eligible for incentives. In addition, the law provides the establishment of the Register of Incentives in Agriculture and Rural Development. The register should collect the data on the type and amount of realized incentives. Data from the Register should be publicly available for analytical and statistical purposes.

According to the legal acts in our country (which directly or indirectly create the business framework for legal entities and farmers in agriculture), sources of

funding can be divided into two categories. The first category are **budget funds** - funds appropriated from the budget Republic of Serbia. The second category aer **other funds -** funds paid from other sources provided by law but have a different form and are not non-refundable.

Methodology

To achieve the goals of regional and agricultural development, it is often necessary to provide a combination of different sources of funding. Although the optimal model has been sought for many years, the universality does not apply (Grujić, 2017). According to its capabilities, each national economy allocates funds from the national budget, foreign sources, banks, and other.

However, the evaluation of approved funds must exist to assess the effects of invested funds and determine future development directions. With qualitative (or quantitative) evaluation, policymakers can control the degree of achievement of implementation in strategic goals. In this paper, the focus will be on a qualitative review of budget funds transferred to agriculture through incentives.

In this paper, the main legal act that regulates the type of incentives, the ways and conditions of using them (which was discussed in the previous paragraphs) is the starting document in analyzing the current system of incentives and their effects. The period of the qualitative analysis is limited by the availability of secondary data that comply with the reasonable level of reliability. This research covers the period 2013-2019. Useful and necessary data for evaluating the effects of approved incentives were collected from the documents adopted annually by the Ministry of Agriculture, Forestry and Water Management. The analysis also includes the data collected from the Directorate for Agrarian Payments.

Many relevant information and data were collected through desk research- They are presented through descriptive and basic indicators such as *the share of individual incentives in total incentives* and *the average value of incentives* from 2013 to 2019. The comparison method was used to analyze the amounts of planned and realized incentives during the observed period.

The results should be used to create appropriate recommendations for policymakers in agricultural economics. Indicators for the qualitative evaluation have been developed in this research: (a) Number of approved requests (current, outstanding, total), (b) Amounts of funds distributed (planned) from the national budget by type of incentive, (c) Degree of realization of incentives in agricul-

ture and rural development (share of realized funds in planned), d) Amounts of subsidies per unit of measure and type. Incentives financed by the budget (according to Serbia's Budget Law) include direct payments, rural development measures, special incentives, and credit support (Zubović, Jovanović, 2021).

Results

Direct payments are one of the forms of incentives for agricultural production and improvement of life quality in rural areas. There is great interest for them in our country. The number of approved requests for direct payments showed significant variations during the observed period. On the one hand, the changes are caused by the interest of agricultural producers in their use. On the other hand, the changes are caused by the allocated budget funds for each year. The highest number of realized requests was recorded in 2017. But, in 2019, almost 20 times more requests were approved than in 2015. The number of realized requests should be compared with the funds allocated from the national budget for incentives in agriculture.

The indicator of the funds for direct payments corresponds to the movement of the total requests approved. Both showed a tendency to grow over time. However, if we look at the average value of the approved requests, it was significantly higher in the first years (in 2015 and 2016). The reason lies in the number of requests, which were significantly less in those years. At the same time, the funds did not show relatively significant variations during the observed period.

Milk production is important for agricultural development and achieving the population's food security. Policymakers should have a more dedicated and serious approach to creating and implementing policy measures to support this agricultural activity. Research results showed that the funds allocated for milk premiums in 2019 were approximately 70% of the funds from 2013. The funds for milk premiums per litre of cow's, sheep's or goat's milk did not change during the seven years (7 dinars per litre). It can be calculated that, on average, the amount of allocated funds could satisfy the average production of 486 million litres of milk. This form of subsidizing agricultural production is characterized by a high degree of realization. In other words, the share of realized funds in the total amount of planned funds for these purposes was above 99 percent (Directorate for Agrarian Payment, 2020).

The analysis of qualitative indicators in this paper showed that *incentives for plant production* have been very interesting for agricultural producers and farmers for years. The average number of requests was about 270 thousand per year. Besides that, the level of funds allocated for these purposes has not reached the level of 2013 yet. As the interest exists, it can be concluded that the approach to this measure should be more careful. First of all, a quantitative analysis should be conducted to estimate the effects of the incentives on plant production. The results should be used to improve their productivity and efficiency in the future. If the obtained results show the improvement of plant production using the incentives, the future funds for these purposes should increase.

In addition to plant production, direct payments also encourage *livestock production*. Over the years, the most significant interest of farmers has been inbreeding dairy cows, fattening cattle, cows for raising calves and beehives. At the same time, there was no interest in some incentives (especially in fishing), although there are funds allocated for their implementation. *Recourses* are the fourth form of direct payments characterized by structural changes. Since 2016, the policymakers have abolished recourses for fuel (primarily due to problems in approving and implementing requests). Until 2017 there was only a category of recourses for fertilizer. Although these payments were very significant for farmers, the policymakers have abolished them. On the other hand, insurance premiums for crops, fruits, perennial crops, nurseries and animals ceased in 2016. Today exists only funds for storage costs in public warehouses.

The results of the analysis point to the following conclusions:

- *Regular planning of budget funds for incentives with no interest by farmers or agricultural producers* – Seven years since the adoption of the Law on Incentives in Agriculture and Rural Development, some budget lines still exists even no requests have been realized so far. That funds could be used for other payments, but they are captured in budget lines without purposes and interests.
- *Inadequate incentives* - There is a possibility that agricultural policymakers are not aware of the real needs in certain agricultural activities. For years, they planned and distributed funds for which there was no interest. Also, it is possible to exist obstacles in meeting administrative conditions for their implementation.

- *Unfamiliar incentives* – Observation of the mentioned data brings into question the adequacy of planning and creation of the agricultural policy. At the same time, there is doubt in the knowledge and awareness of farmers and agricultural producers about the possibilities of using incentives. In other words, are they sufficiently informed to apply and get the right to use them?

The idea for *rural development measures* is based on harmonizing the living standards between rural and urban areas. Measures that include free financial assistance reduce the exodus on the rural-urban relation. At the same time, they provide new job opportunities for the working-age population in rural areas. Also, those incentives are aimed to improve the rural population structure (young people are motivated to stay so that the age structure will be "younger" than usual). The pressure on urban areas will be reduced. Descriptive analysis of the indicators (by subgroups) showed that most budget funds were allocated for incentives to improve competitiveness and achieve quality standards (10.7 billion dinars) in the observed period.

On the other hand, the smallest amount of budget funds was allocated to incentives for implementing local strategies for rural development. (0.7 billion dinars). According to the official data published by the Directorate for Agrarian Payment, there were no realized requests for this type of incentive in 2017 and 2018. On the opposite, only four requests for implementing local strategies for rural development were realized. Since 2017, numbers have shown a growing trend in the funds dedicated to diversifying farmers' incomes and stimulating the rural economy (1.3 billion dinars in total).

More than 60 percent of funds were allocated for investment in rural infrastructure at the beginning of the observed period. However, based on a review of relevant documentation, this type of incentive was abolished without a clear explanation. Another similar situation applied to incentives to improve training in rural development. They were also abolished in 2017. One explanation indicates that in the system of the incentives exists one group for enhancing the creation of knowledge and its transfer. A logical explanation suggests that policymakers abolished the previous group and reallocated funds into this one. Support for young farmers is becoming the dominant form, with a share of almost 50 percent in 2019. The number of realized requests indicates that a significantly higher number of realized requests were in 2017 and 2018, compared to other years. This situation was due to high interest in incentives for young farmers or agricultural producers in rural areas.

Interestingly, after these numbers of approved and realized funds, there is no request realized on this basis in 2019. Unclear numbers and situations indicate the need for further analysis, primarily with the representatives of the Directorate for Agrarian Payments, to establish the causes. The highest degree of realization was achieved in incentives for improving the creation and transfer of knowledge (average 95.2 percent). In contrast, the lowest level of realization was completed in the group of incentives for income diversification (average 58 percent).

Special incentives are the third group of incentives. Their implementation has effects on both agricultural production and sustainable rural development. Their purpose is different from the other two types of incentives. Special incentives are grouped into five smaller subgroups. One of them is intended to implement breeding programs in animal husbandry. They had constant and stable growth. The total number of realized requests by 2019 was 1,713 (428 requests on average per year). The results showed the stability in the number of realized requests and the stability in the growth of allocated budget funds. It can be concluded that farmers are interested in this subgroup of incentives and that selection measures are adequately assessed and meet their needs. This subgroup of incentives has the highest level of realization (98 percent on average per year). The lowest average level of realization has the incentives for promotional activities in agriculture (25 percent on average per year). Those numbers indicate a need for special consideration of policymakers for this subgroup. On the one hand, it is possible that farmers are not sufficiently informed about the ways and conditions of their use. On the other hand, it is possible that the planned amounts of funds do not correspond to the actual needs, which indicates the revision of how these funds are planned and improve this form of the business process.

It is interesting to note that the financing policy in Serbia also supports the establishment and maintenance of data collection systems, continuous monitoring and analysis, and the dissemination and transparency of results. Funds can be used only by entrepreneurs, enterprises and scientific organizations.

Agricultural farms have difficult access to loans from commercial banks compared to other subjects. The policymakers have determined a budget line within the incentive system to eliminate (or reduce) such a gap between economic entities. *Credit support* is a measure that includes payments to agricultural farms to support them in getting credits from banks. This measure was

an integral part of the direct payments in 2013 and 2014. It was separated as a special measure after 2015. Since then, around 2.3 billion dinars have been allocated for this purpose. Most funds were approved in 2017 and the least in 2015. The number of realized requests has been 423 from 2017 till the end of the observed period.

Conclusions

When analyzing incentives in agriculture and the effects of subsidies granted to agricultural enterprises and/or individuals at a national level, the level of implementation is emphasized as an important qualitative indicator. The value of this indicator reveals: (a) The quality of the annual budget plan and the structure of the incentive system, (b) The compliance of farmers' needs and policy measures; (c) The compliance of strategic and legislative documents in agriculture and rural development; (d) The expertise of personnel in charge of monitoring the incentives and projections of future needs in agriculture.

By reviewing all relevant strategic and financial documents, we conclude that the current state of agricultural financing policy does not fully reflect its real needs. Although policymakers undertake strong efforts to set up a system as efficient as possible, it does not seem to be based on empirical evidence. At the same time, the adopted strategic documents set goals for the development of agriculture but without clear indicators for their monitoring. Previous evaluation of the undertaken activities was not available.

The Directorate for Agrarian Payments is the first and most important institution responsible for agriculture and rural development subsidies. It assists farmers in registering in the official Register of Agricultural Farms, applying for incentives, and others. At the same time, as one of the Agriculture and Rural Development Strategy goals is to encourage co-operation with scientific research institutions, the Directorate for Agrarian Payments should be the most essential (micro and macro) data creator that could serve in various economic and non-economic research.

Recommendations for agrarian policymakers based on our research are the following:

- **Create indicators to monitor the implementation and estimate the impact of the incentive systems -** Indicators used in this paper have been developed to evaluate the incentive system over a six-year period. They can also be used for future evaluations of the effects of

approved incentives. In addition to the indicators used in this research, more indicators could be created depending on the data availability. An indicator of the Participation of Approved Requests by type of incentive in the total number of requests received could be created. It would be especially important to track the requests submitted but not approved to determine differences in incentive users.

- ***Conduct cost-benefit*** **analysis of the subsidy policy -** One of the methods to evaluate the incentive system is to conduct a cost-benefit analysis. It can estimate the economic efficiency of the subsidy programs, expressed as the relationship between the cost of the program (all expenditures resulting from its implementation) and the benefits of the program (all gains resulting from its implementation). This would reveal all the benefits that the agrarian subsidy system can achieve. The method is complex, and it requires the inclusion of experts from different fields, but the results would unequivocally contribute to improving the subsidy policy and agricultural production.
- **Increase appropriations for state support with the greatest effects –** Qualitative analysis of the indicators show that there are subsidies with a low level of efficiency. Guidelines for future planning directs agrarian policymakers need to consider reasons for low efficiency and possible instruments to increase it. If farmers are not sufficiently familiar with all forms of subsidies, educational seminars should be provided, along with promotional materials and assistance when applying for subsidies. At the same time, if there is no sufficient demand for some subsidy, the funds should be reallocated to others that are more needed. Finally, the efficiency of subsidies for livestock production needs to be considered in particular.

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AGRICULTURAL POLICY AS AN ELEMENT OF SUSTAINABLE RURAL DEVELOPMENT OF THE REPUBLIC OF SERBIA

Petar Veselinović[1], Danijela Despotović[2], Lela Ristić[3]

Abstract

A key segment of economic policy focused on the development of agriculture and cooperatives pertains to agricultural policy. Agricultural policy is most commonly defined as a set of economic policy measures defining a strategy for achieving goals concerning integrating the agricultural sector into the development of the national economy and the international division of labor.

One of the fundamental directions of the agricultural policy of the Republic of Serbia should be the revival of agricultural production and villages. In order to achieve these goals, the state, through agricultural policy measures, should support more intensive production and provide the basis for generating higher income in agribusiness. Economic measures to direct the development of the rural sector in the Republic of Serbia are of a financial nature and relate to the tax system and tax policy, pricing policy, investment and credit policy, foreign trade policy, insurance policy and commodity reserves. In addition, it is necessary to concentrate agricultural policy measures on rural areas, that will improve living standard and rural economy by means of investing in agricultural production and processing equipment, construction and renovation of rural infrastructure, education and training of rural population, improvement of rural tourism and cultural values.

Key words: *agricultural policy, rural development, government support, agricultural loans, exports.*

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Introduction

Agricultural policy, which includes a set of measures, instruments, programmes, plans, strategies and corresponding elements relevant to agricultural development, is implemented institutionally and as such greatly affects the development of rural areas, where agricultural production takes place. In order to achieve sustainable rural development, it is important that agricultural policy, as a part of rural development policy and overall national development policy, be adequately conceived and consistently implemented in practice in the long-term period, since sustainable development of each segment of the economy and each specific area, requires long-term commitment concerning the process of realization of economic, environmental and social development goals. These components of sustainable development have a particular significance for rural areas, thus, in the context of agricultural policy and in modern conditions they are gradually coming to the fore.

Having in mind the importance of the agricultural sector and the policy that guides its development, as well as the importance of sustainable development of rural areas, where the development of agricultural sector actually takes place, a large number of authors across the world explore this topic from different aspects, bringing into view numerous experiences, theories, models and examples of good practice (D'Souza & Gebremedhin, 1998; Vujičić & Ristić, 2007; Lindberg et al., 2012; Pejanović et al., 2017; Despotović et al., 2019; Nasiri, 2020; Veselinović et al., 2021; Wang & Wei, 2021; Dastagiri & Sindhuja, 2021; etc.).

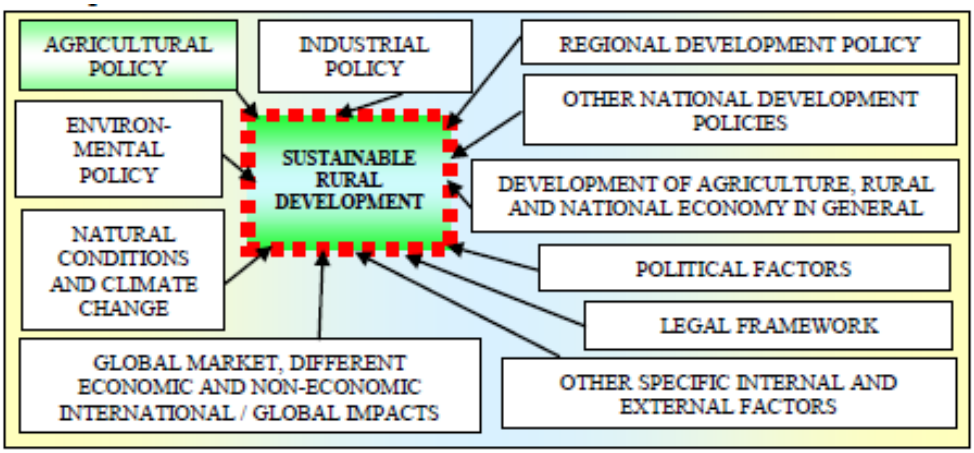
The subject of the research conducted in this paper is agricultural policy, as a determinant of sustainable development of rural areas in the Republic of Serbia. The aim of the research is to accentuate the exceptional importance of adequate development and successful implementation of agricultural policy for achieving sustainability of rural development in the Republic of Serbia.

The paper uses the methods of description and comparison, as well as historical, analytical and synthetic methods, in order to clearly present the relevant current, i.e., present and future directions of agricultural policy development, which can contribute to the revitalization and sustainable development of rural areas in the Republic of Serbia; however, these need to be adequately implemented at all levels of development, starting from the competent institutions, i.e., line ministries and local governments and ending with family farms and their associations.

The impact of agricultural policy on sustainable rural development

The sustainability of rural development depends on a number of economic and non-economic factors (Figure 1). Agricultural policy is only one of the factors pertaining to sustainable rural development, however, it is recognized as one of the most important factors within the sustainability framework; if we examine the certain phases and periods of development, the agricultural policy comes forth as the most important factor in rural development. The place and the role of agrarian policy within the framework of a country's economic policy is of particular importance, especially if there are favorable natural conditions for the development of agriculture, commonly referred to as free agricultural inputs provided by nature. In addition, the tradition of practicing agriculture in rural areas, as well as the success of exports of certain agri-food products, are additional motives for the development and implementation of adequate agricultural policy. Nevertheless, the basic content of the agricultural policy and its consistent implementation in practice, significantly determine the economic, environmental and social effects of the policy's adopted and implemented measures. These effects of agricultural policy are at the same time important components of sustainable development of rural areas, and as such are of exceptional importance.

Figure 1. Agricultural policy as one of the key factors of sustainable rural development



Source: Authors.

There are numerous examples of good agricultural and rural practices implemented by many countries, especially the European Union (EU) Member States implementing the Common Agricultural Policy (CAP) as a part of acquis communautaire. The rural development within the CAP framework

represents one of the key goals, priorities, pillars, directions, concepts and contemporary challenges. The effect of the EU's Common Agricultural Policy on agriculture and rural development of EU Member States is an issue that is much researched by many authors, including Gallerani, et al. (2010), Papadopoulos (2015), Schuh, et al. (2020) and etc. Considering the fact that the Republic of Serbia is a EU candidate country and in view of the EU accession and harmonization process it is important to monitor regulations, trends and modernization of agriculture and rural economy of the EU, in order to step up adaptation and development of the domestic agri-food sector which should transform into a modern agribusiness system, as well as achieve revitalization and more advanced, i.e., long-term successful development of rural areas on a sustainable basis. Sustainability of development in modern environment is gaining in importance, especially in rural areas characterized by a strong health and environmental component, local tradition, culture and economy that is less intense and less polluting compared to urban areas.

Agricultural and rural policy of the Republic of Serbia

The agricultural and rural policy of the Republic of Serbia includes measures, instruments, strategies, programmes, plans and other relevant elements and activities implemented by the competent authorities in the Republic of Serbia with the aim of achieving sustainable development of domestic agriculture and rural areas. The incentives are directed to a certain group of users, such as market-oriented farmers, cooperatives, local governments, associations and other economic entities involved in agricultural production, processing or marketing of agri-food products. In addition, farms registered in the Register of Agricultural Holdings, as well as other entities and organizations involved in agriculture, have the right to incentives, in accordance with the applicable laws and regulations (Law on Agriculture and Rural Development, "Official Gazette of RS", No. 41/2009, 10/2013 - other law, 101/2016 and 67/2021 - other law).

Although the outline of key elements of agricultural and rural policy of the Republic of Serbia (Table 1) indicates the presence of almost all important factors necessary for the implementation of modern agricultural and rural policy as an element of sustainable development of agriculture and rural areas, in practice, implementation of agricultural and rural policy shows weaknesses which need to be solved.

Table 1. Key elements of agricultural and rural policy of the Republic of Serbia in accordance with the relevant legal framework

❖ **Agricultural and rural policy goals:**
• production growth and agricultural producers' income stability; • competitiveness growth, including adaptation to the requirements of the domestic and foreign markets and technical and technological advancement of agriculture; • sustainable management of natural resources and environmental protection; • improving the quality of life in rural areas and reducing rural poverty; • efficient management of public policies and improvement of the institutional framework for the development of agriculture and rural areas.
❖ **Agricultural and rural policy is implemented based on:**
• Republic of Serbia agricultural and rural development strategies; • National Agriculture Programme; • National Rural Development Programme; • IPARD programme.
❖ **Types of incentives included in agricultural and rural development policy:**
• direct incentives: premiums, production incentives, recourses, support to non-commercial agricultural holdings; • market incentives: export incentives, storage costs, loans; • structural incentives: 1) rural development measures to improve competitiveness in agriculture and forestry (investments and introduction of standards), environmental protection, biodiversity conservation, diversification of the rural economy and improvement of the quality of life in rural areas; 2) improvement of protection and quality of agricultural land - improvement of physical, chemical and biological properties of soil, anti-erosion measures, control measures, soil testing, land consolidation, land reclamation, farmland restoration; 3) institutional support measures encouraging agricultural research programmes, advisory services programmes, promotion of agriculture, agricultural market information system of the Republic of Serbia and etc.

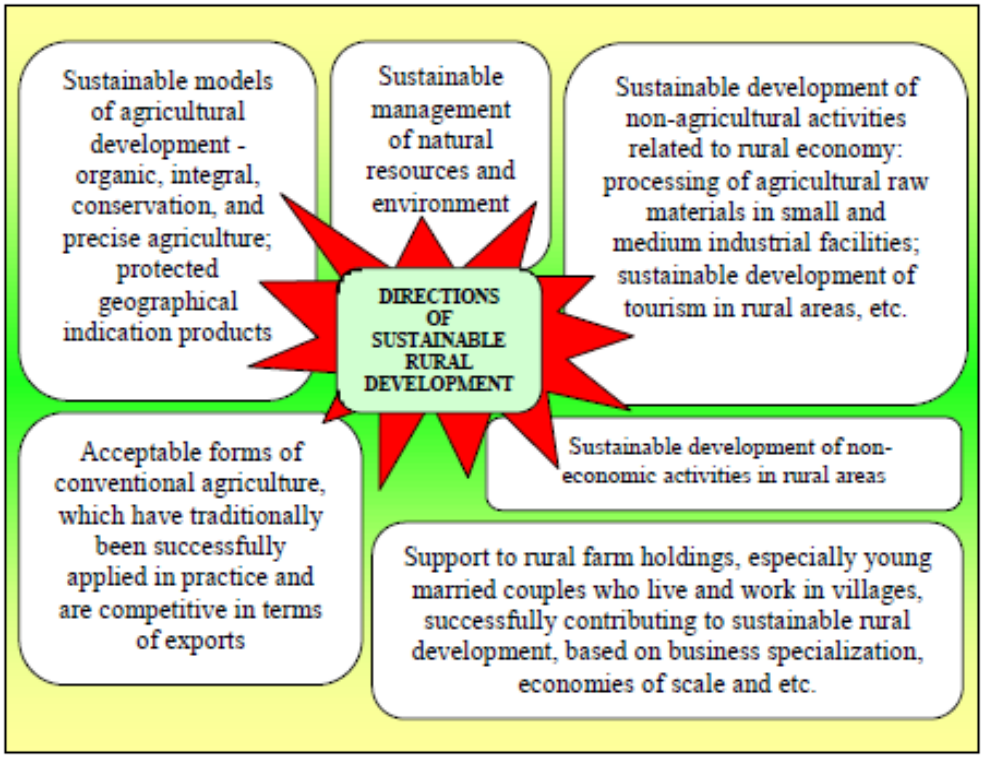
Source: Law on Agriculture and Rural Development, "Official Gazette of RS", No. 41/2009, 10/2013 - other law, 101/2016 and 67/2021 - other law.

Namely, a more substantial and stronger institutional support must be provided to domestic agricultural producers, in terms of consolidation of holdings, purchase and placement of products, replacement of obsolete machinery, agricultural insurance, development of cooperatives, rural infrastructure and tourism, subsidizing primary agricultural production and favourable non-agricultural activities in rural areas, with special attention to the demographic structure of rural areas and other socio-economic and environmental components of rural development, in line with the principles of sustainable development.

Future directions of agricultural policy relevant for sustainable rural development of the Republic of Serbia

Agriculture, as an economic activity implemented in the Republic of Serbia, has a very long tradition and is supported by significant natural resources; in addition, in rural areas, i.e., the villages in Serbia, there is a significant number of inhabitants, and therefore, the agricultural sector and rural areas should receive considerable attention in terms of budget support, investment and project activities, education and modernization of business, especially due to a number of aggravating internal and external factors, which today strongly affect the development of urban and rural areas alike.

Figure 2. Possible directions of sustainable rural development



Source: Authors.

It is imperative that the future directions of the agricultural policy of the Republic of Serbia supporting the sustainable rural development (Figure 2), consider all the problems the domestic farmers and non-agricultural rural population face today, which primarily includes the realistic estimation of

the available resources that, in modern conditions, can be used more creatively in the process of development of agriculture and rural economy as a whole. Numerous benefits can be achieved that also support other sectors, i.e., non-agrarian rural economy and population, which is especially evident when it comes to the choice of tourist destinations by the people living in urban areas, which in changed modern conditions are more likely to spend their holidays in less populated areas, surrounded by healthy natural environment.

In order to redirect financial resources and other incentives, such as tax reliefs, soft loans and subsidies aimed at improving quality of products and services, to rural areas by means of implementing agricultural policy, more significant expected benefits from rural areas for the society must be achieved. Accordingly, the rural economy and non-economic rural activities can attract more attention, and therefore more budget funds, investments, infrastructure and other projects, entrepreneurs, tourists, etc. In this respect, rural areas in Serbia have much to offer, particularly concerning the possibility of producing various primary agricultural products, raw materials for industrial processing, resources for the development of various types of sustainable tourism in rural areas, i.e., different types of tourist offer based on rural resources (agro-tourism, rural tourism, eco-tourism, ethno-tourism, tourism of special interests, weekend tourism, family, educational and event tourism, etc.). Therefore, the task of the state is to primarily and thoroughly create a more stimulating environment for sustainable development of rural areas, that is, to provide the necessary support to farmers and non-agricultural rural population. In this way, benefits can be expected not only for rural areas, but also for urban areas, population and economy.

The state has a variety of support instruments at its disposal, which should be carefully selected and timely implemented in line with identified needs and capabilities, in each specific area, as well as in accordance with specific requirements relating to each product and development period. Namely, a number of measures are available, such as economic measures, i.e., financing policy, subsidies, pricing policy, investment loans, foreign trade policy, insurance policy, commodity reserves, as well as measures prescribed by the land policy, technical and technological measures, which are of organizational, institutional and administrative nature. In order to achieve sustainable rural development, appropriate tax relief is required supported by soft loans, better conditions for the purchase of primary products, subsidies for the process of certification and standardization of quality products and services, technological modernization of the rural economy and etc.

The state has the highest capacity and authority, but also the greatest responsibility to direct the development of rural areas of the Republic of Serbia in a promising direction, while providing benefits for domestic rural and other non-rural population that is directly or indirectly linked to rural areas. Indeed, in addition to the state, other economic and social actors must contribute to sustainable rural development in line with their activities, economic strength and other available capacities for development.

Conclusion

The research conducted for the purposes of this paper pointed out the exceptional importance of agricultural policy for sustainable rural development of the Republic of Serbia, therefore confirming the findings of many previous studies dealing with these issues, which all in their own unique way research and indicate the relevance of agricultural policy for sustainable development of rural areas in the Republic of Serbia. This paper in the distinctive and original way examines the role and importance of agricultural policy of the Republic of Serbia. In addition to the policy's basic elements, which greatly influence the directions of rural development, the influence of other internal and external factors is considered, since all of them significantly determine the directions and intensity of rural development in economic terms, as well as the environmental and wider social context. Therefore, it is concluded that the agricultural policy and its implementors are the factors that are most relevant for the future development of rural areas on a sustainable basis. Accordingly, the importance of a realistic view of resource potentials, problems and limitations of domestic agriculture and rural economy is emphasized, meaning that a more modern agricultural policy, as one of the most powerful instruments for agricultural and rural development, would contribute to long-term and successful development of agri-food sector and non-agricultural activities in rural areas. The adoption of appropriate agricultural policy measures and their successful implementation in practice must be aimed at solving the problems that currently burden agriculture and the non-agricultural rural economy the most and which can only be overcome by means of providing adequate state support. Sustainable rural development can provide a number of socio-economic and other benefits to rural communities and urban areas that are directly or indirectly, in development terms, dependent on the sustainability of rural development. In terms of agricultural policy, priority should be given to domestic farmers and domestic enterprises that rely on rural resources, regardless of whether they operate in urban or rural settlements.

Cost-effectiveness of investing in rural areas, technological modernization of rural areas, increasing the size and capacities of family farm holdings, quantity and quality of production, including special care for environmental aspects of rural development and much better demographic situation in Serbian villages, are priorities that require creating of a more stimulating development environment which would support sustainable development of rural areas and the national economy as a whole.

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ARABLE FARMS' PERFORMANCE IN THE REPUBLIC OF SERBIA – DOES THE FARM SIZE MATTER?[1]

Saša Todorović[2], Sanjin Ivanović[3]

Abstract

Agricultural production in the Republic of Serbia is characterised by the dominance of small family farms. The aim of this research is to evaluate arable family farms' performance and to examine the relationship between farm performance and farm size. Three groups of indicators (total input to total output ratio, relative importance of subsidies and financial stress) were analysed according to the farm size to capture the overall farm performance. Farm-level data (from a dataset developed as an outcome of a regural annual study on a representative group of farms) were used to describe economic and structural characteristics of arable family farms in the lowland area of the Republic of Serbia. The farms were divided into three groups, depending on the size of their arable land. The analysis performed for the period 2009–2020 revealed that the total input to total output ratio and the relative importance of subsidies are the most favourable for the biggest farms. On the other hand, the biggest farms are exposed to an increased level of financial stress.

Key words: *farm performances, farm size, arable farms, family farms, Republic of Serbia.*

Introduction

Arable farms' performance is the result of various factors, of which access to production resources and technologies as well as agro-climatic conditions play a major role. When it comes to field crop production in the Republic of Serbia,

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the territory of the Autonomous Province of Vojvodina (APV) is recognised as the most important given that APV is a production area that is recognisable by favourable natural and socio-economic conditions for organising field crop production (Todorović, 2018a). The APV includes seven provincial administrative districts and covers an area of about 21,506 км² (Figure 1).

Figure 1. Districts of the Republic of Serbia (research area)[4]

As reported by the 2018 Farm Structure Survey done in the Republic of Serbia (SORS, 2019), almost a half (45.29%) of utilised agricultural area (UAA) of the Republic of Serbia is concentrated in the APV. Besides that, this area involves approximately 127,071 farms, characterised by intensive farming practices, where more than 99% are family farms. Farms concentrated in that area are also the largest in terms of their economic size (the average economic size is 16,273 euros), which is almost twice as much as the average economic

4 Due to the lack of data for the Autonomous Province of Kosovo and Metohija for the studied period, all data and estimations pertain to the Republic of Serbia but exclude this province.

size of farms in the Republic of Serbia. The structure of farms by types of production shows that arable farms are dominant in the APV (53.3%), having the largest share (75.1%) of UAA of the APV. However, the average arable farm size in APV is relatively small (17.51 ha), especially if taken into account that the UAA is one of the most important determinants of their income. It is also evident that the increase in farm size has a very favourable effect on the efficiency of field crop production (Bošnjak and Rodić, 2011; Munćan, 2011; Todorović, 2014; Todorović, 2018a; Todorović, 2018b; Todorović and Munćan, 2009; Vasiljević and Sredojević, 2005). At the same time, it should be borne in mind that agricultural land is increasingly becoming a limiting factor for the optimal use of other production resources for a large number of arable family farms in the APV (Todorović, 2018b). Therefore, it is necessary to pay particular attention to the improvement of existing production practices in field crop production, with special emphasis on the efficient use of limited production resources, which is also an integral part of the European Commission's Roadmap for a resource-efficient Europe (European Commission, 2011). Assuming that access to limited production resources is not the same for arable family farms of different sizes, the aim of this research is to evaluate arable family farms' performance and examine the relationship between farm performance and farm size.

Material and method

Bearing in mind that the analysis of the ownership structure has shown that family farms of less than 5 ha are dominant (amounting to 55.58% of family farms in research area), but comprising only 10.45% UAA of the research area and the fact that such farms seem likely to keep producing for their own use while being less incorporated into the markets even upon joining the European Union (EU) (Kostov and Lingard, 2002), further research covered only bigger arable family farms. Also, for the purpose of this study, family farms larger than 50 ha of UAA were excluded from the analysis since they make up only 3.02% of family farms of the research area and have 28.88% of UAA. Using these criteria, a group of arable family farms entered into the Register of agricultural holdings (in active status) was chosen to be a subject of further research. In this way, it was possible to homogenise the sample.

Since the necessary statistical data are not available for adequate analysis of the impact of arable family farm size on farm performances, the data required to undertake an analysis were generated from the research team's dataset. The

dataset was made from the data collected in a representative sample of arable family farms from the lowland areas of APV, and it was used for annual monitoring of farm business performances. The research sample included 45 farms divided into three groups according to the farm size (very small – VS (5–20 ha), small – S (20–35 ha) and medium – M (35–50 ha)) covering the 12-year period (2009–2020). The farms were selected in such a way that all groups of farms were represented across the sample.

To capture the overall farm performance, three groups of indicators (total input to total output ratio i.e. total cost ratio, relative importance of subsidies and financial stress) were analysed according to the farm size.

Different measurement ratios (Bošnjak and Rodić, 2006) and financial performance indicators (Munćan et al., 2010) may be employed to determine the economic performance of arable family farms. We used total cost ratio (TCR) (Davidova et al., 2002; Bojnec and Latruffe, 2013; Todorović, 2014; Todorović, 2018a; Todorović, 2018b) calculated as follow:

$$\text{Total cost ratio} = \frac{\text{Total input (EUR)}}{\text{Total output crops and crop production (EUR)}}$$

The analysis was extended to take into account subsidies and the opportunity cost of own factors (family labour, own land and own capital), which allowed us to assess the total cost ratio with and without subsidies and opportunity cost. Taking into account the results of the conducted analysis, family farms with a cost ratio lower than 1 were considered profitable, while family farms with a cost ratio higher than 1 were considered unprofitable.

In accordance with the previous findings, research corroborates that subsidies, in terms of production costs, play an increasingly important role in the operation of arable family farms (Munćan et al., 2014; Todorović, 2010; Todorović and Filipović, 2010; Todorović, 2014; Todorović, 2018a; Todorović, 2018b) which is why the relative importance of subsidies over the whole farm receipts (RIoS) (Bojnec and Fertő, 2019) was analysed:

$$\text{Relative importance of subsidies over the whole farm receipts (\%)} = \frac{\text{Total subsidies excluding subsidies on investments (EUR)}}{\text{Total output crops and crop production (EUR)} + \text{Total subsidies excluding subsidies on investments (EUR)}} \times 100$$

At the same time, the considerable importance of costs of rent and interest for farm economic performance in years characterised by weather extremes (Todorović et al., 2021) resulted in the inclusion of financial stress (FS) (Latruffe et al., 2008) in the analysis:

$$\text{Financial stress (\%)} = \frac{\text{Rent paid (EUR)} + \text{Interest paid (EUR)}}{\text{Total output crops and crop production (EUR)}} \times 100$$

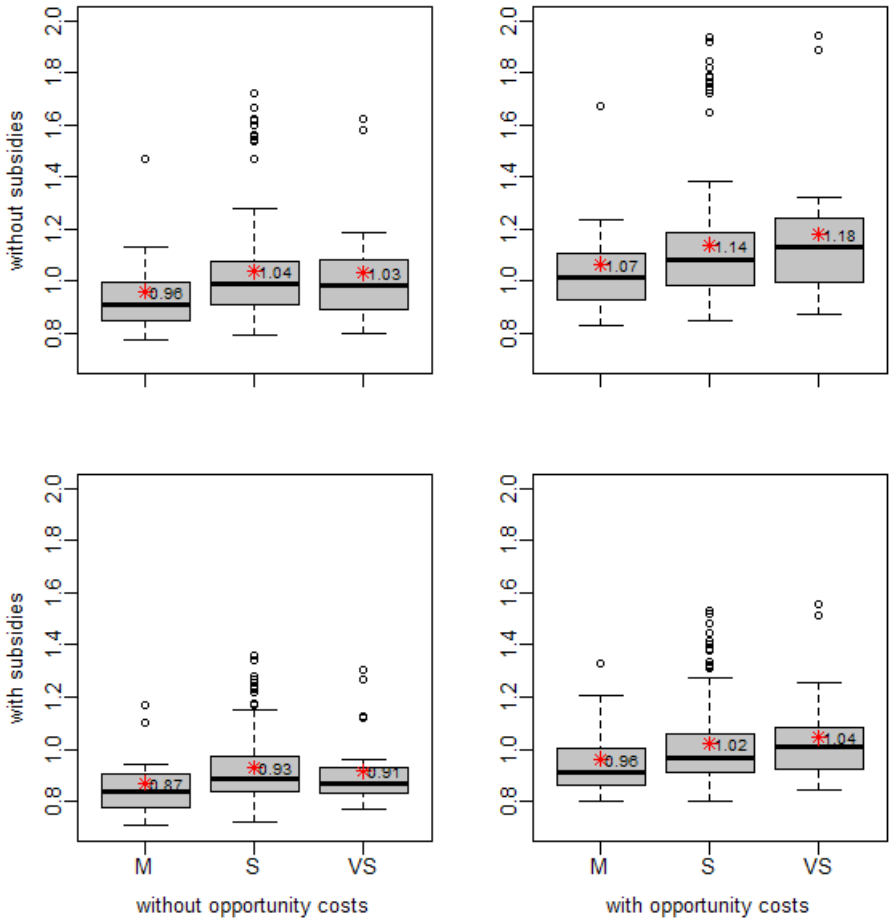
Finally, a comparative analysis was carried out to determine if there were statistically significant differences in farm performance across three various size groups of arable family farms. The Kruskal-Wallis test was used to examine differences in the farm performances among three different size groups of arable family farms. As this test only determines a statistically significant difference in farm performance across three distinct size groups of arable family farms, the Wilcoxon rank sum test with Bonferroni's correction for multiple testing was employed to discover which groups showed statistically significant differences regarding the farm performance.

Results and discussion

An average observed arable family farm size was 29.09 ha (ranging from 12.90 ha to 49.00 ha), and it is over the average arable farm size in the APV. Nevertheless, it should be kept in mind that the research included only bigger arable family farms entered into the Register of agricultural holdings (in active status), which explains the difference. When it comes to the sowing structure of observed arable family farms, it was found that agricultural land was used for growing cereals (maize and wheat) and industrial crops (sunflower and soybean). Maize dominated in sowing structure (48.26%), followed by wheat whose participation was 27.98%. Therefore, it could be concluded that cereals represented the dominant group of crops within the sowing structure of observed arable family farms. Regarding the participation of industrial crops, it could be noticed that soybean, on average, was slightly more dominant in a sowing structure than sunflower (12.06% compared to 11.72%).

The total cost ratio for observed arable family farms indicates that, without subsidies, on average, only medium-sized farms were profitable only in the case when opportunity costs were not taken into account (Figure 2).

Figure 2. The total cost ratio for the different farm sizes in the period 2009–2020 (*Box plot*[5])



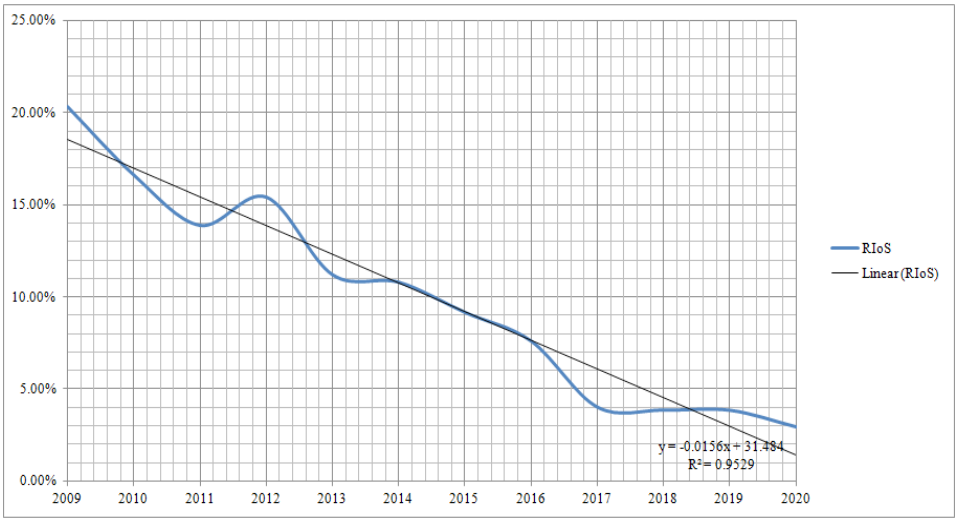
Source: Authors` calculation

Therefore, without subsidies, when opportunity costs are included in the calculation, on average, observed arable family farms cannot cover their costs of production and create a loss. Even if subsidies are included in the calculation, only medium-sized farms will be profitable if opportunity costs are taken into account. By excluding opportunity costs and including subsidies in the calculation, observed arable family farms, on average, become profitable, with the average value of this indicator for farms of all sizes being well below 1. This might imply a straightforward conclusion concerning arable family farm

5 ∗ denotes the mean value of the indicators.

profitability. However, the fact is that when budget transfers are deducted, and especially when own factors are valued, it can be seen that, on average, the profitability of observed arable family farms decreases significantly. This indicates the importance of subsidies for the profitability of observed arable family farms, which is why the relative importance of subsidies over the whole farm receipts was analysed (Figure 3).

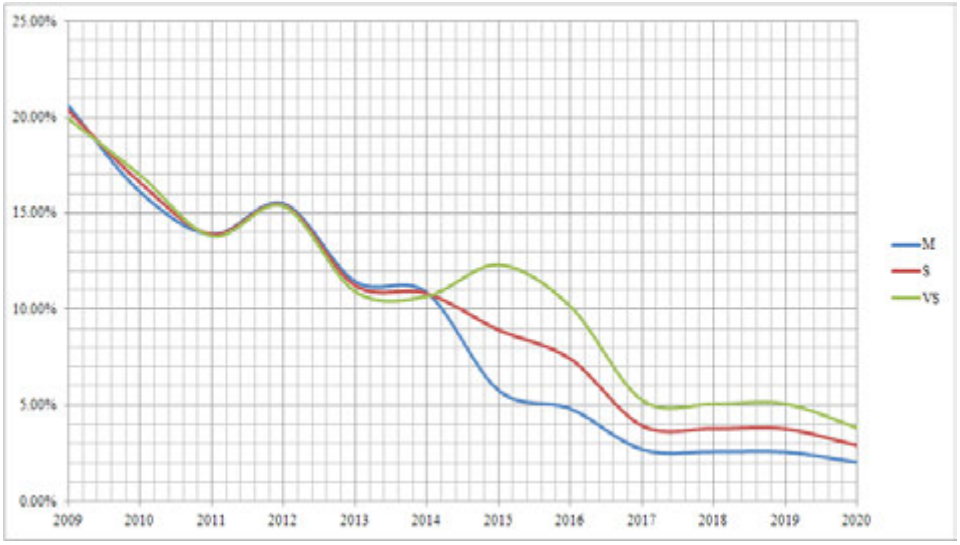
Figure 3. The relative importance of subsidies over the whole farm receipts from 2009 to 2020 (%).



Source: Authors` calculation

It is evident that there is a decrease in the relative importance of subsidies over the whole farm receipts during the observed period. Hence, the agricultural policy of the Republic of Serbia has been defined by recurrent variations within the policy framework, the implementation method, and the scale of the support throughout the last decade. Internal political issues and the EU accession process aimed at gradually aligning Serbian agriculture policy with the Common Agricultural Policy of the EU drove these policy variations (Bogdanov and Rodić, 2014; Bogdanov et al., 2017). When it comes to this indicator, a particularly pronounced decline was recorded in 2015, both in medium-sized and to a lesser extent in small-sized farms (Figure 4).

Figure 4. The relative importance of subsidies over the whole farm receipts for different farm sizes from 2009 to 2020 (%)

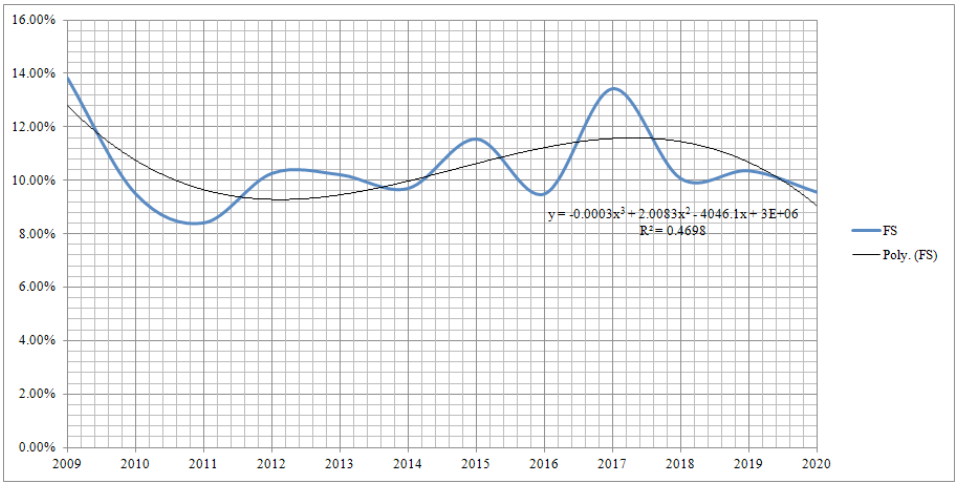


Source: Authors` calculation.

This could be due to the fact that the maximum area eligible for area payments was significantly decreased from 100 ha to 20 ha in 2015. Due to the low eligibility level, area payments (mostly for larger farms) resembled a lump sum payment program (Bogdanov et al., 2017). Therefore, it is obvious that subsidies had had almost equal importance for all sizes of observed arable family farms by 2015. On the other hand, a change in the 2015 agricultural policy affected, to a various extent, farms of different sizes regarding the relative importance of subsidies over the whole farm receipts. Here, it should be emphasised again that this research comprised only arable family farms ranging from 5 ha to 50 ha, so the relative importance of subsidies over the whole farm receipts would have even smaller values for farms cultivating over 50 hectares.

The results of the analysis conducted also show that the observed arable family farms, during the observed period, were the most exposed to financial stress in 2012, 2015 and 2017, that is, during the years characterised by extreme weather conditions expressed in the form of drought (Figure 5).

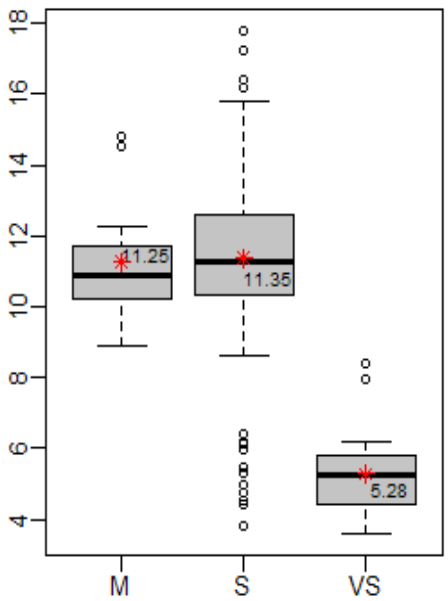
Figure 5. Financial stress from 2009 to 2020 (%)



Source: Authors` calculation

At the same time, observed medium and small-sized farms were exposed to a financial stress to a greater extent compared to very small-sized farms (Figure 6).

Figure 6. The financial stress for the different farm sizes in the period 2009–2020 (%)



Source*:* Authors` calculation

The reasons for this should be sought in the fact that with the increase in the size of arable family farms in the lowland area, the share of rented land in the total UAA of the farm increases (Munćan, 2011; Munćan et al., 2014; Todorović, 2014; Todorović, 2018b). Besides that, the rental rates are high (Munćan et al., 2014) and are primarily paid in cash (Todorović, 2014; Todorović 2018b). As a consequence, in extremely dry years, such as the three mentioned above, arable family farms with a larger share of rented land in the total UAA were in a much more unfavourable economic position in a situation where field crop yields were unsatisfactory due to unfavourable weather conditions in relation to family farms with a smaller share of rented land in the total UAA.

These conclusions are confirmed by the results of a comparative analysis of financial stress of three groups of arable family farms of different sizes (Table 1).

Table 1. Comparative analysis[6] of financial stress for the different farm sizes in the period 2009–2020

Farm size	Kruskal-Wallis test			Wilcoxon rank sum test with Bonferroni's correction for multiple testing	
	Financial stress (%)	χ^2	Prob. > χ^2	Difference	Prob.
VS	5.28	54.91	1.192e-12	-6.07 (1-2)	8.9e-13
S	11.35			-5.97 (1-3)	4.8e-09
M	11.25			0.10 (2-3)	1.00

Source*:* Authors' calculation

Namely, the determined value of $\chi 2$ and p-value indicate statistically significant differences ($p<0.05$) in financial stress among observed arable family farms of different sizes. The Wilcoxon rank sum test using Bonferroni's correction for multiple testing was used because the Kruskal-Wallis test does not specify groups of arable family farms having statistically significant differences in farm performance. According to the results of the Wilcoxon rank sum test using Bonferroni's correction for multiple testing, the significant difference was found between average values of financial stress for very small and small-sized farms and between very small and medium-sized farms, i.e. the difference between these groups of farms was sufficient to be statistically significant ($p<0.05$). Further, there was no statistically significant difference for the same indicator between small and medium-sized farms ($p>0.05$).

6 Statistically significant differences in the farm performances among three different size groups of arable family farms were found only for financial stress.

Conclusion

The analysis revealed that arable family farms performances in the research area varied depending on their size. The biggest observed farms had the most favourable total cost ratio and the lowest dependence on subsidies. On the other hand, an increase in farm size resulted in a greater exposure to financial stress. Considering that the level of financial stress depends on the farm's ability to pay rent and interest costs, bigger farms were more susceptible to financial risk because they rented more land and used credit as a source of financing more frequently. The analysis also shows that the level of financial stress was related to the appearance of extreme weather events in certain years. Therefore, to provide long-term sustainability, an increase in farm size should be followed by appropriate climate change mitigation strategies, including adequate production practices.

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THE IMPORTANCE OF SMART AGRICULTURE FOR THE IMPROVEMENT OF AGROECOLOGY IN RURAL ENVIRONMENTS IN POST - COVID CONDITIONS

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Abstract

Having realized the importance of smart agriculture for the improvement of agroecology in rural areas in the post-COVID-19 conditions, the Belgrade Chamber of Commerce formed the Council on Smart Agriculture at the beginning of 2021. The goal of this Council is to improve agroecology by networking the institutions that work on the development of smart technologies and the availability of various solutions and databases for implementation of smart agriculture, thereby encouraging the application of modern information and communication technologies on farms, such as precision machines, devices, objects of unmanned aerial vehicles, drones, robots, etc. Modern knowledge through trainings and availability of databases reaches family farms dealing with agricultural production, rural tourism and on-farm processing faster and easier.

Key words: *agroecology, smart technologies, resource conservation, farms.*

Introduction

Agriculture is a specific branch, it is on a collision course of old and new, traditional and innovative, but it also has significant resources and technological potential, which provide an opportunity for improving agroecology in rural areas, especially in post-COVID-19 conditions.

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There is a constant need to put knowledge on agriculture together with knowledge on smart technologies necessary for efficient and market-oriented agriculture, and knowledge on the robotics, to improve agriculture and food production.

In 2020, the meeting on "Smart agriculture as an opportunity to provide added value, development of urban agriculture in Belgrade, conservation of natural resources and environmental protection" in the Serbian Chamber of Commerce-Belgrade Chamber of Commerce resulted in an initiative for forming a Council on Smart Agriculture. Businessmen from the territory of Belgrade, state and local administration, scientific and educational institutions and farmers realizing how important it is to connect and network all actors, especially in the times of the COVID-19 pandemic launched an initiative to form a Council on Smart Agriculture for the territory of the City of Belgrade. Realizing, among other things, the importance of smart agriculture for the improvement of agriculture, this initiative was supported by the Belgrade Chamber of Commerce because the agriculture in the City of Belgrade and its surroundings has a significant role and the introduction of smart agriculture is important not only for improving but also for more accurate and efficient use of resources. At the beginning of 2021, the Belgrade Chamber of Commerce formed the Council on Smart Agriculture, which currently has 15 members and it is open to admit new ones.

One of the objectives of the Council is to perceive problems and propose solutions for improving agroecology by connecting institutions that work on development of smart technologies with businessmen and farmers, and enabling various solutions and data for applying the concept of smart agriculture in practice. Moreover, there is the idea to use the Council to apply for numerous projects for which the European Union provides significant funds (Janković et al., 2021).

The solutions that will be implemented in the territory covered by the City of Belgrade can be used as an example of good practice in other regions of Serbia and beyond. Smart agriculture is becoming very popular in modern agriculture because it allows users to monitor the conditions in the field from a distance and in a real time (Janković et al., 2021).

Digitization and availability of knowledge and information is one of the basic goals of the Government of the Republic of Serbia today. The application of smart technology in agriculture and conservation of resources can significantly contribute to food production and food stability, which is crucial for

every country, especially in the conditions of post-COVID-19. The use of smart agriculture technologies in the USA ranges 20-80%, and in Europe it is 0-24%. Moreover, there is an example of the Netherlands, and their vision of astronomical progress launched in the 1990s with the program of digitization of agriculture called "Twice as much food with half as much funds", in which a very few believed because the geographical predispositions of this country do not leave some untapped potential. Today, however, the Netherlands is the world's second largest exporter of agricultural commodities, just behind the United States that has 161 times more arable land than the Netherlands.

Elaboration

The solutions obtained by applying smart agriculture technology can be used on large farms as well as on small farms and on farms with parallel conventional, integrated and organic production, (Ljubičić et al., 2021).

In order to carry out work on farms more efficiently and faster and to obtain quality and safe products, it is important to introduce smart agriculture, through the collection, processing and application of data interpreted by competent IT experts, on the base of which the agricultural advisors from the Agricultural Advisory Service of the Republic of Serbia provide advice to farmers. Expert advice and their implementation are important for the improvement of agricultural production and at the same time they increase chances for farmers, as end-users of smart technologies in agriculture, to survive in a globally competitive environment through better planning and cost optimization, (Janković et al., 2020).

The application of high-tech concepts results in output data, based on which farmers are given specific recommendations and a more accurate insight into production as well as the opportunity to run their farms optimally and increase yields, profits and farm sustainability.

The application of the IT at all levels of agricultural production can significantly contribute to the preservation of Serbian agroecology, soil and environment protection, mitigation of the negative effects of uncontrolled use of fertilizers, mitigation of the negative effects of uncontrolled use of pesticides, optimal irrigation to save the resources but meet the plants' actual needs (Kolarić et al., 2021), choosing which plant to be grown in a certain locality; it can also significantly affect the choice of assortment (Popović, 2002), the procurement of agricultural machinery and equipment, in the process of pre-

paring land to crop growing and development of agricultural production on the principles of sustainable development.

The importance of adopting the concept of smart agriculture and its development in the territory covered by the City of Belgrade and its surroundings

The City of Belgrade and its surroundings are the largest market of agricultural commodities in Serbia. It also has significant agricultural resources, research institutions and software companies that can develop solutions for applying the concept of smart agriculture in practice. The City of Belgrade and its surroundings have numerous registered individual farms, cooperatives and economic entities that could achieve their goals through the Council of the Serbian Chamber of Commerce – Belgrade Chamber of Commerce and operate more efficiently in the post-COVID-19 period, taking into consideration agroecology and environmental protection.

Having considered all the above-mentioned, the tasks of the Council have been defined to know clearly what needs to be done for a wider application of smart agriculture. Furthermore, there are calls for EU-Horizon 2020 projects related to the development of new and the improvement of the existing digital tools that would be available to users through web applications that use the resources of the existing free-of-charge platforms on agriculture, independent web applications or classic software packages.

The partnership of businessmen, farmers, scientific institutions, and software companies, along with the exchange of knowledge that exists in Serbia, Europe and around the world regarding smart agriculture and digitization in agriculture, would improve agriculture and agroecology, and economic and environmental effects of agriculture in Belgrade; then it could be also used in other regions of Serbia and beyond, especially in rural areas, as an example of a good practice.

Figure 1 shows the determination of plots and their coordinates via an Android application on a smartphone for soil analysis and giving advice. Figure 2 shows the professional use of drones equipped with sensors and data processing software in the pre-sowing treatment against weeds of a plot on which corn will be sown. Figure 3 shows the professional use of drones equipped with sensors and data processing software in an apple orchard to detect the needs of the orchard, and to use the data recorded by the drone cameras to

make an accurate analysis and consequently achieve economic benefits by improving production conditions. In this way, one could also obtain information whether plants radiate a certain color, and therefore detect changes in plant metabolism. The goal is to detect occurrences and act in a timely manner by applying certain measures during production.

Figure 1. A soil-sampling plot determined by an Android application

Source: IPN.

Figure 2. Use of drones in pre-sowing treatment of weed plots

Source: IPN.

Figure 3. Use of drones in an apple orchard

Source: IPN

The tasks of the Council on Smart Agriculture are, as follows:

The improvement of agricultural production, based on more precise and efficient use of technologies for conservation of resources and improvement of agroecology; assessment of the needs of agricultural entrepreneurs and farmers for databases that would help them run agricultural business better and lead to the automation of activities, especially in the post-COVID-19 period; encouragement of the use of modern information and communication technologies in agriculture, such as precision machines and devices, digital animal facilities, unmanned aerial vehicles, drones, robots, sensors, soil probes and other devices; participation of businessmen and farmers in considering and launching the initiatives for amending various acts, regulations and legislation related to agricultural production; contribution to the establishment of the AKIS strategy in Serbia, improvement of knowledge flows and strengthening links between researchers and actors in the sector of agriculture; initiating the connection of institutions dealing with the development of smart technologies with businessmen and farmers; raising awareness for the need of using smart technologies and precision agriculture in order to improve agroecology, and the economic and environmental effects of agricultural production; training

and knowledge transfer primarily for small family farms engaged in organic production, rural tourism and on-farm processing; training and knowledge transfer to recognize the benefits of using smart agriculture, which allows easier decision-making in agricultural production and greater resilience to negative impacts in the post-COVID-19 period.

Benefits of introducing the concept of smart agriculture from the aspect of agroecology and the post-COVID-19 period:

The application of smart agriculture can significantly improve agricultural production, since it is based on more precise and efficient use of resources; use and connection of precision machines, various sensors, positioning and tracking systems, unmanned aerial vehicles; the use of robots and similar solutions generates large amounts of data, and processing and analyzing them can provide some guidelines for more efficient work and the improvement of production, product quality and financial effect; conservation of natural resources and a positive effect on agroecology as a whole; it can have a particularly positive effect on "urban" agriculture, as its natural resources are often limited.

Furthermore, the introduction of new solutions in agricultural production can significantly contribute to better understanding the problems from planning and subsidizing production to analyzing and solving indicators that affect the financial aspect of production.

Conclusion

By applying digital technology in agriculture, one can get answers to the questions on what resources the Republic of Serbia has at its disposal and how to make our agriculture more competitive on the domestic and foreign markets.

The importance of the introduction of smart agriculture reflects in the collection, processing, analysis and application of the obtained data. In the interpretation of the data and using them for giving advice there is a significant role of experts from the IT sector and agricultural advisors from the Agricultural Advisory Service of the Republic of Serbia, who undergo numerous trainings in these areas.

Expert advice and their application are important for the improvement of agricultural production but at the same time they increase the chances for farmers, as

end users of smart technologies in agriculture to survive in a globally competitive environment by better planning and cost optimization.

The digital age in agricultural production has come and the importance of digital transformation will be recognized along the way, because thereby some significant improvement of agriculture can be achieved. Digital competencies have become a key for the future work in agriculture, providing answers and opportunities to modern agriculture.

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SERBIA'S FOOD SELF-SUFFICIENCY IN COVID-19 PANDEMIC

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Abstract

In the circumstances of the current pandemic, providing a sufficient domestic agricultural production to meet national food nutrient needs can become a major challenge humanity will face. Considering this, here we explore the ability of Serbia to provide food for its own population from domestic sources. Referening to the FAO calculation method we computed an self-suffcient ratio for overall food as well as for the most important food groups. We also look at correlation between gross domestic product, trade openness, political stability, and self-sufficiency degree. Our results showed a high self-sufficiency degree in overall food, cereals, oil, sugar, fruits, vegetables, and treenuts. Correlation analysis suggests that there exists causality between self-sufficiency ratio and gross domestic product, trade openness, and political stability.

Key words: *food self-sufficiency, COVID-19, Serbia*

Introduction

The experts debate over importance of food self-sufficiency persist through time. Opponents of the concept marked it as a 'nonsense', 'wrong lesson', 'risky', 'harmful to agricultural production', 'distortive to market signals', 'environmentally risky', 'diminishing for farmers income', etc. (Clapp, 2017). Proponents suggest it as a means of decreasing undernourishment prevalence (Mary, 2019), a means of boosting farmers' income (Warr, 2011), straightforward way to increase food security (Bishwajit et al, 2013), and so on. Recent Clapp (2017) research suggests that it is necessary to reject the „black-and-white" approach of food self-sufficiency policies, that is, that a more subtle approach should be adopted.

World food economy in the early 1970s was characterized by high food self-sufficiency at the national level (O'Hogan, 1975). Out of 3.7 billion of the world population, 3 billion lived in countries with food self-sufficiency ratio (SSR) higher than 95%. After World War II, except the European Economic

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Community, many other countries have adopted the food self-sufficiency as a national policy objective for different reasons, suh as minimalization of foreign power leverage (decolonized nation), fencing off from communist influence (in the context of Cold War rivalries), etc (Barker and Hayami, 1976; Margulis, 2017; Davidson, 2018).

Globally, the pursuit of food self-sufficiency flourished in the first decade of the 21st century, after the food crisis (Daviron et al., 2011; Bala et al., 2014; Staatz and Dembele, 2008). Many nations that adopted a trade-based approach of national food security under the rules of liberal trade policies declared self-sufficiency in certain kind of food as a policy objective (Clapp, 2017). Among other, Senegal and Philippines announced self-sufficiency in rice as the primary goal (Daviron et al., 2011). In order to insulate itself from price volatility and global market unpredictability as well as 2014 food embargo consequences, food self-sufficiency become part of the Russian political discourse, also (Wegren and Elvestad, 2018).

The combined effect of COVID and declining level of the food self-sufficiency in the majority of the countries suggests potential erosion in global food security caused by economic stagnation and the resurgence of trade restrictions (Schramski et al., 2019). Unfortunately, today's food economy is not like it was in the 1970s (O'Hogan, 1975). As a result of globalization just one-third of the population could feed itself from local production (Kinneunen et al., 2020). In other words, a small portion of of the world's population had access to food within a radius of less than 100 kilometers. Namely, access to locally produced tropical roots and maize have just 11-16% of the population. The situation is somewhat better with temperate and tropical cereals, rice and pulses - 22-28% of the world's population had access to them.

Considering potential implications of the COVID-19 pandemic for food security and nutrition, the main objective of this paper is to estimate the level of food self-sufficiency in Serbia.

Materials and Methods

Time series data about food exports, food import, and food production is taken from the FAOSTAT Database. For the analysis we selected a period of time, 2006-2018, with respect to the year 2006, the year of Montenegrin independence referendum (secession from Serbia).

The following relevant food categories are covered by the analysis: cereals excluding beer total, starchy roots, oilcrops total, fruits excluding wine, vegetables total, sugar crops total, meat total, pulses total, treenuts, eggs total, milk excluding butter, fish and seafood total. SSR was determined for these 12 food groups as well as for overall food aggregating over those food groups.

Well-known the FAO calculation method (FAO, 2011) was performed to investigate food self-sufficiency ratio (SSRfood), actually following equitations:

$$SSR_{food}=P_{food}/D_{food}*100\%, \quad (1),$$

$$D_{food}=P_{food}-E_{food}+Z_{food}+I_{food}, \quad (2),$$

where SSR_{food}, P_{food}, D_{food}, E_{food}, Z_{food}, I_{food} are the rate of food self-sufficiency, total domestic food output, total supply, food exports, changes in stocks, and food imports, respectively.

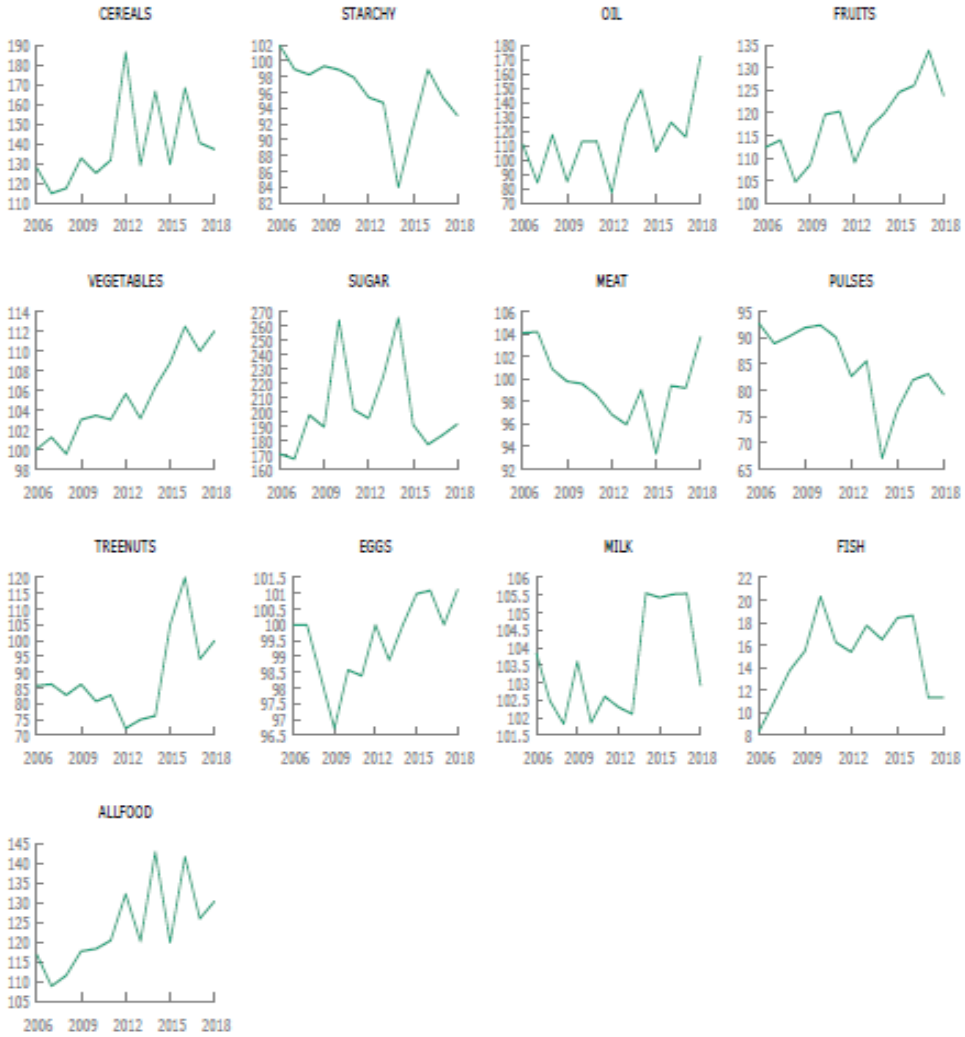
Recent reaserch showed that the achievement of food self-sufficiency in South East Europe depends, among other, on GDP per capita (GDPpc), political stability (PS), and trade openness (TO) (Brankov et al., 2021), so we assumed interdependancy between those factors and the SSR, by simple correlation. For this analysis data is taken from the FAOSTAT and World Bank database.

Results

Despite some variations, there is an evident growing trend in an overall food self-sufficiency in Serbia (Figure 1). Most notably, all food SSR increased from 117% in 2006 to more than 130% in 2018. The oil SSR have increased from 111% to more than 172%; the fruits SSR from 112% to 123%; vegetables from 100% to 112%; cereals from 128% to 137%: sugar from 170% to more than 191%; and treenuts from 86% to 100%. Meat, milk and eggs SSR in most of the observed years was approximately 100%. These findings indicate that a country is able to meet domestic demand for the aforesaid foodstuffs from its own production.

In the same period of time, SSR of starchy roots has decreased by 9%, (from 102% to 93%), while SSR of pulses decline by 14% (from 93% to 79%). SSR of fish in the whole observed period was very low, between 8 and 20%, meaning that a country rely heavily on fish import.

Figure 1. Serbian trends in self-sufficiency (average SSR annually on y axis)



In the next step, we performed KPSS test to detect stationarity around a mean or linear trend of given data (Table 1), following the rules if p-value is significant ($p<0.05$) then the series is non-stationary.

We find that only two time series (meat and fish) are not trend stationary, meaning that they are shock sensitive. All other time series (all foods, cereals, starchy, oil, fruit, vegetables, sugar, pulses, treenuts, eggs and milk) remain stable around the deterministic trend, so they are quite resistant to the external changes.

Table 1. KPSS test

	KPSS Statistics	Significance level	Lag order
All foods	0.05	>0.1	0
Cereals	0.08	>0.1	0
Starchy roots	0.10	>0.1	0
Oil	0.06	>0.1	0
Fruits	0.07	>0.1	0
Vegetables	0.10	>0.1	0
Sugar	0.13	>0.05	1
Meat	0.18	<0.05	1
Pulses	0.10	>0.1	0
Treenuts	0.12	>0.1	1
Eggs	0.15	>0.05	0
Milk	0.11	>0.1	0
Fish	0.16	<0.05	1

Correlation analysis suggests that there is an interdependency between selected variables (Figure 2). GDP, trade openness and political stability seem to have a negative effect on SSR of meat, pulses and starchy roots, and a positive effect on SSR of all other food groups, including an overall SSR. An exception is SSR of sugar, because it correlate positively with political stability. The most pronounced positive correlation is observed between SSR of vegetables and the above factors.

Figure 2. Correlation coefficient between the GDP, trade openness, political stability and food items.

Discussion and Conclusions

Serbia has sustained food self-sufficiency of a nation, despite turbulent political history, trade liberalization, growth of GDP, urbanization, and ideologically defined, ineffective and inconsistent agricultural and food policy. To confirm this, it can be pointed out that an average value of the food self-sufficiency ratio in our sample for the period 2006-2018 is 123,66%, that is very similar to 1970s values - 122.24% - obtained in Dundjerov et al. (1983) reserach. The data show that Serbia is not only capable to feed its population but also to preserve its export markets, even in crisis circumstances. The explanation is simple - more than 20% of the food produced can be used either for export or for filling Commodity Reserves.

However, Serbian food and agriculture system faces a range of challenges. Competitive advantages of Serbian corn, sugar or fruits on the world market cannot mask the well-known problems that pesist in the meat and dairy sector, or problem of high dependence on fish imports. When we add to that, decline in total factor productivity, slowing of agricultural production growth, stagnation of yields, serious demographic outflow, the low purchasing power, and corruption in the food system, all are becoming more complex.

Although the results of our analysis provide a good starting point for policy-making, this study has some limitations. The most important is the simplistic approach we used. Future research should extend its analysis by condidering variation in population growth, a climate change, changes in dietary patterns, land conversion, investments, and other factors that will be important in the future food supply and demand.

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THEMATIC PROCEEDING

EFFECT OF ANTI-COMPETITION AGREEMENTS ON AGRICULTURAL FERTILIZERS

Adela Sorinela Safta[1], *Lavinia Popescu*[2]

Abstract

This paper empirically investigates the overall relationship between plant protection products in agricultural production. A variety of studies show that organic farming tends to reduce fertilizer consumption, the paper provides data on the economic effects of growing fertilizer sales, so we ask serious questions about the reason for the growth, which generates this growth, need or excessive consumption. From the perspective of monitoring the requirements of the CAP, especially regarding the management of fertilizers, we followed the relation of the nitrogen requirement related to the obtained productions, the yields being a cause of non-correlation of contribution and application of adequate quantity not only of nitrogen as a basic requirement The paper also investigates some effects of climate change in agriculture, research shows that carbon absorbers are as important as reducing emissions, being closely interdependent. The results and information on the efficiency of agricultural practices of high-performance farms ready to provide sustainable food supply systems provide the confidence to stimulate the consumption of organic products to ensure the body healthy agricultural products. This article clarifies in a subject and predicate approach, the case of infringement of competition law in the case of imports of nitrogen-based fertilizers, in this case urea, as a product used in agriculture.

Key words: *sustainable, fertilizers, agricultural, anti-dumping*

Introduction

Agricultural production entails a number of production strategies that have an impact on the climate system; the conclusion is obvious, but we wonder how much. Yes, we are confronted with a series of data in most rural regions today that suggest that an increase in fertilizer sales is a relevant indicator

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that unquestionably reflects their use, perhaps in excess. Obviously, as mentioned earlier, environmental problems have global dimensions, but some results have local specificities, such as depletion of biodiversity (species, ecosystems, biome) due to excessive consumption of pesticides as shown in Figure 2, in Pandemic 2020 Eurostat provided information in the report issued in June 2020 on increasing fertilizer consumption. Why ? What can lead to demand other than demand in this regard the anti-damping analysis responds through jurisprudence, and clarifies some of the unknowns, and not the demand determines in this case the consumption of fertilizers, but the prices and agreements.

The understanding and scale of these anti-damping processes, as well as how they might be halted, would be relevant given the harsh local impact of these worldwide changes. As a result, to eliminate any uncertainty regarding the ambiguity, Ad absurdum – „to the point of absurdity" as a logical argument in our analysis to draw attention to the fact that not only agricultural production management validates the" health „of agricultural production, but the thesis is true because any other possible solution would lead to absurd results; it is obvious that this mode of demonstration indirectly reflects a concern. „ A fortiori" our opinion is that we should not analyze globally the elements of good practices nor focus only on habits (consuetudo) but also only through the analysis in time of the character of the mentality, the usages „Animus" which suit the place, the location, the environment, the soil, the biosphere, the need to protect the environment and the general responsibility will be demonstrated when using fertilizers.

Concrete statistics, such as the European Commission's anti-dumping inquiry into urea mixture imports into the Union under Article 5 of Regulation 2016/1036, add to the backdrop in which there is a reason to be concerned about the high level of fertilizer consumption.

This investigation stemmed from a complaint filed by producers who account for more than half of the total Union production of urea-ammonium nitrate mixes.

This is the basis of the anti-dumping investigation into urea and ammonium nitrate imports into the Union from X and Y.

Literature review

Concrete ways of capitalizing on the means of proof

In general, current agricultural systems are increasingly focused on reducing fertilizers and promoting an environmentally friendly agriculture, biodiversity agricultural management aiming to ensure this harmony. Against the background of increasing fertilizer sales we analyzed the market of plant protection products according to Eurostat data from 2020. Whether or not artificial fertilizer consumption was intensified or fertilizer management on the market was distorted, these simulations were due to dumping investigation in the case of the product urea. Research shows that carbon absorbers are just as important as reducing emissions, being closely interdependent so that high levels of fertilizer imports are not an effect of market demand or the attractive price of plant protection products. In the substantive analysis, we had as a starting point the investigation of urea import and the Commission's arguments in the investigated case.

Thus, in the opinion of the Commission of Inquiry, issues related to the dumping conditions found to be similar between the three countries analyzed were considered relevant. Therefore, in connection with the analyzed urea product, it was found that the imports were made under the same conditions, thus being competitive, having the same potential suppliers on the same competitive market, reason for which it was appreciated that the products competed with each other because they are sold mainly by positioning and more favorable display of one's own product offer to the detriment of the offers of partners who marketed the same product and with whom it was in direct competition.

The principle of legality

Thus, in the matter of competition law, unfair competition and anti-dumping methods identified during the article for the situation of the price of pesticides as a result of a decision investigated at the level of the European Union emerge as ways of investigation, among others.

In most situations, competition law violations affect the field of conditions and the marketing price of goods or services, resulting in surcharges and other damages to customers as a result of the violation.

In addition, the infringement could target the core or the type of supply of the infringing subject (for example, in the case of the formation of a cartel in the field of the purchase price). In all these cases, the constraint consists in the absence of the real result of the negotiation, the immediate consequence being the offer of a lower price paid by the subjects of the violation to the detriment of their clients.

Considerations on the principle of reasonableness

The qualification of relevant evidence containing business secrets or other confidential information that should be available in principle in actions for damages is also discussed, and it is rightly considered that such confidential information should be protected on an equal footing cannot be disclosed, precisely because of these considerations.

In fact, it was found that no investigation of dumping is warranted if there are price differences in the sense that the export price may be lower than a price of a comparable product for example for imports into developing countries, where it is affected domestic consumption, and special attention should be paid to the interdependence between the economic conditions on the one hand and the supply on the respective market in the commercial transaction whenever the dumping conditions are analyzed.

Otherwise, applying divergent civil liability rules for infringements of Article 101 or 102 TFEU and for infringements of national competition law rules L 349/2 EN Official Journal of the European Union 5.12.2014 to the same case in parallel with Union competition law would affect the applicants' position in the same case and the scope of their claims, and would be an impediment to the proper functioning of the internal market.

This Directive Council Regulation (EC) No 1206/2001 should not affect actions for damages in the event of infringements of national competition law which do not affect trade between Member States within the meaning of Article 101 or 102 TFEU. (11) In the absence of provisions of Union law, actions for damages are governed by the national rules and procedures of the Member States.

Ammonium nitrate is part of the natural nitrogen fertilizers, and contains 34% nitrogen by mass (less compared to urea).

The products under review are mixtures of urea and ammonium nitrate in aqueous or ammoniacal solutions, originating in X, currently falling within CN code 31028000.

All ammonium nitrate fertilizers placed on the market at Community level should therefore comply with the safety criteria laid down in Regulation (EC) No 1234/2007. 2003/2003.

Notice of initiation of an anti-dumping proceeding concerning imports of mixtures of urea and ammonium nitrate originating in X, Y and T. OJ C 284, 13.8.2018, p. 9. The investigation showed that it is common practice to add additives. in smaller quantities and that the market still considers the resulting product to be UAN. The Commission therefore decided, at this stage, to clarify that the definition of the product under investigation includes mixtures of urea and ammonium nitrate in aqueous or ammoniacal solutions which may contain additives, unless the additives are in the required quantity and the type of those which cause the mixture to be classified under a different CN code.

The competition rules Methodology

Given the customs and in which EU competition policy operates, the initial provisions of the 1957 Treaty, which prohibit certain non-competitive agreements and abuses of a dominant position, as well as the provisions on State aid, although as a result of information developments and globalization, only the application remained unchanged and reached a different approach. Application of antitrust rules In July 2010, the Commission set up the High Level Forum to Improve the Functioning of the Food Supply Chain. The Forum will address in particular the unfair trade practices generated by contractual imbalances and differences in contractual power between suppliers and buyers. These practices, which must be differentiated from anti-competitive practices, are normally covered by national contracts or commercial law.

Dumping and injury

The investigation of dumping and injury covered the period from 1 July 2017 to 30 June 2018 (‘investigation period’ or ‘IP’). The examination of trends relevant for the assessment of injury covered the period from 1 January 2015 to the end of the IP (‘period considered’). The product concerned is

mixtures of urea and ammonium nitrate in aqueous or ammoniacal solutions originating in X, Z and Y, currently falling within CN code 3102 80 00 (hereinafter referred to as' the product concerned 'or' UAN "). (28) UAN is a liquid nitrogen fertilizer.

The nitrogen content is the main characteristic of the product concerned and can vary between 28% and 32% of the UAN. Usually, this variation is obtained by adding a larger or smaller amount of water to the solution. Most imported solutions tend to have a nitrogen content of 32%. UAN with a nitrogen content of 32% is more concentrated and therefore cheaper to transport than UAN with a content of 30% or lower.

The dumping analysis shows conditions in all respects as special economic conditions affect domestic prices; these prices do not provide a commercially realistic basis for dumping calculations. In some cases, the value relationship in the verification of dumping conditions is determined by comparing the export value with the market value of the same or similar product usually exported to third countries or with the cost elements of the production itself of the exported product by adding a the example value of an additional sales cost and other administrative costs. In dumping purchases, all these elements represent criteria that lead to the establishment of a possible market distortion injury.

The statement concerning the definition of the product from the perspective of a Union producer pointed out that the addition of other substances ("additives", in particular ammonium sulphate but also other substances) to UAN still leads to a mixture which is UAN and falls under NC 3102 80 00.

In order to calculate normal value, the Commission first verified whether the total domestic sales volume of each cooperating exporting producer was representative. The investigation found that during the IP, Acron manufactured, sold domestically and exported to the Union only UAN with a nitrogen content of 32%. Domestic sales are considered representative if the total volume of sales of the like product on the domestic market to independent domestic customers for each exporting producer represents at least 5% of its total export sales volume of the product concerned in the Union. During the hip period.

Results - Notice of opening

In the case of the investigated product, other criteria were analyzed, such as those of perishability, the properties of the product contributing to the

increase of the transport risk, this being a corrosive liquid. The analysis showed that the transport of such a product is done through customized transport facilities with vehicles and special storage spaces, which implies an addition that increases costs by about 20% of the selling price sold in various places in Europe depending on demand. Thus, the investigation highlighted that precisely these costs related to its transport conditions they involved differences in sales prices in various countries.

Moreover, the general opinion from the investigation highlighted the fact that this production cost is affected not only by transport but by the raw material used in the production of the product, namely gas and as a chain factor in fact the low price of gas as specific to the area. The production under investigation would have facilitated a more affordable price by distorting the market, for the similar product produced in another area the production cost being much higher precisely due to the raw material that is used in the production of the product during the examined period.

The Commission concluded that the price of urea decreased during the period under investigation but not because the world price for the product decreased, but because the reduction in the low price of urea in the EU contributed to this reduction through the analyzed import.

Even though there were contradictory voices that argued the opposite and the increase in sales on export markets failed to make losses.

At the same time, urea accounts for more than 50% of fertilizer consumption worldwide, and urea is the fertilizer used in the Union, being used in more than 20% as fertilizer.

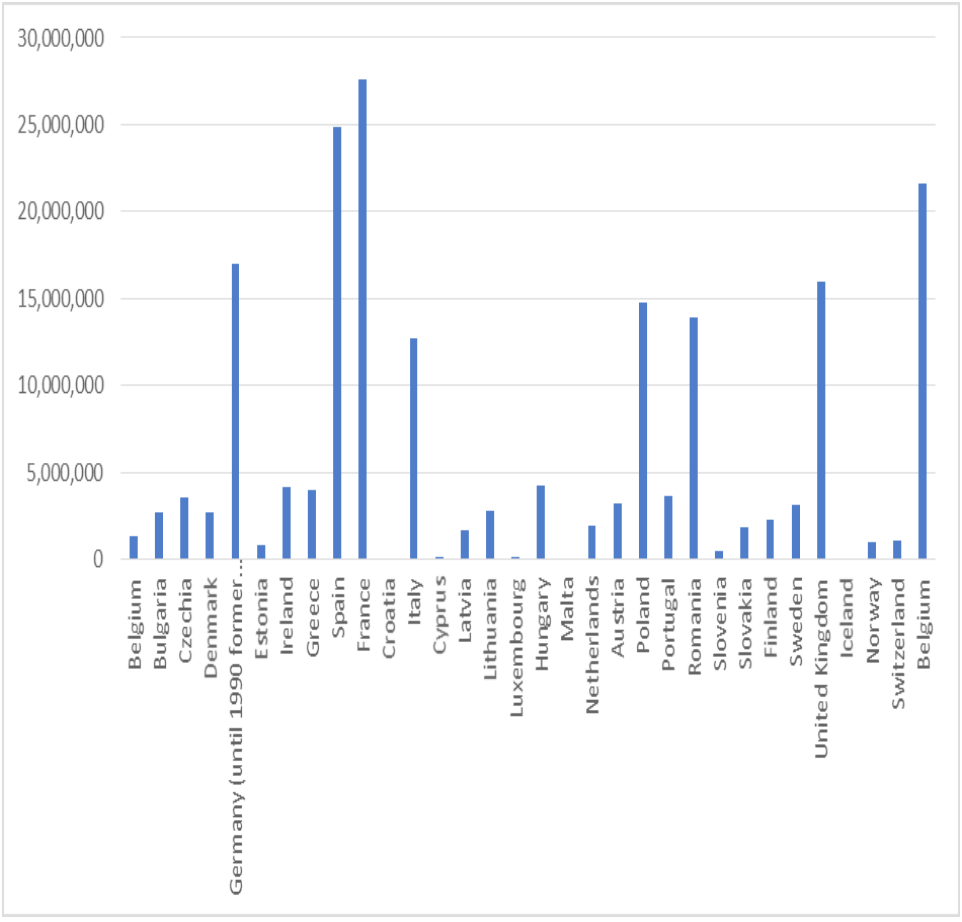
During the period considered, the Union industry increased its sales in export markets by around 280 000 tonnes. The increase in sales on its export market thus only slightly offset the loss of around 700 000 tonnes on the Union market. The export prices of the Union industry were similar to its prices on the Union market.

The Commission therefore provisionally concluded that such exports did not contribute to the injury suffered by the Union, but showed that consumption on the Union market did indeed fluctuate during the period considered and that the world price of urea decreased.

The EU political context

This section examines some of the main changes in agricultural policy, focusing on two areas of growing importance: policies aimed at improving the environmental sustainability of the agricultural sector and changes in agricultural trade policy. Several countries have made efforts to reduce pollution associated with the use of fertilizers. The difference between the arable area of Romania and the number of inhabitants shows that each inhabitant has approximately 0.41 ha of arable land, as shown in Table 1, estimated to be higher in many European Union countries and almost double the EU average. 27, which is 0.212 ha / inhabitant.

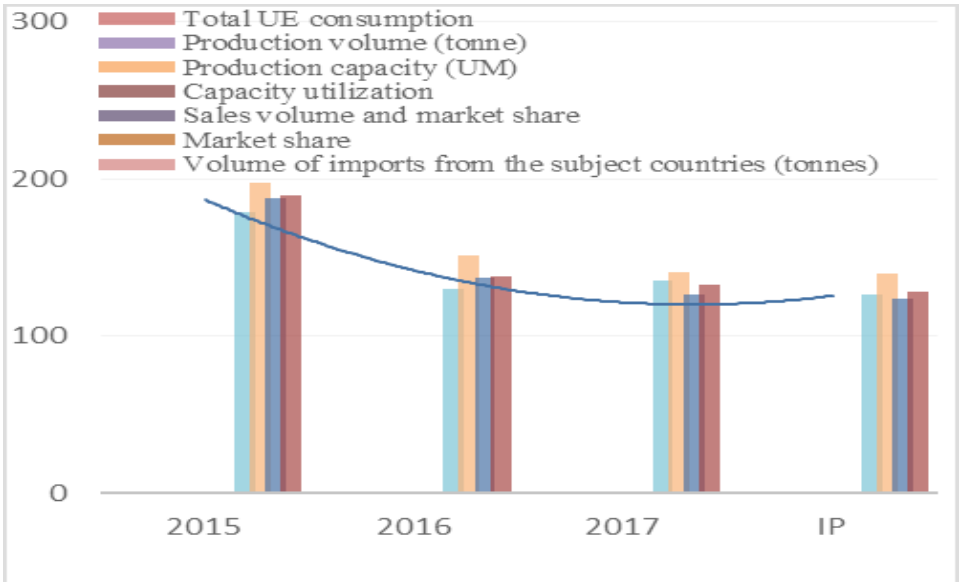
Table 1. Arable area per capita in the EU in 2017.



Source: Eurostat Yearbook 2010 (date 2007)

The investigation revealed that Union traders who purchased urea or through subsidiaries from importers or directly from producers were following orders and market demand for urea, but due to the composition of the product requiring special tank processing it was considered as such the transfer for processing would have led to the redemption of the final urea product previously sold at another cost.

Figure 2. Sales pesticides



Source Eurostat (2020)

Provisional dumping margin

The Commission compared the weighted average normal value of each product type similar to the weighted average export price of the product.

There is a very high probability that anti-dumping measures will cause some farmers to stop producing and / or continue to harm an agricultural sector that cannot transfer costs and need to remain competitive in a globalized market, fertilizer circumvention is not a successful method of the use of counterfeit or low quality fertilizers can have irreversible effects on agricultural systems that affect the environment, creating an imbalance in the biosphere. For some, the parties' anti-dumping measures would be a compromise with the common agricultural policy, and the latter will make it insufficient to guarantee farm incomes and competition between farmers in selling products on the market.

In fact, our opinion is that in the sale or not of a product such as urea, the impact could vary depending on the type of farm or agricultural practice used in production without affecting other sensitive elements such as tradition, good practices, trade relations or why not the attractiveness of the goods.

In addition, the Commission found in the investigation that urea represents around 1% of the total costs of Union agriculture. It has thus been shown that a possible increase in the price of the product as a consequence of the imposition of measures, if any, understanding that there are no unequivocal reasons for such a measure, which does not justify evidence, should not have a significant impact on the agricultural sector overall in the Union, but the Commission does not rule out this possibility, the latter.

In fact, the Commission even notes that a single company that previously produced UAN in France is fully switching to other fertilizers and therefore confines itself to offering UAN production in the Union so as not to justify dumping as an alleged increase in UAN demand and implicitly the disappearance of traditional sources of supply with UAN in the Union, the statement of this hypothesis demonstrates that the orientation towards UAN is the effect of lack of supply and not of market distortion the justification of the distortion in this case being relative in the opinion.

Table 1. Provisional dumping margin case 1.

Society	Provisional dumping margin
MH Limited	55,9 %
All other companies	34,0 %

Source DG Competition

Table 2. Provisional dumping margin case 2.

Society	Provisional dumping margin
Grupul A	31,9 %
Grupul E	34,0 %
All other companies	34,0 %

Source DG Competition

Proportion of profitable sales to customers - Commission analysis

Despite all the hypotheses considered in the investigation, our opinion is that the statements made by some Russian producers exporting urea product, that some Union producers actually sell urea at prices below market price but there has never been any confirmed evidence. Some exporting producers claimed that the investigation was discriminatory, given the distortions of the raw material market in the natural gas market. It is also relevant to mention the importance of using this product urea especially used in agriculture as there are limited offers in plant protection products that cannot be replaced being compatible with the biosphere or are used by farmers tradition even being an insufficient production of nitrogen fertilizers on the market. However the survey did not consider these aspects does not prove an actual lack of fertilizers and are numerous sources of supply of products and fertilizers such as calcium ammonium nitrate, ammonium nitrate or urea.

In the case of EC, based on the representativeness test, it was found that the like product was sold in representative quantities on the domestic market. The investigation found that during the IP, EC produced, sold on the domestic market and exported to the Union only one product type, UAN with a nitrogen content of 32%.

On the other hand, in view of the common agricultural policy, it must be ensured that farm incomes and competitiveness are guaranteed independently of the effects of uncompromising anti-dumping measures.

The analysis of domestic sales showed that less than 15% of total domestic sales were profitable and that the weighted average sales price was lower than the cost of production. Consequently, normal value was calculated as a weighted average exclusively of profitable sales. Manufacturing costs, which are part of the cost of production used for the verification of normal business operations (VOCN), have been adjusted. EC stated that when calculating the net domestic sales price, an additional quota should be applied to the VAG costs incurred by the domestic affiliated trader, as well as to part of the VAG costs of the two producers in the same group. EC claimed that these costs resulted from a different level of marketing of domestic sales compared to export sales, namely that, through its affiliated traders, most domestic sales are sold directly to farmers. However, such a quota would not adequately reflect the net domestic sales price when, normally, the VAG costs incurred by affiliated domestic traders and producers are not deducted to adequately

reflect the price paid, or to be paid in full competition in the internal market. Therefore, the claim was rejected.

Natural gas is the main raw material in the UAN manufacturing process and represents a significant proportion, over 50%, of the total production cost. Following the applicant's request and the findings of previous investigations of fertilizers originating in X, the Commission finally considered that the price Y (US Henry Hub Index), proposed by X stakeholders as an alternative benchmark, would not be appropriate, taking into account the different geographical region, the different types of natural gas sources (such as shale gas) and the limited possibilities of Y to export natural gas in gaseous form (compressed natural gas or CNG).

As a consequence the result of anti-dumping measures would affect production and the agricultural sector by transferring additional costs being forced to farmers to stop producing under the conditions must remain competitive in a globalized market. For some, the parties' anti-dumping measures would be a compromise with the common agricultural policy, and the latter will make it insufficient to guarantee farm incomes and competitiveness. The Commission rejected those arguments.

The Commission examined these allegations and provisionally concluded that:

- the alleged subsidization of natural gas purchases used by the urea producer is not subject to distortions of the raw material.

With regard to the dilution costs specific to this case, the Russian exporting producers only exported UAN with a nitrogen content of 32% during the IP. However, the related importers sold UAN with a maximum nitrogen content of 32% to independent customers. Therefore, if the product concerned was diluted with water to obtain a lower nitrogen content, the adjustment also included the additional dilution costs incurred by the related importer.

Table 3. Provisional dumping margin 3.

Society	Provisional dumping margin
CF I H, Inc.	37,3 %
All other companies	37,3 %

Source: Fertilizers Europe și Eurostat

Table 4. Union consumption (tonnes)

	2015	2016	3027	PA
Total Union consumption	4 803 732	4 658 736	4 783 671	4 571 721
Index	100	97	100	95

Source: Fertilizers Europe şi Eurostat

Table 5. Volume of imports (tonnes) and market share

	2015	2016	3027	PA
Total Union consumption	4 803 732	4 658 736	4 783 671	4 571 721
Index	100	97	100	95

Source: Eurostat

Table 6. Import prices (EUR/tonnes)

Column1	2015	2016	2017	IP
Import prices (EUR/ tonnes)	179	130	135	126
Index	100	73	75	70
from TT (tonnes)	197	151	141	140
Index	100	77	72	71
Z	188	137	126	124
Index	100	73	67	66
Worried countries from Y (tonnes)	189	138	133	128
Index	100	73	70	68

Source: Verified questionnaire replies of the sample of Union producers

In the case of urea investigated as a priority, the investigation analyzed the advantages and disadvantages, with the motivation of maintaining the supply channels of the urea product in the Union, the commission's conclusion was that the amount of import duties should be related to dumping on the grounds that this would fully cover the injury resulting from dumping in the Union of trade in urea.

The Commission decision addressed a risk factor to minimize possible forms of circumvention due to the high difference in duty rates, considering that

special measures are needed to ensure the application of individual anti-dumping duties. The Commission also decided, in accordance with the provisions laid down, to impose a provisional anti-dumping duty on imports of mixtures of urea and ammonium nitrate in aqueous or ammoniacal solutions, currently falling within CN code 3102 80 00 and originating in On the contrary, although the investigation was based on justifying the production of urea as a commodity at an attractive price, because in the Commission's view this would be due to the low price of natural gas, the key element intervention in a complaint of an actor in the fertilizer market, would be the fact that international law prevails, goods subject to international trade are classified according to the Combined Nomenclature [CN], which also includes the Community customs tariff. In short, in such a situation, the alleged supplier was obliged to present the valid document of conformity of the product with the legal tariff classification, which implies the condition that the document is valid, the norm is filled in with other fields, respectively the supplier must and certifies the quality by document, but that document does not constitute a certificate of origin of the product quality goods.

The Commission's conclusion on the increase in the sales quota of the urea product in the case under investigation was restricted to the verification of the evidence in the file which does not prove the existence but not the lack of nitrogen fertilizers in the EU so the urea product was purchased on demand. causes such as the effects of climate change, poor harvests low selling prices, agricultural trade are not factors that cause urea consumption the fact that all these needs are necessary for agricultural production nitrogen fertilizer is a priority on the farm and, in addition, plant protection products and fertilizers are the raw material in the agricultural analysis excludes the causal elements that could have determined the need for the consumption of certain products, even the one under investigation. Or when we talk about agricultural systems there are arguments that claim a cause and effect approach. In other words, for agriculture, it is not the cost of the raw material in the fertilizer manufacturing process; it is towards the affordability of the product, but its value as an effect of use if the product meets the pollution conditions and is competitive. Through direct aid and rural development initiatives, the Common Agricultural Policy [CAP] supports the Nitrates Directive. Farmers can also get compensation for nutrient management measures, such as the development of buffer zones, as part of agri-environmental efforts to encourage environmental protection.

Conclusions

From the perspective of food security, in the world economy, the principles aim to create a level playing field for all parties, without distortions caused by anti-competitive methods.

According to recent Eurostat data, pesticide consumption is alarming. As a result, our recommendations must include alternate means for reducing pesticide consumption, such as converting to organic fertilizers, and we're talking about grasslands here, which should not be overlooked.

Temporary removal from the agricultural circuit or, if the conditions of cross-compliance can be respected for meadows used in hay or mixed regimes, the legislative aspects of meadows exploited by grazing could be overcome by the factual situation or the preparation of farmers and their education / ethics by measures that are not sanctions but incentives.

In an already creative rural environment where all the laws are obeyed, in a rural communion where if a single farmer did not align, it would produce disruptions and imbalances, coercive methods pay off. That is why, despite receiving subsidies, large areas of pastures in mountainous areas may be neglected, requiring only a minimum of maintenance work in order to maintain and increase productivity and biodiversity, for which the European Union provides substantial agri-environmental subsidies. All of these concerns highlight the necessity for us to apply cumulative and measurable legislative actions in a community, rather than only traditional punitive measures, even if sanctions are used. The inclination of the Commission's arguments towards evasive indicators proves that atypical forms of circumvention can occur in practice, with clarifications or guidance given by the courts being an invaluable source of rules that regularize and expose situations that have arisen in practice. For example, plant pests will be subject to further investigation at any time, so it is good to understand and clarify issues such as increasing the consumption of a particular protection product in a certain form, and it will be less relevant to simulate raw materials production of the product, they are indicative. The study shows a number of practical conclusions that need to be considered in order to ensure increased agricultural activity without distorting the growing market for fertilizers sampled at 2020, according to recent Eurostat data, growth prospects in 2021. Therefore, in the risk analysis I pointed out that if these increases are the consequence of a method of forced price increase in the Eurostat analysis, even urea fertilizers and similar products can be

qualified as possible arguments in support of anti-dumping causes and are therefore rejected as confidential. The assessment of competition is analyzed by the causal relationship between uncoordinated horizontal effects, such as the Commission's assessment of uncoordinated horizontal effects, and whether the transaction will not create a significant obstacle to effective competition. Our conclusion is that analysis in this segment confirms the recent developments in the global fertilizer market.

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TRENDS OF RURAL DEVELOPMENT OF THE ROMANIAN SPACE

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Abstract

Currently, the economic development of the rural area in Romania faces multiple social and economic problems, the concerns regarding the identification of solutions and methods for solving them being numerous, rural development thus becoming a strategic priority for the European Union.

This paper aims to perform an analysis of the evolution of the Romanian rural area in socio-economic terms in the period 2015-2020, using data provided by the National Institute of Statistics. The statistics cover aspects of the participation of the rural population in economic activity, through the structure of the active population, the employed population and the employment rates of the rural population, as well as the number of registered unemployed, which provides an overview of the rural labor force.

Key words: *rural development, labor force, income, expenditure*

Introduction

Rural development is defined as a general improvement in the socio-economic well-being of the rural population, as well as in the physical and institutional climate in which they live. (Moldoveanu, Rădoi, Cat, 2015)

The Romanian rural area is characterized by a strong heterogeneity from the socio-economic point of view between the different regions of the country, which is also reflected in the demographic evolution, for this reason the evolution of the rural population follows the socioeconomic evolution of rural communities. Determining factors for the desire to live in these communities are represented by: the level of development reached by localities, the distan-

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ce from significant cities, public infrastructure and utilities and the living conditions that a rural locality admits. (Flavius Mihalache, Alin Croitoru, 2011)

The National Rural Development Plan (PNDR) is the most important tool in the socio-economic development of the Romanian rural area, and implicitly towards a sustainable future, providing support for the modernization of agricultural holdings and seeking to increase their viability. The aim of this program is to increase competitiveness in areas such as agriculture, forestry and improving the quality of life in rural areas, to encourage the diversification of the economic structure of rural areas and to encourage local initiatives, entrepreneurship. PNDR ensures the sustainability of natural resources management, climate action and diversification of economic activities in rural areas, generating jobs and improving infrastructure and services. (G. Mursa, R. Paraschiv, 2009) (Mihai Dinu, Simona Roxana Pătărlăgeanu, Bogdan Chiripuci, Marius Constantin, 2020)

During the elaboration of PNDR 2014-2020, from the initial analysis regarding employment, productivity in the agriculture, forestry and fishing industry in Romania at the level of 2012, resulted a value of 2,464 euros per person employed with a contract of employment, close five times lower than the national average. Thus, more than 40% of the rural population was exposed to the risk of poverty and social exclusion, the rural area being affected by infrastructure deficiencies. (Mihai Dinu, Simona Roxana Pătărlăgeanu, Bogdan Chiripuci, Marius Constantin, 2020)

Rural areas are currently considered to have high potential in terms of stimulating the economy, creating and developing jobs, promoting and ensuring food security, combating climate change, mitigating the impact of crises and maintaining and developing balance and their sustainability.

A report from the European Commission states that rural areas account for about 88% of the territory of the European Union, which is inhabited by 55% of the total population. EU rural areas also account for about 43% of gross value added and more than 50% of jobs are found in rural areas. The same report states that at the level of the European Union, the European Committee of the Regions has noted that rural areas are not homogeneous, many areas are affected by various problems such as: depopulation, aging population, leading to inability to develop economically and socially. Due to these problems, the development of rural areas has become an important point, so it has been proposed to develop a set of policies (Rural Agenda) aimed at addressing all

issues related to these rural areas. It is assumed that the new set of policies should emphasize and give local communities the opportunity to turn these issues into benefits.

Through the emergence of the Covid-19 pandemic, a number of problems that threaten the development of rural areas have been revealed. For example, rural communities have been affected by declining demand for agricultural products due to restrictions imposed, namely border closures, closure of HORECA sectors, lack of labor, especially during this period, sociable isolation, and so on.

Methodology

The paper is based on the series of statistical data presented by the National Institute of Statistics for the period 2016-2020. The research method used in the study consisted of quantitative and qualitative analysis of statistical data, in order to distinguish the evolutionary trends of the analyzed indicators.

During the research, the following statistical indicators were calculated and analyzed:

- standard deviation $\sigma = \sqrt{\frac{\sum(x-\bar{x})^2}{(n-1)}}$, where:
  x = sample mean;
  n = sample size;

- coefficient of variation $v = \frac{\sigma}{x}100$, where:
  σ = average deviation;
  x = average level of a variable;

- growth rate $\overline{R} = (\bar{I}\ x\ 100) - 100$, where:
  $\bar{I}$ general average growth index.

Results and discussions

From a demographic point of view, Romania represents the community state with the highest share of the rural population. At the level of 2020, 19,328,838 people were registered, the urban population being represented in a proportion of approx. 54%, and the rural one accounting for 46% of the total population. (Table 1).

Table 1. Evolution of the rural resident population in the period 2016-2020 (millions of people).

Specification	*Year*					*Min.*	*Max*	*Media*	*Standard deviation*	*Coff. of var (%)*	*Growth rate (%)*
	2016	*2017*	*2018*	*2019*	*2020*						
Romania	19.76	19.64	19.53	19.43	19.33	19.33	19.76	19.54	0.17	0.88	-0.55
Urban	10.64	10.53	10.51	10.46	10.46	10.46	10.64	10.52	0.07	0.69	-0.43
Rural	9.12	9.11	9.03	8.96	8.87	8.87	9.12	9.02	0.11	1.17	-0.7

* Coefficient of variation (10- small; 10-20- medium; 20- large)
Source: INS, accessed on 09.12.2021

According to the INS, on the territory circumscribed as a rural area is registered a rural population of approx. 8.87 million people in 2020, about 3% lower than in 2016, respectively 9.12 million people. From the analysis of the calculated statistical indicators, a good homogeneity of the data series was noticed, the coefficient of variation reaching a value of 1.17%, falling below the threshold of 10%. The annual growth rate registered a negative value of 0.70%, thus suggesting the downward trend of the population at the level of the analyzed period. (Table 1)

The causes that led to the reduction of the rural population were various, represented by migration to urban areas or to other EU countries, where the standard of living is higher and by a demographic behavior characterized by a low birth rate. The Romanian rural area is facing a lack of labor force. (Dona, Dobre, & Gergely, 2005)

Analyzing the statistical data on employment in the Romanian rural area in the period 2016-2020, the following aspects were noted: the active population ranged between 4 million people in 2016 and 4.1 million people in 2017, recording an average of the period equal to 4.07 million persons comprising / including the labor force available for the production of goods and services. The employed population, represented by people in rural areas who have a job, registered an average of 3.86 million people, with variations between 3.76 million people in 2016 and 3.9 million people in 2017 It was noted that of the population categories analyzed in rural areas, the inactive population recorded the most significant number of people, reaching an average of 5.1 million people. Regarding the unemployed and the population discouraged from finding a job in rural areas, a relatively small number was noticed, registering on average 217,914 people, respectively 65,480 people. (Table 2)

Employment and income sources were used to assess the social structure of rural communities and to formulate the impact of the implications of rural development policies on them.

Table 2. The structure of the rural labor force in the period 2016-2020 (millions of people).

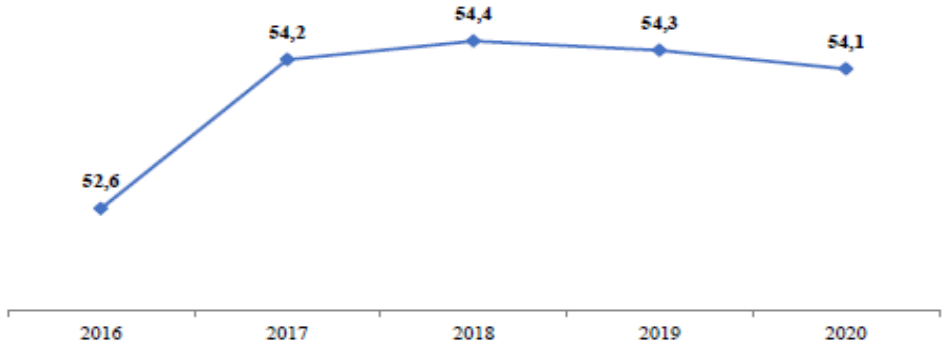
Specification	Year					Min	Max	Average	Standard deviation	Coef. ofvar (%)	Growth rate (%)
	2016	2017	2018	2019	2020						
Active population	4.02	4.13	4.11	4.08	4.05	4.02	4.13	4.08	0.04	1.10	0.23
Busy population	3.76	3.90	3.92	3.90	3.82	3.76	3.92	3.86	0.07	1.71	0.36
BIM unemployed	0.25	0.22	0.19	0.19	0.23	0.19	0.25	0.22	0.03	12.80	-1.74
Inactive population	5.14	4.98	4.91	4.88	4.86	4.86	5.14	4.95	0.11	2.31	-1.41
Discouraged people	0.13	0.10	0.05	0.02	0.02	0.02	0.13	0.07	0.05	76.80	-38.62

* Coefficient of variation (10- small; 10-20- medium; 20- large)
Source: INS, accessed on 09.12.2021

The analysis of the coefficient of variation showed a large variation of the data series for people discouraged from finding a job (76.8%) and a medium variation for the unemployed (12.8%). The value of the coefficient of variation registered for the active population (1.1%), employed (1.71%) and inactive (2.31%) suggests a good homogeneity of the data series at the level of the period 2016-2020. Analyzing the value of the annual growth rate, there was a trend of population growth for the active population (0.23%) and the employed population (0.36%), and in terms of the inactive population (-1.74%), the unemployed (- 1.41%) and people discouraged from finding a job (-38.62%) the trend of evolution was decreasing, the growth rate registering negative values. (Table 2)

However, the decrease in the number of unemployed people in rural areas is noteworthy, at the level of 2020 there is a reduction of 7% compared to the reference year 2016. The reduction of the unemployed was largely influenced by the economic development of the Romanian rural area and the creation of new jobs, these were possible due to the non-reimbursable financial support granted through PNDR in the two periods operations, 2007-2013, respectively 2014-2020, (Table 2).

Figure 1. Rural activity rate (%)



Source: INS data processing, accessed on 09.12.2021.

At the level of the period 2016-2020, the activity rate in rural areas showed an upward trend, at the level of 2020, the share of the active population in the total rural population increased, reaching the value of 54.1%, which means that that more than half of the rural population falls into the category of active population, (Figure 1).

Table 3 The structure of incomes and expenditures of the rural population

Specification	Year					Min	Max	Aver.	Stand. Dev.	Coef. of var (%)	Growth rate (%)
	2016	2017	2018	2019	2020						
Average total monthly income per household (lei)	2447	2825	3386	3835	4240	2447	4240	3347	728	21.75	14.73
Average total monthly expenses per household (lei)	2150	2454	2974	3362	3630	2150	3630	2914	615	21.10	13.99

* Coefficient of variation (10- small; 10-20- medium; 20- large)
Source: INS, accessed on 09.12.2021

The difference between the incomes and the expenses of the rural households was in 2020 of 610 lei. In the period 2016-2020, the average monthly income within a rural family registered an average of 3,347 lei, and the total expenses were on average 2,914 lei, representing 87.06% of the average income level.

Conclusion

The development of rural areas is a topic of great importance both in Romania and in the member countries of the European Union. Thus, at national level, indicators were analyzed that reflect the development of rural areas, such as: rural resident population, rural labor force structure, rural activity rate and the structure of income and expenditure of the rural population.

Thus, the following conclusions were reached:

- Romania has the largest population in rural areas, at the level of the member states of the European Union, with a population of approximately 9 million people.
- For the active population, which currently has a job in rural areas, there is a value of 3.8 million people. In addition to this category, there are a small number of people, who are part of the category of unemployed or people discouraged from finding a job, about 65 thousand people.
- The activity rate registered in the rural area has an ascending slope, the share of the active population in the total rural population being 54%.
- Regarding the structure of expenditures and incomes of the population of rural areas, it was observed that the average income amounts to a value of 3347 lei while 87% represents the value of expenditures.

In conclusion, in this paper were presented and analyzed indicators that characterize the Romanian rural area, providing an overview. With regard to future research directions, it is proposed to analyze and discover new opportunities for the development of these areas by creating new jobs, promoting and improving infrastructure skills as well as capitalizing on sustainable agriculture thus contributing to the diversification of economic activities.

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OPPORTUNITIES FOR SERBIAN PDO FOOD PRODUCTS AT DOMESTIC AND FOREIGN MARKETS

Biljana Panin[1]

Abstract

Protected designation of origin products can contribute both to producers and consumers, as well as to rural development. Protected designation of origin products could bring many benefits for the country, rural population and rural development in Serbia. This paper present analysis for potential of two Serbian products, with geographical indication, in the market in Serbia, but also in foreign market – in Italy. Research showed that market opportunities for two Serbian products exist both in Serbia and in Italy. But consumers have different attitudes and interests towards two products, and also different willingness to buy and to pay for these products.

Key words: *Protected designations of origin, rural development, market, Serbia, Italy*

Introduction

Specific quality characteristics connected with the geographical origin of the food products and special methods of production, , are protected in the European Union through the implementation of the European policy on Protected Designations of Origin (PDOs) and Protected Geographical Indications (PGIs). Besides establishing a harmonized scheme of registered names and labels across Europe, the policy aims include fostering diversification of agricultural production, increasing farmer's income, enhancing fair competition and fostering rural development. On the other hand, the geographical indication (GI) recognition enables consumers to trust and distinguish quality products. The promotion of products with a geographical origin has become a strategic factor for the development of the European agro-food system. As a consequence, number of PDO and PGI food products in EU has increased, as well as their market. GIs give protection to both consumers by realizing quality, and producers through their role in building reputation (OECD, 2000). In the literature it can be highlighted the three main objectives of the protection

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of geographical indications, which are: producer protection, consumer protection, and rural development.

Certified GI products are usually aimed at obtaining higher selling prices for the products, in terms of achieving a price premium over standard, similar products, that do not have geographical differentiation (Arfini, et al., 2010; London Economics, 2008, Areté srl, 2014, Panin, 2015, Panin, 2013). The economic rationale behind this goal is based on the assumption that some consumers are willing to pay higher prices for products of "certified" origin from a specific geographical area, because they connect specific distinctive positive features to products coming from that area, such as specific traditional way of production, natural characteristics, tradition, ass well as positive health issues, etc (Areté srl, 2014, Fotopoulos et al., 2009, London Economics, 2008, Panin, 2013 Loureiro and Hine, 2001). Added value for producers of GI products can be manifested through: access to new markets intellectual property rights protection; better access to investment aid and funds; higher visibility; positive impacts on the GI area (Areté srl, 2014, Panin, 2013, Panin, 2015).

Protected GIs may contribute to rural development. In the European Union quality policy PDOs and PGIs are very important base, and they are seen as an important tool for rural economies development(Panin, 2013). The EU's perspective on GIs has been described as "a legal and commercial basis for development of rural areas, the preservation of cultural heritage [and] the promotion of small and medium firms in the rural economies context" (Sylvander and Allaire, 2008 as cited by Hudges, 2009, Bramley 2011, Panin, 2013).

Agriculture is very important for the economy of Serbia. Rural population in Serbia estimated to be 43.9% (FAO) and find their most basic income in agriculture or in industries closely related to agriculture. The overall development of the rural areas of the country, aided by the strengthening the economic diversification of agricultural production and development of the activities more or less related to agriculture. Serbia had to implement agricultural quality policy, and, within it, geographical indication policy. The number of the registrated PDO/PGI products in Serbia has been increasing, but not the number of products registrated in European Union.

Reaching the markets and consumers for Serbian PDO/PGI products, in Serbia and also abroad is very important. It will provide producers higher income, and also would contribute to sustainable rural development. The aim of this paper is to examine whether opportunities for Serbian PDO products

in domestic and foreign markets exist. Also, differences between markets, regarding interest in PDO products will be presented. The main goal of the paper is to provide analysis of two different markets, for future possible steps in order to promote Serbian PDO products in and out of Serbian boarders. With adequate strategies and support producers of PDO/PGI products in Serbia will achieve higher income, more producers will be interested to be involved in this quality scheme, which will lead to overall rural development and better image of Serbia. These questions were explored in cases of two Serbian PDO products – Futog cabbage and Petrovac sausage, on the market in Serbia and Italy. Italy was chosen as a country which has the most PDO/PGI labelled products in EU (927 products in 2021), with well-known quality label schemes. That country has also very different diet habits from diet in Serbia, and it was interesting to understand if there are possibilities for non-familiar, and products that are not common in diet on the market. On the other hand, commercial relations between Serbia and Italy already exist; transport of the products would not be difficult; many citizens from other EU and non-EU countries live in Italy, even form Eastern European countries including Serbia, and they may be interested in finding products similar to their home country products.

Methodology

In order to understand markets, and to explore whether opportunities for Serbian PDO food products exist, two Serbian PDO products were chosen as case studies – Petrovac sausage and Futog cabbage. For the research, both supply and demand side were analysed. Supply side analysis was qualitative analysis, and it was mainly conducted in order to get enough information to continue with consumer's side analysis. In order to collect data from the consumers, survey technique was used, by conducting two questionnaires, one for Serbian consumers, and the other for Italian consumers. Both questionnaires were provided online and also by personal interviews in the marketplace. In Serbia 251 persons were interviewed, and in Italy 179 persons. Demand side analysis was a quantitative analysis, which was conducted in order to see whether opportunities for Serbian PDO products exist on domestic and foreign markets. On the basis of data collected from consumers in Serbia and Italy, collected data were analysed quantitatively, by calculating mean values and frequencies, in order to have explanation of the samples.

Questionnaire for Serbian consumers explored following aspects: Consumer attitude towards specific product item; Consumer attitude about labeling, food quality; Consumer knowledge and trust toward PDO/PGI scheme; Consumer interest and attitude regarding typical products; Consumer knowledge about Futog cabbage, and attitudes towards it, interest for buying the product and WTP; Consumer knowledge about Petrovac sausage, and attitudes towards it, interest for buying the product and WTP; Consumer personal profile. Aspects explored by Questionnaire for Italian consumers were: Consumer (stated) attitude, interest and behavior towards typical/new foods; Consumer knowledge/attitude towards specific product item (acid cabbage/smoked sausages); Consumer knowledge/attitude/ towards east European countries and their food; Consumer knowledge and trust toward EU PDO Reg.; Two PDO Serbian products – Futog cabbage and Petrovac sausage explanations and Interest for buying the product and WTP for it; Consumer personal profile.

Results of the research, for both markets, will be presented with emphasis on differences between two markets.

Results

Analyzing Serbian sample, it can be concluded that both products are recognized from the consumers, but name of Futog cabbage is more familiar to them. As in Serbian traditional diet both acid cabbage and dried sausages are present, majority of the respondents would buy both Futog cabbage and Petrovac sausage for the price similar to some other similar products. This is connected to interest of the sample for typical products, and also to their awareness of PDO/PGI scheme. Even though these products are familiar for the Serbian consumers, their PDO label is something new, consumers recognize the value that brings that label, and are willing to pay for it.

Italian sample is characterized with high level of awareness of PDO/PGI scheme, which have positive influence for interest in products with this label and not coming from Italy. 98.3% of the sample is familiar with existence of PDO/PGI certification, and only 1.1% of them do not trust that the certification is reliable. Level of their awareness is different as well as the level of trust, but the fact that they have heard of these products and in some level, they trust in the scheme, can be positive from the aspect of PDO/PGI products. Maybe label would have some impact on motivation for purchasing products, especially if those products are from some foreign country, as the label would

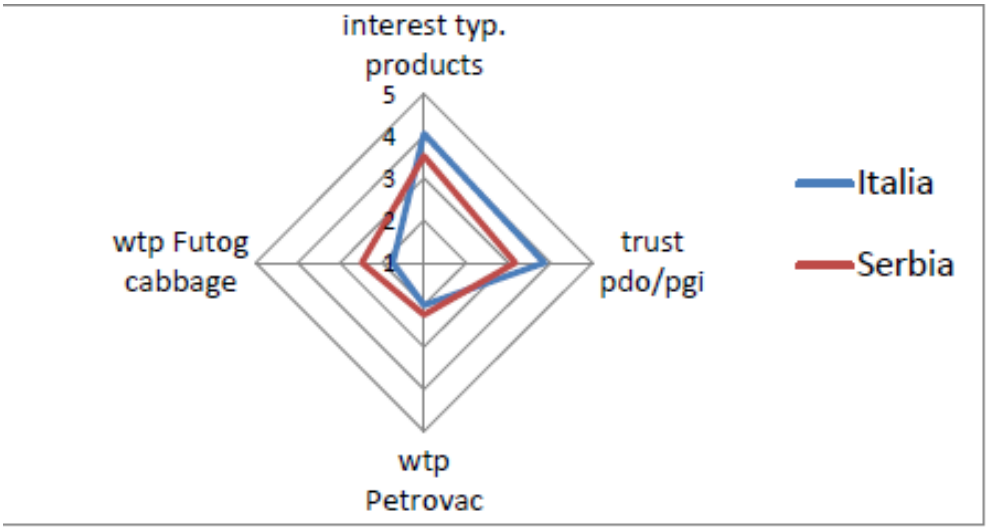
be assurance for some quality. Besides, sample shows also interest for typical products. Only 1.7% of the sample does not have interest in typical products, and even 75.4% have very high level of interest for these products. Almost all from the sample like to try out new products, and all of them like to buy and try out local food when they travel. But knowledge about Eastern European countries and culture, based on travelling experience, is not on the high level. Regarding products from Eastern Europe, which respondents have tasted, Prague ham and Szegedi salami were eaten the most. This interest for meat products from this area could be positive aspect for purchasing Petrovac sausage. Also, majority of the respondents are interested in purchasing and trying Petrovac sausage, and even willing to pay some extra price for it. Interest for buying and paying extra price for Futog cabbage is on the lower level, but exists. Around two-thirds of the sample would like to try Futog cabbage.

Surveys show that Italian and Serbian consumers have different eating habits regarding acid cabbage and dried sausages, attitudes and habits towards typical products, level of awareness and trust in PDO/PGI scheme, interest for buying and paying extra price for PDO Futog cabbage and PDO Petrovac sausage. But, for both samples interest for buying both Serbian PDO products exist. As differences in diet are already known, it can be said that in Serbia people would more likely buy Futog acid cabbage and pay a higher price for it, and in Italy, respondents are more interested in purchasing Petrovac sausage. Interest for typical products is slightly higher in Italy. In Italy, 75.4% of the sample have very high level of interest for these products, and in Serbia this level is on around half of the surveyed population. High level of interest in typical food products gives opportunity to increase their production and sale. Regarding two products that are in our research, this is also a positive fact, because the higher level of interest and likeness of typical products is, the higher demand for our products is possible. The high level of interest for typical products is important for making a decision to buy Futog cabbage and Petrovac sausage. The higher level of interest for typical products is, the higher is the possibility to buy and to pay for them. The awareness of existent of PDO/PGI scheme is higher in Italy, than in Serbia. This is consequence of two circumstances. Firstly, the PDO/PGI certification in Serbia does not have long tradition, and although there are promotions, the level of knowledge is lower than in Italy. Secondly, Italy is the country with the most PDO/PGI products in Europe, so respondents are much more familiar with the scheme. Also, the level of trust into this certification is higher in Italy than in Serbia. That can lead to a conclusion that for Serbian consumers the product quality certifica-

tion is less important for purchasing these products than in Italy, or people in Serbia do not have high level of trust into the food labeling. For Italian consumers trust in the certification can mean the possibility for purchasing certificated products more than others, because they are sure in quality.

All this have impact on interest for buying both PDO Futog cabbage and PDO Petrovac sausage and willingness to pay some extra price for them. Futog cabbage is familiar for respondents from Serbia, and they also have acid cabbage in their diet. So, the level of interest for buying this cabbage is high if it costs as the other acid cabbages that could be found on market. More than half of the sample would pay some level of higher price for both products. 64.1% of sample would buy PDO Futog acid cabbage if the price is higher than for some other acid cabbage. Furthermore, 11.9% of people would pay 5% higher price. 27.5% would pay 10% higher price, 17.9% would pay 20% more, and 6.8% of the persons would pay additional 30%. Higher price for the Petrovac sausage would pay 56.6% of the surveyed population. 5% higher price would pay 14.3% of the sample, 10% higher price would pay 22.8% of the sample. 20% more would be paid from 14.3% of the surveyed population, and 30% higher price would pay 5.2% of the people. As respondents from Italian clusters do not have acid cabbage in their diet, or have it rarely, their interest for buying it is lower. But, two-thirds of the sample would like to buy it and try it. Consequently, also willingness to pay extra price for Futog cabbage is higher in Serbian sample. Respondents in Italy did not have clear idea what Futog cabbage is, while respondents in Serbia did. Willingness to pay for the Futog cabbage in Italian sample would be interpreted as willingness to pay for trying the product out for the first time and not a stable explanation of the market segment. Almost half of the sample (46.9%) would not pay any higher price for it. It was expected according to the attitude towards buying it. But other half of the sample would pay some extra price for Futog cabbage. 35.5% of the sample would pay 5% higher price and 15.6% would pay 10% more. Only 1.1% would pay extra 15% and 1.1% would pay 20% more in respect to some other similar product. The similar situation is for Petrovac sausage. Regarding interviews, 30.2% of the sample would not pay any extra price for Petrovac sausage. Other respondents would pay some extra price for the sausage. 43.6% of the sample indicates that they would pay 5% higher price in respect to some other sausage, and 22.3% would pay 10% higher price.

Figure 1. WTP for PDO Petrovac sausage and PDO Futog cabbage, and Interest for typical products and trust in PDO/PGI scheme in Serbia and Italy



Conclusions

Petrovac sausage and Futog cabbage are products very well recognized by the consumers in Serbia. But they are famous not because of the certification, but because of tradition. Typical products in Serbia are linked with tradition, and people are very favorable regarding them. As in Serbian traditional diet both acid cabbage and dried sausages are present, majority of the respondents would buy both PDO products for the price similar to some other similar products. Moreover, more than half of the sample would pay higher price, to some extent, for both products. People in Serbia are aware of existence of PDO/PGI scheme. Considering other prices and expenses that people have, monthly income for sure can be one limit factor for PDO/PGI products consumption and purchase in Serbia.

Italian sample is characterized with high level of awareness of PDO/PGI scheme and interest for typical products, which have positive influence for interest in products with this label and not coming from Italy. Majority of the respondents are interested in purchasing and trying Petrovac sausage, and even willing to pay some extra price for it. Interest for buying and paying extra price for Futog cabbage is on the lower level, but exists, and people would like to try it as a novelty.

Based on the results presented in the paper, there are opportunities for Serbian PDO products both in domestic, Serbian, and foreign, Italian, markets. As research was based in Italy, as a foreign country, where these products are not familiar for consumers and different from their traditional diet, interest for two Serbian products is positive in terms of possibility of expanding market of two products. With adequate marketing techniques and governmental and institutional intervention Serbian consumers should be more informed about quality benefits of PDO/PGI scheme, which would have impact on higher interest for buying and paying higher amount of money for these products. Interest for Serbian PDO/PGI products exist out of Serbian borders, and with right strategies, and promotion especially on food and traditional fairs, manifestations, shops, but also on internet, market could be enlarged. In that way, producers would have higher income, which will have positive implications on overall rural development.

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PROCESSING OF AGRICULTURAL PRODUCTS BY LYOPHILIZATION

Bojana Bekić Šarić[1]

Abstract

Lyophilization is the process of removing water from a frozen product by drying, where the water from the frozen phase passes directly into the gaseous state, without turning into a liquid. In this way, easily perishable products are preserved, since the removal of water prevents the growth and reproduction of bacteria that would lead to their spoilage. Lyophilization as a way of food processing increases the shelf life of products, without the need to add artificial preservatives, while preserving their nutritional value. The lyophilization technology can be used in the processing of fruits, vegetables, bee products and other primary agricultural products, in order to obtain innovative, healthy and safe agro-food products of high nutritional value. The aim of this review paper is to present methods of preserving fruits and vegetables by drying, with an emphasis on the process of lyophilization, as an innovative modern method of drying and processing of primary agricultural products.

Key words: *lyophilization, processing of fruits and vegetables, innovative food products, market*

Instroduction

Contemporary consumers are looking for high-quality, healthy and safe food. Namely, in the production of agro-food products, in adition to quality, special attention should be directed to safety and shelf life of such products at the market. Processing of primary raw materials, as well as storage or distribution of final products, more or less affects physico-chemical and/or biological characteristics of agro-food products (Ciurzynska & Lenart, 2011). In order to produce helathy and safe food products, atractive to the consumer, which also has a longer shelf-life, it is necessary to apply appropriate methods of processing the raw material. This issue is especially important in the case of foods such as fruits and vegetables, since they have a lot of water in their composition, and therefore spoil quickly. In order to prevent growth of microorganisms, it is nec-

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essary to remove water from the raw food, which can bee done in many ways: drying outdoors, microwave drying, vacuum drying, spray drying, lyophilisation, combination of several drying methods etc. Each method of dehidratation has its advantages and disadvantages, which are related to the qualitative characteristic of the final product, cost price of the procedure and thus the price of the final product. This paper will present an overview of methods of drying fruits and vegetables, with focus on lyophilisation, and also the current state in Serbia regarding processing of fruits and vegetables.

Methods of drying fruits and vegetables

There are several methods for dehidrating fruits and vegetables and each method affects to some extent basic characteristics of the raw material. For example, all drying methods increase the scent of plants such as mint, which can be positive in the case of tea production (Abascal et al., 2005). The oldest way of drying raw food is drying outdoores, by air flow. However, in this way, the quality of the final product is lower in compare to the raw material, since there are signifinact changes in size, porosity, ability to bind water, content of important compounds, etc. (Ciurzynska & Lenart, 2011). Also, there is the question of safety of final dried products, considering that the drying takes place in an open space, where the raw material comes into contact with microorganisms from the air.

A more modern way of drying raw materials is drying in ovens, microwaves etc. The success of this method, i.e. the quality of the final dried product, depends largely on the temperature at which the drying is performed, as well as the properties of the primary raw material. For example, in the case of strawberries, dehydration in the oven leads to complete destruction of shape and texture, so only this method can not be applied in drying this fruit species, but must be used in combination with lyophilization or osmotic dehydration (Prosapio & Norton, 2017). Namely, the combination of several drying methods significantly reduces the drying time, which affects the better preservation of the mechanical and structural characteristics of the strawberry, which is important regarding acceptance of the final product by consumers. The next modern way of drying food is the spray drying, which is a method of rapid evaporation of water in a stream of warm air inside the drying chambers. With this method there can be a significant loss of volatile substances and degradation of thermolabile substances in the raw material due to high input temperatures (Ishwarya et al., 2015). Osmotic dehydration is a drying meth-

od, which involves immersing the product in a hypertonic solution (fructose, sucrose, maltose or some other sugar) which reduces the water content in the raw material by 50%. In this way, a semi-product is obtained, which must be additionally dried using some other method (Prosapio & Norton, 2017). Blanching can have a similar effect as osmotic dehydration, but in the case of soft fruit it cannot be applied. The most modern way of drying the raw material is lyophilization. This is an innovative way of dehydrating the raw material, while maintaining the high quality and safety of the final product, however, it is an expensive method of dehydration, which costs can be reduced by reducing the time required to dry the product (Yeu-Pyng Lin et al., 2005). Also, in addition to lyophilization, new drying methods of fruits and vegetables, may include a combination of several different drying methods, which may be the best option for certain raw materials. For example, the combination of several methods for drying onions significantly reduces production costs and does not affect the deterioration of the quality of the final product (Abbasi, S., & Azari, S., 2009).

The most important characteristics of the final product to be observed after drying, by any method are: the degree of water removal from the raw material (because it directly affects the perishability of the final products, since organisms multiply in humid environment), nutritional value of the final product, odor, color and taste of final product, as well as quanitites of final product after drying.

Lyophilisation as a method of drying fruits and vegetables

The lyophilization process is used today for many purposes, mainly by pharmaceutical and biotechnology companies, but also by the food industry (Bondoc & Bratucu, 2017; Tsinontides et al., 2004). There is a developed industry of lyophilized food in the world, which includes vegetables, fruits, meat, seafood, beverages, dairy products, ready-made meals, and even pet food. Such products are placed on the market through large markets, retail stores, online sales, etc. Due to the possibility of long-term preservation of lyophilized agro-food products, there is an increase in demand for lyophilized products by consumers in the international market. The fast way of life has caused the increased demand for quality and safe food, which is prepared quickly. Numerous scientific and professional papers deal with the topic of lyophilization of fruits and vegetables, and include experiments done on e.g. sweet potatoes, strawberries, cherries, lettuce, corn, berries, carrots, tomatoes, pumpkins, peas, apples, eggplant, etc. Also, research in this sense has

been done on spices such as garlic, coffee, tea, ginger, etc. The stages in the lyophilization process to the final product are successive and include the following stages: preliminary treatment of the raw material, freezing, primary drying, secondary drying, packaging, storage and rehydration during use (Bondoc & Bratucu, 2017).

Preliminary treatments of the raw material can be mechanical (e.g. grinding, chopping), physical (e.g. cooking, blanching), chemical (addition of some substances), followed by drying in a device specially designed for lyophilization. The final product is a dehydrated substance in the form of powder or larger particles (whole fruit, or pieces of different sizes). The final product is porous and hygroscopic, so the packaging must be in a vacuum or in a protected atmosphere, and the material must not be permeable to water vapor, gases and grease, that is it must be metal, glass or multilayer foil. Properly processed products can be stored for several years at temperatures up to 30°C (Bondoc & Bratucu, 2017). In addition to the dehydration of the raw product, the possibility of its rehydration after the addition of water is very important, as well as the content of vitamin C in the dried product (Luanda G. Marques et al., 2007).

Lyophilized products can be used as snacks, additives to muesli, porridge, honey, chocolate, fruit bars, in the tea industry, as natural food colors, etc. (Różyło, 2020). If organic fruits and vegetables are dehydrated, value-added products are created. Lyophilized products can be used during winter months, as the best substitute for fresh fruits and vegetables, which may not be available in the cold season. According to some authors, lyophilized fruits are of better quality than candied, otherwise dried, or frozen fruits, because they do not contain additional sugar, nutrients are not significantly changed, do not contain additives and colors, do not contain added water and do not have to be stored in the freezer (Bondoc & Bratucu, 2017).

The positive aspects of lyophilization are: easy transport, increase in products' shelf-life, high quality of the final product, i.e. preservation of morphological, biochemical and immunological properties in relation to other drying methods (Ciurzynska & Lenart, 2011). The negative aspects of lyophilization are: high investment costs (machines, packaging, etc.), relatively complicated and long lyophilization process (the whole process can take about 24 hours) and high energy consumption (Bondoc & Bratucu, 2017).

Quality of lyiophilised fruits and vegetables

Today, there are numerous studies on the impact of lyophilization on the quality of fruits and vegetables, whose conclusions are diverse. According to some authors, lyophilized fruits, compared to fresh fruits, have higher energy value, and in most fruit species also higher sugar content (Bondoc & Bratucu, 2017). When drying raspberries, drying methods strongly influence the physical properties, the composition of bioactive substances and the antioxidant activity of the final product. Dehydration by lyophilization to powder causes significantly higher powder hygroscopicity, water solubility, color preservation and anthocyanin content, compared to other drying methods or a combination of methods, which create a product with higher total content of polyphenols, flavonoids, and higher antioxidant activity (Si, X. et al. 2016). When it comes to grapes, a grape juice can be lyophilized, while preserving sensory characteristics such as taste, smell and texture (Codoi et al., 2012). For plums, which are traditionally dried worldwide, convective drying is most often used. However, convective drying greatly reduces the anthocyanin content and the total polyphenol content, compared to lyophilization which has been shown to be better in this regard (Gościnna, K., et al. 2021). In the case of berry fruits, due to their perishability, they are mostly frozen and placed as frozen fruits, or processed into jams, marmalades, etc. (Casati et al., 2019). Sun drying is the most common way of drying blueberries, but there is a high possibility of product contamination (Eminoğlu, M. B., et al. 2019). In the case of lyophilization of blueberry, comparing to other drying methods that are performed at higher temperatures, the contents of total polyphenols and flavonoids, anthocyanins, vitamin C and antioxidant activity are higher (Choi, S. R., et al. 2017). Lyophilized berries, such as blueberry, which contains large amounts of anthocyanin pigments, can be used as a dye in the food industry (Casati et al., 2019). Lyophilization can also be used for forest fruits, whereby the process of lyophilization changes the color of the primary raw material to something darker, which does not affect the quality of the final product (Bondoc & Bratucu, 2017). Lyophilization can also be used for drying tropical fruits: papaya, mango, lemon, grapefruit, etc. In the case of vegetables, such as tomatoes, it should be noted that tomato powder is a product that is often used in industry. Tomato is the main source of lycopene pigment for humans. Some studies show that lyophilization does not lead to a significant loss of vitamin C and the content of polyphenols, but the content of lycopene and carotenoids decreases (Georgé, S. et al., 2011). Some researches show that dehydration of vegetables leads to a reduction of

carotene content in vegetables regardless of the applied method of drying, so in the case of broccoli and carrots there is a reduction of carotene content by over 50% after dehydration (Guiné, R.P.F., 2018).

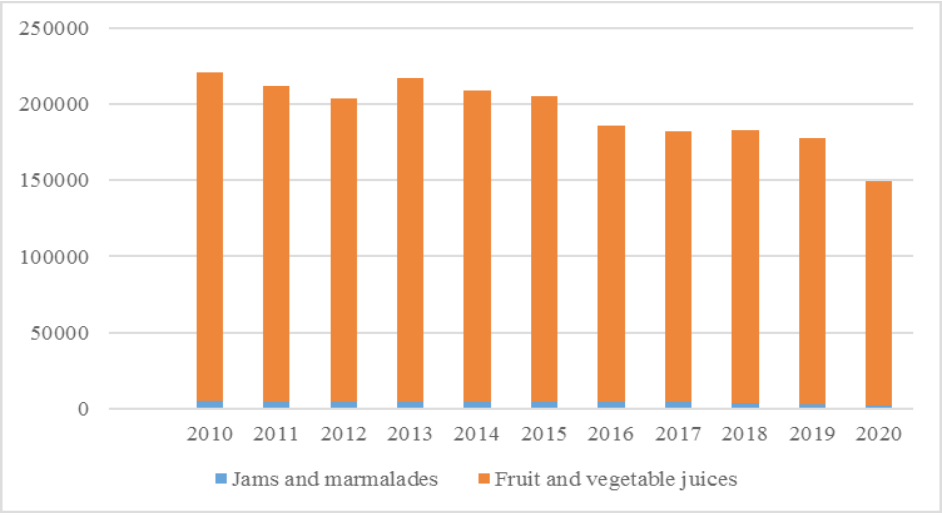
The advantages of lyophilization compared to other methods of drying fruit and vegetables include the formation of a stable product for a longer period of time due to the removal of most water from it, chemical decomposition of the primary raw material is minimized, the chances of oxidation of the product are minimal and since drying is performed in controlled conditions, there is less chance of contamination with microorganisms (Deepak & Iqbal, 2015). However, it should be emphasized that the lyophilization process can have an impact on the content of volatile substances, carotenoids and polyphenols in the final product, in terms of changing their composition and concentration (Abascal et al., 2005) and also some other important compounds, as previously stated.

Fruit and vegetable processing in Serbia

In the processing of agricultural products, cooling, drying and cooking are the most common methods in the processing process (Kovačević, V., 2019). The total number of agricultural holdings engaged in the processing of fruits and vegetables in Serbia is 31.816 (Farm Structure Survey, 2018, Statistical Office of the Republic of Serbia). Fruits are primarily marketed as fresh, although there is a high potential for added value creating through processing into juices, brandies, jams and more (Kovačević, V., 2019). Given that the group of economically weakest agricultural holdings in Serbia includes agricultural holdings focused on fruit growing and viticulture, investments in fruit processing could positively affect the creation of added value, and consequently strengthen the self-sustainability of the agricultural holding (Kovačević, V., 2019). Respectively, a similar conclusion can be made regarding the processing of vegetables on agricultural holdings.

Of the total fruits produced in Serbia, a small amount is processed, only about 10% (Bulatović&Rajić, 2012). According to the available statistical data, the production of fruit and vegetable products in Serbia has a rather declining trend (Graph 1). Fruit and vegetable juices are mostly produced, while significantly less raw materials are processed into jams and marmalades.

Figure 1. Production of fruit and vegetable products in the Republic of Serbia, period 2010-2020



Source: Statistical Yearbook, 2011-2021, Statistical Office of the Republic of Serbia

In Serbia, lyophilization as a way of processing fruits and vegetables by drying, is in its beginings. There are several business entities engaged in the processing of raw materials by lyophilization: Drenovac doo from Arilje, Dibal d.o.o. from Zrenjanin and LYOCAKE from Valjevo. The products created by lyophilization process are diverse, and mostly include lyophilized products of the following fruits: raspberry, strawberry, apricot, apple, cherry, blackberry, blueberry, plum, as well as tropical fruits such as orange, mango, banana and lemon. Lyophilized products are in the form of whole fruit or cut into smaller pieces of different diameters, or in the form of powder. The final products are presented by one fruit or a mixture of different fruits.

In Europe and in the world, this modern technology is already recognized on the market by consumers, so there is a large selection and growing demand for lyophilized products. The largest producer of lyophilized products in Europe is European Frezze Dry, and in the world Asahi Group Holdings Ltd (Japan), Ajinomoto Co.Inc (USA), Harmony House Foods Inc. (USA) and Nestle SA (Canada). Lyophilized products present on the European market are very diverse and include: fruit powders, vegetable powders, produced from organic or convetional raw materials, main dishes (dishes with meat, rice, cheese, etc.) packed for takeaways, vegetable soups, mixtures of fruits and vegetables as breakfast meals, desserts (iccecreams), etc. Sets of meals are made for the entire day or more days/weeks for travel, camping, etc.

Conclusion

Lyophilization of fruits and vegetables is a modern and innovative way of drying fruits, and creating quality and safe final product with a long shelf-life. Also, drying the product in this way can facilitate its transport, handling and storage. However, the effect of lyophilization on the content of certain substances in the final product, comparing to the raw material, may be significantly different. This should be taken into account when choosing lyophilization methods for drying of raw material, so that it does not lose its quality. The quality of the lyophilized products depend on the quality and features of the primary raw material, i.e. with the increase of the quality of the raw material, the probability of obtaining a better final product increases.

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MARKETING PUBLIC RELATIONS IN THE FUNCTION OF MARKET OPERATIONS IN CRISIS SITUATIONS[1]

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Abstract

Crises are such situations when it is not possible to do business objectively. The crisis itself threatens the business of the marketplaces and, ultimately, their survival. An example of a serious crisis at the global level is the "COVID-19" pandemic, which basically made the functioning and work of the marketplaces impossible. Observing such a situation, the aim of this paper is to establish relations with consumers and the rest of the public through the communication link in the conditions of crisis with the help of public relations marketing. The results show that the identity and image of the markets are the main advantage of their business and survival in crisis situations. The conclusion is that it is necessary to make the general public and specific target groupsof importance interested for the work of markets based on marketing principles using modern information technologies and various types of personal communication with consumers.

Key words: *Marketing public relations, marketplaces, crises, consumers*

Introduction

Public relations marketing are one of the most important business functions of a company. In this century of development of information communications, public relations are an unavoidable activity of companies in communication with the interested public and consumers. In such working conditions, consumer care has a specific weight. The information age facilitates intensive and interactive forms of communication between markets and consumers and the interested public. Marketplaces mainly operate in the public sector and contribute to the development of rural areas, so social responsibility in crisis

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situations and changed circumstances is a characteristic segment of business. Marketplaces that operate on the principle of public relations marketing have a greater chance of realizing their business activities in crisis situations. If we know that marketplaces have a historical continuity in trade, as well as the fact that in times of crisis they are the main point of sale of agricultural products from rural areas, their corporate identity is a strategic tool and helps achieve the goals of public relations. When we set the corporate image of the markets on the crisis market as an image of the company, a competitive advantage of the markets can be created. A good image of the marketplace should be a consequence of traditional identity, business behavior, good work and successful communication.

The image in public is sometimes more important than reality itself. Public relations marketing in crisis situations can enable the predominance of image over market identity. In these circumstances, such as the crisis caused by the COVID-19 pandemic for consumers, often under the influence of various media, reality is not identity but image. The main goal of public relations marketing in crisis situations is for communication to be unique and applied in order to differentiate itself from direct and indirect competitors in times of crisis. Thus, the aim of the paper is to design a positive marketing investment through the perception of people as consumers. Every important business decision of the marketplace in crisis situations must be based on consumer perceptions. Consumer perception is based on what they know, or what they think they know. Consumers' buying decisions are based upon the concepts of value and image. Value is a combination of price and quality and can have a special ecological effect in the purchase of fruits and vegetables. The aim of the paper is to direct individual perceptions of people to buy goods in the marketplaces in such crisis situations. Even in the conditions of the cessation of the work of the marketplace, together with the sellers, they must find a way to supply consumers from domestic farms and rural areas. The research is based on a comparative method of marketing research using the historical method and the method of marketing research. The survey questionnaire collected the views of sellers on how to meet the needs of consumers in crisis situations. The goal of data collection is to measure the effects of personal and interactive communication through social networks.

Defining the concept of market operations in crisis situations

The very definition of a crisis shows a state in which one cannot operate normally. The crisis hampers the overall business of the economy. The work of marketplaces is of special importance due to the fact that their role is to supply the population with fresh agricultural products from domestic farms. Every crisis is reflected in business results, especially a crisis on a global level, such as the crisis caused by the COVID-19 pandemic. Marketing public relations as part of the business philosophy of marketing in operational terms takes care of establishing good communication with the public and consumers. In crisis situations, the management of identity and image is the most important interest of the internal and external public of the marketplace. The purpose of addressing the public is the desire to continue cooperation with consumers and emphasize the value of domestic products in times of crisis. Namely, the public is the most important factor that helps business in given situations and preserves the image and reputation. By controlling the crisis through public relations marketing, we make the most important business step that prevents a catastrophe. These activities from the internal part of the organization have the task of maintaining the business continuity of the organization. The operational management of public relations of the market must follow the overall social trends in times of crisis in the form of monitoring adopted laws, public instructions and be part of a system that prevents conflict and contributes to the supply and health of people. From the above said, we see that crises are not an unusual phenomenon, so they do not last for a limited time. The crisis must be managed, all with the aim of communication and control of events in the interest of the company. One of the most important elements of crisis management is defining its implications for market operations. The crisis of COVID-19 has endangered the foundations of business, with a sudden appearance and unknown in the world's scientific and health circles. This crisis has shown negative power, and that its successful overcoming is a matter of organization and events through open communication. In the continuation of the paper, we will deal with the very concepts of crisis situations.

The crisis is a period when the fundamental values of the company are endangered (liquidity, success, profitability and success potential). (Krstić et al., 2016). When the fundamental values of the company are endangered, it is necessary to maintain a positive image in the public, the goals to be achieved, how to implement them and how to measure the effects of overcoming the crisis. Interactive communications and innovation in business can be a good indicator of suc-

cessful communication with consumers in overcoming the crisis. Crises require specially trained people for marketing public relations, because they bear the entire burden of informing the external public about the causes of the crisis and ambitions in overcoming it. The crisis destroys fundamental goals, endangers or prevents the achievement of organizational intentions and goals, and perhaps the very existence of the organization. (Todorović, 2012).

If we place marketplaces in the above said opinion as places of supplying the population with fresh agricultural products, the crisis can have dramatic proportions in situations of the unknown. These scales can lead to major problems in the functioning of markets and even to their disappearance on the market. Bearing in mind that these are the sale of domestic agricultural products that mainly come from rural areas, they are necessary for human life and health, with the help of publicity and public relations, communication with consumers must be managed. According to the Oxford Dictionary, the meaning of a crisis is defined as a time of great danger, difficulty or confusion when certain problems must be solved or when important decisions must be made. (www.oxfordleamersdicationaries.com).

Therefore, the crisis creates confusion and difficulties, so adequate response lies only in making timely decisions. Marketing public relations is an operational management function that can be used to make timely decisions in communication with political entities, the rest of the public and interested target groups. Mutual communication in the case of marketplaces is about managing problems and creating attitudes in the service of the public interest, especially since products from rural areas are mainly sold and contribute to the development of domestic agriculture in times of crisis.

Negative and positive effects of business in crisis situations

Crisis situations often arise due to the inability of management to manage or lead the company. There are various causes of business crises. Management incompetence is mainly related to bad business moves in assessing business, liquidity, credit indebtedness, etc. However, the crisis of global proportions has a completely different course that affects business, but also the health and life of people. The COVID-19 pandemic affected all sectors. The consequences of a pandemic are not and will not be the same for all economies or in the entire global economy. Some sectors may benefit financially, while others will suffer immeasurably. (Cvijanović i dr., 2021).

Crisis periods can be viewed from the angle of predictable events and the global crisis. The danger for the company arises from the negative business assumptions and not predicting the crisis by poor managerial management. These crises will become an imperative for business changes in the future. If we look at the marketplaces from this angle in the modern market environment, we realize that only one wrong investment decision that is not based on market research can shut down a company forever. Unpredictable crisis situations, such as the COVID-19 pandemic, give marketplaces a special aspect of being a place of holding social events. Namely, the sale of agricultural products and food for a large part of the population in those periods is the most important. Trust in marketplaces is traditional and the overall social effect of market work can be multiple. Therefore, it is very important that investments during and after the crisis are directed to the marketplaces as companies of public importance. These investments must be part of the overall social concern for people's health, concern for their social status and assessment of the danger to which marketplaces in the market are exposed. Given that it is in the public interest, the level of investment after the crisis must be at a level that keeps marketplaces competitive.

In the past period, the biggest changes in the market activity occurred as a consequence of the establishment of new, organised forms of supplying the population with various items, including fresh food. (Ostojić et al., 2013). We notice that the marketplaces are trying to maintain the traditional competitive advantage. This advantage is achieved by expanding the offer and increasing production in rural areas. The offer of fruits and vegetables and fresh food is connected with the concentration of the total offer and the selection of the offer of healthy domestic products. Market competitiveness can be improved through responsibility for the quality of services provided, good business results and active management of events in the interest of consumers. In order for companies to be competitive, they need to continuously adapt to external changes by integrating internal processes. (Salaman, 2001).

In order to position on the market and continuously adjust internal processes and external influences on business, it is necessary to create the image of the marketplaces through:

- Timely marketing research and market research on the attitudes of consumers and the general public

- Objective review and analysis of the obtained results from the point of view of marketplaces
- Publication of marketing investment strategy to the public
- Providing continuous information through public relations marketing
- Clearly defining the image of marketplaces and domestic agriculture that is sought to be reached
- Honesty in crisis situations
- Emphasising the integrated interests of marketplaces, sellers and consumers
- Marketing strategy defined according to the competition and its own target groups
- Respecting the integrity of competition and emphasising the traditional role of marketplaces
- Establish cooperation with the media through public relations marketing
- Proportional investment in marketing in crisis and regular situations
- Do public good through humanitarian aid, donations and sponsorships
- Design promotions and projects that are in line with market activities and rural development
- Consistency and strengthening of identity through public events in the marketplaces
- Maximum use of marketing as an investment in the future of the marketplaces.

In a crisis situation, it is of crucial importance for which strategy marketing managers will decide and the resolution of the crisis will be determined by the public relations sector, because the final outcome of the crisis will depend on it. (Horvatin, 2014). The details of the outcome in crisis situations depend on the profile of the company and the catastrophe that befell it. Success in times of crisis also depends on these communications. Through a survey questionnaire on a sample of 30 sellers of fruits and vegetables, at the Zeleni Venac Marketplace in Belgrade, Serbia, in the period from the 1st to 7th June of 2021. We surveyed sellers about communication with consumers in the period of 45 days when the marketplaces were not working, the results are as follows:

Have you had communication with your regular customers:

- Yes 45%
- No 55%.

How did you communicate with them:

- By telephone 30%
- By Facebook 30%
- By publishing an offer through various media 40%.

Are you satisfied with the income earned during the crisis:

- Yes 30%
- No 70%.

What would you change in your business if a similar crisis happened again:

- Maintain a consumer database 71%
- It would sell goods in cooperation with the marketplace through integrated and online marketing communications 20%
- I would not work 8%.

Analyzing the previous attitudes of sellers, we see their complete unwillingness to sell in times of crisis. Only with the onset of the crisis is there a tendency to run a consumer database. Their incomes are satisfactory given the fact that they faced the crisis completely unprepared. From the answers themselves, we see that in the future, the most important factor for them is the success of databases. The modern information age has enabled database management and communication in many ways and means. From the above said, but also from the analysis of the functioning of markets in the Republic of Serbia during the COVID-19 pandemic, it is clear that communication must be interactive and networked.

Unlike the traditional, the modern view of crisis management that is now being created before our eyes, due to the pandemic impact of COVID1-19 on all spheres of human interests and life, and thus on business, is even more comprehensive. (Jeftić et al., 2020). Looking at the marketplaces from the traditional and modern angle, as well as the competition, it is clear that risk

should be built into the business as a serious factor. This managerial concept must be proactively aimed at mitigating business crises and realistic to reduce and mitigate the overall consequences in a crisis such as COVID-19. The example of this catastrophe brings marketplaces into the focus of social concern because their work is conditioned by social stability, sustainable agricultural production and human health. The sale of domestic products from rural areas strengthens social stability in times of crisis.

Critical review and recommendations for improvement of marketing public relations in funcioning of marketplaces in crisis situation

Period of crises demands especially trained people from spheres of communication science, psychnological and sociological sciences, but also multidisciplinar knowledge of business operations of companies. These human resources must have knowlwdge and competencies in business economics and communication science. In such circumstances we must adjust ourselves to complex work and turn towards social community. The solution must be sougth in basic setting of market business through serving to interests of sellers and buyers. Doing business in such situations is completely different and requires maximum of communication effort. As bases for crisis opposition, it is necessary to make business and marketing plan through:

1. Analysis of current situation and couses of crisis
2. Adoptin the business plan in crisis situation
3. Choice of adequate human resources
4. Special education and preparation for working in crisis situations
5. Marketing strategy of communication through marketing public relations

If we want to actively oppose to crisis, it is necessary to take all needed steps and activities in order to fulfill goals of business and marketing plans. Efficiency of business project management in crises is not possible without active planning. The only objective prerequisite for business is implementation of all marketing plan steps. The plan has to be based onprevious business analysis in crisis period, clearly determined and precisely defined. The process of plan realisation must be in the focous of marketing public relations activities.

If we measure intregration and importance of individual instruments, then we separately may measure influence of instrument that complement each other, such as direct marketing, internet marketing and word of mouth. (Prdić et al., 2021).

These instruments in implementation requre harmony through research competencies for the purpose of acieving good resuts and individual performances. In strategic role of work and survival of marketplaces in crisis situation, participation take farmers, especcialy those from rural areas. It is not necessary to stress increased influence of crisis on the society in case of agricultural production termination, hence is necessary to analyse social norms that anticipate conseuences. Strategically directed marketing public relations service in crisis period serves to internet and personal communications directing, making unite communication network in the period of crisis.

Communication instruments should be harmonized, integrated and they have to lean on great number of different instruments to create unique message that may contribute to communication efficiency and increase of economic effects. (Prdić et al., 2019).

For determining model of marketing public relations in period of crisis, based on internet page data, we see that marketplaces give advantage to internet communication. Results of sellers attitudes from research show that the most communication is realitted by internet and direct communication. The business of marketplaces is to direct communications between sellers and consumers, making integrated unique message. Internet may be efficient if marketplaces use it as marketing channel for the purpose of directing and channeling information. Integration of interests of marketplaces, agriculture producers and consumers, contributes to speed and efficiency of information that lead to economic effects increase. Internet enables string of feedback that in each moment in period of crisis may change model of communication and direct sales to other way. On the bases of research of marketplace functioning in crisis period, we may conclude that their reactions usually were delayed. It means that marketplaces have not organizational abilities to apply marketing public relations model in period of crisis. Special significance of interactive and direct communication in crisis period has contributed to information and data flow, which made possible communication between agriculture farms, sellers and consumers. Throuhg harmonised communication grows the effect of sales security from rural areas, and it contributes to social stability during crisis.

After conducted researches, for purposes of this workpaper, the reccomendation is tha domectic marketplaces define strategy of marketing public relations in period of crisis. The analysis of public appruach to marketplaces in period of COVID-19 demonstated that domestic marketplaces have not adopted strategic approach to marketing communications and relations with consumers. The strategy of marketplaces in crisis period has to be harmonised wiht all social activities in struggle against pandemic. Therefore, business of marketplaces in efficient if we apply adequate strategy of marketing publc relations by integrating our interests with sellers and consumers. Implementation of this business model for marketplaces in crisis period implies activation of all activities from business plan. Namely, the fact is that marketplaces offer the possibility of supplying the population in period of crisis, as institutions of traditional confidende. Hence, communication strategy has to be directed and performed on the principles of actual activities of marketing public activities. Besides this fact, marketplaces in crisis period enable work and production for agriculture economies from rural areas and increase of economic standard and social stability.

Conclusion

The conclusion of research presented in this workpaper is significant factor that may help to marketplace functioning in period of crisis. The research demontrated that intenet enables new ways of marketing public relations characterised by interactivity. This form of communication enabled some functioning and selling products to consumers. Analysis of marketplaces functionong during COVID-19 shows that marketplaces informed the public but they have not applied model of active communication through marketing public relations. Information mostly had one direction. Communication that conducted sellers from the survey during time of pausing in marketplace work, showed the lack of adequate data base of regular consumers and daily managing in communication and sale. It is proved, at least for internet, that there is relation between roles and models of marketing public relations and interactive bidirectional communication of sellers and consumers. Development and applying of marketing public relations has to be bidirectional and directed to all interested parts and other public. Marketplaces should make interested general public and specific target groups in agriculture and rural areas, using intetnet and personal communication during crisis, in order to supply consumers.

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STRONGER INVOLVMENT OF WOMEN IN THE DEVELOPMENT OF SERBIAN RURAL TOURISM[1]

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Abstract

The rural tourist product is becoming a very important segment of the tourist offer in Serbia, but it is still not developed enough to leave positive effects on the economy in society as a whole. The authors of the paper started the research of women's participation in the development of tourism in the villages of Serbia. The study was conducted in order to discover the importance and role of women in the development of rural tourism in Serbia. The survey was conducted in 45 households in Serbia engaged in the provision of tourist services, on a total sample of 338 respondents. Descriptive and multiple linear regressions were used to determine whether any of the above predictors could significantly predict the participation and impact of the female workforce in the near future. The obtained results show that most factors can predict greater involvement of women in rural tourism. The initial hypotheses have been confirmed, and the importance of the research certainly contributes to the scientific, social and economic segment of the development of rural areas in Serbia.

Key words: *rural tourism, women, rural tourism.*

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Introduction

One of the most promising selective forms of tourism in Serbia is without a doubt rural. It turned out that rural tourism is an economically and socially important sector with the participation of a large mass. This sector has been important because it provides opportunities either to the global economy or has socio-cultural effects on local communities. Serbia has a huge potential in resources for the development of rural tourism.

The authors of the paper started from the facts and existing literary statements that rural tourism is the future of Serbia, and started research with the aim of determining the participation of women in supporting the development of rural tourism. The female labor force is very pronounced in rural areas, but mostly in the household, while in other sectors of the female labor force it is underestimated and unused. The authors surveyed women orally in 45 rural households in Serbia, in order to reach a general conclusion about their current participation and the possibility of stronger involvement in rural tourism. Used SPSS program version 26.00. Descriptive and multiple regression analysis yielded research results, where the attitude of women towards their position can be observed, and which of the above factors can most strongly influence the greater involvement of women in rural tourism. The results undoubtedly show that there are chances for more frequent employment of women in this tourism sector, due to the fact that they are not sufficiently engaged. The results also indicate that the incentive for greater employment of women in rural areas is the future development of these municipalities. In addition to the fact that rural tourism can provide new jobs, and the presentation and affirmation of old crafts and home-made workshops, women are aware that this form of business will not bring them much income, nor will it negatively affect the culture and attitude towards women in society.

The importance of research is enormous, especially in the segment of the rural progress economy in Serbia. This research can be a starting point for future research at a broader level. The data indicate the prevailing state of the position of women in this tourism sector, as well as the fact that rural tourism, in addition to involving women, can also contribute to the return of young labor to the countryside. The multiple significance of this research is reflected in the sector of society, economy, and the economy as a whole. Based on the obtained results and similar research, it will be possible to identify key problems in rural business, and to identify the true position of women in rural municipalities, and thus devise strategic measures to improve these areas and women's participation in rural tourism.

Literature review

World rural tourism product is already recognized as a sector of the future. The situation in Serbia is at a relatively unsatisfactory level. Rural tourism is considered the future of Serbia, but it is at a very poor level of development, which causes very low total revenues from this activity (Canoves et al., 2004). There have been negative changes in recent decades, most notably the departure of young people to cities, the shutdown of households, and the mass disappearance of villages in Serbia (Cvijanović et al., 2020). The goal of any strategic plan should be to stop these negative changes. The development of rural tourism could bring young people back to the countryside, engage in agriculture and stabilize their lives by generating income from rural tourism development. The most common problem and doubts arise when distinguishing between the concepts of rural, agritourism and rural tourism. Organization for Economic Co-operation and Development - OECD, 1993) rural areas are classified as follows: economically integrated areas (located near cities, are part of rural areas, and are economically and culturally close to urban areas), rural middle-level areas (in rural areas, where agriculture and forestry are predominant, located farther from cities), remote areas (which are sparsely populated, are far from urban areas with poor quality land) Marin et al., 2009). Criteria for population density and settlement size, according to which an area is considered rural, differ between countries. There are data that in Canada, a rural area is considered a settlement with less than 1.000 inhabitants, more precisely with a population density of less than 40 inhabitants per km. As for other countries, the results are as follows: in Portugal and Switzerland, rural settlements have less than 10.000 inhabitants, while in Austria less than 5.000 inhabitants (Chang et al., 2018). Rural areas can vary in size, but with less than 10,000 inhabitants. Rural areas can vary in size, but with less than 10,000 inhabitants. The Republic of Serbia has a great wealth of rural areas to present to the world as a tourist potential (Gajic et al., 2020a). Rural tourism can begin in an area of untouched and preserved nature, with specific flora and fauna, as well as a specific tradition of the people (Cvijanovic et al., 2020). The goal of improving rural tourism must be the comprehensive development of authentic human needs, high quality of human life, renewal of material and spiritual resources of the village, understanding the needs of people for rest, development of creativity and communication that enrich the human personality. The economic meaning of rural tourism is expressed in greater activation of the agricultural population, in connecting agricultural production and tourism, in meeting the needs of guests by selling agricultural

products to tourists (Marin et al., 2009). Statistics show that there are 6.158 settlements in Serbia, of which 3.1% are urban settlements, and 5.965 are classified in other settlements or rural areas. About 1.000 households are registered in Serbia in rural settlements that provide catering and tourist services. Approximately 300 households provide accommodation and food services, with a total of about 8,000 beds (Cvijanović et al., 2020). The average number of overnight stays in Serbia in rural households is about 408,580, more precisely 6.2% of the total number of overnight stays in Serbia. Visitors who come to rural households are mostly domestic visitors, over 90%. (Tourism Development Strategy in Serbia until 2018). In world tourism, 65 percent of employees are women, but only 0.7 percent of them are in high positions, and in Serbian tourism, that percentage is even lower (Lee et al., 2012; Alrwajfah et al., 2020). The activity of catering and tourism belongs to the activities in which women are the most represented - about 54 percent of them 8Gajić et al., 2020b). However, women are generally employed in lower paid jobs. In individual cases, women are also faced with unacceptably harsh treatment by both superiors and work colleagues (Munoz et al., 2009; Tao et al., 2018). Women in the status of "assisting unpaid member of the (agricultural) household" are deprived of many rights (Risman, 2004; Yang et al., 2012). Most women work in the services sector (67.5% of total employed women), and significantly less in agriculture (16.2%) and industry (16.3%) (Rosa et al., 2015; Zhao et al., 2016). The employment rate of women of working age at the national level is lower by 13.5 percentage points than the employment rate of men, and the inactivity rate is higher by 15 percentage points. Less than half of working age women are employed (48.4%). The lowest female employment rate is in Southern and Eastern Serbia (45.6%), and the highest in Belgrade (52.9%) (Statistical Yearbook, 2018). The largest gender gap in employment rates is in Vojvodina (15.5 percentage points), and the smallest in the most economically developed area - Belgrade (8.3 percentage points). Higher employment of women in Belgrade is probably the result of the structure of sectoral employment, given that Belgrade has the largest number of employees in the service sector (78%), which employs mostly women, while in other regions employment in this sector is significantly lower, as illustrated by on the highest employment rate of men in Šumadija and Western Serbia (63.2%) where the share of employees in the services sector is only 46% (Statistical Yerabook, 2018). How powerful women can be in tourism is shown by the fact when Michaela Reitterer bought the hotel "Zur Stadthalle" from her parents in 2002 and, changed it into a showcase project for sustainability

which is also profitable. The hotel has 82 rooms and generates the energy for these rooms over solar and photovoltaic panels and a heat pump. It was awarded numerous prizes, amongst them the "Green Hotelier Award 2015 Europe" and is internationally renowned as a pioneer hotel. Starting from the given literature and similar research, the authors set the starting hypotheses:

H1: There are opportunities for greater involvement of the female workforce in the development of rural tourism

H2: there is a statistical significance of the predictor in predicting the score on the criterion variable

Methodology

The research was conducted in 45 Serbian rural households, which provide tourist and catering services. An oral survey of women living in households engaged in rural tourism was conducted. The interview contained a total of 11 questions related to the position of women in rural tourism. The participants in the research generally gave complete answers, and there were no set limits in the research. The research lasted from February to July 2021. The authors summarized all the answers and processed them in the statistical software SPSS 26.00. Average estimates of variables based on the Likert scale of five points were made, as well as a conclusion on the attitude of women and their position in tourism. After that, a multiple regression analysis was performed, where the authors determined which of the predictors can predict a stronger and more stable participation of women in the tourism sector. Greater participation of women in rural tourism was taken as a criterion variable. Since this is a problem of one dependent and several independent variables, the analysis suitable for data processing is a multiple linear regression. Regression analysis is a method that examines and determines the relationship between two or more variables, ie. Considers the impact of changing one or more variables on the change of other variables. In addition to the survey research, available statistical data and relevant literature dealing with rural tourism were used.

Results and discussion

At the very beginning of the statistical analysis, it is necessary to determine the degree of reliability of the questionnaire or scale with several questions. In that case, Cronbach's alpha is observed, which must be greater than 0.07.

In this research, the value is 0.867, which shows the high reliability of the questionnaire. Out of the total sample of respondents, a total of 338 women participated. The highest percentage of them was between the ages of 46 and 60 (40.5%), followed by 31 to 45 (19.5%). A total of 27.8% of survey participants were aged 18 to 30, and over 60 years of age 12.1%. When observing the education of the research participants, it can be noticed that the non-reporting percentage of them with secondary school is a total of 62.3%, then with primary school 23.2%, and with higher education only 14.5%. Most women are housewives and perform household activities, as well as additional activities related to agriculture. Only a small part of them, only 36.8%, go to cities to work in other economic activities, and their earnings do not exceed more than 300 euros per month.

Table 1. Descriptive statistical analysis of items.

	m	sd
It is necessary to develop rural tourism to a greater extent	4.67	.875
Women need to be more involved in tourism	4.62	.818
Municipalities need to involve more women and motivate them	3.63	.880
There are conditions for greater involvement of women in rural tourism	2.83	.898
Women are involved enough	2.20	.704
Rural tourism creates new jobs for women	3.88	.922
Rural tourism provides opportunities for the affirmation of certain old crafts, the presentation of talents and local crafts	3.93	.876
Rural tourism will increase women's earnings	2.67	.821
Rural tourism has negative consequences for the culture of women and youth	2.03	.608
Attitudes towards women will change	3.07	.631

* m = arithmetic mean,

ssd= standard deviation

Observing the results of the descriptive statistical analysis given in Table 1, it can be seen that the item with the highest average grade was It is necessary to develop rural tourism to a greater extent (m=4.67). That women should

be more involved in this segment of tourism is also indicated by the attitude of women, who rated this item with an average grade point average of 4.62 (sd = 0.818). Many survey participants believe that municipalities are less involved in the engagement of women and that they should be more active (m = 3.63, sd = 0.880). Item There are conditions for greater involvement of women in rural tourism has the value of the arithmetic mean m = 2.83 (sd = 0.898). However, women do not consider themselves sufficiently engaged in the rural tourism product, as the average score for this item is m = 2.20. This form of tourism creates new jobs for women is an item that has taken the value of the arithmetic mean m = 3.88. Regardless of the fact that women believe that rural tourism creates new jobs for them, they are aware that this is not a significant amount of money that they will earn. This fact is indicated by the estimate of item m = 2.67 (sd = 0.821). The general conclusion that rural tourism has no negative consequences for youth and society in villages in general, was assessed with a score of 2.03, while the attitude that will change the attitude towards women and their significant participation in this activity was rated with arithmetic mean m = 3.07.

The following tables show the values of multiple regression analysis in determining the statistical significance for each predictor.

Table 2. Representation of the percentage value of the explanation of variance.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.646[a]	.417	.400	.547
a. Predictors: (Constant),				

R squared gives us the percentage value of the explained variance in the sample, while Adjusted R Square shows how many percent of aviation is explained in the population. In determining whether these predictors can determine the score on the variable higher inclusion of women in rural tourism, it was observed that the model corresponds to the data R^2 = 40%. More precisely, the model explains 40% of the variance.

Table 3. ANOVA[a] - Presentation of common statistical significance of all predictors.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	70.080	10	7.008	23.429	.000[b]
	Residual	97.813	327	.299		
	Total	167.893	337			
a. Dependent Variable: More involvement of women in rural tourism development						
b. Predictors: (Constant), Research items (1-10)						

The results shown in the table 3 show a good agreement of the model with the obtained data, where the determined statistical significance is p = o.ooo and the value F = (10,327) = 23,429 can be seen.

Table 4. Determining predictor strength

Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.347	.183		1.892	.059
	It is necessary to develop rural tourism to a greater extent	.005	.040	.006	.123	.902
	Women need to be more involved in tourism	.247	.043	.286	5.743	.000
	Municipalities need to involve more women and motivate them	.023	.041	.029	.569	.570
	There are conditions for greater involvement of women in rural tourism	.157	.038	.200	4.123	.000
	Women are involved enough	.382	.051	.381	7.444	.000
	Rural tourism creates new jobs for women	.025	.037	.033	.685	.494
	Rural tourism provides opportunities for the affirmation of certain old crafts, the presentation of talents and local crafts	.114	.044	.142	2.567	.011
	Rural tourism will increase women's earnings	.061	.044	.071	1.373	.171
	Rural tourism has negative consequences for the culture of women and youth	.118	.063	.102	1.875	.062
	Attitudes towards women will change	.007	.056	.006	.126	.900

a. Dependent Variable: Vise ukljucivanje zena u ruralni turisticki razvoj

The predictor It is necessary to develop rural tourism to a greater extent has no statistical significance in predicting the variable greater inclusion of women in rural tourism (p = 0.90). The value of B is the partial contribution of the predictor, which tells whether that predictor is significant in itself, more precisely how strong it is in prediction. In the first item B is 0.05, while the beta value is only 0.06. The beta value is a correlation that shows how much this predictor is related to the criterion variable (greater involvement of women in rural tourism). Predictor Women should be more involved in rural tourism has statistical significance because the value is p = 0.000. The values of multiple regression analysis for this item are as follows: B = 0.247, ß = 0.286. Of the other predictors in determining the score on the criterion variable, the existing conditions for greater inclusion of women in rural tourism are important (p = 0.00, B = 0.157, ß = 0.200), then the predictor Enough women are included with values: p = 0.000, B = 0.382 , ß = 0.38.Predictor Rural tourism provides opportunities for Rural tourism provides opportunities for affirmation of certain old crafts, presentation of talents and domestic crafts also has statistical significance in predicting the score on the criterion variable with the following values of multiple regression analysis: p = 0.01, B , ß = 0.142. Predictors: municipalities should be involved in women's engagement, rural tourism will increase women's earnings, rural tourism has negative consequences on women's culture in villages and changes in attitudes towards women are not statistically significant in predicting greater inclusion on the criterion variable women in rural tourism.

Conclusion

There are statistics that show that 85% of the Serbian territory is rural, more precisely it means that between 44% and 55% of the population lives in the countryside. Furthermore, according to the statistics available on the website of the Republic Bureau of Statistics, it can be noticed that about 41% of GDP comes from Serbian rural areas. However, it is known that the Serbian economy mainly relies on agriculture. It is important to note that about 75% of the rural population is engaged in agriculture. Tourism that takes place in a rural environment, with special and specific features, is actually rural tourism. This form of tourism product can contribute to greater employment of youth, but also women, as a workforce. Certainly, the development of this tourist segment will contribute to the overall development of the Serbian economy. It is also very important that tourism employs a large female workforce. What is needed for the revitalization of rural areas is: reconstruction of road and communal infrastructure, continu-

ation of new cooperatives, investment in various projects to improve agricultural production, but also ethno tourism, providing all necessary prerequisites for quality life in rural areas. It is known that in any country that develops the rural tourism product to the least extent, it can record changes at the level of socio-economic structure. The positive effects of rural and agro development are reflected in the improvement of the mentioned main branch of agriculture, then the contribution to the creation of new jobs for youth and women, as well as to the development of the trend of emigration of youth to urban settlements. Along with the development of rural tourism, it is generally known that ethnotourism, ecotourism, adventure are being developed, as well as investing in the development of the infrastructure of the given municipalities, as well as preserving the traditional values of the local community. The highest percentage of poverty is still recorded in the villages of Serbia. Some theorists point out that it is necessary to harmonize the rural and urban economy, to the extent possible, in order to reduce the gap between the economies of the given spaces. The diversification of the rural economy is certainly influenced by the development of tourism. It is certainly about changes in the economic segment of the population or the local community and all institutions in those municipalities. The goal is to reach the lowest level of emigration from rural municipalities, with the help of tourism development. This means greater involvement of both youth and women and the elderly in activities related to the tourism product.

The results obtained by the authors in this research show that women are not sufficiently involved in rural tourism development. Also, the results confirm that there are opportunities to change this situation, which would have positive effects on rural development. This research achieves high importance in finding conceptual solutions for greater involvement of the female workforce in the villages of Serbia. They are certainly in the background of every activity and life, and they are directly crucial for life in the countryside. The state has often organized projects in recent years. The goal of these projects is certainly to engage women in activities, such as tourism promotion and activities. In this way, joint research, as well as experiences in the world, will play its part in understanding the real situation of women in villages, as well as the poor development of tourism in these areas. Rural tourism creates new jobs for women, but will also affect the return of young people to abandoned villages. It will be possible to devise a strategy for the development and improvement of the tourism as well as the engagement of women in that sector. Of course, the economic effects of the development of this segment of tourism will be noticeable, as well as the inclusion of women in this sector of the economy.

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SUSTAINABLE AND DEVELOPMENTAL SYSTEMS IN PRIMARY ORGANIC PLANT PRODUCTION

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Abstract

Surfaces under organic production are constantly increasing, in Serbia as well as in Europe and the World. Organic agriculture uses sustainable systems of production to prevent environmental pollution, enhance biodiversity and efficiently manage natural resources. The implementation of specific cultivation methods such as applying plant extracts and microbiological preparations leads to plant nutrients being secured faster and more efficiently. In field experiments, greater microbiological soil activity was recorded in the organic cultivation system. The increase of the abundance of microorganisms increases biochemical and enzymic activity, which influences the incensement of soil fertility and biodiversity. A certificate for organic products is an important milestone on the path of realizing sustainable agriculture which is based on environmental protection paired with obtaining healthy products. The development of consumer awareness and the values of organically produced food will lead to the further incensement of organic plant production surfaces.

Key words: *biodiversity, microorganisms, organic production, sustainable agriculture*

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Introduction

Agriculture is a primary branch of industry in food production. Market demand for organic products is increasing. Therefore, surfaces under organic production are also being increased, as in the World and Europe, so in Serbia (Table 1) (FiBL, 2021). It is very important for organic production to be certified and controlled, by which data on surfaces and quantity of certified organic products is put on disposal. Organic production combines tradition, innovation and science in the favour of sustaining the environment, it promotes correct relationships and good life qualities for all that are involved in it.

Table 1. Arable land under organic production (ha).

Year	World	Europe	Serbia
2017	69.411.457	14.382.479	13.423
2018	71.172.783	15.607.635	19.254
2019	72.285.658	16.528.677	21.265

Organic agriculture is a system of ecological production management which promotes and enhances biodiversity, matter circulation and biological soil activity (Kovačević and Oljača, 2005). In agricultural production, one of the target and direction measures is integral and organic agriculture, which also implies finding innovative ways of primary plant production as to avoid consequences of soil degradation and microbiological soil activity (Cvijanović et al., 2010). One possible way of organic production is applying aqueous plant extracts (nettle), such as plants that have a fungicidal and insecticidal effect and that, when fermented, present a significant nutrient source of plant nutrition in the form of side dressing. The use of plant extracts is ecologically and economically justifiable. In the long run, by using aqueous plant extracts, lesser soil, air and environmental pollution would be achieved whilst obtaining safe food without decreasing yield quality and quantity. Biopreparations made from other plants and intended for being applied in cultivated crops, beside ensuring a certain amount of plant nutrients are also partially insecticides and fungicides due to bioactive chemicals that can be found in the prepared treatment solution (Kim et al., 2005). Certain plant extracts are being increasingly used for fertilization in organic production. They are simple to prepare in industrial settings, but on smaller farms as well. For that purpose, nettle, common comfrey and a mixture of various plants are most commonly used in Serbia (Mirecki et al., 2011). Nettle is used in biodynamic and organic agricul-

ture for pest control and as a stimulation agent in plant breeding (Di Virgilio et al., 2015). Plant extracts are products that can be a significant source of various elements even in traces, depending on the variety and quality of the soil on which the plant species used for preparing the solution was bred (Popescu et al., 2010). The preparation of nettle (*Urtica dioica*) extracts aims at preventive crop protection from diseases and pests and has a leaf dressing role.

The liquid preparation EM – aktiv with effective microorganisms (EM) is applied before sowing both for soil treatment and foliar. It improves seed germination, root, flower and fruit luxuriance and soil fertility enhancement (Szymanski et al., 2003). EM – aktiv is permitted in organic production.

The total number of microorganisms in the rhizospheral soil segment is an information that indirectly indicates the degree of microbiological soil activity. By increasing the number of microorganisms the biochemical and enzymatic activity also rises, which affects soil fertility and biodiversity (Cvijanović et al., 2012). In every primary production, as well as organic, there is a tendency to achieve great yields, which depends on many factors.

Organic production must be in accord with the Organic production law („Sl. glasnik", number 30/10 and 17/2019 – another law). The control system of organic products in Serbia is based on the control system established by EU regulations. specifically European Council regulation (EZ) number 834/2007 and European Council regulation (EZ) number 889/2008. An organic product certificate is an important step towards realizing sustainable agriculture that is based on environmental protection whilst obtaining products that are organically certified and health safe in terms of health. Organic producers tend to combine ecological practices with developing customer awareness and organically produced food's value, which will lead to further increasement of surfaces under organic primary food production (Pascu, 2013).

The goal of this research was to analyze the influence that applying nettle extract and EM on some cultivated plant species has on the number of microorganisms (MO) in the rhizospheral soil segment, as well as on the yield. On the basis of biannial results, a recommendation which would be useful, especially for organic producers, as well as consumers, would be given for organic production advancement and sustainability.

Research material and methods

Nettle (*Urtica dioica*) was used as material in field experiments – it is applied as an insecticide and as fertilizer. It is found in nature and plucked in rudimentary areas in immediate proximity of spontaneously grown high trees and shrubby vegetation. Effective microorganisms (EM) were applied by using the preparation EM – aktiv. EM – aktiv is a liquid concentrate in which there are 80 strains of main anabiotic organisms which can be found in nature within the soil. The preparation does not contain genetically altered microorganisms, but a strong community of aerobic and anaerobic microorganisms. It enhances seed germination, root, flower and fruit luxuriance and betters soil fertility (Szymanski et al., 2003). EM – aktiv is placed on the list of permitted plant nutrition and soil breeders which can be used in organic production (http://www.minpolj.gov.rs/organska/).

The aqueous nettle plant extract was prepared by plucking the young nettle without not including the roots. 1 kg of chopped nettle was placed inside of a barrel and poured with 10 litres of stood out rainwater. It stood inside the barrel for 15 days. The barrel containing nettle was placed on a shadowy spot. The aqueous nettle extract is permitted for use in organic production (http://www.minpolj.gov.rs/organska/).

The field micro experiments in irrigation less breeding technology were set by a randomized block system design in four repetitions. There were four treatment variants: control, nettle use, EM – aktiv and the combination nettle + EM – active. The nettle extract was drained and diluted with water in a ratio of 1:15. The treatments were conducted within reproductive phases (beginning of blooming). Foliar treatments were conducted by a manual back sprayer. In the full-bloom phase, 3 plants were taken (per every variant) including the root and the soil surrounding the root for determining the total number of microorganisms.

The yield was determined on the basis of main parcel yield and recalculated into kg per hectare.

Weather conditions

Temperature and precipitation data was taken from the government's meteorological station of the Agricultural proffesional service in Bačka Topola.

The average temperature in 2018 in every vegetational month was higher than the perannial average (Table 2), whilst precipitation for the entire vegetational period was 6.7% higher than the perannial average. In may of 2019, mean monthly temperatures were lower, while in other months they were above the perannial average. The sum of precipitation within the vegetational periods of soybean and bean was 22.3% higher when compared to the perannial average and 14.6% higher when compared with 2018. In the reproductional phase, there was a substantial amount of precipitation, which positively affected soybean and bean plants. By observing average temperature values and the total sum, as well as the precipitation distribution throughout both of the examined years, it can be concluded that 2018 was more suitable for soybean and bean production because of more suitable precipitation distribution.

Table 2. Weather conditions in the examined years.

Month	Temperature (°C)			Precipitation (lm^{-2})		
	2018	**2019**	**Long-term average**	**2018**	**2019**	***Long-term average***
IV	17.1	13.4	11.8	12.0	54.1	44.1
V	20.8	14.7	17.2	43.6	147.6	65.4
VI	21.7	23.2	20.5	122.8	63,.	69.4
VII	22.8	23.3	22.2	108.8	21.0	61.6
VIII	24.9	24.4	21.6	39.2	79.1	53.6
IX	18.5	18.2	17.2	38.8	53.1	48.1
Average/ Sum	21.0	19.5	18.4	365.2	418.6	342.2

Research results and discussion

This paper shows the results of the average total number of microorganisms ($x10^7$) value within the rhizospheral soil segment and yield ($kgha^{-1}$) per treatment with nettle, EM – aktiv and the combination of nettle and EM – aktiv for the 2018-2019 period of soybean and bean research.

Table 3. Influence of plant extract and EM to total number MO ($x10^7$) and yield ($kgha^{-1}$) in the period 2018-2019.

Year	Treatment	Plant species			
		Soybean		Bean	
		MO	Yield	MO	Yield
2018	Control	155.6	2890	170.3	1217
	Nettle	173.2	3150	175.4	1252
	EM	227.7	3341	225.2	1344
	Nettle+EM	270.6	3607	257.2	1390
	Average	206.8	3247	207.0	1301
2019	Control	155.2	2659	156.7	1120
	Nettle	170.0	2898	168.6	1152
	EM	220.3	3074	207.2	1236
	Nettle+EM	250.2	3318	236.6	1279
	Average	198.9	2987	192.3	1197
Average 2018-2019		202.9	3117	199.6	1249

Plant species and years	LSD	Treatment	
		MO	Yield
Soybean 2018	1%	17.5	185
	5%	15.9	171
Soybean 2019	1%	14.6	169
	5%	16.1	178
Bean 2018	1%	28.6	91
	5%	27.2	89
Bean 2019	1%	28.1	82
	5%	26.9	76

An average yield of 3117 $kgha^{-1}$ was recorded for both years, considering that in the year 2018 it amounted to 3247, and 2987 $kgha^{-1}$ in the year 2019 (Table 3). In both years of research, a statistically very significant higher total number of MO was determined by applying the treatment. All differences between applied treatments were at a 5% significance level. The greatest number of total MOs was recorded at the combination of the aqueous nettle extract and EM – aktiv (270.06 $x10^7$) in 2018 and 250.2 $x10^7$ in 2019. The influence of weather conditions during the year on the total number of MO is suggested by Dozet (2009). A statistically very significantly higher yield was recorded with all of the treatments in comparison with the control. All differences between the treatments were at the statistical significance level of 1%. Also, Dozet et al. (2019) recorded a significant effect of aqueous nettle extract on soybean yield in comparison to the control.

The average bean yield in both examinatory years was 1249 kgha^{-1}, with consideration that it was 8.7% higher in 2018 than in 2019 (Table 3). The average total number of MO identified within the bean plants' rhizosphere was 199.6 x10^{7}. In the year 2018, the number of total MO was 7.6% higher than in 2019. In both years, in the contrl treatment, a statistically significantly lower yield was recorded in comparison with all other applied treatments between which there were 5% significance level differences. With the use of EM, a higher number of total MO was determined compared to the use of the aqueous nettle extract. Similar results are noted by Cvijanović et al. (2021) in their researches. In both years, the greatest bean yield was achieved by combining the aqueous nettle extract application with EM. That was statistically very significantly more than the control and the treatment where only the aqueous nettle extract was applied. Also, by applying EM, in both examinatory years a higher yield was achieved compared to the bean yield where only the aqueous nettle extract was applied and compared to the control. Other differences were not at a level of statistical significance. Positive foliar application effects on bean yield are shown by Cvijanović et al. (2021). On average, a greater number of total MO was in the soybean plants' rhizosphere compared to the beans' rhizosphere. It is suggested by Mrkovački et al. (2012) that the total number of MO depends on the plant species

Conclusion

Organic agriculture uses sustainable production systems as to prevent environmental pollution, increase biodiversity and efficiantly manage natural resources. On the basis of the obtained results, it can be concluded that soybean and bean production may succsessfully be lead by applying EM and an aqueous nettle extract. Applying such preparations may significantly improve soybean and bean production in an organic breeding system. A certificate for organic products is an important step on the path of realizing sustainable agriculture.

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ECONOMIC EFFECTS OF VEGETABLE PRODUCTION AND PROCESSING ON THE AGRICULTURAL HOLDING[1]

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Abstract

As an agricultural holding in the form of legal entity, cooperatives have a significant role in the production, processing and trade of vegetables in the Republic of Serbia. In order to obtain safe and competitive agricultural products, cooperatives strive to provide greater flexibility to market changes and faster adaptation to occurred changes. Operating in this way has been imposed the need to achieve a higher degree of technological capacities utilization, to fine tune the optimal structure of production and obtain highly valorised products. In other words, cooperatives should invest in products obtained by processing, which will be valorised the most and which will achieve the highest prices (i.e. the maximum economic effect per invested financial unit). Along to previously mentioned, research is focused to the economic effects of a cooperative business operation which intends to organize environmentally friendly production of tomatoes and cucumbers, partly in the open field (on area of 3 ha) and partly in a protected area (greenhouses with total size of 3 ha and 60 are), while it applies modern agro-technic's and food safety production measures. Besides, wanting to approach to safe and continuous market realisation of tomatoes and cucumbers, cooperative will establish processing and sale of processed vegetables.

Key words: *economic effectiveness, investments, public grants, vegetables, agricultural holding.*

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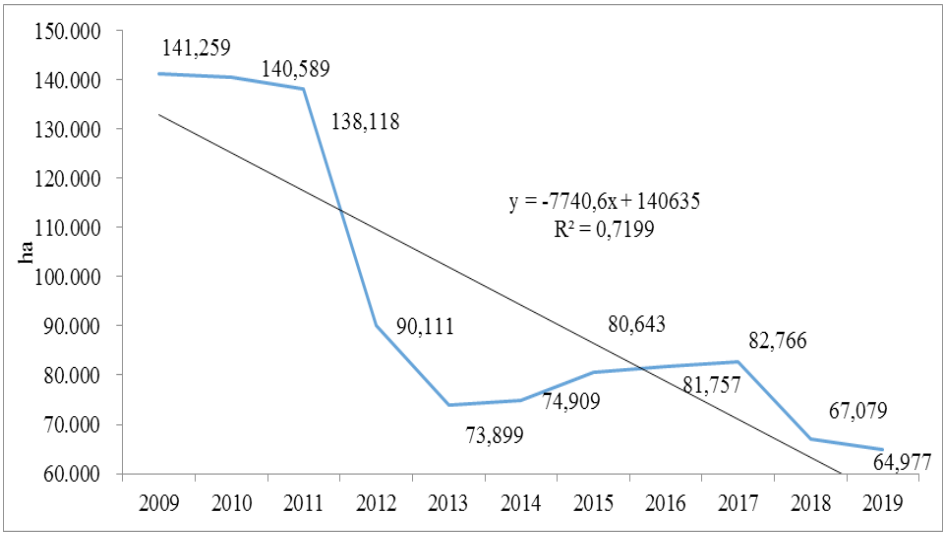
Introduction

Vegetables are one of the most intensive sectors of national agriculture, while Serbia represents the largest regional producer of vegetables. The value of totally produced vegetables in 2019 was 43.7 billion RSD, what is 8.7% of overall agricultural production (SEEDEV, 2020).

Serbia is achieving the surplus in foreign trade balance. In 2019, the export of vegetables was amounted around 116 million EUR, what is for 18 million EUR above the import in same year.

According to FAO data, the area under vegetables in Serbia covers 64,977 ha, representing around 1.9% of available utilized agricultural area (UAA). During the period 2009-2019., the area under vegetables was decreased for 54% (Figure 1.).

Figure 1. Areas under vegetables in Serbia in the period 2009-2019.



Source: FAOSTAT, 2019.

The key reasons for the decline in vegetable production in Serbia are (Roljević Nikolić, Paraušić, 2021):

- non-competitiveness of small producers that give up from veggies production;
- large fluctuations in market prices;
- significant impact of weather conditions on yields and incomes;
- lack of crop insurance.

The most of areas under the vegetables are in the South-Bačka district (13.3%), followed by the Rasina district 7.5%, Jablanica district 6.0%, North-Banat district 5.6%, while in other district there are considerable lower areas under the vegetable (Table 1.).

Table 1. Representation of areas under vegetables in different regions

Districts	Share of areas under vegetables	Districts	Share of areas under vegetables
Belgrade	4.3	Rasina	7.5
West-Babačka	4.1	Raška	1.7
South-Banat	5.1	***Šumadij***a	1.9
South-Bačka	13.3	Bor	1.9
North-Banat	5.6	Braničevo	1.9
North-Bačka	2.2	Zaječar	1.2
Central-Banat	5.5	Jablanica	6.0
Srem	5.5	Nišava	3.6
Zlatibor	4.5	Pirot	0.7
Kolubara	2.1	Podunavlje	2.1
Mačva	5.3	Pčinja	3.4
Moravica	5.2	Toplica	2.9
Pomoravlje	2.4		

Source: SORS, 2018.

Dominant production of vegetables is organized at the open field, around 92%, while production in green houses is carried out on only 8% of areas under the vegetables. There are 114,643 agricultural holdings, or 20.5% of the total number of agricultural holdings, that are engaged in vegetable production. A large number of farms involved in production of vegetables have mixed production. On the other hand, farms specialized in vegetables, floriculture and other types of horticulture (8,126 holdings) take 7.1% of the total number of farms engaged in vegetable production.

Specialized vegetable production is organized at the area of 19,060 ha, which is almost evenly distributed between the regions of Vojvodina (32.8%), ***Šumadija*** and Western Serbia (28.4%) and Southern and Eastern Serbia (30.6%). Economic size of farms specialized in veggies production in average values 10,583 EUR, ranking them as a third, after the farms specialized in pigs and poultry growing (12,432 EUR) and farms specialized in crop production (10,900 EUR), (SORS, 2018).

Methodology and data used

The main subject of research presented in this paper is gaining the safe and competitive agri-food products that are obtained by the processing of vegetables at the farm organized in the form of legal entity (cooperative). Accordingly, research activities were conducted within the rural area, more precisely in the village of Skobalj, which is located at the territory of Smederevo city, or in the Braničevo district.

Competitiveness and added value of the agricultural products can be achieved after the veggies processing done by the family farms joined in cooperative from Skobalj. Mentioned farms give a significant contribution to the overall agricultural production in the Braničevo district. In Serbia has been established a certain legislative that facilitates the general conditions for the crops and animal products processing at the farms. Despite the favourable legislation, a small number of farms are currently involved in the processing of agricultural products.

Vegetable production is among the most intensive sectors of agricultural production at the territory of Braničevo district. The volume of vegetable production is constantly growing primarily caused by the investments in modern equipment and mechanisation, use of quality raw materials and inputs, as well as by the increase in vegetable growing in greenhouses. Meanwhile, unprocessed and usually unpackaged fresh agricultural products have a much lower market price and cannot provide high profitability to the certain farm.

Achieving the secured and permanent sale of veggies at the national market requires to be ensured not only the variety of products, but also the establishment of processing activities and further realisation of processed products. In this context, the main goal of the research is adjusted to the strategic goals of the Strategy of Agriculture and Rural Development of the Republic of Serbia for the period 2014-2024.

In focus of the research goal is the knowledge transfer from the field of cooperatives importance for the production of agricultural products with added value (pointing out to the practical possibilities for establishment of processing capacities throughout the associations).

The research has special importance considering that in the village of Skobalj, as well as in the wider territory of the Smederevo city, there is domination of family farms that generally do not have enough economic strength to process and realize agro-food products by their own.

The selected agricultural farm, which is organized in the form of a legal entity (cooperative), was decided to establish ecologically acceptable production of tomatoes and cucumbers (gherkins) what comes from previous business idea "Obtaining safe and competitive agricultural products gained by processing of vegetables". The production will organize partly in the open field, while partly in protected area (greenhouse), by applying of all required contemporary agri-technic measures and measures turned to production of health and safe food products. In order to provide a secure and long-lasting realisation of tomatoes and cucumbers (gherkins) on the local market, there will be established the processing and selling of processed veggies.

The facility that has to be built and equipment that will be installed represent the pinnacle of existing technology. On the one hand, this represents a requirement from the demand side of the market, while on the other hand it enables high productivity, lower production costs in the long run and higher level of protection standards and better working conditions.

In addition to creation of conditions for much faster development of selected farm in the form of a legal entity (cooperative), as well as to decrease in required time for the investment return, we are emphasizing the intention and necessity to promote the cooperative model, not only at the territory of Smederevo city, but also in entire Branicevo district.

With this research and successful accomplishing the business idea, we want to provide a good example to other farms that interest joining into the cooperatives is necessary and quite a useful.

The benefit that relies on primary production and processing will be expressed through the model of cooperatives, which would serve into the process of training other farmers about the cooperative principles and way of cooperatives functioning, possibilities to increase the incomes, reduce the unemployment and achieve overall social well-being.

Accordingly, the planned organization of the production and processing activities is turned to the following (IAE, 2019):

- Tomato production will be organized in the open field (on 3 ha), as well as in protected area (in greenhouse, on the surface of 3 ha and 60 ar). In the first case, it was expected the yields of 80 t/ha (240 t in total). The plan is to sell the 30% of total yields as fresh veggies at the market, while the rest of 70% will be processed. In the second case, it was expected the

average yields of 141 t/ha (507.6 t in total). Quantities gained in greenhouse would be, depending the class of fruits, either directly realized on the market in fresh condition (75% of I class), or will be processed (25% of II class) and later realized on the market as processed tomatoes (grind veggies filled in glass bottles).

- The production of cucumbers (gherkins) will be also organized on the open field (on 3 ha), as well as in protected area (greenhouse, on 3 ha and 60 ar). In the first case, average yield of 50 t/ha is expected (150 t in total). It was planned to process complete yields and later realize on the local market (pasteurized gherkins in the jar). In the second case, average yield of 125 t/ha is expected (450 t in total). All quantities produced in greenhouse would be also processed and later realized on the local market as a pasteurized gherkin in the jar.

- Regarding tomatoes, it is planned to get processed grind tomatoes which is packed in 1 litter glass bottles. The utilization of tomatoes in processing is 60%, so the final production involves around 355,680 l of processed tomatoes. For this purpose, it is planned to purchase a line for tomatoes processing (grinding of fruits and gaining the squeezed tomato juice). Unlike the tomato processing, related to cucumber (gherkin) processing, it is planned the purchase of fruit calibrator, while for packaging and pasteurization could be used the line for production of tomato juice.

- All previously mentioned agri-food products are linked to adequate level of local and regional demand that guarantee manoeuvring space for products selling. So, there is a fact that with the exception of large quantities, realization of processed products is not a problem for the agricultural cooperative from the village of Skobalj.

In practice, regardless the business conditions, evaluation of economic efficiency of investments has to be generally linked to strict quantitative and qualitative provisions that will define and carry out the precise directing of cash expenditures, i.e. the investment in the most effective business alternative (Rajnović et al., 2016). Accordingly, the main aim of evaluating the economic effects of production and processing at the farm should be potentially the highest rate of realized effects per the unit of invested money.

For the purposes of assessing the project idea effects, in this research was used both static and dynamic methods for assessment of economic effectiveness of in-

vestments. Besides, there was also used the method for assessing the effects of business activities realisation in the conditions of risk and uncertainty.

Methods for expressing the economic effectiveness of investments are so important not only in the field of agriculture, but generally in the defining and carrying out of sustainable development of any legal entities at the micro level. So, this part of analysis represents important segment of evaluation of production and processing at the cooperative level, by which is emphasizing the important role of economic efficiency of investments for sustainable development of agricultural farms organized in the form of a legal entity (Subić, 2010).

Static assessment of investments' economic efficiency is based on simple static methods which imply calculation by taking into account only the parameters from one, or average year from the legal entity's business period. This way of assessment of investments effects does not consider overall period of investing and later exploitation of investment object, but only one time section (Subić, 1999). In this case, the calculation does not adequately take the time within the analysis and evaluation of business activities, i.e. it does not cover the entire period of business operation and exploitation of business objects. In this way there comes to simplification of assessment of the economic effects of business activities, in order to provide simpler calculation of certain methods, but on other hand there come to losing the possibility to consider the effects during the entire period of investing and exploitation of the investment object. As a large number of static methods are proposed in foreign and domestic theory and practice, the special accent will be done to calculations that have an adequate theoretical background and practical verification (Subić et al., 2007).

Due to the imperfection of static methods, there were come to development of dynamic methods for assessment of investments' economic effectiveness, while they have started to rapidly use in economic practice. Currently, these are the methods that are used the most in the process of assessment the economic efficiency of business activities, while the use of static methods is significantly reduced and mainly used as complementary methods to dynamic methods (Subić, 2010). Methodologically, dynamic methods do not include average (annual) expenditures, but all cash expenditures done for the purchase and use of the business object, as well as all cash receipts derived from entire period of business activities based on the use of business object (investment), i.e. they consider assessment of economic efficiency of investment derived from the comparison of invested sum with the calculated sum of net annual

incomes gained in the individual years of investment exploitation. These methods are more complex, since their application is based on a complex interest account, i.e. on the application of financial mathematics (Subić, 2010; Jeločnik, Subić, 2020).

In assessment of the business effects, the lack of ability to forecast certain events in upcoming period (sum of incomes and expenses, exact period of investment usage, etc.) has the important impact on the economic justification of business and reduces the real opportunities in making of adequate decisions. Therefore, when making decision, the manager is facing composite and complex issues that enact uncertainty, or he is facing so complex mission to eliminate or leastwise to decrease the risk of a possible weak decision. Evaluation of the business effects in conditions of risk and uncertainty can be made by various methods and techniques (Subić, 2010).

For the purposes of assessing the economic effects of production and processing on the farm, we believe that in presented case it is sufficient to consider only the profitability threshold.

Results with Discussion

By purchase of modern greenhouses (eight) with accompanying equipment, as well as lines for processing tomatoes and cucumbers (gherkins), there will be opened the possibility to achieve a higher selling price, both fresh products (tomatoes) and processed products (grinded tomatoes packed in bottles and pasteurized gherkins packed in jars). In particular, the farm is expecting next benefits (IAE, 2020):

- Expected selling price of the fresh tomatoes is 25 RSD/kg, while the expected price of bottled grinded tomatoes is 85 RSD/l;
- Expected selling price of pasteurized gherkins in a jar is 60 RSD/kg.

After sale of obtained products (fresh and processed) it can be achieved the average annual incomes in the sum of 73,672,800 RSD. On the other hand, expected average annual profit (net profit) of the cooperative generated through the realization of the proposed business idea is 3,256,058 RSD.

Among the other expected effects of the project realisation the next could be underlined (Table 2.):

- Net present value of investment project: 16,861,455.21 РСД;
- Internal rate of return: 46,05%, while the assumed weighted price of capital is 4,58%;
- Dynamic payback period of investment: 2 years and 5.70 months.

Within the all years of project life cycle (Table 2.) there is:

- The production volume does not fall under the 80,07%;
- Its allowed the fall in production volume for 19,93%.

Table 2. Economic effects of production and processing of vegetables

No.	Description	
1.	**Investment project**	
1.1.	Title of the project	Economic effects of vegetable production and processing on the agricultural holding
1.2.	Investor	Aleksandar Ilić
1.3.	Location	Skobalj
2.	**Estimated value of investment (in RSD)**	
2.1.	Total investment	10,437,675.60
2.2.	Investment in fixed assets	9,488,796.00
2.3.	Investment in permanent working capital	948,879,60
3.	**Source of financing**	
3.1.	Total source of financing	10,437,675.60
3.2.	Internal financial resources	2,956,077.60
3.3.	External financial resources	7,481,598.00
4.	**Object of investment project**	
4.1.	Purpose of investing	Investment in fixed assets and permanent working capital
4.2.	Start of investing	During the 2019
4.3.	End of investing	During the 2020
4.4.	Economic life of the investment project	5 years
4.5.	Sales market	National
5.	**Expected effects of the investment project**	
5.1.	Static assessment of the investment project	
5.1.1.	Economical-efficiency coefficient	1.06 > 1
5.1.2.	Net profit margin ratio	5.11 > 4.58
5.1.3.	Accounting rate of return	36.60
5.1.4.	Simple payback period	2 years and 3.43 months
5.2.	Dynamic assessment of the investment project	
5.2.1.	Net present value	16,861,455.21
5.2.2.	Internal rate of return	46.05
5.2.3.	Dynamic payback period	2 years and 5.70 months
5.3.	Break-even point	80.07%
5.4.	Totally engaged labour - permanent staff	5
5.5.	Totally engaged labour - seasonal staff	10

Source: IAE, 2020.

Conclusion

Achieving the secure and permanent realization of veggies in the local market requires to provide both the wide assortment of products, as well as implementation of processing and selling of processed products. Along to mentioned, general conclusion could be directed to the fact that results of the research are in line with the following priority areas of strategic changes within the field of national agriculture and rural development:

- Income stabilisation of the farmers;
- Advancement of system for the knowledge transfer and development of the human potentials;
- Technological development and modernisation of agricultural production and processing;
- Protection and advancement of environment and preservation of natural resources;
- Improvement of quality and food products safety.

On the other hand, the application of research within the field of interest joining into the cooperative points to the following conclusions:

- Improving the competitiveness of co-operators, through the processing and other forms of added value gaining to the agricultural products;
- Improving the profitability of co-operators, what is of particular importance given that a large part of co-operators live and work on small farms;
- Improving the associations activities in the field of processing of agricultural products on the co-operators' farms.

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POVERTY REDUCTION AND RETENTION OF YOUNG PEOPLE A CONDITION FOR SUSTAINABLE RURAL DEVELOPMENT

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Abstract

Rural areas offer low paying jobs. Low incomes have long been a blessing in disguse for rural areas. At the some time, the rural population experiences a higher poverty rate and a significantly lower level of income compared to the urban population. There is a consistent link between low income and migration. Research to date has shown that people are attracted to areas where earnings are higher. In rural areas live people with the lowest level of wealth and education, ie many pepple who are willing to move. The future of rural areas depends on tow factors: attracting higher-wage industries and improving agricultural productivity. The paper deals with the socio-economic processes and the quality of life in the village.

Key words: *rural areas, low income, poverty, unemployment.*

Introduction

Research confirms what has always been known, namely that poverty and natural resources are linked. There is a higher poverty rate in areas which depend on natural resources (agriculture, forestry and mining) than other activities (Elo and Cavin, 1983). The poor in the countryside do not use social services more adequately. This is because the poor do not have access to these services. Typical characteristics associated with poverty are: lack of productive job opportunities, living in neglected areas, sense of their downfall, reduced social organization, decline in private sector services, poor living conditions, and lack of social and cultural activities for young people. Such an environment is detrimental to the physical and mental health and general well-being of the local population, whereby they united them the misery of life and that of low income.

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Theoretical background

Unemployment or economic inactivity between young people results in dependence on low-value social assistance, which may result in social exclusion due to low incomes. The unemployed people are also more likely to find low-paid and precarious jobs than well-paid and secure jobs. Low-paid work in village is present in agriculture, and as individuals with low-paid or unpaid work of women and young people with low qualifications.

Leisering and Leibfried acknowledge that "the risk of poverty is obviously higher for families of lower economic classes" (1999: 240). Social exclusion is typically aimed at social disintegration, primarily through unpaid work. With rising unemployment and the spread of poverty an analysis of social exclusion and new conditions of insecurity is needed (Martin, 1996; Choffe, 2001). For some critics, social exclusion is "qualitatively a new phenomenon" (Raveaud and Salais, 2001: 48).

Involvement in the labor market through marginal, low-wage precarious jobs in poor working conditions, is not a worthy social inclusion (A.B. Atkinson, 1998; Gallie and Paugam, 2002). It has been characterized as "unpopular involvement" (Sen, 2000: 28-29) or as a "humiliating form of involvement" (Anthias, 2001: 839).

The analysis of Kempson (1996), found that living on a low income is a stressful experience, especially for those who use social help, who face a battle with growing debt and social isolation, where even the most resilient and resourceful can not survive.

The rural women face a higher risk of poverty than men. The gender difference is most visible in households where the woman is a housewife and an unpaid family worker. Women have always experienced greater poverty than men, as noted by Pearce (1990: 266) who coined the term.

In the village, "hidden poverty" is significantly expressed which results in unequal distribution of income and consumption in families. "Wives generally experience greater financial deprivation than husbands", although this varies with the systems for distributing household finances, as well as with women's access to their own money (Vogler, 1994: 234). Women's economic dependence is the price they pay for the care due to the gender division of labor, whereas men are obliged to the majority of the paid function, and women, to the unpaid work. Women in low-income households are often left without

food and clothing to protect other household members, especially children, from the full impact of unequal income (Milddleton et al., 1994; Farrell and O'Connor, 2003). This is one aspect according to which women tend to be shock absorbers of poverty, trying to cope with poverty and debt as part of their overall responsibility for distributing money to low-income households (Daly and Leonard, 2002; Yeandle et al., 2003).

Research shows that employment has a positive and continuous impact on poverty. According to Bailey "looking at the impacts of individual employment status on poverty levels objective and subjective measures both show the benefits of work are positive and continuous. Individuals who work have lower poverty rates than those not in work and full-time workes have lower poverty rates than part-time workes on both measures" (2005:8). The correlation between poverty and trends in the structure of the labour force is significant, even a most important one. "In conditions when there is no, or only a small number of sources of material support, it is clear that exclusion from paid labour leads to poverty" (Alcock, 2006: 80). Poverty can be seen as a general deprivation of things characterized by both low consumption standards and low income level (Ringen, 1988). If someone is starving, then regardless of the relative picture, he lives in poverty (Sen, 1981 :159).

Unemployment and low income

From a geographical point of view, poverty is not evenly distributed in rural areas. In some rural areas there is a higher level of poverty than in others. Many poor people live in poor areas, but in some places there are people who are not poor, or a large number of poor people live outside of the poor areas, but even in such places live people who are not poor. In rural areas often live people who are poor. In rural areas, the various dimensions in which poverty and social exclusion can occur are often ignored. Access to services, whether they are public, such as schools or health centers, or private, such as shops, is much easier in urban centers. The situation in rural areas is different, which may contribute to the creation of a characteristic rural form of social exclusion which intensifies even more for those who do not have access to private transport.

Rural areas are still focused on natural resurces (especially in the fild of agriculture) which do not generate enough jobs of good equality and diversity. The population in rural areas faces low and insecure incomes, as well as underdeveloped communal and social infrastructure. There are number of problems

in rural communities that need to be tackeld: creation of new jobs, improvement of water supply and sewerage, transport, construction and maintenance of roads, availability of social services (schools, kindergardens, ambulants) and shops, and occurance of cultural and sport activities (Jakimovski, 2017).

The analysis of the incomes and expenditures of the agricultural households gives a more detailed description of the difficult conditions in which the inhabitants of the rural areas who depend on the agricultural activity live. Not only is the living standard in the rural areas where the main activity is related to agriculture low, but also the low income of the family prevents the inhabitants of these areas to invest in human capital (education, health) which could improve their lives in the future. According to Orshansky (1969), the average expenditure intended for necessary things can be used to determine the level of poverty, suggesting that people are poor if more than 30 percent of the household budget is spent on food.

Table 1. Net wage per employee, uppaid family worker and household budget is spent on food in the Republic of North Macedonia

Average monthly net wage per employee, July 2021	464 Euro
Average monthly net wage per employee, July 2021 in agruculture, forestry and fishing	373 Euro
% in average monthly net wage per employee, in agruculture, forestry and fishing in to the national average	79.6%
Uppaid family worker in employed in agruculture, forestry and fishing, II quarter 2021	34.1%
Share of uppaid family worker in employed in agruculture, forestry and fishing in th total number of uppaid family worker	85.8%
Percent of the household budget is spent on food and non-alcoholic in 2019	39.8%

Source: Makstat, Republic of North Macedonia (My calculations)

As can be seen from the data in Table 1, over one third of the agricultural employees in the Republic of North Macedonia are unpaid family workers or 86% of the total number of unpaid family workers who are employed in the agricultural sector. Agricultural households set aside nearly two-fifths of the available budget for food. The net salary in agriculture is 20% lower than the national average.

Poverty and low salary are overpaid throughout life as well as across different generations. Low salary in youth can lead to poverty in old age, but long periods with low salary can also lead to poverty. Unemployment and economic inactivity between young people play an important role in creating the chances of becoming socially excluded. Young people especially show a tendency to leave the agricultural activities, and find another profession. The agricultural profession is not something young people chose, but it is more of a last choice when there are no other options left.

Table 2. Activity rates of the population aged from 15 to 29 years, by gender-rural, 2017

	Employment rate			**Unemployment rate**			**Inactivity rate**		
	Total	**Men**	**Women**	**Total**	**Men**	**Women**	**Total**	**Men**	**Women**
Total	43.1	55.2	30.5	21.9	22.2	21.5	44.7	29.0	61.1
15-29	30.9	38.1	22.8	38.5	37.6	40.6	49.6	39.0	61.1

Source: Statistical review 2.4.18.03/894, Population and Social Statistics-Labor Force Survey 2017 (My calculations).

The rate of employed females in the rural areas is for 24.5% lower than rate of employed males. The rate of employed females on the age 15-29 years is lower than the rate of employed males (15.3%). In Republic of North Macedonia the inactive rate of females is 32.1% lower than the males one.

Insufficient household income, lack of employment conditions, poor treatment conditions, poor housing conditions and unfavorable conditions for child care reduce the quality of life of the rural population. The data show that for most people (43.3%) the biggest problem they are facing is "insufficient household income", while for 34.4% it is the "lack of employment conditions," for 9.3% - "poor conditions for medical treatment", for 7.3% - "poor housing conditions" and for 5.6% it is the "lack of conditions for child care (Jakimovski, 2017:5935). The age group 18-29, is of the opinion that the biggest problem is "lack of employment conditions" (51.6%), while for farmers and the employees in the private sector is the " low income" (68.8%; 59.5,0%). (Jakjimovski, 2017:5936).

Conclusion

Rural areas are too dependent on employment in the agricultural sector and that is the reason for low incomes, poverty and migration. In environments where most of the labour force is located in the food production sectors, the number of those with university degree is small. Most of the young people finish high school and immediately want to find a paid job in this sector.

Poverty reduction in rural areas will depend on attracting higher salary-earning activities, improving productivity and connecting with urban areas. Orientation of employment outside of the agriculture and consciousness of the importance of the non-agricultural sector are key conditions for the movement of the village populations on the paths of social mobility. Employment in the non-agricultural sector brings significant advantages: permanent monthly income, pension and health insurance, and favorable social status. If transport and infrastructure improve, rural areas will attract more visitors, migration will be reduced and new opportunities for local businesses will arise. This will revitalize rural areas.

An active involvement of the rural population is important for the future of the village. This can happen through various forms from information sharing to local partnerships. Effective involvement of the local population is important for good public policies and good governance of the local government.

Local governments need to use new indicators and develop local poverty profiles in their areas (such as income, employment, health and education). With these indicators they can provide information on the level of poverty of the smaller rural communities. Spatial measurements concentrated on smaller local rural communities can be very helpful in understanding geographical poverty.

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LOCAL INITIATIVE GROUPS AS MOTIVATORS OF LOCAL DEVELOPMENT IN RURAL AREAS OF BULGARIA

Julia Doitchinova[1]

Abstract

The aim of the report is to analyze the development of local action groups and to assess their role in the multifunctional sustainable development of rural areas. The object of analysis is the process of creation and dissemination of local initiative groups and local fishing groups during the two programming periods of our country's membership in the European Union. The subject of analysis is the type of implemented projects and the directions of impacts for the development of rural areas - economic, social and environmental. For the purposes of the analysis, statistical data and qualitative assessments are used on the importance and impacts of the local initiative groups from a survey of the opinions of experts in the field of rural development from all districts of the country (NUT-3 level).

Key words: *local action group, LEADER approach, CLID approach, rural development.*

Introduction

Over the last few decades, the development of rural policy in the European Union has shifted from centralized governance to expanding local participation in shaping the impacts and financing of development. Policies, approaches and organizations have been established to motivate, activate and dynamize local communities for rural development. On this basis, various new processes have emerged in rural areas, which some authors (Ray, 2006) define as neo-endogenous They develop relationships of partnership and cooperation and contribute to expanding the capacity for action by uniting local people in new forms (Shucksmith, 2010). Some authors (Neumeier, 2017) emphasize the links between local resources, cooperation between local people and networking. They are crucial for local development potential, its promotion and social innovation. The leading role in the implementation of these processes is created by the established local action groups (LAGs), supported by the Leader approach and the Community-led local development (CLLD) approach, which are established in all EU member states.

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The purpose of the report is to assess the development and problems of the LAGs in the rural areas of Bulgaria during the last two programming periods and to develop recommendations for improving their functioning.

Literary review

Local action groups are set up as cross-sectoral territorial partnerships. They are institutions at local level that are set up and operate according to EU rules. Their role is to provide opportunities for cooperation and coordination between stakeholders in partnerships (Esparcia et al., 2015).

The object of research interest are the problems of the role and functions of LAGs. The circle of authors who find that LAGs are often seen as a source of funding, rather than as a platform for mutual cooperation, is expanding. Examples of such application of LEADER have been studied in the new member states (Bukalova et al., 2016). This is reinforced by the key role in many LAGs of the representatives of the local self-government who refuse to lose their influence in supporting the place where they work and live (Furmankiewicz et al., 2021; Marquardt et al.,2012). In older Member States such as Italy or Spain, professional farmers are widely involved and develop private initiatives (Chevalier, 2012).

The idea of LEADER is oriented to local communities for capacity building, skills of local people for rural development. The application of the approach is accompanied by various difficulties and reflects the characteristics of the population in rural areas. (Doitchinova, Stoyanova, 2014).

EU rules build LAGs as partnerships in which operational and administrative rules strengthen consensus in decision-making, various forms of co-financing, transparency in program management, and the implementation of professional governance (Olsson, 2003).

Some researchers question whether the application of the method can reduce interregional disparities. According to Masot and Alonso (2017), LEADER has a positive impact on the most developed areas, where industry and services are highly developed due to their proximity to major cities in the region. Other authors (Canéte, Navarro and Céjudo, 2018), based on an analysis of the Andalusian experience in Spain, conclude that disparities between rural areas are increasing because depressed rural areas are not suitable for the LEADER approach due to limited of support.

Methodology

The analysis of the spread of LAGs and the results of their activities uses the Rural Development Programs during the two programming periods, the interim and final evaluation of their implementation, as well as the results of a survey of experts at district and municipal level on the impacts of Leader approaches and CLLD for rural development. The survey was conducted in 2020 throughout the country. The method of expert evaluation was used and 163 experts from all districts of the country were interviewed. Their estimates were made using a five-point Likert positive scale.

Evaluation of the results

The Leader approach has been applied in Bulgaria since the beginning of the century through the implementation of several pilot projects, and after the accession of our country to the EU in 2007 on the territory of all rural municipalities. It was only in 2012 that the implementation of local development strategies started. This was the first attempt to decentralize rural development in Bulgaria. The established LAGs in a short time have become centers for proposals, discussion, development and approval of priorities and directions for local development.

During the programming period 2007-2013, 35 LAGs were approved, which implement strategies for local development of 23% of the country's territory (29% of rural areas). They cover 27.6% of the rural population (10.9% of the country's population). The boundaries of the LAG territories include 1112 settlements on the territory of 57 municipalities. The total value of the funds under the approved strategies is BGN 128.276 million. The pre-planned parameters of the Leader approach for 50 LAGs with funded strategies were fulfilled at 70%. On the territory of these municipalities were supported to varying degrees and implemented 1259 initiatives aimed at improving the quality of life and development of the rural economy.

The set parameters for financing the local development strategies (in the Rural Development Program 2007-2013) up to EUR 2 million per approved strategy for over 10 thousand inhabitants on the territory of one municipality, became the main prerequisites for the predominance of territories of LAG with one municipality (52% of the groups that implement local development strategies). One LAG includes an average of 1.6 municipalities and 31 settlements with a population of over 23.5 thousand inhabitants and an area of 737 km2. The second group of LAGs includes 2 municipalities and 37% of the local development strategies.

Among the developed, evaluated and financed proposals, within the framework of local development strategies, the most numerous are those aimed at the measures under Axis 3 of the RDP for improving the quality of life and diversification of the local economy. They represent 65.8% of the concluded contracts and 64.9% of the funds in the local development strategies. Next are the projects and the funds for increasing the competitiveness under axis 1 - respectively 31.6% of the projects and 33.1% of the funds. The least interest is observed in terms of environmental measures for the use of non-agricultural land and environmental protection.

The financing of local development strategies under the CLLD approach has created significantly wider opportunities for taking into account the differences and needs of individual regions and for dynamizing the development of rural areas. Compared to the RDP (2007-2013), funding conditions have been significantly changed in terms of the minimum population requirements and the sources of funding have been expanded with 4 more operational programs (Doitchinova et al., 2019). The information according the possible maximum funding shows that the total amount per a strategy can be reached up to 4.46 million euro which is 2.23 times more than the previous period, as follows:

- Rural Development Program - 1 million EUR - below 10000 inhabitants or 1.5 million EUR - over 15000 inhabitants;
- OP "Human Resources Development" - 0.76 million EUR;
- OP "Innovation and Competitiveness" - 0.5 million EUR - 10000-15000 inhabitants or 1 million EUR - 15000-45000 inhabitants or 1.5 million EUR - over 15000 inhabitants;
- OP "Science and Education for Smart Growth" - 0.5 million EUR;
- OP "Environment" - 0.2 million EUR - 60 euro/ha – Natura 2000.

64 local development strategies have been approved, which is 6.7% above the set up indicators in the Rural Development Program (2014-2020) and 83% increment (compared with 2007-2013), which in number is more than the 35 strategies increase. These are the territories of 118 municipalities or 50% of rural municipalities in Bulgaria (Table 1). Almost half of the LAGs (48.4%) are combined between 2 municipalities, followed by one municipality (34.4%).

The most numerous are the strategies that are funded by only one program (39.9%), followed by those involving three programs (36.5%). Only 4 strategies will be funded from the possible 5 programs, with LAGs dominated within a single municipality territory.

Table 1. Distribution of LAGs according to the number of municipalities involved and the number of sources of funding for their local development strategies.

Local development strategies funded by the programms	Number of LAGs on the territory			All	Structure (%)
	1 municipality	2 municipalities	3+ municipalities		
1 program	8	14	3	25	39.1
2 programs	4	2	-	6	9.4
3 programs	5	12	6	23	35.9
4 programs	2	2	2	6	9.4
5 programs	3	1	-	4	6.2
All	22	31	11	64	
Structure (%)	34.4	48.4	17.2	100	100
Number of municipalities	22	62	34	118	

Source: MAFF, 2018.

The map presents the LAG territories that have approved local development strategies from 2017 and 2018. They are not evenly distributed on the countries' territory. Their presence is most significant in parts of the Northeastern, Southwestern, and central located areas of the country. Development strategies are not implemented on the territory of districts in Bulgaria – Vidin, Kyustendil and Ruse. Most numerous are LAGs, which implement strategies near the big cities - Plovdiv (6) and Sofia (5) districts, Varna, Haskovo and Blagoevgrad 4 each (Table 2). The relative share of the population in the territories of the LAG has increased. It is 62% compared to the planned 48% or at least 1,370,000 inhabitants in the country's rural areas. The result at the end of 2018 shows the implementation of 120%, which goal is valid until the end of the programming period.

The increase compared to the previous programming period is also very significant, when this indicator is 27.6% of the population in rural areas.

Table 2. Distribution of the districts in Bulgaria according to the number of LAGs on their territory.

Districts with	Number	Structure	
0 LAG	3	11.1	Vidin, Kyustendil, Ruse
1 LAG	4	14.8	Pernik, Gabrovo, Targoviste, Shumen
2 LAGS	5	18.5	Lovech, Pazardhik, Razgrad, Silistra, Sliven,
3 LAGS	9	33.3	Burgas, Veliko Tarnovo, Dobrich, Kardhali, Montana, Pleven, Smoljan, St.Zagora, Yambol
4 LAGS	3	11.1	Blagoevgrad, Varna, Haskovo
5 LAGS	1	3.7	Sofia district
6 LAGS	1	3.7	Plovdiv
All	**27**	**27**	

Source: MAFF, 2018.

Notwithstanding the above results, the role of the LAG for rural development is not highly valued by experts at the district and municipal level. In the survey, 71.2% of the respondents, on the territory of whose municipalities the CLLD approach is applied, gave answers. The formed score is 2.79.

The importance of the LAG for improving the market structure of agricultural holdings (3.04) and the diversification of the local economy (2.92) is highly valued. The contribution of the implemented strategies to improving the living conditions of the rural residents is evaluated the lowest.

Table 3. Expert assessments of the LAG's contribution to rural development.

		Number of answers	Average score
If the LAG works in your municipality - how do you assess its contribution to rural development		116	2,79
LAG contributes to	• activating civil society	91	2,74
	• improving the living conditions of rural people	91	2,69
	• improving the market structure of agricultural holdings	71	3,04
	• diversification of the rural economy	90	2,92
	• job creation	87	2,76
	• protection of the cultural tangible and intangible heritage	84	2,7

Source: Own study.

Conclusions

The analysis gives grounds for developing the following conclusions and recommendations:

- Insufficient experience and administrative capacity and the slow establishment of the necessary mechanisms and procedures for the development of strategic documents, their approval, financing and implementation have led to delays in the process of approval and implementation of local development strategies. Nevertheless, LAGs in many municipalities have become motivators for exchanging project ideas and creating local development strategies;

- During the second programming period most of the problems were overcome. Most LAGs from the first stage are implementing their next strategies, and local self-government has been significantly improved.

- With the improvement of the coordination mechanisms between the Ministry of Agriculture and Food, the State Fund for Agriculture and the public and private beneficiaries, developing and implementing strategies for local development, greater stability and efficiency of the procedures has been achieved.

- The analysis showed that the most active are the rural areas near large urban centers. This is confirmed by other studies (Margarian, 2013) according to which such localized approaches fail to compensate for rural differences due to the lack of advantages of the agglomeration.

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ECONOMIC EFFICIENCY OF INVESTMENTS IN COW-CALF PRODUCTION IN THE REPUBLIC OF SERBIA[1]

Lana Nastić[2]

Abstract

Value of livestock production in the Republic of Serbia is rather low comparing to value of plant production. At the same time, cattle production is the most important concerning milk production, while level of beef production is low (production of pork is much important comparing to beef production). One of the ways to increase beef production in the Republic of Serbia is introduction of cow-calf production system. This production system has some advantages comparing to usual beef production system, such as low level of investments, use of available natural resources etc. To evaluate investments in cow-calf production, author used net present value, internal rate of return and payback period. Besides, level of profit was determined, depending on existence of state subsidies for this production. The results of the analysis indicated that economic efficiency of cow-calf production in Serbia significantly depends on level of state subsidies.

Key words: *cow-calf production system, investments, net present value, subsidies*

Introduction

In the structure of total agricultural output in the Republic of Serbia in 2019 participation of plant production was 68.5%, while participation of livestock production was only 29%. At the same time, agricultural service participated in total agricultural output by 2.5%. (RZS, 2020). Above presented data indicate strong need for improving the volume of livestock production in Serbia. Available statistical sources for 2020 show that beef production in Serbia is on a rather low level, comparing to pork (as dominant type of meat) or even poultry meat production (Figure 1).

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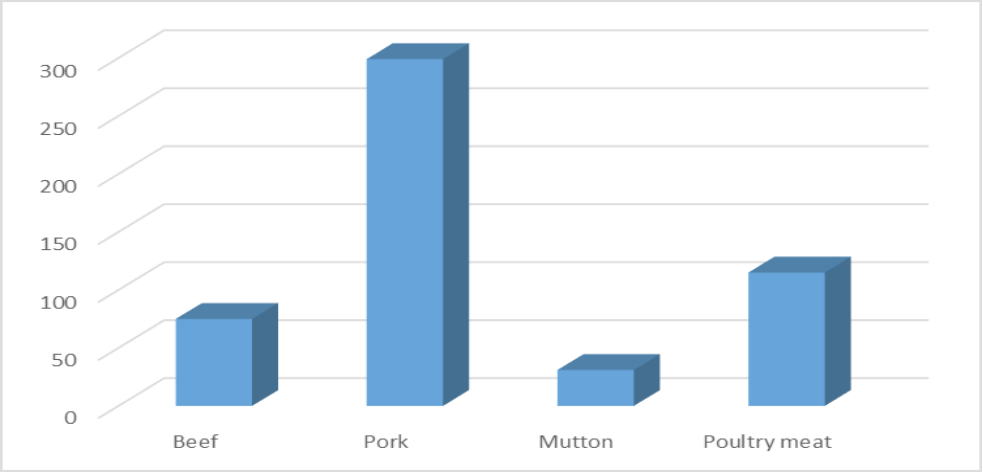
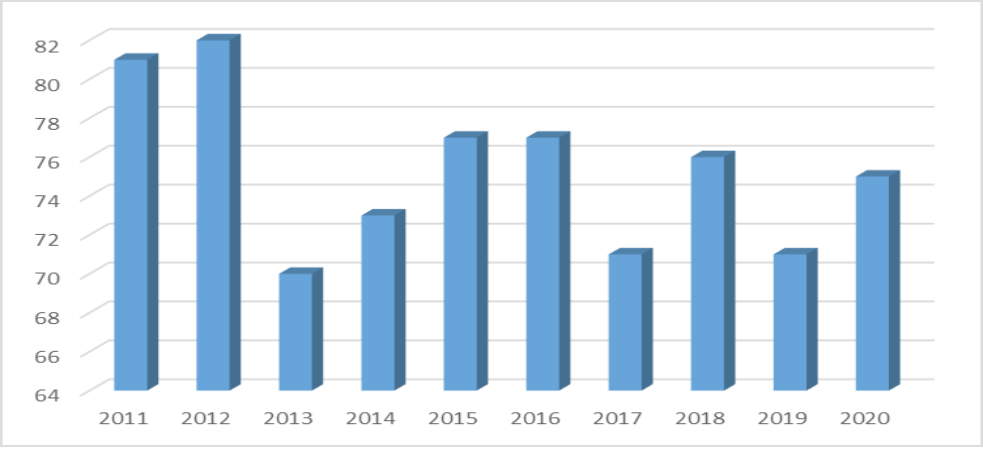
Figure 1. Meat production in the Republic of Serbia in 2020 (000 t).



Source: RZS (2021b).

While the volume of milk production is rather stabile, beef production during the period 2011-2020 significantly varied, and had decreasing tendencies (Figure 2). Therefore, beef production decreased by 7.4% in the last year comparing to the first year of the observed period.

Figure 2. Beef production in the Republic of Serbia during the period 2011-2020. (000 t).



Source: RZS, 2021b.

Volume of beef production also decreased in the EU countries in 2020. Although there are negative tendencies in the EU beef production quantities, there is an increase in number of cows involved in cow-calf production. The data show that in the EU during 2020 total number of cows engaged in cow-calf production increased by 0,4%, i.e., the number of heads increased by 48,000 (MPŠV, 2021).

Cow-calf system is an important way of increasing beef production because it is based on low level of investments, as well as on the use of cheap fodder sources. On the other hand, cow-calf production system has its drawbacks, such as low profitability and exposure to high level of risk (Ivanović, 2018). Perišić et al. (2009) discussed use of Simental breed for cow-calf production, and importance of regular fertility and low feeding costs for its economic feasibility. In cow-calf production system farmers primarily use low quality agricultural land, such as pastures and meadows. According to Farm structure survey (RZS, 2021a) (which was conducted in Serbia in 2018) total area of meadows and pastures in the Republic of Serbia is 676,724 ha, which is 13.1% of total available land (5,178,692 hectares). There are 246.774 farms in Serbia having meadows and pastures, which indicates great potential for the development of cow-calf production in Serbia. Cow-calf production system is not developed in Serbia, which resembles the situation in some neighboring countries, such as Croatia (Vinković et al., 2006).

According to Marohnić (2004) some of the most important preconditions for economically efficient cow-calf production are the use of pastures (preferably community pastures) and season of calving. Production in cow-calf system could be improved by applying rotation use of pastures, which is suggested by Štavalj et al., 2020. Besides, the quality of pastures itself influences the breed of cows that will be used in cow-calf production system (Ivanković et al., 2005). López-González et al. (2020) determined that intensification of production on pastures (by using cultivated pastures and irrigation systems) positively influences productivity of cow-calf system.

Turner et al. (2013) used system dynamics approach to discuss the influence of different cow sales scenarios (different cow culling rates) on some economic indices (net income and return on investments). Within this research, authors determined that an increase in cow cooling rate had a positive influence on the above mentioned indicators. Patalee and Tonsor (2021a) analyzed how changes of weather conditions influence cow – calf production, conclud-

ing that temperatures and precipitation influence not only level of production, but also location of production. Patalee and Tonsor (2021b) addressed a similar issue concluding "that weather impacts during the breeding season are substantially greater than seasonal weather impacts on cow-calf production".

Factors influencing cow-calf production, as well as indicators which could be applied to analyze efficiency of this production were also discussed by other authors (Ramsey et al., 2005; Ward et al., 2008), while some research addressed ecological aspects of cow-calf production system, discussing the influence of this production system on the environment (Morel et al., 2016; Angerer et al., 2021).

The goal of this research is to determine efficiency of investments in cow-calf production in Serbia, as well as profitability of this production type, primarily focusing on the level of state subsidies and its influence on the above mentioned indicators.

Material and method

To perform the analysis, the author established three models of family farms having 20 cows of Hereford breed, which is often used in cow-calf production in Serbia. The differences between models are based on the use of various subsidies available for such production. The models are formed on the basis of literature sources dealing with cow-calf production system (Knežević et al., 2005; Knežević et al., 2007; Ivanović, 2018). The basic assumption is that calves are sold on the market in autumn (at the weight of 210 kg), and that investment is observed for a period of 10 years.

To determine profitability of cow-calf production for the three observed models, the author used enterprise budgeting. Economic effectiveness of investments in this production is determined by applying net present value, internal rate of return and payback period (methodology described by Andrić et al., 2005; Gogić, 2014; Ivanović and Marković, 2018; Subić, 2010). Discount rate used for the investment evaluation was 3.15%. STIPS database is used as a source of market prices for products and materials in cow-calf production. Amount of subsidies and level of market prices are related to the year 2021.

Results and discussion

Three models of cow-calf production (all of them assuming 20 cows at the farm) were established. These models differ concerning the use of different state subsidies:

- Model A does not use state subsidies to support cow-calf production;
- Model B uses subsidies for cows in cow-calf system which are paid every year (amount of these subsidies is 40.000 RSD per head per year);
- Model C uses the same subsidies as model B, but also additional subsidies paid only once to support purchase of high quality breeding herd (cows in cow-calf system). Their amount equals 50% of breeding herd value.

Total investment in cow-calf production included not only the investment in breeding herd, but also the investment in buildings for their accommodation during winter months, investment in necessary equipment, as well as needed working assets (Table 1).

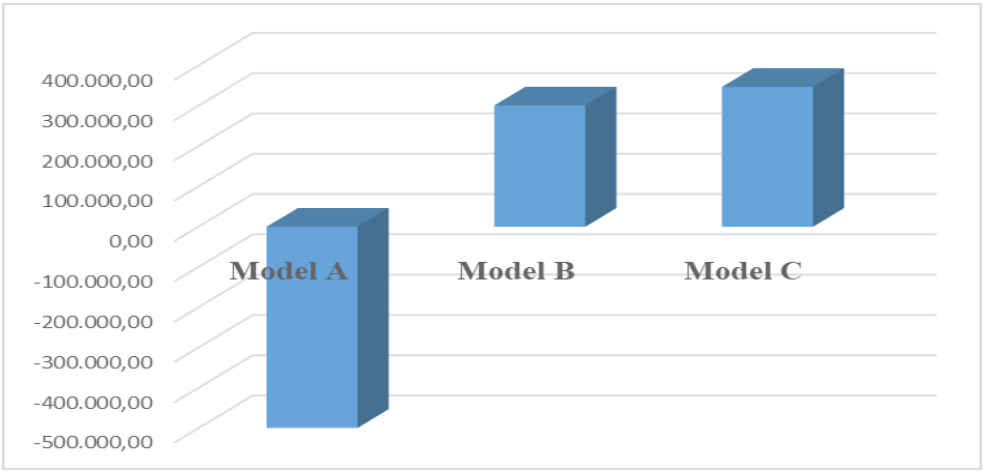
Table 1. Total investment in models A, B and C (RSD).

No.	Item	Total investment (Models A and B)	Participation in total investment (Models A and B) (%)	Total investment (Model C)	Participation in total investment (Model C) (%)
I.	**Fixed assets**	**5,942,000.00**	**83.33**	**4,187,000.00**	**83.33**
1.	Buildings	2,245,000.00	31.48	2,245,000.00	44.68
2.	Equipment	187,000.00	2.62	187,000.00	3.72
3.	Breeding herd	3,510,000.00	49.23	1,755,000.00	34.93
II.	**Working assets**	**1,188,400.00**	**16.67**	**837,400.00**	**16.67**
Total		**7,130,400.00**	**100.00**	**5,024,400.00**	**100.00**

Source: Author's calculation

While in the representative year (fifth year of the project) Model A is not profitable (Figure 3), Models B and C are profitable. The use of additional subsidies in model C increases profit by 15.26% comparing to Model B (from 301,005.05 RSD to 346,935.71 RSD).

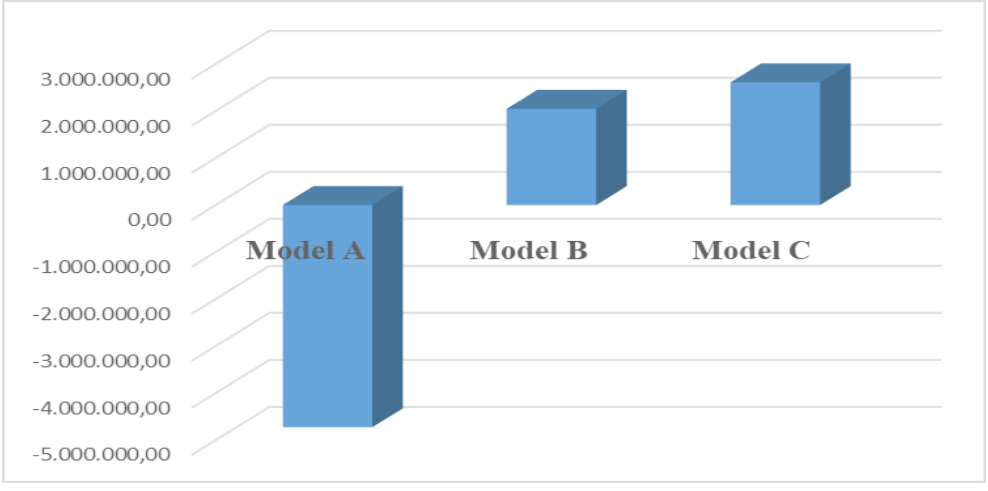
Figure 3. Profit in representative year for models A, B and C (RSD).



Source: Author's calculation

Net present value is negative for Model A (which does not use subsidies at all), indicating that such an investment is not economically efficient (Figure 4). Higher net present value is determined for Model C (2,609,426.83 RSD) comparing to Model B (2,047,849.06 RSD). The use of subsidies in model C led to an increase of net present value by 27.42% in comparison to model B. The results indicate that additional subsidies present in Model C have higher impact on economic efficiency of investments, comparing to their impact on profitability.

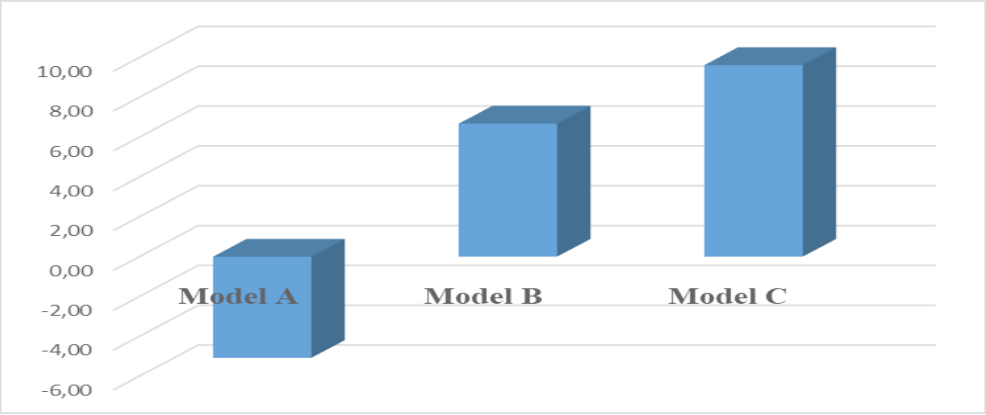
Figure 4. Net present value for models A, B and C (RSD).



Source: Author's calculation

Internal rate of return for Model B is 6.68% while it is somewhat higher for model C (9.62%). Both of them are higher than discount rate (which is 3.15%), so that investments in these two models are economically efficient. On the other hand, application of Model A leads to a negative internal rate of return (-5.08%) indicating that investment is not acceptable (Figure 5).

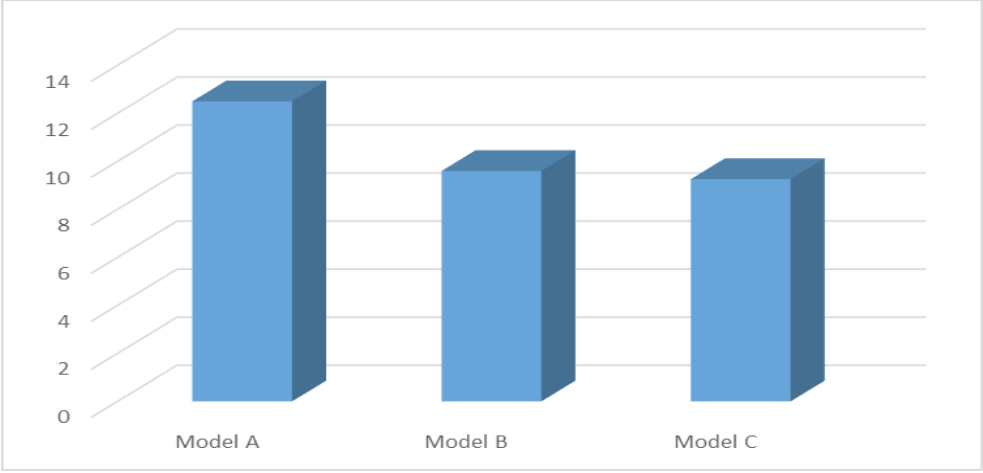
Figure 5. Internal rate of return for models A, B and C (%).



Source: Author's calculation

The payback period for model A is longer than 10 years, which means that the investment in this model is not economically efficient. For other two models payback period is 9.60 years (model B) and 9.26 years (model C), so that these investments are feasible, because their payback periods are under 10 years (Figure 6).

Figure 6. Payback period for models A, B and C (years).



Source: Author's calculation

On the basis of above analysis performed for investments in cow-calf production system, it is determined that without subsidies this production is not profitable, while (considering all applied indicators) investments are not economically effective.

On the basis of Model B it is possible to determine net present value for various discount rates i.e., structures of investment financing (Table 2). It is also possible to calculate amount of subsidies which is necessary to achieve zero net present value for observed discount rates. Considering an initial discount rate (3.15%) it is acceptable to decrease existing level of subsidies (40,000 RSD/head/year) by 30.24%.

Table 2. Net present value for various discount rates (Model B).

Discount rate (%)	Net present value (RSD)	Level of subsidies leading to NPV=0	Decrease of initial subsidies leading to NPV=0
1	3,679,760.09	20,575.00	48.56%
2	2,877,992.62	23,980.00	40.05%
3	2,150,956.95	27,392.00	31.52%
3.15	**2,047,849.06**	**27,904.40**	**30.24%**
4	1,490,795.22	30,810.00	22.97%
5	890,553.11	34,233.00	14.42%
6	344,067.88	37,663.00	5.84%

Source: Author's calculation

The results indicated that level of discount rate significantly influence acceptable amount of subsidies (which are paid every year) for cow-calf production.

Conclusion

Beef production in Serbia is not developed enough, and has decreasing tendencies. Especially low level of development could be attributed to cow-calf production system in Serbia, although there are significant areas of agricultural land which can be used for this type of beef production. In order to facilitate development of cow-calf production system, Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia offers various subsidies for registered producers dealing with this beef production type.

Analysis revealed that the best economic effects are achieved if state support is used from the moment of the establishment of cow-calf enterprise (assuming that farmers use subsidies for the investments in purchasing high quality breeding herd). Such an approach has higher influence on economic efficiency of investments, comparing to profitability of cow-calf production. Having that in mind, it is necessary not only to work on directing farmers towards that type of production but also to educate producers concerning types and amount of subsidies available for such production.

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POSITION AND PROTECTION OF THE INTEREST OF THE HOLDER OF THE RIGHT OF PREFERRED PURCHASE OF AGRICULTURAL LAND

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Abstract

The right of pre-emption is a way of acquiring property rights on real estate, but it is essentially different from acquiring property rights on other grounds. The right of pre-emption is established by law primarily with the aim of not shredding the plots unnecessarily, so the owner of agricultural land during the sale is obliged to offer the agricultural land to the person who has the first pre-emption. If that person is not interested in buying agricultural land, the seller can sell it to a third party, but not on more favorable terms. Failure to comply with this legal obligation leads to a sanction that can be reflected in the annulment of the contract of sale with a third party who is not the holder of the right of pre-emption. Although this obligation is established by law, in practice there are frequent cases of playing the right of pre-emption of natural and legal persons, while the same right of the state is respected, which puts other holders of pre-emptive rights in an unequal position. In this paper, the authors analyze the position of the holder of the right of pre-emption and and seek to find solutions to this problem.

Key words: *pre-emption right, purchase offer, land seller, pre-emption right holder, position of pre-emption right holder, protection of pre-emption right.*

Introduction

Business entities, natural and legal persons, during their business activity must own or have in the possession, the necessary means of labor, movable and immovable property and rights. Also, in the course of business, economic entities plan their life, development and growth, by the realization of planned investment projects or the cessation of performing a certain activity and the disposal of their basic means of work. In these transactions, there is a turnover

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of goods and services, by the will of economic entities, in which contractual relations are created, or outside the will of the contractor, on the basis of law or other facts established by law.

Social life, everywhere in the world, is regulated in order to protect certain goods and interests, personal and property. A general norm affects the participants in a legal relationship by imposing certain behavior on them (by obliging them) or by authorizing them to conduct certain behavior. This means that the subjective right of a certain person represents an objectively recognized authority (authority) of an individual (subjects) to take the acts necessary to satisfy their material or immaterial interests (Stanković, O., Vodinelić, V. 2007).

This means that e.g. the owner of the thing has the authority to hold the thing, to reap the fruits of it, to use it, to dispose of it, excluding from this sphere of power the state and all third parties. The right of ownership is absolute, it acts towards all third parties and implies the stated three rights: usus, fructus and abusus. In that sense, the injured person, e.g. may demand compensation from the responsible person, the buyer is authorized to ask the seller to hand over the items that are the subject of the purchase, the seller from the buyer the payment of the price, etc.

Thus, the sale of agricultural land is the right of one party, the owner, to sell his property. But unlike the rule that he can "exclude the government and all third parties", this right is somewhat limited by the right - the holder of the right of pre-emption, to be offered agricultural land first. His right is the obligation of the seller of agricultural land. At the same time, the law does not make a difference whether the holder of the right of pre-emption is the state or any other legal or natural persons.

When researching this issue, the authors noticed that in practice, the right of pre-emption of the state is treated in a different, more favorable way than the right of pre-emption of other persons. In this regard, they want to show the current situation in practice, the rights of the holder of the pre-emption and the obligations of the seller, as well as the role of the state in regulating these property relations.

The right to property - a natural right

The right to property is a natural right (ius naturale). Natural law is a set of objective, unchangeable and eternal rules of human behavior that are similar in nature to natural laws (Vasić, R., Jovanović M., 2020). Its origin has been viewed dif-

ferently in theory and practice: some theorists believe that it arises from nature itself (John, L., 2003), and the scientific direction, rationalism, has developed the opinion that it arises from human reason. In this regard, it is stated that every man can, using only his own, given by nature reason, understand its rules and act in that way. For them, Roman law was a ratio scripta-written reason, a legal system in which eternally valid principles were largely contained.

Natural law is above the existing, positive law and its source is human nature and the nature of the universe (nature), and it can only be discovered by human reason. The school of law, Jusnaturalism, starts from the belief that, as is the case in nature where certain laws apply (eg the forces of gravity), both the individual and society are subject to them. Such natural laws, the natural law by which society is governed, exist independently of our will and consciousness. The task of all subjects, including the state, is to respect the principles of that ideal, natural right. Such a natural right is considered the right of ownership (Avramović, S., Stanimirović V., 2019). Applying this attitude to the sale of agricultural land, such a natural right has the seller, but also the holder of the right of pre-emption, regardless of whether it appears in the person of the state, or any other person.

So, the idea of natural law is woven into the very foundations of our civilization, it is a permanent feature of European legal culture. Moreover, the whole history of legal philosophy until the beginning of the 19th century was the history of solving only one issue - the question of the source and content of natural law. The term itself, naturally, represents the aspiration to discover immutable, objective and lasting principles or rules of human behavior, rules that are independent of human choice, will and consciousness, just what natural laws are. The properties of natural law are finality and inevitability - they must be respected as they are (D'Antrev, A., 2001. If a person violates them, he must be held accountable. Therefore, the two basic theses of all natural law theories are:

- in addition to the positive, man-made and transitory law, there is an order of legal norms whose basis is in the unchangeable and eternal nature,
- this order is above the rank of positive law and better in terms of values (Pierre, B., 1990). Positive law is a means by which the state fulfills its task and it is obligatory only to the extent that it is harmonized with natural law.

The pre-emption right of agricultural land

The right of pre-emption is a way of acquiring the right of ownership of real estate, regardless of whether the seller has the will to sell to the holder of the right of pre-emption. The right of pre-emption is an imperative rule established by law during the sale of agricultural land (Milošević, Lj., 1970). The goal of the right of first refusal to purchase agricultural land is to prevent the fragmentation of plots and enable the creation of larger estates on which more modern models of cultivation can be applied, and thus achieve greater property benefits for the investor and the wider community. In addition to the above, since Serbia is dominated by small farms of an average of 5.4 ha (Agriculture in the Republic of Serbia I, 2013 ;, Agriculture in the Republic of Serbia II, 2013), without economic strength, such farms can find a way to competitiveness in value-added products, such as organic production (Kovačević, V., 2021), for whose products there is a growing demand in the developed world. Ecologically sustainable agriculture that wisely uses natural resources is necessary for the production of food for the population and the quality of life of people and at the same time cares for nature, while preserving biodiversity (Cico, S., Rajnović, Lj., Bošnjak, I., 2021).

If there are several owners whose plots border on the plot sold by the seller, the right of priority in the realization of the right of pre-emption has the owner of the neighboring land whose land is mostly bordered by the agricultural land of the seller. If there are more such persons, and the border lines are equal, the problem is solved in such a way that the owner of the neighboring land whose area is the largest has the right of pre-emption. Also, when exercising the right of pre-emption, the owner of the neighboring land is behind the co-owner of the land that is the subject of sale, so the seller has the obligation to first offer the land to the co-owner, and only then to other persons who have the right of pre-emption. After the co-owner, follows the state (Law on Agricultural Land) and then the person whose agricultural plot borders the seller's plot.

The seller's offer should contain all the essential elements about the subject of the sale, the price and other important conditions of the sale, if any. In order to realize the general principle of contract law, the offer must be made in writing, sent by registered mail so that the right of pre-emption can be realized, which is a possible condition for the sale of real estate to a third party in a lawful manner. In one case from case law, the seller sent a written offer to the owner of the neighboring agricultural land to the address listed in the public books, as the address where the house of the recipient of the offer is located. However, the seller did not know that the holder of the right of pre-emption did not live at that address and that he rarely came to the same address,

so he did not receive the offer. The court took the position that, since the defendant (seller) before concluding the disputed contract, by registered mail offered the holder of the right pre-emption to sell his real estate and that the shipment was returned to him with an indication that the potential recipient did not ask for it, that the defendant , could not have known that he did not live at the address indicated in the public books, so he fulfilled his legal obligation with the described offer. The court pointed out that the harmful consequences of non-delivery must be borne by the plaintiff because he did not change his address in the public books, which he was obliged to do, and thus provided the conditions for his delivery to the address where he actually lives.

Failure to act in accordance with this legal obligation leads to a sanction which is reflected in the possibility of annulling the contract of sale with a third party who is not the holder of the right of pre-emption (Stanković, O., Orlić, M., 1999). This obligation is established by law. Thus, the co-owner of the real estate, when selling his co-ownership part, has the obligation to offer the same for sale to other co-owners (Law on Real Estate). It is possible that there are several co-owners of one property. Then, the law prescribes that the co-owner with a larger co-ownership share has the priority in exercising the right of pre-emption. If the co-owners have the same parts, the co-owner of the real estate is free to decide to whom he will sell his co-ownership part.

How the law protects persons who have the right to preemptive purchase of land

From the described legal provisions arises the obligation of the seller of agricultural land to first inform the holders of the right of first refusal about the sale and to offer the purchase of the land. If he does not act in a descriptive manner, the law prescribes the possibility of annulling the contract of sale in court proceedings, which are initiated by the injured party, the holder of the right of pre-emption, namely the co-owners, the state, or the owners of neighboring agricultural plots. The offer submitted to the holders of pre-emption rights must be in writing. Such an offer must be responded to within 15 days, also in writing.

A person whose right of pre-emption has been violated (holder of pre-emptive right) has the opportunity to, within one month from the day of learning that his right has been violated, and no later than two years from the day of concluding the contract on sale of real estate), initiate court proceedings for annulment of such sales contract. The lawsuit requests that the real estate be sold to him and handed over under the same conditions from the contract. An aggravating circumstance for a person whose right of pre-emption has been violated is his obligation, in addition to filing a lawsuit, to deposit an amount, in the amount of the market value of

the real estate on the day of filing the lawsuit with the competent court. The market value is determined by expertise by a permanent court expert or a tax administration body (Judgment of the Supreme Court of Cassation Rev. No. 850/2016 of 17 May 2018). This obligation additionally burdens the holders of pre-emption rights who want to exercise their right in court proceedings, because the dispute can be prolonged, and the outcome itself is often uncertain, while the deposited funds cannot be used and lose their value. Therefore, the land is sold to the injured party at the market, not the purchase price, which may be different in relation to the price from the purchase contract. (https://www.agroklub.rs/poljoprivredne-vesti/kako-zakon-stiti-one-koji-imaju-pravo-prece-kupovine-zemljista/57551/).

The authors investigated 18 cases of land sales on the territory of the Municipality of Surčin, in any case there was a violation of the right of pre-emption of all persons except the state. The research established the following:

- sellers fulfill their obligation to offer by right of pre-emption only to the state and not to other persons,
- also notaries public do not act in the same way when certifying a contract of sale. As a mandatory document without which they do not accept the certification of contracts, notaries public ask for proof that the offer was made under the right of pre-emption to the state, but not to other persons who have the right of pre-emption. The authors believe that, in practice, not all persons, holders of pre-emption rights, are treated in the same way, but the position of the state is protected and others are not, although by law they have the same treatment,
- the obligation to put the estimated market value of the land in the court deposit, until the end of the court proceedings, unfairly burdens the holders of pre-emption rights who must exercise their right in court proceedings, because the deposited funds cannot be used and lose value. Every business entity plans its investments in the short or long term and what will be achieved from what is planned will depend, above all, on the available and available to the issuer, own or external financial resources (Rajnović, Lj., Subić, J., Zakić, N., 2016), so that the deposit can be a limiting factor in the development of the holder of the right of pre-emption,
- Also, the authors believe that the procedure for entering a change of address in the cadastre should be more transparent, publicly announced that it is a request for a change of address and, most importantly, resolved as soon as possible. In most countries in the region, this data is visible within one day.

Conclusion

Simultaneously with the development of agriculture in Serbia, as well as everywhere in the world, the purchase and sale of agricultural land, primarily private, but also state, between individuals and / or legal entities on the territory of Serbia is growing. The holders of the right of pre-emption are determined by the Law on Real Estate, which puts all holders, regardless of whether it is the state or other persons, in the same position.

In recent decades, the state has leased or sold its land in accordance with the Law on Agricultural Land and the Rulebook on the Conditions and Procedure for Leasing and Using State-Owned Agricultural Land. In order to protect the public interest, the state is an active participant in various procedures concerning agricultural land: the procedure of consolidation, expropriation, parceling, but also through the procedure of restitution.

Regulation of the agricultural land market and legal security depends on a number of fundamental economic and legal factors, which influence market ideology and market coordination, legal rules and practices, which provide legal security of land market participants, market regulation, control and supervision of participants' actions. , transparency and equal access to every person in exercising the right of pre - emption to purchase land, which is the subject of trade.

Since agricultural land is a good of general interest, in the case of sale, it must be available to any legally determined holder of the right of pre-emption under equal conditions. The authors believe that the state has the legitimacy to, in order to maintain the level of legal security, ensure the application of legal provisions in practice in the same way for all economic entities participating in trade, buyers, sellers, cadastre, notaries.

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SUSTAINABLE AGRICULTURE – A BIBLIOMETRIC ANALYSIS

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Abstract

Raising awareness of sustainable farming and the importance given to the environment has led producers to move towards sustainable agriculture. The aim of the paper is to highlight the importance of sustainable agriculture and to highlight the connection with other themes. In order to achieve this goal, a specialized literature and a bibliometric analysis were performed or revised. The results show that sustainable agriculture was becoming increasingly important, being a topic included in the Common Agricultural Policy and increasingly common among research.

Key words: *sustainable agriculture, bibliometric analysis, Romania*

Introduction

Sustainable agriculture is the management system through which the environment is not affected by human activities. The practice of sustainable agriculture is based on avoiding the use of pesticides, herbicides, synthetic fertilizers in order to solve the problems that have arisen recently. Out of everyone's desire to make a profit, agriculture, at the same time as the development and innovation of human activities, has become more and more distant from nature. However, efforts are currently being made to protect the environment and support sustainable agriculture.

In the paper entitled "Ecological agriculture. What it is and how it works", Kiley Worthington argues that modern agriculture is a source of great concern due to the use of large amounts of inputs. Also in the same paper, the author argues that the main problem is „undermining the energy-efficient self-sustaining character of a biological system."

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Codreanu C. also argues that the practice of sustainable agriculture is economically viable and socially responsible if it meets the following criteria: use of methods to maximize productivity and soil potential, while minimizing the negative effects on it, putting the footprint on how to protect resources as well as the use of means of production based on renewable resources.

According to the International Federation of Organic Agricultural Movements (IFOAM), an organization that promotes the development of organic farming internationally, standards have been set for the adoption of production and processing methods recognized as „organic". According to this organization, the main practices refer to: the principle of health (sustaining and maintaining the health of all ecosystems), the principle of ecology (reuse and recycling of resources through efficient management), the principle of equity (maintaining relationships in a fair way for all actors: producers, employees, processors, distributors, traders and consumers) and the precautionary principle (caution and responsibility being the key points in making management decisions in organic farming).

Organic farming is developing in all the Member States of the European Union, but not at the same pace and following different paths. Switching to organic farming increases production costs in some countries and reduces them in others. Conventional sectors, which are competitive in some countries, are no longer competitive once converted to organic farming. The study „Euagricultural outlook, for markets and income 2018-2030" presents an overview of organic farming in several EU Member States. Hénin Frédéric claims that most organic farms are located in Austria and Latvia. In Austria, about 20% of cattle and 35% of sheep are organically raised, while only 2.3% of the pig sector is organically reared. There are several factors that contribute to the development of these sectors, for example grassland areas that are easier to convert to organic farming. Also in this study it is claimed that the most consumed products of ecological origin are dairy products. The EU produces about 3% of organic milk, of which six Member States (Germany, France, the United Kingdom, Denmark, Sweden and Austria) produce about three-quarters of the total amount of organic milk.

Another study shows that in 2017, of the top ten global markets for organic products, seven were located in Europe. The market for organic products in Europe amounted to 39.8 billion euros, ie about 42.9% of total organic products obtained worldwide. It is assumed that these high values are due to the distribution that is much more developed in Europe than in the rest of the world.

Sustainable agriculture is based on four principles: the integration of organic cycles, the non-use of inputs harmful to the health of the environment and farmers, the updating of farmers' knowledge and skills, and the promotion of collective labor. (FAO, 1995; Pretty, 2008).

Today, more and more certifications have appeared for ecologically obtained products. Most of the time, together with the ecological certification, the Fair-Trade type certifications are the most known among the consumers. This certification takes into account fair trade that emphasizes the rights of producers, gender equality and decent working conditions.

Methodology

Bibliometrics is a method of quantitative measurement of scientific publications in a particular field and has appeared in the scientific world since 1969, in a documentary note by Alan Pritchard.

The bibliometric analysis involves demonstrating the impact of a journal in the Web of Science database, the frequency of citing articles, and the interest given to a particular topic by country. This involves making maps that illustrate the link between the most commonly used words in the papers in the Web of Science database. With this database, a detailed analysis of a specific field can be performed using keywords. Following the bibliometric analysis, a map is generated based on the links between the words, the keywords used in certain years, as well as the links from the co-authoring countries.

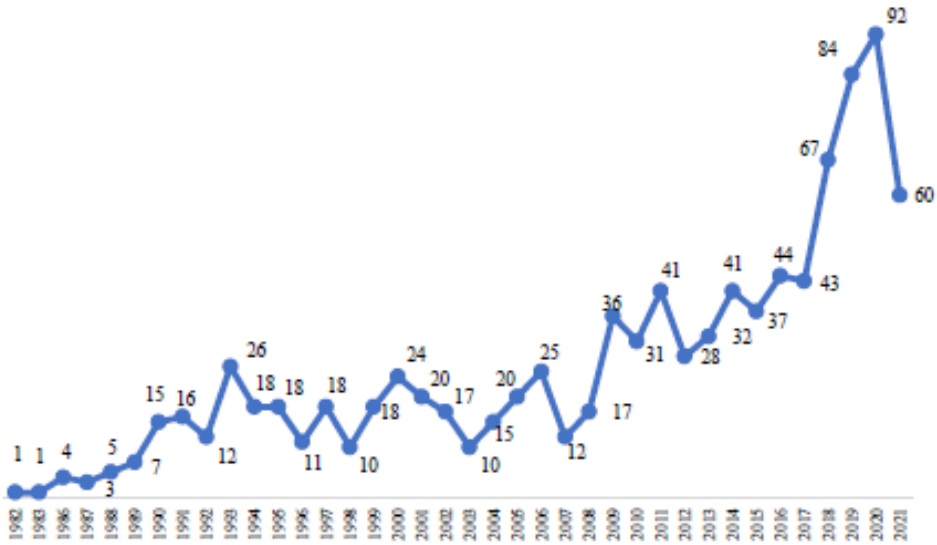
Results and discussions

Sustainable agriculture is a concept that has come to the attention of many experts globally. This concept emerged from the social, economic and environmental changes that took place 30 years ago. Sustainable agriculture is a complex process that aims to maintain the balance between the pace of change in rural areas and the conservation of raw materials.

The concept of sustainable agriculture has expanded in recent years, with research in this area gaining considerable scope. Between 1981 and 2021, 28,132 scientific papers related to sustainable agriculture were written. The research fields included in these scientific papers are: environmental science (7225 papers), agronomy (3449 papers), green sustainable science tehnology (3364 papers), enviromental studies (3043 papers), multidisciplinary agriculture (2959 papers). Other areas include ecology, water resources, horticulture.

Analyzing the dynamics of the works carried out in this field, according to the data presented in figure number 1, until 1990 the maximum of the works was 7, reaching in 1994 26 works. The research has expanded, reaching a peak of 92 works in 2020. (Fig. 1).

Figure 1. Number of paper by year.



Source: own processing based on WoS data,

According to the data presented in Table 1, it is observed that 143 of the analyzed researches are not published in a journal, representing 14.6% of the total. Most papers were published in the journal Sutenabily, followed by the Journal of Sustainable Agriculture with 14 papers and Agriculture an Human Value (Table 1).

Tabel 1. List of journals.

Nr. Crt	Journal	Journal appearances	% of total
1.	Lucrări fără jurnal	143	14.60%
2.	Sustainability	19	1.90%
3.	Journal of Sustainable Agriculture	14	1.40%
4.	Agriculture and Human Values	13	1.30%
5.	International Journal of Agricultural Sustainability	13	1.30%
6.	American Journal of Alternative Agriculture	10	1.00%
7.	Agriculture, Ecosystems & Environment	8	0.80%

Nr. Crt	Journal	Journal appearances	% of total
8.	Agronomy	8	0.80%
9.	Agronomy for Sustainable Development	8	0.80%
10.	Biotehnology for Sustainable Agriculture	7	0.70%
11.	Land Use Policy	7	0.70%
12.	Rural sociology	7	0.70%
13.	Frontiers in microbiology	6	0.60%
14.	Frontiers in plant science	6	0.60%
15.	New and Future Developments in Microbial Biotehnology and Bioengineering	6	0.60%
16.	American Journal of Alternative Agriculture	10	0.50%
17.	Advances in Agronomy	5	0.50%
18.	African Journal of Microbiology Research	5	0.50%
19.	Agricultural Systems	5	0.50%
TOTAL		**980**	**100%**

Source: own processing based on WoS data.

The Vos Viewer program processes data that has been exported as text. Figure 2 shows the interdependent words with sustainable agriculture, namely sustainable development, sustainable agriculture, agriculture, food security, sustainability, food, system, being grouped in 3 clusters (Fig. 2).

The first cluster refers to organic farming and includes terms such as: agroecology, organic farming, farmers, adaptation, conservation, alternative agriculture, sustainable intensification, irrigation, intensification, quality, system, education.

The second cluster aims at the development of the sector and includes terms such as: future, adaptation, performance, efficiency, climate change, but also terms such as sustainability and organic farming.

The third cluster includes general terms related to agriculture such as: conservation of agriculture, soil, innovation, rural development, systems, organic farming, impact (Fig. 2).

Figure 2. The link between the keywords.

Source: own processing based on WoS data.

Figure 3 shows rough terms related to sustainable agriculture used in research over time. Thus, in 2010-2012, researchers were concerned with organic farming, environment, quality, alternative agriculture. In the period 2012-2014 the main topics were sustainability, circular economy, irrigation, soil and adaptation (Fig. 3).

Between 2015-2017, researchers used terms such as: farmers, technology, innovation, area used, indicators, climate change, knowledge. In 2018, researchers focused on urban agriculture, performance, efficiency, impact, intensification, food security, ecosystem service, conservation of agriculture (Fig. 3).

Figure 3. The links between sustainable agriculture and other terms by age.

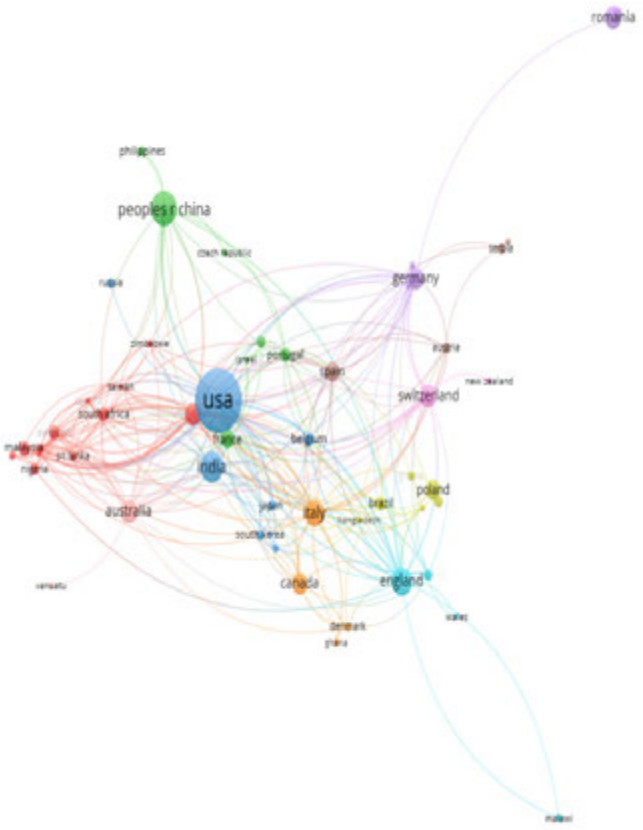
Source: own processing based on WoS data.

Regarding the frequency of co-authors, depending on the country, it is observed the degree of relationship between countries and the interest given to sustainable agriculture. (Fig.4)

Figure 4 shows the countries that give interest to the subject approached by the size of the nodes, and the diversity of colors representing the directions of research. The links between the nodes also represent the cooperative relations between the countries.

The first places to address this issue are the United States, followed by Italy, England and Australia. Thus, the United States of America has a special interest in the subject and has common points with Italy, China, Germany, Africa, Australia, India, Canada (Fig. 4)

Figure 4. Relations between co-author countries.



Source: own processing based on WoS data.

Conclusion

Sustainable agriculture, sustainable development, climate change, rural development, are just a few elements that Romania is trying to develop. The new regulations regarding organic farming will enter into force starting with 01.01.2022. The new regulations aim to ensure fair competition for producers and farmers and to prevent consumer fraud.

This paper involved conducting a bibliometric analysis, using the information that was obtained by querying the Web of Science database. The data were processed through the VOSviewer program, which yielded the following results:

- The interest given to the subject on organic farming almost tripled in the period 2010-2021 (569 papers) compared to the previous period, 2000-2010, when only 203 papers were published. Interest in organic farming did not exist even in the period 1990-2000, when about 186 papers were published, 67% less.
- The country with the most publications on organic farming is the USA (209 publications (21.3% of the total), followed by China with 63 publications, which represents approximately 6.42% of the total articles. related to organic farming, but only 27 documents were published in the Web of Science database.
- The groups of words that were most frequently found in scientific publications referring to organic farming were: "sustainable agriculture", "sustainable development", "Agriculture", "Sustainability", "Food security" etc.

In conclusion, this paper presented the importance of organic farming, highlighting its role in the future development of the world.

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ECONOMIC ASPECTS OF INVESTMENT IN WHEAT PROCESSING[1]

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Abstract

In order to strengthen the competitiveness of agriculture, there come to notable increase in state support for investments in improvement of production and processing on individual or joined agricultural holdings in Serbia. Accordingly, paper is focused to assessing of economic effectiveness of investments in processing of wheat in selected agricultural cooperative. The business idea and cooperative needs assume the modernization and completion of the facilities for the wheat processing and production of mill products (human and animal flour). There is the plan to purchase electromechanical modular truck scale, a steel silo for wheat storing, stretch machine, equipment for quality control of wheat that enters the milling process and equipment for increasing the mill capacity and finished products quality. It is expected that with this investment, the cooperative would directly affect the strengthening of its competitiveness, while additional employment would indirectly affect the development of the local community. Considering that realization of the business idea relies partly on own funds, and partly on public incentives, in paper was made an assessment of the economic effectiveness of investment in purchase of equipment used in mill industry.

Key words: *economic effectiveness, investments, incentives, wheat, flour, agricultural cooperative.*

Introduction

In line to high nutritional value, wheat represents one of the most widely grown and used crops worldwide, specifically grain, in human diet. Besides, it is also very valuable as a feed or a raw material in food and processing industries. By produced quantities, its production globally guarantees the food safety for the majority of population, securing the high share within the world market and economy.

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Achieved wheat yields oscillation results due to occurrence of many factors, primarily used variety and environmental characteristics, as well as used production technology, conducted agro-technical measures and applied crop (Dončić et al., 2019).

Some recent estimations show that wheat takes over the 25% of global areas under the grains, achieving the average yield around 2.7 t/ha. Along the increase in world population and pooled demand for wheat and wheat products, in upcoming period global food security will be fully satisfied with yields grow up to 3.8 t/ha (Dimitrijević et al., 2020).

Among the farms involved in crop production in Serbia, the most of them are oriented to wheat. Nationally, maize and wheat are two leading crops, where in overall sowing structure (over the 3,4 ha of utilized agricultural areas) wheat takes around 17% of available UAA with the annual production above the two million tons (Popović, Kovljenić, 2017). Although the wheat is present in all regions of Serbia, the most significant wheat-producing area is the province of Vojvodina (Janić Hajnal et al., 2015). To wheat is given strategic position, ensuring the food security at national level, while certain quantities are turned to export, mainly as raw material (Jeločnik et al., 2021).

Despite the large areas under the wheat in Serbia, and fact that its production is highly dependent to water availability, unfortunately it is mainly produced in rain-fed system of production. Really soon, related to often presence of climate change accidents (primarily drought), sustainability of wheat production could be efficiently supported just with more intensive introduction of irrigation (Jeločnik et al., 2019).

As was previously mentioned, national policymakers assign to wheat special status, along to food self-sufficiency, its greater use in food processing and huge export potential. Most often, penetration to international market is linked to introduction of quality standard schemes, upgrade of technological approach in production, implementation of full marketing orientation, etc. (Ignjatijević et al., 2018).

Wheat production is usually characterized by significant variation in yields and grain quality, where quality variations could exist even in the same production parcel. Just few years ago grain buyers have been starting to classify and pay the wheat by its quality, avoiding the potential economic and technological problems to processors (*Đurić* et al., 2020). Wheat is a crop with long tradition in Serbia and one of the indispensable parts in crop rotation. On the other side,

from the economic aspect, in spite to simple production requirement farmers usually do not have adequate economic benefit in its growing, as it gives one of the lowest contribution margins within the sector of crop production (Todorović, Filipović, 2010).

So, global production, processing and trade of wheat have positive tendencies, while in Serbia production has negative trend, initiated by the lack of economic interest for investment in wheat production, as its burdened by costs-income and price disparities, uncertainty of realization, etc. (Marković et al., 2013). Price of wheat produced in Serbia is usually lower than average price in global market (Djuric et al., 2015). Besides, prices of used inputs (certified seed, fertilizers, pesticides, energy, etc.) are not so rare much above that worldwide average. So, facing the low profitability in wheat production at farm level generally could be changed with generation of value added in farm yard, for example through the wheat processing, and later selling of wheat products.

It has to be mentioned, that for a long time running of any level of economic crisis in Serbia is mostly followed by the price transmission within the wheat to bread supply chain that is not so favorable for the primary production (wheat producers). In the period of constant growth of food prices, despite the conduction of comprehensive support by the local authorities, the worst effects are experiencing the primary producers and final consumers. Grain producers are facing the minimal contribution margins, while consumers are facing growing flour, bread and other pastries prices, leading to assumption that wheat processors and retail chains are taking the largest part of gained profit (Djuric, Götz, 2016).

Vertical integration and establishment of wheat processing (for example the first level of processing - flour production) is not cheap project, and usually is financially impossible for a single farms. It could require farmer's common action, as are forming of agricultural cooperative.

According to last census of agriculture, there are just few hundreds agricultural cooperatives in Serbia that joins few thousand members and couple hundred thousand subcontractors (Simonović et al., 2016). Guided by the direct support of the Ministry of Agriculture and Ministry of Rural Welfare, or specifically, initiated by the project 500 cooperatives in 500 villages from the mid of 2017 to present moment there are established over the 600 new agricultural cooperatives, so currently is active over the 1,500 of them. For that purposes in less than three year was reallocated to the old and new agri-cooperatives over the 15 million EUR (Rajevic, 2019). Main goal of given support was to boost both

the competitiveness of farms involved in crop and animal production, as well as competitiveness of overall sector of national agriculture.

Methodology and data used

The main goal of this paper is to show does the investment in wheat processing could be economically justified business alternative for certain farms' association, specifically cooperative.

Applied methodological framework includes static (Total output-total input ratio, Net profit margin, Accounting rate of return, and Simple payback period) and dynamic (Net present value, Internal rate of return, and Dynamic payback period) methods for evaluation of economic effects of investment done in wheat processing. All data used within the paper are gained through the in-depth interview with the director of selected agricultural cooperative active in crop production and wheat processing. Cooperative is located in Central Serbia, while interview was done during the mid of 2021. For boosting the scientific and practical value of the paper, adequate scientific and professional literature sources were also used. Evaluated investment, its technical and financial elements are so realistic.

Results with discussion

The cooperative has long tradition in grain production. In last few decades, it has also been active in wheat processing. The cooperative wants to access a free public grant and to invest in project idea that assumes modernization and full equipping the grain processing facility, i.e. facility for production of mill products (human and animal flour). Investment involves the purchase of missing equipment which will complete the wheat processing, as well as technologically and economically improve the business, increase processing quantities, improve the quality of final products, and attract new subcontractors, what would directly strengthen the competitiveness of the agricultural cooperative. Additionally, two external workers would be employed. It is planned to purchase the electromechanical modular truck scale, steel silo for storing the wheat, stretch machine, equipment for quality control of raw material that enters the milling process, and equipment that will increase the mill capacity and quality of final products. All equipment is purchased as new.

Wheat processing assumes the following matrix. All cooperators and subcontractors are linked to production of the raw material base (cereals, mostly wheat),

which is purchased by the cooperative. Additionally, cooperative make finalization of the raw material (drying, checking and possible mechanical cleaning of grains), grinding it into the human and animal flour, adequately packing (in 25 kg and 30 kg bags) and further selling to well-known local customers. Besides, the cooperative supplies the cooperators with the necessary inputs (mineral fertilizers, seeds, pesticides and mechanization services), asking the payment upon the grain delivery.

Assessment indicators of the planned investment are visible in the next table (Table 1.). There are some brief explanations that follow the investment. Around 91% will be invested in fixed assets, while the rest will be turned to covering of required permanent working capital. Over the 55% of overall investment represents the value of required facilities. More than 10% of investment will be covered by own financial resources. Rest will be granted by public support. It was assumed the 5 years lifecycle of the investment that is in line to usual credit period approved for that purposes. Besides, it was assumed constant level of annual sale incomes derived from investment usage (according to constant production volume and fixed prices of the products). Their annual value is almost 10 million RSD. Overall incomes involves the local market price of realized human (type 400 and 500) and animal wheat flour (milling wastes). Required production costs also assume fixed annual sums. They amount slightly over the 7.5 million RSD. In their overall sum dominates material costs with over the 60%, while in them more than 95% comes to direst material (purchased wheat as a raw material). Over the all 5 years the investment exploitation is liquid and brings to annual net profit of almost 2.1 million RSD. Related to current circumstances at the national capital market, observed discount rate was set to 7%.

In same manner, there are some brief explanations of gained results after investment analysis. Related to static assessment of investment, while observing the fifth, representative year of investment use, i.e. year when the investment is exploited in its full capacity, it could be seen that:

Value of the Total output/total input ratio, i.e. Economical-efficiency coefficient is greater than one, meaning that gained incomes are over the overall production costs. So, investment sounds to be economic, and economically justified. Value of the Net profit margin ratio is above the assumed price of the capital, 7%, meaning that investment shows strong accumulative potential, or during the investment use it could be expected certain level of profit after the covering of required price of capital. Same as previous is with the value of accounting rate of return, meaning

that investment could be seen as profitable for the cooperative. Related to gained Simple payback period of 4.27 years, investment could be also labeled as economically justified, as it could cover invested assets for less than 5 years.

Table 1. Investment in wheat processing: Evaluation of the project idea.

No.	Description	
1.	**Investment project**	
1.1.	Title of the investment project	Building the storing capacities for grains and purchase of equipment for mill products production (human and animal flour)
1.2.	Investor	Agricultural cooperative
1.3.	Location	Central Serbia – Kragujevac
2.	**Estimated value of investment (in RSD)**	
2.1.	Total investment	16.668.040,30
2.2.	Investment in fixed assets	15.152.763,91
2.3.	Investment in permanent working capital	1.515.276,39
3.	**Source of financing**	
3.1.	Total source of financing	16.668.040,30
3.2.	Internal financial resources	1.686.299,50
3.3.	External financial resources	14.981.740,80
4.	**Object of investment project**	
4.1.	Purpose of investing	Investment in fixed assets
4.2.	Start of investing	During the 2022
4.3.	End of investing	During the 2022
4.4.	Economic life of the investment	5 (five) years
4.5.	Sales market	National
5.	**Expected effects of investment**	
5.1.	*Static assessment*	
5.1.1.	Economical-efficiency coefficient	1,33
5.1.2.	Net profit margin ratio	20,97
5.1.3.	Accounting rate of return	12,55
5.1.4.	Simple payback period	4 years and 3,21 months
5.2.	*Dynamic assessment*	
5.2.1.	Net present value	4.395.087,63
5.2.2.	Internal rate of return	14,21
5.2.3.	Dynamic payback period	4 years and 6,82 months
5.3.	Break-even point (relative)	6,83
5.4.	Additionally employed staff	2
6.	**Exchange rate**	117,6 RSD = 1 EUR

Source: IAE, 2021.

In line to dynamic assessment of the project economic effects, there are few things that have to be mentioned. Firstly, in the period of 5 years of investment use it could be enable to cooperative enlargement of the profit in amount of almost 4.4 million RSD (discounting to the zero moment, or moment of investing). Investment is fully profitable, as gained Internal rate of return is more than doubled compared to observed discount rate. In line to gained Dynamic payback period of 4.57 years, investment could be also considered as economically justified.

Having in mind the assessment of the project effects in conditions of risk and uncertainty, accenting the break-even point of wheat processing, it could be seen that positive business results are secured if the volume of production does not fall below the 6.83%.

Conclusions

Crop production, especially growing of grains could be very limiting for the securing of expected level of development of certain farm at national level. Although the wheat represents one of basic raw products used for preserving the national food security, unfortunately this line of crop production gives relatively small contribution margins and profit for average farm. Adequate alternative farmers could found in vertical integration, or cooperation within the crop production.

It was found that investment in wheat processing (primarily flour production), based on state support directed to cooperatives, could be economically justified and sustainable. Besides, creation of value added gives the cooperators, joined farms, additional maneuver space to maintain the expected profit in by yields bad production years, mainly affected by drought. Surely, with employment of two additional persons, investment has also positive impact to development of local rural community.

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QUANTIFICATION OF MAIN NATURE-BASED RESOURCES IN RURAL TOURISM AREAS

Milica Luković[1], *Marija Kostić*[2]

Abstract

Agriculture is dominant economic activity in the traditional concept of rural areas functioning, but decade back multifunctional concept of rural areas is characteristic for EU countries and worldwide. One aspect of multifunctionality is sustainable tourism based on natural resources. Nature-based tourism contributes to economic diversification in rural areas. This study aimed to determine the potential rural sites and their suitability to nature-based tourism demands. This study quantifying and ranking main nature-based resources as indicators of suitability in rural areas. The whole set of the widely recognized nature resources important for nature-based tourism development divided into two groups: natural attractive features (landscape, protected sites, geomorphological and hydrological objects) and "eco-friendly" facilities suitable for e.g. walking, climbing, bird watching, photo-safari. Those factors were selected according to the literature sources. Using the analytic hierarchy process (AHP) method it was calculated, quantified and ranking list of the most suitable natural features according to criteria weight to the selected site. Paritaly used principles of SMCE- Spatial Multi-Criteria evaluation method results were visualy represented on the map using DIVA-gis software.

Key words: *natural resources, rural areas, nature-based tourism*

Introduction

Tourism is an important economic activity today, because it can additionaly encourage the development of other economic activities such as multifunctional agriculture, local food and homemade production, and help increase contry revenue (Dorobantu & Nistoreanu, 2012). Tourism of any kind could have the potential to impact (positive or negative) at the first physical envi-

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ronment of the destination, as well as social and economic aspect (Mathieson & Wall, 1982). In that context, sustainable tourism has emerged in order to maximise the benefits of tourism and minimise its adverse impacts.

Sustainable tourism could be considered as live laboratory of sustainable development which promotes rational use of natural resources and environment, supporting socio-cultural uniqueness of the local communities, contributing to economic diversification and providing long-term economic processes, where the part of tourism income being used for restoration of tourism resources and improvement of tourism services technologies. Edgell (2006) states that "the main components of sustainable tourism include environmental tourism (often referred to as "ecotourism"), heritage (locations), culture (places) and rural areas" (p. 41), and that "the relationship between tourists, local communities, businesses, attractions and environments complex, interactive and symbiotic" (p. 15). On the other hand, Edgell (2016) views nature-based tourism, geotourism, responsible tourism, and cultural tourism as elements of sustainable tourism "that have evolved the most since the mid-1980s" (p. 13).

For the last decade many regions of the Republic of Serbia actively involved in rural tourism development. Among the range of tourism types, rural, agri tourism together with nature-based tourism represent promissing activities for sustainable rural development. Both of mentioned forms of tourism takes place in rural environment and based on exploitation of natural and anthropogenic tourist resources, and support social and economic activities that generate benefits for local communities (Surugiu, 2008).

According to Blumstein et al. (2017, p. 2) and in the global perspective "nature-based tourism is huge". According to estimations at least 8 billion people visit nature protected areas annually (Balmford et al., 2015). At the same time, natural environments and wildlife species are threatened or on the edge of extintion global environmental problems such as climate changes, biodiversity decline, unsustainable resource consumption and other anthropogenic factors (Blumstein et al., 2017; Wearing & Schweinsberg, 2018). Very dangerous is fact that large number of tourists (mass tourists or ecotourists) can be a source of additional pressure on natural resources, since no exist „zero tourism" that occur without generating impact on environment (Øian et al., 2018). It's encouraging because nature-based tourism is described as one of the fastest growing sector and very important justicication for conservation (Balmford,

et al., 2009) especially today when there is a trend of outdoor activities and nature-based unexpectedly boosted by the COVID 19 outbreak in the spring of 2020 (Fredman & Margaryan, 2021).

Natural resources are also related to the development of rural areas. The natural environment is one of the objective factors in the demand for rural tourism (Cvijanović & Ružić, 2017, p. 97). The components of nature are also important as factors in the rural tourist offer, namely: "climate, hydrographic elements, relief, flora and fauna, protected natural areas, nature parks, and general and special ecological and bio agriculture" (Cvijanović & Ružić, 2017, page 101).

The area that is the subject of this research has a rich nature, including various geomorphological forms, water resources, favorable climate and diverse flora and fauna. In contrast, natural resources are currently not a key aspect on which the tourist offer is based, actually their potential has not been fully exploited. Geographical and, already observed, natural-geographical resources will be considered as a basis for creating a new and improving the existing tourist offer. An overview of natural resources and their current state is a good basis for determining the potential for the development of sustainable tourism based on natural resources, as well as comparisons with the existing degree of their use for tourism purposes. Here, it is crucial to compare potentials based on natural resources, evaluation of the existing tourist offer and the relationship between the achieved and potential level of tourism development and its sustainability, in order to get a complete picture of what tourist potentials should focus on in further development. In that way, a systematic overview of the proposals of key directions for the development of sustainable tourism in the future was obtained. Therefore, the initial step towards sustaiable planning is to systematically identify and assess the resource framework for its potential development (Priskin, 2001) .

From all of the above, this destination could be very popular in several tourism products such as: nature-based or eco-tourism, agro/rural tourism, religious tourism, sightseeing, excursion or education tourism, recreational tourism (e.g. cycling, walking, hiking, horseback riding, paragliding), which we will determine with this research. Future projects such as the panoramic road, the system of hiking/mountain and bike paths, viewpoints, the adventure parks constructions on the Golija River, the eco / ethno village in Rudno palateau, the museum / theme park in Ras could be a big driving force in the affirmation of Golija as a very popular tourist destination (Tomić & Stojsavljević 2013).

Material and Methods

Study area

For the purpose of this research was selected area of villages Rudno, Reka, Bzovik, Vrh i Biniće within the boarders of Biosphere Reserve "Golija-Studenica". The selected villages are located on the slopes of Mount Radočelo at a latitude of 43° 2 ' 53 " and a length of 20° 28' 56" in southwestern Serbia, the municipality of Kraljevo. With an area of 14.27 km^2, the village has about 200 households with about 1000 inhabitants and a population density of 21.2 inhabitants per km^2. The core hydrological networks make rivers Brevina, Izubra and Vrelo, contributars of Studenica. The climate of the villages is moderately continental, with sub-alpine impact on the higher altitude. It is very good for winter sports. The river Izubra flows through the territory of the village with its waterfalls and attracts the attention of all canyoning fans. Most of the territory of villages (about 60%) is covered with forest vegetation, the rest are higeh mountain meadows and pastures and agricultural land. The dominant forests are: beech, spruce, fir and pine. Flora of this area is very rich and diverse with about 729 species of vascular plants (Gajić, 1989). The fauna is especially rich in ornithofauna with about 90 species, of which 45 species belong to the group of natural rarities. As well as, Rudno is hunting area that consists of an open part of the hunting ground at the following locations: Divan, Nikoljača, Srnjača and others. In this area there are: deer, wild boars, wolves, bears, foxes, martens, rabbits and many other species of game. Hunting and fishing are also compatible with tourism.

Figure 1. Map of researched area.

Method

The suitability of any area for nature-based tourism development is based on its natural and community features. This research was didvided into 3 stages. The first stage is related to inventory of selected area in tearms of biological, ecological, hidrological, geomorphological characteristics and other relevant information, as well as data on demographic status, economy, infrastructure, etc. This dataset were collected in pervious period using PLA (Participatory Learning and Action) and PRA (Participatory Rural Appraisal) methods during the Local Action Groups (LAG) establishment. Data were published in official document ID card of village Rudno (Vilimonović and Ralević, 2008). The second stage was to extract main natural and community factors that have impact on nature-based tourisam development and to apply AHP method to prioritise and rank them. It was selected 6 factors/categories with its sub-ctegories. Each factor represent one thematic layer on the map (Figure 2). Valuation of selected factors were based on gis-map analysing (www.geosrbija.rs), available literature and pervious field work. Landscape include areas with forest, high natural meadows, agricultural land and settlements. Viewpoints are places with the best visibility. Wildlife include rare, endemic, protected flora and fauna and connected to protected areas. Hidrology include the most attractive features like waterfalls, high mountain lakes and mountain salmonid streams for recreatianal fishing. Geomorfology coveres caves or rocks or other interesting landforms. Group of community features include „eco-friendly" facility with designed walking or bicycling paths, paragliding locations, herbal paths, info-tables of objects, etc., and distance of imortant natural sites from roads.

Table 1. Selected categories and sub-categories for suitability evaluation process for nature-based tourism.

Factors/categories	Criteria/sub-categories	Unit	Suitability rating of factors			
			H	Mod.	Mar.	NS
Natural features						
Landscape/wildness	Land use Viewpoints	Class Km	H <2	Mod. 2-5	Mar. 5-10	NS >10
Wildlife	Protection zones Diversity	I II, III %	III >30	III, II 20-30	II 5-20	I | <5
Hidrology	Water falls, Streams ,Lakes	Km (availabilty fro village center)	<2	2-5	5-10	>10
Geomorphology	Caves, rocks	Number of objects	>5	3-5	2-3	<2
Community features						
„Eco-friendly" facilities	Walking and bicyle paths, Info-tables, info-objects	Km Number of...	>20 >10	15-20 5-10	10-15 3-5	<10 <3
Accesability to main roads	Distance of main natural features from roads	km	<1	2-3	3-5	>5

*H-high, Mod. Moderate, Mar.- marginal, NS-not suitable.

The AHP method is widely used an approach to multicriterion decision-making with aim to calculate and quantify values of selected criteria (e.g. Bunruamkaew and Murayam, 2011; Zabihi et al., 2020; Alkema et al., 2015; Zucca, et al., 2007; El Jazouli et al., 2019, etc.). At the beging of process it is imotrant to establish hierarchical structure with aim, categories and sub-categories. After that, determine relative importance for each categoria using standardized scale proposed by (Saaty, 1980) and put values into pair-wais comparision matrix. Each category was objectively evaluated and determined relative importance value according based on pervious stages of research. Than, with series of equations calculate weightened SUM value, Criteria Weight (Wi) and Consistency Ratio index (CR). If CR index is smaller than 0.10, then degree of consistency is acceptable.

$$CR = \frac{CI}{RI}$$

For the calculations of pair wise comparison matrix and computation of Consistency ratio and Weight was used excell. The results presented in table 2.

Site suitability assessment (Si) was calculated for each used factor's suitability.

$$Si = \sum_{i=1}^{n} (Wi \; X \; Ri),$$

Where n represents number of factors, Wi is multiplication of all associated Criteria Weights in the hierarchy of "i" and Ri is rating given for defined class of "i" factor. Final data represented in unique map with combination of total suitability scores for each factor.

Results and discussion

This research area attracts a large number of researchers who have written about it. In the literature, it is possible to find research about geoheritage (Grujičić-Tešić, 2017), as well as geoecological evaluation of this nature park for tourist and recreational purposes (Šaćirović, 2014). When it comes to hydrological characteristics, lakes stand out in the literature published so far (Marković et al., 2012). Golija was also analyzed from the aspect of the flora and fauna that is present on it, and, as a whole, as a reserve of the Golija-Studenica biosphere (Aleksić & Jančić, 2012). There are also separate observations of certain aspects of biodiversity. This is supported by research on flora and vegetation (Gajić & Savin, 1989), moss (Papp & Erzberger, 2005) and mountain maple (Panjković et

al., 2015). An evaluation of the climatic characteristics of Mount Golija is also unavoidable (Milanović and Milanović, 2010).

Analysed data set show that the highest weight criteria have landscape (0.39%) and wildness with 0.27% (Table 2). In that context, the construction of specific viewpoints is necessery as soon as posible, as a needs of visitors to meet the authentic natural areas in order to enjoy the scenery, natural features and traditional values.The lowest rank has the importance of roads (0.03%). In the middle of the ranking scale, a similar weight criteria value has eco-friendly facilities (0.07%), geomorphological features (0.08%) and hydrological objects with a higher value 0.15%. According to AHP results of prioritizing criteria, for nature-based tourism, the most important characteristics that sites should have are related to natural values, especially ambient scenic and portion of wildness. Single hydrological or geomorphological objects such as waterfalls, caves, unusual features could be an advantage, but not crucial for nature-based tourism. Eco-friendly facilities are favourable in such a tourism context, but it depends on the level of development of the research area and the degree of investments in this kind of infrastructure. Because of that, future tourism development of Golija should be primarily oriented towards the summer season that incorporates healthy living on a mountain with recreation, adventure, education and culture which is correlated with other research (Tomić & Stojsavljević 2013).

Table 2. Pair-waise comaparion matrix with Weights criteria and Consistency ratio.

	Pair-waise comaparion matrix						Calculation process								
Crit.	**L**	**W**	**H**	**G**	**EF**	**AR**							**SUM**	**Wi**	**CR**
L	1	2.00	4.00	6.00	6.00	7.00	0.39	0.54	0.60	0.48	0.42	0.21	2.64	0.39	6.77
W	0.50	1	3.00	6.00	5.00	5.00	0.20	0.27	0.45	0.48	0.35	0.15	1.9	0.27	7.04
H	0.25	0.33	1	3.00	4.00	5.00	0.09	0.09	0.15	0.24	0.28	0.15	0.91	0.15	6.07
G	0.17	0.17	0.33	1	3.00	3.00	0.07	0.05	0.05	0.08	0.21	0.09	0.55	0.08	6.87
EF	0.17	0.20	0.25	0.33	1	4.00	0.07	0.05	0.04	0.03	0.03	0.12	0.34	0.07	4.86
AR	0.14	0.20	0.20	0.33	0.25	1	0.05	0.05	0.03	0.03	0.02	0.03	0.21	0.03	7
														λ_{max}	**5.44**
														CI	**0.1**
RI (statndardized Random Index)- for n=6, RI=1.24														**RI**	**1.24**
CR*<0.10 (acceptable)														**CR***	**0.08**

*L- landscape, W-wildness, H- hidrology, G-geomorphology, EF-"Eco-friendly" facilities, AR- accesability to roads.

The total suitability score includes the weight of the main criteria and the weight of sub-criteria. The results include values from 0.02 to 0.04 for community features and from 0.13 to 0.22 for natural values. These results confirm the importance of natural values existence for nature-based tourism. Analysed map (Fig-

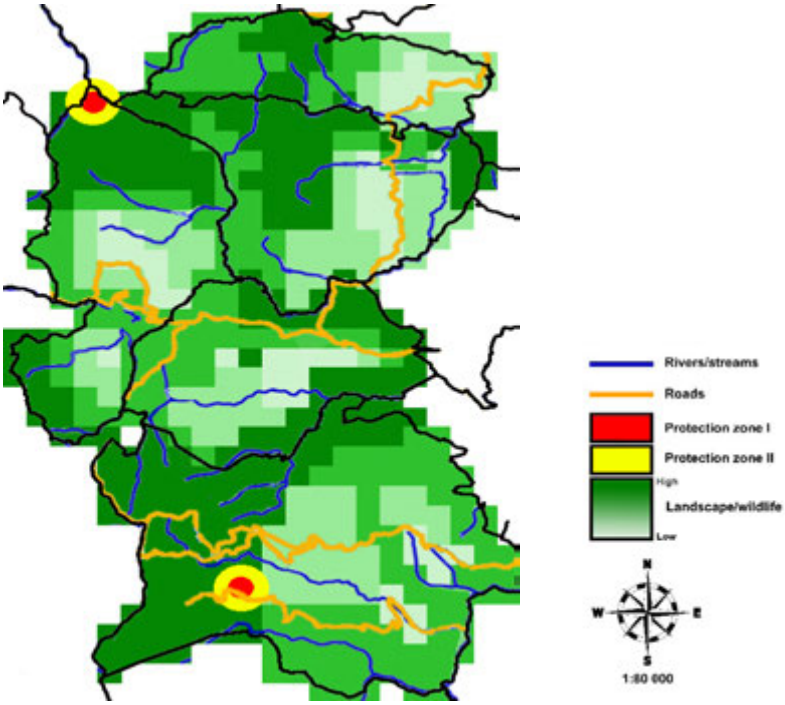
ure 2), more than 50% of the researched area covered by suitable landscape with diverse ecosystems (forest, meadows, pastures, viewpoints, etc.) which is correlated with the data found in the literature (Николић, 2011). But, in this area, the problem of overgrowing of agricultural land due to non-cultivation is particularly pronounced, which is especially a consequence of aging capable population and pronounced emigration of the younger population (Мирковић, 2014). Moderate level of suitability for nature-based tourism offers a hydrological network of this area because most of the objects are located between 2-5km and more from Rudno touristic centre. Eco-friendly facilities positioned between moderate to marginal suitability level with around 15km of paths and more than 5 info-tables.

Table 3. Criteria and sub-criteria weight for total nature-based suitability of researched area.

Factor/ category	Weight (Wi)	Sub-criteria	Weight (Wi)	Si	
L	0.40	Land cover	0.55	0.22	>30% (H)
		Viewpoints	0.45	0.18	
W	0.28	Protection zones	0.45	0.13	
		Diversity	0.55	0.15	
H	0.15	Availability/km	0.57	0.02	Mod.
G	0.08	Number of objects	0.45	0.04	Marg.-NS
EF	0.06	Km of paths	0.55	0.03	Mod.-Marg.
		Number of IT	0.45	0.02	Marg.
AR	0.03	Distance	0.59	0.02	Marg.

The roads are marginal, because the total area has only main roads for passenger vehicles, while the roads network inside the territory is not developed well and is appropriate for off-road vehicles. The construction of roads for all types of transport is preferably, because the entire area lacks all sorts of roads infrastructure. The landform is designed as marginal to not-suitable because in the selected area there is fewer than 2 caves or other objects.

Figure 2. Map with total site suitability for the important criteria.



Conclusion

During the last decade domestic and international research about this topic has significantly matured. The need for nature-based tourism is greater today then ever, in order to maximise the environmental, economic and social benefits and minimise impacts on nature.

In that context, this research represents an example of potential quantification of site assessment for nature-based tourism according to natural potentials and community facilities important for ecotourists. The results show that natural values (landscape, wildness, hydrological and geomorphological features) have an average higher importance for nature-based tourism than community facilities. The selected area of Biosphere Reserve Golija-Studenica has great potential for nature-based tourism in the multifunctional agricultural ambient of rural development. This area is known for its great wealth of natural and economic resources which provide good living conditions for the rural population, and now a good chance for the development of tourism, but, unfortunately, it is characterized today economic neglect and demographic

depopulation. Limitation for conventional agriculture or other economic activities, because of strict rules of UNESCO protected areas, opening space for diversification and improvement of tourism. More than 30% of research territory is covered by forest, protected sites with a high diversity of species, attractions such as waterfalls, mountain streams give opportunities and meet requirements for nature-based tourism. Eco-friendly facilities are in the beginning stage of development, while the road map has poor spread within the villages. The natural values are very high ranked and final considerations should be directed to ecotourism facilities establishment. On that way, Golija should be developed as unique tourist destination in Serbia, recognizable as a synonymous with relaxation in untouched nature, clean air, relaxation, adventure but also spirituality and education.

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THE IMPORTANCE OF ACCOUNTING INFORMATION IN THE ECONOMIC DEVELOPMENT OF AGRICULTURAL ENTERPRISES

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Abstract

The development of digitalization and globalization implies the need for a holistic approach, but above all a rational management of accounting information. Their importance is an important component of the positioning of agricultural enterprises in both the local and global market. The success of positioning is crucial in their economic development. Strategic business decision-making is based on a variety of information from various sources, which, among others, provides management accounting. Merit information is collected by strategic management accounting using strategic management accounting instruments and tools. The subject of this paper is to affirm the importance of accounting information in making strategic business decisions and managing the company in order to achieve the goal of economic development. Namely, the emphasis is on the criterion of expediency in the application of instruments and usefulness of information, which requires the transformation of strategic management accounting in the direction of providing competent support to holistic business management aimed at the lasting well-being of agricultural enterprises.

Key words: *information, economic development, accounting*

Introduction

The expansion of production and the complexity of the environment have encouraged the development of strategic accounting due to the dominant importance of competitiveness as a criterion for success. The agricultural company

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must recognize its present and identify the future situation in the environment in order to know and be able to adequately position itself in the market. Positioning a company in the environment is a creative - only extremely intuitive, and usually rational - activity of modeling a strategic option that assumes acquiring one's own knowledge of managerial management or disposing of knowledge of others (specialists or experts) in order to acquire and accept knowledge about the subject of decision-making. disposal of information from internal and external sources (environments) of the company needed for meritorious business decision-making. Adequate positioning can be understood as a cause but also as a consequence of the economic development of an agricultural enterprise. Economic development enables an adequate or desired position on the market, on the one hand, while on the other hand it enables future economic development.

A modern agricultural enterprise must necessarily adapt to changes in the environment, in which timely accounting information is an unavoidable factor, as well as adequate treatment of them. At a time when economic activities are taking place, there is an increasing need for quick reactions, which, as a rule, must be adequate. The application of new management approaches requires appropriate information support, which emphasizes the role of management accounting, ie cost accounting, as the information core of the accounting information system of the agricultural enterprise (Jablan et al., 2019).

Strategic accounting information is aimed at creating additional value for shareholders and successfully achieving the set goals. The subject of this paper is to highlight and point out the possibilities provided by the instruments and techniques of strategic accounting. In other words, the goal is to emphasize the expediency in the application of strategic management accounting instruments, in the process of collecting useful strategic accounting information, to support holistic change management aimed at the lasting well-being of agricultural enterprises.

Overview and criteria for the application of typical methodical procedures of strategic management accounting

The purpose of strategic accounting is to provide information on which managers set long-term goals, strategies for meeting them, and make strategic business decisions. Strategic management accounting is aimed at creating accounting information for the purposes of analyzing the success of strategic management of agribusiness operations.

In this way, strategic management accounting contributes to risk identification – opportunity and threat from the environment and strengthens the ability to adapt to agro enterprise to change.

The option of applying specific methodical procedures or strategic management tools is determined by: (Malešević & Čavlin, 2009)

- organizational context of agro enterprises, and
- individual characteristics and context of top management.

Emphasizing the individual characteristics of top management from the view that an individual's behavior is crucial to the success of agribusiness, and the diversity of their behavior is largely conditioned by individual characteristics. Individual characteristics of top management can be compared to two types: demographic characteristics such as age, gender, education, continuity of work in the position of agribusiness, etc., and psychological characteristics such as: propensity, attitudes, references, etc.

Therefore, the essence of choosing strategic managerial techniques (SMTT-strategic management tools and techniques) is the relevance of professional assistance to managers in all phases of strategic management – from the strategic analysis phase, strategic choice to implementation, with the aim of addressing deficiencies in the organization to enable better performance of operations (Afonina & Chalupsky, 2013). In other words, the orientation is to provide information on the acceptance of the cost aspect of the agribusiness business for the market and its compliance with the designed strategic intentions.

The theory and practice of research shows that there is a significant correlation between strategic management accounting with the strategy and management of the enterprise, and as methodical procedures they are related to the following areas of strategic management accounting (Gulin, 2011):

- specific cost calculations,
- planning, control and analysis of results,
- strategically edified business decisions,
- accounting of competitors, and
- accounting of customers.

For each of these areas, it consists of a number of methods and techniques.

a) Typical methods and techniques of specific cost calculations.

The following methods and techniques are most commonly applied within the area of specific cost calculations:

- calculation of process costs or accounting activities,
- calculation of specific product or service characteristics (attributes of costing),
- calculation of the cost of living (life-cycle costing),
- assessment of environmental impact in the product life (life-cycle assessment),
- quality cost calculation (quality costing),
- environmental cost calculation (eco costing),
- calculation of target costs (target costing) and
- calculation of value chain costs (value chain costing or activity based costing).

b) Typical methods and techniques for planning, controlling and analyzing results. Within the area of planning, control and analysis of results, the following methods and techniques are most commonly applied:

- analysis of its own results with the best competitor (benchmarking),
- theory of constraints,
- accounting of sales liquidity (throughput accounting) and
- integrated approach to evaluating results (integrated performance measurement).

The following methods and techniques are most commonly applied within the area of strategically oriented business decisions:

- strategic cost management(strategic costing or strategic cost management),
- strategic approach to income management (strategic pricing) and
- assessment of the financial effects of brand application (brand valuation).

c) Typical methods and techniques of accounting competitors. The following methods and techniques are most commonly applied within the field of accounting of competitors:

- competitor cost assessment,
- insurance accounting assumptions for collecting relevant information in the assessment of competing market strategy (competitive position monitoring) and
- competition position assessment (competitor performance appraisal).

d) Typical methods and techniques of accounting buyers. Within the field of customer accounting, the following methods and techniques are most often applied:

- customer profitability analysis or customer account profitability),
- profitability of target customers over several future periods (lifetime customer profitability analysis) and
- valuation of customers as assets.

In order for the result of the application of the following methods to provide value for the decision-maker in the business, the selected method procedure should be characterized by the following, according to FAROUT criteria (Fleisher & Bensoussan, 2003):

- Future orientation,
- Accuracy,
- Resource efficiency,
- Objectivity,
- Usefulness,
- Timeliness.

Failure to meet these criteria at a satisfactory level results from an analysis that does not value the decision-maker. That's the essence of using a FAROUT approach in the analysis process.

By applying these strategic accounting techniques, based on the "FAROUT" approach, and data generated from all legal and legitimate sources, accounting, but also from non-accounting reports and sources, management creates a platform and the ability to make rational strategic business decisions, set goals and formulate and implement business strategies. The essence of the outcome of the application of strategic managerial accounting methods are non-financial measures, monitoring of competitors and orientation to the organization's strategy. Therefore, strategic management accounting evaluates, analyzes and communicates financial and non-financial information that helps decision-making managers achieve the organization's goals (Horngren, 2012). Therefore, it is logical and necessary that today's accounting and accounting managers take an active part in processes that fundamentally transform the way business entities operate by directing them towards creating values (Malinić, 2021).

Goals and needs of users for business information

The aim of business information is to provide relevant information to different user groups to decide (Glautier, 1994):

1. *information on whether to buy, retain or sell an investment,*
2. *employees information on the stability and profitability of their employers,*
3. *information to creditors on whether their money (capital) and interest belonging to them will be returned on time,*
4. *information to suppliers about whether the amounts owed to them will be paid on time,*
5. *information on the continuity of agroenterprises.*

The objectives of user groups and their tasks imply different purposes of business reporting, which is conditional: the volume of needs and demand for information and their offer (Ziegenbein, 2008).

The need for information is made up of the type, quantity and quality of information (especially indicators) that users objectively need to fulfill their tasks "must-to-have" information. Determining the need for information comes from parsing the objectives and tasks of the users into pieces, and their content synthesis, from which the answering needs for information are identified.

The demand for information is expressed by users, subjectively determined by the following reasons: knowledge of the ability to obtain information is not complete, the imperative of innovation implies a frequent change in the need for information, the direction of intellectual or pragmatic nature, sense of prestige and security ("nice-to-have" information) due to the possession of not-so-necessary information, etc.

The offer of information consists of type, quantity and quality at a time of available information. The fact is that a large number of available data and their combinations from internal sources of agroenterprises, and that through internet and global digital networks are offered and that an even greater, vast number of quantitative and qualitative data is available, implying great possibilities, but also high costs..

The tendency to offer information about an agroenterprises constantly growing, which is not the case with demand for information that is changing rela-

tively slowly. This can be an advantage on the one hand, if a user with a high degree of knowledge is limited to several key information, and on the other hand a deficiency, because of the multitude of information users do not accept and consume all the information offering. This creates an information gap, i.e. a narrow throat in the supply of information that is caused less in the lack of information and more in the absence of time to study and read business reports.

Marking and character of key accounting information for the purposes and objectives of strategic business management

Management accounting, as part of the business information dystopia, provides information mainly of cost, in a way that managers will understand that they could make quality business decisions. In this activity, the controlling function incorporates accounting information and supplements with non-accounting information, and coordinates and integrates the activities of professional management support. The key importance of accounting information for management is:

1. planning, because in budgeting accountants are participating in quantitative expression or defining goals by managers,
2. reporting, because when reporting on the Performance report) accountants collect information, and by applying the feedback principle, to analyze the planned performance;
3. in organizing and managing, the accountant provides information for management on compliance of costs, prices and requirements of competing strategies, continuously and daily;
4. in decision-making, the accountant uses optimal methods for troubleshooting cost/use issues and informs managers about it.

Information provided to management must be purposeful and purposeful in the function of rational business decision-making. Information in modern living and working conditions is the basis of survival (Milojević, 2017). From the above request and the interests of the user of information, it is crucial to provide useful information that is relevant and reliable. While relevant information is characterized by an important impact on the decision, versus that, reliable information is characterized by a lack of material error.

For information to be reliable, it must be based on:

1. *neutrality,* which involves presenting information without prejudice, excluding any influence on the user;
2. *substances,* which means that the information reflects actual transactions and other events, and that it is presented in accordance with its substance and economic realities, not just in legal form;
3. *fully* within the materiality and costs, because omission causes the creation of false, incomplete and unreliable information in its relevance;
4. *experience* (practice) which represents a degree of caution in the assessment required in conditions of uncertainty.

Furthermore, it is important to note that the information is:

1. *comparable,* which implies the possibility of comparing (by content and time) reports within agrocompanies with the aim of identifying the trends and performance of agrocompanies, as well as comparisons between agrocompanies, which implies that agrocompanies include transactions in the same way; comparison does not mean uniformity;
2. *understandable,* which is a request to present understandable information to the user, taking into account his knowledge of business and economic activities and accounting, as well as his willingness to devote attention and time to studying the report.

The quality of information contributes to the increase in our knowledge of the functioning and conditions of the functioning of the agrocompany, and thus apostrophes the role of the managerial information system, which aims to ensure full and quality information in an accessible way for the relevant decision-making of all levels of governance, and in this case for the strategic level.

Conclusion

Accounting is applied science, so its concept is continuously evolved and redefined. The subsystem of the environment, in modern conditions, gains a primary role. The transformation of the accounting management system towards new perspectives, dimensions and tendencies, initiated by the knowledge factor as a source of competitive advantage, implies the need to develop the application of methods and accordingly, to novel the character of the information it provides. In other words, management accounting generates

relevant, reliable and timely information that forms the stationery for holistic business management.

In this sense, strategic accountants are most often used techniques for supplying information from the following areas: specific cost calculations, planning, control and analysis of results, strategically oriented business decisions, accounting of competitors and customer accounting.

Optimal selection and application of adequate techniques for subject areas enables accountants to access different information, which is necessary to select, in the appropriate format to provide management. Therefore, created and emerging, changes require accountants, professionals with the right balance between technical skills and width of knowledge that is in tune with the character of change.

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POTENTIALS FOR THE DEVELOPMENT OF AGRICULTURAL PRODUCTION IN THE AREA OF KLADOVO

Nataša Kljajić[1], Zorica Sredojević[2]

Abstract

The subject of research is climate, land and other natural resources in the Braničevo district, for the municipality of Kladovo. The aim of the research is to consider the natural potentials for intensifying and improving agricultural production. Climate parameters were analyzed: maximum, minimum and average temperature, air pressure, relative humidity, wind speed, insulation, precipitation, etc., soil types and water resources. Based on the established indicators of natural potentials, it is possible to predict and plan appropriate agricultural production, as well as to direct activities to avoid or mitigate potential risks and limitations.

Key words: *natural resources, agricultural production, Kladovo*

Introduction

Agricultural production is conditioned by multiple factors that directly or indirectly affect its intensity and effectiveness *(Kljajić & Popović, 2011; Kljajić et al., 2015).* Regardless of the increase in production weald in primary agricultural production as a result of breeding and improvement of cultivation technologies, viewed globally, climate change has a negative impact on overall world food production *(Morgounov et al., 2018).* Climate change is also having a negative impact on socio-economic aspects related to food production systems and safety, transport, demographic change and human behavior *(Tirado et al., 2010).* Climate indirectly affects the water regime of land under agricultural crops, their growth and yield per unit area. Drought stress in the last two decades has had negative consequences for overall agricultural production *(Janković & Kovačević, 2019).* Water use efficiency is the relationship between total dry matter and evapotranspiration.

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Water scarcity during the growing season is a significant limiting factor in achieving high and stable yields and quality *(Arsić et al., 2013)*. In the tissues of all life forms on Earth are from 50 to 80 % water.

Land, as one of the most important a natural resource is being improved, but it is also subject to negative changes. By introducing new varieties, hybrids, agrochemicals (i.e. plant protection products and mineral fertilizers), as well as agricultural machinery, while reducing the work involved, provides adequate yields. *Welch & Graham (1999)* point out that this system of production, despite the numerous benefits reflected in the increase in production, endangers the environment - salinization of the soil, concentration of toxic residues, pollution of water and air. Changes in soil are the primary factor that determines the absorption and accumulation of mineral elements in plants *(White & Broadley, 2009; Živanović et al., 2015).* To date, studies of cultivated plants do not provide reliable results on whether the root system of modern varieties is adapted to soil and environmental factors and whether it is necessary to make changes by breeding *(Zhu, 2019).*

Soil fertility is variable and depends on its physical, chemical and biological characteristics, as well as on climatic parameters, relief, proximity to rivers, applied agro-technical measures, etc. "Costs that address the issue of environmental liability, in some cases, exceed the value of the assets in many cases, so that their precise calculation requires determination of the ecological, physical, geological and hydro-geological characteristics of the site, as well as the type and quantity of harmful substances" *(Sredojević et al., 2019).* Accordingly, in these paper are analyze the natural potentials of the Kladovo area in the function of improving and further developing economically justified agricultural production.

Materials and Methods

In order to consider the climatic characteristics the municipality of Kladovo, the average monthly values of the basic climate parameters for the period 2010-2020 were analyzed years. Data from the main meteorological station "Negotin", which is located at an altitude of 42 m, were used, with coordinates: latitude 44 ° 14´ and longitude 19 ° 55´. Based on the data from Statistical Office of the Republic of Serbia (SORS), important indicators of agricultural production in the analyzed area were determined.

Results and Discussions

Climatic characteristics - Climate significantly affects the overall development of the economy and activities in an area. Systematic meteorological measurements lasting several decades enable a valid assessment of the current state of the climate as well as a comparison with previous periods. In the area of Kladovo, the climatic conditions are characterized by a typical continental character, with certain specifics. It is characterized by dry and warm summers with little precipitation, which significantly affects the reduction of yields in agriculture, and long and cold winters with snow cover since November. Starting from specific data, regularly registered in a longer period of observation and action of climate factors, the important features of the following climate parameters are considered (Table 1 i 2).

Table 1. Parameters of air pressure, temperature and relative humidity of the meteorological station of Negotin, 2010-2020.

Year	Air pressure (med, mb)	Air temperature (°C)			Relative humidity (medium, %)
		max	min	medium	
2010	1,008.9	17.2	7.7	12.2	72
2011	1,013.3	17.9	6.8	12.3	67
2012	1,011.1	18.9	7.5	13.2	64
2013	1,010.7	17.9	7.8	12.9	71
2014	1,011.2	17.4	8.5	12.7	77
2015	1,013.1	19.0	8.3	13.7	69
2016	1,011.8	18.4	8.1	13.1	71
2017	1,012.0	18.8	7.6	13.2	66
2018	1,011.4	18.6	8.3	13.1	73
2019	1,010.8	19.5	8.6	13.9	70
2020	1,012.1	19.2	8.4	13.7	69
Average	**1,011.5**	**18.4**	**8.0**	**13.1**	**69.9**

Source: Calculation based on data from meteorological yearbooks of Institute of Hydrometeorological of the Republic of Serbia, 2010-2020.

From the parameters, the following were analyzed: Maximum, minimum and average air temperature (T, ºC); Air pressure (mb); Relative humidity (RH,%); Wind speed, measured at 2 m above the ground (V, m / s); Insolation (n, time); Cloudiness (tenths), and Precipitation (P, mm). The average annual value of maximum temperature of air in the area of Kladovo is 18.4 ºC. Average annual value of minimum temperature of air is 8.0 ºC. Air pressure values range from 1,008.9 – 1,013.8 mb, while the average annual value is 1,011.5 mb. Relative humidity is

characterized by a certain regularity of phenomena that is inversely related to air temperature. Monthly values of relative humidity well follow the monthly values of air temperature, but in the opposite direction. The average annual value of relative humidity of the observed period for the area of Kladovo is 69.9%. The wind speed is in the range of 1.0-1.7 m / s, with the annual average being 1.5 m / s. Winds affect other climate parameters (air temperature, relative humidity, etc.), and also the soil, because they increase its evaporation. The average annual insolation in this area for the observed period is 2,270.1 hours. The average annual cloud cover is 4.8 / 10 of the sky. This area is characterized by an average annual rainfall of 680.1 mm. This amount of water sediment is unevenly distributed by seasons and months.

Table 2. Parameters of wind speed, insolation, clouds and precipitation of the meteorological station of Negotin, 2010-2020.

Year	Wind speed (medium, m/s)	Insolation (h)	Cloudy skies (medium, the number of days)	Precipitation (sum, mm)
2010	1.5	1,995.9	5.5	737.1
2011	1.5	2,497.8	4.2	352.4
2012	1.6	2,582.8	4.2	532.5
2013	1.5	2,220.1	4.9	700.1
2014	1.3	1,897.8	5.9	1,237.2
2015	1.5	2,353.0	4.5	732.1
2016	1.6	2,195.5	4.8	744.7
2017	1.7	2,364.2	4.5	565.5
2018	1.3	2,223.9	5.0	738.6
2019	1.4	2,333.4	4.6	569.3
2020	1.5	2,306.9	4.8	571.6
Average:	**1.5**	**2,270.1**	**4.8**	**680.1**

Source: Calculation based on data from meteorological yearbooks of Institute of Hydrometeorological of the Republic of Serbia, 2010-2020.

Land types - Of the total area of Kladovo, i.e. 62,628.33 ha, water areas occupy 3,634.67 ha (≈4%). Of all the represented soil types, there are the most luvisols and soils in leaching (≈37%, i.e. 23,314.53 ha), as well as eutric cambisol (≈28%, i.e. 17,351.18 ha). Calcomelanosols, syrosomes and lithosols on limestone are present in a slightly higher percentage (≈13% and 8,119.43 ha, respectively), while other soil types are present in a smaller percentage. Of the represented types of land, chernozems and alluvial deposits along the watercourses certainly have the greatest productive capacity, so it is possible to successfully cultivate field crops in this area.

Table 3. Land types in the area of Kladovo.

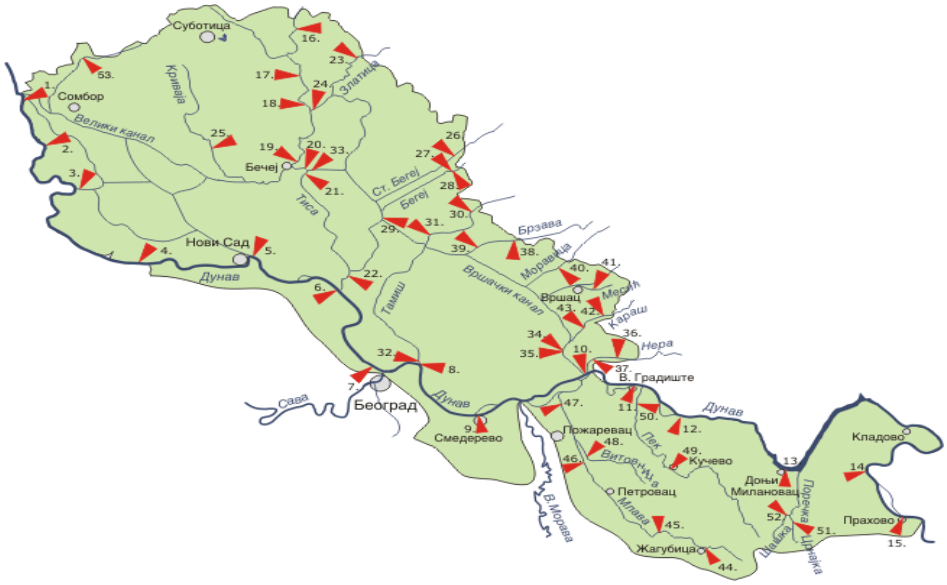
Land type	Surface area (ha)	Share (%)
Water surfaces	2,634.67	4.21
Arenosol and syrose on sand	1,316.82	2.10
Chernozem	1,112.68	1.78
District cambisol and occasional ranker	3,062.15	4.89
Eutric cambisol (grove)	17,351.18	27.70
Fluvisol	1,616.67	2.58
Humofluvisol	848.05	1.35
Humogley and eugley	343.00	0.55
Calcocambisol and calcomelanosol	1,541.93	2.46
Calcomelanosol, syrosome, lithosol on limestone	8,119.43	12.96
Colluvium	413.05	0.66
Luvisol and land in leaching	23,314.53	37.23
Pseudogley	532.74	0.85
Ranker, syrose, lithosol on sandstone, flysch and hornblend	241.11	0.38
Ranker, syrup, lithosol on shale and gnei	144.73	0.23
Ranker, syrup, lithosol on shale and gnei	35.58	0.06
Total:	62,628.33	100.00

Source: Possibilities for growing fast-growing energy crops from the aspect of availability of agricultural land in RS, UNDP, BG, 2017.

Groves and brown soils are very suitable for fruit and vineyard production. Pseudogley soils, as well as mineral-wetland soils can be adapted to agricultural production, with intensive drainage using horizontal pipe drainage, which is at the same time a prerequisite for the application of irrigation on these areas.

Water resources - The area of Kladovo is characterized by an extensive hydrographic network, with the Danube as a river of large water capacity. The construction of the hydroelectric power plant "Djerdap I" near Kladovo created the largest artificial lake in Serbia, the so-called Djerdap Lake. Thanks to the creation of this lake, the Danube became navigable through the Djerdap gorge. Apart from the Danube, in the area of Kladovo, of the larger watercourses, there are the Great River and the Podvrška River, which flow into the Danube, then a large number of springs, and several thermal springs, as well as a large number of streams. Watercourses are mostly torrential and belong to the basin of the right bank of the Danube. Given the connection with surface waters, groundwater is part of the total water resources of this area. Well water is less used in the lowland part of the Kladovo area, while in mountainous areas almost every household has its own well. The Danube basin in the territory of our country is shown in a Figure 1.

Figure 1. Danube River Basin.



Source: http://www.hidmet.gov.rs/ciril/hidrologija/povrsinske/sliv_dunav.php

Agricultural production - The number of farms in the municipality of Kladovo is 1,912, which is 17.02% of the total number of agricultural farms in the Bor area (Table 4).

Table 4. Number of agricultural holdings in the area of Kladovo, 2018.

Region/ Area / Indicator	Kladovo	Borska area	Southern and Eastern Serbia	Republic of Serbia
Number of households	1,921	11,285	164,802	564,541
Used field. land (ha)	12,165	78,611	719,997	3,475,894
Arable land and gardens (ha)	7,404	45,266	460,046	2,571,580
Orchards (ha)	165	1,384	50,908	182,923
Vineyards (ha)	189	1,101	7,472	20,466
Meadows and pastures (ha)	4,274	30,093	195,838	676,724
Other	133	767	5,733	24,201

Source: https://www.stat.gov.rs/

In 2018, there were 12,165 ha of used agricultural land in the territory of this municipality, of which arable land and gardens were represented on 7,404 ha, orchards on 165 ha, vineyards on 189 ha, meadows and pastures on 4,274 ha.

Areas under production of important crops in the municipality of Kladovo are: corn for grain on an area of 1,938 ha, cereals on 5,560 ha, legumes on 76 ha, potatoes on 26 ha, oilseed rape on 75 ha, sunflower on 1,138 ha, vegetables, melons and strawberries on 58 ha, fodder plants on 349 ha, and the rest on 4,178 ha (SBS, 2020) Vegetables, melons and strawberries are irrigated mostly, followed by sugar beets and legumes and other crops much less (Table 5).

Table 5. Grown plant Crops in the area of Kladovo, 2018.

Region/ Area / Species plant crops	Kladovo (ha)	Irrigated areas in Kladovo (%)	Borska area (ha)	Southern and Eastern Serbia (ha)	Republic of Serbia (ha)
Corn for grain	1,938	1.24	11,236	157,893	900,048
Cereals	5,560	0.54	32,044	334,278	1,702,829
Legumes	76	3.48	204	2,733	7,834
Potato	26	11.55	314	6,062	27,701
Sugar beet	0	0	2	49	44,898
Rapeseed oil	75	0	76	1,921	45,575
Sunflower	1,138	0	4,822	25,507	239,794
x*	58	98.01	966	11,898	50,107
Other	4,527	1.17	30,151	268,749	1,120,684

Source: https://www.stat.gov.rs (*Vegetables, melons and strawberries)

"Cost-benefit analysis is seen as one component of a broader assessment within integrated area management. In relation to the application of standard financial analysis, Cost-Benefit analysis also covers the social dimension" *(Sredojević & Gajić, 2020).* In the district of Southern and Eastern Serbia, in terms of the method of irrigating agricultural crops, dew is the most common, followed by dripping and finally surface irrigation (Table 6).

Table 6. Areas and their share according to the method of irrigation in the Southern and Eastern Serbia, 2018

Region / The way irrigation	Southern and Eastern Serbia		Republic of Serbia	
	Surface area (ha)	Share (%)	Surface area (ha)	Share (%)
Superficial	19	0.30	59	0.12
Sprinkling	5,048	79.96	43,253	92.30
By dripping	1,246	19.74	3,550	7.58
Total:	6,313	100.00	46,863	100.00

Source: https://data.stat.gov.rs/Home/Result/25010204?languageCode=sr-Cyr l

Simultaneously with the preparation of project documentation for the construction of irrigation systems, it is necessary to start organizing individual producers, future users of the system in the association of irrigation water users and their education in the direction of approaching market conditions. In that sense, PTK "Ključ" is suitable for operational involvement in the project as an "umbrella", i.e. the center of all activities in the process from organizing production in the conditions of irrigation, system maintenance, as well as to the placement of production. Thus organized individual producers would be able to develop high and quality plant production, diverse economic activities and ensure the economic stability of family farms.

Conclusion

The Kladovo area belongs to the climate zone temperate-continental climate, with of large temperature oscillations, extremely cold winters and warm summers. Problems that characterize agricultural production in the area are: a wide range of production of small quantities of products, financing of primary production, low productivity, improper quality management, technological inferiority to competition, as well as low level of knowledge in marketing. Hydromeliorative measures (irrigation and drainage) are still, to a small extent, represented in this area. When planning the spatial and functional organization of the area, one should take into account all natural resources that are important in the implementation of investments in agriculture. Given the favorable climatic conditions, the richness of water resources and land of good quality and production value, for the development of the Kladovo region, agricultural production should be intensified by introducing complex agro-technical measures.

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PERSPECTIVE FOR SUSTAINABLE DEVELOPMENT OF RURAL TOURISM IN THE MUNICIPALITY OF KLADOVO[1]

Predrag Vuković[2], Slavica Arsić[3]

Abstract

Municipality of Kladovo is located in Eastern part of the Republic of Serbia. It has huge potential for development different types of tourism products and to offer them to the market. The attitude is based on reach natural and anthropogenic potential tourist attractions that municipality of Kladovo poses and that can be put in the function of development tourism. In municipality of Kladovo exists 21 villages which have respectable potentials for development rural tourism. In some of them rural tourism have been starting to developing. For the reason that rural tourism is in initial phase it is important to follow the rules that science prescribe. One of them is sustainable development. That is in coordination with concept of rural tourism that cannot exist if it is not in correlation with local ambience and local community. The aim of the article is to show huge potential that municipality of Kladovo possess for development rural tourism. Also, in the article it would be shown possible tourist strategy and policy that can bring success on the market.

Key words: *sustainability, development, rural tourism, destination.*

Introduction

The most important economic resources in the municipality of Kladovo are managed by the state. These are the "Djerdap" hydroelectric power plant and the "Djerdap" National Park. However, if this fact is excluded and other significant economic potentials are considered, it is estimated that the primary

1 This paper is a result of the research conducted within the framework of the agreement of the implementation and funding of scientific-research work in 2021 made between the Institute of agricultural economics, Belgrade and the Ministry of Education, Science and Technological Development of the Republic of Serbia, the registered Agreement number: 451-03-9/2021-14/200009.

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and tertiary sectors of the economy, in addition to the evident weaknesses, are more developed than the secondary ones. They are the backbone of future economic development.

Tourism is seen as one of the promising economic branches of the future economic development of Kladovo. The attitude is based on the natural and social attractions that this municipality has.

Residents of the municipality recognized tourism as an opportunity to increase their income, so in a large part of the settlements in the municipality, tourism began to develop spontaneously. One of the promising types of tourism that is available is rural tourism.

Tourist attractions of the municipality of Kladovo

The Municipality of Kladovo has respectable natural and socio-historical, cultural (anthropogenic) resources for tourism development. The most important natural resources and at the same time tourist attractions on the territory of the Municipality are:

- National Park „Đerdap“;
- Gorge "*Kazan*" located in "*Djerdap Gorge*" on the Danube river;
- "*Belederijsky*" waterfall;
- Oasis of birds in „*Mala Vrbica*“;
- Hiking trails on „*Miroč*“ mauntain.

On the territory of the Municipality there is a rich cultural and historical, ie. anthropogenic heritage. The most important resources and at the same time tourist attractions of the area are:

- "*Trian's tablet*" carved on the carved rock above the "Djerdap gorge". It dates from 100-103 and was created by the Roman emperor Traian as a sign of marking the end of the military journey from Belgrade to Djerdap;
- "*Trian's Bridge*" and the fortress "*Pontes*" which are located near the village of Kostol, about 5 km from Kladovo. The bridge was built in the period from 103-105. The length of the bridge with portals was about 1,134 m;
- Fortress "Diana" built on the banks of the Danube, located near the village of Sip. It dates from the 1st century;

- Archaeological site "Glamija" located near the village of Ratkova. It is the highest military fortification located above the Danube River;
- Fortress "Fetislam" from 1524, which was built by the Turks. In translation, the name means "victory of Islam". It consists of a small town that was an artillery base, and an open amphitheater;
- Church "St. Đorđa "is located in Kladovo, built in 1735;
- Monastery "St. Trojice "from the 19th century is located above the village of Manastirica;
- "Stara Čaršija" (Old Bazaar) in Kladovo is protected by the Institute for the Protection of Cultural Monuments of Serbia as a spatial, cultural and historical (ambient) entity. In the "Old Bazaar" there are many trade, catering and other facilities of public importance, which is why it is the center of social life.
- The Archaeological Museum is located in Kladovo. It was founded in 1996.

Accommodation facilities in Kladovo which are important for the development of rural tourism

On the territory of the municipality of Kladovo, there is a large number of accommodation facilities that can meet the needs of increased tourist demand. It is characteristic that seasonality is expressed in their business, which is manifested by their occupancy in the summer months and insufficient utilization in the winter.

The share of the number of beds by individual municipalities in the Lower Danube region shows that the municipality of Kladovo is in first place with an average of 37.98%, followed by the municipalities of Majdanpek with 24.47% and Veliko Gradiste with 17.74%, etc.[4]

The development of accommodation capacities in the Municipality is a result of the presence of tourist attractions (natural and social) that generate tourist demand. However, it should be emphasized that not all types of tourist accommodation capacities have the same impact on the development of all types of tourism.

4 Master plan for development Lower Danube Rebion, (2007), Economic faculty, Universtiy of Belgrade, pp. 99.

a) Hotel accommodation capacities - The literature points out that despite the large number of accommodation units at their disposal, hotels make a small contribution to the development of rural tourism[5]. However, this does not necessarily mean that a rural tourism product cannot be created with tourists who would combine a hotel boarding house with a non-boarding rural tour offer. The role of management and the way in which they will create the so-called "Rural tourism experience". According to the capacities, the two largest accommodation hotel facilities in the municipality of Kladovo are the hotels "Aquastar Danube" and "Djerdap".

b) Camping - There are 2 (two) campsites on the territory of the municipality of Kladovo. These are the youth camp settlement "Karatash" in Kladovo and the camp "Miročka Voda" in the settlement Brza Palanka.

Roberts at al. (2016)[6] have attitude that camping in rural areas should be in the function of rural tourism development.

When it comes to the camping settlement "Karatash", it cannot be used for the development of rural tourism. However, the camping settlement "Miročka voda", which is located downstream from Kladovo, can certainly do that.

It is located on the banks of the Danube downstream 22 km from Kladovo.

Within the camp there are 80 camping units for tents and caravans, as well as 20 double bungalows. It is a kind of "oasis" on a well-kept sandy beach near the center of Brza Palanka. It is an ideal place for Danube lovers, scouts, campers, fishermen. It has a variety of facilities for recreation and the possibility of visiting beautiful natural attractions such as "Blederijski waterfall", hiking trails on Mount Miroč, Vratnjanski gates, etc. . There are also organized tours to tour the picturesque rural areas with numerous attractions of the National Park "Djerdap. Unlike the first campsite according to the criteria of thematic tours, this campsite can be included in the accommodation offer of rural tourism, because it meets the criteria defined by the OECD (1994)[7].

c) **Rural tourist households**. According to the Tourist Organization of Serbia,[8] Tourist organizations of Kladov accommodation capacities of rural tourism[9],

5 Greffe, X., (1994): "*Is Rural Torusim a Lever for Economic and Social Development*", Journal of Sustainable Tourism, Vol. 2. No.1&2, pp.22-40.

6 Lesley Roberts, Derek Hall, Mitchell Morag (2016), *New Directions in Rural Tourism,* Routledge, London, UK.

7 OECD (1994), Tourism Strategies and Rural Development, OCDE/GD(94)49, Organization for Economic Co-Operation And Development, Paris, 1994.

8 Publication «*Catalog of rural tourist households*» (2018), Tourist Organization of Serbia.

9 Tourist organization Kladovo, web. link: http://tookladovo.rs/ (accessed: 21.02.2021).

and the National Association "*Rural Tourism of Serbia*"[10] accommodation capacities of rural tourism, type "rural tourist household" are located in the villages: Velika Vrbica, Korbovo and Rečica.

- In the village of Korbovo, 18 km away from Kaladovo, there is a rural tourist household with a location on the Danube. It has good access for boats, yachts, kayaks, etc. The household organizes excursion tours around Kladovo with 2 boats and 1 yacht. It has a well-kept wine cellar and a hall with a capacity of up to 50 guests. From the accommodation capacities it has 2/2 rooms.[11]
- In the village of Velika Vrbica there is 1 rural tourist household which is 11 km away from Kladovo. It is categorized with 4 stars and has an ethno restaurant where tourists can consume specialties typical of the Lower Danube region.
- In the village of Recčica there is 1 rural tourist household categorized with 4 stars.[12]

Based on the data of the Municipal Administration during 2020, there was an increase in the interest of tourists to stay in rural areas in Kladovo, and from there consequently there was:

- increasing interest in rural tourism,
- increase of accommodation capacities and
- increase in the number of realized overnight stays.

However, due to the presence of the "COVID 19" virus, no records were kept, so this increase cannot be quantified.

The document "Master Plan for Sustainable Development of Rural Tourism of Serbia 2011" (p. 81) in the area of the Municipality suggests the rural ethno-zone in the villages of Podvrška, Petrovo Selo, Manastririca and Reka as important for the development of rural tourism.

It is emphasized that the villages are characterized by traditional architecture, customs and rituals that have been preserved to this day. Also, the folklore of the Serbian, Vlach and Romanian people has been preserved. These villages also have a rich offer of traditional cuisine.

10 Association "Rural Tourism of Serbia" - official representative of Serbia in the "European Federation of Rural Tourism" (EUROGITES), https://www.selo.rs/rs (accessed: 12.02.2021).
11 Owner Bogosav Popović (February 2021)
12 It is about the rural tourist household "Jović" (February 2021).

The assessment presented in this document is that there are no adequate capacities for the development of rural tourism, as well as that the number of visitors is not recorded. These villages also have a rich offer of traditional cuisine, which could affect the development of food tourism and so-called „event tourism“ or tourism “manifestation tourism”.

d) **Private accommodation.** Based on the data obtained from the Municipal Administration and the Tourist Organization of Kladovo, in recent years there has been a sharp expansion in the number of accommodation facilities in private accommodation. Hence the assessment that the municipality of Kladovo can meet the needs of increased tourist demand. Observed individually by settlements, the settlements of Kladovo and Tekija had the greatest expansion, but increased interest is also shown in other settlements in the municipality of Kladovo. The most important accommodation capacities on the territory of the municipality in private accommodation are presented in Table 1.

Table 1. Accommodation capacities in private accomodation in the municipality of Kladovo in 2021.

The settlement/village	Object/facilities type	The total number of facilities
Kladovo	Apartments	26
	House for rest	3
	Rooms for rent	8
Tekija	Apartments	4
	House for rest	2
	Rooms for rent	2
Kostol	Apartments	4
	House for rest	0
	Rooms for rent	0
Novi Sip	Apartments	1
	House for rest	1
	Rooms for rent	0
Ljubičevac	Apartments	0
	House for rest	0
	Rooms for rent	1

Source: Tourist Organization of Kladovo, http://tookladovo.rs/ (accessed on November 22, 2021.)

Note: Data obtained from the Tourist Organization of Kladovo are not fully compliant with the current “Rulebook on conditions and manner of performing catering activities, manner of providing catering services, classification of catering facilities and minimum technical conditions for arranging and equipping catering facilities” (Official Gazette of RS)., No. 48/2012 and 58/2016), have already been recorded as arriving from the field.

Based on the insight into Table 1 and the data obtained from the Tourist Organization of Kladovo, it can be seen that when it comes to private accommodation in:

- In *Kladovo* there are 26 apartments, 3 hose for rest and 8 rooms for rent. The facilities cannot be directly related to rural tourism, given the type of settlement and the character of the area.
- In *Tekija*, which is 22 km away from Kladovo, there are several types of accommodation facilities that can be used for the purpose of rural tourism development. The facilities are located near the river. It is about 4 apartments, 2 hose for rest and 2 rooms for rent.
- In the village of Kostol there are 4 apartments that are categorized into 2 and 3 stars.
- In the village of *Novi Sip*, accommodation facilities are located with 2 hosts. It is about 1 house for rest and 1 apartment.

Based on collected and presented data and facts:

- that in 4 villages in the municipality of Kladovo, the owners of rural farms have decided to actively engage in rural tourism (villages Korbovo, Velika Vrbica, Rečica, Novi Sip);
- that observed individually by villages, these are sporadic cases of dealing with rural tourism;

it can be concluded:

- that rural tourism in the municipality of Kladovo is in the initial phase of development;
- that in the period from 2016 to 2020 there was an increase in the number of farms that decided to engage in rural tourism (either as rural tourist households or in some of the emerging forms of private accommodation);
- rural tourism has so far developed spontaneously, without an appropriate strategy, plan and development program;
- In order for rural tourism to enter a higher stage of development, appropriate investments are needed, both by the state (direct investments or subsidies to rural households), but also by private entrepreneurs who would recognize the interest in the development of rural tourism.

Tourist traffic in the municipality of Kladovo

Table 2 shows the data on the movement of the number of tourists and their overnight stays in the last ten years.

Table 2. *Trends in the number of tourists and overnight stays in the municipality of Kladovo in the period 2010-2019.*

Years	Tourists			Overnight Stays			Average number of tourist overnights	
	Total	From Serbia	From abroad	Total	From Serbia	From abroad	From Serbia	From abroad
2010	30.542	28.158	2.384	85.855	80.310	5.545	2,9	2,3
2011	31.566	28.230	3.336	87.637	79.526	8.111	2,8	2,4
2012	25.524	22.875	2.649	66.972	60.657	6.315	2,7	2,4
2013	23.746	20.610	3.136	63.577	55.715	7.862	2,7	2,5
2014	16.050	13.293	2.757	39.102	30.757	8.345	2,3	3,0
2015	22.347	18.791	3.556	49.326	40.810	8.516	2,2	2,4
2016	25.651	21.719	3.932	50.187	42.219	7.968	1.9	2.0
2017	32.043	26.937	5.106	73.250	61.200	12.050	2,3	2,4
2018	33.126	26.978	6.148	75.092	60.781	14.311	2,3	2,3
2019	36.875	28462	8.413	79.758	64.296	15462	2,3	1,8

Source: Publication "Municipalities and Regions in the Republic of Serbia" for the period from 2014 to 2020.

Note: The Republic Bureau of Statistics monitors the movements of tourists without classifying them by types of tourism. Therefore, monitoring the dynamics of the number of tourists and their overnight stays in rural tourism is difficult.

It is noticeable that the number of tourists and overnight stays decreased in 2014, which is the result of heavy floods that were immanent to the whole of Serbia. Since 2015, there has been a continuous growth in the number of tourists and the number of overnight stays. In order to increase the competitiveness of Kaldov as a tourist destination, it is to raise the quality of tourist services and increase the number of accommodation capacities in rural tourism. First of all, by categorizing interested rural households.

As the representatives of LTO pointed out in the conversation, in recent years there has been a noticeable increase in the interest of local residents in engaging in rural tourism, which was initiated by the increase in tourist demand for living in the Lower Danube region.

Opportunities to improve the current situation in the tourism sector in the municipality of Kladovo in context of sustainable development

The Municipality of Kladovo as a tourist destination, viewed from the aspect of natural and social (anthropogenic) resources, having in mind the need to develop rural tourism as an individual, ie. the partial goals of its future development must include:

1) Greater orientation on modernization of existing and (if conditions are created), construction of new attractive accommodation capacities;

2) Investing in catering capacities and in promotional activities, emphasizing the tradition of rich local cuisine and local specialties;

3) Arrangement, adaptation and adjustment of numerous cultural and historical buildings to the needs of tourism;

4) Arrangement, adaptation and adjustment of religious buildings to the needs of tourism. It should be emphasized that in order to enable tourists to visit, the consent of the Serbian Orthodox Church is necessary, ie to harmonize the ways, rules and regulations of tourist visits, with religious rules, the principles of the so-called. religious canons.

5) As a possibility of valid use of the natural convenience of the location of Kladovo on the river is the construction of marinas, piers, etc., as well as all facilities related to the stay of tourists on the river (various sports and recreational activities, etc.);

6) Arrangement, adaptation and adaptation of numerous typical rural ambient units to the needs of tourism. In that respect, we have already started in the villages of Korbovo, Velika Vrbica, Rečica, and the tendency has continued. Potentials in the villages of Podvrška, Petrovo Selo, Manastirica and Reka, which have not yet been used, should also be used;

7) Investments related to the development of "wellness" tourism. Having in mind the preserved natural environment, the area of the municipality of Kladovo provides opportunities for the development of this increasingly popular type of tourism.

8) Use of all natural facilities for the development of tourism of special needs (hunting and fishing tourism, photo safaris, mountain and excursion tourism);

9) Use the advantages that Kladovo has for the development of transit tourism, relying on the potential provided by the road to Romania, the first-class state road I B-35 and the second-class state road II A-167; as well as the Danube River - European Corridor 7, international river waterway;

10) Take measures on the organizational and business connection of tourism, catering, trade, crafts, transport, agriculture, fisheries and other activities that form the tourist offer - an integral marketing approach.

One of the premises on which rural tourism is based is that development must not be to the detriment of the environment. *Lane* B. (1994, p.9.)[13] has attitude that there must be rurality in terms of volume, number of buildings and the number of settlements. For these reasons, routine tourism must be small. In other words, it must not disturb the original ambience due to which tourists visit rural areas.

Conclusion

Based on the analysis of data from the municipality of Kaldovo, a large number of natural and social resources can be seen that can help manage a large number of tourist products that can enrich the stay of tourists in rural areas. Modern tourists are looking for not only classic boarding house facilities, but also more. Today, the competition between tourist destinations is conducted primarily in the number of non-board facilities that can be offered to tourists.

It is the large number of resources (natural and social) that represent potential and current tourist attractions, that affects the management in creating the tourist offer. Residents of the municipality of Kladovo recognized the opportunities for the development of rural tourism. Today, it is in the initial phase of development. In other words, it develops spontaneously in places where there are objective conditions for its development.

- that rural tourism in the municipality of Kladovo is in the initial phase of development;
- that in the period from 2016 to 2020 there was an increase in the number of farms that decided to engage in rural tourism (either as rural tourist households or in some of the emerging forms of private accommodation);

13 Lane B., (1994): *"What is Rural Tourism"*, Journal of Sustainable Tourism, No. 1-2., Vol. 2., p. 9.

- rural tourism has so far developed spontaneously, without an appropriate strategy, plan and development program;
- In order for rural tourism to enter a higher stage of development, appropriate investments are needed, both by the state (direct investments or subsidies to rural households), but also by private entrepreneurs who would recognize the interest in the development of rural tourism.

In order to improve rural tourism, it is necessary to make appropriate investments and to move from the phase of spontaneous to the phase of purposeful development. Both the state and local entrepreneurs who will invest in the development of tourism must find their interest in that. One of the premises on which tourism is based is that it is just as efficient as investing in it. In this development, care must be taken not to disturb the local environment. This is all the more so because the municipality of Kladovo is partly located in one of the largest and most important National Parks in the Republic of Serbia. It is about "Djerdap". If all resources (natural, social, human) were connected and synergy was created, multiplied effects from tourism development could be expected.

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SOLAR ENERGY AS A RENEWABLE ENERGY SOURCE[1]

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Abstract

The amount of solar energy that reaches the surface of the Earth depends on the intensity of sunrays (which is in connection with the latitude) and the day length (depending on the season of the year), which on average is around 1000 W/m² a day. Which amounts are in question is indicated by the data showing that the annual amount of the solar energy that reaches the surface of the Earth is about 15000 times as great as the total annual needs of the world.

The last 15 years have recorded unbelievable progress made in increasing the use of solar energy over 50 times as great, especially so with installed powers of the photovoltaic technology. The progress made is, first of all, a consequence of the growth of ecological awareness throughout the world and the state support to the use of renewable energy sources. The contribution of price reduction and the efficiency of photovoltaic panels and the other electronic equipment used in solar energy production is not negligible at all.

Key words: *renewable energy sources, solar energy, photovoltaic systems, energy efficiency*

Introduction

All natural processes and phenomena can be explained by some of the known forms of energy: kinetic, potential, heat, gravitational, electromagnetic, chemical, nuclear and so on. All available energy on Earth originates from the three basic sources: the energy of the Sun (photosynthesis, water evaporation, airflow), the energy of the Earth (geothermal energy), and gravitational energy (ebb tide).

1 The result of the research conducted within the framework of the agreement of the implementation and funding of scientific-research work in 2021 made between the Belgrade Faculty of Agriculture and the Ministry of Education, Science and Technological Development of the Republic of Serbia, the registered Agreement number: 451-03-9/2021-14/200116.

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Given the time of their exhaustion, the primary energy sources are divided into renewable and nonrenewable. In renewable sources, energy is consumed at a speed not exceeding the speed of its creation in nature. Irrespective of the fact that nonrenewable energy sources were being created during thousands or millions of years, reserves are estimated to last only several tens or hundreds of years. It is exactly because they are rare in nature that nonrenewable energy sources will become expensive "luxury goods" in the future. The reserves of renewable energy sources are estimated to last for a few millions of years or to be permanent, as is the case with the energy of the Sun. The development of technologies for transforming energy into forms useful to humankind will lead to an ever-increasing use of renewable energy sources by the human civilization, such as the energy of the Sun, the energy of the wind, and geothermal energy.

The use of renewable energy sources is important for several reasons. First, they emit the zero or minimum amount of CO_2 to the atmosphere. Second, the greater share RESs have in total energy increases the energy stability of the electric-energy system of a country. Ultimately, third, lowering the costs of the installation of the systems for producing energy from renewable sources can be expected to lead RESs becoming economically competitive, especially so the energy of the wind, biomass energy and solar energy. The main obstacle to a greater competitiveness of these plants is their installation initial price. What share energy from renewable sources will have in the total energy production depends on the political will to invest in pure energy production plants and to strengthen the population's ecological awareness of the significance of producing energy from renewable sources for the population's living and health. The EU Directives have been imposing an obligation upon member states and those on their way to receive membership to have a share of at least 20% of energy from RESs by 2020. High incentives for the production and distribution of energy produced from RESs have also been envisaged for electric energy distribution operators.

In a direct or indirect way, the Sun "delivers" the Planet Earth several thousand times more energy than man's current needs for energy are at the present level of economic development. The mentioned indicates that, in the future, renewable energy sources have to be used considerably more as an energy alternative to fossil fuels.

The paper is aimed at pointing to the significance of renewable energy sources for humankind, bearing in mind the fact that nonrenewable energy sources

will be exhausted in the period to come and that they will become unavailable to the inhabitants of the Planet Earth. As a renewable and unexhaustive energy, the energy of the Sun is becoming the key focus of future research studies.

The different professional and scientific literature pertaining to the researched problem matter was consulted to determine the possibility of converting the energy of the Sun into the forms useful to humankind. Data taken from other authors, the domestic and foreign literature, and the Internet data, too, were also used in the research study.

Energy and the Economy

The papers written by the classics of economic thought (A. Smith, D. Ricardo) did not treat energy as one of the main production factors (the soil, labor and capital). They considered that, in order of significance, the soil, labor and capital were the main factors of the economic growth of every country. In later development, the organization and intellectual capital were also added to the economic production factors. Energy was not considered as an important factor of economic development. Because of not knowing the character of resources (non-exhaustion), it was considered then that man could use all resources from nature in unlimited quantities. Nature was even believed to be able to neutralize human-activity-generated waste disposal on its own. (Stern, 2010)

The energy crisis of the early 1970s refuted the theories of the classics of economic thought. In economic theory, energy became the subject matter of research, after which it was included in the basic factors of economic activities. Today, there are a large number of economic research studies related to the influence energy has both on the national economy and on the world economy. In its research studies, contemporary economic theory has established a connection realistically existing between energy, the economy and ecology (the so-called 3Es). A further step forward was also made, so the economies based upon non-renewable energy sources are considered as the main ones to blame for the increased pollution of the environment. Wishing to make a balance between the opposing economists' and ecologists' attitudes towards future economic development and the preservation of the environment, a sustainable development concept has been developed. The concept is implicative of a compromise between the speed of economic development and the preservation of the available natural resources that will remain available for generations to come to use them simultaneously maximally protecting the environment. Today's prosperity should not be built on the present

generations' increased exploitation of natural resources; the economic development that will leave the same number of natural resources as the present generations have at their disposal today should be promoted instead.

A strong correlation between energy, the economy and ecology has been confirmed through the green economy concept on the sustainability principle. Besides, the green economy has to solve new problems of nowadays, namely the shortage of food and drinking water, followed by the drastic pollution of the environment and the consequences provoked by climate change.

At the beginning of the 21st century, the issue of the rational energy use imposed itself. Instead of 3Es, the fourth component – energy efficiency was introduced, leading to the 4Es (energy, efficiency, the economy, ecology). Energy efficiency encompasses all the ways intended to ensure the same number of energy services with as few energy resources as possible. It is one of the two ways[4] to fight for the protection of the environment, i.e. the one way to have as low a greenhouse gas emission as possible. A more efficient use of energy would reduce the need for a greater energy production. According to the IEA[5], the improvements of energy efficiency in the fields requiring the most energy (buildings, industry, transportation) by the year 2050 might lead to a reduction in the global need for energy by the one-third of the present demand for energy. (Ilić et al., 2018).

Solar Radiation Energy Potentials

So far, solar radiation has been the biggest known resource of the energy that comes to the Earth. The amount of the Sun's energy emission is very stable, and its emission of energy during the fusion process is estimated to last for a period of yet about 5 billion years. Apart from the fact that, from the point of view of the amount of its energy, the energy of the Sun is unlimited, it only has a low percentage share in the total energy production in the world. Transformed energy forms, such as fossil fuels, biomass and hydro-energy (Graph 1) are much more in use today. The limitedness of certain energy resources, however, should not be neglected; the high pollution of the environment created by their use in primary energy production should not be neglected, either.

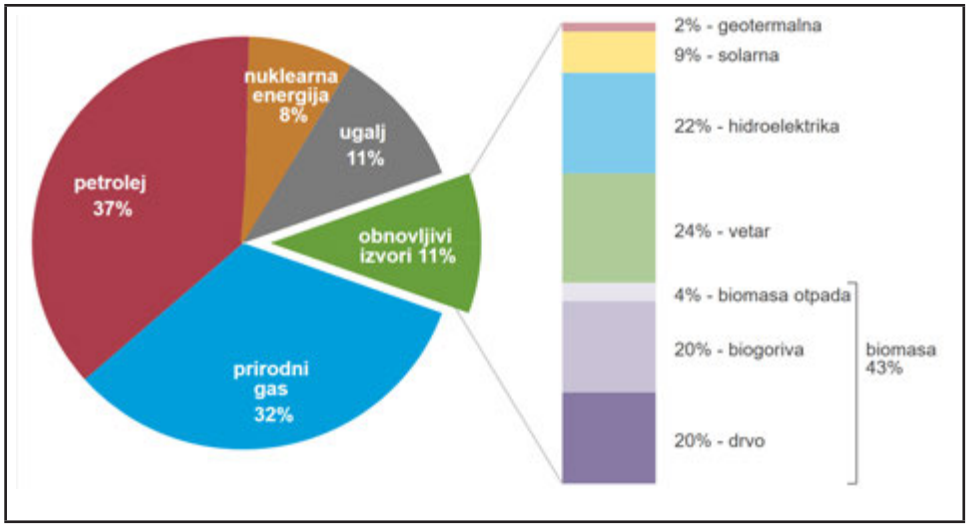
The energy of solar radiation on the surface of the Earth depends on the amount of the energy that comes to the Earth's surface and the angle at which sunrays fall. Climate conditions and the relief influence the amount of the solar energy that reaches

4 A greater use of RESs is the other way to fight for the preservation of the environment.

5 International Energy Agency (IEA).

the Earth. The angle of incidence under which sunrays fall on the Earth is determined by the season of the year and the latitude of the place on the Earth. Depending on the pollution degree of the atmosphere with particles, sunrays reflect against those particles on their way through the Earth's atmosphere and disperse, which reduces the amount of the energy reaching the Earth from the Sun. The smaller the angle of incidence of sunrays (i.e. the closer it is to the poles), the longer the path sunrays make, and the greater the dispersion. (Energy Efficiency & Renewable Energy)

Figure 1. The energy production structure.



Source: https://greenenergysolution.org/

The energy of the Sun is a consequence of the ongoing nuclear fusion in its heart under the influence of high temperature and pressure. The energy released in this process spreads into the universe in the form of electromagnetic radiation. Passing through the atmosphere, 1.5×10^9 TWh comes to the surface of the Earth. By reflection[6], about 30% of the energy is returned to the universe again, whereas 70% of the energy (i.e. 1.05×10^9 TWh) is absorbed on the Earth's surface. This amount is greater than the total coal and oil reserves taken together.

Only a small part of the energy of the Sun is directly used to produce energy through thermal collectors (heat energy) and photovoltaic panels (electric energy). One part of the Sun's energy transforms into indirect energy forms: biomass energy (the photosynthesis process), the energy of water (water evap-

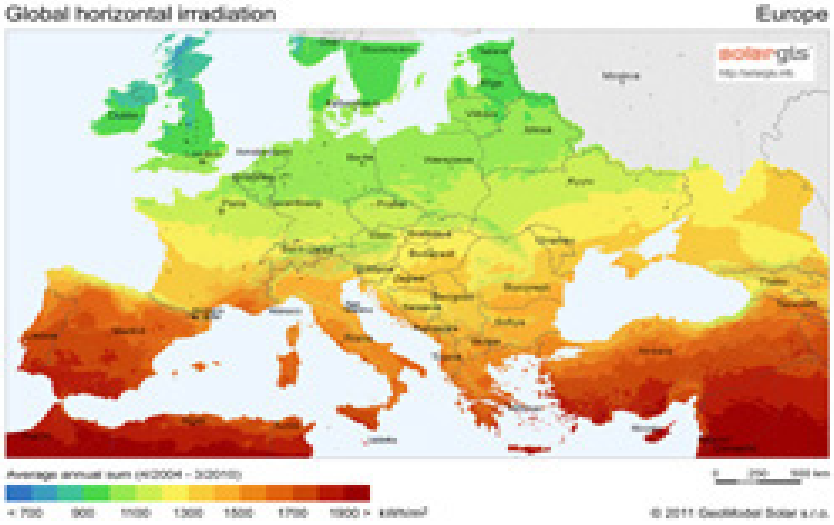
6 Clouds, atmospheric particles and the regions of the Earth's surface with more light, such as snow- and ice-covered regions.

oration and precipitation), the energy of the wind (airflow), and the energy of the waves (sea currents and waves).

Given the fact that the Earth goes around the Sun on the elliptical path, the distance depends on the season of the year. Because of that, the solar radiation power that reaches the surface of the Earth under the right angle during the year ranges in an interval[7] from 1307 to 1399 W/m^2. (Šljivac et al., 2007)

Based on the previously said, a conclusion might be drawn that the Sun's energy is the energy of the future. When using solar energy, however, there are a few problems which become a matter of relativization. Firstly, the energy of the Sun is quite a dispersed energy resource much fluctuating during the day and the year. For that reason, wide devices occupying a large space are needed to concentrate that energy and to convert it into electric energy. Simultaneously, the construction and maintenance of suchlike devices require the consumption of a great amount of conventional energy. Secondly, there is a great daily, seasonal, annual and meteorological fluctuation of solar radiation with a very low compatibility of solar energy production and consumption. Thirdly, a low degree of the conversion of the Sun's energy into electric energy has as a consequence a low degree of the device usefulness (Đorđević, 2008).

Figure 2. Global horizontal irradiation in Europe.



Source: https://www.solarnipaneli.org/

7 The mean value of the solar radiation power under the right angle (90°) in relation to the surface of the Earth is called the solar constant, which is 1367.7 W/m^2.

Further in the paper, the potentials of the energy of the Sun in Serbia are presented. The number of the solar radiation hours on the Serbian territory ranges between 1,500 and 2,200 per annum. The average solar radiation intensity is from 1.1 kWh/m2/day in the North to 1.7 kWh/m2/day in the South – during January, and from 5.9 to 6.6 kWh/m2/day – during July.

The average value of the radiation energy is from 1,200 kWh/m2/per annum in northeastern Serbia to 1,550 kWh/m2/per annum in southeastern Serbia, whereas it is around 1,400 kWh/m2/per annum in the country's central part[8].

Serbia has a considerably bigger number of solar radiation hours than the majority of the European countries, and the best conditions are in the southeastern part of the country.

Apart from the direct solar radiation coming to the Earth, the indirect effects of solar radiation, i.e. the effects of the solar energy passive application should not be neglected, either. It is based on the application of the construction elements and materials that are esthetically and functionally connected into one compact whole. In this manner, solar energy is collected and used without installing special mechanical or electric devices. Passive solar energy can be ensured in a few ways:

- by orienting a building southwards, with a 20-30^{o} deviation eastwards or westwards;
- by installing the eaves, mobile or fixed, which will prevent incoming sunrays in the summer from penetrating the building and enable those rays to penetrate the building in the winter;
- by installing the windows along the 60-90% of the southern façade of the building;
- by installing heat curtains on the windows used to protect from overheating and prevent from heat losses from the inside of the building;
- by means of the colors of the outside walls and the furniture inside the building;
- by installing the so-called heat absorption and storing Trombe[9] Wall;

8 https://www.energetskiportal.rs/obnovljivi-izvori-energije/energija-sunca/.

9 The Wall is usually made of bricks and concrete and is 20-40 cm thick. At a distance 2-10 cm in front of the Wall, glass is installed. In practice, two construction variants of the Trombe Wall are used: without openings and with openings at the base and the top of the wall.

- by constructing a glass terrace on the southern part of the building; it is usually combined with the Trombe Wall;
- the floor storing of heat is ensured by installing gravel under the building floor where heat is accumulated during the day and emitted during the night (Dragićević, 2010).

Solar Energy Use Benefits

Even though solar energy is unlimited and beside the option of applying the sustainable development concept in solar energy production, its use has both advantages and shortcomings in relation to the other renewable energy sources available to us. The fact that it will be available in unlimited amounts as long as there is the Sun (which is at least other 5 billion years according to scientists) is its basic advantage in relation to the other energy sources. The solar energy use significantly reduces the costs of electric energy production. The savings may even be greater if the surpluses of produced energy are delivered during the day, and the energy is consumed from the distribution system during the night, when the price for electric energy is considerably lower. An important segment of the advantages of using solar energy reflects in the low costs of solar system maintenance in the exploitation period. Solar panels have to be clean so that solar energy absorption can be as great as possible. The solar system exploitation period ranges from 20 to 25 years, and the period of the return of the capital invested in the construction of such solar systems is from 8 to 10 years, depending on the price and the amount of incentives for delivered energy. Given the fact that there are no mobile parts, the solar panel maintenance costs and the costs of their potential repairs in relation to the initial investments made are low during the exploitation period. The solar panel production price has been reduced in the last 15 years by more than 50%. The production technology in the solar industry is constantly developing thanks to innovations in quantum physics and nanotechnologies. New technology will increase the efficiency and outgoing power of solar panels in multiple ways. Thanks to easy portability and assembly on almost all surfaces, solar energy will find a way to be applied in the places where it is impossible to install or produce electric energy from other sources, especially the nonrenewable ones.

The shortcomings/deficiencies in the solar energy use are also worth mentioning. Until recently, solar panel production has been characterized by a high production price. A constant increase in solar system production, especially

in China, as well as their ever-increasing large-scale use in energy production will certainly exert an influence on a fall in these systems prices in a future period. The efficiency of solar systems drastically declines during the night, during change in the seasons of the year and worsening weather conditions. Because of the specificity of its production, solar energy has to immediately be utilized or stored in batteries which still impose a high cost of solar system construction. Batteries are charged with the surplus of the solar energy produced during the day only for the battery to be used later during the night, when there is zero or minimum solar energy production. The delivery of the surpluses of produced solar energy to electric energy distribution systems is a frequent practice during the day, whereas during the night the same is consumed from the electric grid. This is justified by greater energy consumption during the day in relation to energy consumption during the night. Bearing in mind the fact that the amount of produced solar energy proportionately depends on the solar panel size and the amount of the sunlight coming onto the panel, it is very often the case that panels occupy large spaces and have to be in the places which sunrays may uninterruptedly reach without barriers and shadows during the largest part of the day. Even though the environment pollution is insignificant in comparison with the other energy sources during the production of solar energy, solar energy production may yet be brought into connection with the pollution of the environment. This, however, is the indirect pollution that appears during the production, transportation and installation of solar systems. (Vierda, 2018).

Conclusion

In spite of the fact that the use of renewable energy sources contributes to a reduction in the pollution of the environment and climate stabilization, there is an impression that cheap and easily available renewable energy is insufficiently used. This specially works for solar energy. It is safe, unlimited, available everywhere and nonharmful for the environment. The solar radiation energy that reaches the surface of the Earth is sufficient to meet all the energy needs of the world population and economy.

Investments in research studies and the development of the production of photovoltaic systems with a high solar energy to electric energy conversion coefficient are being increased in the world today. China's inclusion in solar technology production and exploitation has led to a significant reduction in the price for photovoltaic and thermal system production. That will have an

influence on an increase in the competitiveness of solar energy production in relation to other producers of energy from renewable sources.

The significance of the production of energy from renewable sources is so much greater if we bear in mind the limitedness of the potential of conventional energy sources. Apart from this cognition, however, a more visible financial support on the state's part to a greater use of solar energy has been missing. A contribution to an increase in the use of renewable energy sources (the energy of the wind, the energy of water, the energy of the sun and biomass energy) is also the main goal of the European Commission's Energy and Transportation Department's energy policy. No less significant than financial support to a greater use of renewable energy sources are the media and public activities intended to increase an interest with the broad population in the significance and advantages of energy efficiency and the solar energy use.

In Serbia, which is known for its low rationality in energy consumption, it is necessary that the population's interest in and education on the significance and advantages of energy efficiency and the solar energy use should be increased. A special accent should be placed on the economic aspect and the influence on the preservation of the environment. It is also necessary that the population should be made more closely familiar with the benefits of installing solar panels to meet one's own needs for electric energy, especially so the influence on a drastic reduction in the electric energy bill.

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GREEN AGENDA FOR THE WESTERN BALKANS-GENERATOR OF SUSTAINABLE AGRICULTURAL DEVELOPMENT OF THE REGION

Svetozar Krstić[1]

Abstract

The European Union has decided to actively fight against climate change and environmental pollution. To that end, it adopted the Green European Agreement, which is becoming its key document in the fight against climate change. The EU is aware that it cannot act alone in this fight and that the most critical regions are in the immediate neighborhood. Therefore, it allocated funds and proposed to the leaders of the Western Balkans the adoption of the Green Agenda for the Western Balkans, accompanied by significant financial support. The Western Balkans region is extremely sensitive to climate change, because the region's economies are based on agriculture, forestry and tourism. Although the measures have not been elaborated in detail and the time frame for their implementation has not been specified, the conclusion is that the Green Agenda for the Western Balkans will be a generator of sustainable agricultural development in the region.

Key words: *agriculture, rural development, sustainability, climate, environment*

Introduction

The Western Balkans region includes five countries, Albania, Bosnia and Herzegovina, Montenegro, Serbia, Northern Macedonia and Kosovo according to UN Resolution 1244. It covers an area of about 208,000 km2 and about 18 million inhabitants. Although it is a spatially small region, it has a diverse climate, from subtropical climate around the Adriatic Sea to continental in parts of the Pannonia Basin and in hilly and mountainous areas. Such climatic diversity brings a very diverse flora and fauna of the region. The region is characterized by low-developed economies engaging the population in areas that are highly dependent on climate and climate change. The population is primarily engaged in agriculture, tourism, forestry and related services. These activities are the most sensitive and vulnerable to climate change. In recent decades, the Western Balkans have been

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committed to EU membership, Montenegro and Serbia are candidates for EU membership, and Albania and Northern Macedonia expect EU decision-making on the start of membership negotiations, while Bosnia and Herzegovina and Kosovo under Resolution 1244 still do not have a likely timeframe for the start of EU membership negotiations. The characteristics of the countries in the region are the lack of financial resources, activities to attract foreign investment and the focus on increasing GDP through the improvement of the services sector, energy supply. Despite the political commitment, no great results were achieved precisely due to the lack of financial resources, but also coordinated regional actions.

European Green Agreement

On December 11, 2019, the European Commission presented the European Green Agreement. In drafting this document, the European Commission started from the goal of turning a burning problem into a development opportunity for Europe. It also started from its own responsibility to take responsibility as the most developed part of the world in the fight against climate change and environmental protection, which will be in the function of better health of European citizens and preservation of natural capital. The European Green Plan is a set of policies and measures that are in the function of achieving the goal of making the European Union climate neutral by 2050. The European Commission supports decarburization efforts at the international level by strengthening diplomatic activity with Member States, with a strong commitment to ensuring that compliance with the Paris Agreement is essential for all future trade agreements. The central idea of the European Green Plan is to show that decarburization is possible in the world, not just in the European Union, and that solutions for decarburization can be very different. The European Green Agreement document also sets out a strategy for establishing a fair, healthy and environmentally safe food system[2]. It is stated that providing food for the world's population is a demanding process, and that food production pollutes water, land, air, as well as throwing huge amounts of food. Unhealthy food causes obesity, and impairs the health of the population. The application of new scientific achievements and new technologies will contribute to better meeting the needs of citizens for food. The main actors in the transition to agriculture and food production should be farmers and fishermen. Member States' national strategic plans are expected to be aligned with the European Green Agreement. the principles and objectives of the European Green Agreement will be implemented in strategic plans. To achieve the planned, the European

2 A European Green Deal, European Commission, final version, Brussels, 11.12.2019.

Commission will allocate at least 40% of the total budget for agriculture in the budget. The implementation of the strategy "from the field to the table" will also contribute to achieving the goals of the circular economy. The European Commission pointed out in the European Green Plan, among other things, that measures that will be effective for the energy transition. This was also the key motive for proposing the Green Agenda for the Western Balkans.

Green Agenda for the Western Balkans

The European Commission has prepared a Green Agenda for the Western Balkans, with the aim of using significant renewable energy resources, strengthening and expanding regional cooperation, to improve the health of citizens of the Western Balkans and the environment, and to significantly support the circular economy. At several rallies, the leaders of the Western Balkans supported the commitment of the countries of the region to active support and contribution to the realization of the EU Green Agenda and its implementation in the Western Balkans. Ministerial conferences were held in Podgorica in 2016, Bonn in 2017 and Skopje in 2018, at the convocation of the Regional Cooperation Council. It is important to emphasize the summit of the Berlin Process in Poznan in 2019 and the Zagreb Declaration of May 6, 2020, where the prominent role of the Western Balkans in achieving the EU Green Agenda and contribution to the fight against climate change and environmental protection was agreed with EU leaders. The leaders of the Western Balkan countries adopted the Declaration on a Green Agenda for the Western Balkans[3] at a conference in Sofia on November 10, 2020, held as part of the Berlin Process initiative. The declaration states that they accept the European Green Agreement, a new EU growth strategy that aims at a modern, climate-neutral and competitive economy that uses resources efficiently. The Declaration states the need to establish a basis on which to transform the needs and challenges of the Western Balkans regarding sustainability into opportunities through the implementation of the European Green Agreement in all related sectors. It also expresses its readiness to achieve compliance with measures to combat climate change and environmental protection, energy policies and goals set by the Paris Agreement as soon as possible. The readiness to continue supporting the Green Agenda is clearly expressed, as well as to contribute to its realization in the use of economic opportunities brought by green transformation, consistent application of the circular economy and consistent

3 Sofia Declaration on the Green Agenda for the Western Balkans, Regional Cooperation Council, Sarajevo, 10. November 2020

fight against climate change. The leaders of the Western Balkan countries expressed unequivocal support and readiness to make concrete contributions to the coordinated development of a greener and economically more prosperous region. The full commitment to the implementation of the Green Agenda for the Western Balkans in five pillars was also stated, as follows:

1. Climate, energy, mobility
2. Circular economy
3. Pollution reduction
4. Sustainable agriculture
5. Biodiversity

The goals set for the region are very ambitious. Achieving these ambitious goals in an efficient and sustainable way requires much greater coordination of the region and joint action. Therefore, the leaders especially expressed their readiness for

- improving cross-sectoral governance and supporting the integration of green low-carbon transformation
- development of programs and taking all necessary measures to raise administrative capacity for the implementation of the Green Agenda for the Western Balkans
- active participation in various pan-European networks, such as Horizon 2020, regional organizations, macro-regional strategies and other forms of joint action
- development of plans for activities specific to a particular economy and regional awareness-raising activities in all five pillars, as well as the reflection of the Green Agenda in the reforms of the education system
- inviting the Regional Cooperation Council, together with other relevant organizations and relevant institutions of the Western Balkan economies in charge of policies covered by the Green Agenda for the Western Balkans, to harmonize the preparation of the action plan with the implementation plan of this declaration and establish an effective and efficient monitoring system.

To implement these measures, the European Commission has adopted a European Investment Plan for the Western Balkans. The plan envisions an investment package of about 30 billion Euros, of which it has determined 9 billion Euros from the IPA 3 fund for the period 2021-2027. in the Economic and

Investment Plan for the Western Balkans region, as grants. The main areas for investment are sustainable transport, clean energy, environment and climate, digital future, human capital and the private sector. The investment potential of the Western Balkans would also be strengthened by launching a new Western Balkans Guarantee Facility, to launch 20 billion Euros in investments.[4] Sectors for investment have also been identified, including renewable energy, abandonment of coal use, renovation to increase energy efficiency, waste and wastewater management. As a rule, these are projects that have already been confirmed in the European Union in the same or similar form. The European Union has announced that it will make 1.1 billion Euros available by the end of 2021 for the implementation of the European Investment Plan for the Western Balkans region. The document emphasizes the need to invest in food safety, animal welfare and the transition to sustainable food systems. Also, in the process of joining the EU, it will be necessary for the countries of the Western Balkans to harmonize with the acquis Communautaire in the field of food safety, as well as with the strategy "from the field to the table". In the part of the document that talks about the closer integration of the Western Balkans with the EU, it is planned to encourage trade in agricultural products, including processed products, in in accordance with the sanitary and Phyto-sanitary requirements of the EU, through the Integrated Management System for Official Controls. Support integration into relevant EU systems such as TRACES, RASFF, Europhyt, AAC and cooperate in the fight against animal diseases and antimicrobial resistance.[5] The guidelines for the implementation of the Green Agenda for the Western Balkans are essentially a draft of potential measures and activities related to the Green Agenda, which would be a platform for measures and activities to be jointly adopted by the European Union and partners in the region. key areas identified in the European Green Plan. The President of the European Commission, Ursula von de Leyen, during the presentation of the Action Plan and guidelines, pointed out that Serbia should be helped to improve wastewater management, so that the Danube can be clean all the way to the Black Sea. The countries of the Western Balkans have an obligation to declare energy and climate targets in line with the European Union's targets to reduce greenhouse gas emissions by 55% by the end of the decade, as well as other targets in these areas.[6]

4 Economic and investments plan for WB, p.7.

5 An Economic and Investment Plan for the Western Balkans {COM(2020) 641 final} p 21.

6 Leaders Declaration from Brdo, Slovenia, 06. 10.2021 Regional Cooperation Council, Sarajevo

Action plan for the implementation of the Sofia Declaration

In Slovenia, at the EU-Western Balkans summit on Brdo on October 6, 2021, the Action Plan for the Green Agenda for the Western Balkans was adopted. For the period until 2030, the most important parts are related to the collection of greenhouse gas emissions, plans for the phasing out of coal use, regional integration, pollution control and environmental protection. On October 4, 2021, the Regional Cooperation Council in Sarajevo published an Action Plan for the implementation of the Sofia Declaration on the Green Agenda for the Western Balkans. The aim of this document is to translate statements into concrete actions. According to the text, detailed consultations were held with representatives of the governments of the region, the EU Commission and other EU bodies, representatives of civil society and stakeholders. measure. The plan also established a framework for coordinating and supporting the proper implementation and monitoring of the progress of measures. The plan emphasizes that the greatest responsibility for the implementation of the plan lies with the authorities in the countries of the region and with inter-sectoral and inter-institutional cooperation. Related documents and policies of the EU and the Western Balkans were taken into account in creating the plan. This part of the Action plan sets an indicative timeframe for each commitment of the Sofia declaration and identifies the main regional coordinators; the plan also established a framework for coordinating and supporting the proper implementation and monitoring of the progress of measures. The plan emphasizes that the greatest responsibility for the implementation of the plan lies with the authorities in the countries of the region and with inter-sectoral and inter-institutional cooperation. In creating the plan, account was taken of related documents and policies of the EU and the Western Balkans. On 30 September, 18 civil society organizations sent a let sought clear deadlines for implementing and specifying and defining tasks. Related documents and policies of the EU and the Western Balkans were taken into account in creating the plan. An indicative timeframe for each commitment of the Sofia Declaration and the main regional coordinators, support organizations and relevant structures have been established in the Action Plan section. A time frame has been developed for all five pillars, also for sustainable agriculture. The action plan envisages 58 measures, of which seven measures are dedicated to sustainable agriculture.er to the RCC and DGNEAR requesting improvements and enhancements. First of all, they are sought clear deadlines for implementing and specifying and defining tasks.[7] Re-

7 www,bankwatch.org/blog/ The Western Balkan Green Agenda Action Plan; Quantity over quality

lated documents and policies of the EU and the Western Balkans were taken into account in creating the plan. An indicative timeframe for each commitment of the Sofia Declaration and the main regional coordinators, support organizations and relevant structures have been established in the Action Plan section. A time frame has been developed for all five pillars, also for sustainable agriculture. The action plan envisages 58 measures, of which seven measures are dedicated to sustainable agriculture.

Overview of measures for sustainable agriculture in the action plan

Action	Chief Regional Coordinator	Timeframe	Comment
44. Align agricultural- food sector and sector primary production with the EU food safety standards, plant and animal health and theirs welfare and environment, and solving waste fertilizers and waste management.	SWG RRD	2026.	Continuous improvement by 2030
45. Strengthen official sanitary supervision traceability and labeling of food product.	SWG RRD	2027	Continuous improvement by 2030
46. promote organic farming I environmentally friendly, with reduction synthetic-chemical products that are used in production	SWG RRD	2026	Continuous improvement by 2030
47. Cooperation with scientific, educational business, agricultural entities to promote transfer and innovation,	SWG RRD	2026	Continuous improvement by 2030
48. Arranging action to reduce waste in rural and coastal areas	SWG RRD	2030	Waste anagement requirements significant finances tion and implementation targeted measures

49. Strengthen efforts for sustainable Development rural areas through implementation in Leader program	SWG RRD	2026	Continuous improvement by 2030	
50. Support for investments in renewable energy production and technology as well as reducing GHG emissions and measures adaptation to climate change in agriculture,[8]	SWG RRD	EnCS 2027	Continuous improvement by 2030	

From the observed measures, it can be seen that the measures are generalized and that there are no precise deadlines for implementation. Also, there is no indication of the elaboration of any individual measures, by priorities. It could be concluded that no sanctions are envisaged for non-implementation of measures. measures that have the greatest impact on pollution and human health.

Agriculture and rural development are one of the most important sectors in terms of overall development. In the countries of the Western Balkans region, this is even more pronounced given the importance of agriculture in their economies. When we talk about agriculture and rural development in the Western Balkans, we cannot ignore the attachment of societies to rural areas. Due to the special importance of rural areas, this field of action is perhaps the most sustainable of all five pillars. Greening agriculture increases the efficiency in the use of resources, improves protection natural resources and reduces the negative impact of farming, increases the resilience of communities, as well as the participation of mitigation due to climate change. Greening agriculture increases resources and productivity, increases opportunities for increased and new incomes, and improves the quality of life in rural areas. Raising the quality of life in rural regions can be crucial, because all the countries of the Western Balkans are facing the depopulation of villages and rural areas. This is so large that it is an obstacle to the further development of the economies of the Western Balkans. Organic agriculture represents the future and the backbone of green agriculture, which is also accepted in the documents accompanying the Green Agenda. However, organic agriculture requires even greater participation of living labor than conventional. Therefore, we are in danger that even the best agricultural program cannot be implemented due to the lack of labor force in rural areas. Emptying rural areas

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brings with it a security problem, but also makes it difficult to maintain existing infrastructure and use natural resources from those areas. The implementation of these measures related to sustainable agriculture is the most sensitive segment of all, precisely because of the need to ensure the economic development of rural areas while ensuring the preservation of environmental protection. Therefore, these measures require extensive elaboration and constant coordination with other segments that affect the development of rural areas, such as transport and environmental construction, for example.

The action plan for the implementation of the Sofia Declaration on the Green Agenda for the Western Balkans in the part two Roadmaps for the implementation in sustainable agriculture also envisages the establishment of a Regional Expert Advisory Working Group to harmonize activities and reform practices in the agricultural sector that ensures compatibility between organic farming and land management. REAWGs would be composed of important stakeholder representatives, ministries, important institutions, institutes, faculties, NGOs. We distinguish two types of REAWG. namely REAWG organic which promotes organic agriculture and farming reducing the use of chemical pesticides and other pollutants and REAWG soil, which aims to establish a regional partnership to improve knowledge and identify and implement best practices to protect land from degradation and pollution.

The need for more significant than before cooperation with scientific institutions, educational institutions, agricultural companies and other representatives of the business community to accelerate the transition to innovative technologies and eco-friendly technologies, as well as farming methods that will be applied through knowledge transfer and innovation structures in the Western Balkans, based on the regional Agricultural Knowledge and Innovation System-AKIS. This activity would continue with the establishment and development of the AKIS REAWG regional innovation network, which would enable and accelerate the transfer of innovative and eco-friendly technologies and farming methods. Membership in this working body would consist of representatives of ministries, scientists in the field of agriculture, food and innovation policies, as well as representatives of private regional, but also from the EU, champions and leaders in innovation in the field of agriculture and food. The regional AKIS REAWG is expected to contribute to the definition and introduction of new education programs, both formal and non-formal, with a strong focus on research, innovation, development and digitalization in agriculture. The new program should include practical training that is in line with future market needs. Standing Working

Group on Regional Rural The Development-SWG RRD will also encourage increased renewable energy production and investment in relevant technologies through the promotion of relevant IPARD and IPARD-like measures in the Western Balkans where such measures exist. The aim of the REAWG is to enable the transfer of knowledge according to EU standards, increase awareness and networking on technical assistance and training measures, as well as capacity building of administration and beneficiaries to improve the possibility of accepting funds and compliance with EU measures.[9]

Conclusions

- Time frame for the application of measures is widely set. When it is taken into account that most of the measures are listed only in outline, without specifying the content of the details, then there is a danger that the action plan set in this way will be difficult to implement. This is especially true, given the proverbial commotion that characterizes the countries of the region. We are aware that it was necessary to act quickly politically, in order to include the Western Balkans in the European Green Agreement and assess that it is much more important for leaders to decide to support and implement the values of the European Green Agreement. It is proposed that the plans be supplemented with elaborated content of measures and a precise time frame. This would make it easier to monitor and evaluate what has been achieved.

- The issues addressed by the Green Agenda for the Western Balkans are by their nature beyond the political options and are issues of importance to all citizens of the region. Therefore, it would be necessary to guarantee the participation of the non-governmental sector, professional public and science in the implementation of measures from the Green Agenda for the Western Balkans, through the education of bodies that would include civil society, scientific and professional public to monitor each measure. at the level of the countries of the region, but also one such body at the level of the region for the purpose of monitoring the implementation of measures in the entire region.

9 Guidelines for the Implementation of the Green Agenda for the Western Balkans Accompanying the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions An Economic and Investment Plan for the Western Balkans {COM(2020) 641 final

- Introduction of a system of continuous consultation process by sectors, including agriculture, with the obligatory involvement of representatives of NGOs, civil society, business associations, professional organizations, universities and institutes, by fostering such a model of consultation that encourages different opinions and consideration of different ideas and testing their feasibility. It is especially necessary to ensure consultations and participation of civil society representatives at the national level, as in the Western Balkans the culture of dialogue and participation of civil society in public policy making is not yet developed. areas. They know best what the region needs and what needs to be emphasized. The perspective of officials who are the authors of such documents and the people to whom the documents and measures referred to in practice refer are usually completely different. Given the extent to which measures are generalized, as well as the fact that things in these areas are changing at a very rapid pace, this type of consultation could contribute to better achieving the goals set by the Green Agenda for the Western Balkans.

- In addition to the identified weaknesses in the design of measures, their insufficient elaboration and specifying the time frame for their implementation, it can be concluded that the implementation of the Green Agenda for the Western Balkans will encourage and accelerate sustainable development of agriculture and rural areas in the Western Balkans.

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EU-28 FARM SUSTAINABILITY ASSESSMENT THROUGH DATA ENVELOPMENT ANALYSIS OPTIMIZATION

Veselin Krustev[1], *Bozhura Fidanska*[2]

Abstract

The various main emphases regarding sustainability in agriculture are clarified and summarized in a broader definition, according to which conceptually agriculture should be economically efficient, environmentally compatible and socially responsible. As a result of the accession of every Member State of the EU, its agricultural holdings have been undergoing a significant transformation. This reflects on the economic size and furthermore on the farms sustainability. This study aims to find out and analyze the connection and characteristics between the economic size of farms and changes in the sustainability and to illustrate the EU differences between member states. In order to handle the complication in evaluation of sustainability, recently many studies have been focused on the construction of a composite sustainability indicator using an optimization modelling. The elaborated and used approach for evaluating sustainability is the technical sustainability method, as a multi-criteria group of indicators are selected covering the three main pillars of the concept. The DEA model is an instrument that facilitates the implementation of the technical assessment of sustainability, normalizing the primary data and figures and ranging the countries depending on predefined criteria, which might be used as a technical sustainability scoring. The data for carrying out the analysis is the FADN, which allows to compare the member states due to harmonized and common applied indicators through a certain time period. The issue of sustainability is an important concept, which significance enhances the new goals of the EU and the world society to reduce the greenhouse emission and to undertake more measures for environmental protection. It will directly affect the agricultural holdings, which may receive subsidies for the foregone costs and actions to contribute to these goals or be forced and regulated to comply. The EU funding requires the EU farms to be market-oriented and to be actual farming units, which might exclude some

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of those holdings that fulfill the environmental friendly practices but are set aside from subsidy schemes.

Key words: *Agricultural Holdings, Sustainability, Technical Sustainability Assessment*

Introduction

The multidimensional concept of sustainability includes ecological, social and economic objectives. From the contemporary point of view, the ecological plays the key role. Measuring sustainability involves basic indicators, which often do not support each other and there appears the necessity of building a composite sustainability indicator. Data Envelopment Analysis (DEA) approach facilitates the estimation of farm sustainability and provides information for policy-makers who aim to increase the sustainability and "greening" of the agriculture. The most papers dedicated to sustainability assessment are focused on eco-environmental component and so in this paper we evaluate sustainability through the technical efficiency of the main detrimental production factors, intensification level and the wellbeing of a holding based on their costs.

Methodology

The farm sustainability is estimated using input oriented DEA model under the constant returns to scale (CRS) setting. Technical efficiency scores are computed for the EU sample of farms taken from the FADN survey for the period from 2007 to 2019. 15 categories of variables were used, which compete each other through the years altogether:

Economic indicators (EUR): gross output (EUR), total value of the assets (EUR), animal intensity coefficient – gross livestock output per livestock unit, utilized agricultural area (ha) and labour input (AWUs).

Detrimental inputs (pollutants) in the form of undesirable inputs which usage creates the negative effects – the costs of fertilizers (EUR), pesticides (EUR) and energy – fuel, lubricants and other (EUR) were used. Additionally, as environmental indicators, were used stocking density and percentage of protein crops in the crop rotation.

As social indicators – family farm income per family working unit (EUR), the paid wages per paid working unit (EUR), the total gross farm income (EUR), the total domestic farm consumption (EUR) and own produced production factors (EUR).

Charnes A. et al. (1978) define DEA as "a nonparametric method for the estimation of production frontiers" In this study the "Benefit-of-the-doubt" DEA approach was applied, using 15 indicators simultaneously in order to calculate sustainability. These indicators were used in the model as outputs and as input was used one and every pillar assessments as outputs were used 5 indicators. Calculations were made including all the years together.

When DEA was initially invented in 1996, it was commonly used as technical efficiency tool, but also can be adjusted as a sustainability assessment as many authors do this in the most of the continents.

DEA creates virtual producer on the production border combining the most efficient decision making units (DMUs) in the sample (2007-2019) so there is a possibility none of them to be a hundred present efficient (sustainable) as well as several units to present the greatest results. Every other score computed by the program is presented as a coefficient according to the distance from the best indicators combination between 0 - 1.

The wide DEA's application "stems from its relative lack of assumptions, ability to benchmark multi-dimensional inputs and outputs as well as computational ease owing to it being expressible as a linear program, despite aiming to calculate efficiency ratios" (Cooper W et al., 2011).

The solution of the DEA model, when one input and one output are included, is traditional and easy. It is the ratio of output to input. The model is complicated when more outputs and inputs are used. Charnes A et al. (1978) in their basic DEA model (CCR) define the objective function to find the efficiency of DMU (hj) as:

$$max\ h_j = \frac{\sum_{r=1}^{s} u_r y_{rj}}{\sum_{y=1}^{m} v_i x_{ij}} \leq 1 \quad j = 1,\ldots\ldots, n$$

$$u_r v_i \geq 0, \qquad r = 1,\ldots\ldots, s \qquad i = 1,\ldots\ldots, m$$

The outputs y_{rj} and inputs x_{ij} of the j^{th} DMU are positive and the u_r and $\upsilon_i \geq 0$ are the variable weights, determined by the solution of the DEA model.

The efficiency score h_j is sought to be maximized, under the constraints that using those weights on each DMU_j j=1,.., n. The efficiency score does not exceed one. For linear optimization in the input-oriented DEA model, the sum

of outputs is constrained to a fixed value, while in the output-oriented model the subject of constraint is the sum of inputs.

All the indices calculated by DEA represent independent estimations of different number of variables. No average values were presented, except the EU coefficients.

Economic Size of the EU Holdings 2007-2019.

According to the European Commission data of the Standard Output coefficients, the economic size of the EU farms is slightly but permanently increasing such as the economic size threshold for including a holding into the Farm Accountancy Data Network sample. The only exception according to the threshold are Finland and Croatia. Only Malta has decreased it. This increase is accompanied by decrease of the holdings number. The average increasing rate (2007-2019) for EU is 63% as the biggest is Bulgaria – 314% and the smallest is Greece - 22%. Croatia has only 2% but for shorter period – from 2013 when the country became a member-state.

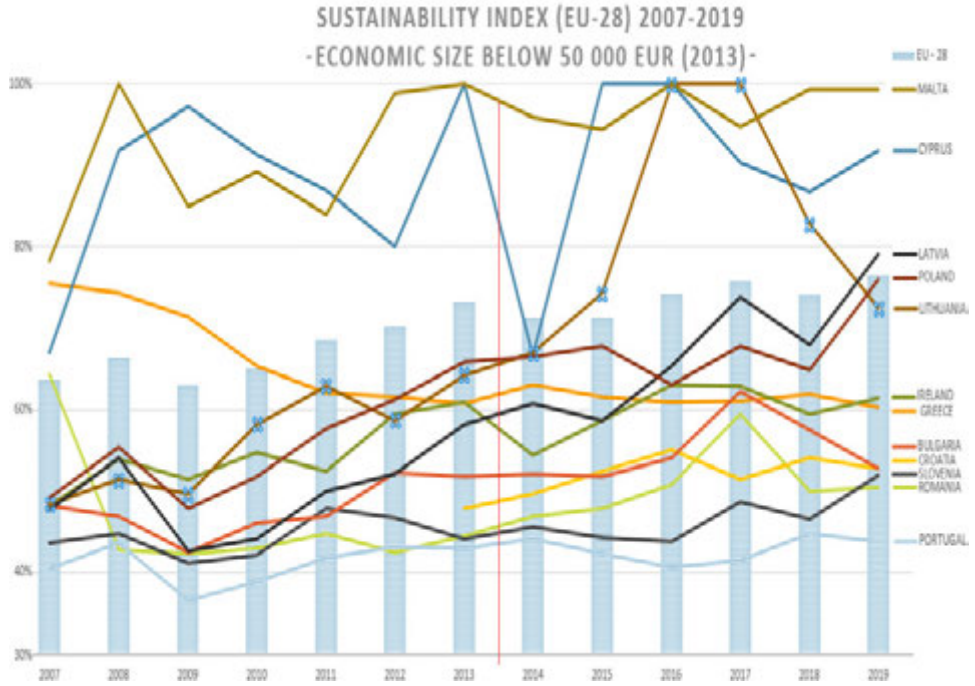
From now on the farms (member-states) will be divided into three groups by their average economic size compared according to 2013 as a middle year of the survey – up to 50 000 EUR (12 member-states), from 50 000 to 100 000 (6MS) and more than 100 000 EUR standard output (10MS).

Agricultural Holdings with an Economic Size of less than 50 000 EUR Standard Output (2013)

1. The Sustainability Index of the smaller farms reveals there might be a 100% sustainable unit despite of the economic size – Malta (+21.8% increase during the first Program Period and +3.4% for the second), Cyprus (+33.1%; +25.2%) and even Lithuania (+15.8%; +5.6%), started 2007 at level of 48.4%, reached the top (2016,2017) out of all member states.

On the other hand – Greece (-14.6%; -2.8%) and Romania (-20%; +3.5%) set a long-term sustainability decrease staying below the average of the EU.

Figure 1.



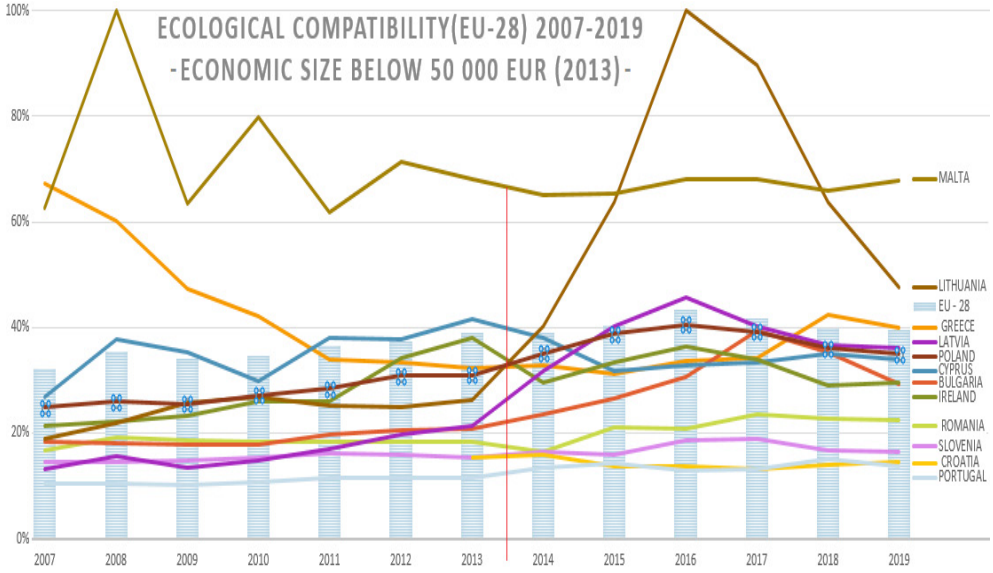
Source: FADN and Own Calculations

Poland (+16.6%; +9.5%) and Latvia (+10.6%; +18.2%) showed substantial increase during the both program periods and reached the EU average.

Slovenia (+0.5%; +6.4%), Bulgaria (+3.5%; + 0.6%), Portugal (+2.5%; -0.3%), Croatia (+3%) and Ireland (+12.8%; +7.1%) have a trivial increase and so continue to stay far away from the EU level.

2. Ecological Compatibility Index. In ecological terms Malta (+5.5%; +2.7%) and Lithuania (+7.4%; +7.2%) again reached the top and have the best curves over the EU-28 level as Greece (-34.9%; +6.9%) until 2010, but the Balkan country has a long-term decrease.

Figure 2.

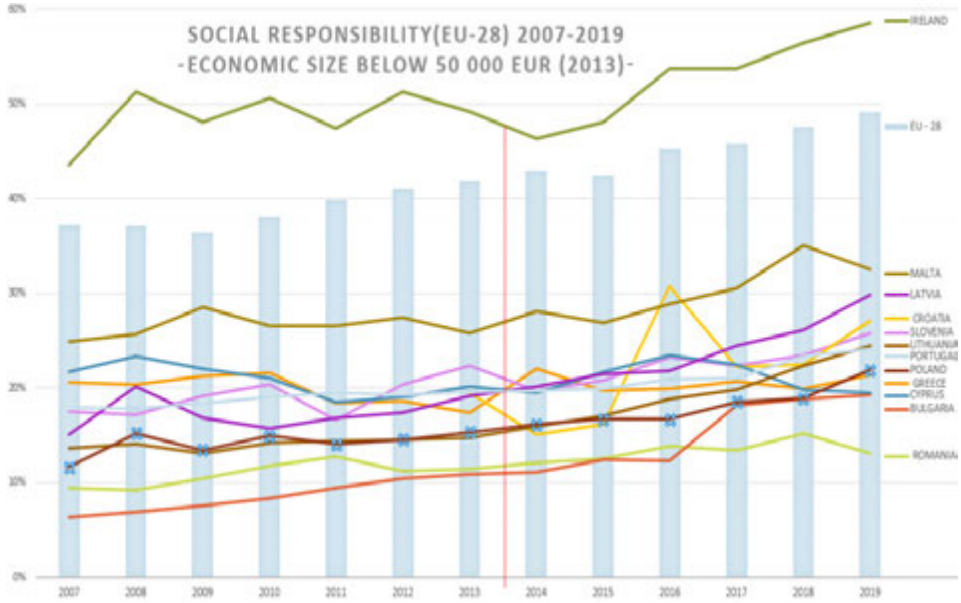


Source: FADN and Own Calculations

Latvia (+8.3%; +4.3%), Poland (+6.2%; -0.1%), Cyprus (+14.9%; -3.9%), Bulgaria (+2.5%; +5.9%), Ireland (+16.7%; +0%), Romania (+1.6%; +5.8%), Slovenia (+1%; -0.2%) and Portugal (+1.1%; 0.3%) gain a short increase and have balanced curves, Croatia (-1.4%) shows a reduction in eco-practices. These countries cannot reach the EU-28 average curve.

3. The Social Responsibility Index lightens Ireland (+5.6%; +12.3%) as the only MS in that part that is above the EU average and shows a sustainable increase as Malta (+0.9%; +4.4%), Poland (+3.7%; +5.8%), Lithuania (+1.1%; +8.6%), Latvia (+4%; +9.8%), Croatia (+12%), Slovenia (4.9%; 6.1%), Bulgaria (+5.6%; +8.1%), Portugal (+1.7%; +4.4%).

Figure 3.

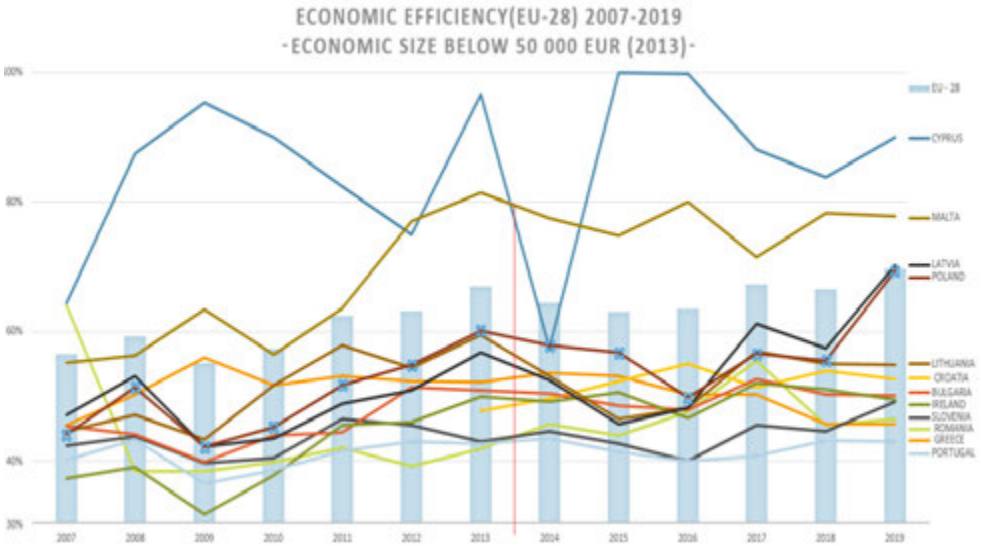


Source: FADN and Own Calculations

Slight increase can be observed in Romania (+2%; +1%), but decrease appears in Greece (-3.2%; -0.7%) and Cyprus (-1.6%; +0%).

4. Economic Efficiency Index

Figure 4.



Source: FADN and Own Calculations

The most economically efficient farms in this group are Cyprus (+32.3%; +32.5%) and Malta (+26.3%; 0.2%). The two island countries have above the EU-average values and showed a significant increase as Ireland (+12.6%; +0.3%), Latvia (+9.6%; +17.7%), Poland (+16.1%; +11.5%) and Lithuania (+14.8%; +1.7%).

Slight increases are visible in Portugal (+2.6%; -0.4%), Croatia (+3%), Bulgaria (+5.4%; -0.4%) and Slovenia (+0.6%; +4.6%).

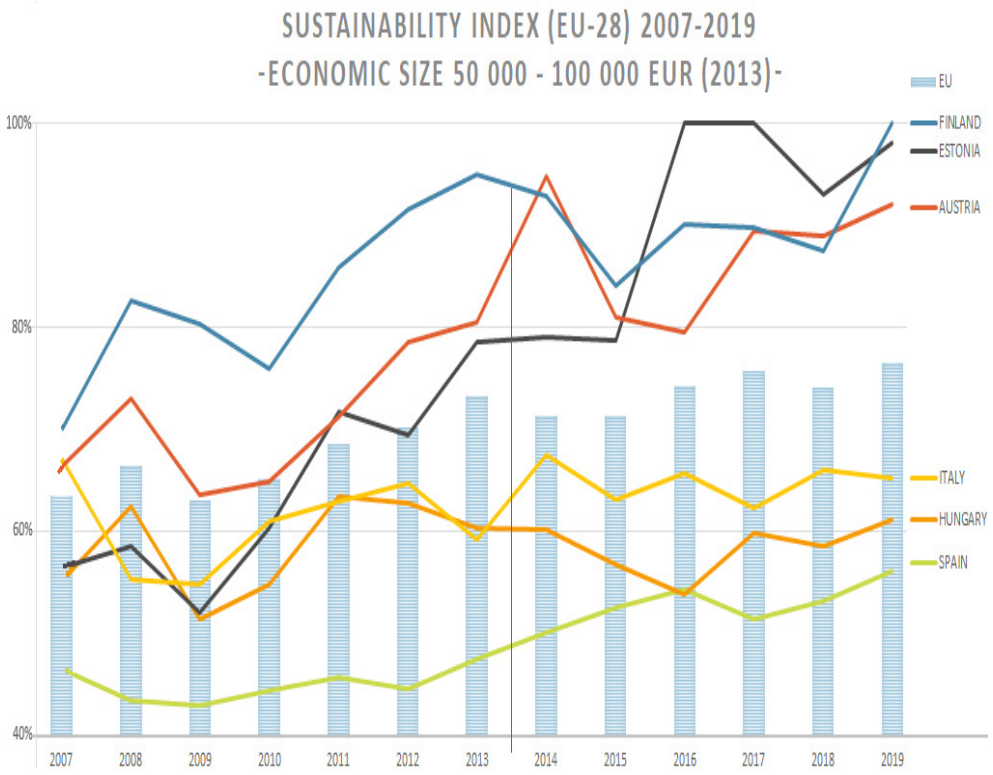
Greece (+ 6.7%; -7.8%) has a negative aggregate value right from the starting point of 2007.

The Romanian decrease (-22.2%; +0.7%) only confirms the EU policies are hard to be implemented in the smallest farms.

Agricultural Holdings with an Economic Size of 50 000 to 100 000 EUR Standard Output (2013)

5. Sustainability Index

Figure 5.



Source: FADN and Own Calculations

The sustainability curves present Estonia (+22.2%; +19%) for 2016, 2017 and Finland (+25.1%; +7.2%) for 2019 reached the top of the scale. Also Austria (+14.2%; -2.7%%) demonstrates an amplified rise.

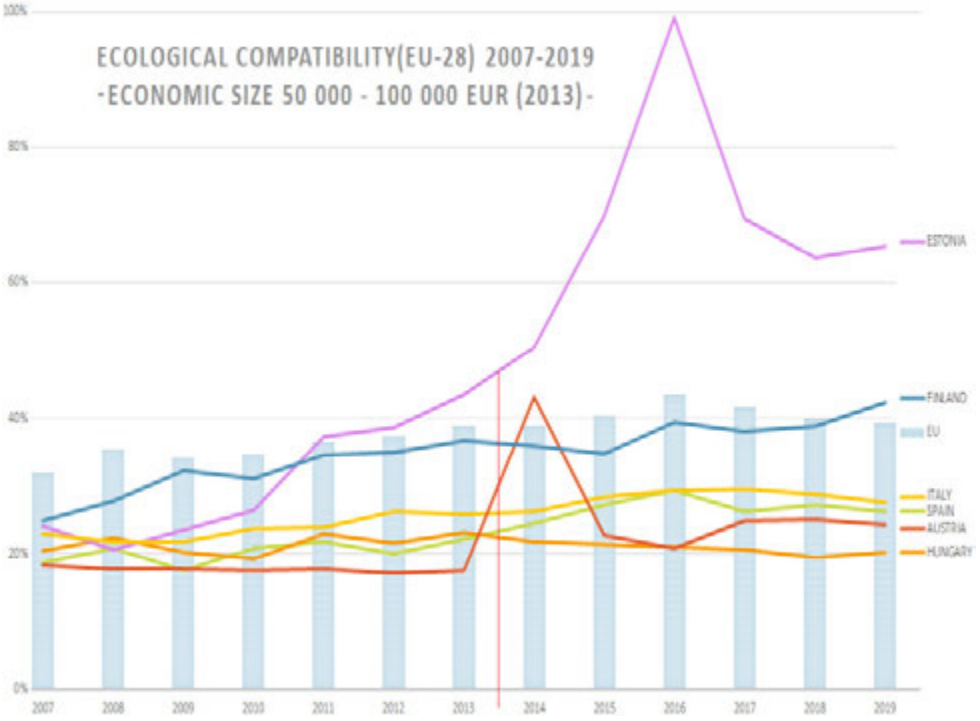
The last three MS are situated below the average of the European Union:

Italy (-7.9%; -2.3%) has fluctuating negative curves which started at above the EU-average and sharply dropped below.

Hungary (+5.2%; +0.9%) and Spain (+0.9%; +6%) have increase situated respectfully in the first and the second program period.

6. Ecological Compatibility Index. Estonia (+19.4%; +14.9%) is the only mid-sized MS reached by rapid rise to the 100% frontier (2016) followed by a sharp drop. Estonia`s curve seems to express Austria`s (-0.8%%; -18.8%) but more successfully.

Figure 6.



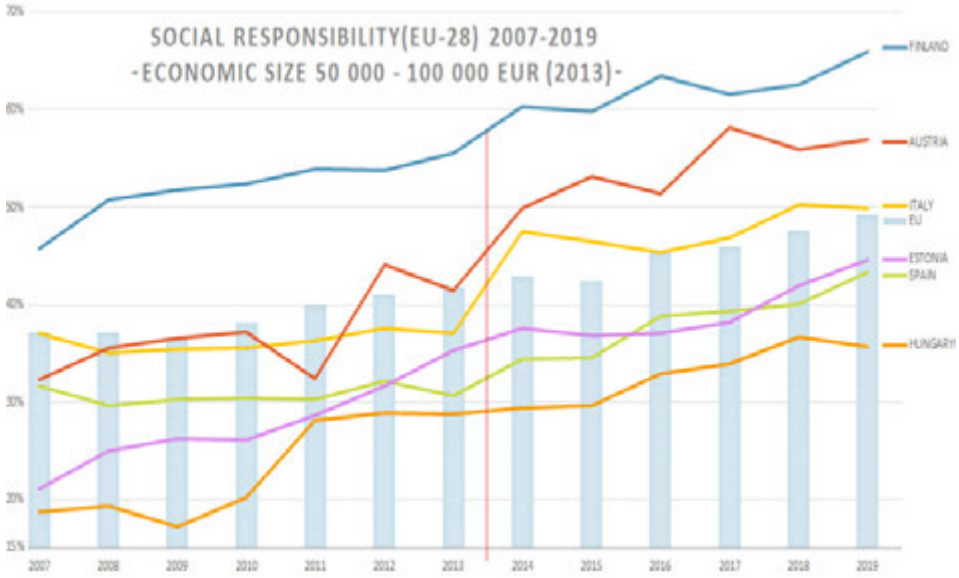
Source: FADN and Own Calculations.

Finland (+24.3%; +6.6%), Spain (+0.2%; +5.2%) Hungary (+2.8%; +0.7%) and Austria have slight increases in the period but Finland succeeded to overtake the EU level after 2018.

Italy (-10.2%; -4.2%) shows a little decrease, but the curve stands for a balanced practice in the ecological field.

7. Social Responsibility Index. In social terms all the mid-sized MS have an evenly distributed growth between the two periods

Figure 7.



Source: FADN and Own Calculations

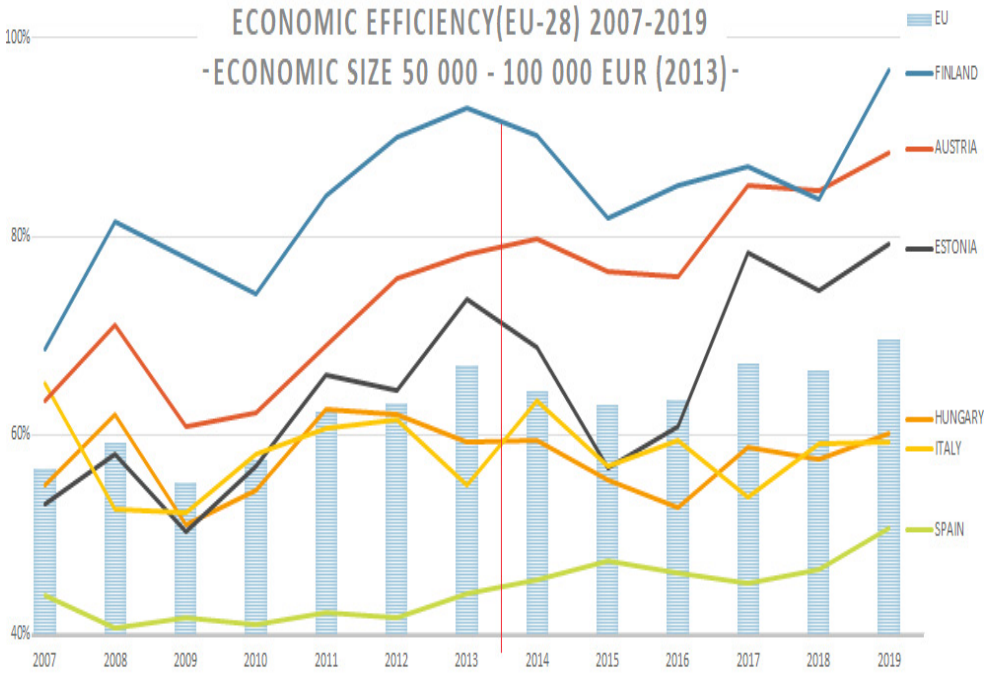
That ongoing increase interprets the MS efforts to implement more correctly and successfully the EU`s CAP and to gain more and more out of its tools.

Finland (+9.8%; +5.7%) has strongly above the average curve. During the second program period Austria (+9.2%; +7%) and Italy (+0.1%; +2.4%) passed through the EU levels while Estonia (+14.2%; +7%), Hungary (+10.1%; +6.3%) and Spain (-1.1%; +9%) stay below.

8. Economic Efficiency Index. The most MS raise their economic efficiency through the two program periods.

The only exception is Italy (-10.2%; -4.2%) which curve shows a decrease.

Figure 8.



Source: FADN and Own Calculations

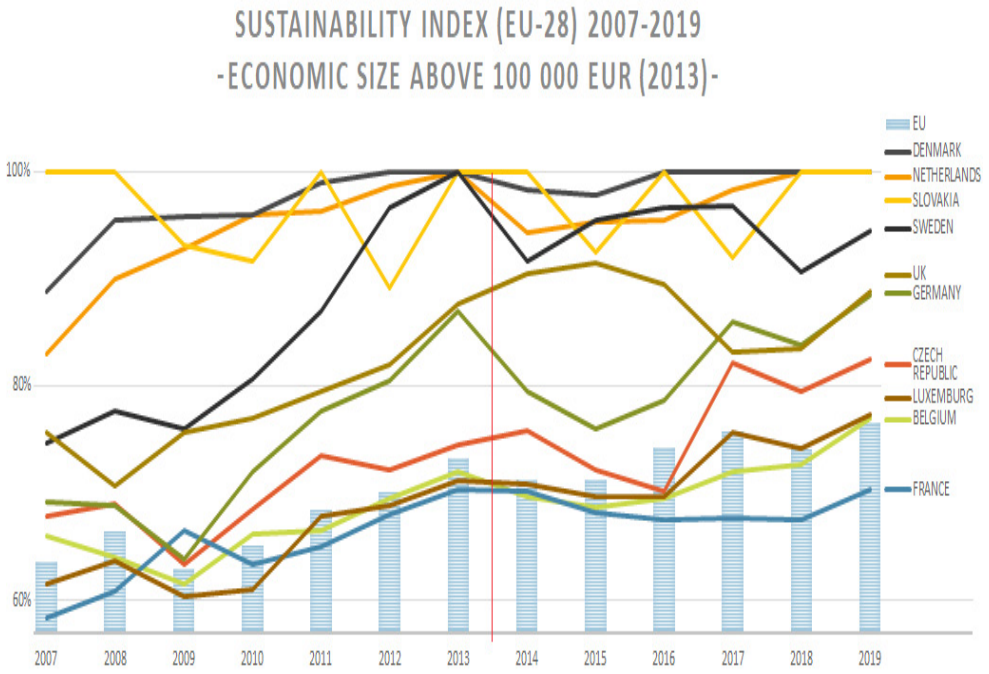
The big winners are Finland (+24.3%; +6.6%), Austria (+14.7%; +8.6%) and Estonia (+20.5%; +10.4%) in order to solidify their efforts assimilating the EU funds efficiently and have values above the EU average.

Hungary (+4.4%; +0.7%), Italy and Spain (+0.2%; +5.2%) stay underneath the average.

Agricultural Holdings with an Economic Size of more than 100 000 EUR Standard Output (2013)

9. Sustainability Index. The most powerful group of MS should be the most sustainable. That is adequate to Denmark (+11.2%; +1.8%), Netherlands (+17.1%; +5.8%), Slovakia (+0%; +0%) and Sweden (+25.3%; +2.8%). The UK (+12.1%; -1.6%) and Germany (+17.8%; +9%) operate over the 90% border after 2011 despite Sweden`s growth. The Czech Republic (+6.6%; +6.7%) is the last participant with an above the EU-28 average curve.

Figure 9.

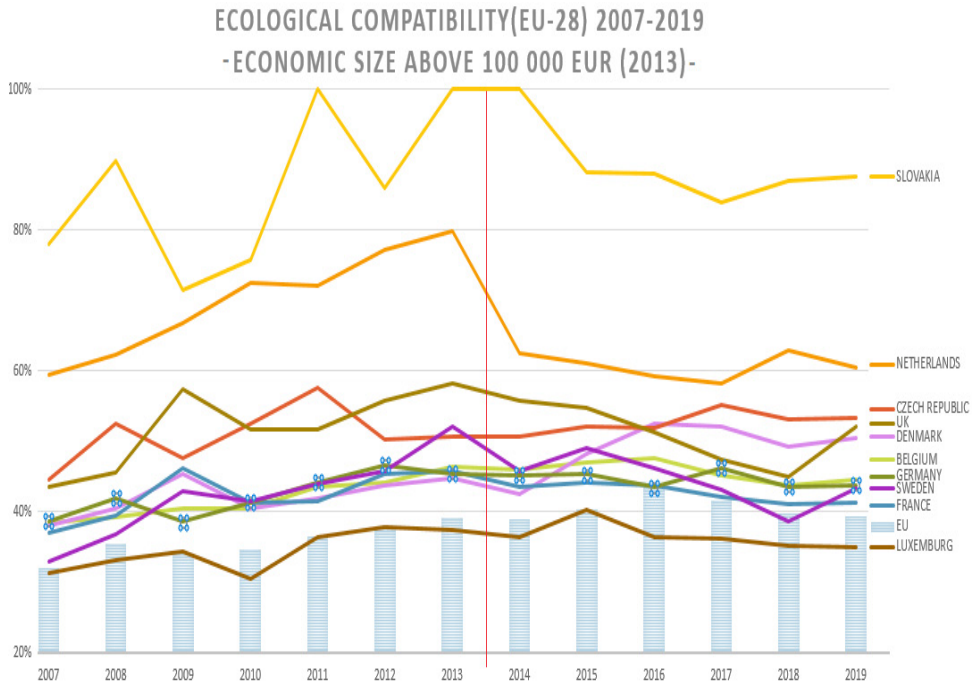


Source: FADN and Own Calculations

Luxemburg and Belgium almost match the EU-28 frontier but still not sufficiently to be over it. France cannot reach the average except 2009 and sits stuck on the bottom of this category.

10. Ecological Compatibility Index. The biggest and most profitable holdings are situated in Slovakia (+22%; -12.4%) due to the highest scale efficiency. The second place is ordered to Netherlands (+20.5%, -1.9%).

Figure 10.

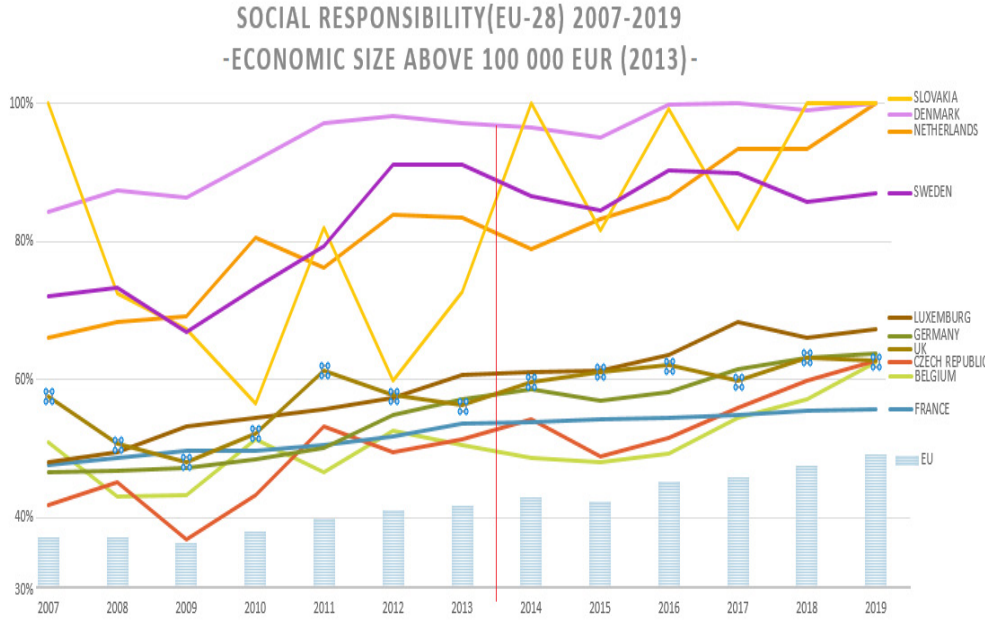


Source: FADN and Own Calculations.

The Czech Republic (+6%; +2.8%), Denmark (+6.9%; +7.9%) and the UK (+14.7; -3.7%) are situated strictly behind. Belgium (+7.9%; -1.3%), Germany (+6.8%; -1.4%), Sweden (+19.1%; -2.6%) and France (+8.7%; -2.2%) complete the above-average MS, but Luxemburg stays permanently below even regardless of the economic size.

11. Social Responsibility Index. In social terms all the MS have above the average scores as Denmark leads as the most persistent although Slovakia runs ahead through several years but shows fluctuation.

Figure 11.



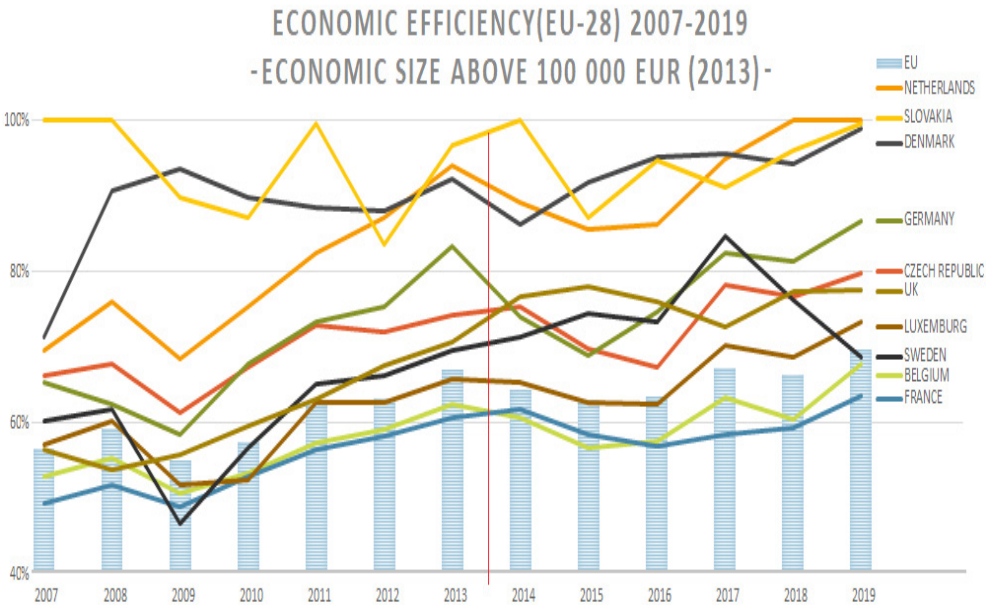
Source: FADN and Own Calculations.

Netherlands and Sweden complete the top of the social aspect. The other MS have balanced rise.

12. Economic Efficiency Index. Netherlands, Slovakia and Denmark continue to lead EU as far as efficiency is concerned.

Germany, the Czech Republic and the UK show stable above the average results, but Luxemburg has only strengthened in recent years. Belgium and France cannot escape above the EU average.

Figure 12.



Source: FADN and Own Calculations.

Conclusions

As smaller a holding remains, it continues to stay vulnerable due to a small production scale.

The economic size is no guarantee of either social or ecological sustainability terms.

All factors for sustainable development are in the hands of the managers and/or owners of a business, but on the other hand the government plays the crucial role for the implementation of the CAP.

CAP in turn is not so easy to be implemented in the MS that do not have a well-functioning and transparent administration.

The shortcomings of this article is a lack of farm specialization and in-depth parameter analysis outside the DEA calculations in order to show its reflections on the EU holdings after the all 28 different CAP implementations.

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6. Appendix 1: Economic size statistics (EU Commission) and DEA estimations based on (FADN) data

Year	MS	Economic size	Farm Sustainability	Economic Efficiency	Social Responsibility	Ecological Compatibility	Year	MS	Economic size	Farm Sustainability	Economic Efficiency	Social Responsibility	Ecological Compatibility	Year	MS	Economic size	Farm Sustainability	Economic Efficiency	Social Responsibility	Ecological Compatibility	Year	MS	Economic size	Farm Sustainability	Economic Efficiency	Social Responsibility	Ecological Compatibility
2019	EU - 28	145.3	76.6%	69.6%	49.1%	39.4%	2019	GREECE	19.5	60.2%	45.8%	21.3%	39.8%	2019	LITHUAIA	32.8	72.5%	54.9%	24.5%	47.5%	2019	PORTUG	37.5	43.8%	43.1%	24.1%	13.6%
2018	EU - 28	143.6	74.1%	66.5%	47.6%	39.8%	2018	GREECE	19.4	61.9%	45.7%	19.9%	42.3%	2018	LITHUAIA	32.7	82.8%	55.1%	22.3%	63.6%	2018	PORTUG	38.5	44.7%	43.2%	23.3%	15.0%
2017	EU - 28	143.2	75.7%	67.3%	45.9%	41.6%	2017	GREECE	19.3	61.1%	50.3%	20.7%	34.3%	2017	LITHUAIA	32.9	100.0%	57.0%	19.8%	89.6%	2017	PORTUG	37.1	41.5%	40.9%	21.0%	13.2%
2016	EU - 28	140.8	74.2%	63.5%	45.3%	43.3%	2016	GREECE	19.3	60.9%	50.4%	19.9%	33.7%	2016	LITHUAIA	32.8	100.0%	48.3%	18.8%	100.0%	2016	PORTUG	37.7	40.7%	40.1%	20.9%	12.9%
2015	EU - 28	139.4	71.3%	63.1%	42.5%	40.3%	2015	GREECE	19.1	61.5%	53.2%	19.7%	31.2%	2015	LITHUAIA	33.0	74.3%	46.6%	17.0%	63.7%	2015	PORTUG	39.0	42.2%	41.5%	19.9%	14.1%
2014	EU - 28	126.7	71.3%	64.4%	43.0%	38.9%	2014	GREECE	20.5	63.0%	53.6%	22.0%	32.9%	2014	LITHUAIA	28.6	66.9%	53.2%	15.9%	40.3%	2014	PORTUG	36.8	44.1%	43.5%	19.7%	13.3%
2013	EU - 28	129.1	73.2%	67.0%	41.8%	39.0%	2013	GREECE	20.7	60.8%	52.3%	17.4%	32.3%	2013	LITHUAIA	28.7	64.2%	59.5%	14.7%	26.3%	2013	PORTUG	34.2	42.9%	42.8%	19.6%	11.4%
2012	EU - 27	124.9	70.1%	63.2%	41.1%	37.4%	2012	GREECE	20.6	61.6%	52.4%	18.6%	33.4%	2012	LITHUAIA	27.9	58.7%	54.5%	14.5%	24.8%	2012	PORTUG	36.3	43.1%	43.0%	19.2%	11.5%
2011	EU - 27	112.8	68.5%	62.4%	39.9%	36.5%	2011	GREECE	17.3	62.1%	53.1%	18.4%	33.8%	2011	LITHUAIA	24.1	62.9%	57.9%	14.4%	25.3%	2011	PORTUG	33.6	41.8%	41.6%	19.5%	11.5%
2010	EU - 27	111.0	65.1%	57.4%	38.1%	34.6%	2010	GREECE	17.1	65.4%	51.8%	21.6%	42.1%	2010	LITHUAIA	24.8	58.2%	51.7%	14.2%	26.9%	2010	PORTUG	32.2	38.9%	38.7%	19.0%	10.6%
2009	EU - 27	111.4	63.0%	55.1%	36.4%	34.0%	2009	GREECE	16.8	71.4%	56.1%	21.2%	47.3%	2009	LITHUAIA	24.7	49.6%	43.3%	13.1%	25.7%	2009	PORTUG	32.8	36.6%	36.5%	18.4%	10.1%
2008	EU - 27	97.9	66.5%	59.3%	37.1%	35.5%	2008	GREECE	15.9	74.4%	50.3%	20.4%	60.2%	2008	LITHUAIA	19.6	51.4%	47.1%	14.0%	22.0%	2008	PORTUG	28.8	43.5%	43.4%	17.8%	10.4%
2007	EU - 27	97.2	63.6%	56.6%	37.2%	32.0%	2007	GREECE	16.0	75.4%	45.6%	20.6%	67.2%	2007	LITHUAIA	20.0	48.4%	44.7%	13.6%	18.9%	2007	PORTUG	29.1	40.4%	40.2%	17.9%	10.3%
2019	BULGARI	68.3	52.7%	50.1%	19.2%	29.3%	2019	SPAIN	94.3	56.1%	50.7%	43.4%	26.3%	2019	LUXEMB	250.9	77.3%	73.5%	67.3%	35.0%	2019	ROMAN	17.4	50.4%	46.5%	13.1%	22.3%
2018	BULGARI	68.4	57.5%	50.3%	18.8%	35.2%	2018	SPAIN	85.8	53.2%	46.4%	40.1%	27.1%	2018	LUXEMB	246.9	74.2%	68.7%	66.0%	35.1%	2018	ROMAN	17.2	49.9%	45.6%	15.2%	22.8%
2017	BULGARI	67.6	62.2%	52.7%	18.1%	39.5%	2017	SPAIN	85.7	51.4%	45.0%	39.3%	26.2%	2017	LUXEMB	238.2	75.7%	70.4%	68.3%	36.1%	2017	ROMAN	10.2	59.4%	55.5%	13.4%	23.5%
2016	BULGARI	45.6	54.0%	47.9%	12.3%	30.7%	2016	SPAIN	84.7	54.4%	46.1%	38.8%	29.4%	2016	LUXEMB	233.6	69.7%	62.6%	63.5%	36.3%	2016	ROMAN	10.1	50.8%	47.6%	13.8%	20.9%
2015	BULGARI	45.5	51.7%	48.6%	12.4%	26.4%	2015	SPAIN	82.9	52.5%	47.4%	34.6%	27.1%	2015	LUXEMB	229.4	69.7%	62.7%	61.3%	40.2%	2015	ROMAN	9.8	47.9%	44.0%	12.5%	21.1%
2014	BULGARI	32.6	52.1%	50.5%	11.1%	23.4%	2014	SPAIN	57.3	50.1%	45.5%	34.4%	24.4%	2014	LUXEMB	193.8	70.8%	65.5%	61.1%	36.3%	2014	ROMAN	9.3	46.9%	45.8%	12.1%	16.5%
2013	BULGARI	33.2	51.7%	50.9%	10.9%	20.7%	2013	SPAIN	58.9	47.5%	44.0%	30.6%	22.2%	2013	LUXEMB	192.9	71.1%	65.9%	60.7%	37.4%	2013	ROMAN	9.8	44.4%	41.9%	11.4%	18.3%
2012	BULGARI	33.2	52.2%	51.4%	10.4%	20.5%	2012	SPAIN	56.8	44.6%	41.6%	32.2%	20.0%	2012	LUXEMB	190.2	68.9%	62.7%	57.3%	37.7%	2012	ROMAN	10.2	42.5%	39.3%	11.2%	18.4%
2011	BULGARI	24.6	46.8%	44.5%	9.4%	19.7%	2011	SPAIN	56.0	45.8%	42.2%	30.3%	21.7%	2011	LUXEMB	167.8	67.9%	62.8%	55.8%	36.3%	2011	ROMAN	9.1	44.7%	42.1%	12.7%	18.3%
2010	BULGARI	24.7	46.1%	44.0%	8.3%	17.8%	2010	SPAIN	55.6	44.5%	41.0%	30.4%	20.7%	2010	LUXEMB	165.7	61.0%	52.5%	54.5%	30.5%	2010	ROMAN	9.2	42.9%	39.9%	11.7%	18.3%
2009	BULGARI	25.3	42.5%	39.9%	7.5%	17.7%	2009	SPAIN	55.2	43.0%	41.6%	30.3%	17.5%	2009	LUXEMB	166.8	60.4%	51.8%	53.2%	34.4%	2009	ROMAN	9.3	42.2%	38.5%	10.4%	18.6%
2008	BULGARI	16.9	46.8%	44.1%	6.9%	18.1%	2008	SPAIN	54.0	43.5%	40.5%	29.7%	20.8%	2008	LUXEMB	148.5	63.7%	60.3%	49.4%	33.0%	2008	ROMAN	7.5	42.8%	38.4%	9.2%	19.2%
2007	BULGARI	16.5	48.2%	45.5%	6.3%	18.2%	2007	SPAIN	50.7	46.6%	43.9%	31.7%	18.7%	2007	LUXEMB	143.7	61.5%	57.2%	48.1%	31.2%	2007	ROMAN	7.1	64.4%	64.1%	9.4%	16.7%
2019	BELGIUM	317.3	77.0%	67.8%	62.6%	44.6%	2019	ESTONIA	109.8	98.1%	79.3%	44.6%	65.4%	2019	LATVIA	52.2	79.0%	70.3%	29.9%	36.0%	2019	FINLAN	93.8	100.0%	96.8%	66.0%	42.3%
2018	BELGIUM	311.2	72.7%	60.5%	57.2%	43.8%	2018	ESTONIA	108.9	93.0%	74.5%	42.0%	63.6%	2018	LATVIA	49.0	67.9%	57.5%	26.1%	36.7%	2018	FINLAN	96.7	87.5%	83.7%	62.6%	38.9%
2017	BELGIUM	301.8	72.0%	63.4%	54.5%	45.2%	2017	ESTONIA	110.4	100.0%	78.4%	38.2%	69.5%	2017	LATVIA	48.2	73.8%	61.3%	24.5%	40.3%	2017	FINLAN	92.3	89.8%	87.0%	61.6%	38.0%
2016	BELGIUM	289.5	69.5%	57.6%	49.2%	47.5%	2016	ESTONIA	104.4	100.0%	60.9%	37.0%	99.1%	2016	LATVIA	48.0	65.3%	48.3%	21.8%	45.8%	2016	FINLAN	94.8	90.1%	85.1%	63.5%	39.5%
2015	BELGIUM	275.2	68.6%	56.7%	48.0%	46.9%	2015	ESTONIA	107.8	78.7%	56.7%	36.8%	69.8%	2015	LATVIA	49.9	58.7%	45.7%	21.5%	40.3%	2015	FINLAN	95.7	84.1%	81.8%	59.8%	34.8%
2014	BELGIUM	298.9	69.7%	60.8%	48.6%	45.9%	2014	ESTONIA	92.0	79.1%	68.9%	37.6%	50.5%	2014	LATVIA	39.5	60.8%	52.6%	20.1%	31.7%	2014	FINLAN	87.0	92.8%	90.2%	60.3%	36.0%
2013	BELGIUM	296.7	72.0%	62.6%	50.5%	46.3%	2013	ESTONIA	91.6	78.6%	73.6%	35.3%	43.4%	2013	LATVIA	40.1	58.2%	56.8%	19.1%	21.4%	2013	FINLAN	82.3	95.0%	93.0%	55.5%	36.7%
2012	BELGIUM	296.5	69.5%	59.2%	52.6%	44.2%	2012	ESTONIA	90.1	69.4%	64.5%	31.7%	38.6%	2012	LATVIA	38.4	52.1%	51.0%	17.4%	19.8%	2012	FINLAN	81.8	91.6%	90.0%	53.8%	34.9%
2011	BELGIUM	237.8	66.5%	57.3%	46.7%	43.4%	2011	ESTONIA	72.0	71.7%	66.1%	28.7%	37.2%	2011	LATVIA	33.6	49.9%	48.9%	16.8%	17.0%	2011	FINLAN	76.3	85.8%	84.1%	53.9%	34.5%
2010	BELGIUM	237.9	66.2%	53.3%	51.4%	40.5%	2010	ESTONIA	70.7	60.3%	56.9%	26.1%	26.5%	2010	LATVIA	33.6	44.1%	43.5%	15.7%	14.8%	2010	FINLAN	75.8	76.0%	74.2%	52.4%	31.0%
2009	BELGIUM	230.0	61.5%	50.8%	43.2%	40.4%	2009	ESTONIA	79.0	52.0%	50.3%	26.3%	23.4%	2009	LATVIA	36.7	42.6%	42.2%	16.8%	13.4%	2009	FINLAN	74.3	80.3%	77.8%	51.8%	32.2%
2008	BELGIUM	195.1	64.0%	55.3%	43.1%	39.3%	2008	ESTONIA	53.6	58.6%	58.1%	25.0%	20.6%	2008	LATVIA	28.7	54.0%	53.2%	20.1%	15.5%	2008	FINLAN	64.7	82.6%	81.4%	50.8%	27.7%
2007	BELGIUM	195.4	66.1%	52.9%	51.0%	38.4%	2007	ESTONIA	52.9	56.4%	53.1%	21.1%	24.0%	2007	LATVIA	28.1	47.6%	47.2%	15.1%	13.1%	2007	FINLAN	64.2	69.9%	68.7%	45.7%	24.9%
2019	CYPRUS	48.9	91.8%	90.0%	19.5%	34.0%	2019	FRANCE	202.1	70.4%	63.6%	55.7%	41.3%	2019	MALTA	35.0	99.4%	77.8%	32.5%	67.7%	2019	SWEDEN	184.2	94.5%	68.7%	87.0%	43.2%
2018	CYPRUS	49.2	86.7%	83.9%	19.8%	35.0%	2018	FRANCE	203.2	67.5%	59.4%	55.5%	41.1%	2018	MALTA	35.0	99.4%	78.3%	35.1%	66.0%	2018	SWEDEN	181.0	90.7%	76.4%	85.7%	38.6%
2017	CYPRUS	47.0	90.3%	88.1%	22.5%	33.5%	2017	FRANCE	202.5	67.6%	58.6%	54.8%	42.0%	2017	MALTA	36.5	94.7%	71.6%	30.5%	68.2%	2017	SWEDEN	180.2	96.7%	84.8%	89.9%	43.0%
2016	CYPRUS	45.1	100.0%	99.8%	23.5%	32.7%	2016	FRANCE	205.9	67.5%	56.9%	54.5%	43.7%	2016	MALTA	35.6	100.0%	80.1%	28.9%	68.0%	2016	SWEDEN	177.5	96.6%	73.5%	90.3%	46.2%
2015	CYPRUS	45.2	100.0%	100.0%	21.7%	31.6%	2015	FRANCE	207.1	68.2%	58.6%	54.3%	44.1%	2015	MALTA	36.5	94.5%	74.9%	26.9%	65.4%	2015	SWEDEN	180.4	95.4%	74.6%	84.5%	49.0%
2014	CYPRUS	43.7	66.6%	57.5%	19.5%	37.9%	2014	FRANCE	182.2	70.1%	61.8%	53.8%	43.5%	2014	MALTA	37.1	96.0%	77.6%	28.1%	65.0%	2014	SWEDEN	152.2	91.7%	71.3%	86.6%	45.8%
2013	CYPRUS	37.8	100.0%	96.7%	20.1%	41.6%	2013	FRANCE	180.5	70.3%	60.8%	53.7%	45.7%	2013	MALTA	37.4	100.0%	81.5%	25.8%	68.2%	2013	SWEDEN	149.5	100.0%	69.7%	91.2%	52.0%
2012	CYPRUS	40.4	80.0%	75.0%	19.0%	37.7%	2012	FRANCE	182.4	68.0%	58.2%	51.8%	45.3%	2012	MALTA	36.2	98.8%	77.0%	27.4%	71.3%	2012	SWEDEN	149.4	96.6%	66.3%	91.2%	45.7%
2011	CYPRUS	38.1	86.9%	82.4%	18.5%	38.1%	2011	FRANCE	158.2	65.0%	56.6%	50.5%	41.4%	2011	MALTA	30.9	83.9%	63.6%	26.6%	61.8%	2011	SWEDEN	121.5	87.0%	65.2%	79.3%	44.0%
2010	CYPRUS	35.7	91.4%	90.0%	21.0%	29.7%	2010	FRANCE	155.8	63.3%	52.9%	49.8%	41.3%	2010	MALTA	31.2	89.2%	56.5%	26.6%	79.7%	2010	SWEDEN	121.7	80.7%	56.8%	73.4%	41.4%
2009	CYPRUS	37.6	97.2%	95.4%	22.0%	35.2%	2009	FRANCE	154.8	66.5%	49.0%	49.8%	46.2%	2009	MALTA	31.6	85.0%	63.5%	28.5%	63.4%	2009	SWEDEN	119.1	76.0%	46.8%	66.9%	42.9%
2008	CYPRUS	40.2	91.9%	87.5%	23.3%	37.7%	2008	FRANCE	142.7	60.9%	51.8%	48.7%	39.5%	2008	MALTA	33.0	100.0%	56.3%	25.7%	100.0%	2008	SWEDEN	113.2	77.6%	61.8%	73.4%	36.7%
2007	CYPRUS	38.9	66.9%	64.4%	21.7%	26.7%	2007	FRANCE	141.6	58.3%	49.4%	47.6%	37.0%	2007	MALTA	32.9	78.2%	55.2%	24.9%	62.7%	2007	SWEDEN	109.0	74.7%	60.3%	72.0%	32.9%
2019	CZECH	289.2	82.5%	79.8%	62.7%	53.4%	2019	HUNGAR	56.5	61.1%	60.1%	35.7%	20.2%	2019	NETHERLA	505.9	100.0%	100.0%	100.0%	60.5%	2019	SLOVAK	433.5	100.0%	99.6%	100.0%	87.6%
2018	CZECH	281.3	79.4%	76.8%	59.9%	53.2%	2018	HUNGAR	56.0	58.5%	57.5%	36.7%	19.4%	2018	NETHERLA	504.9	100.0%	100.0%	93.4%	62.9%	2018	SLOVAK	422.9	100.0%	96.1%	100.0%	87.1%
2017	CZECH	276.6	82.1%	78.4%	55.9%	55.2%	2017	HUNGAR	56.1	59.9%	58.7%	33.9%	20.5%	2017	NETHERLA	499.7	98.3%	95.0%	93.3%	58.2%	2017	SLOVAK	456.3	92.0%	91.1%	81.8%	84.0%
2016	CZECH	274.1	70.1%	67.5%	51.5%	51.8%	2016	HUNGAR	56.8	53.8%	52.7%	32.9%	20.9%	2016	NETHERLA	505.9	95.5%	86.4%	86.4%	59.3%	2016	SLOVAK	448.0	100.0%	94.7%	99.1%	88.1%
2015	CZECH	267.8	72.2%	69.9%	48.9%	52.0%	2015	HUNGAR	61.8	56.8%	55.5%	29.7%	21.3%	2015	NETHERLA	505.1	95.2%	85.7%	83.3%	61.1%	2015	SLOVAK	445.7	92.5%	87.1%	81.6%	88.2%
2014	CZECH	244.8	75.8%	75.4%	54.2%	50.6%	2014	HUNGAR	55.2	60.2%	59.4%	29.4%	21.8%	2014	NETHERLA	436.6	94.2%	89.2%	78.8%	62.4%	2014	SLOVAK	456.5	100.0%	100.0%	100.0%	100.0%
2013	CZECH	245.7	74.5%	74.2%	51.3%	50.6%	2013	HUNGAR	53.9	60.3%	59.3%	28.8%	23.1%	2013	NETHERLA	417.5	100.0%	94.0%	83.5%	79.9%	2013	SLOVAK	460.9	100.0%	96.8%	72.7%	100.0%
2012	CZECH	242.5	72.1%	72.1%	49.4%	50.3%	2012	HUNGAR	54.5	62.8%	62.1%	28.9%	21.6%	2012	NETHERLA	417.5	98.6%	87.1%	83.8%	77.3%	2012	SLOVAK	359.8	89.2%	83.7%	59.9%	86.0%
2011	CZECH	243.0	73.5%	72.9%	53.3%	57.5%	2011	HUNGAR	49.1	63.5%	62.5%	28.1%	23.0%	2011	NETHERLA	366.9	96.2%	82.5%	76.3%	72.2%	2011	SLOVAK	401.9	100.0%	99.7%	82.1%	100.0%
2010	CZECH	245.1	68.5%	67.3%	43.3%	52.4%	2010	HUNGAR	47.3	54.9%	54.5%	20.2%	19.3%	2010	NETHERLA	369.5	96.0%	75.5%	80.6%	72.5%	2010	SLOVAK	359.8	91.6%	87.3%	56.6%	75.7%
2009	CZECH	242.0	63.4%	61.5%	36.9%	47.6%	2009	HUNGAR	46.9	51.4%	50.9%	17.2%	20.2%	2009	NETHERLA	365.3	92.8%	68.6%	69.2%	66.8%	2009	SLOVAK	375.8	93.1%	89.8%	67.2%	71.5%
2008	CZECH	215.6	69.0%	67.9%	45.1%	52.4%	2008	HUNGAR	46.3	62.4%	62.1%	19.3%	22.3%	2008	NETHERLA	315.9	89.9%	76.0%	68.3%	62.3%	2008	SLOVAK	308.9	100.0%	100.0%	72.5%	89.8%
2007	CZECH	218.2	67.9%	66.3%	41.9%	44.6%	2007	HUNGAR	48.4	55.1%	54.9%	18.7%	20.3%	2007	NETHERLA	312.6	82.9%	69.6%	66.1%	59.4%	2007	SLOVAK	311.0	100.0%	100.0%	100.0%	78.0%
2019	DENMAR	410.9	100.0%	98.9%	100.0%	50.4%	2019	IRELAND	63.3	61.4%	49.5%	58.6%	29.6%	2019	AUSTRIA	77.1	92.1%	88.4%	56.9%	24.3%	2019	SLOVENI	24.1	52.0%	49.3%	25.8%	16.3%
2018	DENMAR	403.8	100.0%	94.2%	99.0%	49.3%	2018	IRELAND	64.3	59.5%	51.1%	56.5%	28.9%	2018	AUSTRIA	76.4	88.9%	84.6%	55.9%	25.0%	2018	SLOVENI	23.6	46.6%	44.6%	23.5%	16.8%
2017	DENMAR	399.5	100.0%	95.7%	100.0%	52.1%	2017	IRELAND	64.0	62.8%	52.1%	53.7%	33.8%	2017	AUSTRIA	76.0	89.5%	85.1%	58.2%	24.8%	2017	SLOVENI	22.9	48.6%	45.6%	22.4%	19.0%
2016	DENMAR	395.9	100.0%	95.3%	99.8%	52.4%	2016	IRELAND	63.9	63.1%	46.7%	53.8%	36.3%	2016	AUSTRIA	63.6	79.6%	75.9%	51.4%	20.8%	2016	SLOVENI	22.6	43.7%	40.1%	23.2%	18.5%
2015	DENMAR	388.7	97.8%	91.8%	95.0%	48.3%	2015	IRELAND	58.3	58.6%	50.6%	48.1%	33.5%	2015	AUSTRIA	62.6	81.0%	76.5%	53.1%	22.7%	2015	SLOVENI	22.9	44.2%	42.8%	20.8%	16.0%
2014	DENMAR	348.2	98.2%	86.2%	96.4%	42.5%	2014	IRELAND	49.4	54.3%	49.2%	46.3%	29.6%	2014	AUSTRIA	55.8	94.8%	79.8%	49.9%	43.1%	2014	SLOVENI	20.3	45.6%	44.7%	19.7%	16.5%
2013	DENMAR	357.4	100.0%	92.2%	97.2%	44.8%	2013	IRELAND	49.0	60.9%	50.0%	49.2%	38.0%	2013	AUSTRIA	56.8	80.5%	78.1%	41.5%	17.4%	2013	SLOVENI	22.0	44.0%	43.0%	22.4%	15.4%
2012	DENMAR	349.3	100.0%	88.1%	98.2%	43.8%	2012	IRELAND	49.7	59.5%	46.0%	51.3%	34.1%	2012	AUSTRIA	56.5	78.6%	75.7%	44.1%	17.1%	2012	SLOVENI	22.9	46.7%	45.6%	20.4%	15.8%
2011	DENMAR	293.6	98.9%	88.5%	97.1%	41.8%	2011	IRELAND	35.8	52.4%	45.6%	47.4%	26.0%	2011	AUSTRIA	57.1	71.2%	69.0%	32.4%	17.7%	2011	SLOVENI	21.5	47.8%	46.5%	16.6%	16.1%
2010	DENMAR	294.8	96.0%	89.8%	91.8%	40.5%	2010	IRELAND	35.4	54.7%	37.8%	50.7%	25.9%	2010	AUSTRIA	56.7	64.9%	62.2%	37.2%	17.5%	2010	SLOVENI	21.9	42.1%	40.6%	20.3%	15.3%
2009	DENMAR	286.5	95.7%	93.6%	86.3%	45.4%	2009	IRELAND	35.0	51.4%	31.8%	48.1%	23.2%	2009	AUSTRIA	60.4	63.6%	60.9%	36.5%	17.7%	2009	SLOVENI	20.8	41.2%	39.7%	19.1%	14.7%
2008	DENMAR	245.9	95.5%	90.8%	87.4%	40.4%	2008	IRELAND	35.9	53.9%	39.1%	51.3%	22.2%	2008	AUSTRIA	52.6	73.1%	71.1%	35.6%	17.6%	2008	SLOVENI	19.3	44.7%	43.9%	17.1%	14.6%
2007	DENMAR	242.7	88.8%	71.4%	84.2%	37.9%	2007	IRELAND	36.4	48.1%	37.4%	43.6%	21.3%	2007	AUSTRIA	51.4	66.3%	63.4%	32.3%	18.2%	2007	SLOVENI	19.7	43.5%	42.4%	17.5%	14.4%
2019	GERMAN	259.5	88.5%	86.8%	63.7%	43.8%	2019	ITALY	88.2	65.2%	59.3%	49.9%	27.5%	2019	POLAND	32.1	75.9%	69.4%	21.9%	35.0%	2019	UK	241.2	88.8%	77.6%	62.7%	52.1%
2018	GERMAN	255.8	83.8%	81.4%	63.1%	43.6%	2018	ITALY	93.0	66.0%	59.1%	50.2%	28.8%	2018	POLAND	31.5	64.9%	55.6%	18.9%	36.0%	2018	UK	238.8	83.5%	77.3%	63.2%	44.9%
2017	GERMAN	257.4	85.9%	82.5%	61.5%	46.2%	2017	ITALY	92.8	62.3%	53.7%	46.8%	29.6%	2017	POLAND	32.2	67.8%	56.6%	18.5%	39.2%	2017	UK	241.2	83.1%	72.7%	59.8%	47.3%
2016	GERMAN	256.2	78.7%	74.8%	58.2%	43.5%	2016	ITALY	92.3	65.7%	59.4%	45.4%	29.4%	2016	POLAND	31.6	63.1%	49.8%	16.7%	40.5%	2016	UK	241.1	89.5%	76.1%	62.1%	51.3%
2015	GERMAN	252.7	76.0%	68.9%	56.9%	45.3%	2015	ITALY	89.3	63.1%	56.9%	46.5%	28.3%	2015	POLAND	31.6	67.8%	56.8%	16.7%	38.7%	2015	UK	234.5	91.4%	78.1%	61.1%	54.7%
2014	GERMAN	235.2	79.5%	74.0%	58.6%	45.2%	2014	ITALY	79.2	67.5%	63.5%	47.5%	26.3%	2014	POLAND	28.2	66.4%	57.9%	16.1%	35.1%	2014	UK	203.4	90.4%	76.8%	59.7%	55.8%
2013	GERMAN	234.6	87.0%	83.4%	57.2%	45.4%	2013	ITALY	66.0	59.2%	55.0%	37.1%	25.9%	2013	POLAND	27.7	65.8%	60.2%	15.3%	31.0%	2013	UK	198.6	87.7%	70.8%	56.3%	58.2%
2012	GERMAN	234.3	80.4%	75.5%	54.9%	46.6%	2012	ITALY	64.2	64.8%	61.5%	36.7%	26.3%	2012	POLAND	27.6	61.3%	54.9%	14.5%	30.8%	2012	UK	202.6	81.9%	67.6%	57.7%	55.8%
2011	GERMAN	203.5	77.7%	73.3%	50.1%	44.2%	2011	ITALY	59.2	62.9%	60.6%	36.3%	23.8%	2011	POLAND	23.7	57.6%	51.8%	14.0%	28.4%	2011	UK	188.1	79.4%	63.2%	61.3%	51.7%
2010	GERMAN	204.4	72.0%	67.8%	48.5%	41.3%	2010	ITALY	58.3	61.0%	58.1%	35.5%	23.7%	2010	POLAND	23.8	51.7%	45.3%	14.9%	27.1%	2010	UK	188.1	77.0%	59.7%	52.2%	51.6%
2009	GERMAN	206.9	63.8%	58.4%	47.3%	38.5%	2009	ITALY	61.1	54.8%	52.1%	35.4%	21.8%	2009	POLAND	24.0	47.9%	42.2%	13.4%	25.5%	2009	UK	190.3	75.7%	55.8%	48.1%	57.4%
2008	GERMAN	205.9	68.8%	62.4%	46.9%	41.9%	2008	ITALY	48.6	55.3%	52.5%	35.1%	21.7%	2008	POLAND	20.6	55.4%	51.5%	15.2%	25.9%	2008	UK	164.3	70.6%	53.8%	50.7%	45.6%
2007	GERMAN	206.3	69.2%	65.4%	46.7%	38.6%	2007	ITALY	47.0	67.1%	65.2%	37.0%	22.9%	2007	POLAND	20.3	49.2%	44.1%	11.6%	24.8%	2007	UK	164.5	75.6%	56.6%	57.6%	43.5%
2019	CROATIA	24.1	52.7%	52.1%	27.1%	14.5%	2017	CROATIA	24.4	51.4%	51.0%	22.2%	13.2%	2015	CROATIA	25.5	52.4%	52.0%	16.1%	13.8%	2013	CROATI	23.6	47.8%	47.3%	19.5%	15.3%
2018	CROATIA	24.9	54.0%	53.5%	22.5%	13.9%	2016	CROATIA	26.5	55.1%	54.3%	30.8%	13.6%	2014	CROATIA	21.9	49.7%	49.1%	15.1%	15.9%	-	-	-	-	-	-	-

SHORT FOOD SUPPLY CHAINS IN SERBIA: CASE STUDY OF KLADOVO MUNICIPALITY

Vesna Paraušić[1]

Abstract

The short food supply chain represents a concept related to the notion of local production markets and marketing, emphasizing trade without intermediaries as well as close relationships based on trust between agricultural producers and consumers. This concept assists in strengthening the social, economic and ecological performance of rural areas and agriculture, and it is promoted and supported by rural development measures in the countries of the European Union. In Serbia, placing food on the market through short food supply chains is developed in practice, but this concept is not institutionally arranged. The paper presents the state of this sphere in the national regulations, and it shows the operation of short food supply chains using the example of agricultural producers in the municipality of Kladovo.

Key words: *food supply chains, short chains, Serbia, agriculture, Kladovo.*

Introduction

Short Food Supply Chains are established as an alternative to conventional, long and globalized food chains, and are increasingly gaining importance in the development of new food supply networks, as well as in the rural development policy of numerous countries.

According to the EC, "*short supply chain means a supply chain involving a limited number of economic operators, committed to co-operation, local economic development, and close geographical and social relations between producers, processors and consumer"* (EC, 2013, p. 499). Short Food Supply Chains (abbr. SFSCs) are based on the direct relationship of the local producer and consumer, with no more than one intermediary in trade. This supply chain is mainly used by small-scale farmers for selling fresh fruit and vegetables (EC, 2014; Kneafsey et al, 2013).

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The European Commission (abbr. EC) perceives SFSCs as one of the manners of faster integration of primary agricultural producers into the agri-food chain and improvement of their competitiveness (which are, among other things, the priority aims of the Union in the field of rural development). Therefore, the farmers who participate in local markets and short supply circuits are provided the support by means of the rural development measure "Cooperation" (EC, 2013).

SFSCs are not officially defined in Serbia and the support for producers participating in these marketing channels is not recognized by the Law on incentives in agriculture and rural development (Government of the Republic of Serbia, 2016). However, a large percentage of farmers of the small economic and physical size, who are not able to participate in long supply chains or the network of large-scale trade companies, use these channels for placing their products on the market.

The aim of the paper is to present the current state in the sphere of understanding and applying SFSCs in Serbia, as well as to show the operation and the required conditions for producers in order to participate in these chains, using the example of agricultural producers in the municipality of Kladovo. The analysis involved secondary data, as well as the data obtained by in-depth interviews with key stakeholders in the rural development of the municipality of Kladovo. The data were processed and analyzed by means of the qualitative research method.

Short food supply chain in Serbian agriculture

As the result of the domestic market liberalization and integration of Serbia into the global trade flows, Serbia is characterized today by a greater number of modern retail chains with complex demands for suppliers regarding delivery (prices, quantities, quality, standards, and delivery deadlines) and high negotiating strength at the market.

At the same time, the strategic document in the field of agriculture and rural development in Serbia (Government of the Republic of Serbia, 2014) emphasizes that a large percentage of primary agricultural producers of the small economic and physical size are excluded from long and highly demanding food supply chains due to the fragmented, disunited and unstable offer. Due to this kind of offer and small production capacities, small-scale farmers simply cannot ensure the sufficient quantity of products of equal quality; they cannot fulfill strict requirements of large trade chains related to the implementation

of quality standards; they cannot ensure continuous supply; and they have no possibility of lobbying for joining large trade chains or for better selling conditions. In addition, a study by a group of authors (Živkov et al., 2013) highlights the fact that the trade chain of agricultural products in Serbia is short (without adding value to products), as well as that to a great degree farmers do business, i.e. trade, in the grey economy zone.

Bearing the aforementioned in mind, the Strategy for Agriculture and Rural Development of the Republic of Serbia 2014–2024 (Government of the Republic of Serbia, 2014) emphasizes the need for the stronger integration of agricultural producers into large trade chains and the need for recognizing the concepts of local markets and short supply chains. FAO (2020) also highlights that short food supply chains are useful and promising for a great number of small-scale farmers in Serbia, who still mainly sell their products in (semi)-informal trade channels.

Serbia does not have an official definition of the "*short food supply chain*" concept and it has not regulated the support for farmers' participation in these supply chains at the national level. However, the Ministry of Agriculture, Forestry and Water Management has facilitated the food production and marketing at the domestic market for producers of small quantities of food of plant and animal origin by introducing the two following regulations:

- "Regulation on small quantities of primary products used to supply consumers, areas for performing of these activities, and deviations related to small entities in the business with animal origin food" (Official Gazette of the RS, No. 111/17). This Regulation defines the issues related to producing and marketing raw milk, products based on processing raw milk, fish and eggs, slaughtering and processing of meat and similar products;

- "Regulation on the production and trade of small quantities of food of plant origin, on the area for performing these activities, as well as on the exclusion, adjustment or deviation from food hygiene requirements" (Official Gazette of the RS, No. 13/2020). This Regulation defines the issues regarding the production and placing on the market of the following products: flour, bread, pastry, pasta, fruit juices, dried fruit, thermally processed vegetables and similar products.

Among other things, these Regulations also define the notions such as: local market, local sales, small quantities of local products, small food quantities,

small entity in food business, small capacity facility, etc. In addition, they more thoroughly prescribe the conditions for placing small quantities of food on the market, as well as the construction, arrangement and equipment of facilities where food is produced, primarily from the aspect of exclusion, adjustment or deviation from food hygiene requirements for the producers of small food quantities. This implies allowances for producers which, among other things, refer to the producers' self-control plan and the frequency of and sample number for examining the production process and product safety, conditions for product declaration, scope and content of the documents and records related to the raw material origin, production and marketing, and alike.

In this manner, the conditions have been created for food producers to sell their products legally in several manners, such as: direct delivery to consumers, selling on the farm, at the green market, in retail facilities, by means of home delivery ("door-to-door"), at manifestations and by means of the so-called "homemade meals" (marketing in rural tourist households). While doing so, food producers are obliged to be entered in the Central Register of Facilities for Food Production and Circulation kept by the Ministry of Agriculture, Forestry and Water Management.

The "short food supply chain" concept is additionally promoted in Serbia by means of the following two projects financed by the European Union's Horizon 2020 research and innovation programme, which include partners from Serbia:

- Smart solutions in short food supply chains (Smartchain project, https://www.smartchain-h2020.eu/) and
- Strength2Food project (Strength2Food, https://www.strength2food.eu/).

Short food supply chains in the municipality of Kladovo: a case study

Kladovo has a status of a municipality and it is located in the Bor District, in the Southern and Eastern Serbia region. It belongs to a group of insufficiently developed municipalities, with the development degree ranging from 60% to 80% of the national development average (Municipality of Kladovo, 2021)

Agriculture represents a significant resource of development of this municipality, but it has numerous limitations. Also, the market chain of agricultural products has many limitations regarding development, primarily in terms of the following characteristics (Municipality of Kladovo, 2021):

- Small market surplus of primary agricultural and processed agricultural products (a small number of market-oriented producers of goods);
- Fragmented and disunited offer (undeveloped farmers' cooperatives and a low degree of farmers' association);
- Unorganized purchase flow for all products (except for field crops) which partly belong to the "grey economy" zone;
- A short chain of agricultural products' value (selling primary agricultural products without adding value through processing, packaging, geographical indications and similar).

However, in contrast to the aforementioned, it is noticeable that a number of agricultural producers use short supply chains and local market participation as a way for promoting and placing their products on the market. On the basis of the example of the Municipality of Kladovo, farmers' participation in short supply chains implies placing the products on the market by means of some of the following channels (Paraušić, 2021):

- Green markets in the municipality of Kladovo;
- Local fairs and manifestations:
- Doorstep sale;
- Marketing through the local retail chain.

The following text provides more information about these marketing channels, the products which are promoted and placed on the market in this manner, as well as the conditions which farmers are required to fulfill.

Marketing agricultural products at local green markets. Two green markets in the municipality are managed by the Public Company "Komunalac". One of the markets is located in the settlement of Kladovo, while the other is in the settlement of Brza Palanka. At these markets, approximately a dozen of agricultural producers from the territory of the Municipality of Kladovo (mostly from the settlements of Mala Vrbica, Velika Vrbica and Rtkovo) seasonally sell their products, mainly seedlings, fruit and vegetables. These farmers are obliged to have an active agricultural holding, entered in the Register of Agricultural Holdings (abbr. RAH), led by the Directorate for Agrarian Payments.

Promotion and marketing of agricultural products at local fairs and manifestations. The Municipality of Kladovo organizes a large number of fairs and manifestations, such as: "Ethno-festival of Eastern Serbia" (July-August);

"Kladovo Summer" (held every weekend from April to September with around 15 different manifestations occurring within this programme); "Exhibition of honey and bee products" (September); "Saint Tryphon" (February 14); "Golden Fish Bait" (traditional catfish catching held every August); "The Open Heart Municipality" (New Year's holidays). During the majority of these manifestations, farmers exhibit and sell honey and other bee products, homemade cakes, jam, juice and fruit preserve. In order to exhibit and sell these products, farmers are obliged to have a registered agricultural holding, i.e. the holding entered in the RAH, as well as to fulfill other conditions prescribed by laws and appropriate regulations for food production and placing on the market.

Direct doorstep sale. Honey and cheese are mainly placed on the market in this manner. These products are sold to well-known buyers who have a years-long cooperation with producers. Small quantities of products are sold in this manner.

Placing the products on the local market through retail chains. The most significant retail chain in Kladovo is "Tekijanka" Ltd, Tekija. Since a small percentage of agricultural and processed agricultural products represent the commodity production intended for the market, the possibilities for marketing products by means of this retail chain have been insufficiently utilized. Namely, this retail chain cooperates with only a few farmers (active registered agricultural holdings) from the territory of the Municipality of Kladovo who deliver fruit and vegetables, as well as with the "Gamanović" winery from Kladovo. In order to place their products on the market through this retail chain, producers have to meet a series of requirements. Primarily they have to possess: (1) an active registered agricultural holding; (2) legal production fulfilling all requirements regarding production, business and trade prescribed by national laws and regulations; (3) sufficient quantities of products to be placed on the market; (4) safe delivery and (5) constantly maintained high-quality of products, etc. (Paraušić, 2021).

There are additional requirements for farmers related to placing products on the market through retail trade companies in terms of the obligatory declaration or labelling of products (barcodes or QR codes). These requirements are prescribed by the Law on Trade (Official Gazette of the RS, No. 52/2019, Article 34). The GTIN identification (Global Trade Item Number), better known as the "barcode", is used for the unique identification of trade items worldwide. In Serbia, barcodes are assigned by the GS1organization. While barcodes are paid for (as a sort of the membership in the GS1 organization), QR codes are free of charge and can be obtained on the internet website "QR

free generator". Although producers or importers (for imported goods) are responsible for machine-readable product labels on the declaration, sellers bear consequences if a product without this label is found in retail shops.

Conclusion

In Serbia, the concept of placing agricultural products and food on the market through short food supply chains is developed in practice, but this concept is not sufficiently institutionalized and supported, and in one percent it is still present in the gray economy.

By introducing appropriate regulations, the Ministry of Agriculture, Forestry and Water Management has facilitated conditions for placing small food quantities on the market and the construction, arrangement and equipment of facilities where food is produced, primarily from the aspect of exclusion, adjustment or deviation from food hygiene requirements for the producers of small quantities of food of plant and animal origin.

In this manner, conditions have been created for food producers to sell their products legally in several manners: directly on the farm, at the green market, in retail facilities, by means of home delivery, at manifestations and through the rural tourist offer. While doing so, food producers are obliged to be entered in the Central Register of Facilities for Food Production and Circulation kept by the Ministry of Agriculture, Forestry and Water Management.

The case study of the Municipality of Kladovo has shown that producers in this municipality use various short food supply chains to successfully placing their small quantities of market surpluses to the consumers on the local market.

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PROMOTING GENERATIONAL RENEWAL IN SERBIAN AGRICULTURE

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Abstract

Transition towards sustainable agriculture and food systems based on innovation, digital technologies, diversification and entrepreneurship needs young, motivated and skilled farmers capable to manage challenges and take risks. However, delayed farm succession and serious resource, infrastructure, economic, sociocultural, knowledge and administrative barriers discourage young people from engaging in the farm business. In 2018, only 3.3% of managers on Serbian farms were younger than 35, while 39.1% were 65 or older. Through a literature review and secondary data from the national and EU statistics, documents and reports, the paper deals with young farmers and their farm structures, and drivers and motivations of young people to engage in agriculture. The focus of study is, however, on business and entry models and support schemes for inspiring young people to takeover/start and develop their farm business and thus contribute to meeting society's demands for quality food, a healthy environment and vibrant local communities.

Key words: *young farmers, drivers and motivations, entry models, business models, support schemes*

Introduction

Recognizing the need for radical transformation of food systems toward 2030, the High Level Panel of Experts of the UN Committee on World Food Security stressed that "the future of agriculture and the sustainability of food systems depends on its youth" (HLPE, 2020, pp. 42). Starting from the role of family farm-

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ing in world food and agriculture[4], FAO and IFAD (2019) are even more precise, stressing in the Global Action Plan for the implementation of the UN Decade of Family Farming 2019-2028 that "the future of food and agriculture lies in the hands of the next generation of family farmers" (p. 30). Youth involvement may be particularly important for innovation and creative solutions necessary for sustainable food systems' transition (HLPE, 2019).

Generational renewal crisis, also referred to as a "young farmer problem," has gained in importance over the last few decades, primarily in developed parts of the world, such as the EU. The share of farm managers younger than 40 in the EU in 2016 was 10.6% (5.1% of those younger than 35) while 32.8% were 65 and older, so for every farmer younger than 35, there were more than six farmers of 65 and older (compared to more than five in 2013 and four in 2010) (Eurostat, 2021). However, data at the EU level hide significant differences by country – the share of farm managers under 40 ranges from 3.3% in Cyprus and 4.2% in Portugal to 20.3% in Poland and 22.2% in Austria. For every farmer younger than 35 years, there were almost 34 farmers of 65 and older in Cyprus and more than 27 in Portugal, 14 in Romania and 10 in Italy while the value of this indicator was only 0.6 in Austria, 1.1 in Germany and Poland, and 1.8 in France and Slovakia (Eurostat, 2021).

Matthews (2018) includes general demographic trends in Europe reflected in lower birth rates, extended education and delayed retirement as well as farm size, inheritance legislation, tax and pension policies, and social and cultural attitudes related to farm succession as factors influencing above-mentioned differences at the country level, emphasizing the importance of cross-country analysis. Moreover, studies on drivers and motivations for generational renewal in agriculture found that they are largely different and intertwined, and therefore require tailored, targeted, consistent and integrated system of support (Zagata & Sutherland, 2015; Eistrup et al., 2019; May et al., 2019; Coopmans et al., 2021; Dellapasqua et al., 2019; EC, 2021a). Generational renewal is one of the post-2020 CAP nine objectives (Dellapasqua et al., 2019; EC, 2021b). Also, the EU youth strategy 2019-2027 is, inter alia, aimed to create conditions for young people to work and live in rural areas. This is important particularly in the post-Covid-19 era that gives young people new business opportunities in agriculture and rural areas offered by innovation and digitalisation of agriculture and rural services (EC, 2021c).

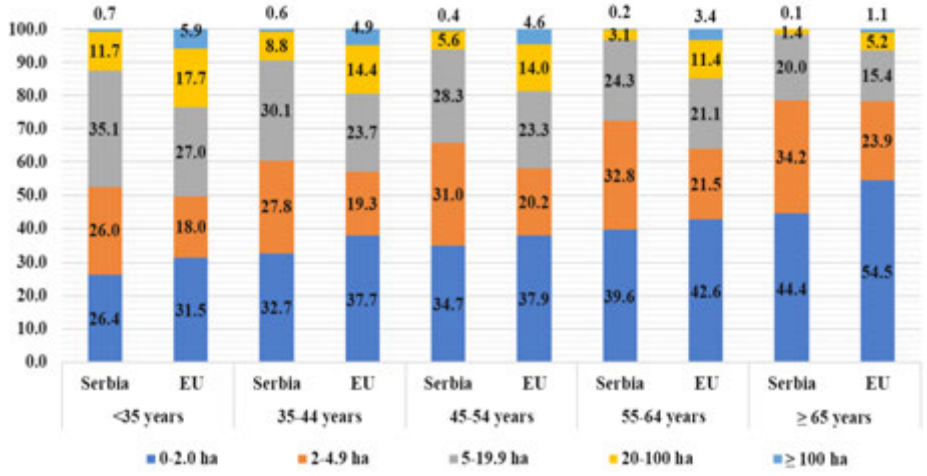
4 Producing more than 80% of the world's food in value terms, family farms are the most prevalent form of world agriculture (FAO, 2014).

With only 3.3% of farm managers younger than 35 and 39.1% of them aged 65 or older in 2018, compared to 4.7% and 32.8% in 2012, respectively, i.e. with index of ageing (65/35 ratio) of nearly 12 in 2018 compared to 7 in 2012 (SORS, 2013, 2018), Serbia is among European countries with "young farmer problem." What policy actions could contribute to the farm, and wider, rural generational renewal in Serbia will be discussed at the end of the paper after the analysis of young farmers farm performances, drivers and motivations, business and entry models, and the supports to young people's engagement in farming in the EU and Serbia as the EU membership candidate country.

Young farmers in Serbia – statistical overwiev

Statistics indicate young farmers as farm managers aged under 35 using Farm Structure Survey age intervals[5]. Young farmers in Serbia tended to menage larger farms in terms of area, wich is in line with EU trends (Figure 1).

Figure 1. Farm managers by age class and farms area in Serbia, 2018 and EU-28, 2016.

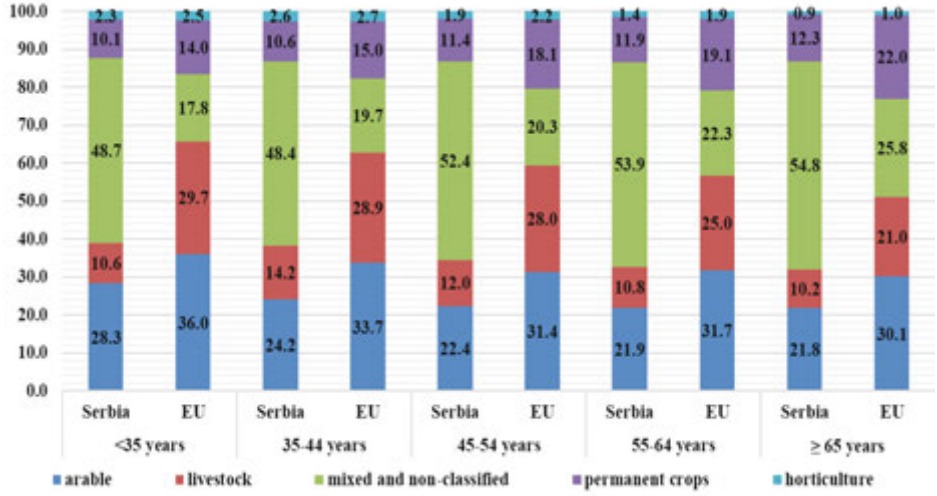


Source: SORS, 2018; Eurostat, 2021.

Regarding farm specialisation, Serbian farmers are much less specialized than EU farmers, but, as in the EU, they are more engaged in specialized production than oldest farmers (Figure 2).

5 FSS age statistics limit the analysis of YF supports that consider young farmers to be holders of registered farms aged 18-40 (NPRD, 2018) / under 40 (IPARD, 2021) conflating successors as individuals taking over existing farms from a previous generation and newcomers who start farms (Zagata & Sutherland, 2015; EIP-AGRI, 2016; Monllor i Rico & Fuller, 2016).

Figure 2. Farm managers by age class and types of farming in Serbia, 2018 and EU-28, 2016.



Source: SORS, 2018; Eurostat, 2021.

Generally larger and more specialised, young farmers' farms appear to be more economically efficient, with standard output per farm of 17,583 EUR in 2018, compared to national average of 9,455 EUR. However, behind these values are significant regional differences and there is also a large lag in relation to the relevant EU numbers (Table 1).

Table 1. Farm managers by age class and standard output per farm (EUR) in Serbia, 2018 and EU-28, 2016.

	Serbia – NUTS 2				Serbia	EU-28
	Belgrade region	**Vojvodina region**	**Region of Šumadija and West Srbia**	**Region South and East Srbia**		
<35 years	14,118	30,735	11,989	8,895	17,583	55,328
35-44 years	11,500	28,727	11,225	9,193	16,017	49,120
45-54 years	13,367	21,923	9,557	7,383	12,337	49,616
55-64 years	9,683	18,101	6,987	5,868	9,391	35,451
65 and over	5,762	8,883	5,491	4,672	5,838	12,501
Total	8,976	18,067	7,367	5,978	9,455	34,088

Source: SORS, 2018; Eurostat, 2021.

Zagata and Sutherland (2015) highlight findings from the literature, which suggests that succession, as the major form of generational renewal in agriculture, is more likely to occur on profitable farms and that young farmer problem is mainly related to small-scale farming in less productive and remote regions, with high youth outmigration. Such regularity can be noticed in Serbia as well. The share of young farmers (under 35 years of age) among managers of, on average more specialized and productive, farms in the fertile Vojvodina plain was 4.9% in 2018 and they generated 8.3% of standard output of farms in the region, with an average of 30,735 euros per farm. The value of these indicators is far lower in the hilly and mountainous regions of Central Serbia,[6] with small-scale and mixed agricultural production and rural youth exodus.

Drivers and motivations

Drivers can be defined as factors and processes, from the global to the local scale, that provide conditions or barriers for being engaged in an activity while motivations include intrinsic targets of individuals that inspire their actions in this direction (Ryan and Deci, 2000; Ruiz-Mallén et al., 2015).

Young farmers in most cases take over an existing farm through family and non-family farm succession. Coopmans et al. (2021) define four spheres of factors with mutual influence on farm generational renewal during phases of successor identity formation, farm succession, and farm development. Personal sphere includes personality, early involvement in farming, career and perception of farming; the farm and family sphere encompasses farm resources and performances, and interpersonal and farm-family dynamics; the external agro-entrepreneurial sphere includes labor market, access to land and capital, and policy framework while societal sphere covers appreciation for farming, lifestyle aspirations and farm location. Fischer and Burton (2014), emphasized the role of the successor identity in drivers' effects on succession process in the sense that the impact of these factors is less significant when the successor identity is strong and vice versa. Plana-Farran and Gallizo (2021) confirmed the influence of farm families' socio-emotional ties on individuals' intentions to succeed the family farm. Non-family farm succession allows prospective young farmers (raised on another farm or without farming roots) to engage in farming without sizeable start-up capital and local farming knowledge, and elderly farmers without heirs to provide successor

6 The share of young farmers among farm managers in the Region Šumadije i Zapadne Srbije and the Region Južne i Istočne Srbije was 2.8%, they realized 4.6% and 4.1% of the total SO, with an average SO per farm of 11,989 EUR and 8,895 EUR, respectively (SORS, 2018).

while retaining a home, social interaction and involvement in farming (Duesberg et al., 2017; Grubbström & Eriksson, 2018; Korzenszky, 2019).

Newcomers (with and without family farm background) usually start from scratch or take over a derelict farm (Helms et al., 2020; Simões et al., 2021). The number of complete newcomers (individuals outside farming families) is increasing, as is their role in farm entrepreneurship, innovation and rural renewal. They are more likely to have higher education, off-farm incomes and specific work, lifestyle, environmental and social aspirations. Access to land, housing, infrastructure, capital, skilled labor, markets, knowledge and information, off-farm employment, social services and networks is regionally differentiated and particularly important for them (EIP-AGRI, 2016; Monllor i Rico & Fuller, 2016; Hopkins et al., 2020).

Surveyed young farmers in Serbia explained their decision to become a farmer by their passion for agriculture, healthy food and nature, desire to be their own boss and to continue family tradition (Šimleša, 2019; Ratković, 2020). They marked subsidies, stronger position in food supply chain and better access to land, machinery, training and advisory services, infrastructure and social services as preconditions for sustainable farm development (Šimleša, 2019).

Business and entry models

According to Osterwalder and Pigneur (2010) "a business model describes the rationale of how an organization creates, delivers, and captures value" (p. 14) and it is described through nine building blocks, including key resources. Addressing the legal aspects of access to key resources, the entry models into farming make a decisive part of a business model (Lorleberg et al., 2015). As stated earlier, the main entry model into farming throughout Europe, including Serbia, is family succession, which is mostly performed by inheritance. Junior-senior partnership is commonly used form for non-family farm succession (Korzenszky, 2019; Helms et al., 2020). Newcomers use tenancies and, less often, land purchases to start new farm business, or enter into different cooperation / collaborative farming arrangements with existing farmers such as cooperatives, contract farming, share farming and partnerships. They also take over derelict farms and use crowd funding, crowd sourcing or the incubator farm support services (Lorleberg et al., 2015; Helms et al., 2020).

Business strategies depends largely on resources and markets, farm performances, and new entrant's investment capacities, values and ambitions. As already

mentioned earlier, a large number of family farm successors in the EU and Serbia take over profitable, mainstream farms and further expand and modernize the family farm business based on specialization and economies of scale. They can also diversify their farm business relatively easily using available (inherited) farm resources. Small-scale successors and newcomers opt for innovative and consumer-oriented business models, based on value-added products and short food supply chains, on-farm diversification and share and experience economies, often combined with additional off-farm activities, depending on local agro-ecological, infrastructure, economic and social conditions (Monllor i Rico & Fuller, 2016; Helms et al., 2020). Milone and Ventura (2019) pointed out to a "new peasant's generation" (van der Ploeg, 2018) of innovative young farmers in Italy and their business success based on creativity, innovation, ability to collaborate with different agents and responsiveness to societal demands regarding food. In Serbia, newcomers are often returnees from cities and abroad and prefer to invest in high-quality niche products and on-farm diversification (Jurašović, 2016). The pandemic can further push remote workers and their families into farming and rural businesses (Djordjević, 2021). Their contributions to rural revival go far beyond farming and need more tailored and integrated support.

Policies to support young farmers

The evaluation of the impact of CAP income and investment support and start-up aid to young farmers on generational renewal in EU agriculture finds it mostly positive, particularly if these measures are accompanied by other EU policies aimed at increasing attractiveness of farming and rural areas for prospective young successors and newcomers (EC, 2021a, 2021c). Also, many issues that affect generational renewal are in the scope of national inheritance, fiscal, social, environmental and land policies, and their regulation need to be consistent with EU interventions. The new CAP, which will be implemented from 2023, envisages support for young farmers (up to 40 years old) at the new mandatory minimum level of 3% of Member States' envelope of CAP income support (EC, 2021b). Member States will also be able to support junior-senior partnerships, land mobility services and innovation and knowledge transfer to young farmers while various form of financial instruments will help them overcome credit barriers (Dellapasqua et al., 2019).

As the EU membership candidate country and a country with an obvious need for generational renewal in agriculture and rural areas, Serbia strives to follow developments in EU policies in this field. Generational renewal of agricultural holdings will be one of the 12 special goals of the new National Rural Devel-

opment Program 2021-2024 and implies coordination of policies leading to socio-economic transformation of rural areas (MAFWM, 2021). In this regard, young farmers can benefit from investment support for livestock, fruit and vegetable production and have a preferential treatment in realization of agri-environmental subsidies and support for the development of rural tourism and old and artistic crafts under the National Rural Development Program 2018-2020 (OG RS, 60/18), credit support under the National Program for Agriculture 2018-2020 (OG RS, 120/17), investment support in physical assets of agricultural holdings and rural tourism under the IPARD Program 2014-2020 (OG RS, 38/21), and grants under the Competitive Agriculture Project 2021-2024 (OG RS, 30/21). Vojvodina province supports young farmers' investments in physical assets of agricultural holdings and on-farm food processing in rural areas (OG APV,66/20) and the farm holder's age is one of the selection criteria for RD support at the provincial and city levels.

All these measures are aimed at already established young farmers' businesses, but it is equally important to promote farming as an occupation and a lifestyle among preschool and school age children and youth, and facilitate access to resourses, infrastructure and social services to prospective young farmers, especially in rural areas. In that regard, National RD program supports rural infrastructure, the Ministry of Trade, Tourism and Telecommunications is in the process of building rural broadband communication infrastructure (Delegation of the EU to Serbia, 2021) while the Ministry of Village Care starts with the project of buying abandoned houses in rural areas and giving them to young married and unmarried couples, single parents and young farmers up to 45 years of age (OG RS, 64/21)[7]. The latter project is included in the National Village Revival Program, along with other proposed actions on generational renewal in rural areas such as the transfer of up to 50 ha of state-owned land for free use to young married couples (Mitrović, 2020). Support to farm succession advisory services, junior-senior partnerships, innovative farmers networking and knowledge transfer, land mobility platforms and incubator farms for newcomers, backed by inheritance, social and tax policies' adjustments, are some of measures that could be a part of new, tailored and place-based support schemes targeting young farmers in Serbia.

7 Financial support at the provincial level to married couples for the purchase of rural houses with a kitchen garden (providing that one of the spouses / extramarital partners is not older than 40 years) has been implemented since 2015 in AP Vojvodina within the Program of Economic Empowerment of the Institute for Gender Equality (Institute for Gender Equality, 2021).

Conclusion

Young farmers in Serbia need a broad and timely support, but it must be consistent, integrated, regionally differentiated and tailored to the different needs of successors and newcomers, according to their entrance motives and barriers, business models they develop and contributions they provide to local economy and society.

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EVOLUTION, CURRENT STATE AND PERSPECTIVE OF THE DEVELOPMENT OF THE WALNUT SECTOR OF THE REPUBLIC OF MOLDOVA

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Abstract

Due to its geographical location, fertile soil and favourable climatic conditions for walnut cultivation, the Republic of Moldova is part of the ten most important producers of walnut kernels worldwide. The dynamic demand for the product in both the domestic and foreign markets opens up favourable economic prospects for domestic producers. At the same time, increasing global competition between the main nut producers, high demand of the final consumer requires local producers to take a new approach in terms of technology, logistics and marketing. In this context, it is necessary to realign the walnut sector of the Republic of Moldova to international standards. This means the introduction of new production technologies, including: transition from the extensive to the intensive cultivation system, introduction into the agricultural circuit of new varieties of superior quality, further processing of the walnut harvest and obtaining of finished products with high economic value.

Key words: *agriculture, walnut sector, global production, production technologies.*

Introduction

The geographical location and the pedo-climatic conditions of the Republic of Moldova allow the successful cultivation of walnut (Juglans regia L.) in the given area. Due to the high productivity, as well as the superior quality of the walnut obtained even in the years with less favourable conditions for agriculture, the given crop enjoys a special attention from the native population. This indicates the massive presence of walnut trees grown in auxiliary households in rural areas of the country.

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The evolution of walnut culture in the Republic of Moldova can be noticed to have undergone two stages:

- The period up to the first half of the 20th century, which is characterized by the cultivation of walnut mainly in the auxiliary sector. The walnuts were mainly intended for domestic consumption, as well as the creation of protection strips both on the perimeter of agricultural land and on and along roads and highways;

- The transition period from the auxiliary culture to the industrial culture, characterized by the establishment of massive walnut plantations, the production of which should correspond to the requirements of foreign markets. The base of these plantations was laid in the early '70s of the 20th century, being boosted by the creation of the Scientific Production Association "Codru" - the only producer of grafted walnut seedlings during that period.

Currently, the geography of the export of walnuts produced in the Republic of Moldova is quite vast, the given production being present both on the European Union market and on the Eastern market. This fact has determined a constant evolution of the share of incomes in the national economic structure.

The advanced technological production processes promoted by the big walnut producers (USA and China), the fierce competition, the increasing demands of the final consumer have forced the local producers to adapt to the given challenges. This fact requires the implementation of optimal production methods, efficient development of the value chain, identification of ways and new methods to increase the added value.

Data sources and used methods

The general research methods (empirical and theoretical methods) have been used in the elaboration of this paper. The analysis of statistical data reflecting the evolution of the areas and the productivity of the walnut culture in a certain period on the territory of our country, the comparison of these indicators with the neighbouring states (Romania and Ukraine) were carried out by authors.

Primary documents represented by the literature (books, monographs, scientific reports and teaching materials, etc.) as well as secondary documents in the form of institutional sources (statistics by field) were used as the main

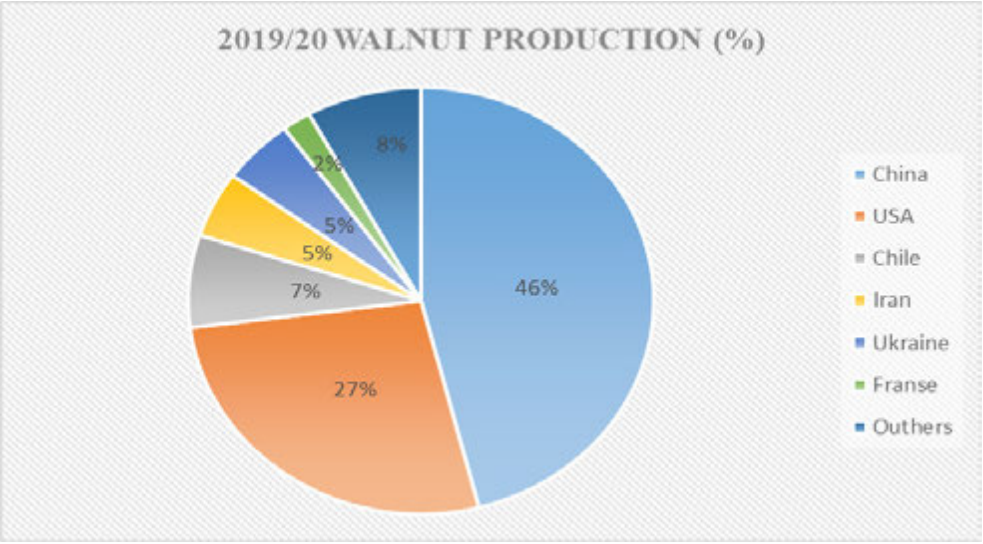
sources for the given research. The information provided by the National Bureau of Statistics of the Republic of Moldova and of the relevant international organizations was widely used.

The results of research and discussions

Walnut (Juglans regia L.) is one of the oldest fruit species and, at the same time, the culture with a wide area of distribution. At present, from a spontaneous culture mentioned in ancient times, first in the present territories of China, Japan, India and then in the Caucasus and introduced to Europe by the Roman Empire [1], it has evolved into one of the most valuable fruit crops, both nutritionally as well as economically. At the same time, due to its high ability to adapt to different environmental conditions, modest requirements for soil structure, walnut can be found both in mountainous regions, at an altitude of up to 2,700 m (Middle Asia, Afghanistan, Himalayas) and on hills (France, England, North America).

Until the end of the 19th century, walnuts were mostly cultivated as a secondary crop, being used for domestic consumption. Starting with the next century, with the intensification of market relations between countries, agricultural producers have become aware of the potential and prospects of this crop. Thus, in Western Europe (France), in the Balkans (Bulgaria, Romania, Greece), in North America (USA) gradually began to appear massive walnut plantations whose production was intended for trade. As a result, thanks to the constant improvement of production technologies, by moving from extensive to intensive cultivation, countries such as the USA and China have managed to become the main producers of nuts worldwide. The production quota of these countries obtained in the period 2019 - 2020 accounts for 73% of the global nut production, which amounts to 699 466 tons.

Figure 1. The main walnut-producing countries and their share in the structure of global production.



Source: Nuts & dried fruits statistical yearbook 2019/2020.

Indicators of global nut production are on the rise. Thus, if in 2008 the global production amounted to 551 185 tons, then in 2019 - 2020 it reached the level of 965 402 tons. At the same time, in the period 2008 – 2019-2020 the total harvested production constituted 7 653 698 tons. [4]

In terms of exports, according to data provided by INC International Nut & Dried Fruit for 2018, the main exporters of nuts worldwide are: USA – 111 178 tons (48%), Ukraine – 31 167 tons (14%), Chile – 25 034 tons and the Republic of Moldova – 13 034 tons (6%). It is noteworthy that China, although the largest producer of nuts in the world, is not on the list of major exporters. This is caused by the growing demand for walnuts on the Chinese domestic market, which increased from 206 670 tons in 2015 to 364 030 tons in 2018. At the same time, the highest average consumption of walnut kernels per capita is attested in Iran - 0.75 kg / year and in Hungary - 0.49 kg / year.

The main importers of nut production worldwide is Germany, which imported during the period of 2008 and 2018 a quantity of 348 940 tons, followed by Japan – 153 567 tons and Spain – 122 901 tons. The total quantity of nuts and kernels imported worldwide during this period is 2 044 353 tons.

Ukraine, the eastern neighbour of the Republic of Moldova, is one of the world's leading exporters of nuts. However, this country does not have important industrial plantations totalling only 3000 ha with the prospect that by 2025 their area will exceed 25 thousand ha. Therefore, 99% of the total walnut production is produced in the auxiliary sectors, of which 25-30%, mainly walnut kernels, are intended for export [6].

Currently, the Ukrainian walnut sector is undergoing a reshaping of production technologies. The old, extensive type orchards have a low production yield, the seed material bears fruit over 12-15 years after planting, which considerably diminishes the economic efficiency of this crop. The implementation of production technology practiced in many countries, where orchards are based on grafted trees has not shown any success. Thus, the main problem of local producers is to obtain the planting material that corresponds to both climatic conditions and the quality of the walnut kernel requested by the consumer.

The other neighbour, with a secular tradition in walnut cultivation, is Romania. Due to the favourable pedo-climatic conditions this country was during the 20th century one of the main producers of walnut kernels worldwide, producing an average of 31.6 thousand tons of walnuts annually. Between 1985 and 2010, it was the European leader in global walnut production. This was largely due to the massive areas of extensive orchards and the auxiliary sector. The peak of the total area occupied by this crop was reached in 1995 (2,506 ha) and then in the next 15 years (1995 - 2010) to be reduced to 1490 ha. However, thanks to the public and European Union funds, this sector has been revived, with 1 246.8 ha of new walnut orchards and 2,566 ha of mixed hazelnut and walnut orchards being established in the next four years [2]. At the same time, the nut sector of this country has become one of the most competitive in Europe registering in the period 2018 – 2020-2021 a total production of 1 546 thousand tons of nuts [5].

Like its neighbours, the Republic of Moldova has a centuries-old tradition of growing walnuts. In the archaeological museum from Odessa there are samples of nuts with an age of about 1800 years, being identified following the archaeological excavations carried out in the south of the republic [7]. Regardless of the fact that this species has long been known to the native inhabitants, the development of this culture was chaotic, the trees being grown next to the auxiliary households or could form certain massifs in the aboriginal forests.

The evidence of walnut as an agricultural crop has a fragmentary character. The first information is dated from 1938 when 688 430 trees of this species are registered. Subsequently, according to the 1945 census, in the Republic of Moldova were highlighted over one million trees, in 1953 - over two million. However, following the collectivization and reconfiguration of agricultural land, a considerable part of the fertile walnut trees was deforested, and their number decreased in 1960 to 1,300 thousand units. However, the overall production of nuts obtained in 1964 was 900 tons or 3.5 quintals / ha. [7]

Starting with the 1970s, the walnut culture begins to recover its previously lost positions. Until 1985, the number of fruit trees was 3,328 thousand, of which 1,128 thousand trees were placed in private households. Thus, in the Republic of Moldova were concentrated 12% of the areas cultivated with walnut in the former USSR, and the production obtained amounted to 13% of the global production from USSR.

This trend was maintained in the following years. In 1997, the land area occupied by this species represented 6.2 thousand ha, of which fruit bearing- 4.9 thousand ha and with a total production of 4,802 tons or 9.8 quintals / ha. This trend was maintained in the following years, managing to place our country in the group of the main exporters of nuts. Thus, within 20 years, the total land area occupied by walnut trees has expanded six times, exceeding the figure of 35 thousand ha.

Table 1. Basic indicators for growing walnuts in the Republic of Moldova (2015-2019).

	2015	**2016**	**2017**	**2018**	**2019**
Total area, ha	25 000	27 200	29 000	30 800	35 200
Fruit bearing area, ha	15 000	15 800	17 700	18 900	21 400
Total production, tons	11 261,3	13 825,4	18 519,8	20 237,5	19 688,4
Average price, EUR/ton	1 094,5	1 423,1	1 217,6	1 036,3	1 147,5

Source: National Bureau of Statistics

According to the data reflected in table 1, in the period 2015 – 2019, 10 200 ha of nut plantations were established, noting an increase of 40% of the total area. At the same time, in the same period, 7 900 ha of young plantations entered the fruiting phase, ensuring in 2019 the global harvest of 19 688.4 tons, representing a significant increase of 74.8% compared to 2015 [3]. The newly established plantations and those that enter the fruiting phase annually are based on the supply of high quality production, a fact offered by the successful use of the noble native walnut varieties. This fact will determine, according to the forecasts, the obtaining in 2025 of a global harvest of approximately 30 thousand tons.

The continuous increase of the global walnut harvest has directly influenced the export share of this crop for our country. Thus, depending on the weather conditions, in recent years the export of nuts is placed on positions 4 - 5 in the category of agri-food products exported by the Republic of Moldova. Regardless of the fact that the structure of the import of agri-food products also includes the import of nuts, the export of this product prevails in the trade balance.

Table 2. Import-export analysis of nut production of the Republic of Moldova in 2005 - 2018, USD.

Specification	**2005**	**2010**	**2015**	**2016**	**2017**	**2018**	**Difference, % (2016-2018 compared to 2015-2018)**
Import	4 799 232	6 446 764	14 102 841	10 717 628	13 541 430	20 417 092	113,8%
Export	30 740 819	59 835 863	101 078 273	85 462 964	98 640 218	96 329 091	146,3%
Trade balance	25 941 587	53 389 099	86 975 432	74 745 336	85 098 788	75 911 999	141,8%

Source: National Bureau of Statistics

The data from table 2 reveals an upward dynamics of Moldovan walnut exports. About 90% of the export of the given production is made in the form of a kernel (Kernel Basis) and is mainly oriented on the European Union market. Thus, the main countries where domestic walnut production is exported are France, Germany, Austria, and the Netherlands. Export growth is an upward and lasting trend because currently only 50% of the potential of this crop is being exploited by local producers.

With the expansion of land planted with noble varieties of walnuts and the fruiting of young orchards, the quality of Moldovan production is constantly evolving. Due to the local varieties, obtained by grafting, already 40% of the exported walnut production is collected from industrial plantations and fully corresponds to international standards. However, the domestic nut sector faces a number of challenges related to production technologies, processing capacity, the creation and maintenance of the value chain, and the maintenance of positions on the international market.

Modern technological trends in walnut cultivation require local producers to comply with new production requirements. The transition from extensive to intensive orchards, increasing the productivity of both existing and developing varieties, homogenizing as quickly as possible the quality of production obtained are the objectives they are to meet. Some actions, such as the replanting of existing plantations with valuable varieties (in 2019-2020 over 1000 ha were replanted), the establishment of new orchards with foreign varieties, such as Chalndler, Fermor, are in full process of development. The French varieties Lara and Franket are already placed on an area of 1000 ha and, which, together with the recently cleared variety - Tulari, have shown very good results. A significant contribution to improving the quality of walnut production has one of the best varieties of walnut and also the most popular in the Republic of Moldova - Pescianski variety.

A special turning point is the quality of walnut harvest processing works. This fact requires the improvement of the kernel extraction process as high as possible (Kernel Basis). At present, the local walnut producers have at their disposal modern harvest processing lines, but the walnut kernel collected from the population is extracted manually, which considerably diminishes both the quality of the finished product and the competitive capacity of the local production on the foreign market. For the future, the evolution of the quality of the finished product will be directly proportional to the increase of the share of plantations owned by specialized producers and their capacity to use modern processing equipment.

Another problem of the walnut sector of the Republic of Moldova is the low level or ability to identify the most efficient and cost-effective distribution channels for finished products. As an example can serve the case when the local walnut of the brand “Organic product” is sold in Romania at a price of 6-8 euros per kilogram and then distributed in supermarket chains at a price of 33 euros / kg, the difference being capitalized by distributor. Therefore, this gap could be attributed to

producers if they would improve their marketing activity, minimized the number of intermediaries, increased the added value of production obtained by offering consumers finished products in various forms (vacuum packed, prepared in honey, etc.). In this context, only the decrease in the amount of product as a raw material and the increase of the share of finished production will allow the Republic of Moldova to remain in the group of the main exporters of nuts worldwide.

Conclusions

The area of distribution of walnut is quite wide, starting with China, Central Asia, Europe and ending with North America, classifying this variety in the category of fruit crops with the widest spread and high economic value at the global level. Originating in China, walnut has adapted very well to the region of Southeast Europe where it lives both in the form of agricultural crop, as well as solitary in forest strips. This fact has determined that such countries as the Republic of Moldova, Romania and Ukraine are part of the group of the main exporters of walnut production worldwide.

The transfer of walnut from a wild habitat to an agricultural crop with a high economic value in the Republic of Moldova started only in the middle of the 20th century, manifested by the establishment of industrial plantations based on walnut varieties with a high genetic value.

Due to the quality and exclusive appearance of the walnut kernel (Kernel Basis) produced in our country; the given production is permanently requested by the states of the European Union, Turkey, etc. This economic opportunity has boosted the domestic walnut sector, starting a comprehensive process of restructuring old walnut plantations and creating new ones that meet international requirements. However, fierce global competition, growing product requirements of consumers, require local producers to implement new production technologies, obtaining new valuable varieties of walnut, developing the value chain and streamlining marketing strategies.

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INCENTIVE MEASURES IN VITICULTURAL AND WINE PRODUCTION OF THE REPUBLIC OF SERBIA [1]

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Abstract

In this paper, we wanted to give an overview of the current situation in the agricultural policy of the Republic of Serbia, special to the production of grapes and wine. In that sense, we have given a brief overview of the current situations at the policy agrarian of the Republic of Serbia. We have noticed that in the last few years, there has been progressing in the system of providing incentive funds, primarily thanks to the group for fruit growing and viticulture of the Agriculture of Ministry, Forestry, and Water Management. In that sense, in the continuation of the paper, we tried to give a brief overview of the incentive funds allocated for rural development. We have paid special attention to incentives related to viticulture and wine production.

Key words: *agricultural policy, incentives, viticulture, winemaking, Republic of Serbia.*

Introduction

In general, the policy agrarian of the Republic of Serbia in the last ten years characterized by greats changes. These changes occurred process to market liberalization, support for agricultural development, encouraging family farms and improving living conditions in rural areas, the introduction of technological innovations in the production process, production capacity, and professionalization of services in agriculture. The lack of forms consis-

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tency and application of policy agrarian throughout this period has led to a decrease in investment in the agricultural sector. This situation has led to non-market profit spillovers between economic factors in the market chain. (Simonović, 2014).

We can see that in the last few years, the institutions of support and the legislative framework have made progress in their development. For example, the Directorate for Commodity Reserves has been reformed and is working successfully. The advisory service is better organized and participates in the implementation of support for agriculture from a scientific point of view. The roles of the Association of Winemakers and Viticulture of Serbia, which actively participates in improving business conditions, are also most important. On the other hand, Cooperative Unions and some professional organizations are not, although they should be, bearers of development due to their unwillingness to implement internal reforms.

The Republic of Serbia is showing more and more interest in this type of production by drafting the Program for the development of winemaking and viticulture for the period 2021–2031.The program defines the goals and measures for the development of winemaking and viticulture. Application should result in:

- increasing the total vineyard area under vines,
- increasing the number of employees through employment in the wine and viticulture sector,
- increase revenues from the sale of wine to the end user,
- protection and development of the domestic market,
- as well as other aspects that contribute to the improvement of the sector.

The program contributes to the achievement of strategic goals set by the Strategy for Agricultural Development and Rural Development of the Republic of Serbia for the period 2014-2024. ("Official Gazette of RS", No. 85/14).The program contributes to the achievements of strategic goals set by the Strategy for Agricultural Development and Rural Development of the Republic of Serbia for the period 2014-2024. ("Official Gazette of RS", No. 85/14).

Fruit and Viticulture Group of the Ministry

The Ministry of Agriculture, through its group for fruit growing and viticulture, performs certain tasks related to the most adequate application of agricultural policy measures in viticultural production. These jobs are primarily related to:

- analysis, which includes monitoring the production, processing, consumption, trade, and prices of grapes and wine, i.e. grape and wine products and aromatized wine products, to proposes policy measures and market regulation, quality policy, and strategic development of wine and aromatized products from wines;
- monitoring and analysis of the state of development of viticulture and winemaking;
- providing conditions for creating expert bases for drafting regulations in the field of market regulation and quality policy of wine and aromatized wine products and their harmonization with the acquits nature and relevant international organizations and international agreements, as well as preparation of technical regulations in this area;
- active participation in the preparation of strategic measures and programs for the use of budget funds in the part of support to viticultural and wine production;
- introduction of geographical indications (PDO / PGI) for wines and aromatized wine products and production and control of the production of wine and aromatized wine products with a geographical indication, fulfillment of conditions use of geographical indications for wines, and at the end issuance of registration stamps for wines with a geographical origin;
- authorizing control organizations, laboratories to test the quality parameters of grapes, wine, and other products;
- introduction and constant updating of the Viticultural Register and the Wine Register;
- application of data analysis for wine declaration;
- constant monitoring and updating of records in viticulture and winemaking;
- participation and work in the preparation of international agreements and projects related to viticulture and winemaking, and;
- finally, perform other tasks in this area.

From all the above, it is observable that the Ministry of Agriculture provides full support to agricultural producers who want to engage in viticulture and wine-making. The support is systematic and well organized.

Incentives for rural development measures

Based on the data of the Statistical Office of Serbia, over 80,000 agricultural farms are mainly engaged in grape production. That is 12.7% of the total number of all agricultural holdings. This number does not include workers permanently employed in wineries, as well as seasonal workers. From these data, we can notice that this is the most important agricultural branch because it provides material income for large numbers of inhabitants.

These are sufficient reasons for the measure for incentives in viticulture and wine-making to expand in the last few years. Incentive measures can best be monitored on the basis of the existing Law on Incentives in Agriculture and Rural Development. Measures by the implementation as compensation for the part of costs. Calculate in a certain percentage the value of a particular type of measure. They determined in the minimum amount of 30% of the total value of particulars types but 45% for areas with difficult working conditions in agriculture. Incentives for rural development measures include support for programs related to:

- improving competitiveness;
- preservation and improvement of the environment and natural resources;
- income diversification and improving the quality of life in rural areas;
- preparation and implementation of local rural development strategies;
- Improving the system of knowledge creation and transfer.

Incentives to support programs related to the improvement of competitiveness in accordance with the Regulation and include incentives for:

1. investments in physical assets of the agricultural holding;
2. investments in processing and marketing of agricultural and food products and fishery products;
3. risk management. (Official Gazette of RS", No. 85/14, 10/2013, 142/2014, 103/2015 and 101/2016).

Incentives for agricultural holdings in viticulture

In the continuation of the work, we will pay special attention to the provision of financial resources in the physical property of the agricultural farm, and they refer to the encouragement of raising new perennial production plantations of vines.

The request incentives have submitted the term prescribed the Public Invitation published by the Directorate for Agrarian Payments during the year. The right to incentives has been a request by the applicant who has fully realized the investment. They are paid in the maximum amount of 50% of the value of a type of rural development measure, namely at the most amount by 65% of the value of a kind of rural development measure in an area with difficult working conditions in agriculture, except for digitalization of livestock and vineyards. Amount to the most for 60% of the value of the investment and field electrification a maximum of 90%.

The Rulebook on Incentives for Competitiveness Improvement Programs for Investments in Physical Property of an Agricultural Farm through Support for the Establishment of Perennial Grape Plantations regulates incentives for the establishment of production plantations and refers to:

- support for the establishment of new production plantations with modern grape growing technology, without backrest and with backrest;
- prepare the land for raising production plantations.

Incentives cover 50-65% of the amount of eligible investment costs and can be for:

- Incentives cover 50-65% of the number of eligible investment costs and can be for:
- procurement of grapevine seedlings;
- procurement of backrests for production plantations;
- land preparation;
- analysis with the recommendation of land fertilization, i.e, testing of land chemical composition

Eligible costs relate to the purchase of standard SA seedlings or certified vine seedlings. In Serbia, by encouraging the raising of production plantations with domestic varieties, the costs of plantations are increased by vines with recognized domestic group varieties.

According to the Program of development of winemaking and viticulture of the Republic of Serbia for the period 2021-2031. It is stated that in order for incentives to give results, they must be provided by a system that will additionally support the growth and development of winemaking and viticulture. To this end, by following measures should be taken:

- To increase the growth of land from vineyards, winemakers, and winegrowers, adequate capital is needed, as well as additional financial resources, if we keep in mind that long-term results by expected on average 5-6 years from the investment;
- The current system of incentives should be improved because there are not enough funds in the budget for these purposes, and on the other hand, there is some room for increasing funds;
- According to this program, 2022 should be the year for defining a new structure of incentives (harmonized with the IPARD program), which will be a focus on the realization of strategic goals and which will improve the efficiency of implementation;
- The new incentive system should ensure the attraction of new capital (domestic and foreign), as well as create additional conditions for the opening of new and development of existing wineries and vineyards. ("Official Gazette of RS", No. 154/20).

The benefits that can be realized from these measures:

- More budget funds and a better incentive system;
- The better motivation of producers for the growth and development of existing wineries and vineyards;
- Creating conditions for the entry of new capital into this type of production.

Conclusion

Based on the above valid documents of the Republic of Serbia, it must conclude that viticulture and wine production can be important elements of economic development. This type of production for agriculture generally has a social and ecological component in addition to the economic one. Based on that, we can conclude that the viticultural production of Serbia has the necessary level that is necessary and that can be economically viable.

However, despite the great potential in viticulture and wine production, which is the effect of favorable climatic conditions, natural characteristics of the land, and available water resources, it is still not sufficiently used.

We believe that the viticultural production in Serbia can still satisfy the domestic market with its capacities. And not only the domestic market but also widest can be freely said that extremely high-quality grapes are produced in Serbia, which is also an excellent basis for good wine. In the last few years, the supply of the market with wine from EU countries, but beyond, is quite present. Despite this trend, which conditioned the opening of our market, we believe that domestic production is not endangered for the simple reason that we produce quality wines.

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