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Legal regulation of agricultural technologies in the context of digital transformation: A comparative analysis of the EAEU countries

Cholpon Sulaimanova*

PhD in Law, Associate Professor
Kyrgyz-Russian Slavic University named after B. Yeltsin
720000, 44 Kyiv Str., Bishkek, Kyrgyz Republic
https://orcid.org/0009-0002-5725-9905

Irina Mistriukova

Graduate Student
Kyrgyz-Russian Slavic University named after B. Yeltsin
720000, 44 Kyiv Str., Bishkek, Kyrgyz Republic
https://orcid.org/0009-0004-3856-7050

Abstract. The digitalisation of the agricultural sector is accompanied by the introduction of innovative technologies, creating new challenges for legal regulation. Within the Eurasian Economic Union, there is a growing need for coordinated approaches to ensuring sustainable development and food security. The article presented a comprehensive analysis of digitalisation processes in the agricultural sector of the Eurasian Economic Union member states, based on a comparative study of the legal framework and practices of digital technology implementation. The authors highlighted different models of digital transformation. Russia is implementing a large-scale federal project "Digital Agriculture", Kazakhstan is focusing on creating model digital farms and full digitalisation of agricultural land, while Belarus has made significant progress in automating accounting and implementing an electronic system of veterinary certification. Kyrgyzstan and Armenia, despite the adoption of appropriate policy frameworks, faced serious challenges, including inadequate infrastructure, limited funding, and low levels of digital literacy. The main findings indicated common problems in the Eurasian Economic Union countries: a digital divide between large and small farms, poorly developed digital infrastructure in rural areas, and a shortage of qualified specialists. As promising areas, the authors proposed harmonisation of legislation, the creation of a single Eurasian digital agricultural platform and the development of joint educational programs, while emphasising the need to take into account the national characteristics of each participating country when coordinating the digital transformation of agriculture within the Eurasian Economic Union. The results of the research can be used both in the scientific community and in the development of digitalisation strategies, improving legislation and developing coordinated approaches to regulating agricultural technologies in the Eurasian Union

Keywords: digitalisation; Eurasian Economic Union; agricultural cooperation; cybersecurity; agricultural data; harmonisation of norms

Introduction

Modern agriculture faces many challenges, including the need to increase production volumes for a growing population and adapt to climate change. In this context, digitalisation, understood as the process of introducing digital technologies into traditional operations, offers new opportunities to improve the efficiency and

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*Corresponding author

sustainability of the agricultural sector (Katrin, 2022). Of particular interest is a comparative analysis of the regulatory framework for this process in the countries of the Eurasian Economic Union (EAEU), as the rapid development of digital technologies is making the agricultural sector one of the key industries most receptive to innovation. The introduction of agricultural technology, including elements of precision farming and remote monitoring systems based on artificial intelligence, can significantly increase the productivity, sustainability and environmental safety of agricultural production. At the same time, the digitalisation of agriculture requires adequate regulatory and legal regulation, as the use of innovative solutions affects a wide range of legal aspects: from the protection of personal and production data to the regulation of intellectual property and cybersecurity. Research on this topic is particularly relevant in the context of the Eurasian Economic Union, where there are both common trends and significant differences in the pace and mechanisms of legal regulation of agricultural technologies. Despite the existence of supranational institutions such as the Eurasian Economic Commission (EEC) and the desire to harmonise legislation, the EAEU member states (Russia, Belarus, Kazakhstan, Armenia, Kyrgyzstan) demonstrate varying levels of digital maturity and approaches to the legal support of agrotechnological transformation. A corporate analysis of national strategies and regulatory acts in the field of digital agriculture allows for identifying institutional barriers, best practices and growth points, as well as formulating proposals for harmonising legal regulation within the EAEU. This is particularly important in the context of integration processes that offer the free movement of goods, services and technologies within the union. The lack of a unified approach can create obstacles to the cross-border introduction of agricultural technologies and slow down the digital transformation of the entire agricultural sector in the region.

An analysis of recent scientific research has revealed a growing interest in issues related to regulatory legal regulation, agricultural technology, and digital transformation of the agricultural sector in EAEU countries. Contemporary research touches upon both strategic and applied aspects of digitalisation, emphasising the need for a comprehensive approach to the legal support of the agricultural digital agenda. The work by M. Mustafayev *et al.* (2024) examined the legal support for the integration of the EAEU digital space, focusing on the need to synchronise national legal systems for the effective implementation of digital technologies, including in the agricultural sector. The authors pointed to a lack of legal instruments regulating cross-border interaction within the digital economy. N. Voronina (2024) emphasised the importance of digitalisation for the cooperative movement in agriculture. The author argued that digital tools help strengthen ties between small agricultural producers and markets, but that legal regulation does not yet meet these challenges. A. Makrushin (2023) examined the impact of digitalisation on the labour market in the EAEU, including the agricultural sector. The author emphasised that the sustainable development of digital agricultural technologies requires the adaptation of labour legislation and the strengthening of digital literacy in rural areas. The work of S. Kamolov & S. Glazyeva (2023) presented a critical review of the current state of implementation of the digital agenda. The authors noted that the agricultural sector is characterised by a fragmented approach, insufficient regulation of data collection and exchange, and gaps in the legal protection of intellectual property in agricultural technologies. The study by Ch. Adamkulova *et al.* (2025) emphasised that digital agricultural platforms improve logistics, increase management efficiency and promote international cooperation, while the introduction of technologies such as the Internet of Things, AI and blockchain, minimises costs and improves supply chains. This indicates that the digitalisation of the agricultural sector has the potential to significantly increase its competitiveness. Finally, G. Barseghyan, representative of the EEC at the Digital Almaty forum in 2025, noted that the digitalisation of the agro-industrial complex was identified as a key area for improving the competitiveness of the industry within the EAEU, which once again emphasises the importance of legal support for technological progress in the agricultural sector (Goar Barseghyan..., 2025).

The aim of the study was to conduct a comparative analysis of the regulatory framework for agricultural technologies in the context of digital transformation in the countries of the Eurasian Economic Union in order to identify institutional barriers, effective practices and areas for harmonisation of legal support that would contribute to the sustainable innovative development of the agricultural sector within the Union's integration space.

Materials and Methods

The methodology of this study was based on a systematic, comparative legal, interdisciplinary and analytical approach. The study combined theoretical and applied aspects of jurisprudence, with an emphasis on comparative analysis and integration potential, which helped to identify current problems and propose recommendations for legal modernisation and convergence of digital agrotechnology regulation in the EAEU countries. The methodological basis of this study was a comprehensive approach, including both an analysis of the regulatory and legal documents of the member countries of the Eurasian Economic Union and an assessment of the practical implementation of agricultural technology in the context of digital transformation. The main object of the study was the legal regulation systems in the agricultural sector in the

Russian Federation, the Republic of Belarus, the Republic of Kazakhstan, the Kyrgyz Republic and the Republic of Armenia. The main empirical material used was official legal acts of strategies and concepts regulating the digitalisation of agriculture in these countries. To analyse the actual level of digitalisation and the introduction of agricultural technologies, the websites of relevant ministries and agencies and official documents were used, such as: Order of the Government of the Russian Federation No. 151-r (2015), Law of the Kyrgyz Republic No. 127 (2017), Resolution of the Government of the Republic of Kazakhstan No. 827 (2017), Resolution of the Government of the Republic of Armenia No. 1886-I (2019), Cabinet of Ministers of the Kyrgyz Republic (2021), Concept of Cluster Policy… (2021), FAO & ITU (2023), Concept of Digital Transformation… (2024), Ministry of Agriculture and Food of the Republic of Belarus (n.d.), etc. The study also used publicly available analytical materials and articles, which made it possible to track scientific and practical interest in the topic. To ensure the comparability of approaches and assess differences in regulation, a comparative legal method was used to conduct a parallel characterisation of regulatory acts, programmes and strategies for digital agricultural development in the EAEU countries. This approach made it possible to identify both common vectors of digital transformation and unique national features. In addition, structural-functional analysis methods were used to assess the effectiveness of existing legal regulation mechanisms, as well as a formal-legal method to study the original legal texts.

Results and Discussion

Legal and institutional foundations for the digitalisation of agriculture in the Kyrgyz Republic

Kyrgyzstan, where, according to the Cabinet of Ministers of the Kyrgyz Republic (2021), agriculture remains the backbone of the economy and a source of livelihood for 66% of the rural population, faces challenges of digital transformation that are characteristic of the region. As noted by S. Kurbatova & L. Ajsner (2019), the process of digitalisation requires special legal regulation that takes into account the specificities of the agricultural sector. With a poverty rate of 23.2% in rural areas, according to the Cabinet of Ministers of the Kyrgyz Republic (2021), the country is in particular need of modern solutions, but faces problems typical for the region: lack of funding, weak internet infrastructure and low digital literacy.

In 2017, the Kyrgyz Republic adopted Law of the Kyrgyz Republic No. 127 "On Electronic Management" (2017), which laid the foundation for building a modern e-government system in the country, ensuring transparency, efficiency and accessibility of public services. Its provisions create the necessary legal conditions for the further development of the country's digital economy, including the digitisation of key sectors such as agriculture. The document provides for the development of information systems, the integration of various departmental databases, and the use of modern technologies in control and supervisory activities. The Concept of Agricultural Development of the Kyrgyz Republic until 2025 (Cabinet of Ministers of the Kyrgyz Republic, 2021) defined the strategic directions for the modernisation of the country's agro-industrial complex for a five-year period. The main objective of the act was to radically increase the efficiency of the agro-industrial complex through the comprehensive modernisation of all its sectors. The concept paid particular attention to the introduction of innovative technologies, including large-scale digitalisation of agriculture. As part of the implementation of these tasks, it was planned to create a modern system for tracking agricultural products at all stages, from production to the end consumer, which was to ensure improved food quality and safety. In the area of digital infrastructure development for the agro-industrial complex, the concept envisaged the creation and development of the Ayylmalyimat information system, designed to organise effective online document management in the agricultural sector (Dzhumagulov & Mistriukova, 2025).

At the same time, the Concept of Cluster Policy for Agricultural Development of the Kyrgyz Republic Based on Specialisation by Regions for 2021-2025 (2021) was developed, which aimed to create conditions for sustainable economic growth through the development of cluster initiatives bringing together business, science and the state. The main focus was on the agro-industrial complex, where clustering would increase the competitiveness of products through cooperation between small and medium-sized producers, the introduction of innovative technologies and improved access to markets. The document provided for the formation of territorial and sectoral clusters (e.g., fruit and vegetable, textile, tourism), infrastructure development (logistics, processing), and support for export potential. The Concept paid particular attention to the digitalisation of processes, staff training and attracting investment. The implementation of the concept was intended to contribute to the diversification of the economy, the creation of new jobs and an increase in Kyrgyzstan's share in regional value chains. The next regulatory legal act governing digitalisation in the Kyrgyz Republic was the Concept of Digital Transformation of the Kyrgyz Republic for 2024-2028 (2024). This concept defines the priority areas for digitalisation in all sectors of the country's economy, including agriculture. The document focuses on the creation of geographic information systems (GIS) for precision farming, the introduction of satellite monitoring of agricultural land, and the use of unmanned aerial vehicles (drones) to monitor the condition of crops and pastures. Particular importance is attached to the creation of unified digital registers of agricultural land and livestock in order to establish a

system for accounting and managing the country's agricultural resources.

Thus, despite the existence of key strategies and regulatory documents governing the digitalisation of Kyrgyzstan's agro-industrial complex, the implementation of these initiatives remains limited and largely fragmented. The adopted concepts, programmes and laws form the necessary legal framework, but the lack of a consistent implementation mechanism, insufficient inter-agency coordination and poorly developed regulatory details reduce their practical effectiveness. Disparate initiatives often duplicate functions, lack sustainable funding and are not based on a unified digital infrastructure. In addition, systemic problems of an infrastructural and personnel nature are a serious constraint: poor internet coverage in rural areas, low levels of digital literacy among farmers, and an acute shortage of specialists in the field of agricultural technology. These barriers turn strategic priorities into declarative intentions that have no lasting impact on the development of the industry. However, with the political will to develop mechanisms for interdepartmental cooperation, attract investment in infrastructure, and implement comprehensive educational programmes, Kyrgyzstan has great potential to move from local digital solutions to systemic transformation of the agricultural sector. Given the importance of agriculture for the country's economy and the standard of living of the majority of the population, effective digitalisation could become not only a driver of modernisation, but also a key tool for combating poverty and improving food security.

Comparative analysis of the digital transformation of agriculture in the EAEU countries

Kazakhstan demonstrates a systematic approach to the digitalisation of its agro-industrial complex. As noted in a review by A. Nazarbekov (2023), the country is implementing a comprehensive programme that includes precision farming, digital farms, satellite monitoring and automated accounting. These initiatives are backed by a robust regulatory framework. In 2017, the state programme Digital Kazakhstan (n.d.) was adopted, with a separate section devoted to agriculture (Resolution of the Government of the Republic of Kazakhstan No. 827, 2017). A key result of the programme was the creation of digital model farms. Kazakhstan has completely digitised its agricultural land (222 million hectares) by introducing a unified GIS system with electronic land passports containing data on soil, usage history and cadastral value (100% of farmland…, 2025). This project aims to combat illegal land trafficking, increase the transparency of state support, and provide farmers with yield analytics. Although the system already monitors the condition of fields and simplifies land transactions, there are also issues with data accuracy in some areas and limited internet access in rural areas.

A comparative analysis shows that Kazakhstan, as one of the largest agricultural countries in the EAEU, demonstrates a more advanced approach to the digitalisation of agriculture. The state programme Digital Kazakhstan (n.d.) includes comprehensive projects in the areas of precision farming, digital livestock farming and agricultural holding management. According to B. Irmulatov *et al*. (2021), the introduction of precision farming has increased grain yields. However, as in Kyrgyzstan, the process faces problems of internet access in remote areas and a shortage of qualified specialists (Kurbatova & Ajsner, 2019).

Legal regulation in the EAEU countries is developing along similar lines. For example, Kyrgyzstan has adopted the Concept of Agricultural Development of the Kyrgyz Republic until 2025 (Cabinet of Ministers of the Kyrgyz Republic, 2021) and the Concept of Digital Transformation of the Kyrgyz Republic for 2024-2028 (2024), and in Kazakhstan, the Digital Kazakhstan (n.d.) programme. The precision farming project covers the introduction of satellite navigation and remote sensing technologies, automatic agricultural machinery control systems, and irrigation and fertiliser application control systems. This can optimise fertiliser and water costs, increase crop yields and product quality, and reduce the environmental impact of agricultural production. According to reports, the introduction of precision farming has contributed to a 15-20% increase in grain crop yields (Nazarbekov, 2023).

The FAO (2020) and FAO & ITU (2023) note that digital technologies should be accessible to all categories of farmers, which is especially important for countries with a predominance of small farms, such as Kyrgyzstan. The technological solutions offered by digitalisation – artificial intelligence, remote sensing, the Internet of Things – need to be adapted to the conditions of each EAEU country. Educational programmes play a key role in the digital transformation of all EAEU countries; without trained specialists, the introduction of new technologies will be limited (Godin *et al*., 2020). In Kazakhstan, special attention is paid to this through training and educational programmes, while in Kyrgyzstan this aspect is still underdeveloped.

Russia's experience in digitising the agro-industrial complex, including the federal project "Digital Agriculture" and the industry programme "Digitisation of the Agro-Industrial Complex 2024", demonstrates the most developed regulatory framework among the EAEU countries (Dobrovlyanin & Antineskul, 2022). At the same time, as noted by V. Belsky (2019), the Russian Federation also faces characteristic problems – the gap between large holdings and small farms, insufficient internet coverage in rural areas, and a shortage of qualified personnel. The digitalisation process is hampered by uneven technology adoption (25% of large farms use precision farming techniques, compared to 5% of small farms), a shortage of skilled personnel, and poor

internet coverage in rural areas (Gasanov *et al*., 2021). Despite the creation of a unified digital platform for the agro-industrial complex and the introduction of satellite monitoring (covering 30% of large enterprises), the main barriers remain insufficient funding for small farms and a fragmented regulatory framework. The Russian Federation Government approved the Strategy for Sustainable Development of Rural Areas… (2015). The strategy set out long-term development goals for rural areas in Russia. The regulatory act considers the socio-economic development of rural areas as a key factor in ensuring the country's food security and improving the quality of life of the rural population. The strategy provides for measures to develop infrastructure, create modern jobs, improve housing conditions and access to social services in rural areas. Although the text of the document does not directly refer to digitalisation as a separate area, it implies the use of modern technologies in agriculture. In particular, the strategy creates the conditions for the introduction of innovative solutions, such as the use of quadcopters to monitor the condition of fields, the use of precision farming systems and other digital tools that contribute to improving the efficiency of agricultural production.

The Belarusian agro-industrial complex is actively introducing digital technologies, as confirmed by materials from the official portal of the Ministry of Agriculture and Food of the Republic of Belarus (n.d.). The country is implementing a comprehensive approach to the digitalisation of the industry, combining technological modernisation with the creation of an appropriate regulatory framework. Particular attention is paid to the automation of key agricultural production processes. A significant achievement was the introduction of the "Electronic Veterinary Certificate" system, which radically changed approaches to quality control of livestock products. Digital support for the entire chain of goods movement has significantly reduced the time required for paperwork and increased the transparency of control. This aspect is particularly important for simplifying export and import operations and complying with international standards. In crop production in Belarus, there has been active implementation of precision farming technologies. According to the Ministry of Agriculture and Food of the Republic of Belarus (n.d.), modern GPS-based systems optimise soil cultivation processes, significantly reducing overlap and increasing the efficiency of equipment use. Automated irrigation systems demonstrate impressive results in terms of water conservation, which is particularly relevant in the context of climate change. Satellite monitoring of fields and differentiated fertiliser application make it possible to increase yields and reduce the anthropogenic impact on the environment. Digital transformation has also affected the field of accounting and reporting. The transition to electronic document management has significantly reduced the time spent on preparing reports and minimised the number of errors, which in turn has created conditions for rapid access to data and increased the transparency of budget spending. The strategy for further digitalisation of the industry includes the creation of a unified digital platform for the agro-industrial complex, the development of precision farming infrastructure and the introduction of intelligent data analysis systems (Zhuravlev, 2024). Particular attention is paid to the training of qualified personnel and the development of a regulatory framework for the use of new technologies. The prospects for the development of digital agriculture in Belarus are linked to the introduction of advanced technologies, including artificial intelligence for yield forecasting, smart greenhouse systems with automatic climate control, and the creation of digital twins of agricultural enterprises (Karniciy, 2021). The integration of blockchain solutions into supply chain tracking systems creates an immutable digital chain of product data, which dramatically improves quality control efficiency.

The Eurasian Economic Union's agricultural development strategy opens up new horizons for Armenia to modernise its agricultural sector through digitalisation. For a mountainous country with a predominance of small farms, this document serves as a roadmap for the technological transformation of traditional agriculture. The Strategy for the Development of Agriculture in the Republic of Armenia until 2030 takes into account the importance of introducing digital technologies to modernise the agro-industrial complex (Resolution of the Government of the Republic of Armenia No. 1886-I, 2019). The strategy envisages the creation of digital platforms for farmers and the digitisation of public services in the agricultural sector, including the automation of subsidy and reporting processes. Armenia also has a State programme for the development of "smart" livestock farms, which provides financial support for the construction and modernisation of farms with the introduction of modern technologies (State support for…, 2019). The programme offers three farm models: small (130-280 m^2 for 10-15 head with compensation of 5.5 million drams), medium (281-450 m^2 for 20-25 head – 11.5 million drams) and large (451+ m^2 for 40-45 head – 17.5 million drams). The programme is being implemented by the Ministry of Agriculture and provides for standard farm designs using various materials and automated animal husbandry systems.

Armenia, with its unique agroclimatic conditions, can benefit particularly from the strategy's provisions on adapting modern technologies to complex terrain and limited water resources. The introduction of precision farming systems tailored to the specific characteristics of mountain slopes will enable Armenian farmers to optimise the use of scarce resources and increase land productivity (Resolution of the Government of the Republic of Armenia No. 1886-I, 2019). The use of smart drip irrigation technologies, which can radically

solve the problem of water shortages in arid regions of the country, looks particularly promising. For Armenian agricultural exports, the EAEU strategy creates fundamentally new opportunities through the formation of a unified traceability system for agricultural products. All this is particularly significant for Armenia's traditional export goods – fruit, vegetables and wine products – the quality of which can now be documented all the way from the field to the shop shelf. The provisions of the strategy aimed at supporting small and medium-sized farms are of particular value to Armenia. The creation of regional centres of excellence and the development of special programmes for preferential access to digital services will allow even small family farms to take advantage of technological modernisation (Resolution of the Government of the Republic of Armenia No. 1886-I, 2019). In the context of mass rural exodus, digitalisation is becoming particularly important as a means of preserving and adapting the traditional rural way of life to modern conditions. The implementation of educational programmes within the framework of the strategy gives Armenia a chance to train a new generation of farmers who combine centuries-old traditions of agriculture with mastery of modern digital technologies. Participation in the creation of joint EAEU research centres gives Armenian specialists the opportunity to contribute their unique experience in viticulture, soil erosion control and water resource management. The digital transformation of agriculture within the framework of the Eurasian strategy provides Armenia with an opportunity to overcome key constraints, such as a shortage of arable land, water scarcity, fragmented land plots and difficulties in accessing external markets. The successful implementation of this project will require careful adaptation of the union-wide provisions to national conditions, the development of rural digital infrastructure, and the creation of an effective training system (Resolution of the Government of the Republic of Armenia No. 1886-I, 2019).

A comparative analysis of the digital transformation of agriculture in the countries of the Eurasian Economic Union shows that, despite common directions and goals, each country is implementing the digitalisation of the agricultural sector taking into account its national characteristics and priorities. Kazakhstan and Russia demonstrate the most systematic and comprehensive approach, supported by government programmes, regulatory frameworks and technical infrastructure. Belarus focuses on process automation and transparency, including electronic document management and product tracking systems. Armenia, in turn, is adapting digital technologies to its geographical and water conditions, focusing on supporting small farms and developing export potential. Kyrgyzstan is in the process of establishing a regulatory and technological framework, facing a shortage of personnel and infrastructure. Thus, the main challenges for all EAEU countries are similar: a shortage of qualified specialists and limited access to digital technologies for small farms. At the same time, there is a common desire to digitise the agricultural sector, supported by EAEU strategies and national programmes, which creates potential for sustainable growth, increased productivity and improved quality of agricultural production.

Prospects and priority areas for the digitalisation of the agricultural sector within the EAEU

The prospects for the further development of digitalisation of the agro-industrial complex within the EAEU are presented in several key areas. Technologically, this involves the development of platform solutions for small farms, the creation of regional centres of excellence and the development of adaptive technologies for different climatic zones. In the regulatory sphere, there is a need to harmonise standards within the EAEU, create an intergovernmental certification system and simplify procedures for introducing innovations. Organisational measures should include the development of a grant support system, the creation of a network of demonstration farms, and the implementation of educational programmes. Of particular importance is the development of uniform EAEU standards for the collection and processing of agricultural data, the use of unmanned aerial vehicles (UAVs), and precision farming systems. The creation of mechanisms for technology transfer between the countries of the Union, the development of joint educational programmes and the coordination of research activities could significantly accelerate the digital transformation of the agro-industrial complex throughout the region.

It should be noted that the most promising direction appears to be the creation of a Eurasian digital agricultural platform that would combine databases and analytical systems, forecasting mechanisms, monitoring systems and educational resources. Such an approach would preserve the national characteristics of each country's agricultural sector development, while ensuring the synergistic effect of combining efforts and resources. Russia's experience, particularly in terms of regulatory control and the creation of a comprehensive system for technology implementation, would form the basis for such a platform, adapted to the specific characteristics of other EAEU countries. The implementation of these measures requires coordinated action at the intergovernmental level, including the harmonisation of legislation, the creation of mechanisms for financing joint projects, and the development of infrastructure for the exchange of knowledge and technologies. Only such a comprehensive approach will enable EAEU countries to fully realise the potential of digital transformation in agriculture, ensuring its sustainable development in the face of modern challenges.

Conclusions

The digital transformation of the agro-industrial complex in the countries of the Eurasian Economic Union

is developing at different rates, reflecting both common strategic guidelines and the national specifics of each state. An assessment of the state and prospects of digital transformation demonstrates both similar directions of development and marked differences in the national approaches of the participating countries. Russia demonstrates the most systematic and large-scale approach to the digitalisation of the agro-industrial complex, which corresponds to the size of its agro-industrial sector. The country has created a comprehensive regulatory framework, including the Digital Agriculture project and an industry-specific digitalisation programme. Russian agricultural holdings are actively introducing precision farming technologies and satellite monitoring. However, there remains a significant gap between large enterprises that have achieved a high level of digitalisation and small farms that face difficulties in introducing new technologies.

Kazakhstan occupies an intermediate position in the process of digital transformation of the agro-industrial sector, focusing on the creation of "digital farms" as pilot projects for subsequent scaling up of experience. Kazakhstan's strategy for the digitalisation of agriculture is characterised by a pragmatic approach that combines the borrowing of international experience with adaptation to local conditions. Particular attention is paid to the development of digital infrastructure in rural areas and personnel training, although the pace of technology adoption lags somewhat behind Russian indicators. Belarus is demonstrating a cautious but consistent approach to the digitalisation of the agro-industrial complex, taking its first steps in the automation of accounting and reporting. The Belarusian model is characterised by a high degree of centralisation of digital transformation processes with an active role for the state. The introduction of electronic veterinary certification and certain elements of precision farming demonstrates potential for further development, although the overall level of technological equipment in agricultural enterprises remains low.

Armenia, which has the smallest agro-industrial sector among the EAEU countries, demonstrates a special approach to digitalisation, focused on the needs of small farms and the specifics of mountain farming. The Armenian model emphasises the adaptation of technologies to complex terrain and water scarcity, as well as the development of traceability systems for traditional export goods such as fruit, vegetables and wine products. The level of digitalisation remains low, but the strategic guidelines are clearly defined. Kyrgyzstan, on the other hand, is in the early stages of digital transformation of its agro-industrial sector, facing the most serious challenges related to limited resources and weak infrastructure. Particular attention is paid to the digital literacy of the rural population and the creation of simple, accessible technological solutions.

Despite differences in the pace and scale of digitalisation, all EAEU countries face a number of common challenges. These include digital inequality between large and small farms, underdeveloped rural digital infrastructure, a shortage of skilled personnel and the need to adapt the regulatory framework. At the same time, each country is developing its own approaches to solving these problems, based on the specifics of its agro-industrial complex. The prospects for the further development of digitalisation of the agro-industrial complex within the EAEU are linked to deeper coordination between the participating countries. The creation of a single digital space for agriculture, the harmonisation of standards and the exchange of best practices could become a powerful catalyst for technological modernisation across the entire region. The development of joint research projects and educational programmes that will allow for the pooling of efforts in training personnel for digital agriculture appears to be particularly important.

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Санариптик трансформация шартында агротехнологияларды укуктук жөнгө салуу: ЕАЭБ өлкөлөрүнүн салыштырма анализи

Чолпон Сулайманова

Юридика илимдеринин кандидаты, доцент
Б. Ельцин атындагы Кыргыз-Россия Славян университети
720000, Киев көч., 44, Бишкек ш., Кыргыз Республикасы
https://orcid.org/0009-0002-5725-9905

Ирина Мистрюкова

Аспирант
Б. Ельцин атындагы Кыргыз-Россия Славян университети
720000, Киев көч., 44, Бишкек ш., Кыргыз Республикасы
https://orcid.org/0009-0004-3856-7050

Аннотация. Агрардык сектордун цифралашуусу жаңы технологияларды киргизүү менен коштолуп, укуктук жөнгө салуу үчүн жаңы чакырыктарды жаратат. Евразиялык экономикалык союздун алкагында туруктуу өнүгүүнү жана азык-түлүк коопсуздугун камсыз кылуу боюнча макулдашылган ыкмаларга муктаждык өсүп жатат. Макалада санариптик технологияларды ишке ашыруунун укуктук базасын жана практикасын салыштырып изилдөөнүн негизинде Евразия экономикалык биримдигине мүчө мамлекеттердин агрардык секторундагы санариптештирүү процесстерине комплекстүү талдоо берилген. Авторлор санариптик трансформациянын ар кандай моделдерин белгилешет. Россия "Санариптик айыл чарба" масштабдуу федералдык долбоорун ишке ашырууда, Казакстан моделдик санариптик чарбаларды түзүүгө жана айыл чарба жерлерин толук санариптештирүүгө басым жасаса, Беларусь бухгалтердик эсепти автоматташтырууда жана ветеринардык сертификациянын электрондук системасын киргизүүдө олуттуу ийгиликтерге жетишти. Кыргызстан менен Армения тийиштүү саясат алкактары кабыл алынганына карабастан олуттуу көйгөйлөргө туш болууда, анын ичинде инфраструктуранын жетишсиздиги, чектелген каржылоо жана санариптик сабаттуулуктун төмөн деңгээли. Негизги жыйынтыктар Евразия экономикалык биримдигинин өлкөлөрүндөгү жалпы көйгөйлөрдү көрсөтөт: чоң жана майда чарбалардын ортосундагы санариптик ажырым, айыл жеринде санариптик инфраструктура начар өнүккөн жана квалификациялуу адистердин жетишсиздиги. Перспективдүү багыттар катары авторлор Евразия экономикалык биримдигине алкагында айыл чарбасын санариптик трансформациялоону координациялоодо ар бир катышуучу өлкөнүн улуттук өзгөчөлүктөрүн эске алуу зарылдыгын баса белгилеп, мыйзамдарды шайкеш келтирүүнү, бирдиктүү евразиялык санариптик агрардык платформаны түзүүнү жана биргелешкен билим берүү программаларын иштеп чыгууну сунушташат. Изилдөөнүн жыйынтыктары илимий чөйрөдө, ошондой эле санариптештирүү стратегиясын иштеп чыгууда, мыйзамдарды өркүндөтүүдө жана Евразия мейкиндигинде агротехнологияларды жөнгө салууга макулдашылган мамилелерди иштеп чыгууда колдонулушу мүмкүн

Негизги сөздөр: санариптештирүү; Евразия экономикалык биримдиги; айыл чарба кооперациясы; киберкоопсуздук; айыл чарба маалыматтары; стандарттарды унификациялоо

Нормативно-правовое регулирование агротехнологий в условиях цифровой трансформации: сравнительный анализ стран ЕАЭС

Чолпон Сулайманова

Кандидат юридических наук, доцент
Кыргызско-Российский Славянский университет им. Б. Ельцина
720000, ул. Киевская, 44, г. Бишкек, Кыргызская Республика
https://orcid.org/0009-0002-5725-9905

Ирина Мистрюкова

Аспирант
Кыргызско-Российский Славянский университет им. Б. Ельцина
720000, ул. Киевская, 44, г. Бишкек, Кыргызская Республика
https://orcid.org/0009-0004-3856-7050

Аннотация. Цифровизация аграрного сектора сопровождается внедрением инновационных технологий, что формирует новые вызовы для правового регулирования. В рамках Евразийского экономического союза возрастает потребность в согласованных подходах к обеспечению устойчивого развития и продовольственной безопасности. В статье представлен всесторонний анализ процессов цифровизации в аграрном секторе государств-членов Евразийского экономического союза, основанный на сравнительном изучении нормативно-правовой базы и практики внедрения цифровых технологий. Авторы выделили различные модели цифровой трансформации. Россия реализует масштабный федеральный проект «Цифровое сельское хозяйство», Казахстан фокусируется на создании образцовых цифровых ферм и полной оцифровке сельскохозяйственных угодий, в то время как Беларусь добилась значительного прогресса в автоматизации учета и внедрении электронной системы ветеринарной сертификации. Кыргызстан и Армения, несмотря на принятие соответствующих политических рамок, сталкиваются с серьезными проблемами, включая неадекватную инфраструктуру, ограниченное финансирование и низкий уровень цифровой грамотности. Основные выводы свидетельствуют об общих проблемах в странах Евразийского экономического союза: цифровой разрыв между крупными и мелкими фермерскими хозяйствами, слаборазвитая цифровая инфраструктура в сельской местности и нехватка квалифицированных специалистов. В качестве перспективных направлений авторы предложили гармонизацию законодательства, создание единой евразийской цифровой агроплатформы и разработку совместных образовательных программ, подчеркивая при этом необходимость учета национальных особенностей каждой страны-участницы при осуществлении координации цифровой трансформации сельского хозяйства в рамках Евразийского экономического союза. Результаты исследования могут быть использованы как в научной среде, так и при разработке стратегий цифровизации, совершенствовании законодательства и выработке согласованных подходов к регулированию агротехнологий на евразийском пространстве

Ключевые слова: цифровизация; Евразийский экономический союз; сельхозкооперация; кибербезопасность; агроданные; унификация норм