Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 24, Issue 3, 2024
PRINT ISSN 2284-7995, E-ISSN 2285-3952

DIRECTIONS FOR ACHIEVING SUSTAINABLE DEVELOPMENT OF THE PRODUCTION POTENTIAL OF THE RUSSIAN AGRO-FOOD COMPLEX

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Abstract

In the international food market at the global level, one of the major task and strategic goal of any country is to sustain technologically and financially food security. The goal of this research work is to quantify the reserves for increasing agricultural production and to set up the directions for its sustainability. The study emphasized the opinions of foreign and Russian scientists who were dealing with the sustainability of rural areas. The dynamics of the pace of agricultural development in leading foreign countries is empirically studied, and the trends in innovative development are substantiated. The directions for sustainable growth of production potential are improved taking into account environmental factors: development of innovation and investment mechanisms to stimulate the introduction of digital technologies in agricultural production, development of scientific and educational centers to build up digital competencies, formation of a system of package solutions ready for implementation in agricultural production of digital technologies. For evaluating the efficiency of the presented activities, there were used specific indicators. The criteria reflecting the efficiency of the implementation of digital technologies regard the degree of their distribution, the increase of crop yields, the reduction and optimization of the production costs related to farm inputs. The practical value of the results is in the development of a strategy for sustainable development of rural areas.

Key words**:** *sustainability, development, agro-food complex, industry approach, state support measures, foreign experience, legal framework*

INTRODUCTION

In modern geopolitical conditions, the sustainable development of the rural areas is a driver for ensuring the country's independence [5]. Intensive implementation of innovative and digital products in agricultural production stimulates sustainable development [33]. Research on sustainable development is presented in the works of N. Schaller, who proposes a systems approach [31]. According to F. Menalled, the most important condition for ensuring and increasing the quality of life is the synthesis of economic and environmental efficiency, as well as the study of climate problems [4, 24].

The concept of the American economist J. Elkington is based on a triune approach to sustainable development, according to which three most important elements of corporate sustainability (3P) are identified - People, Planet, Profit, reflecting the assessment of sustainability in various dimensions. The goal-setting basis of the proposed triple benefit strategy is the spillover effects of benefit for business representatives, consumers and society as a whole [11,12].

Studying the functioning of individual organizations, Stoneham, G., Chaudhri, V., Ha, A., Strappazzon substantiated the need to adapt business strategies to the tasks of sustainable development of regions, taking into account possible risks [32].

The rationale for models and scenarios of balanced ecological, economic and social development is reflected in the works of Placet [26].

The UN has developed Sustainable Development Goals, which are implemented at the national and supranational levels in accordance with existing governance mechanisms [3, 27].

In particular, O. V. Gonova emphasizes the need to assess and diagnose sustainable development of the agro-food complex. A set of methods of simulation and economic-mathematical modeling is proposed as an assessment and forecasting tool for sustainable development. Russian scientists Medyanik N.V., Cherednichenko O.A., Dovgotko N.A. are researching the directions of monitoring the goals of sustainable development [15, 23].

According to the research results, in order to achieve sustainable Russian business, state stimulation and support are necessary.

To assure a better life quality for the rural population and the preservation of the natural systems regarding biodiversity and the beauty of the landscapes is the main goal to carry out by any country.

For rural areas, the main goal-setting principles remain improving the quality of life of the population and maintaining an acceptable state of natural systems [10].

Similar ideas have been sustained by [2, 17] in their research studies.

In this context, the paper aimed to assess the resources destined to sustain the increase of agricultural production and establish the efficient framework and the major directions for a sustainable production development.

MATERIALS AND METHODS

This study is based on a large number of information sources including publications such as: books and articles on the topic, and updated data for the main studied indicators which are going to be analyzed.

Also, classical methods and procedures specific to similar studies used by various scientific personalities and experts in the field were adopted in this research as well.

From a methodological point of view, there were utilized various well known tools like: monographic description, analysis, synthesis, critical evaluation of the others' opinions, logical structure of the ideas and results, comparisons, analogies, illustrative items for a better understanding of the phenomena.

Sustainable development of agriculture and rural areas requires a brainstorming, a 'spring" of new ideas and solutions from the greatest scientific personalities which have to enlarge the knowledge wealth in the field.

More than this, following the experience accumulated by the EU, one of the top players in the world agriculture and agri-food trade, other countries could use this model adapted to their local conditions regarding land, human, and financial capital to cover the economical and social requirements for a sustainable development which preserves the environment quality.

RESULTS AND DISCUSSIONS

The global sustainable development goals are related to solving multifaceted problems, including overcoming hunger, mitigating dramatic climate change and significantly reducing greenhouse gas emissions. UN experts noted significant difficulties in implementing the goals at the national level:

in 2022, about 30% of the world's population was undernourished; there was a very high concentration of greenhouse gases; high risks of extinction of flora and fauna species remained. In many countries, the income gap between small and medium-sized farmers has not been overcome. Based on selected data, experts determined that the average annual income of small agricultural businesses is 40-50% lower.

In Russia, specialists from the Federal Statistics Service monitor and evaluate targets and indicators for achieving sustainable development. According to their assessment, in 2010-2021, greenhouse gas emissions per unit of GDP decreased by almost 3 times, which is due to the use of energy-saving and material-saving technologies. At the industry and regional levels, plans for adaptation to climate change are being developed [34].

Many countries around the world are not fully achieving the goal of promoting sustainable economic growth. In 2022, global output slowed from 5.3% in 2021 to 2.2% in 2022.

The growth rates of agriculture in some countries are shown in Figure 1.

The European Union has strict environmental standards. In the period under review, Russia achieved the highest growth rates, especially in crop production and food production, which

indicates a successful solution to the problem of food security.

The growth rates of livestock production (116.9%) were also higher than those of individual European countries.

The development of agricultural production should be coordinated taking into account the principles of sustainable development [30].

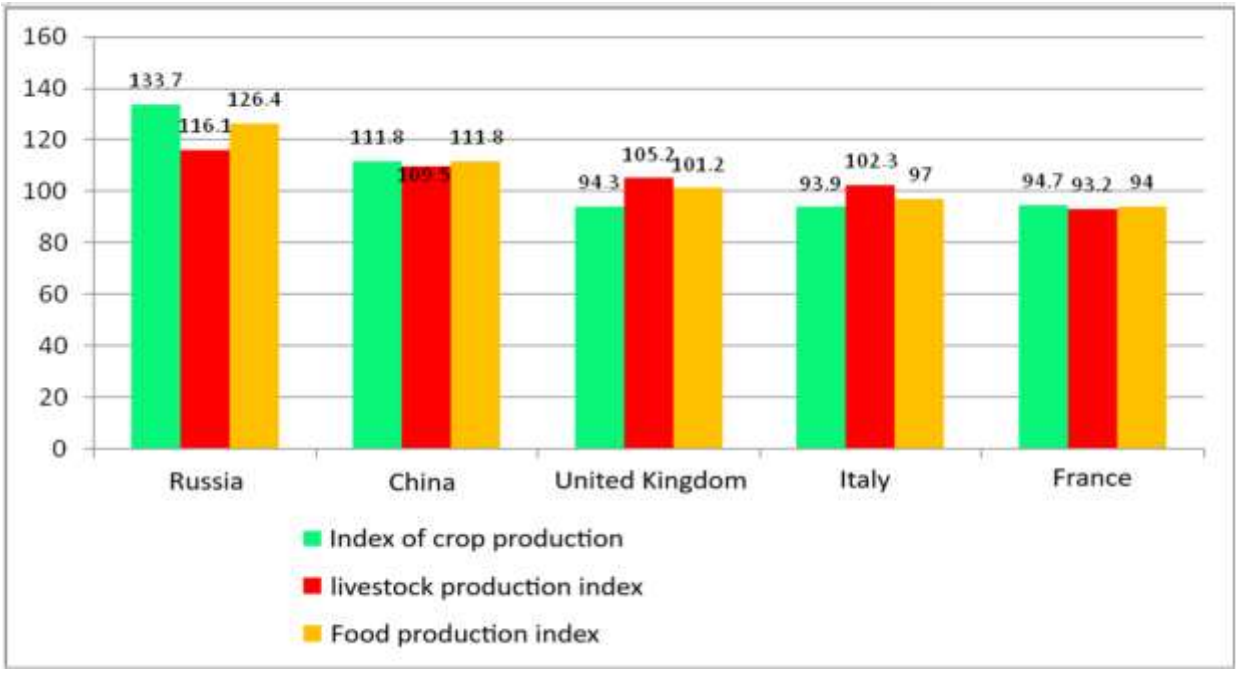

Fig. 1. Indices of production of agricultural products (2022 in % of 2004-2006)
Source: Own calculations based on data [18,19, 22].

Significant growth is expected to be achieved due to innovative factors that allow for effective resource substitution and increase the productivity of production factors [6, 8]. Fig. 2 shows the indices of total factor productivity of agriculture. different countries. The calculation of these indices is based on the assessment of the contribution of labor and capital factors to production using the production function method [35].

According to research by Russian scientists, in 2021 Russia ranked second in the world in terms of factor productivity.

In the analyzed period, the processes of scaling up the agricultural business in certain branches of animal husbandry [7].

For example, precision farming technologies are used mainly in large and medium-sized agricultural organizations, which helps to increase yields by about 20%.

With strict compliance with the technology requirements, production costs can be reduced by 10 - 50%. The use of nanotechnology and intelligent biosensors in precision farming allows for timely diagnosis of soil conditions to assess compliance with environmental standards [16, 29].

In greenhouse vegetable growing, an important innovative solution is the use of satellite control to organize production [9].

High rates of production of modern agricultural technologies, especially agro-biotechnology, predetermine the possibilities of Russia's positioning in world markets [1].

The main condition for cost optimization is the development of domestic selection. In Italy - organic production; in Germany - precision farming and plant protection. Innovative projects to create artificial soils, greenhouses using sea water are being implemented in the agriculture of African countries. For Russia, trends in selection technologies and precision farming will retain their significance in the short term. Promising technologies that have not received sufficient distribution include bioinformatics, bioengineering and genomics [13].

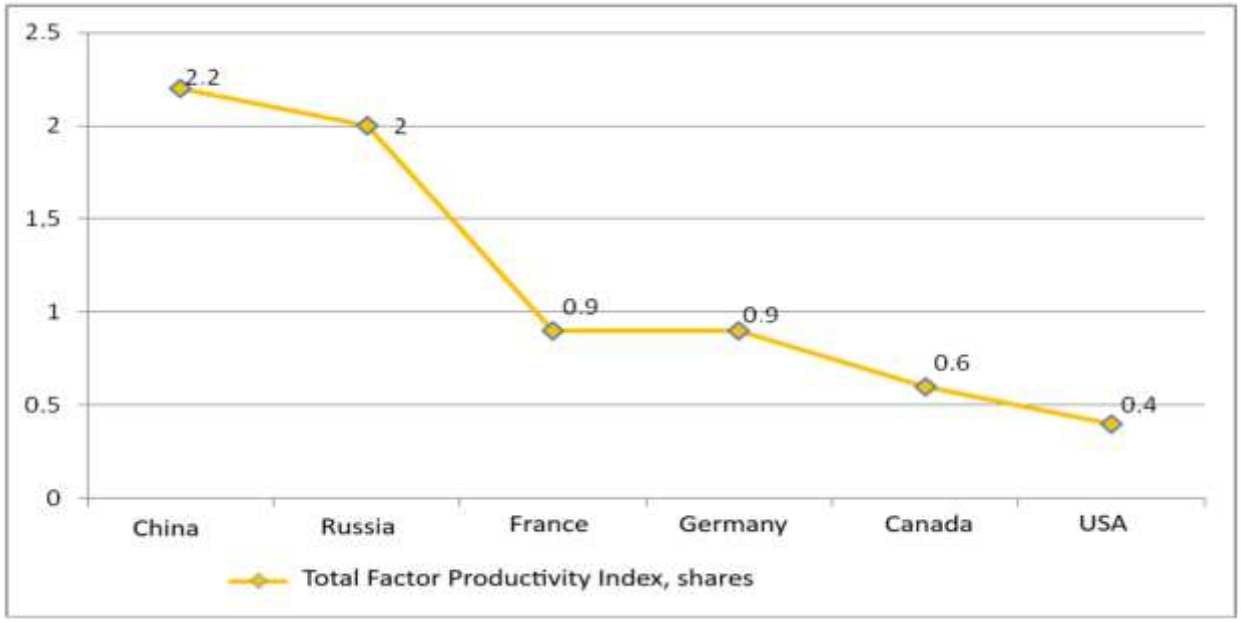

Fig. 2. Total factor productivity indices in agriculture of individual countries (2021 in % of 2000)
Source: Own calculations based on data [21] .

In animal husbandry, the main trends in scientific and technological development in the medium term are defined as aerospace digital technologies in pasture livestock farming, organic livestock farming, genomic assessment of livestock genetic resources, production of agro-food products and feed mixtures with specified quality characteristics [14].

The study proposes to take into account the principles of forming an innovative and ecological profile with the substantiation of the system of evaluation indicators. It is substantiated that the criteria for the effectiveness of the introduction of digital technologies are the degree of their distribution, the growth of crop yields, the minimization of the costs of economic resources, the coefficient of the optimization of the cost of production.

When developing mechanisms for sustainable development of rural areas, both national goals and regional and sectoral characteristics should be taken into account.

The introduction of new technologies in selection and seed production will ensure technological independence in the Russian agro-food sector. Therefore, the most important indicator is the indicator of import substitution of new plant varieties and animal breeds.

The authors share the point of view on the need to adapt individual elements of the Common Agricultural Policy of the European Union to the Russian conditions of functioning of the agro-food complex. Important attention should be paid to environmental protection standards called to sustain the green economic growth for the future [10, 28].

Only based on the knowledge economy and the principles of inclusive development the future of the novel sustainable growth could be attained and provided to the next generations [20, 25].

No doubt, the long and positive EU experience which led to high economic, social and environment performance, is model that any country would like to follow.

The EU healthy vision for its future economic grown and social well-being is founded on an effective management in solving problems in close connection with a firm response to diminish the negative impact of climate change, to increase the capacity of resilience, and to implement the Green Deal by 2050.

In Russia, there are similar problems agriculture and rural areas are facing and to solve them a transfer of positive EU experience could be beneficial for setting up new strategies of development called to assure the sustainable growth under the environment conservation.

CONCLUSIONS

The new strategy of the development of agriculture and rural areas has to take into account the own local conditions and to quantify the influences of various factors (geographical, demographical, economical, social, environmental etc).

The strategic objectives have to be realistic and to be accompanied by measures and tools called to sustain the attainment of the goals.

The results of this study emphasized the conceptual aspects of foreign and Russian agricultural scientists having the most significant achievements regarding the research of sustainable development of agriculture and rural zones.

The dynamics of the pace of agricultural development in leading foreign countries is empirically studied, and the trends in innovative development are substantiated.

The directions for sustainable growth of production potential must be improved taking into consideration the need of innovation and investments, the benefits of the digital era which offer efficient tools for agriculture modernization and automatization for an increased productivity, the new digital technologies will changes job structure and sustain a new orientation in the field of education and scientific research as fields producing economic and social progress. Educational centers based on the new technologies applied in teaching and learning process are called to build up digital competencies, and to create a system of package solutions ready for implementation of digital technologies in agricultural production. This study substantiated that the criteria for the effectiveness of the introduction of digital technologies, the degree of their distribution, the growth of productivity, the minimization of the production expenses.

Knowledge economy and the principles of inclusive development must be involved in the process for assuring the sustainable growth.

The new strategies for the development of Russian agriculture must be positively influenced by EU experience in solving problems management for assuring an economic sustainable growth, a better living standard to the population and a high quality of the environmental factors.

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