ECONOMICS OF AGRICULTURAL PRODUCTION IN SLOVAKIA: DEVELOPMENT AND PERSPECTIVES

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Abstract

The agricultural sector is a branch of the national economy whose main task is to provide food for the population. At the same time, the needs of humanity are constantly increasing, which is linked both to population growth and to improvements in the quality of life. To solve these problems, it is necessary to rationalize the forms of combining factors of production and their qualitative and quantitative ratio in the production process in agriculture based on the measurement of production dependencies. Modern trends in the development of the agricultural sector in Slovakia appeared in the 90s of the 20th century. Between 1990 and 1999, Slovakia's agriculture was transformed under new market conditions in order to achieve greater efficiency and productivity. During the economic crisis, unemployment increased, stocks of products decreased, the management structure changed and support from the state decreased, which led to the formation of a market-oriented agriculture. Following Slovakia's accession to the EU, it assumed new obligations in the field of environmental legislation. Slovakia got the opportunity to use EU funds to increase the efficiency and productivity of agricultural production and improve the quality of life of the rural population. The main goal was to analyze the trends in the development of the agricultural economy in Slovakia, to identify existing problems and ways to solve them, to describe the prospects for improving agricultural production. One of the promising areas for the development of agriculture in Slovakia is the bioeconomy, which is able to solve some of the problems and introduce new and improved methods to improve the efficiency of agricultural production. The indicators of the development of agriculture in Slovakia over the past 20 years show a relatively stable development. The general dynamics reflects a decrease in the productivity and efficiency of agriculture, a decrease in labor productivity, and the insecurity of the domestic market with food. To do this, it is necessary to adhere to new CAP and RDP policy principles and introduce more effective incentive measures from the state and new ones to bring the productivity of agricultural labor and its efficiency to the average European level.

Keywords: *agricultural development, agricultural production, agricultural productivity, ecological agriculture, labour productivity, new CAP, rural development*

1. INTRODUCTION

The development of agriculture is the basis of economic and social development of the country. Because agriculture as a multifunctional system includes the following objectives: food production, improving the quality of life in rural areas, promoting national economic growth, which depends on the development of the market and institutional development, environmental protection and adaptation to climate change (Hloušková & Lekešová, 2020).

The agricultural sector has limited capacity, and its effectiveness and competitiveness are driven by R&D activities, innovation and policy support. The transformation of agriculture to a developed, dynamic, efficient environment depends not only on appropriate climate and natural resources but also on human resource development in the relevant sector. (Sabouri & Solouki, 2015). Agricultural development is a set of processes to improve agricultural conditions through the development of technologies, field research and the involvement of farmers in relevant activities through local communities and through political support (Berdegué & Escobar, 2001). Which in turn will affect the improvement of the socio-economic conditions of life of farmers.

Modern trends in the development of the agricultural sector in Slovakia originate in the last decade of the last century. During this period, a movement began from a centralized economy and administrative command management to a free market. Slovakia's agriculture has been exposed to the external pressure of market forces for achieving greater efficiency, performance and adapting to market conditions during ten years of the economic reform in the period from 1990 to 1999. The greatest decline in agriculture was in 1993, followed by moderate growth (Dudić et al., 2020).The economic crisis was characterized by an increase in unemployment, the destruction of agricultural cooperatives, a decrease in stocks of products, an increase in unemployment, and at the same time an increase in the income of land owners and the scale of conversion of land to non-agricultural work, the structure of management is changing, support for agriculture is decreasing, and exploitation of agriculture is intensifying. g of land. As a result, a market-oriented agriculture is being formed.

After joining the EU in Slovakia CAP is being launched, strengthened agro-ecological orientation, farming is being developed, and a a subsidy system is being established. Ecological and environmental limits were applied, which meant reduced use of chemicals and machinery; the result was a lower burden on individual landscape components. As intensification decreased, there was a significant decrease in industrial fertilizers consumed in agriculture. While in 1980 the consumption of pesticides was 19,016 tons, by 1993 it had decreased to 3,904.5 tons, a decrease of 79.5%. In contrast, since 1993, the consumption of pesticides has slightly increased (Izakovičová, Špulerová & Raniak, 2022). Since 2000, however, the consumption of industrial fertilizers has had a fluctuating nature with a tendency to increase again.

The entry of Slovakia to the EU meant adoption of commitments in the field of environmental legislation. The underlying principles are the decentralization of responsibility, which in turn strengthens subsidiarity and partnership, as well as measures of Common Agricultural Policy (CAP) that are targeted and implemented according to the specific needs of Member States. Thus, CAP pursues three main goals: the creation of a stronger agricultural and forestry sector for rural development; improving the competitiveness of rural areas; supporting the environment and preserving Europe's rural heritage.

On May 1, 2004, Slovakia became a member of the EU, which allowed it to use funds from EU, that provide financial support to the agricultural and forestry sectors, as well as rural areas, to improve the efficiency and productivity of agricultural production and the quality of life of the rural population (Dudić et al., 2020).

In the framework of the EU rural development program (2007-2013), Member States received €96 billion. In 2017, EC communicated its vision of the future of food and farming stressing the need of smarter, modern and sustainable CAP (Hloušková & Lekešová, 2020). The aims of the policy have been simplified and clarified around economic, environmental and territorial objectives: improving the competitiveness of agriculture and forestry; improving the environment and the countryside; and improving the quality of life in rural areas and encouraging diversification of economic activity (Monfort et al., 2017).

Support for Rural Development is the 2nd Pillar of the Common Agricultural Policy. The Rural Development Programme (RDP) also aims to boost the whole rural economy creating 2200 jobs through investments in enterprises, including innovative cooperation projects, infrastructure and human resources via training, advisory services and local services to the population, including integration of marginalized communities. In Slovakia, the Slovak Rural Development Program for the years 2014-2020 was drawn up, on the basis of which financial assistance is provided from the European Agricultural Fund for Rural Development. The Slovak RDP was formally adopted by the European Commission 13 February, 2015 and last modified on 3 February 2022, outlining Slovakia's priorities for using EUR 3,0 billion of public money that is available for the 9 year period 2014-2022 (EUR 2 276 million from the EU budget and EUR 766 million of national funding (European Commission, 2022).

The main institutions contributing to the implementation of the CAP in Slovakia are Ministry of Agriculture and Rural Development, The Agricultural Paying Agency. MOA and Rural Development of the Slovak Republic is responsible for the coordination of legal relations in providing any assistance

or subsidies for rural development. This ministry carries out financial management and decision-making on project assignments and direct support. Agricultural Paying Agency is a payment agency providing administrative activities in securing support and subsidies as a state administration body. This agency acts as a state administration body. The payment agency carries out activities related to the provision of support in agriculture and subsidies for rural development only on the grounds of accreditation granted by the Ministry of Agriculture.

The current state of agriculture is significantly influenced by scientific and technological progress, as well as the political and economic situation in the country. Slovakia is a country with rich natural resources that offer opportunities for a more diversified agriculture, forestry and rural economy. Support for RDP and CAP will help to embed and expand the use of innovative projects that provide new modern products, technologies and methods. This will create conditions for the development of a stable agricultural economy and sustainable agricultural development, strengthen the competitiveness of farmers, create new jobs, improve the quality of life in rural areas.

2. MATERIALS AND METHODS

The main goal was to analyze the state of the agricultural economy in Slovakia, trends and development prospects. For this, we used data from official statistical pages like Eurostat, The World Bank, Datacube.sk. Also, official materials from European Commission and Ministry of Agriculture and Rural Development of the Slovak Republic were used. With the help of such research methods as synthesis, analysis, deduction and comparison, a qualitative analysis of the European Union regulations, new policies, literature review was carried out to determine and evaluate the current state of the agrarian economy and agrarian policy in Slovakia, identify problems and ways to solve them.

Based on the obtained time series data relative indicators are calculated, which demonstrate the change in the agriculture in Slovakia over time. Descriptive analysis uses graphical techniques for displaying time series, with the help of which it looks for certain patterns in the development of the studied data. By graphically representing the time series of data, we were able to observe changes in its shape and various fluctuations, which may be long-term or short-term, and thus we were able to establish trends and cycles in the development of agriculture in Slovakia.

3. RESULTS

The Slovak Republic spreads over an area of 49 036 km² of which around 48% is agricultural land and 40% is covered by forests. Agricultural land is composed of around 71 % arable soils and 28% permanent grassland; 65% of agricultural land is classified as affected by natural constraints limiting its production potential. The high forest coverage in Slovakia (40%) makes forestry an important sector in the rural economy, although the forest roads network needs substantial investments. The forestry sector is also concentrated on primary production rather than further processing and highly depends on the turnover (80%) from timber harvesting. The Slovakian countryside with its mountainous and sub-mountainous areas and lowlands and different climatic conditions is rich in biodiversity. Slovakia is rich in natural and traditional heritage and natural resources which provide opportunities for more diversified agriculture, forestry and the rural economy (e.g. through rural tourism) (European Commission, 2022).

The country's most important agricultural trading partners are the Czech Republic, Germany, and Poland. Slovakian agriculture is characterized by a dual farm structure, with a high proportion (80%) of small farms up to EUR 15 000 of standard output, and a small number of large farms (1 180) with standard output higher than EUR 250 000. The agricultural production is characterized by low added value of primary agricultural production mostly oriented to cereals and oilseeds production.

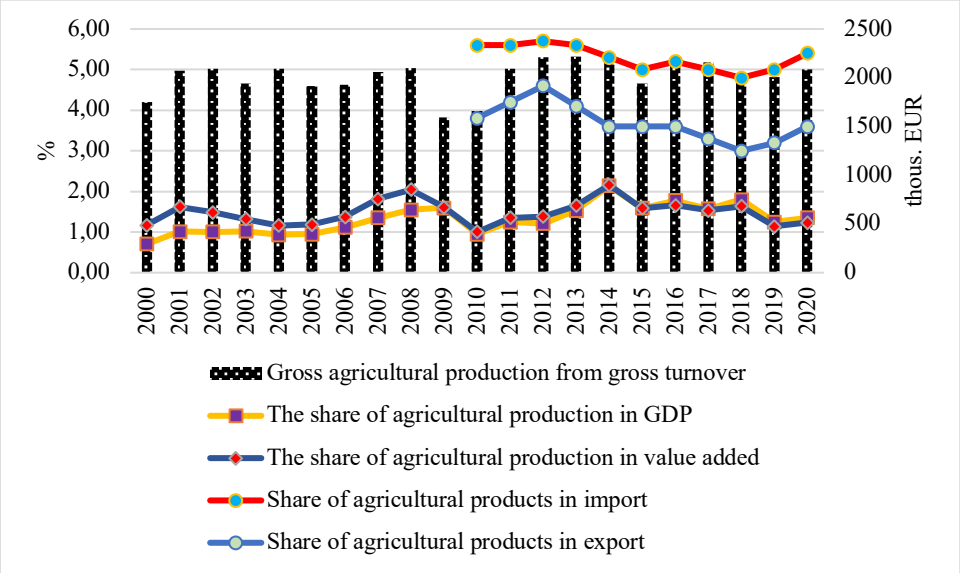

Fig. 1. The dynamics of Gross Agricultural Production in Slovakia

Source: DataCube.statistics.sk

The indicators of rural development in Slovakia over the past 20 years indicate a relatively stable development without signs of an economic breakthrough. During 2000-2020, the volume of agricultural production increased by only 0.6%, the biggest jump was in 2001 – by 19.0% and in 2011 by 26%, in 2009 the output fell by 25% In other years the increase fluctuated at the level of +/-1-10%. The share of agriculture in GDP increased from 1.01 to 1.35%, in the total amount of added value decreased from 1.62 to 1.23% (Fig. 1).

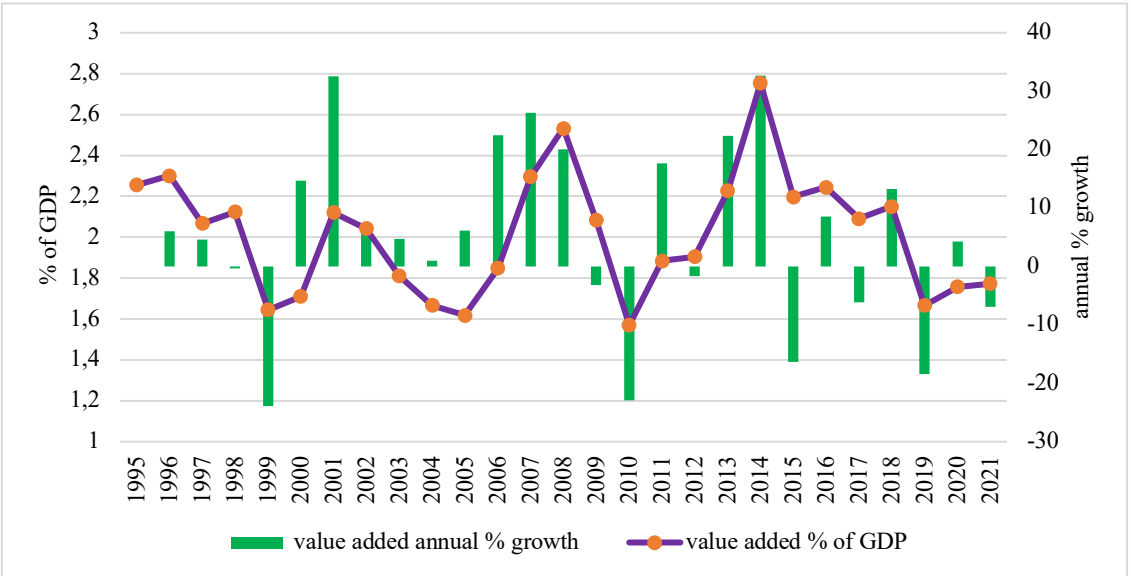

Fig. 2. Agricultural, forestry, and fishing, value added (% of GDP), 1995-2021 years

Source: The World Bank Data

The jump-like dynamics of this value indicates a drop in productivity and efficiency of agriculture (Fig. 2). This is also supported by the fact that the share of agriculture in exports and imports of Slovakia

remained practically unchanged at the level of 5.4 and 3.6%, although in 2017-2019. there was a period of decline within 1.0%. The predominance of the share of imports of agricultural products over the share of exports in Slovakia indicates that national agriculture does not fully meet the needs of the domestic market. In general, agricultural development trends show the need for more effective incentive measures on the part of the government to bring agricultural labour productivity and its efficiency to the average European level.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Real labour productivity in agriculture, forestry and fishing per hour worked (the same period of the previous year=100)	81.4	116.6	102	117.5	134.5	83.4	109.2	96.3	113.5	82.2	110.8
The share of employed in agriculture in total employed, %	3.37	3.31	3.19	3.37	3.26	3.24	3.12	3.05	2.98	2.95	2.93

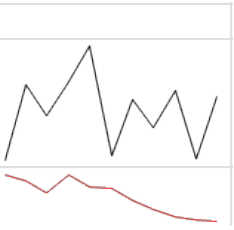

Table 1. Labour productivity in Slovak agricultural

Source: DataCube.statistics.sk

Labour productivity in agriculture and in the food industry is very low, respectively 46% and 39% of the EU average. The continuous February 2022 decrease of employees in agriculture ranks Slovakia among the countries with the lowest share of agricultural workers from total employees (European Commission, 2022). Real labor productivity in agriculture decreased by 14.1%, while the share of those employed in agriculture fell almost in half – from 6.22% to 2.93% (table 1).

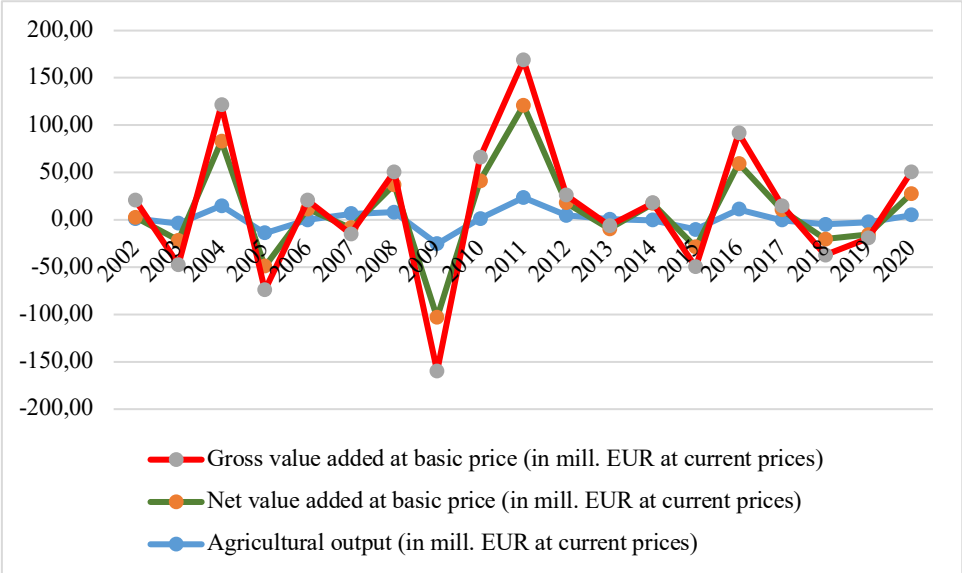

Fig. 3. Annual changes of the main indicators of agricultural development in Slovakia

Source: DataCube.statistics.sk

The dynamics of statistical indicators of the development of the agricultural sector of Slovakia is the main driving force behind the changes that have given rise to many new not only environmental, but also socio-economic problems in the region. These problems are often interrelated. The change in the use of agricultural land has had a significant impact, often negative, on the biodiversity and sustainability of the landscape in the region, and the pollution of certain parts of the environment requires investments

to mitigate these effects and the introduction of new technologies. The closure of industrial enterprises that have a negative impact on the environment is often associated with exacerbation of social problems - an increase in unemployment and an increase in negative psychosocial problems (Izakovičová, Moyzeová & Oszlányi, 2010). Therefore, there is a need for a comprehensive economic development of the agricultural sector with a focus on environmental and social stability.

The following are among the problems of agricultural development in Slovakia:

- The agricultural production is characterized by low added value of primary agricultural production mostly oriented to cereals and oilseeds production. Although the Slovakian agriculture and food industry are able to produce high quality products, increasing exports of raw primary agricultural production and imports of finalized food products result in only 65% of domestic production being processed in Slovakia
- Labour productivity in agriculture and in the food industry is very low.
- The continuous decrease of employees in agriculture ranks Slovakia among the countries with the lowest share of agricultural workers from total employees (half the EU average). The unemployment rate in rural areas remains above the EU level (8,4%, EU: 6,3%).
- The main challenge for the country's agriculture is the lack of interest among young people in going into farming.
- R&D sector lacks investments. Only approximately 0,7% of Slovakia's GDP is spent on scientific research, which represents one of the lowest scientific budgets in Europe. Slovakia's agri-food sector needs fundamental support and incentives for farmers to remain in the market through enhancing eco-systems related to agriculture (Izakovičová, Špulerová & Raniak, 2022).

The origins of problems at the macro level are usually inextricably linked with the activities of business entities. Small farms are the main economic entity in rural Slovakia. Slovakian agriculture is characterized by a dual farm structure, with a high proportion (80%) of small farms up to EUR 15,000 of standard output, and a small number of large farms (1,180) with standard output higher than EUR 250,000 (European Commission, 2022).

Most farms are market-oriented, commercialized, selling most of their produce. For example, 98.0% of the sold products in the total output is typical for wheat-producing farms. Livestock farms are less market-oriented, their share is only 32.5%. The combination of market-oriented activities with self-consumption in one farm is not a very common phenomenon. Mixed farms are a rare example, where their own needs are mainly satisfied, and the market share of the product is relatively small and only surpluses are sold. Almost half of those farms that sell livestock products also sell plant products. The share of farms that both sell products and produce them for their own use is only 16.0%, the market specialization of animal husbandry is only 10.0%, and only 20.0% of farms are focused on own consumption. For commercialized individual farms, specialization is typical, but on products that are easy to sell (wheat, sugar, seeds) and these are large farms.

Agricultural support in Slovakia is implemented within the framework of the Rural Development Priorities program, which is aimed at the following main goals.

Diversification of farming activities is an important direction for improving the efficiency of rural Slovakia. One main objective will be to increase the competitiveness of agriculture and forestry by supporting the investments bringing the higher added-value to the primary production and increasing the efficiency of the organisation of supply chain. In this way, the agricultural diversification with particular focus on the plant specialized sectors (e.g. fruits and vegetables) and animal sectors should create more resilient and productive agriculture with new jobs and alternatives for the agricultural diversification.

A second main objective will be the protection and maintenance of high nature value of agricultural and forestry areas, targeting the sustainable use of soils and water, and thus, providing more opportunities

for high quality food production and creation of rural tourism activities including diversifying products and services outside from agricultural towards a variety of economic activities in rural areas.

Under this priority the RDP includes support to 2 000 farms (8,18% of the total) for investments in the specialized plant (excluding cereals and oilseeds) and animal sectors, while simultaneously targeting resource efficiency (water, soil, energy) and GHG emissions.

In addition, the RDP will improve the economic and social life conditions of rural citizens through investments in better and new infrastructural network, including the broadband infrastructure. The LEADER approach should also help in better use of local resources and to enhance the ownership of investments and cooperation of local actors in integrating economic activities for creating new jobs and improving the quality of life. In order to multiply the investments effect, more than 6 500 persons will be trained and 25 operational groups will be supported linked to the European Innovation Partnership for agricultural productivity and sustainability. In 2020, as a response to the crisis caused by COVID-19 pandemic, the Slovak RDP introduced exceptional, temporary support to the SMEs in food processing industry to an estimated 317 potential beneficiaries.

For the 2021-2027 period, the European Commission is proposing an ambitious total budget of €365 billion meaning that the CAP will account for just under one-third of the total EU budget, underlining the continued importance of the policy. The CAP budget will be divided between its two traditional 'pillars': direct support for farmers/market measures and rural development. In order to allow Member States to better adapt the policy to their farming sector's priorities, they will have the option to transfer up to 15% of their CAP allocations between direct payments and rural development. Member States will also have the flexibility to transfer an additional 15% from pillar 1 to pillar 2 for environmental and climate measures without co-financing.

An additional €10 billion will be available through the EU's Horizon Europe research programme to support specific research and innovation in food, agriculture, rural development and the bioeconomy. The policy will shift the emphasis from compliance and rules towards results and performance. The one-size-fits-all approach will be replaced by a more flexible system, with greater freedom for EU countries to decide how best to meet the common objectives while, at the same time, responding to the specific needs of their farmers and rural communities. The new CAP will encourage and support greater use of modern technologies and innovations. Higher ambition, in particular with regard to the environment and climate, will be complemented by a series of checks and balances to ensure that both farmers and Member States meet their obligations (European Commission, 2018).

Beyond 2020 the CAP will aim to deliver against nine specific objectives all of which could be facilitated through development of a sustainable bioeconomy. The bioeconomy features explicitly as one of the CAP's objectives – in relation to 'vibrant rural areas' – specifically "Promote employment, growth, social inclusion and local development in rural areas, including bio-economy and sustainable forestry" (European Network for Rural Development, 2020). Each Member State will be tasked with drawing up a CAP Strategic Plan to outline their targets and expected results according to these nine objectives. It is therefore essential that the CAP strategic plans are aligned to the aims of the EU Bioeconomy Strategy and that public funds through the CAP are used to support the sustainable development of the EU and Member State bioeconomies.

Ehe updated principles of the CAP after the reform are as follows:

- EU set basic rules and toolbox of measures. Member States can decide which measures will ensure most effective and targeted results, reflecting their own circumstances
- Helping farmers through tailor-made solutions focused on results, not process. Each country will develop a CAP Strategic Plan outlining the measures chosen and desired results, which will be subject to Commission approval and ongoing monitoring
- Direct support for farmers to ensure stability and predictability to farmers. Pre-defined result indicators assess whether progress has been made towards each country's strategic goals.

- More incentives for farmers to go beyond the minimum and tougher penalties for insufficient progress. New system of monitoring and steering policy implementation, with possibility to reward/penalise (CAP, 2022).

Support for agricultural development through CAP is an important source of funding for realizing the benefits of using new bioeconomy technologies in value chain development, which will affect the development of infrastructure and facilities in rural areas. At the same time, the development of the bioeconomy represents new opportunities and support for the realization of the main goals of the CAP, such as sustainable food production, sustainable management of natural resources and climate change measures, balanced territorial development and ensuring an equitable distribution of income. It is the bioeconomy that contributes to this, because the new CAP requires taking into account environmental and social needs: support for value added within rural areas and more resource-efficient, environmentally beneficial and climate-sensitive methods, the release of new, innovative products. Rural development policy and new Common Agricultural Policy will contribute to the diversification of the rural economy and the delivery of the Cork 2.0 Declaration for "A Better Life in Rural Areas.

4. CONCLUSIONS

An analysis of the trends in the development of agriculture in Slovakia gave reason to draw the following conclusions. The indicators of agricultural development in Slovakia over the past 20 years indicate a relatively stable development with no signs of an economic breakthrough. For 2000-2020 the volume of agricultural production grew by only 0.6%, the increase fluctuated at the level of +/- 1-10%. The share of agriculture in GDP increased from 1.01 to 1.35%, in total value added decreased from 1.62 to 1.23%. The share of agriculture in exports and imports of Slovakia remained practically unchanged at the level of 5.4 and 3.6%.

Such dynamics indicates a general decline in productivity and efficiency of agriculture. The predominance of the share of imports of agricultural products over the share of exports in Slovakia indicates that national agriculture does not fully meet the needs of the domestic market. In general, agricultural development trends show the need for more effective incentive measures on the part of the government to bring agricultural labor productivity and its efficiency to the average European level.

The problems of agricultural development in Slovakia include the following:

- falling labor productivity in agriculture, which reduces its share in GDP and value added.
- weak focus on the production of products with a high content of added value, which reduces the competitiveness of agriculture and leads to the predominance of imports of agricultural products over its ecoport,
- small farming is predominantly a family business, changing the motivation to increase profits, and focusing only on generating income sufficient to live on;
- lack of investment in innovation and technological re-equipment of production, which, accordingly, does not create a basis for obtaining a profitable and modern agribusiness;
- the orientation of agricultural policy towards maintaining the income level of farmers with a weak stimulating effect on technological renewal and the introduction of new types of agricultural activities within the bioeconomy.

To solve these problems, the following Rural Development Priorities have been defined:

1) Increase the competitiveness of agriculture and forestry by supporting investments that bring higher value-added to primary production and improve the efficiency of the supply chain.
2) Protect and maintain the high natural value of agricultural lands, provide additional opportunities for the production of high-quality food and the diversification of products and services that are not related to agriculture, towards various economic activities in rural areas.

3) Improve the economic and social conditions of rural people through investment in new better infrastructure network, help in efficient use of local resources and increased responsibility for investment and cooperation of local activists, stakeholders and politicians in the integration of economic activities to create new jobs and improve the quality of life.

A promising direction for the development of Slovakian agriculture is the bioeconomy, which is capable of mitigating the acuteness of accumulated problems, the development of the bioeconomy represents new opportunities and support for the realization of the main goals of the CAP, such as sustainable food production, sustainable management of natural resources and climate change measures, balanced territorial development and ensuring an equitable distribution of income.

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