

Conference Paper

Land Reclamation Digitalization As a Key Factor in Ensuring National Food Security

Sergey Vasilyev, Vladimir Slabunov, and Alexandra Slabunova

Russian Research Institute for Land Reclamation Problems, Novocherkassk, Russia

Abstract

The purpose of the research was to analyze the impact of digitalization of land reclamation on food security of the Russian Federation, as a result of which its significant role was established. In this connection, the concept of digital land reclamation was developed, which is distributed at all stages of the life cycle of reclamation objects. Thus, within the framework of the implementation of digital reclamation, it is planned to ensure its close integration with the processes of digital agriculture, and its close integration with the platforms developed in the process of implementation of the digital economy. It also provides for a flexible architecture of its end-to-end integration with the databases of various federal executive authorities of the Russian Federation for the collection, storage and processing of information. In order to develop digital land reclamation, it is proposed to create scientific and educational centers for land reclamation in the form of specialized sites, a complex of objects, facilities and equipment, technological and innovation infrastructure in the regions of Russia and intended for the approbation and commercialization of scientific and technical results in the field of land reclamation, which will simplify the process of implementing the results of scientific research in production. Introduction of scientific and educational centers for land reclamation will ensure: food security of Russia and increase of profitability in agriculture; creation of tools (methods, technical means, technologies, etc.) for digital agriculture; creation of innovative platforms for decision support to agricultural producers; increase of efficiency of interaction between participants and the state with transition to digital format; development of digital environment for remote agricultural production. Increasing the efficiency of interaction between the participants and the state with the transition to digital format; development of the digital environment of distant agrarian education and the market of professional agro-consulting; increasing the attractiveness of work in agriculture, increasing the demand for information technology specialists in the agricultural sector, increasing the level of income in rural areas.

Keywords: Digital economy, digital agriculture, digital land reclamation, food security, food independence, land reclamation

Corresponding Author:

Sergey Vasilyev

SlabunovaAV@yandex.ru

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1. Introduction

One of the fundamental factors in ensuring the security of the Russian Federation is "food security", which is also confirmed by the provisions of the Doctrine [1]. At the

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same time, considering the agrarian potential of Russia, we have the fact that there are "large" areas of agricultural purpose, which occupy a leading position in the world in terms of land quality [2]. The main solution to the problem, which should be taken into account in the implementation of agricultural policy in the country's food supply is self-sufficiency, that is, food "independence", which can be achieved by increasing the share of the domestic market of raw materials, food and agricultural technologies of domestic producers [3, 4]. It is impossible to ignore the fact that not only increasing the influence on the domestic market of agricultural products will give a positive result in achieving the set goal, but also the activation of domestic producers in the foreign market by increasing the volume of agricultural products supplied, which can compete with the products of other countries. Here, membership in the company established in 2015 should also be taken into account. The Eurasian Economic Union, in which Russia's agricultural policy is aimed at increasing the volume of agricultural products, raw materials and foodstuffs, meeting the needs of the common agro-food market and increasing exports [2].

So, for the purpose of "increasing the volume of agricultural production" and in pursuance of the Decree of the President of the Russian Federation [5] the national project "International cooperation and export" was developed, which includes the federal project "Export of agricultural products" and provides for the development of such direction as reclamation of agricultural land. In this connection, the role of land reclamation as a tool for the implementation of the state economic policy in ensuring the food independence of the Russian Federation, is obvious and significantly increases under the close attention of the state [6].

2. Methods and Equipment

The methodological basis of the research were the positions of scientific works and developments of domestic and foreign authors devoted to the issues of ensuring food security of the country, as well as the digitalization of agriculture and land reclamation, published in the Russian and foreign press, as well as presented on specialized professional websites of the Internet.

The research is carried out with the use of theoretical analysis of scientific literature, descriptive method, which allows to transfer specific features of digital land reclamation, methods of graphical representation of information, statistical analysis of data and methods of comparison, analogy and systematization.

3. Results and Discussion

The Russian agrarian sector has also been affected by the new trend of global social development -- digitalization [7], which has replaced informatization and computerization. The approval of the program "Digital Economy of the Russian Federation" [8] generated the beginning of formation of a new information society in our country called "Digital Economy". This served together with the course of our country on import substitution as an incentive for the digital transformation of agriculture along the entire trophic chain "from field to counter" through the introduction of digital technologies and platform solutions to ensure a technological breakthrough in the agricultural sector and achieve productivity growth in agricultural enterprises (digital agriculture -- DAR) [9--11]. Methodological and methodological issues of the need to intensify the process of digitalization of the agricultural sector are described in the work of M. Kosolapova. [12]. Prospective directions of using digital technologies in agriculture are considered in the work of M. Vartanova. L. and Drobot E.V. [13]. Since agricultural land reclamation in Russia is an integral part of agriculture, it is also, both in scientific and practical aspects at the national, regional and agribusiness levels, modified and transformed into a "Digital reclamation" (DM), which should lead to increased environmental and economic efficiency [14].

The low effect of agricultural production is mostly due to losses of about 70 % at the stages of cultivation (depending on weather conditions), processing, storage and transportation. However, 30 % of the effect, depending on the human factor, should be used fully[13]. Thus, during the season the agricultural producer has to make more than 40 different decisions in limited time intervals. Many of these decisions, which have a direct impact on the economic effect of production, are the objects of digitalization. In particular, the digitization of the melioration industry will make it possible to connect the needs of a specific end user and the capabilities of a particular agricultural producer, thus eliminating the intervention of intermediaries, which now account for up to 80 % of the retail price of agricultural products. A significant part of the losses caused by natural conditions is intended to reduce the amount of CM. Thus, in 2018, the area of reclaimed land used in agricultural production accounted for 6 % of the arable land, and it is produced up to 65 % of vegetable and potato products, 100 % of rice, about 20 % of fodder for livestock and other products [15]. Thus, even despite the introduction of the food embargo in 2014, in Russia the overall level of food independence (an indicator of the well-being of the agricultural sector) increased to 92--94 % (it was 86--87 % in 2012) at the level of 2018 [16]. At the same time, Russia ranks 15th in the world

in terms of the level of digitization of agriculture and only about 10 % of arable land is cultivated with the use of digital technologies [8, 9, 13], which indicates the huge resource potential for the introduction of these technologies. Thus, the technologies of control and management of used equipment and technologies of "precision farming" will have the greatest potential in the meliorative branch. According to the forecast [9], if these rates of digitalization are observed by 2026, the market of agricultural technologies will grow by 5 times, which will allow Russia to become a worthy competitor in the market of digital technologies of agriculture [17].

In turn, scientists of FSBNU "RosNIIPM" have developed a concept of forming an integrated digital platform of CM, which covers all stages of the life cycle of reclamation objects. Within the framework of the CM implementation, it is planned to ensure close integration of the CM with the processes of the CM, and its -- with the platforms developed in the process of implementation of the digital economy (Figure 1).

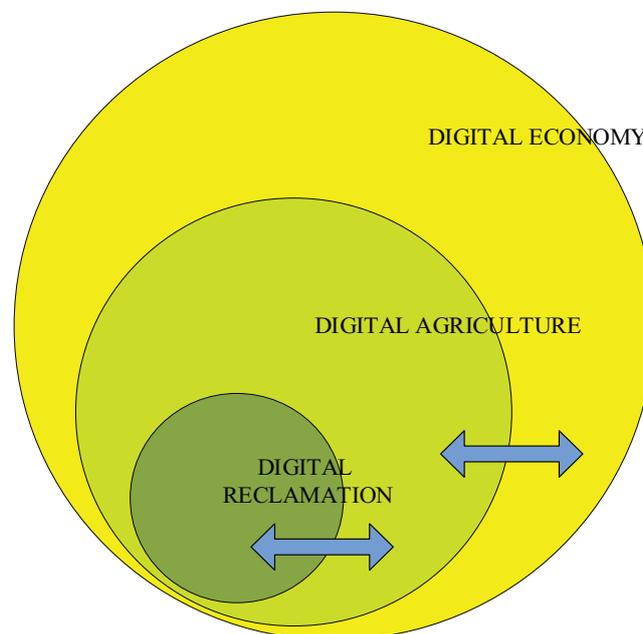


Figure 1: Relationship of digital reclamation to the digital economy.

According to the developed concept within the framework of the information platform of the CM taking into account the key problems of digitalization of the agrarian sector at the federal level [18], a flexible architecture of its end-to-end integration with the databases of various federal executive authorities of the Russian Federation for the collection, storage and processing of information is provided by means of agreements (Figure 2).

Considering the tendencies of digital reclamation development, it is worth noting that the Ministry of Communications and Mass Media of the Russian Federation submitted a

proposal to the Government to create a fund for the development of the digital economy, which actively supported it by approving the Plan of transition to the use of domestic GIS-technologies [19], which will reduce the level of import dependence and ensure the sustainability of Russian agricultural production. This is a good start for the active development and implementation of domestic digital technologies in the field of land reclamation. This, in turn, indicates the achievement of greater potential and effect in the modernization of the reclamation industry in the "high-tech industry" through the use of innovative developments and adoption of optimal management decisions [20].

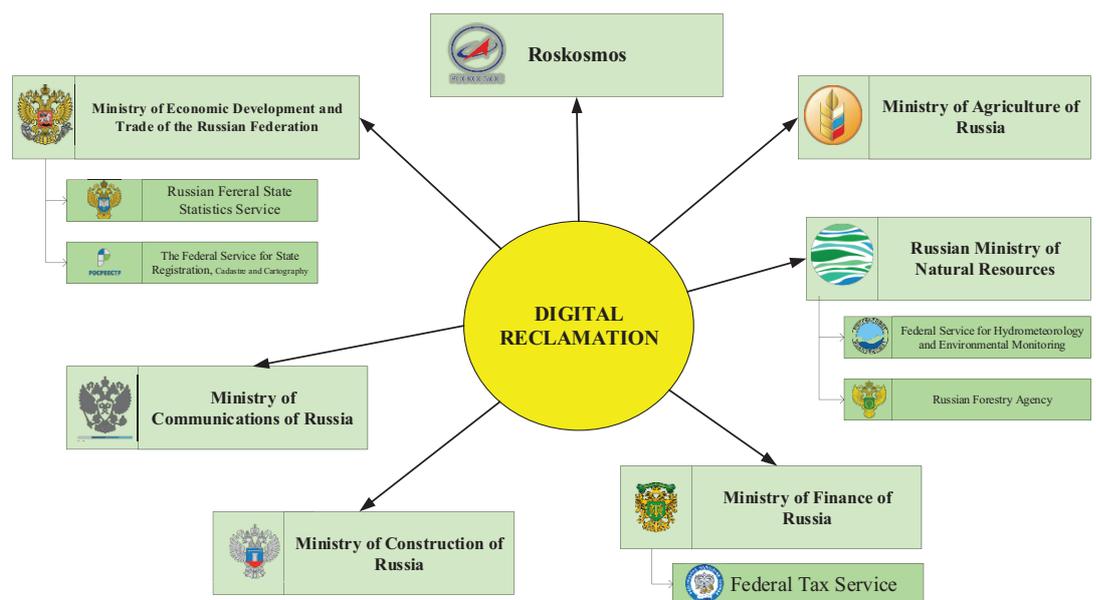


Figure 2: Integration of databases of various federal executive authorities in digital land reclamation.

The key direction for the development of CM is the creation of a single through information platform (base) in the form of specialized sites, a complex of objects, facilities and equipment, technological and innovation infrastructure in the regions of Russia (scientific and educational centers for land reclamation), designed for the testing and commercialization of scientific and technical results in the field of land reclamation, to simplify the process of implementing the results of scientific research in production.

The creation of scientific and educational centers for land reclamation (NECM) can serve as a realization of this direction (Figure 3). These centers are designed to concentrate the effect of "three whales" -- science, education and production. The peculiarity of these NWRMCs is the sectoral principle aimed at scientific research of applied nature, which solves the immediate problems of farmers and, in turn, the introduction of these results, both for agricultural producers and in the training processes of professional staff.

The main role in setting the task will be played by the investor (agricultural producer). Enterprises of the real sector of the meliorative complex should form an order for applied scientific research, which is planned to be carried out in such centers, as well as to ensure the attraction of investments of large and medium companies to the sphere of research and development. At the same time, the participants of the NCM will have to ensure technology transfer from the NCM to the industry, create conditions for the formation of technological startup projects and their access to regional, national and global markets, implement partnership programs of the NCM with organizations operating in the real sector of the economy, as well as engineering centers, scientific laboratories, research centers, small innovative enterprises, including participants of the state support programs, having experience in cooperation with universities and scientific organization. The result of the activity of NOCM should be new competitive technologies and products, as well as their commercialization, both in the domestic and foreign markets.

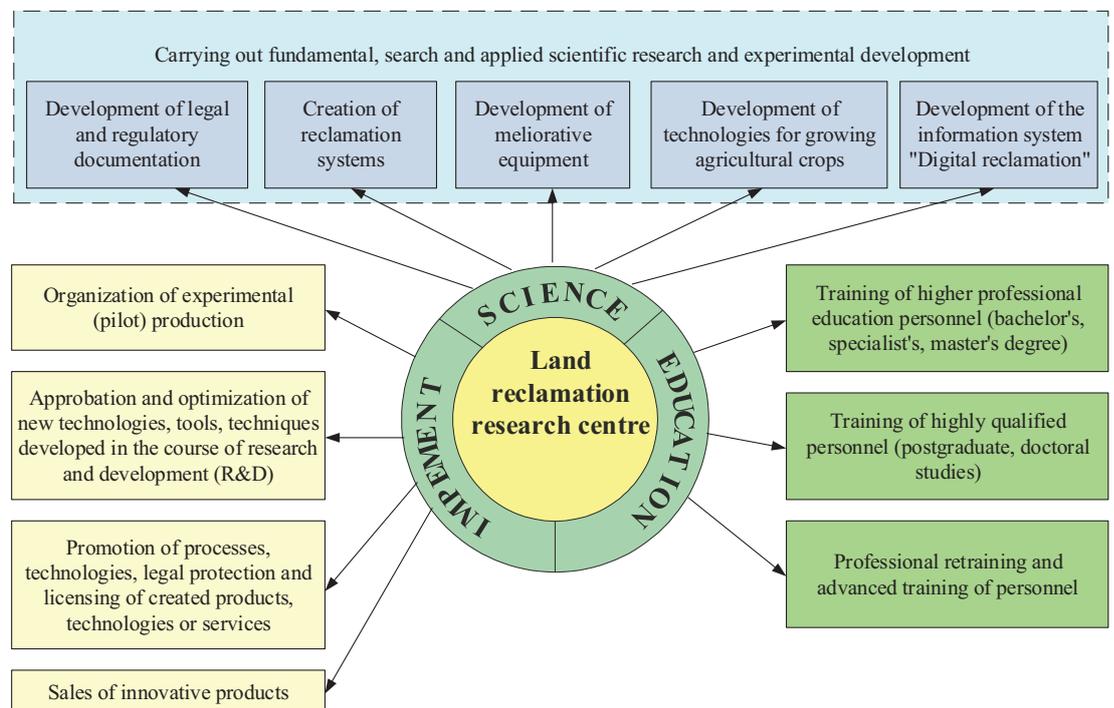


Figure 3: Areas of activity of scientific and educational centers Land Reclamation (LRL).

It should be noted that this platform should be used in the future to control and synthesize operational data flows to create «"end-to-end chains"» for the cultivation and processing of agricultural products with access to the end consumer with direct interaction with related industries of digital reclamation.

4. Conclusion

Land reclamation now stands on the threshold of global change, so necessary for its further sustainable and effective development. Meliorative branch from a state of decline and the subsequent stagnation in the conditions of the modern world smoothly passes in the period of "clever" reclamation – digital reclamation and one of the factors contributing to this will serve as a unified information platform in the form of scientific and educational centers for land reclamation. The introduction of SNMCs for operational as well as efficient use of available resources will ensure that they are implemented:

1. creation of tools (methods, techniques, technologies, etc.) for digital agriculture;
2. creation of innovative platforms to support decision-making by agricultural producers;
3. increasing the efficiency of interaction between the participants and the state with the transition to digital format;
4. integration of information resources and access to them by an unlimited number of authorized agricultural producers (electronic support of transactions, distributed register technologies, etc.);
5. development of the digital environment for distant agrarian education and the market of professional agro-consulting;
6. increasing the attractiveness of work in agriculture, increasing the demand for information technology specialists in the agricultural sector, and raising the level of income in rural areas;
7. ensuring food security in Russia and increasing profitability in agriculture.

Conflict of Interest

The authors do not declare a conflict of interest.

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