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The Model of Financing of Circular Economy in Agriculture

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The paper examines the institutional and infrastructural factors of crediting the circular economy in the agricultural sector. The contradictions and barriers of the development of the value chain in the cycle of resource supply, production, sale, and waste processing are identified. The research stresses focuses on the role of stakeholders in attracting investments for agriculture; describes ways to improve bank credit and financial services for farmers. It is noted that different combinations of business models, namely, replacement of traditional materials by the bio-based renewable materials which is obtained from unused resources, waste recycling, product life cycle extension, sharing, leasing, and reusing of product after modernization, as well as improvement of green product design, will contribute to a more effective utilization of natural resources and reduce demand on its extraction. A lending scheme based on the principle of partnership is proposed. It envisages the use of the relationship between industrial enterprises and farmers and the determination of the value chain, which includes the cycle starting from the purchasing of raw materials, to the sale of products, the provision of services and the offer of after-sales services, the collection of waste, processing, recycling and the renewable of the post-production. This cycle will create a guarantee for sustainable lending, as far as the financial scheme of lending will not be focused on a single manufactured product. A cluster approach to the financing of circular business models in agriculture will also contribute to the formation of a group loan strategy. *© 2022 Bull. Georg. Natl. Acad. Sci.*

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The agricultural sector is one of the important sectors in the economy. It is characterized by low labor productivity. In Georgia, 42 percent of the population lives in rural areas and 20 percent of the workforce is employed in agriculture, however, 7 percent of the total output is produced (2021). Low labor productivity and low incomes intensify migration processes, while at the same time its potential opportunities remain unused. The agricultural sector is less attractive for investors, because the share of this sector in total bank loans is very small, 2-3 percent, and the share of foreign direct investment (FDI) is less than 1 percent (2021).

Challenges of the Agricultural Sector in Georgia

Circular economy and unused waste management create potential opportunities in Georgia's agricultural sector. The circular economy is the

economic backbone of sustainable development, which requires a fundamental change of methods and approaches in the development of value chain of production and consumption, product design, as well as wise use of resources, management and consumption habits, etc.. It combines re-production of resources and materials, and recycling of waste by recycling used goods and materials for renewing the product life cycle. The formation of such an economy is important due to the scarcity of water and other resources, the limitation of land, and the rapid growth of industrial demands for various agricultural and non-agricultural products.

The introduction of the "take-make-use-collect waste-recycle-use" model instead of "take-make-use-throw" model changes previously existing ideas about the inexhaustiability and infinity of natural resources and unlimited dependence on agricultural resources.

According to National Statistics Office of Georgia, on average, share of loses in agricultural products (losses are calculated based on resource usage/consumption) in wheat production are 9 percent, in grape and wine production - 22 percent, in vegetables – 15 percent, in corn - 38 percent, om potatoes 8 percent. Losses in the production of other agricultural products are relatively low. Total losses are more than 50 thousand tons annually.

Sustainable development of Georgia is based on waste management policy. In 2016, the National Waste Management Strategy (2016-2030) and National Action Plan for 2016-2020 were adopted, and in 2018, the Code of Georgia on Waste Management was adopted [1, 2]. Currently, the National Waste Management Action Plan for 2022-2026 is presented. The waste management policy has been based on waste prevention, preparation for re-use, recycling, other types of recovery, including energy recovery and disposal.

An extended producer obligation (EPR) was introduced at the national level and strategic objectives were defined. Regarding EPR, on May 25, 2020, the Government of Georgia adopted four technical regulations: "On waste management of batteries and accumulators"; "On tire waste management"; "On waste management of electrical and electronic devices"; "On waste oil management". However, due to the situation created by the pandemic, according to the decision of the Government of Georgia, the dates for fulfilling the obligations of the parties involved in the scheme of EPR have been postponed. The drafts of technical regulations were developed: on the management of end-of-life vehicles and on the management of packaging waste. The Ministry of Environmental Protection and Agriculture of Georgia launched the register for entities involved in EPR.

These regulations refer to the development and implementation of new means that will facilitate the recycling of waste materials, the minimization of material loss after the removal of products from use, the effective collection, treatment, reuse and recycling of waste in environmentally safe and socially acceptable ways.

Implementation and development of these processes in the agricultural industry is a future task. The approach of intensive exploitation of resources in agriculture is replaced by the concept of sustainable efficiency, according to which efficiency is determined not only by how much the sector produces, but also by how much resources it produces, and the use of which does not exceed its ability to reproduce [3]. The global trend of price growth on raw materials will be relieved by the expanded re-production of raw materials, which will significantly reduce the risk of losses and promote the introduction of circular production in the supply chain.

Theoretically, as well as in the practice of different countries, the increase of labor productivity of farmers and their infrastructure is under discussion, but achieving real progress also requires that production and consumption based on greener models to be carried out, and circular

businesses to be introduced along with traditional linear businesses.

Today, business models are developing in 5 directions: 1. The model of circular use of unused resources implies the replacement of traditional materials by the bio-based renewable materials which is obtained from unused resources. In the long term it reduces the demand on extraction of resource; 2. Resource recovery models refer to waste recycling; 3. Product life cycle extension models involve extending the period of use of existing products; 4. Modern technological developments have enabled entrepreneurs to implement business models that often involve sharing, leasing, and reusing of product after modernization; 5. Models that address the product-service system improve green product design and promote more economical use of natural resources [4].Circular business models can be implemented in various combinations to achieve maximum efficiency.

Institutional approach to the financing of agriproducts

Financing of agricultural sector is hindered by various factors. These factors are intertwined and, in many cases, caused by each other. Among these factors, we highlight the short cycle of value chain development. A stand-alone enterprise cannot be successful if it is not part of a complete, well-coordinated entire value chain, starting from purchasing materials and raw materials, to selling products, providing services and offering after-sales services, collecting waste, processing, recycling and continuing the post-production cycle. It increases the value and creates new opportunities for sustainable lending, as long as the financial scheme of lending will not be focused on a single manufactured product. It includes a value chain that integrates the cycles of agro-industry reproduction.

Partnerships and collaborative efforts are known to improve access to financial instruments and credits for entrepreneurs, households and smallholder farmers. Therefore, the proposed scheme is based on the principle of partnership and envisages the creation of clusters of agro-industrial associations and cooperatives, working in interrelated circular production.

In the implementation of the circular economy, there are specific barriers that may be common characteristic for of all countries that are starting to introduce the principles of circulation. Such barriers are: insufficient implementation of circular economy regulations, lack of information about circular economy and technologies, ineffective recycling policy, absence of environmental management system, costs for implementation of green activities and limited research and development opportunities, shortage of professional staff, etc. [5]. It is known that the better organized farmers are, united in cooperatives and associations, the more opportunities they have to establish partnership relations with financial organizations and large industrial groups [6].

In turn, state programs help farmers and their unions both institutionally, with technical assistance projects, and with various financial schemes, including tax incentives. Measures to encourage the development of circular models in agribusiness and sustainable and long-term state programs (e.g. sharing of interest rate on loans, trainings, etc.) help attracting investments. In order to create and stimulate farmer clusters, it is possible to implement state-initiated pilot programs in accordance with different circular models.

In the market, farm clusters operate as large business units and enjoy economies of scale. This gives them a favorable position when negotiating with intermediaries and wholesalers. A Farmers Credit Union borrows from commercial banks at a favorable rate, and then distributes it to members based on a mutual guarantee of payment.

An indirect way of financing small and medium-sized farmers and their cooperatives is the participation of large wholesalers and industrial sectors together with farmers united in business

clusters, which guarantees stability to credit organizations when issuing loans.

A cluster approach to financing circular business models in agriculture can be used to develop a group lending strategy. This strategy includes various parties involved in the system - from primary suppliers to final product distributors and participants in the subsequent recycling cycle. The basic idea of the strategy is that the entire cycle of business activities should be studied first, problems or inefficient links that are useless for cluster activities should be identified, and then, the feasibility of financing joint cluster activities should be determined.

A circular-cluster approach to loans will help to create a system of credit guarantees for farmers. Today there is a clear need for guarantee schemes between partners. Guarantee schemes are usually multi-stakeholder initiatives. They directly or indirectly involve clusters as stakeholders in the decision-making and management process. For example, to reduce the risk of credit repayment by farmers, conditions should be designed so that farmers use not only crops, but also partnerships with vendors, established contracts, inventory, linkages with large enterprises, and the goodwill of third parties as a means of securing credit. The introduction of a credit risk system focused on partnership relations will strengthen the competitiveness of farmers and enable the formation of a risk transfer mechanism.

State support for guarantee schemes is necessary because it ensures equality and protects the interests of farmers to develop their activities and increase efficiency.

Targeted cooperation within circular business clusters, with the participation of the state and international donors, will give farmers the opportunity to participate in the process of increasing of value add.

Financial structures such as solidarity credit groups and cooperatives will reduce both transaction costs and risks associated with lending to small farmers. They need institutional support to attract private investors [7-9].

The introduction of another financial mechanism - the revolving loan fund (a source of money from which loans are issued for small business development projects) would help the entities and cooperatives engage in circular business. In this case, after the payment of the loan, the loan fund becomes available to other companies and thus, the money is transferred (circulated) from one person or company to another. Initially, the fund is created with capital that is not subject to return. In such a case, the participation of donors is necessary. Borrowers will be households and small producers of goods or services - farmers who do not have a credit history and for whom loans from commercial banks are not available. These funds are used to fill the "financial gap" in business development projects, and the ultimate goal is to ensure the credit financial stability of farmers and prepare them for ensure business linkage with commercial banks.

აგრარული მეცნიერება

ცირკულარული ეკონომიკის დაფინანსების მოდელი სოფლის მეურნეობაში

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**აღმოსავლეთ ევროპის უნივერსიტეტი, თბილისი, საქართველო

ნაშრომში განხილულია აგრარულ სექტორში ცირკულარული ეკონომიკის დაკრედიტების ინსტიტუციური და ინფრასტრუქტურული ფაქტორები, გამოვლენილია პროდუქციის წარმოების წინააღმდეგობები და ბარიერები რესურსების მიწოდების, წარმოებისა და რეალიზაციის, ასევე ნარჩენების გადამუშავების ერთიან ციკლში, რომლებიც ხელს უშლის ღირებულების ჯაჭვის განვითარებას. კვლევა ორიენტირებულია დაინტერესებული მხარეების როლზე იმისათვის, რომ სოფლის მეურნეობა გახდეს მიმზიდველი ინვესტიციებისთვის; აღწერს საბანკო კრედიტებისა და ფერმერებისთვის ფინანსური მომსახურების გაუმჯობესების გზებს. აღნიშნულია, რომ ბიზნესის მოდელების სხვადასხვა კომბინაცია, კერძოდ, გამოუყენებელი რესურსებიდან მიღებული ტრადიციული მასალების ჩანაცვლება ბიოზე დაფუძნებული, განახლებადი, ან აღდგენილი მასალებით, ნარჩენების გადამუშავება, პროდუქტის სასიცოცხლო ციკლის გახანგრძლივება, საზიარო გამოყენება, იჯარა და ხელახალი გამოყენებით პროდუქტის მოდერნიზაცია, ასევე მწვანე პროდუქტის დიზაინის გაუმჯობესება ხელს შეუწყობს ბუნებრივი რესურსების უფრო ეფექტიან გამოყენებასა და გრძელვადიან პერსპექტივაში მათზე მოთხოვნის შემცირებას. შემოთავაზებულია პარტნიორობის პრინციპზე დაფუძნებული დაკრედიტების სქემა. იგი ითვალისწინებს ინდუსტრიული საწარმოებისა და ფერმერების ურთიერთკავშირის გამოყენებას და ღირებულების ზრდის ჯაჭვის განსაზღვრას, რომელიც მოიცავს ციკლს დაწყებული მასალების და ნედლეულის შეძენიდან, დამთავრებული პროდუქტების გაყიდვით, მომსახურების გაწევას და გაყიდვის შემდგომი მომსახურების შეთავაზებას, ნარჩენების შეგროვებას, გადამუშავებას, რეციკლირებასა და წარმოების შემდგომ განახლებას. ეს ციკლი შექმნის გარანტიას მდგრადი დაკრედიტებისათვის, რამდენადაც დაკრედიტების ფინანსური სქემა არ იქნება ორიენტირებული ცალკეულ წარმოებულ პროდუქტზე. სოფლის მეურნეობაში კლასტერული მიდგომა ცირკულარული ბიზნეს მოდელების დაფინანსებაში ხელს შეუწყობს ასევე ჯგუფური სესხის სტრატეგიის ჩამოყალიბებას.

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