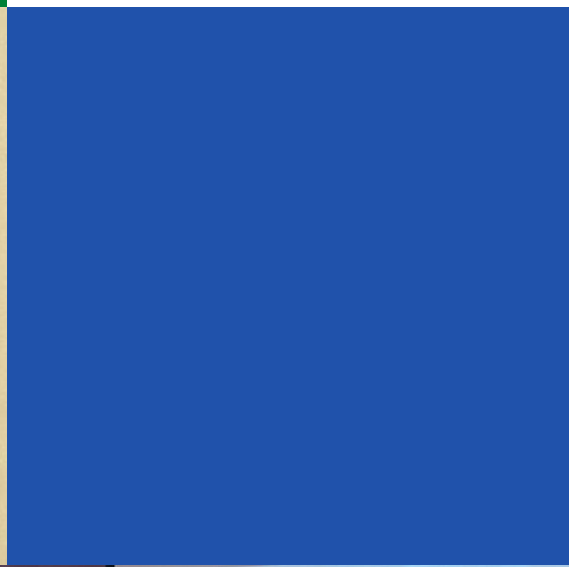




**International Conference**

**Circular Economy**

Opportunities and Challenges



INTERNATIONAL CONFERENCE

# CIRCULAR ECONOMY

## Opportunities and Challenges

17-18 November 2022



# International Conference “Circular Economy: Opportunities and Challenges”

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## **Financial support tools for the development of business models of agro-circular economy**

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### Abstract

*Financial support tools for the development of agro-circular economy business models are proposed. The peculiarities of financial support through such instruments as public-private partnership, venture capital and private equity capital, crowd-funding, European and International grant programs for sustainable development, state financial subsidies and industry subventions, loan guarantees, the mechanism of administration and formation of conditions for sustainable development are revealed. agribusiness, state and private-partner support for investments, credit lines for agro-circular economy projects, financial reporting based on circulars and sustainable development standards. It is substantiated that the priority direction of financial support for this development should be the transformation of agriculture into a single closed model of the agri-food sector, which should be aimed at effective management of resources, waste, preservation of biodiversity to ensure the closure of cycles of materials and resources into a single organic system. The role of the state and its institutional bodies in ensuring an effective financing mechanism for the development of circular agribusiness belongs to the state and its institutional bodies. Measures to reduce the riskiness of agro-circular investment projects are proposed. It is substantiated that the voluntary adoption and use of sustainable development standards reduces the riskiness of financing circular agribusiness projects.*

**Keywords:** agricultural sector, circular economy, financial support tools, investments, agro-circular economy projects.

**Jel Code:** F14, O13, Q10

**Introduction.** The implementation of the goals of sustainable development, which today are the strategic priorities of the management of social development, require the development and implementation of new business models of management, focused on resource conservation, climate change prevention, food security and the preservation of the natural and ecological environment for current and future generations. An exclusive role in solving these tasks is given to the agrarian circular economy, which takes part in the creation of value chains, which are the most valuable for ensuring the quality of life of the population. Agriculture has always been a rather expensive type of economic activity in terms of resources. The traditional linear model of agribusiness in the long term no longer satisfies the needs and interests of society. This objectively requires a transition to new models of agricultural management, the basic principles of which are the rational use and recovery of resources, preservation of the environment, sustainable development of agribusiness and rural areas. The implementation of closed models of agribusiness in the practical plane requires the search for appropriate sources of financial support and effective institutional support.

**Literature review.** The scientific and practical problems of ensuring the sustainable development of the national economy, in particular, in terms of the development of the circular economy, have recently been in the spotlight of famous domestic and foreign scientists, the theoretical, methodological and practical basis of their scientific works form a powerful framework for solving this complex and urgent problem today. Among the scientists who made a powerful contribution to the development of the specified problem, the following should be noted: T. Berger, D. Carrez, N. Boken, N. Millar, P. Leuven, M. Saineni, N. Horbel, S. Whitman, Z. Galushko, Zh. Derii, N. Butenko, K. Kononova, V. Loiko, T. Merkulova, N. Trushkina and others.

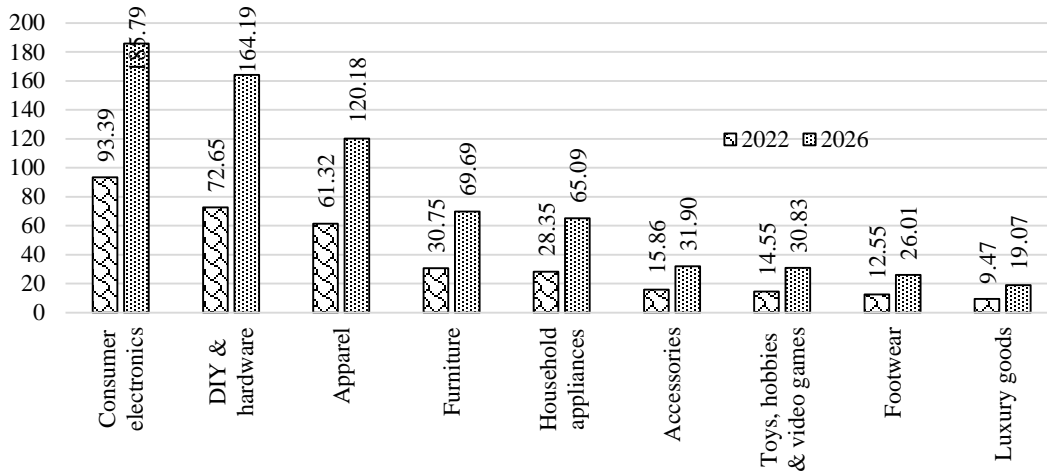
**Tools and methodology.** To give a general vision of circular economy let's look at the most important indicators that characterize it:

estimated revenue generated from circular economy transactions in 2026 will be near 712,74 billion U.S. dollars in comparison to 2022 – 338,88 billion U.S. dollars. So, the volume should almost double [1];

as we can see the most important branch of economy is consumer electronics, but at the second place is hardware and DIY with almost similar figures. The less important branch is luxury goods. The general rate of gross of all these branches is double. Unfortunately, only very few branches of economy can be represented in circular economy, and we can't see here agricultural sector that means insufficient attention to this item in this branch of economy (Figure 1);



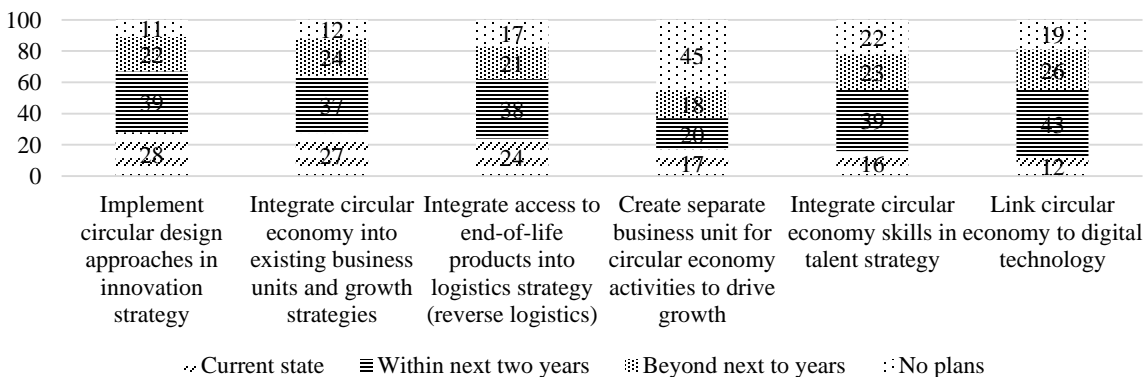
Figure 1. Estimated revenue of the circular economy market worldwide by category



Source: Statista (2022). Estimated revenue generated from circular economy transactions in 2022 and 2026 worldwide [2]

if we look at the most popular strategies of implementing circular strategies (Figure 2) entering the model of business, we can see that the most promised for the next two years is making interdependence between circular economy and digital technology, but nowadays this is the less popular strategy. The bottleneck of all these types of strategies is creating separate business unit for circular economy and the main idea is a very strong plan for implementing circular strategies for the nearest future. It means that businessman all over the world understand the huge importance of this type of economy;

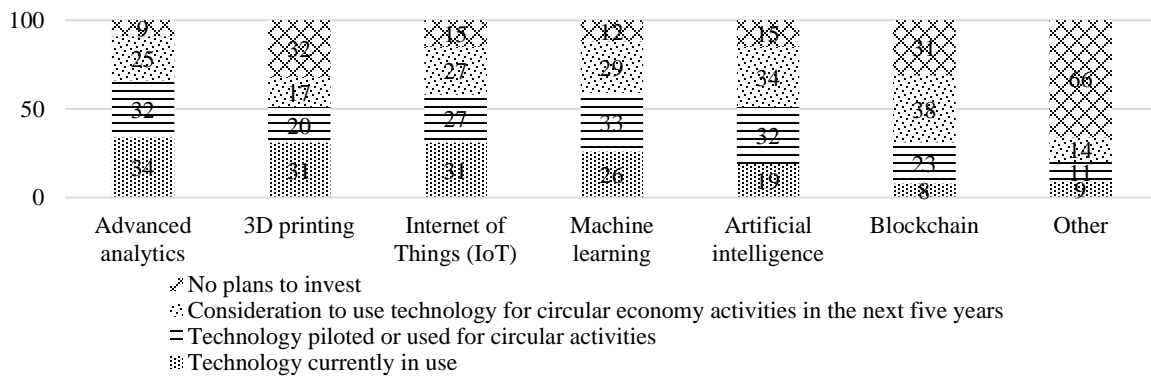
Figure 2. Strategy of supply chain firms to integrate circular economy practices worldwide in 2019 [3]



Source: Statista. Strategy of supply chain firms to integrate circular economy practices worldwide in 2019. (2022) [3]

another side of analysis of circular economy is understanding the most popular technologies (Figure 3) that is used and can be used more and more to enable secure economy activities in supply chains. As we can see the most important nowadays is advanced analytics, at the second place is 3D printing and Internet of things. Next place is by machine learning and artificial intelligence, blockchain place one of the less important roles in circular economy nowadays, but it has the biggest potential for developing in their nearest five years. As we can see all these technologies relate to informational technology, Internet-technologies, communication, and neural networks;

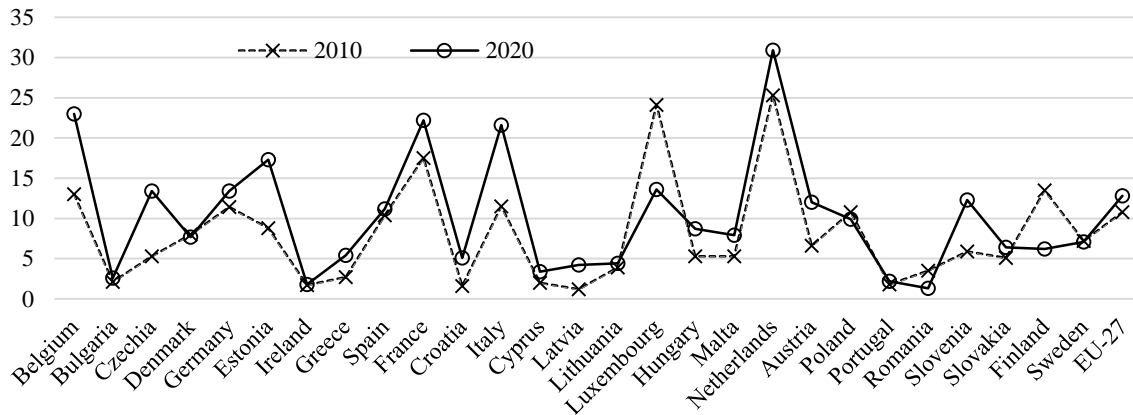
Figure 3. Leading technologies used to enable circular economy activities in supply chains worldwide in 2019 [4]



Source: Statista. Leading technologies used to enable circular economy activities in supply chains worldwide in 2019 (2022) [4]

except general vectors of developing technologies in circular economy it's very important is to analyze the difference in rates of secular material use in different European countries (Figure 4). As we can see, the spread of the values of the indicators of the use of materials in different countries of the European Union shows the different policies of the countries towards the establishment of a circular economy: the leaders are the Netherlands, where almost a third of the materials are recycled, compared to Bulgaria, where the indicated coefficient is equal to "3". Ukraine should focus on the leaders and apply the successful experience of developed countries.

Figure 4. Circular material use rate in the European Union [5]



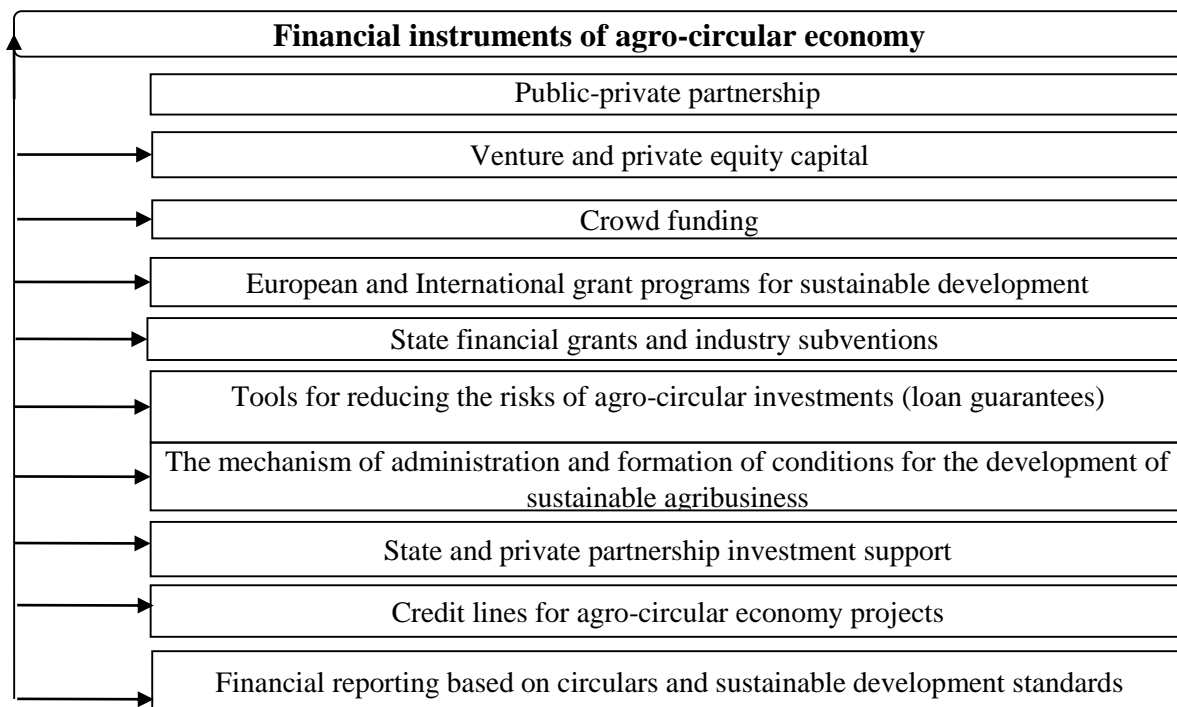
Source: Statista. Circular material use rate in the European Union (EU-27) in 2010 and 2020, by country (2022) [5]

A closed-loop agrarian economy offers significant financial opportunities to achieve the goals and objectives of sustainable development, while using the best sources of long-term value creation. Almost half of the emissions in the world are related to the processes of food production and use. The circular agricultural economy provides a powerful toolkit for ensuring global food security, preventing climate change and combating biodiversity loss. A circular agrarian economy has the properties of rapid job creation, participates in the formation of value chains and ensures the building of long-term value potential.

The experts of the Ellen McArthur Foundation indicate that the following factors can be defined as the advantages of the «circular economy» for the organization: significant saving of materials; sustainable resource use; stimulation of innovation; the ability to meet the needs of the constantly growing population of the Earth; increased recycling and reuse could generate an additional \$1 trillion for the global economy by 2025 [6].

The substantiation of effective mechanisms and increasing the amount of financial support of the agricultural circular economy today is a key prerequisite for the transition to business models of closed-loop agro-economy, which allow in the future to preserve the value of the resource potential of agriculture and increase the effectiveness of its use (Figure 5). As noted by domestic scientists, business models of agro-circular economy are not always suitable for traditional financial instruments and financial institutions. The mechanism of action of agro-circular economy models is currently determined by the increased level of risk management, they are not widespread enough in domestic practice, they have not acquired developed methods and forms of state financial support mechanisms [7].

Figure 5. Financial support tools for the development of agro-circular economy business models



Source: developed by the authors

The modern toolkit of financial support for the implementation of business models of the agrarian circular economy should be reoriented from traditional income interests to the creation of long-term social values and the preservation of natural and agricultural resources to ensure the existence of humanity. Possibilities should take into account the rethinking of the general design, agricultural production and food production, optimization of the use of technical and technological and biological resources of agriculture. The priority direction of financial support should be the transformation of agriculture into a single closed model of the agri-food sector, focused on effective management of resources, waste, preservation of biodiversity to ensure the closure of cycles of materials and resources into a single organic system.

For the financial support of the development of the circular agrarian economy, the most effective tool is crowdinvesting, which can be implemented in two main ways: through the purchase of shares in the capital of a circular agribusiness or in exchange for a part of future income (profits).

Horizon 2020 is a powerful tool of the state financial support mechanism of EU countries. The total budget of Horizon 2020 is more than 3.7 billion euros specifically for the implementation of the Societal Challenge 2 (SC2) program «Food security, sustainable development of agriculture and forestry, marine and inland water research and bioeconomy» (2014-2020). For 2014-2020 within the framework of the Horizon 2020 project, about 1 billion euros was directed to the financial support of sustainable development programs in agriculture, namely: sustainable food security, revitalization of rural areas, food and natural resources. With the help of the allocated

funds, the following tasks were solved: 1) improving the management of regional ecosystem resources; 2) ensuring healthy and full nutrition of the population of the regions; 3) environmental protection and adaptation of agribusiness to climate change; 4) development of active, green and inclusive rural areas; 5) creation of innovative chains of value formation; 6) increasing the level of digitization of agriculture and green areas [8].

An important role in ensuring an effective financing mechanism for the development of circular agribusiness belongs to the state and its institutional bodies. The key function of the state in solving this task is to provide favorable incentives for investment in the industry for closed-loop projects. In this regard, the main directions of the state's strategic influence on the processes of attracting financial flows to the implementation of agro-circular economy business models are: 1) integration of measures to accelerate organizational transformations and the transition to the principles of closed-loop economy development within the entire agro-food complex; 2) increase in financing of state programs for ensuring economic growth on the basis of circularity; 3) removal of institutional barriers and creation of a system of motivators for the implementation of circular agrarian business projects in the national economy.

The financial component of institutional support for the development of the agricultural sector and rural areas of Ukraine has always been one of the most relevant and problematic for national management practice. In particular, the share of expenditures of the State Budget of Ukraine for financing the agricultural sector was no more than 0.8% for 2015-2020. [9]. The main directions of state financial support for the agricultural sector in recent years were: state support for the livestock industry; support for the development of hops, establishment of new gardens, vineyards, berry orchards; providing loans and making them cheaper; support for the development of farms; partial compensation of the cost of complex domestic agricultural machinery. Other financial support programs included: providing loans to farms, direct financial support to agricultural producers (Table 1). The total amount of financial assistance in 2021. amounted to UAH 4,712.4 million (or UAH 418,000 per entity receiving funds) [10].

Table 1. The dynamics of the volume of financial support for the development of the agricultural sector of the economy of Ukraine, UAH million

Directions of financial support	2015	2017	2019	2020	2021
Financial support for the agricultural sector through cheaper loans	300.0	300.0	300.0	127.2	1200.0
Financial support for the development of farms	-	-	800.0	130.8	120.7
Financial support for development and horticulture, viticulture and berry growing	-	-	299.3	400.0	512.2
Financial support for animal husbandry	250.0	170.0	3500.0	1040.6	1609.6

Financing the formation of an intervention food fund	1400.0	-	-	-	-
Financial support for leasing	3.8	3.8	4.8	-	-
Partial compensation of the cost of agriculture. techniques			640.8	1456.6	991.3
Other financial support programs	30.6	4675.0	1003.1	1131.3	78.6

*Source: compiled by the authors for [10]*

Within the framework of institutional financial support for agriculture and rural areas of Ukraine, several promising strategic projects were agreed upon for implementation, the financing of which is carried out jointly with international organizations (USAID): «Credit resources for agricultural producers» (2016-2023), «Agrarian development» (2018-2024), which are focused on providing preferential credit resources and achieving food security and sustainable development of agriculture in Ukraine [11].

Currently, among potential investors, investing in circular economy projects, in particular, in the agricultural sector, is associated with a high level of risk and an insufficient level of profitability. To reduce the riskiness of agro-circular investment projects, the latest tools of both institutional management policy and financial support are necessary. As part of the levers of institutional policy, the primary measures are the allocation of funds for the development of the infrastructure of the agro-circular economy (systems of reuse and processing of resources, waste disposal, infrastructural facilities for the reproduction of the fertility of agricultural lands and the biopotential of animals, etc.). The policy of eco-design of food products, the policy of attracting «green» investments in the industry, optimization of the fiscal burden on agrarian business can become effective tools of the institutional policy of managing the formation and development of the agro-circular economy.

Among the instruments of financial support for agro-circular investment projects, state guarantees for loans for agribusiness, reimbursement of part of the costs associated with structural transformations, joint public-private lending and insurance, and joint investment in the authorized capital of circular agribusiness can become priorities.

The circular economy is a pillar of the European strategic «Green Course», for which the total budget provides for the allocation of about 1 trillion euro. Along with this, active financial support is provided by banking institutions: the European Investment Bank in the amount of 2.5 billion euros, the European Fund for the Biocyclic Economy together with five commercial banks of the EU in the amount of 10 billion euros. The EBRD issued «green loan» bonds for a total value of 500 million euros [7].

Financial flows from public capital raised in the form of shares related to circular business projects are increasing, and private and private debt funds focused on the development and support of circular business models are more actively being created. Despite the increased degree of risk, over

the last year the value of assets, including shares with a focus on the closed cycle economy in the EU, increased six times – from 0.2 to 2.0 billion euros [8].

In recent years, the amount of investment flows directed to the implementation of circular projects in agricultural business has increased significantly. Today, among such projects, the greatest investment demand is focused on the processing of food waste, the reuse of bio-agricultural waste, the construction of appropriate circular infrastructure facilities, investments in circular innovation projects that ensure an increase in the shelf life of food products.

For potential investors, the financing of agricultural circular economy models appears to be a venture business associated with an increased level of riskiness of the invested funds. At the same time, the agri-food sector is one of the most prioritized and popular for joint venture capital today. This is due to the following business motives for capital donors: 1) the circular economy covers all types of economic activity, but it is the agri-food sector that forms the most important value chains for human existence, the value of which will increase with the increase in the world population; 2) to a greater extent, humanity seeks to obtain safe and ecological food products, which affects health, duration and quality of life; 3) closed-type agro-food sector forms chains of value creation with maximum economic returns and profitability of advanced capital.

The growth in demand for food products, which are separate, ecologically clean and safe, causes an increase in the interest of investors in the management of food value chains, an increase in the level of competitiveness of agricultural products on the basis of cost optimization, and the efficiency of food storage methods. Food waste reduction projects (following the example of Food Lost and Waste Champions), which have already been joined by more than 40 large international corporations, are current investment resource investment programs in the world today. A promising direction for attracting financial resources to the agro-circular economy is provided by digital platforms that create opportunities for attracting traditional and venture capital, combining investments and innovations in the direction of circular transformations. Investment and innovation platforms focused on the development of closed-loop agribusiness can have a joint management mechanism, be based on the unification of interests and capital through partnerships between private participants and state institutional structures. The joint mechanism of private-partnership relations makes it possible to increase financial flows for the implementation of agro-circular business models, to provide the agricultural sector with innovations, to solve the problems of the inclusive gap in the access of producers and startups to sources of financing.

In the global practice of financing closed business projects of agro-economics, the following are among the most relevant and widespread: agro-food projects for the processing of food waste and their transformation into valuable products; equipping agricultural production with reactors that allow turning agricultural waste into eco-fuel and ecological liquid fertilizers; production and implementation in the food industry of technologies for long-term food storage; restoration of sustainable properties of agricultural land, financing of the introduction into economic practice of industrial 3-D printers capable of turning agricultural production waste into animal feed or biofertilizers. Such projects go beyond the purely agrarian economy and combine the business structure of the entire agro-product and agro-industrial complex within the framework of common interests.

Within the limits of one agro-farm, closed-loop projects can be presented following the example of the Dutch model of J. Sanders, where the following models were implemented as part of the financing of a joint project of the agricultural product chain in agriculture: Agro-Innovatieregio Achterhoek model of nutrient circulation, improvement of soil quality); Noord-Nederland (eco-landscape design, waste recycling); Mineral Valley Twente Twickel (creation of organic liquid fertilizers, improvement of water quality and restoration of arable land fertility, formation of a regional food chain, creation of added value of biomass) [9].

Conclusions and recommendations. Custom platforms used to maintain sustainable, edible backyard landscaping have gained significant popularity today. The creation and launch of blockchain platforms for agriculture and continuous digital monitoring of the condition of soils, plants, and the future harvest is especially relevant for the Ukrainian agrarian business, which is developing on the basis of the circular economy. Such a platform connects agricultural producers with capital donors, balances their interests to achieve the goals of sustainable development, aligns value chains, creates prerequisites for increasing the competitiveness of products, increasing the profitability of agribusiness and developing rural areas. An example of the action of such digital platforms in closed-loop agribusiness is the Circular Food Solution platform, which today is a catalyst for investment and innovation solutions and a tool for creating sustainable agro-food systems.

Research shows that one of the prerequisites for reducing the degree of riskiness of financing circular agribusiness projects can be the voluntary adoption and use of sustainable development standards. The optimal situation appears when the profiles of risks and sustainable investment reach an equilibrium balance. Sustainable agrarian business, of which circular agro-economics is a part, is able to provide a more reliable return on investment than traditional agricultural entrepreneurship. Agricultural enterprises that carry out their economic activities based on the principles and standards of sustainable development become more attractive for investment due to the high level of competitiveness of products, increasing the value of image capital and higher business profitability. Under such an approach, investments and standards of sustainable development of the population provide a joint synergistic effect of combining a pragmatic profitable approach and socially responsible initiatives for the benefit of the circular agricultural economy and society as a whole.

For the agricultural sector, the implementation of the circular economy is closely related to the further spread of innovative technologies of precision agriculture, biologicalization of agriculture, integrated technologies of pest control, resource-saving technologies of soil treatment, computerization and automation, etc.

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