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AGRICULTURE COEXISTENCE AS A NECESSARY PART OF THE SOCIO-ECONOMIC DEVELOPMENT OF RUSSIA

Alexander Y. Sokolov (a)*, Oleg A. Lakaev (b), Natalia V. Bogatyreva (c)
*Corresponding author

(a) Saratov State Law Academy, 1, Volskaya Str., Saratov, 410056, Russia, aysockolov@mail.ru,
(b) Saratov State Law Academy, 1, Volskaya Str., Saratov, 410056, Russia,
(c) Verba Legis LLC, 58B, Zheleznodorozhnaya Str., Saratov, Russia

Abstract

Diversification of the methods for obtaining agricultural products is necessary for sustainable socio-economic development of the Russian Federation. Coexistence of traditional, organic, and biotechnological agriculture allows for reduction of climatic changes' impact on the harvest, whilst ensuring the competitiveness of the modern biotechnological developments of Russian scientists at the international level. This study is to identify a coexistence model that will protect farmland biodiversity, and economic interests of organic producers, who avoid using genetically engineered material in their crops due to probability of casual over-pollination. The coexistence model for biotechnological, organic, and conventional farming exists in many countries but is not yet applied in Russia. In this regard, the prospects for this model implementation in Russia should be assessed considering the experience of foreign countries, primarily that of the United States and the European Union countries. The coexistence model implementation could result in recognition at the state level of the importance and value of each of the three types of agriculture – organic, traditional, and biotechnological, and in creation of mechanisms for their support and development. This will ensure the interests of various groups of population — farmers using genetically modified varieties, farmers working with traditional plants, as well as consumers, scientists, and agricultural entrepreneurs.

Keywords: Administrative regulation, control, genomic technologies, GMO, monitoring, supervision

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1. Introduction

The use of modern gene engineering-based methods of biotechnology in agriculture could result in solving the urgent socio-economic problems of the Russian Federation. Firstly, it helps avoiding crop reduction caused by unfavorable climatic changes using the new plant varieties with improved economically valuable traits. Secondly, this will increase the profits of farms using genetically modified varieties. Thirdly, this will ensure further progress of the modern biotechnological developments of Russian scientists, their competitiveness at the international level, and commercialization opportunities. At the same time, it is necessary to diversify the development strategies of the agro-industrial complex, combining and protecting traditional, organic and biotechnological agriculture. These goals could only be reached by developing and implementing the biotechnological, organic, and conventional agriculture coexistence model in public regulation. This study is devoted to the legal opportunities and prospects for the coexistence model implementation in Russia.

2. Problem Statement

Obtaining new plant varieties with artificially changed characteristics will increase the yield of agricultural crops, their resistance to an arid climate and other unfavourable conditions. It gets special relevance in the context of global climate change. Scientific research confirms that climate change affects 98 per cent of the Earth's land area (Neukom et al., 2019). Therefore, the search for new ways to obtain plants with the specified characteristics is an urgent task, the solution of which will allow the societies to quickly respond to changes in familiar climatic conditions.

One way to solve this problem is the use of genomic technologies in the production of new plant varieties. The practice of introducing modern biotechnologies based on genetic engineering methods into agriculture in countries where this is supported, demonstrates positive effects on the economy of individual farms and the country as a whole. These benefits are especially noticeable in developing countries, as a meta-analysis of 2014 year shows. This meta-analysis covered 147 studies of the growing genetically modified (hereinafter — “GM-”) crops of soy, corn, and cotton in farms around the world. The meta-analysis shows that the introduction of GM-crops reduced the use of chemical pesticides by 37 %, increased yields by 22 % and increased farmers' profits by 68% on average (Klümper & Qaim, 2014).

These data confirm studies conducted in individual countries, including the European region. Thus, a review of the economic and environmental effects of using insect-resistant GM-maize in Spain and Portugal over the past 21 years shows that for every extra euro spent on seeds of modified crops compared to regular seeds, farmers received an extra income of 4,95 €. These incomes provided an increase in productivity by 11.5 %. In addition, the use of herbicides, insecticides and fuels for agricultural work decreased, which reduced the negative impact on the environment (Brookes, 2019).

A review of the practice of using GM-crops in Colombia from 2003 to 2020 years fixed the same benefits for farmers. The indicators of economic efficiency in this case were evaluated separately for GM-corn and GM-rice. In the first case, the average profitability of investments amounted to $ 5.25 for each

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additional US dollar invested in GM-crops, compared with ordinary seeds, in the second — $ 3.09 (Brookes, 2020).

The economic benefits of using plants obtained by genomic technology in agriculture are confirmed by ongoing research, but in many countries such plants are banned due to public concern about the biological and environmental safety of such crops.

The solution to this dilemma may be the introduction into agricultural practice of new plant varieties obtained by gene editing methods, not gene modification. These organisms do not have the same associated risks as genetically modified organisms. Genetically edited organisms do not contain foreign genetic material. Examples include soybeans with healthier fatty acids; wheat with a lower content of gluten; potatoes with a longer shelf life, bacterially resistant rice, grape, wheat; cocoa varieties that are resistant to fungi and drought-resistant varieties of corn and wheat (Towards a scientifically justified …, 2015). However, the legal status of such organisms is currently uncertain, so there are significant legal risks for biotechnological agribusiness that must be eliminated at the legislative level by making decisions on differentiated legal status between genetically modified (GM-) and genetically edited (GE-) organisms. This is most relevant for countries where the cultivation of genetically modified organisms (hereinafter — GMOs), also obtained using genomic technology, has been banned. The Russian Federation is among such countries, as most countries of European Union (except for Spain and Portugal). GE-organisms are not the GMO, despite the use of genomic technologies in their preparation. The different methods are used for their obtaining, and it requires different law.

On the other hand, the introduction of GE-plants as a type of biotechnological farming in Russian agribusiness cannot be allowed without protecting organic and traditional crops from cross-pollination. It is necessary to ensure the interests of farmers and agricultural entrepreneurs working with traditional plants. Recognition of each of the three types of agriculture and their protection is an important direction of diversification in the Russian agricultural economy.

Thus, a conventional, organic, and biotechnological crop production coexistence system is the most effective way to reduce risks for Russian economic, associated with the reduction of climatic changes' impact on the harvest, the loss of competitiveness of the biotechnological developments of Russian scientists at the international, and the environmental safety of GM- and GE-crops.

3. Research Questions

The focus of this research is the study of construction of the system of conventional, organic, and biotechnological crop production coexistence. Among the data obtained, it is necessary to identify those that may be useful for the Russian coexistence system development. It is also essential to pay attention to the problems faced by other countries, their consequences, and solutions in order to prevent any negative scenarios in Russia.

4. Purpose of the Study

The research is aimed at finding out the prospects of conventional, organic, and biotechnological farming co-existence in Russia, restrictive measures to prevent unintentional genetically engineered

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material transfer being taken. To achieve this goal, it is also necessary to solve the following task: to outline ways to eliminate the main legal risks associated with the introduction of GE-plants in the Russian Federation.

5. Research Methods

The study uses general scientific cognition and legal methods and techniques. The comparative legal method was used to study foreign legislation concerning crop production coexistence.

6. Findings

A comparative legal survey of different state regulation systems of coexisting traditional, organic and biotech crop cultivation shows that the most common way of growing traditional and biotech crops safely together is using buffer zones (no-till zones). Buffer zones should be defined regionally because only then can the diversity of natural and climatic conditions, the topography of the area, the specificity of the crops and that of farming practices be taken into consideration. This practice is in line with the current recommendations of the European Union (Commission Recommendation, 2010). Recent studies show that, for example, in South-east Russia, a minimum isolation distance of 15 m with buffer zones can be considered acceptable to eliminate the risks of maize over-pollination (Gusev et al., 2021). In addition to buffer zones, varietal seed purity and grain storage methods influence the amount of genetically engineered material present in plants growing nearby (Dolphin et al., 2020).

The most developed coexistence system practice has developed in the USA, where GMO cultivation is permitted. Not only broad buffer zones used, but also safety protocols may contribute to individual approval of each GMO type, and provide monitoring mechanisms and procedures to resolve disagreements between neighbouring farms (Byrne & Fromherz, 2003).

European Union countries now have strict measures regarding GMO cultivation, with individual states having the right to prohibit such cultivation on their territory. Within general supranational regulation framework, individual countries are free to establish their own coexistence system regulation. For example, in some countries, farmers have to obtain official permission before they can start growing GMOs (Pryazhnikova, 2017).

By 2021, only two European Union countries had actually started growing GM varieties (Portugal and Spain), in all the other countries GMO cultivation has either never started or stopped. One of the reasons is strict supranational regulations (Commission Recommendation, 2010). Back to the 2000s, scientists warned that the EU authorities might adopt too rigid and severe co-existence rules not eventually developing genetic crop production engineering but hindering it (Demont & Devos, 2008). For example, the system introduced in Hungary is so strict that it effectively bans biotechnological production (K'yarabolli & Radzhon'eri, 2013). Therefore, when constructing coexistence requirements, the fact if some measures are considered to be burdensome by farmers shall be taken into account (Rednikova, 2020).

Interesting experience comes from France, where municipalities were to be empowered with the function of determining buffer zone requirements (Bodiguel, 2020), the Czech Republic, where simple

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and clear coexistence rules might ensure simple, reliable and fully transparent GMO cultivation (Rakouský & Doubková, 2020), and other countries.

It is reasonable to study the German GMO cultivation and monitoring developments based on WebGIS, a geographical information system (Kleppin et al., 2011). The technology should be implemented with a registry and an interactive biotechnological, organic and conventional crop map simultaneously, which is a convenient way to plan and track the coexistence system functioning.

The building of the coexistence model in the Russian Federation is impossible without the definition of biotechnological, organic, and traditional farming. The urgent problem is to define what the biotechnological methods are permitted. At the present time, the definition of GMOs and the methods for GMOs obtaining in the Russian law and international legal acts must be reviewed considering the current level of science development. The current legislation should be supplemented with a clause that GE-plants are not considered as GMOs. The introduction of a refinement amendment will make it possible to overcome the legal uncertainty with legal status of GE-plants and will have a positive effect on the economic, scientific, and technological development of countries that will introduce GE-plants.

At the same time, the safety assessment of products obtained from GE-plants should be standing carried out based on comparison with traditional analogues of plants and products, as well as the safety assessment of any new products obtained using modern biotechnology methods. In perspective, a transition should happen from a process-based regulation model adopted in the European Union and partially adopted in the Russian Federation to a product-based one, tested in the USA, Canada and several other countries that successfully implement in agriculture organisms obtained using the latest technologies.

7. Conclusion

The system of conventional, biotechnological, and organic farming coexistence will solve two problems associated with genetically engineered technologies' development at once:

1) it will protect producers of organic and conventional crops from economic losses due to ingestion of genetically engineered material into their crops;

2) it will ensure biotechnological crop production industry development in Russia and enable the farmers and agricultural companies to take advantage of genetically engineered plant varieties.

It is important to mention the fact that economic costs do not exceed the income and potential benefits of growing organic and biotechnological products. Therefore, the system shall be flexible, and the measures proposed shall be affordable. Overly restrictive measures and a rigorous regulatory system could make investing in biotech production economically and strategically unprofitable.

For this goal, the modern legal regulation for plants obtained using genomic technologies should have not a process-based, but a product-based approach, which will eliminate the main legal risks associated with using of GE-plants in agribusiness and make using of GE-plants economically advantageous in countries, where the cultivation of GMOs is prohibited as in the Russian Federation.

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