Comparative analysis of sustainable development in the Republic of North Macedonia and the European Union

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Abstract

The rural economy represents a significant segment in the socio-economic development of every country. In the context of sustainable development, rural areas have a key role as they are a source of natural resources, agricultural production and biodiversity. They are also spaces where traditional values and cultural heritage are preserved and passed on to future generations (Van der Ploeg, 2008).

The purpose of this paper is to explore the opportunities and challenges facing the rural economy and to present strategies for its integration into contemporary trends of sustainable development through a comparative analysis of rural development in the Republic of North Macedonia and some of the countries in the European Union. Through the analysis of various theoretical models and practical examples, the potential of rural areas as a driver of sustainable development will be presented, with an emphasis on the balance between the economy, society and the environment (Sachs, 2015).

Keywords: *sustainable development, biodiversity, resources, economy, environment.*

Introduction

The theoretical aspects of rural economy include the analysis of the structure, functions and dynamics of economic activities in rural areas. These activities are closely related to agriculture, forestry, tourism and crafts, which are the basis for economic growth and sustainability (Marsden, 2003). The practical application of these theoretical concepts is reflected through initiatives for the development of local communities, the introduction of sustainable practices and the improvement of the living standards of the rural population (Pretty, 2008).

Sustainable development is a concept that defines the way in which humanity can achieve progress without compromising the resources of future generations. According to

the Brundtland Commission report (1987), “sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987).

The basis of this concept lies in the integration of three main dimensions:

1. Economic sustainability: Promoting economic growth and prosperity, through the rational use of resources. This aspect involves creating employment opportunities, supporting the local economy, and investing in sustainable technologies, with the aim of achieving economic stability (Barbier, 1987).

2. Environmental sustainability: Protecting the environment, conserving natural resources, and addressing climate change. This includes using renewable energy sources, reducing pollution, and establishing ecological balance through responsible land and water use practices (Pretty, 2008).

3. Social Sustainability: Achieving social justice, reducing poverty, and improving the quality of life. Social sustainability includes ensuring access to education, healthcare, and creating equal opportunities for all citizens, with the aim of strengthening communities and reducing social inequality (Sachs, 2015).

These three dimensions do not operate in isolation, but are interdependent and complementary, creating a system in which economic progress is inextricably linked to social well-being and environmental stability (Sachs et al., 2025). For example, without a healthy environment there can be no long-term economic productivity, and without social justice and education, technological development remains limited (Brundtland, 1987).

Modern European sustainable development policies apply this integrated approach through the European Green Deal programs and the Europe 2030 strategy, which promote the transition to a circular economy – a model where waste becomes a resource, and production and consumption are organized according to the principles of responsibility and efficiency (European Commission, 2020).

Additionally, sustainability requires active participation of citizens and institutions, as it cannot be imposed only through legal frameworks, but is built through a culture of responsibility and education for sustainable development (UNDP, 2020). In this sense, education and public awareness are considered a key fourth element that underpins the economic, environmental and social framework (Sterling, 2016).

Thus, sustainable development represents a dynamic process of balance between humans and nature, where each of the three dimensions constantly influences the others, creating conditions for a better, fairer and more responsible life for current and future generations (Sachs, 2015).

Sustainable development in the Republic of North Macedonia

North Macedonia, as a candidate country for membership in the European Union, has set sustainable development as a priority national goal. Government strategies, such as the National Strategy for Sustainable Development (2009–2030) and the National Strategy for Climate Change (2021), emphasize the need for balanced economic growth, social cohesion, and environmental protection (Ministry of Environment and Physical Planning, 2021).

Sustainable development in North Macedonia is a dynamic process that requires the integration of all three dimensions — economic, environmental, and social — into a common state vision.

Although challenges exist, particularly in the area of the environment and institutional

coordination, the country is moving in a positive direction through increased investments, legal reforms, and cooperation with international partners.

North Macedonia, through continued support for green policies and integration of European standards, can become an example of a small country that successfully connects economy, society and nature into a sustainable whole.

1. Economic dimension:

Economic development in North Macedonia in the last decade has been focused on improving competitiveness and increasing investments in green sectors. Programs are being introduced to support small and medium-sized enterprises, especially in the agro-sector, tourism and energy, with the aim of encouraging innovative and sustainable business models (World Bank, 2023).

However, economic sustainability requires long-term stability and diversification. Therefore, the state is gradually increasing support for renewable energy sources, where solar and hydropower play an increasingly important role. In 2023, more than 25% of the electricity produced came from renewable sources (Energy Agency of North Macedonia, 2023).

As part of the EU accession process, North Macedonia is aligning its economic policy with the European Green Deal, which entails reducing carbon emissions and investing in green infrastructure (European Commission, 2022).

2. Environmental dimension:

The environmental dimension is one of the most serious challenges for the country. North Macedonia faces problems such as air pollution, insufficient waste selection, and uneven use of water resources (UNEP, 2021).

In recent years, the country has strengthened environmental legislation, introducing new measures for waste management, biodiversity protection and air monitoring in urban areas (MEPP, 2021). The concept of a circular economy, which aims to reduce waste and increase the reuse of materials, is also being promoted.

North Macedonia, in cooperation with the European Union, is also implementing energy efficiency programs in public buildings, which allows for a significant reduction in energy consumption and CO_2 emissions (EU Delegation, 2022).

3. Social dimension:

Social sustainability in the country is based on creating equal opportunities and improving the quality of life of the population. The government has introduced measures for social inclusion, gender equality, and support for vulnerable groups, in line with the goals of the United Nations (UNDP, 2020).

Within the framework of the “Together for the Community” program, funded by the European Union, social housing, kindergartens, and rehabilitation centers were built in several municipalities, which is a direct application of the principles of social sustainability (European Union, 2021).

In addition, North Macedonia is gradually advancing education for sustainable development, including topics related to ecology, energy, and social responsibility in university curricula (Sachs, 2015).

The institutional framework for sustainable development in North Macedonia is based on coordination between several ministries and state institutions. The main actor is the Ministry of Environment and Physical Planning (MEPP), which works in partnership with the Ministry of Economy, the Ministry of Agriculture, Forestry and Water Management, and the Energy Agency (MEPP, 2022). In order to

better implement the policies, national councils and working groups have been established to coordinate the activities for the implementation of the National Strategy for Sustainable Development 2009–2030. These bodies are tasked with ensuring the integration of sustainable development principles in all sectors — energy, transport, agriculture, tourism, and education (Ministry of Environment and Physical Planning, 2021).

Additionally, Macedonia actively cooperates with international organizations, such as UNDP, GIZ, and the European Environment Agency, which provide technical and financial support for implementing eco-projects and strengthening institutional capacity (UNDP, 2023).

At the national level, the alignment of legislation with European standards is underway, through the transposition of directives on environmental protection, waste management, air quality and energy efficiency (European Commission, 2022). This process is of essential importance as it prepares the state system for EU accession and creates the preconditions for more responsible management of natural and human resources.

Although the institutional structure is in place, implementation and continuous monitoring remain a key challenge. Some of the strategies have not been fully implemented due to limited financial resources and lack of human capacity. Clear indicators and digital systems for monitoring progress need to be introduced, so that the public and academic institutions have a transparent insight into how far the country is actually moving towards sustainability (World Bank, 2023).

Sustainable development cannot be achieved through central institutions alone — the active involvement of local communities and municipalities is also necessary.

In North Macedonia, several municipalities, such as Debarca, Bogdanci, Gevgelija and Karposh, are already implementing local green city strategies and introducing smart energy solutions. Through energy efficiency programs, some public buildings are equipped with solar panels, waste management systems and green facades (EU Delegation, 2023).

One of the most successful examples is the municipality of Bogdanci, where in 2014 the first wind farm in the country was built, with a capacity of 36.8 MW, financed with support from the European Bank for Reconstruction and Development (EBRD, 2015). This project is an example of how the local economy can contribute to national energy transition goals.

In addition, increasing emphasis is being placed on rural development through the concept of Smart Villages. Although the concept is in its infancy, pilot projects are being implemented in Pelagonija and the Eastern Region, where digital solutions are being used to improve agriculture, transport and communication (Zavratnik et al., 2020).

According to UNDP research (2023), such initiatives not only improve the economic structure of villages, but also reduce youth migration, strengthening social cohesion.

Local authorities play a key role in implementing the European Green Agenda for the Western Balkans, especially in the areas of waste management, water protection and urban emissions reduction (European Parliament, 2021).

North Macedonia has the potential to become a regional example of a green transition, especially if it leverages its natural resources, young workforce and position in South-Eastern Europe. All that is needed is consistent policy implementation and continued investment in knowledge, infrastructure and innovation (Sachs, 2015).

Sustainable development in the European Union

Sustainable development is one of the fundamental pillars of European Union policies. The concept of integrating economic growth with environmental protection and social justice has been constantly evolving and advancing since 1997, when the first European Union Sustainable Development Strategy was adopted (European Commission, 1997). Today, this concept is most strongly represented through the European Green Deal, which sets out a vision for a climate-neutral continent by 2050 (European Commission, 2020).

The infographic shows how the European Union systematically monitors its progress in implementing the 17 Sustainable Development Goals (SDGs), adopted by the United Nations as part of the 2030 Agenda.

According to the latest Eurostat report (2023), most Member States are making significant progress in the areas of:

- quality education,
- clean energy,
- industry and innovation,
- sustainable cities and communities.

At the same time, the infographic shows that there are challenges in the areas of climate action, responsible production and consumption, as well as in reducing economic inequality between regions (European Environment Agency, 2023).

The European Union places sustainable development as a central priority of all its policies, with the aim of economic growth based on innovation, energy efficiency, digitalisation and social equality. This approach highlights the need for a balance between economic interests and the protection of natural resources, as well as for greater inclusion of citizens in decision-making processes (Sachs, 2015).

Important directions of this strategy are:

- Transition to green energy,
- Development of a circular economy,
- Reducing social inequalities,
- Promoting a digital and innovative economy (Sachs, 2015).

Through the Horizon Europe, Fit for 55 and NextGenerationEU programs, the European Union invests in research, technology and innovation in green sectors (European Parliament, 2021).

European countries are achieving significant results: the use of renewable energy in the EU is around 45%, and CO_2 emissions have been reduced by more than 30% compared to 1990 (Eurostat, 2023).

Over the last two decades, the European Union has developed a comprehensive policy framework supporting the transformation towards a green, digital and inclusive economy. The most significant documents and initiatives are:

1. The European Green Deal (2019) – a strategy that sets Europe as the first climate-neutral continent by 2050, with clear targets for reducing greenhouse gas emissions, promoting renewables and fostering green innovation (European Commission, 2020).

2. The 2030 Agenda for Sustainable Development – aligning the 17 global Sustainable Development Goals (SDGs) with European policies, by integrating social, economic and environmental objectives in all areas of public policy (UN, 2015).

3. The Fit for 55 Plan (2021) – a package of legislative measures aimed at

reducing emissions by 55% by 2030, in line with the Paris Agreement and the United Nations climate goals (European Parliament, 2021).

Additionally, the European Union invests in scientific research and innovation through the Horizon Europe program (2021–2027), which supports the development of green technologies, circular economy and digital solutions in member states (Koundouri et al., 2024).

The economic component of sustainable development in the EU is closely linked to a reorientation towards a green economy and innovative growth. This creates a balance between economic stability and environmental responsibility.

The European economy is gradually moving away from classic industrial models and towards a circular economy, where materials and resources are reused and waste is minimized. EU countries, through European funds, are actively investing in renewable energy, green innovations, transport and energy efficiency.

The NextGenerationEU programme (2020) is one of the largest financial packages in the history of the Union, aimed at recovering the economy after the pandemic, but also at transforming it into a green and digital economy. Over 37% of the funds are intended for climate projects and sustainable investments (European Commission, 2021).

Economic sustainability in the EU is not only measured through GDP, but also through social and environmental indicators. The European Statistical Office (Eurostat, 2023) shows that countries with the highest investment in green technologies and energy efficiency (such as Germany, the Netherlands and Denmark) also have the highest rates of innovation, productivity and stability in the labor market.

The EU's environmental policy is guided by the principle that economic growth must be compatible with environmental protection. According to Koundouri et al. (2024), this is achieved through a combination of regulations, financial instruments and research programmes.

The main directions of this policy are:

- increasing the share of renewable energy sources (wind, sun, biomass);
- reducing emissions of CO_2 and other pollutants;
- creating a circular economy that minimizes waste;
- managing natural resources and protecting biodiversity.

According to the European Environment Agency (2023), by 2022, greenhouse gas emissions in the EU have been reduced by 31% compared to 1990 levels, and the use of renewable energy sources has reached 45%.

Sustainable development in some EU countries

The European Union is making significant efforts to ensure a just transition to a green and sustainable economy. This transition aims to support communities and regions most affected by the transition to climate neutrality, in particular those that depend on coal, carbon-intensive industries or traditional energy sources (European Commission, 2022).

One of the most important financial instruments for this purpose is the Just Transition Fund (JTF), which provides funds for training workers, creating new green jobs, and supporting local economies to reduce the social and economic impact of the transition to green energy (European Network for Rural Development, 2022).

This transition process is not limited to the economic transition, but also

encompasses the social and environmental dimensions of development. To ensure long-term sustainability, it is necessary to involve all stakeholders in the process – governments, local communities, workers and the private sector (Sachs et al., 2025). Through cooperation and consultation, a framework is created that ensures a fair distribution of the benefits and costs of the green transition, especially in regions where traditional industry has been the main source of income (Papadopoulou et al., 2020).

Sustainable development in Greece

Greece, as a member state of the European Union, is actively integrating the sustainable development strategy into its national policies and economic plans. The National Energy and Climate Plan (Hellenic National Energy and Climate Plan, 2021) is a fundamental document that defines the guidelines for reducing emissions, transitioning to renewable energy sources and enhancing energy efficiency (Hellenic Republic, 2021).

In the last decade, Greece has made significant steps towards a just transition to a green economy, through the implementation of several programs supported by the European Union, the most significant of which is the Just Transition Fund (JTF).

The Just Transition Fund (JTF) is one of the most important financial instruments of the European Union to support regions that are economically dependent on carbon-intensive industries, such as the coal hubs of Western Macedonia and the Peloponnese (European Commission, 2022).

The main objective of the JTF is to enable a socially and economically just transition to sustainable growth models, through:

- investments in renewable energy sources and energy efficiency,
- retraining the workforce,
- creation of new green jobs,
- support for small and medium-sized enterprises that apply green technologies.

In the context of Greece, the fund directly supports decarbonization actions in the region of Western Macedonia, which has been dependent on the lignite industry for decades. These activities are part of the national strategy to eliminate the use of coal by 2028, which is one of the most ambitious goals in South-Eastern Europe (Papadopoulou et al., 2020).

Through the Just Transition Mechanism program, the EU has allocated over 1.6 billion euros to Greek regions affected by the closure of thermal power plants and mines, creating the prerequisites for sustainable, inclusive and digitally advanced communities (European Commission, 2023). These funds are aimed at developing new green industries, such as battery production, renewable energy sources and smart agriculture. Such investments enable the economic revitalization of local communities and open up new employment opportunities, especially for young people and women in rural areas (Ioannou et al., 2025).

1. Examples of green investments in Greece:

The Greek government, in collaboration with the European Investment Bank (EIB) and the private sector, is financing numerous green projects, such as:

- construction of solar parks in the region of Kozani and Ptolemais,
- installation of wind turbines in the Aegean Sea,

- electrification of public transport in Athens and Thessaloniki,
- introduction of digitalized waste management systems (Ioannou, Karasmanaki & Tsantopoulos, 2025).

According to research by Manasakis and Taliouris (2022), these measures not only contribute to reducing pollution and protecting natural resources, but also have a positive impact on employment and local economic growth, as they create new opportunities for young engineers, technicians, and experts in renewable technologies.

Sustainable development in Slovenia

The Republic of Slovenia is one of the leading countries in the region in implementing sustainable practices, thanks to integrated policies that link economic, environmental and social aspects of development. Slovenia was among the first countries in the EU to introduce a national circular economy plan, as well as the “Green Scheme of Slovenian Tourism”, rewarding municipalities and companies that apply environmental standards (Ministry of the Environment and Spatial Planning, 2022).

1. Economic and innovation dimension:

Within the framework of the European RENOINVEST and SMAFIN EXPANDED programmes, Slovenia has established a national network for financing sustainable and energy-efficient projects.

These initiatives are implemented in cooperation with the Institute for Construction and Materials (ZAG) and the József Štefan Institute, with the aim of creating models for public-private investments in energy efficiency (Archenerg, 2024).

In the private sector, companies such as Cinkarna Celje are integrating sustainability as a strategic direction through investments in solar panels, renewable energy sources and recycling technology (SLO-MAG, 2023).

These investments not only improve the competitiveness of the industry, but also significantly reduce the carbon footprint.

2. Ecological and rural dimension:

In the environmental segment, Slovenia is implementing the COSMOS program, developed by the Slovenian Forestry Institute, which aims to promote agro-forestry systems based on synergy between forestry and agriculture.

This model includes the cultivation of aromatic plants, mushrooms and beekeeping, which increases the biodiversity value and sustainability of the land (Slovenian Forestry Institute, 2023).

Slovenia is also actively promoting the concept of “Smart Villages” — a pilot initiative that combines digitalization, energy efficiency, and innovation in rural communities. Examples include the municipalities of Kranj, Tolmin, and Kočevje, where smart lighting systems, smart waste management, and local green energy production have been implemented (European Network for Rural Development, 2022).

3. Social and educational dimension:

Slovenia is investing in the educational component of sustainable development. Through the EduZeleni program, funded by the Ministry of Education, modules on energy efficiency and environmental awareness are being introduced in secondary schools and universities (MIZŠ, 2023). This approach aims to develop generations of young people who are aware of climate change and the importance of responsible resource use. The program is implemented in cooperation with the universities of Ljubljana and Maribor and

includes practical activities such as eco-projects, research and local initiatives for environmental protection (Ministry of the Environment and Spatial Planning, 2022). Through this educational transformation, Slovenia is strengthening a sense of social responsibility and building a culture of sustainability that is the basis for long-term environmental and economic progress (Sachs et al., 2025).

Sustainable development in Germany

Germany is one of the most advanced countries in the world in implementing sustainable development. Its national sustainability strategy (Deutsche Nachhaltigkeitsstrategie, 2021) follows the framework of the 2030 Agenda and is based on three pillars: economic growth, social equality and environmental protection (German Federal Government, 2021).

1. Energy and technological transition:

Green energy projects in Germany are at the core of the Energiewende strategy. One of the most significant is the EWE and Siemens Energy project (2024), which envisages the construction of a 280 MW green hydrogen electrolysis plant in northern Germany. This project will provide renewable energy for industry and transport and help reduce CO_2 emissions (Reuters, 2024).

Additionally, Germany is leading the digital green transition through the creation of Smart Cities — the most prominent example is the Schumacher-Quartier project in Berlin-Tegel, the first urban district in Europe built entirely of wood, with a neutral carbon balance (SDG21, 2023).

2. Education and Innovation:

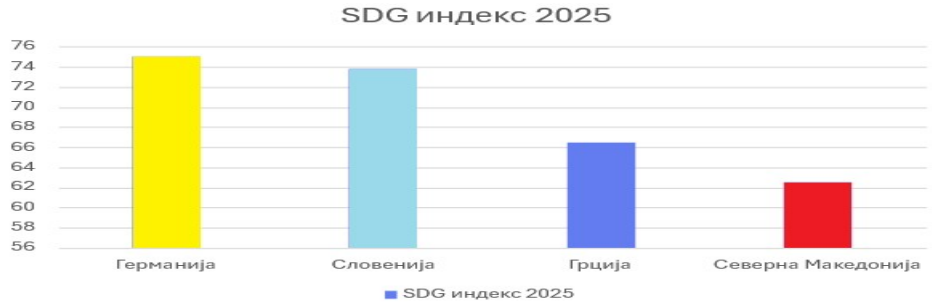
In the field of education, the HOCH-N (Hochschule für Nachhaltige Entwicklung) project plays a key role. It is a network of universities that integrate sustainability principles into teaching, research and institutional management.

The project is funded by the Federal Ministry of Education and Research and is an example of a long-term national commitment to educational sustainability (HOCH-N, 2022).

3. Social dimension and local communities:

In German regions such as Saxony and Bavaria, local communities are developing energy cooperatives (Energiegenossenschaften), where citizens jointly invest in solar and wind parks and represent a successful example of sustainable local development (Bundesnetzagentur, 2023).

Chart 1. Sustainable Development Index (SDG Index) 2025 for Germany, Slovenia, Greece and North Macedonia.



Source: own research

The chart shows the comparative status of four countries according to the SDG Index for 2025, which measures progress towards meeting the 17 Sustainable Development Goals (SDGs) defined by the United Nations. As can be seen, Germany (75.0) and Slovenia (73.8) are among the most successful countries in Europe in achieving the set goals, thanks to their developed strategies for green energy, circular economy and digital transformation (European Commission, 2023). Greece (66.5) has been making steady progress, especially after the implementation of the Just Transition Mechanism, which supports a just energy transition and the creation of green jobs (Papadopoulou et al., 2020). On the other hand, North Macedonia (62.5) is still below the EU average, indicating the need for strengthened policies for renewable energy, energy efficiency, and environmental management (Ministry of Environment and Physical Planning, 2021).

This graph visually confirms the conclusive analysis that countries with a clear national strategy and investment mechanisms for a green economy achieve a higher degree of sustainability, while countries in transition must continue with reforms and European integration to reach the same standards (Sachs et al., 2025).

Conclusion

Sustainable development is a fundamental pillar of contemporary national and international policies, aimed at creating a balance between economic growth, social justice and environmental protection. Within the framework of this paper, a detailed comparative analysis of the concept and application of sustainable development in the Republic of North Macedonia and several countries of the European Union was carried out - in order to identify similarities, differences and opportunities for improving national policies.

The analysis of the Republic of North Macedonia highlighted that the country recognizes the importance of sustainable development and incorporates its principles into national strategies (National Strategy for Sustainable Development 2009–2030; National Strategy for Climate Change 2021). However, although an institutional framework is in place, the implementation of measures is limited due to economic challenges, insufficient digitalization and weak environmental awareness. Therefore, it is necessary to strengthen coordination between the public and private sectors, as well as the involvement of academic institutions and civil society organizations.

Comparative analysis with Greece, Slovenia and Germany showes that progress towards sustainable development most often depends on consistent state policy, innovation and effective use of European funds. The comparison shows that a successful model of sustainable development requires integration, predictability and participation of all social actors. EU member states are moving towards a system where economic growth is based on innovation and digital solutions, social equality is achieved through education and inclusion, and environmental protection is ensured by modern technologies and green investments.

This paper shows that sustainable development is not just an economic or ecological category, but a way of thinking and acting that requires constant cooperation between the state, science, business and citizens.

Only through a combination of knowledge, responsibility and innovation can a society be created that will progress without endangering the future of future generations.

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