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INNOVATIONS FOR INCREASING PRODUCTIVITY IN AGRICULTURE AND ENSURING FOOD SECURITY (THE CASE OF GEORGIA)

Summary. *On the basis of comparative analysis the paper concludes that the level of productivity in agricultural sector of Georgia is low. The key factor for solving the problem is to create an innovation-based agricultural model.*

The factors that hinder innovation development and productivity growth are identified in the paper. Recommendations for innovative development and productivity growth in agriculture are suggested.

Key words*: innovation, productivity, agriculture, food security.*

Introduction. Development of agricultural sector is of particular importance for Georgia. Agriculture in Georgia has always played an important role in ensuring food security and increasing wealth. Nevertheless, food production has reduced in recent decades, the level of self-sufficiency with domestically produced food and incomes are low, poverty level in rural areas is high and the deficit of food is covered by imported products [12]. Food balance sheets show that ensuring food security for the population in Georgia remains one of the major challenges. It is enough to note that according to the data of 2019, the self-sufficiency ratios of wheat, meat and vegetables are low (15%, 52%, 59% respectively) [5]. Household expenditures on food account for 43% of total consumer spending [15].

In a number of official documents, agriculture is regarded as a strategic and priority area by the Government of Georgia. In addition, the country is trying to achieve progress in this area

through various programs. Infrastructure projects have been implemented in this sector, preferential agro credits have been applied for agribusiness development [11], etc. However, the risks in agri-food production are high, revenues in this field are low, interest rates on agro-loans are still high. By using preferential agro-credits, it is possible to increase infrastructure capacity, introduce modern technologies in production and develop value-added integration processes in agribusiness. In addition, the leasing service, which is one of the most important sources of financing of private sector in other countries, is not properly developed in Georgia [11]. Food production has declined in Georgia over the last decade, self-sufficiency ratio for locally produced food products is low.

Agriculture in Georgia has traditionally played a crucial role in the provision of food to the population and improvement of welfare. However, food production has decreased in last decade, the level of satisfaction of the population with local food products is low [8]. Today, almost half of Georgia's population is employed in agriculture while the sector accounts for only 6.9% of the country's GDP [13]. Therefore, a large part of the population creats only a small amount of GDP. The analysis of the above indicators shows that the level of productivity in rural areas is quite low and the opportunities of innovative development are not used in the sector. Accordingly, the study of these problems is very important for Georgia.

Purpose. The purpose of the research is to identify the ways for improving productivity in agriculture and food security in Georgia based on analyzing opportunities for innovative development.

Various methods are used in the research process; in particular, the level of problem development is studied through bibliographic research and the key paradigms are identified. The data provided by the National Statistics Office of Georgia, the Ministry of Agriculture of Georgia, as well as the policy documents of the Parliament of Georgia are studied through empirical research. Analysis, synthesis, induction and other methods are used for selecting and grouping the data, identification of similarities and differences and revealing the tendencies.

Results. Ensuring food provision to the population still remains one of the main problems of the economy in many countries. In addition, creating a high productivity agricultural model is considered as the main way to solve the problem. It is also observed that sustainable food security highly depends on the development of agriculture [6].

Growth of productivity is impossible without innovative development. Nowadays, formation of a competitive model of agriculture is directly determined by innovations.

An analysis of production trends in agricultural sector of Georgia showed that competitiveness of the most of agricultural food products is low [12] and the growth rates do not provide possibilities for intensive development of the sector; therefore, the problem of food security can not be resolved and sustainable food security can not be achieved without the introduction of innovations in the short term [12].

Opportunities for applying innovations in agricultural sector of Georgia are quite limited. In general, Georgia is ranked 60^{th} with 26.7 points in overall innovation index and 67^{th} with 41 points in spending on innovations. The innovation efficiency ratio of the country is 0.7 and holds 67^{th} position among 128 countries [4]. Based on these indicators, it is possible to conclude that Georgia needs to encourage research and innovation, introduce innovative technologies in education, support private sector to create and introduce innovations and encourage creation and production of innovative products.

In the modern world, growing economy, including agriculture, is based on innovations. Innovative development and productivity in Georgian agriculture is hindered by the following factors:

- Small-scale production and land fragmentation;
- Unused resources, especially uncultivated arable land;
- Very small number of innovative enterprises in rural areas, which does not substantially encourage economic growth;

- Underdeveloped retail and wholesale food markets, poor innovation infrastructure;
- Lack of financial resources of companies for developing innovative businesses;
- Mostly outdated technologies are used in the sector, which has a negative impact on the competitiveness of products, especially in international markets;
- Low level of cooperation;
- Low level of knowledge of farmers on modern technologies and achievements;
- Vague and imperfect state policy documents on innovation activities, etc.

Scarcity of land represents the main hindering factor for increasing productivity in the sector. Georgia belongs to the countries with scarce land resources; however, the resources are not used effectively. Isreal is also a small country, but while agricultural land accounts for 49% of the total land fund in Georgia, the respective indicator in Israel is 20%. As seen, Israel has twice as less agricultural land than Georgia. However, Israeli agriculture is considered as a high-yielding phenomenon by the world experts. To prove this, it is enough to note that in terms of such limited resources of the land fund, 3.7% of Israel's farmers produce enough to meet almost 95% of their population's needs [14]. The number of people employed in agricultural sector in Isreal account for a small share of total employment; however, the volume of goods produced by them significantly exceeds the corresponding indicator in Georgia. Therefore, application of inclusive innovative approaches is vital for Georgian agriculture. Using inclusive innovative approaches will allow to increase production growth rates in line with Georgia's agricultural development priorities. In this regard, it is desirable to use competitive models of agribusiness and the experience of the leading country such as Israel.

Increasing productivity in agriculture can also be achieved through the cultivation of uncultivated arable land [7]. Currently, only one third of arable land is cultivated in Georgia. Therefore, there is a good potential for expansion in the future, but development of intensive, innovation-based production will be needed.

Both the wholesale and retail food markets operating based on modern technologies play an important role in the growth of agricultural productivity in developed countries [10]. Such markets are located in economically and socially advantageous areas and they have promising opportunities for development and modernization. Markets are managed through information systems, products are diversified, losses in the food supply chain are minimized, subsidies and incentives programs are implemented where needed, the design of the food markets is highly developed, etc.

Increasing agricultural productivity and preserving and enriching natural resources at the same time is vital for farmers, so that they can increase food supply globally on the basis of sustainable development. In this respect, the success of developing countries in increasing agricultural productivity will have a significant impact on improving the sustainability and flexibility of food markets, increasing food security, improving welfare, and promoting sustainable development [9].

The advice provided by highly qualified agronomists, experts and other specialists, as well as the application of knowledge throughout the production and supply chain of agricultural products are highly important for productivity growth. However, currently there is a shortage of highly skilled specielist and the supply chain is underdeveloped in Georgia. With the purpose to ensure food security and environmental protection, sustainable systems of innovation (SAIS) need to be developed in agriculture. Application of such systems requires increasing the share of young specialists along with the experienced ones in the total number of employees. Currently, the desire of the young people to be employed in the sector is not high [14]. This is mainly due to the low level of profitability in the sector.

Expanding farmers' skills and knowledge, providing education and business links play a special role in the growth of productivity. It should be taken into consideration that an effective link between education, science and business for innovative development of the economy is

developed in entrepreneurial universities [2]. Such model of universities supports sustainable development of economy [3] and creates a cluster around it [1].

Conclusions. Through elimination of the factors hindering the introduction of innovations in agriculture, it is expected to achieve modernization of agriculture, development of innovative enterprises and infrastructures and increase of production scales, which, in turn, will ensure economies of scale through increased productivity, increasing competitiveness of the sector and solving the problem of food security.

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