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Implementation of circular economy principles to promote the development of rural areas

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► **Abstract.** The relevance of the study lies in identifying and explaining the impact of implementing circular economy technologies on the development of rural areas within the framework of the state strategy for regional development in Ukraine, thereby contributing to ensuring the socio-economic stability of communities and the overall security of the country. The purpose of this study was to investigate the influence of utilising circular economy opportunities on the development of rural territories. The abstract-logical method was employed to substantiate the research methodology and formulate theoretical conclusions. The analytical and comparative methods was utilised to organise researchers' scientific approaches to theoretical aspects of circular economy development, refine the methodological basis, and substantiate the applicability of circular economy principles in rural development. The research utilised a graphical method to illustrate the findings and an abstract-logical approach to draw conclusions and recommendations. The study was divided into three main stages. The literature on the contemporary definition of "circular economy" was examined, and the driving forces and barriers to systemic circular economy in rural areas were analysed. The study investigated how European Union countries apply strategies to address environmental and economic issues through the lens of circular economy. The analysis of the experience in implementing circular economy practices in EU countries revealed a clear trend towards more sustainable resource utilisation and reduced environmental impact. The implementation of the "Farm to Fork" strategy under the European Green Deal is a crucial step towards ensuring sustainable resource use and implementing environmentally friendly practices in agriculture and the food industry. An assessment of the impact of implementing circular economy on the socio-economic development of rural areas was conducted, indicating that the development of circular models can be key to optimising resource utilisation, creating new employment opportunities, improving production efficiency, and increasing the profitability of agricultural enterprises. The implementation of circular methods in agriculture can reduce resource costs and provide more stable conditions for development. The results can be beneficial for government bodies, local administrations, agricultural enterprises, and cooperatives in Ukraine striving to achieve sustainable development of rural territories through the implementation of circular approaches in the economy

► **Keywords:** regional development; sustainable development; rural areas; regional growth; rural development

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► Introduction

Ensuring the sustainable development of humanity is one of the key challenges for the global community. The main goal is to meet all the needs of people – economic, social, and environmental – simultaneously, without causing harm to future generations. Many countries, including China, USA, European Union, India are taking measures to fulfill the Paris Agreement goals aimed at achieving sustainable development (Raiser *et al.*, 2020). The significance of the development concept has seen a considerable rise, particularly as humanity faces increasingly evident threats from significant environmental issues resulting from what is termed a “linear economy”. This economic model relies primarily on the single-use consumption of resources, without the ability for their subsequent recycling or reuse.

One of the pressing environmental issues in Ukraine, according to L. Pronko (2022), is waste management, the volume of which is constantly increasing due to urban development, the growth of the service sector, and other factors. Society violates one of the basic principles of ecology – the closed material cycle in nature, by introducing secondary materials into the natural environment.

According to I. Honcharuk & V. Vovk (2020), Ukraine faces a serious problem in waste management, characterised by its large scale and significance. This is explained by both the prevalence in the national economy of technologies requiring large amounts of resources and generating high levels of waste, and the lack of an adequate response to this problem over an extended period. Uncontrolled accumulation of waste poses a threat to Ukraine’s national security, environment, and public health. Agriculture generates a significant amount of waste, which could serve as raw material for biofuel production from various plant and animal sources. However, despite its value, such waste remains unused due to the lack of plans for their conversion into biofuels and their use to improve soil fertility. This underscores the need for effective waste management in agriculture (Soil and its regeneration..., n.d.).

In a situation of energy resource scarcity and exacerbated environmental problems, finding an ecologically safe way to handle them, including conversion into biogas, is an urgent and important task. According to data from 2020, the volume of waste from agricultural enterprises, processing enterprises of agriculture, and households exceeds 15 million tonnes. A significant portion of this raw material can be used for biogas production, underscoring the relevance of this issue (Mazur & Gontaruk, 2022).

The agricultural sector suffers the most from climate change and contributes to it through its own actions. The agro-industrial complex is a significant source of greenhouse gas emissions due to the use of fossil fuels, burning of plant residues, and failure to comply with waste disposal regulations. I. Honcharuk (2020) explores solutions to these problems by implementing environmentally friendly production and use of biofuels in agricultural enterprises, which will reduce CO₂ emissions, increase profitability and soil fertility, and ensure energy independence for the industry (Michelle *et al.*, 2021).

Due to a significant reduction in gas imports and a sharp increase in energy prices, utilising the biomass potential for biomethane production has become an urgent

task to ensure the country’s energy security. According to V. Bondarenko *et al.* (2023), sugar factories can serve as a basis for the rapid implementation of relevant production. Biomethane, which is a natural gas equivalent, can be used for heating, electricity generation, transportation fuel, and in the chemical industry, thereby aligning with the principles of the circular economy by converting agricultural by-products and household waste into sources of energy and fertilisers for agricultural lands. Such a transition could be a key factor in ensuring the country’s energy security in the medium term.

According to N. Kuenzer (2021), for a smooth transition to a local economy that efficiently utilises resources and has development potential, a closed-loop economy serves as a key element of sustainable regional development. The interaction of the closed-loop economy in urban environments is already attracting the attention of many scientific studies. Therefore, it is important to consider how the implementation of closed-loop technologies can impact the development of territorial communities.

There is increasing attention to environmental conservation and ecosystem preservation. In this context, the closed-loop economy emerges as a new economic paradigm designed to effectively replace traditional linear growth models. Researchers (Ingrassia *et al.*, 2023) are convinced that agricultural production and tourism, in particular, can significantly contribute to achieving sustainable development goals through economic circularity. In the current context, ensuring the sustainable and effective utilisation of resources presents a pressing challenge, prompting shifts in production, consumption, and lifestyle patterns (Gómez & Martínez, 2023). According to E. Stamevska *et al.* (2020) circular economy aims to ensure that products, components and materials always have the highest utility and value. According to N. Kuenzer (2021), the economy of a closed cycle should be based on innovative potential and diversification.

The growing human impact on the natural environment, resulting from rapid and inefficient use of natural resources, leads to the disruption of ecological balance and exacerbates the global issue of climate change. The purpose of the study was to investigate and analyse the current environmental problems in Ukraine, particularly waste management and the impact of the agricultural sector on climate change. The research was focused on applying the principles of the circular economy to ensure sustainable development of rural areas.

► Materials and methods

The research methodology was established using the abstract-logical method to support the study’s framework and formulate theoretical conclusions. The analytical and comparative methods were employed to systematise the scientific approaches to the theoretical aspects of circular economy development, thereby enhancing the methodological foundation for advocating the application of circular economy principles in rural areas. These methods also helped identify potential barriers and challenges that may hinder the implementation of circular economy. Additionally, the graphical method was utilised to visualise the research results.

To analyse the dynamics of material circularity in EU countries, methods of data systematisation and statistical analysis were employed, and relevant data were collected from the Eurostat website (Database, n.d.). This indicator, which measures the proportion of materials that are recycled and reintroduced into the economy, was analysed using the abstract-logical method to support the theoretical framework of the study and formulate theoretical conclusions.

For the investigation of the European Investment Bank's (EIB) role in the development of the circular economy and support for projects addressing major environmental issues, a detailed analysis of the EIB's activities in the context of circular economy support and environmental problem-solving was conducted. This analysis helped identify key aspects of the bank's role in these processes and delineate the main directions of its activities. An examination of the financial instruments and consultations provided by the EIB to project initiators was carried out to ascertain how the bank contributes to the transition to a circular economy and the achievement of sustainable development goals. These methods facilitated an analysis of the EIB's role in circular economy development and identified the main directions of its activities in this field. Additionally, they helped identify examples of projects and initiatives supported by the EIB to build a more sustainable economy.

The research can be seen as a long process divided into three main stages. In the first stage, a literature review of L. Pronko (2022), V. Bondarenko *et al.* (2023), The Circularity Gap Report (2023) was conducted on the current definition of circular economy and its drivers and barriers were analysed. In addition, the spatial factors that were key to the creation of a systemic circular economy in rural areas were identified. During the second stage of the research, the focus was on analysing how European Union countries applied strategies to address environmental and economic issues through the lens of the circular economy. The experience of EU countries in implementing the circular economy was examined (Database, n.d.), showing a trend towards more sustainable resource use and reduced environmental impact. The third stage involved assessing the impact of implementing the circular economy on the socio-economic development of rural areas, which included a statistical evaluation of the socio-economic development of rural areas in Ukraine based on data from the State Statistics Service of Ukraine (Official web-site of the..., n.d.) and developing recommendations to enhance the positive impact of the circular economy on rural development.

► Results and Discussion

Definition of circular economy: key factors and spatial aspects in the context of rural areas. It is entirely true that there is a growing interest among researchers and experts from various fields in the concept of the circular economy in recent times. However, research focused on rural areas remains relatively limited compared to urban regions. The participants of the Systemic circular economy holds great potential for rural areas (2023) project understand not only waste management, but also systemic thinking from product development to use and recycling.

In general, the concept of a closed-loop economy is most effectively implemented on large scales. However,

the implementation of this concept is also possible in individual regions or even within a single company (Abbaszade, 2021). F.-C. Mihai *et al.* (2022) highlight significant deficiencies in knowledge regarding waste management in rural areas. According to the researchers, rural communities become accomplices in plastic pollution due to issues with household waste disposal and illegal dumpsites (Cutting plastics pollution..., 2023).

Managing solid waste and its impact on the environment, health, well-being, and resources is becoming increasingly challenging in remote areas. These challenges primarily stem from inadequate infrastructure, limited land availability, high waste collection costs, and low levels of environmental awareness. A study conducted by H. Salim *et al.* (2023) investigated the factors influencing sustainable solid waste management practices. The study conducted by M. Geissdoerfer *et al.* (2018) explored the feasibility of implementing circular business models and circular supply chains as key components for realising the principles of sustainable development.

M. Briguglio *et al.* (2021) argue that the circular economy is largely dependent on institutional and regulatory factors. It is worth agreeing with the researchers' opinion that public policy can create a favourable environment for innovation and entrepreneurship. The researchers suggest that government bodies can implement various instruments and programmes aimed at stimulating the development of the circular economy, providing financial support, and incentives for enterprises adopting circular practices. The state can regulate the market to promote circular practices by establishing standards for environmentally friendly production and resource use, and implementing tax incentives for companies operating in the circular sector. Government procurement can be directed to support circular producers and suppliers by creating demand for circular goods and services, thereby stimulating the market and increasing its volume.

Numerous researchers from Ukraine have explored the concept of the circular economy and the advantages of adopting it, drawing from the expertise of the European Union, which is globally recognised as a pioneer in this field. In particular, N. Horbal & Y. Lomaha (2022) analysed the implementation of circular economy principles and give examples of successful application of its business models. They identified the most pressing global problems that can be solved only by the circular economy. The study conducted by M. Ruda & Ya. Myrka (2020) examined findings regarding the circular economy and its advantages when applied in Ukraine, drawing insights from the European Union's practices. The researchers outlined the recommendations, which can be considered by the governments of the country, taking into account the critical environmental situation in the world. The possibilities of creating and developing circular business models in Ukraine, using the best European practices in the field of waste management, are also substantiated.

Starting a business in rural areas is a way to promote sustainable development and responsible use of shared resources, such a business is oriented towards a circular economy model in which the concept of waste is eliminated, reuse is included and supply chains are reduced (Stamevska *et al.*, 2020). By its very nature, the circular

economy promotes interaction between different stakeholders and industries to achieve maximum potential. This requires joint, coordinated efforts at different levels of government, starting from local and regional to national and European levels.

As noted by researchers (Ekins *et al.*, 2019), circular economy practices are already being implemented at the enterprise level. However, it is evident that these practices have not yet become widespread. From this, it can be concluded that there are factors that contribute to the implementation of the circular economy and, in certain circumstances, to its development, but there are also barriers that prevent its more widespread application. Studying both the driving factors and barriers for the circular economy provides a valuable foundation for developing interventions to enhance the approach's effectiveness, overcome obstacles, and bolster driving forces.

When analysing the drivers and barriers of the circular economy, it is important to distinguish between internal and external barriers. The external environment allows businesses to adapt to changes and identify new development opportunities. Internal barriers are often associated with factors such as insufficient staff qualifications, inadequate financial resources, or lack of leadership skills within the team. On the other hand, external barriers may include economic, social, political, technological, and environmental trends. It is important to understand that not all external factors are obstacles; some of them can act as motivators for businesses, offering new opportunities or prompting changes. In summary, distinguishing between internal and external barriers helps businesses better understand their environment, identify key factors affecting their operations, and develop strategies for success in their surroundings (Fig. 1).

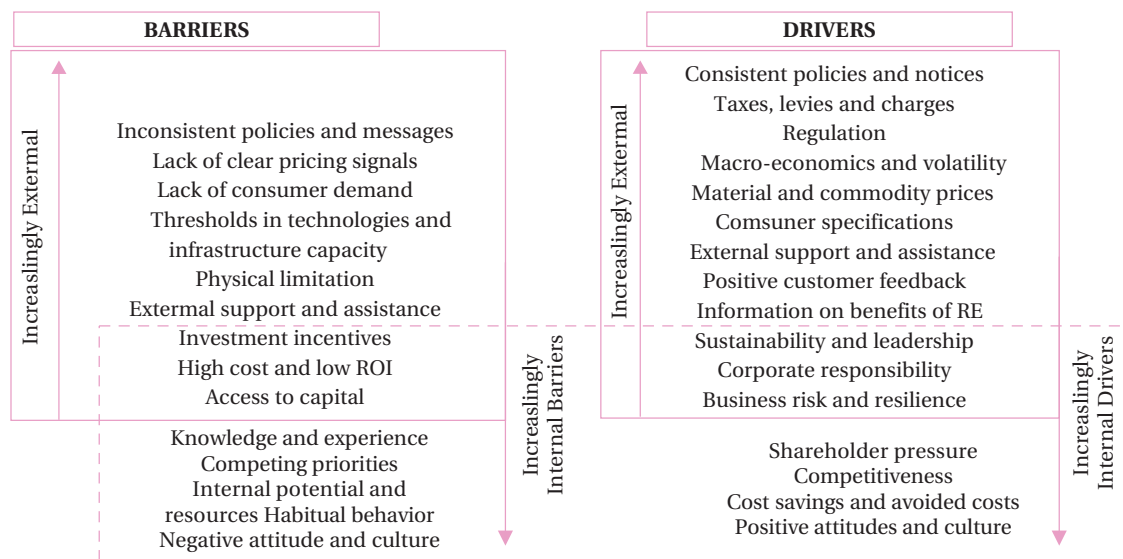


Figure 1. Barriers and drivers of circular economy development

Source: developed by the authors based on P. Ekins *et al.* (2019)

Moreover, findings from the OECD (Fig. 2) survey underscore common obstacles to this transition, including cultural, regulatory, and financial challenges. Additionally, addressing issues related to information, awareness, engagement, political will, and having a coherent vision

are essential for overcoming these barriers and promoting a more circular economy. Overall, concerted efforts from companies, governments, and society are needed to implement the transition to a more sustainable and circular economic model.

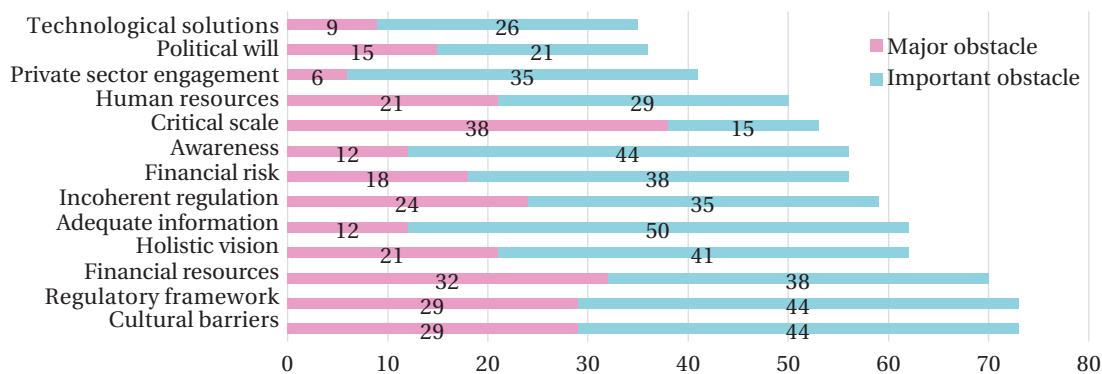


Figure 2. Obstacles to transitioning to a circular economy for cities and regions

Notes: defined in %

Source: developed by the authors based on The circular economy in cities and regions (2019)

Hence, obstacles and drivers for any participant or organisation may be categorised as either internal, pertaining to internal operations and choices, or external, associated with external circumstances that they have limited direct influence over, according to the OECD survey (2019). There are important synergies between different categories of barriers/drivers, between internal and external differences, and between perspectives at the firm, individual, and government levels.

Analysis of the experience of the EU countries in implementing the circular economy in the agro-industrial complex. Shifting towards a circular economy offers advantages for enterprises. Through reassessing business models, production methods, and product design, companies embracing circularity can notably diminish expenses associated with materials, energy, and waste management. Consequently, this can result in heightened profitability and a strengthened competitive edge. This approach is reflected in the new Circular Economy Action Plan adopted by the European Union, which is a key

element of the European Green Deal and a new strategic direction for Europe's sustainable development, New circular economy action plan for the European Union (n.d.). The sustainability principles identified in the plan include improving durability, reusability, renewability and maintainability, addressing the presence of hazardous chemicals in products and increasing the content of recycled products. These new rules and initiatives have been developed with the participation of businesses and stakeholders and will be implemented by the European Commission to support sustainable development.

Analysing the experience of EU countries in applying the circular economy reflects a trend towards more sustainable resource use and reduced environmental impact (Table 1). However, it is important to consider that the effectiveness of the circular economy may vary depending on the context and conditions of each country. Therefore, national specificities and opportunities need to be considered for successful implementation of these strategies.

Table 1. Dynamics circular material use rate of the EU countries

Countries	2018	2019	2020	2021	2022
Belgium	20.8	20.7	23.0	23.7	22.2
Bulgaria	2.5	4.1	5.9	4.8	4.8
Czechia	10.4	10.5	11.5	11.4	11.9
Denmark	8.0	7.6	7.6	8.0	7.4
Germany	12.1	12.5	12.9	12.7	13.0
Estonia	13.9	15.4	16.5	15.9	16.0
Ireland	1.7	1.6	1.7	1.9	1.8
Greece	3.0	3.4	4.2	3.5	3.1
Spain	8.9	9.0	9.2	6.9	7.1
France	19.5	18.1	18.7	18.7	19.3
Croatia	5.0	5.3	5.5	5.7	5.8
Italy	18.8	18.8	20.6	19.0	18.7
Latvia	4.7	4.7	5.2	5.6	5.4
Austria	11.9	11.6	11.5	12.8	13.8
Poland	10.5	9.2	7.3	9.1	8.4
Portugal	2.2	2.3	2.5	2.6	2.6
Romania	1.6	1.4	1.5	1.4	1.4
Slovenia	10.0	10.2	9.9	10.1	9.4
Slovakia	4.9	8.4	10.4	8.2	9.1
Finland	4.4	4.5	4.4	1.6	0.6
Sweden	6.6	6.4	6.9	6.2	6.1

Source: developed by Database (n.d.)

Analysing the dynamics of material usage in European Union countries reveals several important trends. Firstly, there is significant diversity in circularity levels among different countries. Netherlands and Ireland, for example, demonstrate high levels of circular material usage throughout the study period, indicating efficient utilisation of secondary materials. Secondly, there are certain trends in the change of circularity levels over time within each individual country. For instance, Bulgaria and Romania may observe an increase in circularity over the study period, while others like Spain may experience fluctuations in this dynamic. Overall, the analysis of this data underscores the importance of developing the circular economy as an effective tool for reducing environmental impact and ensuring sustainable resource utilisation. Half

of EU cropland relies on pollinators, but these populations are declining. Droughts inflict EUR 9 billion in yearly damages across agriculture, energy, and water. Overuse of antibiotics in healthcare fuels a crisis, causing an estimated 33,000 deaths in Europe each year. Rising temperatures are projected to decrease major crop yields by 3-10% per degree Celsius (Database, n.d.).

The EU's Green Deal, aiming for a climate-neutral Europe by 2050, includes the Farm to Fork strategy (Farm to Fork strategy, n.d.). This strategy seeks to make EU food production more sustainable. The goal is a resilient system with a positive environmental impact, combating climate change and biodiversity loss. It should also ensure food security, good nutrition, and fair economic practices for all.

Agriculture, food processing, and fisheries generated over 55 million tonnes of waste in the EU in 2020, representing nearly 3% of all industrial waste. Food waste is a significant concern, with an average person in the EU discarding 131 kg of food in 2021 (Key figures on the European food chain 2023 edition, 2023). Households are the biggest culprit, contributing over half of this waste. Food processing generates the most food waste within the industry, though households remain the primary source in most EU countries. Notably, some countries like Belgium and the Netherlands see higher food waste from processing than households. The EU is implementing policies to encourage a circular economy, where resources are reused and recycled. This approach aims to reduce environmental impact and promote sustainable development. Data shows a variation in circularity levels among EU countries, highlighting the need for tailored strategies.

Assessment of the impact of the implementation of the circular economy on the socio-economic development of rural areas. Ukraine is one of the largest agricultural countries in the world, and a large amount of biological waste in the form of plant and animal residues can be used for the production of biofuels, organic fertilisers, biogas, and other products that can be used in agriculture or processed into higher value goods. Plant and animal waste can be processed into biofuel, which can be used for energy purposes or as alternative fuel for transportation.

Biogas obtained from the processing of organic waste can serve as a source of energy for electricity generation or heating. In agriculture, transitioning to the principles of a circular economy involves adopting a “zero waste” system, where all produced products are either used as end products or as raw materials for other production. This helps address the problem of natural resource scarcity and reduces dependence on imported materials, especially amid constraints in international trade. Implementing circular practices can foster the development of new technologies aimed at sustainable production, which, in turn, can contribute to economic growth in the agricultural sector. The use of soil restoration technologies, such as composting and green manure, allows increasing soil fertility and reducing the use of chemical fertilisers. For example, through composting, organic waste can be transformed into nutrient-rich compost, which can then be used for irrigation of crops or added to the soil to enhance its fertility. The use of water-saving technologies and the restoration of water resources enable optimisation of water use in agriculture, while the creation of closed-loop systems for processing and utilising products, allows minimising losses and optimising resource utilisation. The socio-economic development of rural areas is based on the advanced development of the agricultural sector in a specific region and aims to address the social, environmental, and demographic needs of the local population (Table 2).

Table 2. Employment and average monthly wages in agriculture in Ukraine

Indicators	2019	2020	2021	2022	2023
Employed in agriculture, thousand persons	407.1	408.0	376.5	360.4	369.4
Average monthly wage across all sectors of the economy, UAH	9,308.05	10,889.92	11,969.90	17,319.36	14,577.39
In agriculture, UAH	7,764.67	8,090.19	9,392.56	10,918.97	11,898.75

Source: developed by Official web-site of the State Statistics Service of Ukraine (n.d.)

In 2023, 369.4 thousand people were employed in agriculture in Ukraine, constituting 51.2% of the total employed population. However, the number of workers directly employed in agricultural enterprises decreased by 37.7 thousand compared to 2019 (Official web-site of the..., n.d.). This trend negatively impacts the socio-economic status of rural residents, potentially leading to increased unemployment, income reduction, and economic challenges in rural communities. Low wages compared to other economic sectors, lack of stable employment, absence of professional growth opportunities, and deterioration of social infrastructure in rural areas diminish the desire of young people to work in agricultural production, prompting migration of the workforce from rural areas in search of alternative, better-paying jobs in regions with higher living standards. This adversely affects the reproduction of human and labour potential in rural settlements and exacerbates the problem of demographic decline in rural populations.

The development of circular models in agriculture can optimise resource utilisation and create new employment opportunities. For instance, the development of waste processing industry may require the establishment of new plants or recycling enterprises, employing local residents.

Additionally, the production of secondary raw materials may open up new markets for selling products and services, which also demands additional personnel. Thus, the advancement of circular models in agriculture can serve as a powerful catalyst for increasing employment and improving the living standards of local populations.

The implementation of circular methods in agriculture can significantly reduce resource costs, such as water, fertilisers, and energy. Reduction in expenses enhances production efficiency and increases the profitability of agricultural enterprises. Moreover, the adoption of circular methods can help agricultural farms become more resilient to fluctuations in resource and energy prices, ensuring more stable conditions for development and growth. As a result of these measures, agricultural enterprises can achieve higher income levels, enabling them to invest in further development and modernisation of farms, and increase payments to their employees, contributing to economic growth and raising the living standards of the local population. Most initiatives aimed at implementing circular business models require significant investments, while small and medium-sized agricultural enterprises continue to operate in conditions of uncertainty compounded by environmental constraints and social challenges.

► Conclusions

During the study, the main challenges facing rural areas in the context of sustainable development were identified. Modern global challenges such as population growth, resource depletion, and climate change require the implementation of a new approach to economic management - circular economy, especially due to its closed-loop model.

The analysis of the experience in implementing circular economy practices in EU countries has revealed a clear trend towards more sustainable resource utilisation and reduced environmental impact. The implementation of the “Farm to Fork” strategy under the European Green Deal is a crucial step towards ensuring sustainable resource use and implementing environmentally friendly practices in agriculture and the food industry. This strategy aims to ensure food security, preserve the environment, and support economic profitability, highlighting the importance of adopting circular practices for the sustainable development of rural and urban areas.

In 2023, agriculture in Ukraine accounted for 51.2% of the total employed population, but the number of workers in agricultural enterprises decreased by 37.7 thousand

people compared to 2019, leading to socio-economic challenges in rural communities. The development of circular models can be key to optimising resource utilisation and creating new employment opportunities, and improving production efficiency and increasing the profitability of agricultural enterprises. The implementation of circular methods in agriculture can reduce resource costs and provide more stable conditions for development.

In the future, it is worth analysing the impact of other types of concepts of sustainable development, provided that they are implemented in the development of the region, and to compare them with the concept of cyclical economy. This study will provide valuable insights into sustainable development principles, aid other authors in their research endeavours, and contribute to the analysis of the socio-economic conditions in various regions of Ukraine, among other potential applications.

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► Conflict of interest

None.

► References

- [1] Abbaszade, M. (2021). The main directions of regional economic development in the conditions of modern market economy. *Agrosvit*, 5-6, 82-86. doi: 10.32702/2306-6792.2021.5-6.82.
- [2] Bondarenko, V., Gontaruk, Y., & Shevchuk, H. (2023). Biomethane production at sugar factories as a way of ensuring energy security of the state. *Economy and Society*, 56. doi: 10.32782/2524-0072/2023-56-120.
- [3] Briguglio, M., Llorente-González, L.J., Meilak, C., Pereira, Á., Spiteri, J., & Vence, X. (2021). Born or grown: Enablers and barriers to circular business in Europe. *Sustainability*, 13(24), article number 13670. doi: 10.3390/su132413670.
- [4] Cutting plastics pollution – Financial measures for a more circular value chain. (2023). Retrieved from <https://op.europa.eu/en/publication-detail/-/publication/7e3b97fe-bc9f-11ed-8912-01aa75ed71a1/language-en>.
- [5] Database. (n.d.). Retrieved from <https://ec.europa.eu/eurostat/web/main/data/database>.
- [6] Ekins, P., Domenech, T., Drummond, P., Bleischwitz, R., Hughes, N., & Lotti, L. (2019). *The circular economy: What, why, how and where*. Retrieved from https://www.researchgate.net/publication/374740327_The_circular_economy_What_why_how_and_where.
- [7] Farm to Fork strategy. (n.d.). Retrieved from https://food.ec.europa.eu/horizontal-topics/farm-fork-strategy_en.
- [8] Geissdoerfer, M., Morioka, S.N., Monteiro de Carvalho, M., & Evans, S. (2018). Business models and supply chains for the circular economy. *Journal of Cleaner Production*, 190, 712-721. doi: 10.1016/j.jclepro.2018.04.159.
- [9] Gómez, M., & Martínez, M.M. (2023). Redistribution of surplus bread particles into the food supply chain. *LWT*, 173, article number 114281. doi: 10.1016/j.lwt.2022.114281.
- [10] Green Deal targets for 2030 and agricultural production studies. (2022). Retrieved from https://agriculture.ec.europa.eu/document/download/69adfd09-3836-4a9e-b673-4435a56ec4cd_en?filename=factsheet-farmtofork-comparison-table_en.pdf.
- [11] Honcharuk, I. (2020). Biogas production in the agricultural sector – the way to increase energy independence and soil fertility. *Agrosvit*, 15, 18-29. doi: 10.32702/2306-6792.2020.15.18.
- [12] Honcharuk, I., & Vovk, V. (2020). Conceptual apparatus of the category of agricultural waste, their classification and prospects of further use for bioenergy production. *Economy, Finances, Management: Topical Issues of Science and Practical Activity*, 3(53), 23-38. doi: 10.37128/2411-4413-2020-3.
- [13] Horbal, N., & Lomaha, Y. (2022). Circular economy – the basis of sustainable enterprise development. *Bulletin of the Lviv Polytechnic National University. Series “Problems of Economics and Management”*, 6(1), 9-24. doi: 10.23939/semi2022.01.009.
- [14] Ingrassia, M., Bacarella, S., Bellia, C., Columba, P., Adamo, M.M., Altamore, L., & Chironi, S. (2023). Circular economy and agritourism: A sustainable behavioral model for tourists and farmers in the post-COVID era. *Frontiers in Sustainable Food Systems*, 7. doi: 10.3389/fsufs.2023.1174623.
- [15] Key figures on the European food chain 2023 edition. (2023). Retrieved from <https://ec.europa.eu/eurostat/documents/15216629/18054337/KS-FK-23-001-EN-N.pdf/048e130f-79fa-e870-6c46-d80c9408620b?version=7.0&t=1707290893751>.
- [16] Kuenzer, N. (2021). *The potential a circular economy offers for rural development in Germany and Europe*. Retrieved from <https://territorialagenda.eu/news-articles/the-potential-a-circular-economy-offers-for-rural-development-in-germany-and-europe/#:~:text=In%20particular%20for%20the%20integrated,employment%20types%2C%20social%20patterns%20or>.

- [17] Mazur, K., & Gontaruk, Y. (2022). Prospects for biogas production from waste of enterprises and households on solid waste landfills. *Eastern Europe: Economy, Business and Management*, 2(35), 63-71. doi: [10.32782/easterneurope.35-9](https://doi.org/10.32782/easterneurope.35-9).
- [18] Michelle, M., Laforest, V., Bélaïd, F., & Tanguy, A. (2021). Assessment of the impact of the circular economy on CO₂ emissions in Europe. *Journal of Innovation Economics & Management, Prépúblicaion*, 3, 107-129. doi: [10.3917/jie.pr1.0107](https://doi.org/10.3917/jie.pr1.0107).
- [19] Mihai, E.-C., et al. (2022). Plastic pollution, waste management issues, and circular economy opportunities in rural communities. *Sustainability*, 14(1), article number 20. doi: [10.3390/su14010020](https://doi.org/10.3390/su14010020).
- [20] New circular economy action plan for the European Union. (n.d.). Retrieved from <https://www.furn360.eu/new-circular-economy-action-plan-european-union/>.
- [21] Official web-site of the State Statistics Service of Ukraine. (n.d.). Retrieved from <http://www.ukrstat.gov.ua>.
- [22] Pronko, L. (2022). Improvement of information systems for management of domestic solid waste in territorial communities. *Economy and Society*, 40. doi: [10.32782/2524-0072/2022-40-20](https://doi.org/10.32782/2524-0072/2022-40-20).
- [23] Raiser, K., Kornek, U., Flachsland, C., & Lamb, W.F. (2020). Is the Paris Agreement effective? A systematic map of the evidence. *Environmental Research Letters*, 15(8), article number 083006. doi: [10.1088/1748-9326/ab865c](https://doi.org/10.1088/1748-9326/ab865c).
- [24] Ruda, M., & Myrka, Ya. (2020). [Circular business models in Ukraine](#). *Management and Entrepreneurship in Ukraine: Stages of Formation and Problems of Development*, 2(1), 107-121.
- [25] Salim, H., Jackson, M., Stewart, R.A., & Beal, C.D. (2023). Drivers-pressures-state-impact-response of solid waste management in remote communities: A systematic and critical review. *Cleaner Waste Systems*, 4, article number 100078. doi: [10.1016/j.clwas.2023.100078](https://doi.org/10.1016/j.clwas.2023.100078).
- [26] Soil and its regeneration at the core of our circular bioeconomy model. (n.d.). Retrieved from <https://www.novamont.it/eng/our-pillars-20>.
- [27] Stamevska, E., Stankovska, A., & Stamevski, V. (2020). [Principles of the circular economy](#). *Economics and Management*, 17(1), 99-107.
- [28] Systemic circular economy holds great potential for rural areas. (2023). Retrieved from <https://www.ifls.de/en/news/details/systemic-circular-economy-holds-great-potential-for-rural-areas/>.
- [29] The circular economy in cities and regions. (2019). Retrieved from <http://www.oecd.org/cfe/regional-policy/Circular-economy-brochure.pdf>.
- [30] The Circularity Gap Report. (2023). Retrieved from <https://www.circularity-gap.world/2023>.

Впровадження принципів циркулярної економіки для сприяння розвитку сільських територій

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► **Анотація.** Актуальність дослідження полягає у виявленні та розкритті впливу впровадження технологій циркулярної економіки на розвиток сільських територій в контексті державної стратегії регіонального розвитку в Україні, сприяючи забезпеченню соціально-економічної стабільності громад та загальної безпеки країни. Метою даного дослідження було вивчення впливу використання можливостей циркулярної економіки на розвиток сільських територій. Для обґрунтування методології дослідження та формування теоретичних висновків використано абстрактно-логічний метод. Аналітичний та порівняльний методи використано для впорядкування наукових підходів науковців до теоретичних аспектів розвитку циркулярної економіки, удосконалення методологічної бази та обґрунтування застосовності принципів циркулярної економіки у розвитку сільських територій. Для ілюстрації результатів дослідження використовувався графічний метод, а для отримання висновків і рекомендацій – абстрактно-логічний. Дослідження було розділено на три основні етапи. В статті вивчалася література щодо сучасного визначення поняття «циркулярна економіка» та аналізувались рушійні сили та бар'єри для системної циркулярної економіки в сільських місцевостях. Проаналізовано, як країни Європейського Союзу застосовують стратегії для вирішення екологічних та економічних проблем через призму кругової економіки. Аналіз досвіду впровадження практик кругової економіки в країнах ЄС показав чітку тенденцію до більш стійкого використання ресурсів та зменшення негативного впливу на довкілля. Реалізація стратегії «Від ферми до виделки» в рамках Європейського зеленого плану є ключовим кроком у забезпеченні сталого використання ресурсів та впровадженні екологічно чистих практик у сільському господарстві та харчовій промисловості. Проведена оцінка впливу впровадження кругової економіки на соціально-економічний розвиток сільських територій та визначено, що розвиток кругових моделей може бути ключовим для оптимізації використання ресурсів та створення нових можливостей для зайнятості, а також покращення ефективності виробництва та збільшення прибутковості сільськогосподарських підприємств. Впровадження кругових методів у сільському господарстві може зменшити витрати на ресурси та забезпечити більш стабільні умови для розвитку. Результати дослідження можуть бути корисними для державних органів, місцевих адміністрацій, аграрних підприємств та кооперативів в Україні, що прагнуть досягти сталого розвитку сільських територій за допомогою впровадження циркулярних підходів в економіку

► **Ключові слова:** регіональний розвиток; сталий розвиток; сільська місцевість; розвиток регіонів; сільський розвиток