Features of Investing in Reconstruction of Reclamation Objects by the Example of Irrigation Systems of the Saratov Region

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Abstract: *The economic mechanisms for stimulating the national economy spheres, implemented in the Russian Federation, in particular the agricultural sector, require the need to revise the vector of using the existing irrigation facilities as part of the existing strategy for the development of land reclamation in the country. A sharp increase in energy prices, a decrease in the production of irrigation equipment, its cost, and accelerated aging of all reclamation facilities have identified the importance of the problem concerning rational use of reclaimed land. In this vein, the tasks of increasing the technical level of irrigation systems, improving the reliability and environmental friendliness of their operation through technical re-equipment and reconstruction of existing reclamation systems, building new and implementing innovative technologies for cultivating crops are becoming urgent. Financing of land reclamation measures that ensure the effectiveness of options for the development of the reclamation fund should be considered through the means of budgets of different levels and the intensification of attracting extrabudgetary investments by increasing the investment attractiveness of the reclamation sector in the economy. The value of specific capital investments in the development of the reclamation complex considering current prices has been clarified. A capital investments effectiveness assessment (feasibility study) for the reconstruction of the irrigation system by the example of the Komsomolsky irrigation system in the Saratov region was carried out.*

Keywords: *reconstruction, feasibility study, commercial efficiency, budgetary efficiency, source of financing, innovative development.*

INTRODUCTION

In February 2020, the President of the Russian Federation has read out the annual Message to the Federal Assembly, which, first of all, was focused on the issues of internal social and economic development of the country (Actual issues of reclamation complex development in low-water regions of the Russian Federation). The successes of agriculture in terms of increased efficiency and access to foreign markets were also noted. Directly, in 2018, growth amounted to 19.4%, and exports grew to $ 25.8 billion. The starting points for the country's national security and successful competition in the growing food market are the huge natural opportunities of the Russian Federation, as well as the possibility of using them to increase the production of environmentally friendly products (http://www.kremlin.ru). At the same time, ensuring stable agricultural production for growing crops in certain climatic zones was due to the work of the reclamation complex. In the Russian Federation, as of March 14, 2019, there were 9.47 million hectares of reclaimed land, including 4.69 million hectares of irrigated land and 4.78 million hectares of drained land. At the same time, 75% of the available lands (7.08 million hectares of reclaimed land) are used in agricultural production, including 3.89 million ha of irrigated land and 3.19 million ha of drained land. In general, reclaimed areas occupy 8% of the arable land, where up to 70% of vegetables, melons and potatoes, all rice, and about 20% of animal feed are produced (Actual issues of reclamation complex development in low-water regions of the Russian Federation).

An obstacle to the development of the agro-industrial complex was and remains a technical lag and a physical shortage of infrastructure capacities for export (modern storages of fruits and vegetables, port-transhipment complexes in certain regions, reclamation facilities). Therefore, in order to ensure the fulfilment of the state task for the provision of public services in the field of land reclamation and to increase the efficiency of using the existing reclamation potential in the Russian Federation, measures are being taken to modernize irrigation systems and irrigated lands. Directly in the Saratov region, financing of measures for the technical equipment of the reclamation complex is carried out within the framework of the Federal Targeted Investment Programme “Development of Land Reclamation of Agricultural Land for 2014-2020”. According to the Federal State Budgetary Institution “Land Reclamation and Agricultural Water Supply Administration in the Saratov Region”, in 2014-2018 36.6 thousand hectares of irrigated land were restored, and 148 projects were implemented.

The number of subsidies to agricultural producers from the federal and regional budgets amounted to 1 billion 423 million rubles. In 2020, in the Saratov region, within the framework of the departmental program “Development of the land reclamation complex of Russia for 2020-2022”, the number of subsidies for land reclamation activities is planned to be 239,827 thousand rubles. According to the Federal project "Export of agricultural products" for 2020-2022, distribution of subsidies from the federal budget for the implementation of measures in the field of land reclamation (reconstruction, technical re-equipment and construction of new reclamation systems), in 2020 for the Saratov region will amount to 63836 thousand rubles. It should be added that in recent years there has been a tendency for large

agricultural holdings to come with new investment projects to regions which management pays attention to rural development. According to many experts, the investment attractiveness of the Russian agro-industrial complex is growing. About 200 thousand hectares of land in eleven areas of the Volga region are managed by the holding "Solnechnye produkty" which is in the top 25 largest owners of agricultural land in Russia. Among its priority projects are the development of reclamation systems in the Volga region on the fields of the holding (development of the reclamation complex, crop production using irrigation technology, and further industrial processing of crops). This project is quite capital-intensive; its costs were estimated at over 200 thousand rubles per 1 hectare, and implementation is planned in several stages. In 2016, the irrigated land area under the project amounted to about 6 thousand hectares; in the summer of 2017, about 5 thousand hectares of new irrigation were introduced (https://www.rshb.ru).

The expected efficiency and effectiveness of the development of the reclamation complex in the constituent entities of the Russian Federation, including the determination of the need for financing and budgeting, is recommended to be evaluated with the use of the positive discounted cash flow balance in calculating the public, commercial and budgetary effectiveness of the options for the development of land reclamation. The purpose of the study is to investigate the features of determining the effectiveness of investments for the development of the reclamation sector as part of the agro-industrial complex (technical re-equipment, reconstruction, new construction of irrigation systems and other types of land reclamation) using the example of reconstruction of the irrigation system in the Saratov region.

RESEARCH MATERIALS

The key factor ensuring the program implementation effectiveness for the sustainable functioning of the agro-industrial complex in the Russian Federation due to the restoration and development of the reclamation facilities is the system of state financing of reclamation measures. The specific cost of land reclamation measures (direct reconstruction) calculated within the Concept of the Federal Target Program “Development of Land Reclamation of Agricultural Lands in Russia for the Period until 2020” (The concept of the federal target program "Development of land reclamation of agricultural lands in Russia for the period up to 2020") should be clarified at the current time using the construction and installation works estimated cost change indices recommended by the Ministry of Construction and Housing and communal services of the Russian Federation dated 25.12.2019 No. 50583-DV / 09 (table 1).

Table 1. The unit cost of land reclamation activities

Measure	Development options, thousand rubles / hectare		
	'No change' scenario	Innovative scenario	Accelerated development Scenario
Reconstruction	191.0	278.25	447.1875

Source: compiled by the authors according to the concept of the Federal Target Program “Development of Land Reclamation of Agricultural Lands in Russia for the Period Until 2020”.

At the same time, it is proposed to implement the option of innovative

development of the reclamation complex, as it is less exposed to natural, man-made, social and macroeconomic risks. In the constituent entities of the Russian Federation, in particular, the Saratov region, the implementation of land reclamation development activities is ensured on the basis of state contracts concluded by federal state institutions for land reclamation and agricultural water supply (table 2).

Table 2. Financing of measures for the facilities of the reclamation complex of the Saratov region

Name		Capacity	Term	Marginal cost of an object, thousand rubles	The total volume of budget investments due to budgetary appropriations of the federal budget, thousand rubles			
					2017	2018	2019	2020
Volga irrigation system (northern aggregation, 1st stage of reconstruction)		4860 ha	2005-2020	447560	35000	35000	30000	30000
Engels irrigation system (1st stage of reconstruction)		19200 ha	2005-2020	411170	30000	30000	30000	35000
Saratov irrigation and watering canal named after E.E. Alekseevsky (reconstruction)		126 km	1999-2020	3003040	251300	259400	173220	112738
Varfolomeevsky group water supply line (construction)		870 km	1987-2020	2357940	130000	140000	180000	15000
Reconstruction of the irrigation system named after Gagarin. Engels district, Saratov region (Development of design and working documentation. Head pumping station)		414 ha	2014-2020	251000			40000	211000
Reconstruction of the irrigation system named after Gagarin. Engels district, Saratov region. (Development of design and working documentation. Transfer pumping station No. 2)		414 ha	2014-2020	100000			10000	90000

Source: compiled according to the Federal Target Program "Development of Land Reclamation of Agricultural Land in Russia for 2014 – 2020.

It is recommended to justify the prospects for the further development of individual objects in the reclamation complex of the Saratov region, considering the resources of the federal budget and based on a feasibility study of capital investments. In relation to the features of the development and implementation of the project for the reconstruction of the irrigation system, calculation of the investment effectiveness should be performed, considering RD-APK 300.01.003-03. “Methodological recommendations for assessing the effectiveness of investment projects for the reclamation of agricultural lands” developed on the basis of the Methodological recommendations for evaluating the effectiveness of investment projects (second edition) approved by the Ministry of Economy of the Russian Federation, the Ministry of Finance of the Russian Federation and the Gosstroy of the Russian Federation in 1999, and the requirements of the Federal Laws “On land reclamation" and "On investment activity in the Russian Federation in the form of capital investments", "Water Code" and "Land Code" (Abdrazakov et al., 2017; Abdrazakov et al., 2016; Abdrazakov et al., 2015; Abdrazakov et al., 2018).

A potential direction for preparing additional capacities of irrigation systems and ensuring water supply to newly introduced irrigated hectares is the reconstruction of the Komsomolsky and Volga irrigation systems in the Marx district of the Saratov region. The Department of Construction, Heat, Gas and Energy Supply of the Federal State Budget Educational Institution of Higher Education Saratov State Agricultural University named after N.I. Vavilov in July 2017 conducted an instrumental examination of the technical condition for engineering structures of buildings and structures of the Komsomolsky irrigation network (Figure 1). It was concluded that there is a necessity to implement a comprehensive reconstruction with replacement of worn out, outdated and inefficient equipment to restore the technical level of the system (Abdrazakov et al., 2017; Abdrazakov et al., 2016; Abdrazakov et al., 2015; Abdrazakov et al., 2018). The planned amount of capital investments for reconstruction was determined by calculating the preliminary volumes of construction and installation works, taking into account all limited costs and tax payments (VAT) in prices as of the 2nd quarter of 2017, and it was amounted to 852,802,012.7 rubles.

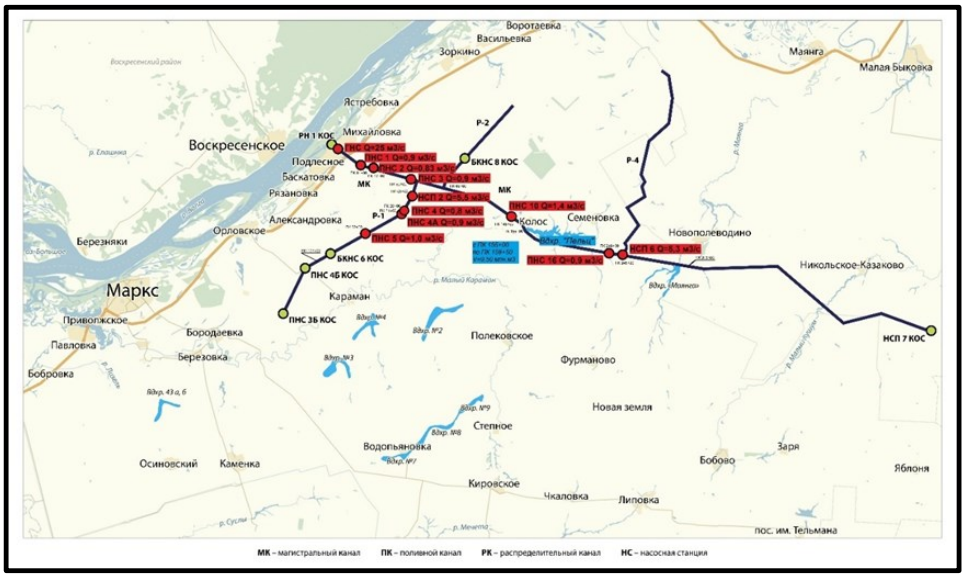

Figure 1. Komsomolsky irrigation system

Source: tender information “Design and survey work on the project “Reconstruction of the Komsomolsky irrigation system, Marx district, Saratov region”.

The efficiency of investments in its classical sense, and ultimately the intensity of investment activity determines the level of investment attractiveness. In this case, the effectiveness of reclamation investment projects was assessed by discounting the corresponding cash flows when the discount factor without taking into account the project risk was calculated by the ratio of the refinancing rate established by the Central Bank of the Russian Federation (the key rate of the Central Bank of the Russian Federation) and the inflation rate announced by the Government of the Russian Federation for the current year. The key rate of the Bank of Russia at the time of justification of the investment effectiveness was 9.00%. The inflation forecast was adopted in accordance with the Letter of the Ministry of Economic Development of the Russian Federation dated November 25, 2016 No. 36144-AV / D03i “On the Application of the Forecast Indicators concerning the Socio-Economic Development of the Russian Federation for the Pricing of Products Delivered with regard to the State Defense Order” (table 3).

Table 3. Forecast of inflation and price systems indices until 2019

Option – basic	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
	Report								Estimation	Forecast		
Inflation indicators: - consumer price indices (CPI)												
Price increase at the end of the period, % to December	13.3	8.8	8.8	6.1	6.6	6.5	11.4	12.9	5,8	**4,0**	4,0	4,0
Annual average, % y / y	114,1	111,7	106,8	108,4	105,1	106,8	107,8	115,5	107,1	104,7	104,0	104,0

Source - Letter of the Ministry of Economic Development of the Russian Federation dated November 25, 2016 No. 36144-AV / D03i.

The project risk adjustment is determined by the data (table 4) of determining the risk premium used when placing centralized investment resources of the RF development budget on a competitive basis (https://www.cfin.ru).

Table 4. The project risk adjustment

Risk value	Project Goal Example	P, per cent
Low	investments in the case of intensification of production based on mastered technology	3 - 5
Average	Increase in sales of existing products	8 - 10
High	production and marketing of a new product	13 - 15
Very high	investment in research and innovation	18 - 20

Source - Methodology for determining the risk premium used when placing centralized investment resources of the development budget of the Russian Federation on a competitive basis.

The budgetary effectiveness of the Komsomolsky irrigation network reconstruction project is the balance of revenues to the regional budget and payments from it in connection with the implementation of this project.

RESULTS OF THE STUDY

The financing source for the reconstruction project will be the federal budget; the basis for financing is the Federal Target Program “Development of Land Reclamation of Agricultural Land for 2014-2020” (Approved by Decree of the Government of the Russian Federation dated October 12, 2013 N 922) in terms of capital investments. The percentage ratio of the equity basis of financing is proposed at 30:30:40, respectively, from the federal budget, budgets of constituent entities of the Russian Federation (Saratov Region) and extrabudgetary sources (The concept of the federal target program "Development of land reclamation of agricultural lands in Russia for the period up to 2020). The total amount of tax payments under this project for 20 years will be 448,760,915 rubles, an average of 22,438,046 rubles / year. In the form of recommendations, one can consider the amount of tax payments as one of the sources of financing for this project (Abdrazakov et al., 2017; Abdrazakov et al., 2016; Abdrazakov et al., 2015; Abdrazakov et al., 2018). The reconstruction of the Komsomolsky irrigation system is aimed at introducing additional irrigated land for large farms in the Marx district: LLC "Anshe Delo" - 5011 hectares; agricultural holding LLC Trading House "Solnechnye produkty" - 21540 hectares, and farms - 1000 hectares.

According to information from potential large water consumers (LLC Nashe Delo and agroholding LLC TD Solnechnye produkty), it is planned to cultivate crops on irrigated lands: soybean (75%); corn for grain (25%). The use of low-pressure irrigation equipment will significantly reduce operating costs directly for agricultural producers which are water users. Agricultural enterprises already use circular sprinklers made by Valley firm in the Marx district; their operation ensures a reduction in operating costs, a quick payback on capital investments and resource conservation, since, according to experimental data, the low-pressure operation mode can reduce the energy consumption of pumping stations by 20-40%. The feasibility study of the planned activities (reconstruction of the Komsomolsky

irrigation system) allows us to recommend the project for execution due to its profitability: the discounted increase in net income from the implementation of the reconstruction project will amount to 1,560,317,288 rubles; project payback period (discounted) is 5.2 years. The project profitability index is above the threshold value of 1. The number of additional jobs as a result of the positive implementation of this project will be 222 people (targeted index).

CONCLUSIONS

The feasibility study for reconstruction, in other words, the establishment of its "economic feasibility" is based on an analysis of the technical condition of irrigation systems (assessment of the technical level). The task is that as a result of the reconstruction, the reclamation system will increase its technical level, which will lead to a reduction in water losses, optimization of equipment operation, reduction of energy consumption, provision of sparing start-up algorithms to extend the service life of the equipment, and the selection of energy-efficient pumping equipment. This in turn will provide a drastic increase in the productivity of the irrigated wedge of the Saratov region and the effectiveness of its use.

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