European Proceedings of
Social and Behavioural Sciences
EpSBS

www.europeanproceedings.com
e-ISSN: 2357-1330

DOI: 10.15405/epsbs.2020.03.169

II International Scientific Conference GCPMED 2019
"Global Challenges and Prospects of the Modern Economic Development"

INTEGRATED FARMING DEVELOPMENT IN THE CONTEXT OF DIGITAL TRANSFORMATION

O. A. Rodionova (a)*, T. G. Evsyukova (b), A. A. Pertsev (c)
*Corresponding author

(a) Financial University under the Government of the Russian Federation, 125993, Leningradskiy prospect, bldg. 49, Moscow, Russia; All-Russian Scientific Research Institute of the Organization of Production, Labor and Management in Agriculture, 111621, Orenburgskaya str., bldg. 15, Moscow, Russia, olanrod@mail.ru
(b) All-Russian Scientific Research Institute of the Organization of Production, Labor and Management in Agriculture, 111621, Orenburgskaya str., bldg. 15, Moscow, Russia, 8309219@gmail.com
(c) All-Russian Scientific Research Institute of the Organization of Production, Labor and Management in Agriculture, 111621, Orenburgskaya str., bldg. 15, Moscow, Russia, alx.pertsev@yandex.ru

Abstract

The article considers the problem of adapting the conceptual provisions of sustainable development in relation to agriculture integrated with the requirements of environmental protection and the economical use of natural resources. Despite the growth of investment in fixed assets aimed at preserving water resources from contaminated wastewater an unstable situation persists. The highest share in the Russian economy in terms of pollutant is held by manufacturing sectors – 36%, mining – 25%, production and distribution of gas, water and electricity – 1 %. About 1% falls on the share of agriculture along with hunting and forestry. The highest share in terms of wastewater discharges is accounted for by organizations producing and distributing electricity, gas and water - 56%. The share of agriculture, hunting and forestry in the total volume of wastewater discharges over 10 years was 5%.Despite the positive changes in the digitalization of Russian agriculture, but in comparison with foreign experience, they are not developing so intensively. For example, the draft law “Digital Agriculture” does not provide for specific measures aimed at reducing the negative impact of the results of economic entities on the environment. The processes of digitalization of the economy determine the search for new approaches to the formation of information in order to increase its transparency and publicity of the activities results connected with organizations and industries on environmental pollution.

Keywords: Transformation, environment, sustainability, integrated farming, rating.

https://doi.org/10.15405/epsbs.2020.03.169
Corresponding Author: O. A. Rodionova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

The information component on the state of the environment becomes an important factor that influences the sustainable development of territories, industries and organizations in respect of the transition to the digital economy. This is necessary for the following purposes: making management decisions in order to attract investment; determining budget financial support; coordinating and protecting the economic interests of food producers and consumers; conducting research and testing their results.

The theoretical provisions of the "green economy", "new normality", "reindustrialization" describe the trends of world economic development. The main trend is the growth of investments in the field of resource conservation to reduce the environmental burden in order to achieve economic growth. According to experts (Afontsev, 2014), by 2050 in condition an annual investment of 1.3 trillion dollars in the green economy sector, GDP growth could reach 16% with a 48% reduction in energy demand compared to the baseline scenario. At the same time it is noted that the degree of “fragility” of the model proposed over the years is very high due to constantly recurring economic crises and environmental disasters that pose a threat to sustainable development (Sala, Ciuffo, & Nijkamp, 2015). The scientific community is increasingly discussing the problem of bioeconomics. In this regard, the importance of the ecological or biological component in socio-economic development is increasing (Giampietro, 2019).

2. Problem Statement

The Strategy of Economic Security of the Russian Federation until 2030 states that access to renewable resources is increasingly affecting access to renewable resources (Russian Federation Presidential Decree of May 13, 2017 No. 208 "On the Strategy for the Economic Security of the Russian Federation for the period until 2030", 2017). Resilience, vulnerability, sustainability are interrelated concepts. In the field of sustainable development of ecological systems, established a certain rules. Thus, in the Sustainable Development Concept for the period until 2030 of Food Agriculture Organization (United Nations, 2017), 17 interconnected goals and objectives are formulated to eliminate poverty, conserve the planet’s resources and ensure the well-being of the entire planet’s population. Each of the 17 Goals contains indicators that must be achieved within 15 years. For example, the block “Life on Land” includes indicators characterizing the protection of the environment, and a thrifty attitude to natural resources and wildlife. The main ones include: 1) forest area as a percentage of the total land area; 2) the proportion of wild animals that are the object of poaching or illegal traffic, for species that are being traded; 3) the area of degraded land as a percentage of the total land area. Indicators also include the amount of budget allocated for the conservation and sustainable use of biodiversity and ecosystems.

Evaluating the situation regarding the implementation of the Sustainable Development Goals as applied to agriculture, hunting and forestry - sectors integrated into one type of economic activity (TEA). The problem of sustainable agricultural development from the perspective of growing needs for food is becoming overly relevant (Sala, Ciuffo, & Nijkamp, 2015). The European Union has developed the concept of integrated agriculture – “integrated farming”, the contents of which are disclosed by EISA (European Initiative for Sustainable Development in Agriculture, 2012).

https://doi.org/10.15405/epsbs.2020.03.169
Corresponding Author: O. A. Rodionova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

Integrated farming (IF) is considered as a holistic management system that allows businesses to conduct efficient management. It must, firstly, be sustainable, respectful of the environment, plants and animals, and secondly, ensure the production of high-quality raw materials and food. Based on these principles, the European Union has identified areas, forms and volumes of support for agriculture. They are interconnected with requirements for protecting the environment and maintaining land in an environmentally friendly condition. For example, environmental protection requirements include the protection of waters from nitrate pollution from agricultural sources (European Initiative for Sustainable Development in Agriculture, 2012).

3. Research Questions

It is supposed to analyze how the environmental component is taken into account in solving the problem of sustainable development of agriculture in the Russian economy. To do this we will evaluate the indicators of agricultural development with other types of economic activity (TEA) that have an impact on the environment (Boiral & Heras-Saizarbitoria, 2017). The share of agriculture in the total production of this foreign economic activity exceeds 90-95% (Federal State Statistics Service, 2019). This is the basis for the spread of the changes taking place in it to agriculture.

4. Purpose of the Study

The purpose of the study is to identify indicators that are directly related to the environmental component of the sustainable development of foreign economic activity.

For the analysis we used indicators of five TEA, the results of which affect the environment, namely:

- agriculture, hunting and forestry;
- mining;
- manufacturing industries;
- production and distribution of electricity, gas and water;
- transport and communication.

Based on indicators for 5 sectors, rank the sectors with the most sustainable development.

5. Research Methods

This study analyses state reports concerning negative impact on the environment and investments for rational use of water resources. Based on statistical information, the same indicators are compared in content, but related to different sectors and foreign economic activity. The methods used in the analysis such as determining the geometric mean and rating score expand the boundaries focusing not only on the sphere of real production, but also on the state of the environment.

https://doi.org/10.15405/epsbs.2020.03.169
Corresponding Author: O. A. Rodionova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

6. Findings

We briefly describe the indicators that have an impact on the environment as a result of the activities of organizations. These include: emissions that pollute the atmosphere of substances emanating from stationary sources; discharges of wastewater into surface water bodies. Air emissions of pollutants adversely affect public health and the environment from stationary and mobile sources of emissions. Emissions of air polluting substances are accounted both for their state of aggregation (solid, gaseous and liquid), and for individual substances (ingredients). The discharge of contaminated wastewater includes industrial and domestic (municipal) effluents. They are discharged into surface water bodies without treatment (or after insufficient treatment) and contain pollutants in amounts exceeding the approved maximum allowable discharge (Table 01).

Table 01. The average annual growth rate (decrease) of indicators characterizing the environmental component in the context of TEA on average for 2008-2018

Type of economic activity (TEA)	**The average annual growth rate (decrease),%**		
	Air emissions of pollutants	**Discharges of polluted wastewater into surface water bodies**	**Volume of investments for rational use of water resources**
Agriculture, hunting and forestry	106,1	97,0	199,8
Mining	98,9	96,9	104,1
Manufacturing	94,9	96,7	113,4
Production and distribution of gas, water and electricity	95,4	98,9	97,4
Transport and communications	96,9	93,6	128,8

Source: authors based on Federal State Statistics Service data (Federal State Statistics Service, 2019)

The results of the analysis are as follows.

1. In terms of air emissions of pollutants for the period 2008-2018 the highest share is occupied by manufacturing sectors – 36%, then Mining – 25%, Production and distribution of gas, water and electricity – 17%. The lowest, about 1% is accounted for by Agriculture and hunting and forestry the highest proportion is accounted for by the organization for the Production and distribution of electricity, gas and water – 56%, Manufacturing – 18%. The share of Agriculture, hunting and forestry in the total volume of wastewater discharges over 10 years period was 5.5%.

2. During the analyzed period, there are significant fluctuations in the volume of emissions of polluting substances into the atmosphere and the discharge of polluted wastewater for all types of economic activity. The highest average annual growth rate for pollutant emissions is in Agriculture, hunting and forestry - 106.0%. The deterioration of the ecological situation caused by the activities of economic entities is explained by the expansion of industrial production in such sectors as pig farming, poultry farming, and vegetable growing. Failure to comply with technical regulations during the commissioning of livestock, vegetable and other combines leads to negative environmental consequences,

https://doi.org/10.15405/epsbs.2020.03.169
Corresponding Author: O. A. Rodionova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

soil pollution by sewage and hazardous waste. Regarding the discharge of contaminated wastewater for all TEA, a slowdown and a decrease in growth rates are observed.

3. The results of the analysis of investment volumes aimed at rational use of water resources give an idea of the current environmental situation. In the context of foreign economic activity, there is a positive trend in the growth rate of investments used for the rational use of water resources. Positive shifts occur in the field of agriculture, hunting and forestry. Despite the fact that the volumes and growth rates of investments in fixed assets aimed at preserving water resources from polluted wastewater have increased, the unstable situation, however, persists.

To illustrate this situation, a rating of five foreign economic activities was carried out according to 3 indicators (Table 02).

Table 02. TEA rating by growth (decrease) of emissions and discharges, investment in rational use of resources

Type of economic activity (TEA)	**The average annual growth rate (decrease),%**						**Total points**	**Ranking place**
	Air emissions of pollutants		**Discharges of polluted wastewater into surface water bodies**		**Volume of investments for rational use of water resources**			
	Value	**Place**	**Value**	**Place**	**Value**	**Place**		
Agriculture, hunting and forestry	106,1	5	97,0	4	199,8	1	9	**2**
Mining	98,9	4	96,9	3	104,1	4	11	**3**
Manufacturing	94,9	1	96,7	2	113,4	3	6	**1**
Production and distribution of gas, water and electricity	95,4	2	98,9	5	97,4	5	12	**4**
Transport and communications	96,9	3	93,6	1	128,8	2	6	**1**

Source: authors based on Federal State Statistics Service data (Federal State Statistics Service, 2019)

In recent years, the state policy of Russia in the field of sustainable development is aimed at digital transformation. According to experts (Schneider Electric, 2019), Mining and Manufacturing industries are leading in the implementation of industrial Internet of things technologies. This is realized due to a significant share of state participation in corporations. Of the five types of economic activity studied, only agriculture belongs to the “debutants” in the process of adaptation to digital technologies.

The EU agricultural policy first explicitly addressed the impact of agriculture on the environment in a Green Paper published in 1985 (Commission of the European Communities, 1985). Over the past two decades, the concept of supporting transformations in the field of sustainable development has been actively discussed through an attempt to harmonize economic, social and environmental goals. Based on these targets, new approaches to the maintenance of the economy are being developed. For example, the

https://doi.org/10.15405/epsbs.2020.03.169
Corresponding Author: O. A. Rodionova
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

economy is circular or green economy, with a slowdown or steady state, as well as bioeconomics (Loiseau et al., 2016). European companies are more likely to use the concept of a circular and green economy (D'Amato, Korhonen, & Toppinen, 2019) The EU's environmental and economic policy provides both tax collection for environmental damage and financial support for farmers to transform agricultural activities in order to reduce the negative impact on nature, the so-called agroecological schemes. In Russia, such support measures are not yet applied (Rodionova & Evsyukova, 2019). The issue of introducing an environmental tax is being discussed, the tax base of which will be measured by the volume of negative impact, i.e. volume of emissions and discharges. At the same time, the bill provides incentive benefits for payers developing new technologies that reduce the negative effect on the environment. Ratification of the draft law is planned in 2021.

IT and sustainable development are closely intertwined. In countries with market economies, a variety of sustainable environmental development programs are used (Nabernegg, Bednar-Friedl, Muñoz, Titz, & Vogel, 2019; Cellis, Pascual, & Mertz, 2019), which contain innovative agricultural solutions.

In the Russian Federation a draft law "Digital Agriculture" has been developed. It contains directions, forms and tools for the development of digital public administration of a strategically important industry. The project creates a digital platform for entities working in this industry. It should be noted that the project does not provide measures aimed at reducing the negative impact of the results of economic entities on the environment and improving the rational use of natural resources.

Information support regarding environmental monitoring could be assessed by means of an environmental tax. Data on the amount of the fee paid used to be published annually, but no information has been provided since October 2018, which to some extent contradicts the principles of “open data”. Targeted statistical studies on payers and by type of activity, including integrated farming, were also not conducted. The lack of information restricts the conduct of research, does not make it possible to analyze the “fairness” of reimbursement by the industry of performance results for negative environmental impact.

7. Conclusion

An integrated approach for agricultural development in digital transformation conditions is extremely important. Sustainable development of integrated farming is possible only when it is associated with increased production efficiency, social development of rural areas, conservation of biological diversity and regeneration of natural resources, as the problems observed in the environmental sphere (negative impact on water systems, atmosphere and soils), affect the results of agricultural production.

A complex problem requires complex solutions, and despite the fact that the Russian Federation takes certain steps in this direction (which, in particular, is expressed in an increase in investments in the rational use of natural resources), the imperfection of the regulatory framework governing green agricultural production, coupled with other limiting factors, does not allow Russia to make significant progress in this area.

References

Afontsev, S. A. (2014). World economy: A quest for the new growth model. *World Economy and International Relations, 2*, 3-12. [in Rus.].

Boiral, O., & Heras-Saizarbitoria, I. (2017). Corporate commitment to biodiversity in mining and forestry: Identifying drivers from GRI reports. *Journal of Cleaner Production, 162*, 153-161. https://doi.org/10.1016/j.jclepro.2017.06.037

Cellis, E. C., Pascual, U., & Mertz, O. (2019). Ecosystem services and nature's contribution to people: Negotiating diverse values and trade-offs in land systems. *Current Opinion in Environmental Sustainability, 38*, 86-94. https://doi.org/10.1016/j.cosust.2019.05.001

Commission of the European Communities (1985). Perspectives for the common agricultural policy. Communication from the Commission to the Council and the European Parliament. Brussels: COM. Retrieved from: http://aei.pitt.edu/931/1/perspectives_for_cap_gp_COM_85_333.pdf Accessed: 18.10.2019.

D'Amato, D., Korhonen, J., & Toppinen, A. (2019). Circular, green, and bio economy: How do companies in land-use intensive sectors align with sustainability concepts? *Ecological Economics, 158,* 116-133. https://doi.org/10.1016/j.ecolecon.2018.12.026

European Initiative for Sustainable Development in Agriculture (2012). *European integrated farming framework.* Retrieved from: http://www.sustainable-agriculture.org/integrated-farming/ Accessed: 30.09.2019.

Federal State Statistics Service (2019). *Russia in figures 2019*. Retrieved from: https://gks.ru/bgd/regl/b19_11/Main.htm Accessed: 06.10.2019. [in Rus.].

Giampietro, M. (2019). On the circular bioeconomy and decoupling: Implications for sustainable growth. *Ecological Economics, 162*, 143-156. https://doi.org/ 10.1016/j.ecolecon.2019.05.001

Loiseau, E., Saikku, L., Antikainen, R., Droste, N., Hansjürgens, B., Pitkänen, K., ... & Thomsen, M. (2016). Green economy and related concepts: An overview. *Journal of Cleaner Production*, *139*, 361-371.https://doi.org/10.1016/j.jclepro.2016.08.024

Nabernegg, S., Bednar-Friedl, B., Muñoz, P., Titz, M., & Vogel, J. (2019). National policies for global emission reductions: Effectiveness of carbon emission reductions in international supply chains. *Ecological Economics, 158*, 146-157. https://doi.org/10.1016/j.ecolecon.2018.12.006

Rodionova, O. A., & Evsyukova, T. G. (2019). Economic branch characteristics of special tax regimes based on analysis of the indicators of structural shifts. *Samoupravlenie, 2*(3(116)), 272-276. [in Rus.].

Russian Federation Presidential Decree of May 13, 2017 No. 208 "On the Strategy for the Economic Security of the Russian Federation for the period until 2030". Retrieved from: https://www.garant.ru/products/ipo/prime/doc/71572608/ Accessed: 06.10.2019. [in Rus.].

Sala, S., Ciuffo, B., & Nijkamp, P. (2015). A systemic framework for sustainability assessment. *Ecological Economics, 119*, 314-325. https://doi.org/ 10.1016/j.ecolecon.2015.09.015

Schneider Electric (2019). Digital funnel of consumption: Features and prospects of the Russian IoT market. Retrieved from: https://www.se.com/ww/promo/ru/ru/getPromo/A11883?_ga=2.174480866.1996669551.1571080878-419418680.1571080878 Accessed: 01.10.2019. [in Rus.].

United Nations (2017). *The Sustainable development goals report*. Retrieved from: https://unstats.un.org/sdgs/files/report/2017/thesustainabledevelopmentgoalsreport2017.pdf Accessed: 06.10.2019.