

Innovations of Rural Areas as a Necessity of Green Economy and Sustainable Development

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Abstract. *Increasing the competitiveness of agricultural products, sustainable management of rural resources, and demographic aspects of rural development are issues that unite both science and practice in thinking. The relevance of the topic is confirmed by data on the increase in population and demand for food, as well as changes in consumption habits of agricultural products. Research highlights the importance of applying the principles of the green economy using the example of plum production and marketing in the Republic of Serbia. Observing the average rate of fluctuation and the coefficient of variation of plum production around the calculated average value, we notice an uncertain market placement. The importance of the demographic picture of villages due to changes in rural population is depicted through the constant decrease in the agricultural population in the Republic of Serbia. The process of joining the European Union further emphasizes the importance of the green economy and sustainable development as priority areas for Serbia. Accession to the EU obliges the country to align with European standards, including those related to environmental protection and sustainable development. Thus, sustainable development represents a link between economic policy and environmental protection processes. The process of implementing the green economy in the agricultural sector in Serbia requires an active role of the state, regulatory framework, and support from international partners. Institutional support is the basis for successful implementation of efficient solutions. Additionally, it is important to promote innovation, short marketing channels, and knowledge exchange. Concrete measures involve organizing advisory services, training farmers through the modernization of agricultural holdings.*

Keywords: green economy, sustainable agriculture, rural demography, competitiveness of Serbian plums.

Introduction

Reforms of agricultural policy, as defined in the Strategy for the Development of Agriculture and Rural Development for the period 2014-2024, respond to current challenges, such as reducing technological development gaps with competitive countries and more effectively addressing the effects of climate change on the agricultural sector, improving the business environment for

farmers and entrepreneurs. Most indicators for monitoring the implementation of the goals of this strategy are related to improvements in the sub-areas of the 4S food for the future priority. The defined sub-areas are: high-tech agricultural production, food products added values and a sustainable food production chain.

The synergy of the Strategy with the needs of smart specialization also exists in the domain of bringing creators and users of knowledge closer through the inclusion of agricultural producers in advisory work and the establishment of recording systems in agriculture.

In 2015, the European Commission recognized the value offered by interregional integration and initiated three thematic platforms established to support interregional cooperation in the context of smart specialization through agriculture and food industry, energy, and industrial modernization. These platforms contribute to the creation of an increasing number of interregional partnerships throughout the EU, with the ultimate goal of establishing European ecosystems for transnational and interregional cooperation in regions and countries with similar or complementary priorities of smart specialization. Thematic partnerships also assist regions in improving their knowledge base, leading to new developmental paths and better positioning in global value chains and transnational joint innovation strategies (Strategy of Smart Specialization in the Republic of Serbia 2020-2027).

There is a clear need for a green economy in Serbia, given the challenges that society and the environment currently face. The country has the potential to leverage its resources and geographical position to achieve sustainable development. Serbia possesses natural resources such as renewable energy sources, as well as potential for the development of environmentally sustainable industries. This includes sectors such as renewable energy sources, energy efficiency, ecotourism, and sustainable agriculture. There are also challenges that need to be overcome, including capacity constraints, required investments, and education.

Understanding rural development as a concept in the past meant that the term "rural" was equated with "agricultural," which is a narrow interpretation of the concept. Today, the concept of rural development represents an integral approach to the development of rural areas, based on strengthening not only a specific economic sector such as agriculture but also addressing non-economic aspects of rural development.

Unfavorable demographic trends are one of the biggest developmental problems in rural areas of Serbia. The Republic of Serbia is in a long phase of demographic transition, with a range of serious demographic issues.

It follows that the new rural paradigm, namely integral rural development in the function of sustainable development, promotes decentralization, organizes local populations, motivates and encourages their participation at all levels. Working on preserving and strengthening rural areas is primarily work on a sustainable society. Empowered for their own developmental initiatives, local communities will take responsibility for their implementation and will become responsible for crafting local rural development strategies and finding secure funding sources. Of course, national policy should support local rural communities, while economic policy should support the establishment of micro-enterprises, with microcapital.

Literature review

The structure of production in the Republic of Serbia provides significant opportunities for further diversification and sophistication as a result of production diversity. This is largely due to foreign direct investment, which influences the alignment of Serbian agricultural production with

the needs of advanced European economies and thus increases the index of opportunities for Serbian agriculture. Machinery, machine components and devices, electrical equipment, and food represent the most promising production categories for industrial sophistication in the Republic of Serbia today (OECD, 2019).

The Republic of Serbia has relatively low productivity compared to the EU average. Overall firm productivity in the Republic of Serbia is growing at a rate of 1.1% per year, however, to increase GDP growth by 1 percentage point, current productivity growth needs to double. High-growth companies (companies achieving minimum turnover growth of 20% in the last three years) have created 61% of new jobs, but they account for only 5% of the total number of companies in Serbia. The Republic of Serbia ranks significantly below most European Union countries in terms of the number of high-growth companies. New firms in the private sector are the main source of growth and job creation in the Republic of Serbia (World Bank, 2019).

In the past, the greatest attention was paid to ensuring adequate materials and raw materials in production companies. Compared to this practice, today the key resource of every company is its employees. Therefore, instead of focusing on finding adequate materials and raw materials, the focus is on finding employees who are competent to perform certain business activities (Cyrek & Fura, 2019). Given that the business environment is subject to constant change, it is necessary for individuals to constantly invest in acquiring new knowledge and skills to remain competitive in the labor market.

Long-term observations from 2013 to the end of 2021 have recorded a significant decrease in the proportion of the population at risk of social exclusion. However, current conditions indicate a deviation from the goal, which could lead to the annulment of the positive results achieved from 2013 to the present (SORS, 2022).

Increasing the competitiveness of the rural economy, sustainable management of rural resources, and the social aspects of rural development are some of the most important issues that attract the attention of the scientific community. While the amount of food to be produced is increasing, the rural workforce, or the number of farmers, is decreasing as a result of urbanization. The rural population decreased from 66.4% to 46.1% between 1960 and 2015. In 2017, the urban population accounted for more than 54% of the total global population. Almost all future growth in the world's population will be in urban areas, "so that by 2050, 66% of the world's population will live in cities" (Perović et al., 2020, p. 16).

To raise awareness of the importance of environmental protection and address many other significant global issues, the concept of sustainable development has been adopted (Kates et al., 2005). At the core of this concept is the requirement that future generations should inherit an environment that will be, at worst, in the same condition as the one current generations have inherited. Therefore, it requires maintaining the environment at its current level, i.e., without additional pollution (Hopwood et al., 2005).

More and more topics related to the origin of food, quality, sustainability of food production, and health values are being opened up. The great importance of the origin and quality of food has been recognized after the COVID-19 pandemic. The current global topic is the restriction of movement that has affected supply and demand. Besides the fact that the COVID-19 pandemic has acted as a setback for the recent advance of sustainable development in the European Union, it has also caused a series of major sanitary and socio-economic issues. This 'lost momentum' for sustainable development can be harnessed and used to redesign policies and projects in the direction of mitigating sustainable development disparities (Constantin et al., 2021). Understanding this sector appears to be particularly important, as it accounts for about 15-

30% of all negative environmental impacts (Heggen et al., 2020; Koster, 2021; Memon et al., 2021). A greater number of goals of the Strategy for the Development of Agriculture and Rural Development for the period from 2014 to 2024 are coherent with activities related to development within the priority area of food for the future.

Methodology

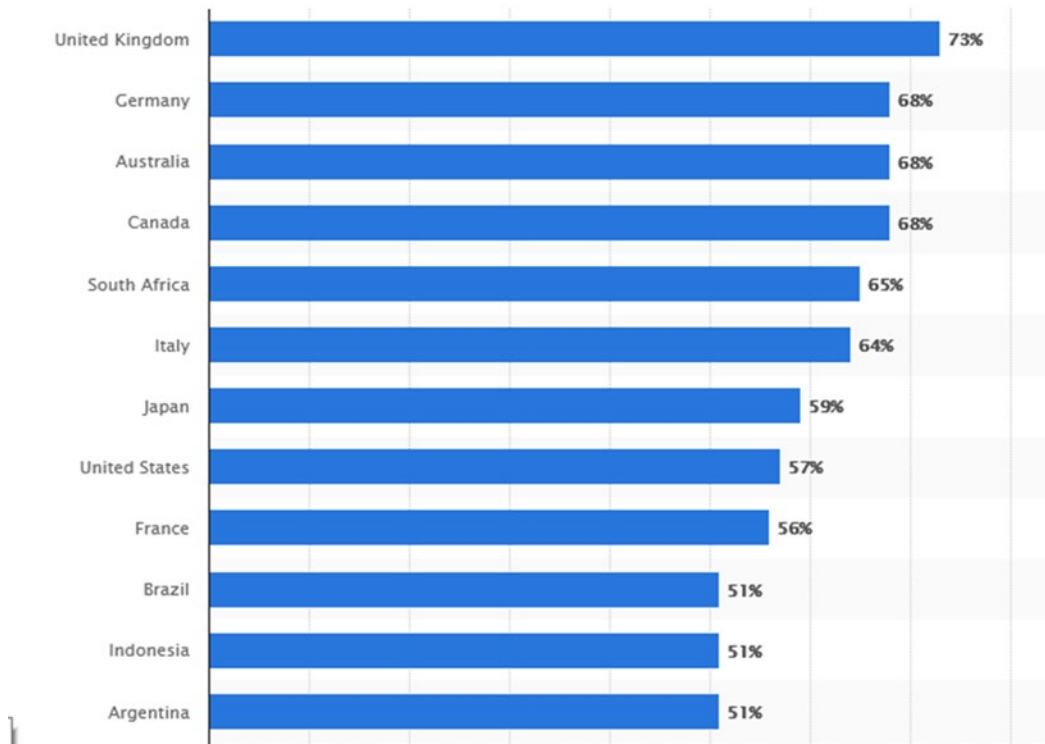
The method of analysis and synthesis will be used to analyze the relationship between the Goals of Sustainable Rural Development and the Smart Specialization Strategy 2020-2027 in the Republic of Serbia. Additionally, an analysis will be conducted on what kind of management of rural population (adoption and implementation of what rural policies and measures) makes their long-term development sustainable.

The historical method will be used for the chronological presentation of rural development policies, as well as agricultural and rural development strategies of Europe and Serbia. The descriptive method will be used to explain the assumptions and conditions for the development of rural areas, sustainable development, green economy, and the creation of effective marketing channels for plums in the Republic of Serbia. The comparative method will highlight differences in defining agricultural development and sustainable rural development, as well as how proactive action on rural development challenges and EU support measures change the development of rural areas towards their sustainable development and the application of green economy.

Results and discussions

Synergy of the Green Economy and Agriculture

During fifty years of reforms, this policy has evolved from productivity (in 1970), through competitiveness (in 1992), to sustainability (in 2000). The EU's rural development, which is aimed at smart, sustainable, and inclusive growth, is associated with the "EU 2020 Strategy," which embraces "green growth" in agriculture and rural economy. In the latest "Biodiversity Strategy for 2030," the emphasis is on long-term nature protection and halting ecosystem degradation. The Common Agricultural Policy for the period 2021-2027 supports even stronger green ambitions and is based on a fair deal for farmers, as well as preserving agriculture at the heart of European society but with greater ambitions for environmental and climate actions.



Graph 1. Support for investments in the green economy among G20 countries in 2020

Source: Salas, B. E. (2023). Support for investment in the green economy among G20 countries 2020, Retrieved from: <https://www.statista.com/statistics/1201304/popularity-more-investment-green-economy-jobs-g20-countries/>.

Since the industrial revolution, technology and industry have developed rapidly. This has helped raise living standards and, consequently, increase the world's population. Desires and needs have emerged that currently exceed the capacity of our planet. We all understand that such an operation will not last long and that something must be done about it. Choosing a sustainable path such as sustainable development is necessary. The concept that lays the foundation for such development is the green economy. Regarding Europe, rural areas cover more than 83% of the total area according to data from 2018. Agricultural land, forests, and other natural areas make up more than 80% of the area in Europe, and 30.6% of the population lives in rural areas. Europe's rural development policy is linked to the Common Agricultural Policy, the most significant and oldest EU policy.

Investments in green enterprises and jobs focused on sustainable development and environmental protection can play a key role in reducing greenhouse gas emissions and promoting sustainable development. Understanding public attitudes in different countries can help shape appropriate policies and strategies (Salas, 2023).

The green economy aims to preserve and sustainably manage natural resources such as water, forests, and biodiversity. This includes reducing deforestation, promoting sustainable agriculture, and protecting ecosystems. By examining the sector at the national level, it can be concluded that Serbia has significant arable land. Due to this potential, further investments in agriculture should be made to increase the sector's share of GDP. Comparing the total amount of arable land used for various agricultural crops with arable land in the Netherlands, it can be

concluded that Serbia has great potential, but due to the absence of modern technology, it is not competitive in the market. To improve the current situation in the country, additional programs subsidizing farmers need to be developed. The development of the sector has also reduced the current level of poverty in the country.

The goals of transitioning to a green economy can be diverse and encompass many aspects of sustainable development. The most important goals include:

- Economic competitiveness: Transitioning to a green economy can enhance a country's or region's competitiveness in the global market. Environmentally friendly products and services can have a competitive advantage.
- Energy self-sufficiency: Developing renewable energy sources and efficient energy systems can reduce dependence on domestic and imported energy sources and ensure energy supply stability.
- Preservation and management of natural resources: The green economy strives for sustainable management of natural resources to preserve them for future generations.
- Quality of life and work environment: Transitioning to cleaner production processes and using responsible technologies can improve air, water, and soil quality, positively impacting people's health and overall quality of life.
- Development of green jobs: The green economy can support the creation of new green jobs in sectors such as renewable energy, sustainable construction, recycling, and more.
- Local development and marketing: The green economy can support the development of local communities and attract investments in sustainability. Additionally, green products and services can be successfully marketed to attract consumers.
- Pollution reduction: Transitioning to a green economy also aims to reduce emissions of harmful pollutants and minimize the effects of climate change.
- Encouraging innovation: The green economy can stimulate innovation in technology, production, and sustainable development, which can benefit the economy and society. The key to the success of the fourth industrial revolution is the gradual digitalization of the population and companies. To implement this industry in companies, it is necessary to digitally train the workforce, equip the company with the necessary equipment, introduce new laws, and standards (Zaramenskikh & Fedorova, 2020, Burlacu et al., 2021).

Innovations in the Function of Demographic Renewal of Rural Areas

In Serbia, 85% of the territory falls under rural areas dominated by small-scale farming with small parcels. Legally unregulated land ownership, especially agricultural land in social, state, and cooperative ownership, makes it difficult to irrigate and protect from floods and erosion. When combined with limited support measures for agriculture and rural areas, unregulated agrarian markets, underdeveloped advisory services, and rural depopulation, the obstacles and challenges for agricultural and rural development are structural and profound. Post-2020, qualifications are expected to be obtained to access larger EU funds for sustainable management of natural resources, environmental and climate challenges, and rural infrastructure.

In addition to the demographic and migration challenges facing our country, rural areas are also affected by numerous other socio-economic problems such as poverty and social exclusion, regional disparities and inequalities, lack of local initiative and competitiveness, and loss of cultural identity. In a globalized world where predicting economic trends is difficult and environmental and social problems are growing, life in rural areas becomes a more sustainable

choice for the future. Inheritance issues, knowledge and skills transfer, and access to financial markets and land are some of the most common problems faced by young farmers worldwide. The pandemic has heightened concerns worldwide that supply chains have become too long and complex. Some countries' policies included export bans to prevent the spread of the pandemic. However, this export ban only exacerbated shortages in stores. This was evident in the food crisis of 2012, where the export ban raised prices and further worsened short-term shortages (Douglas, 2020). Young people have vision, knowledge, and skills, but at the current stage of development, their aspirations towards agriculture need to be supported by appropriate state support measures. In this sense, aligning sectoral strategies with the preferences of young people towards agriculture is of great importance for the success of our country's rural policy. Considering the unfavorable demographic trends and the intensive process of depopulation of rural areas in Serbia, as well as the significant impact of contemporary challenges on establishing new development directions for rural areas, the research focus in this paper is directed towards considering the role and importance of young farmers in the demographic renewal of villages and the formation of new sustainable development paths in rural environments in Serbia.

Table 1. Rural Population in Serbia from 2011 to 2021

Area	Element	Year	Unit	Value
Serbia	Rural population	2011	1000 No	4027.87
Serbia	Rural population	2012	1000 No	3998.80
Serbia	Rural population	2013	1000 No	3972.25
Serbia	Rural population	2014	1000 No	3946.35
Serbia	Rural population	2015	1000 No	3921.44
Serbia	Rural population	2016	1000 No	3897.60
Serbia	Rural population	2017	1000 No	3872.98
Serbia	Rural population	2018	1000 No	3847.25
Serbia	Rural population	2019	1000 No	3819.99
Serbia	Rural population	2020	1000 No	3790.88
Serbia	Rural population	2021	1000 No	3759.83

Source: <https://www.fao.org/faostat/en/#data>.

Increasing the competitiveness of the rural economy, sustainable management of rural resources, and the social aspects of rural development are among the most important issues that concern the scientific community.

New scientific and technological solutions and practices in organizing advisory services, promoting cooperative associations, developing and applying new knowledge and skills through education programs for farmers, and supporting young farmers in modernizing their farms and implementing new technological solutions are possible solutions to overcome the constant decline in the rural population in the Republic of Serbia.

As part of the goal related to eradicating hunger globally, in Serbia, it is possible to depict the share of the total population facing moderate food insecurity, as well as those who are severely food insecure.

Regarding moderate food insecurity, this parameter increased during 2019 compared to 2015. In 2015, 11.4% of the population of Serbia faced moderate food insecurity, while the same parameter at the end of 2019 amounted to 12%.

On the other hand, the parameter related to severe food insecurity also increased from 1.7% in 2015 to 2.6% in 2019. However, the indicator measuring the nutrition status of children in Serbia has made progress. During 2021, there was a significant reduction in the number of malnourished children in our country (SORS, 2022).

Poverty, armed conflicts, and natural disasters contribute to the spread of diseases (World Bank, 2005). Rural areas are more susceptible and vulnerable to diseases due to poor infrastructure conditions, limited access to general health services, lack of disease awareness, and widespread poverty. Food insecurity and malnutrition can increase vulnerability to diseases (www.fao.org).

Innovations, digital literacy, social, and environmental awareness are some of the most significant sustainable sources of growth and development. Recognized large regional differences in demographic potential require systemic reforms and decentralization of decision-making. In a world where the growing global population and food consumption are met with limited natural resources, the green economy represents an appropriate development model for readiness to face future challenges in agriculture.

Government intervention and institutional solutions for the implementation of sustainable plum production in Serbia

The organization of young farmers and their farms is not possible without the assistance of the state and society. If we consider Serbia through the lens of achieving the goals of the green economy in terms of economic competitiveness, preservation and management of natural resources, local development, and marketing, using the example of plum productivity in Serbia for the period from 2013 to 2022, we conclude that the potentials have not been fully utilized. State support, which has a fluctuating trend, is not sufficient to transform Serbia's comparative advantages in terms of potential plum production, as the fruit with the largest share in production for the period from 2013 to 2022, into competitive ones.

Based on the presentation in Graph 2, it can be concluded that the record value of the index of state expenditures for financing the agriculture sector was recorded during the year 2017. However, from the beginning of 2019 until the end of 2021, the value of the index has declined. Observing the entire period, there is still a positive trend in agricultural financing, but it could turn negative relatively soon, given the small difference in the values of the index considered during 2015 and 2021.



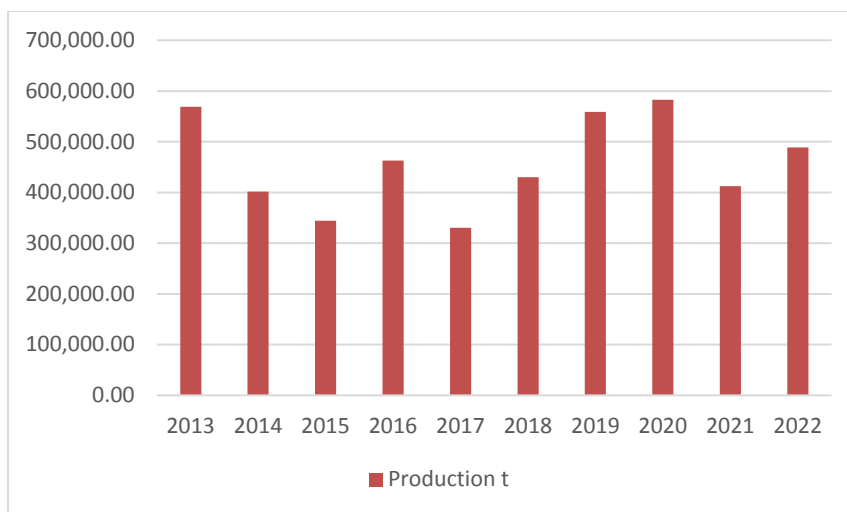
Graph 2. Index of state expenditures for financing the agriculture sector

Source: <https://www.stat.gov.rs/media/353536/izvestaj-o-napretku-u-ostvarivanju-ciljeva-odrzivog-razvoja-do-2030-godine-u-srbiji.pdf>.

By considering the sector at the national level, it can be concluded that Serbia has significant arable land. Due to this potential, further investments should be made in agriculture to increase its share in the gross domestic product of this sector continuously. To improve the current situation in the country, additional programs to subsidize farmers need to be developed. The development of the sector has also contributed to reducing the current level of poverty in the country, as one of the Millennium Development Goals.

Using the example of plum production and marketing, we can identify the shortcomings of Serbian agriculture. Serbia has good comparative advantages for plum production due to its fertile land, suitable climate, and the knowledge of farmers. Plum production varies due to neglect and lack of protection. Overproduction occurs, leading to fluctuations in production. Due to irrational harvesting, a large amount of the harvest is either destroyed or processed into brandy.

High plum yields have not been utilized due to the lack of organization and production quality. With improved plum quality, the opportunity for developing marketing channels for plum placement would offer significant potential. Plums are a very significant fruit, which is relatively underused in its fresh state, mainly due to processing into a variety of products, dominated by brandy of recognizable quality. The average plum production in the given period is 458 thousand tons, with a tendency of mild increase at an average annual rate of 2.24%. Production is marked by some variations, as indicated by the calculated coefficient of variation around the calculated trend line, at 19.8%.



Graph 3. Production of plums in Serbia in the period 2013-2022

Source: www.rzs.rs.

Out of the total plum production, which averages between 400-450,000 tons, 80% is processed into brandy. A small portion is processed into prunes (around 200 tons, according to statistical data, although estimates suggest that individual farmers and households could process an additional 600 to 800 tons that are not captured statistically), and the rest is used for table varieties. Smaller quantities of fruit are processed into jams, marmalades, juices, jellies, and similar products (Preparation of Fruits & Vegetables sector study for the IPARD Programme Final Report – March 2010). Plum production in Serbia is an example of what happens in specific production when there is no state phytosanitary system as part of the public interest system, which is a prerequisite for profitable production and development. Human intervention in

nature has endangered soil functioning and the provision of soil functions it offers. Soil degradation refers to the deterioration of the physical, chemical, and biological properties of the soil. Fertile soil is considered a non-renewable natural resource because its formation is linked to many human generations and can last for hundreds to thousands of years. Therefore, participation in soil management and preventing soil degradation is important to ensure a secure future for future generations (Ephraim et al., 2016).

Plum production in Serbia is an example of what happens in specific production when there is no state phytosanitary system as part of the public interest system, which is a prerequisite for profitable production and development. Human intervention in nature has endangered soil functioning and the provision of soil functions it offers. Soil degradation refers to the deterioration of the physical, chemical, and biological properties of the soil. Fertile soil is considered a non-renewable natural resource because its formation is linked to many human generations and can last for hundreds to thousands of years. Therefore, participation in soil management and preventing soil degradation is important to ensure a secure future for future generations (Ephraim et al., 2016).

Due to its unfavorable situation, Serbia disposes of lowest quality of plum intended for export, accordingly realizing a lowest price. Serbia is characteristic by the old seedings, owners of the family-owned properties, which use plum mainly for the production of brandy. The high costs of production are the result of uneven returns and inadequate quality, and the sale through mediators or buying-up is mostly applied. The future trend should contain investments into new technologies of breeding, thus reducing the expenses of production, increasing the quality of revenue and the number of organized producers (Radosavljević, 2015, Pătărlăgeanu, 2007).

The value chains of plums move towards the sale of fresh plums, production of brandy, processing of fresh plums for fruit brandy production, production of dried plums, production of jams, purees, compotes, etc. Mechanisms for future development directions should address the level of farms and the level of the entire chain, taking into account a range of chain configurations (short supply chains and export-oriented chains) and farm structures (family farms and corporate farms with hired labor) (Meuwissen et al., 2018).

The integrated approach, which involves the interconnection and intertwining of these different dimensions of sustainable development, is crucial for achieving the goals of the 2030 Agenda. For example, economic development can contribute to social inclusion, while environmental protection can affect both of these dimensions. This integrated approach implies that sustainable development cannot be achieved by focusing solely on one dimension but requires a holistic approach that takes into account all aspects of society, economy, and the environment. This is important to ensure a balance between economic, social, and environmental sustainability, which is crucial for creating a better future for all (Weiland et al., 2021).

Conclusion

The process of joining the European Union further emphasizes the importance of the green economy and sustainable development as priority areas for Serbia. Accession to the EU commits the country to aligning with European standards, including those related to environmental protection and sustainable development.

By integrating social, environmental, and economic aspects, the green economy aims to promote sustainable development in Serbia. This may involve promoting sustainable business models, investing in renewable energy sources, reducing harmful gas emissions, creating green

jobs, and improving the quality of life. It is important for Serbia to consider and implement green recovery measures that will support sustainable growth. This includes investments in renewable energy sources, improving energy efficiency in buildings and infrastructure, as well as supporting sustainable agriculture.

Compliance with environmental legislation and efforts to increase environmental efficiency in all areas imply a change in business practices and management, both in a broader and narrower sense or over a specific period. There is also the realization that these changes and their success depend on the assistance of the state and the efficiency of all participants in the marketing channel of agricultural and food products. From this, we can conclude that the implementation of environmental management requires cooperation among all participants in the production and marketing of agro-products. Without it, marketing channel entities cannot successfully implement and efficiently implement any form of environmental management.

Serbia has significant natural resources such as forests, water, and agricultural land. These resources can be used sustainably to maintain a green economy, for example, through sustainable agriculture.

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