ORIGINAL PAPER

DOI: 10.26794/2587-5671-2025-29-1-106-118
UDC 336.027(045)
JEL G18

Strengthening the Role of the Unified Agricultural Tax in Economic Incentives of the Agro-Industrial Complex

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ABSTRACT

In the context of countering sanctions from unfriendly countries within the framework of the implementation of the state import substitution program and the food security doctrine, improving measures aimed at developing subjects of the agro-industrial complex is of particular **relevance**. The **purpose** of the study is to formulate proposals for improving the mechanism for collecting the Unified Agricultural Tax based on assessing the effectiveness of tax incentives for agricultural producers, using statistical data from the Federal Tax Service of Russia in form No. 5-Unified Agricultural Tax. To achieve this goal, the following **tasks** were solved: the fiscal and regulatory role of the Unified Agricultural Tax was assessed; tax benefits for agricultural producers were analyzed, including the mechanism for introducing a reduced unified agricultural tax rate in certain regions; The feasibility of applying benefits under the Unified Agricultural Tax was determined using mathematical tools by calculating the pairwise correlation coefficient between the number of registered payers of this tax and the tax payments they paid in the context of federal districts. The **methodology** used in the study includes the compilation of time series, statistical and correlation analysis of statistical tax reporting data of the Federal Tax Service of Russia in the context of federal districts. Based on the identified scholastic relationship between the number of Unified Agricultural Tax payers and revenues from this tax to the budget system, a conclusion was made about the effectiveness of using this special tax regime in relation to agricultural producers, including regions where preferential rates are applied. **The scientific novelty** of the research is to increase the efficiency of the provided tax benefits using mathematical tools by analyzing the received tax payments from this category of taxpayers. Efficiency is achieved by reducing shortfalls in budget revenues by narrowing the circle of benefit recipients. Based on a generalization of the **results** obtained, proposals were made that would allow greater emphasis to be placed on targeting tax preferences to subjects of the agro-industrial complex, manipulating the conditions for their provision, which should strengthen the role of the regulatory function of the Unified Agricultural Tax.

Keywords: unified agricultural tax (UAT); effectiveness of tax incentives; agricultural producers; tax benefits; agro-industrial complex

For citation: **Kosov M.E., Zvereva A.O., Akhmadeev R.G., Golubtsova E.V. Strengthening the role of the unified agricultural tax in economic incentives of the agro-industrial complex. *Finance: Theory and Practice*. 2025;29(1):106-118. (In Russ.). DOI: 10.26794/2587-5671-2025-29-1-106-118**

INTRODUCTION

The tax regulation of the agro-industrial complex takes on special significance due to the urgent need to ensure the food security of the Russian Federation. The doctrine of food security in our country is one of the main directions of state activity that ensures national independence.[1] Foreign researchers consider food security to be a political factor that cannot be neglected [1]. The global increase in food prices compels the improvement of the state support system for entities in the agro-industrial complex in both developed and developing countries [2]. At the same time, it is important to ensure the diversification of stimulating methods. Indicative are the data on soft wheat prices in European countries for the period from 2018 to 2022, presented in *Table 1*. A similar trend is observed for other types of crop production.

Geopolitical processes in recent years, which have led to the introduction of anti-Russian sanctions, have exacerbated the issue of the need for import substitution, including in the agro-industrial complex. It should be noted that the trend of stimulating import substitution is also observed in other countries [3, 4].

Taxes are one of the most effective tools for increasing the investment attractiveness of the agricultural sector. The sustainable development of an autonomous food supply system depends on the effectiveness of state support for agricultural producers.

The insignificant tax burden in the agricultural sector (2021–4.7%[2]) is explained by the existence of a large number of tax benefits available to entities in the agro-industrial complex, including the unified agricultural tax (UAT) [5]. There are also research data indicating that the weighted average cost-effectiveness ratio is higher for UAT payers than for organizations using other taxation systems [6].

The provision of tax benefits is always associated with the loss of government budget revenues, which is why the evaluation of the effectiveness of existing fiscal preferences becomes particularly important.[3] The system for monitoring and evaluating tax expenditures takes into account both the effectiveness of the provided tax preferences and their demand. The aforementioned circumstances make the study of the choice of method and the direct evaluation of the effectiveness of tax preferences for entities in the agro-industrial complex relevant.

LITERATURE REVIEW

In the paper, T. S. Kravchenko and D. S. Yasyinskaya note the favorable investment climate and the increase in the share of own funds in the structure of investments in fixed capital, while maintaining a significant share of attracted funds, which include budgetary sources of various levels, based on the results of the monitoring and assessment of the investment attractiveness of the Russian agricultural sector [7]. The authors conclude that the significant contribution of state support for agricultural entities has led to the aforementioned favorable structural changes, indicating that entrepreneurs expect stable and high income from agricultural activities.

The study of such issues has also been undertaken by scholars in the USA and the UK, taking into account state support in the strategy of farm business, which includes tax instruments [8, 9]. The analysis of the consequences of the abolition of the

[1] Decree of the President of the Russian Federation dated January 21, 2020, No. 20 "On the Approval of the Doctrine of Food Security of the Russian Federation". URL: https://www.consultant.ru/document/cons_doc_LAW_343386/ (accessed on 21.11.2023).

[2] Appendix No. 3 to the Order of the Federal Tax Service of Russia dated 30.05.2007 No. MM-3–06/333@ "On the Approval of the Concept of the System for Planning Field Tax Audits". URL: http://base.garant.ru/12153820/ (accessed on 20.10.2023).

[3] Main directions of budgetary, tax, and customs-tariff policy for 2023 and the planning period of 2024 and 2025 (approved by the Ministry of Finance of Russia). URL: http://www.consultant.ru/document/cons_doc_LAW_429950/ (accessed on 20.10.2023).

Table 1

Prices for Soft Wheat Varieties in European Countries in 2018–2022 (in Euros Per 100 Kg)

Country	2018	2019	2020	2021	2022
Germany	16.84	16.69	17.21	21.96	32.1
Spain	18.29	18.66	18.57	23.64	34.21
Romania	14.61	15.38	16.33	19.51	30.22
Hungary	15.27	15.47	15.35	19.99	32.39
Greece	18.45	19.08	19.77	23.27	38.3
Finland	19.98	18.4	17.05	21.55	33.62
Estonia	16.41	16.79	16.78	21.1	32.02
Croatia	14.61	14.99	13.94	18.15	29.77

Source: Eurostat data. URL: https://ec.europa.eu/eurostat/databrowser/view/apri_ap_crpouta/default/table?lang=en (accessed on 21.11.2022).

agricultural tax in China allowed for the assertion of a negligible impact of the tax factor on the net income of farmers [10]. However, other Chinese researchers do not deny the effectiveness of the regulatory function of taxes, particularly in stimulating the reduction of harmful environmental impacts [11].

Some researchers dealing with regional economic development issues have paid significant attention to tax regulation of the agro-industrial complex in their papers [12, 13].

Individual papers are dedicated to improving tax regulation in agriculture, taking into account specific industry characteristics, such as seasonality. A. I. Borodin et al. established a connection between natural and climatic conditions and the necessity of state support for the agricultural sector. Statistical data and expert assessments, on which the research was based, confirm the need for budgetary support for agriculture in countries where a significant share of land is in a risky farming zone. Tax benefits are a cause of budgetary revenue losses; at the same time, they are a form of state support for agricultural producers. Therefore, the established pattern can also be applied to them.

Conducting a study based on the example of the Krasnoyarsk, T. A. Borodina et al. also adhere to the viewpoint that SAT rates should be differentiated based on the agro-climatic potential of the region [15]. The conducted correlation-regression analysis allowed for the assessment of the impact of natural-climatic and territorial conditions on the profitability of entrepreneurial activities of peasant (farm) households. As a result, the authors proposed a system of corrective coefficients that would make UAT rates fairer. According to specialists, such an approach could stimulate the activities of entities in the agro-industrial complex, which would ensure the development of rural areas and employment for the population. These ideas are also reflected in the works of foreign authors. Thus, in the scientific article by M. Simbürger et al., an attempt is made to incorporate taxes into the climate risk management system [16].

I. A. Ezangina and O. S. Gromysheva, using Volgograd as an example, raise the issue of

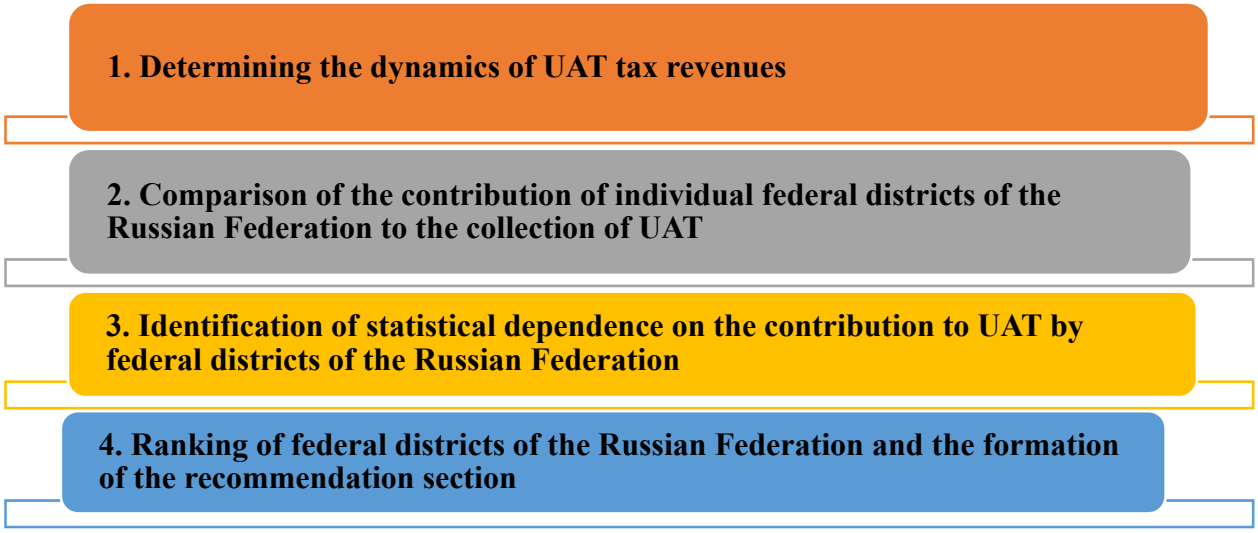


Fig. 1. **The Procedure for Implementing the Methodology for the Effectiveness of Applying the Preferential Tax Regime of the Unified Agricultural Tax**

Source: Compiled by the authors.

the imbalance between efficiency indicators and the level of costs for the implementation of state programs. The study of tax regulation methods in the context of their improvement involves determining the degree of achievement of the goals of state support for agricultural producers [17].

O. A. Levshukova et al., based on the analysis of quantitative and structural changes among UAT payers against the backdrop of the dynamics of this tax's revenues, propose improvements to the collection of UAT from agricultural producers [18]. The authors advocate for the automatic recognition of entities in the agro-industrial complex as UAT payers, with the exception of small agricultural producers with incomes of less than 8 million rubles.

Moreover, the paper of O. V. Vaganova et al. deserve attention, in which the issues of maintaining a balance between the tax burden on the agro-industrial complex and the revenues to the state budget from this category of taxpayers are raised [19, 20].

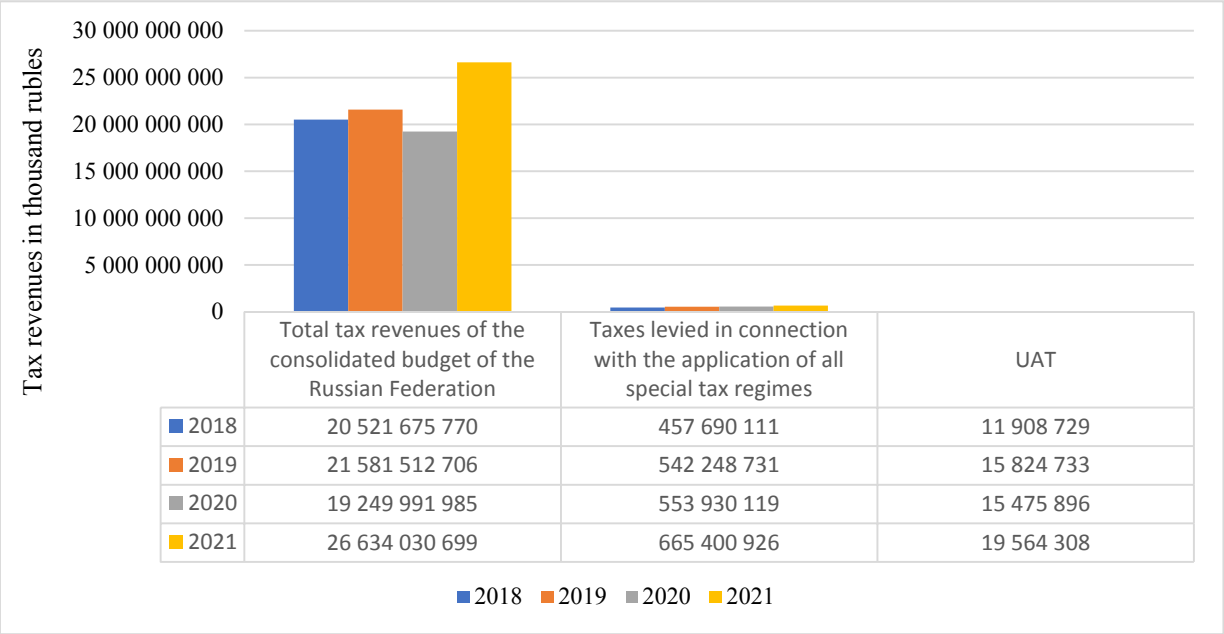
METHODOLOGY

To determine the effectiveness of using such a tool as UAT benefits, to assess the feasibility of their application across the federal districts of the Russian Federation with development potential, and to improve the state's fiscal policy in the context of providing tax benefits to agricultural producers, a developed methodology is proposed, which includes several stages outlined in *Fig. 1*. In order to identify the nature of changes in UAT payments by taxpayers in the Russian Federation, dynamic series have been compiled at the first stage, representing a set of indicator values based on statistical tax reporting forms.

The second stage of the methodological approach involves conducting a statistical analysis by calculating indicators for the elements of the aggregate using forms of statistical tax reporting across the federal districts of the Russian Federation. To assess the contribution of individual federal districts of the Russian Federation to the total amount of accrued UAT, it is advisable to determine the specific weight of each federal district based on the tax base and the structure of UAT accruals.

As part of the ongoing research, a sample of data on UAT collectability has been formed at equal time intervals.

At the third stage, statistical dependence is identified, and causal relationships are



	Total tax revenues of the consolidated budget of the Russian Federation	Taxes levied in connection with the application of all special tax regimes	UAT
2018	20 521 675 770	457 690 111	11 908 729
2019	21 581 512 706	542 248 731	15 824 733
2020	19 249 991 985	553 930 119	15 475 896
2021	26 634 030 699	665 400 926	19 564 308

Fig. 2. **Tax Revenues of the Consolidated Budget of the Russian Federation, Thousand Rubles**

Source: Data from the Federal Tax Service of Russia according to form 1-NM URL: https://www.nalog.gov.ru/rn77/related_activities/statistics_and_analytics/forms/ (accessed on 21.09.2023).

determined at the level of individual federal districts of the Russian Federation in the context of UAT.

Identifying the relationship between features using correlation analysis is based on determining the strength and direction of the relationship through the calculation of the linear correlation coefficient.

The value of the Pearson correlation coefficient is calculated based on the formula provided below and allows determining the type and strength of the linear relationship between two variables, x and y. Generally, correlation relationships indicate that changes in one characteristic are accompanied by changes in another.

$$r_{xy} = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \overline{y})^2}}. \quad (1)$$

As the variables *x* and *y* under investigation, data on the number of UAT taxpayers (legal entities and individual entrepreneurs) and the amount based on the tax base and the structure of UAT accruals are used.

At the final stage, recommendations are being developed to improve the mechanism of state tax regulation for entities in the agro-industrial complex with the aim of increasing efficiency and narrowing the circle of recipients of tax preferences.

The initial information for conducting the research was provided by the statistical observation data of the Federal State Statistics Service (Rosstat), as well as the data from the Federal Tax Service of the Russian Federation on statistical tax reporting forms (5-UAT).

RESULTS AND DISCUSSION

UAT, like other special regimes, creates preferential tax conditions for its payers. This is also one of the reasons for the low budget significance of UAT (*Fig. 2*).

The dynamics of UAT receipts, presented in *Fig. 3*, show the current situation and allow for noting a slight positive growth throughout the studied period. The demand for domestically produced agricultural products has only increased, creating incentives to enhance the

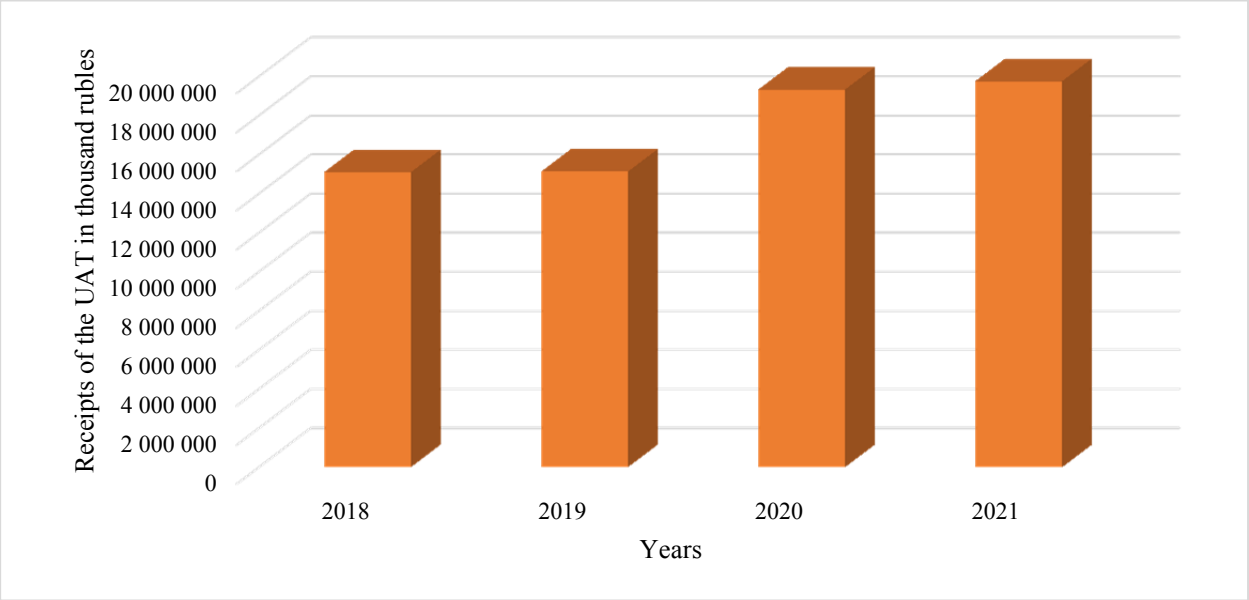


Fig. 3. **Dynamics of Unified Agricultural Tax Revenues for the Russian Federation as a Whole, Thousand Rubles**

Source: Data from the Federal Tax Service of Russia according to form 5-ESKhN. URL: https://www.nalog.gov.ru/rn77/related_activities/statistics_and_analytics/forms/ (accessed on 21.09.2023).

efficiency of the activities of entities in the agro-industrial complex.

Next, we will present the results of the assessment of the structure of UAT revenues by federal districts (*Fig. 4a — 4g*). The largest share of UAT payments during the study period falls on the Far Eastern, Southern, and Northwestern Federal Districts. The leading positions of the Southern Federal District are due to the natural and climatic conditions and population density, which affect the number of taxpayers and the size of their income, and in turn, the amounts of tax assessments depend on these factors. It is the Southern Federal District that dominates in the number of taxpayers who submitted UAT declarations. The figures for the Far Eastern Federal District are mainly due to UAT revenues from the Sakhalin Region and the Kamchatka, whose agricultural producers traditionally engage in fishing and fish processing. Similarly, the situation is the same with the Northwestern Federal District, where the main share of tax payments is formed by Murmansk.

To determine the existing relationships between the objects of the study, it is advisable to consider the data on the number of UAT payers (legal entities and individual entrepreneurs), the size of the tax base, and the structure of UAT accruals as variables. To build the model, we use retrospective indicators of the activities of Russian taxpayer organizations. Form 5-UAT allows for the comparison of calculated UAT amounts by subjects and federal districts of the Russian Federation and the number of taxpayers who submitted UAT tax returns. To simplify the process of statistical analysis, it is advisable to use the Analysis ToolPak add-in in MS Excel. By comparing the datasets using the statistical macro function to calculate the correlation coefficient between two sets of indicators for each of the N subjects of the Russian Federation that are part of the federal districts, it is possible to form the resulting correlation matrix (*Table 2*). It characterizes the degree of association between the data sets.

The obtained results indicate the presence of statistically significant dependencies between the variables, which can be used for making managerial decisions regarding state policy to stimulate agricultural producers

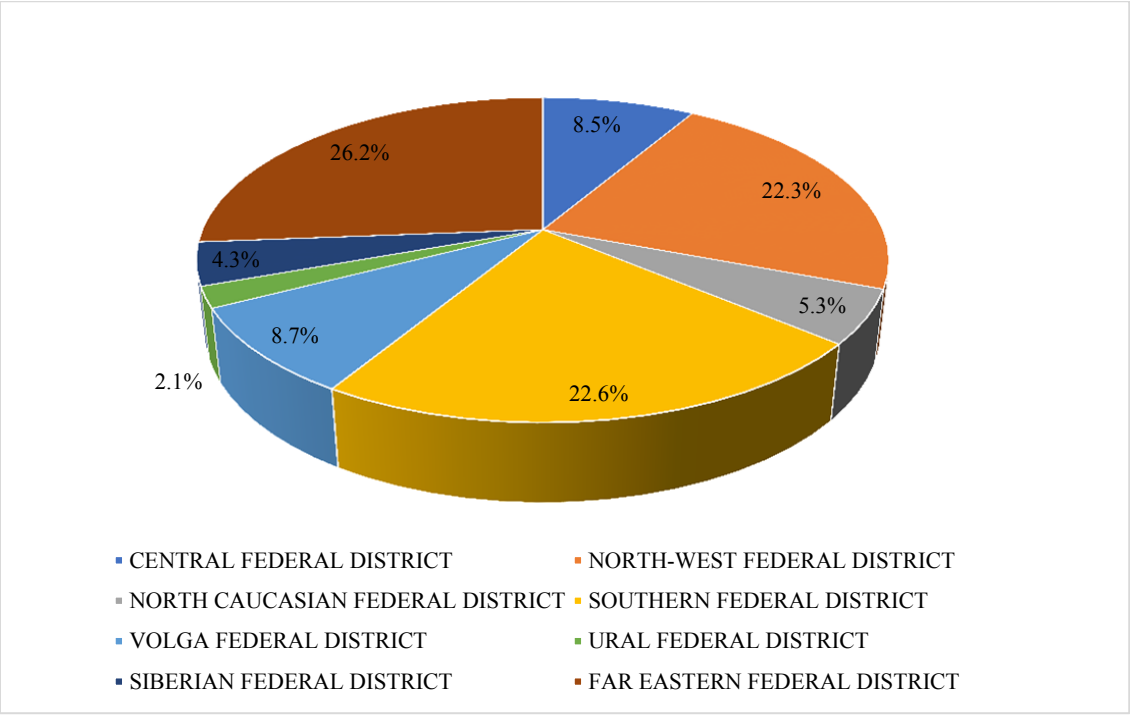


Fig. 4a. **Structure of Unified Agricultural Tax Revenues by Federal Districts for 2018**

Source: Constructed by the authors based on data from the Federal Tax Service of Russia (form 5-ESKHN). URL: https://www.nalog.gov.ru/rn77/related_activities/statistics_and_analytics/forms/ (accessed on 07.09.2023).\

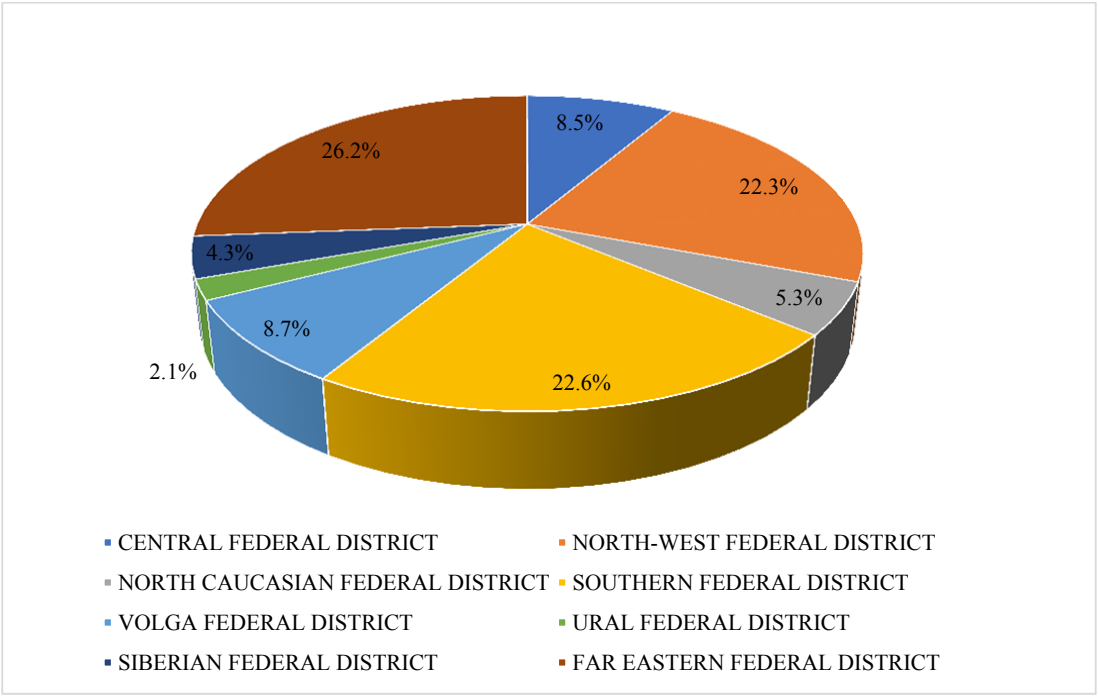


Fig. 4b. **Structure of Unified Agricultural Tax Revenues by Federal Districts for 2019**

Source: Constructed by the authors based on data from the Federal Tax Service of Russia (form 5-ESKHN). URL: https://www.nalog.gov.ru/rn77/related_activities/statistics_and_analytics/forms/ (accessed on 07.09.2023).

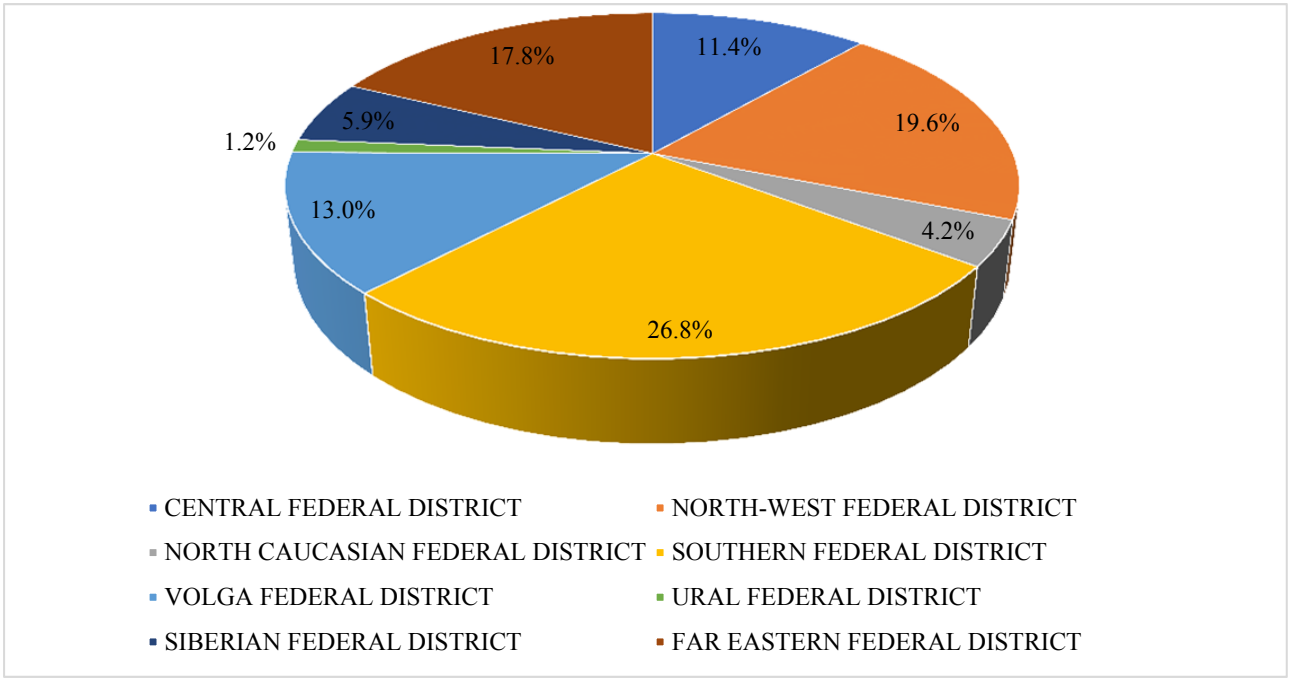


Fig. 4c. **Structure of Unified Agricultural Tax Revenues by Federal Districts for 2020**

Source: constructed by the authors based on data from the Federal Tax Service of Russia (form 5-ESKHN). URL: https://www.nalog.gov.ru/rn77/related_activities/statistics_and_analytics/forms/ (accessed on 07.09.2023).

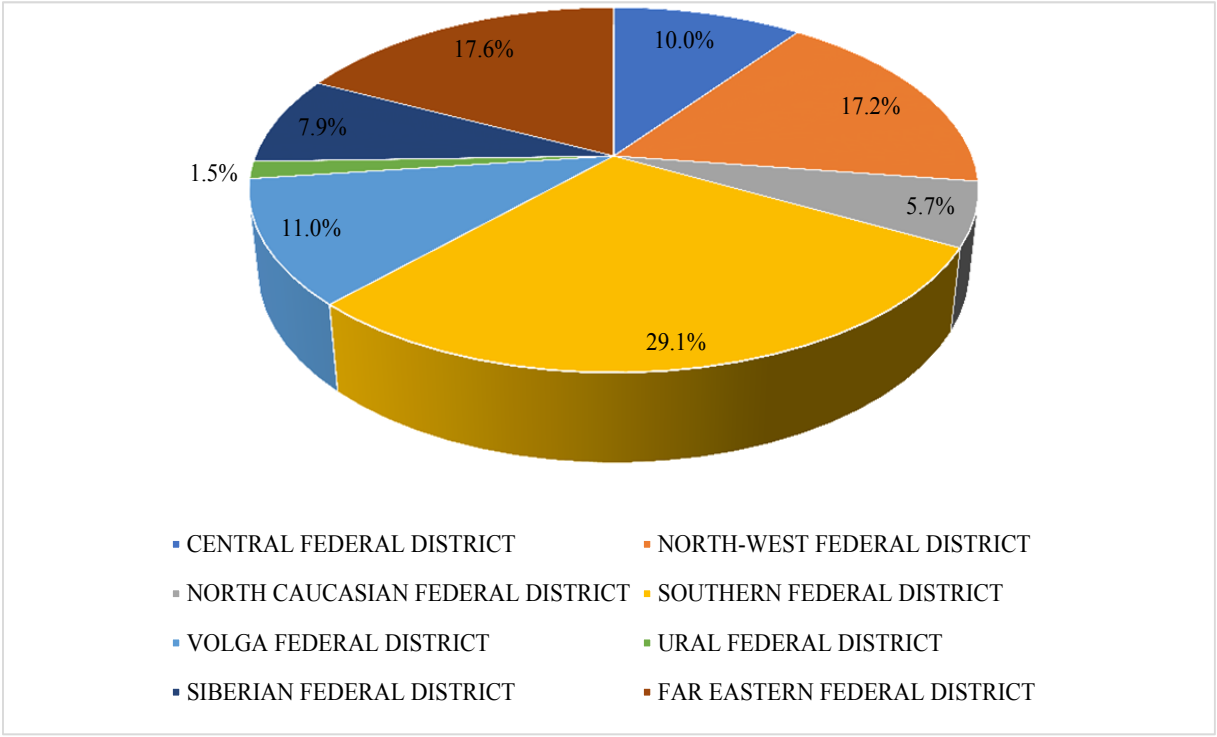


Fig. 4d. **Structure of Unified Agricultural Tax Revenues by Federal Districts for 2021**

Source: Constructed by the authors based on data from the Federal Tax Service of Russia (form 5-ESKHN). URL: https://www.nalog.gov.ru/rn77/related_activities/statistics_and_analytics/forms/ (accessed on 07.09.2023).

Table 2

Correlation Matrix of the Dependence between the Number of Taxpayers of the Unified Agricultural Tax (Legal Entities and Individual Entrepreneurs) and Tax Revenues from the Unified Agricultural Tax by Federal Districts

Russian Federation	2019	2020	2021
Central Federal District	0.939	0.896	0.878
Northwestern Federal District	–0.202	–0.184	–0.200
North Caucasian Federal District	0.913	0.894	0.860
Southern Federal District	0.977	0.976	0.965
Volga Federal District	0.584	0.556	0.584
Ural Federal District	0.966	0.919	0.852
Siberian Federal District	0.944	0.926	0.932
Far Eastern Federal District	–0.315	–0.331	–0.332

Source: Compiled by the authors based on correlation analysis data.

through the introduction of special tax regimes. The state faces a dual task: on the one hand, it needs to perform fiscal functions, and on the other hand, it is precisely state policy towards entrepreneurial structures whose activities are related to one of the agricultural sectors (crop production, animal husbandry, fishing, or forestry) that can stimulate the development of the industry by providing tax preferences.

The obtained correlation coefficients can be interpreted as follows. For the five studied federal districts, the correlation coefficient values range from 0.852 to 0.977, indicating a strong dependence between the studied parameters. For the Northwestern and Far Eastern federal districts, a weak inverse dependence is characteristic. One of the likely reasons for this phenomenon is the specificity of agricultural activities. The growth of tax revenues in these districts occurs without a comparable increase in the number of UAT payers, which is typical for fishing and fish processing.

The possibility of reducing UAT tax liabilities for payers is the application of a reduced rate, which can be set by the subjects of the Russian Federation. For example, in the Moscow region in 2022, the UAT rate was 0%, in Dagestan it was 1%, and in the Chelyabinsk region it was 3%. Data from the Federal Tax Service of Russia indicates that the share of UAT payers applying reduced rates is constantly increasing. Thus, in 2019, this share was 2.8%, in 2020 it was 4.78%, and in 2021 it was 6.22%. At the same time, as already noted above, tax revenues from UAT during this period increased. This circumstance confirms both the positive nature and demand for the benefit from

the taxpayers' perspective, as well as its effectiveness in the context of implementing the fiscal functions of the state.

The analysis of the subjects of the Russian Federation providing a tax preference in the form of a reduced UAT rate does not show a clear correlation between the accrued UAT, the number of taxpayers applying this special tax regime, and the share of agricultural producers exercising their right to the benefit. This is explained not only by the different rates, which vary in the principles of determining the recipients of benefits among agricultural producers, but also by the regional characteristics of the functioning of the agro-industrial complex.

CONCLUSION

As a result of a comprehensive analysis to confirm the necessity of state control in regulating the activities of agricultural production enterprises, the budgetary significance of UAT was analyzed and determined to be insignificant. However, the regulatory function of this tax is of great importance for the development of the agro-industrial complex. The effectiveness of state tax policy regarding agricultural producers is confirmed by the growing number of registered UAT payers and tax revenues. Positive collection dynamics are demonstrated even in those regions where reduced rates of this already preferential tax regime are in effect. The conducted study revealed a correlation between the dynamics of the number of agricultural producers and the increase in tax revenues to the budget of the Russian Federation in most federal districts. Consequently, the analyzed preferential tax regime, which leads to a loss of budget revenues, ultimately results in an increase in the consolidated budget's revenues due to the scale effect, confirming the effectiveness of such a fiscal preference.

To enhance the effectiveness of using the regulatory function of UAT in the economic stimulation of entities in the agro-industrial complex, it is advisable to pay more attention to the targeting of tax preferences and the conditions for their provision, namely:

- it is advisable to apply reduced UAT rates at the regional level not to all agricultural producers, but only to those categories that require special state support, taking into account the economic conditions in this subject of the Russian Federation;
- the period of the reduced UAT rate in the region for a certain category of taxpayers should not exceed 6 years (and a decision on extending the period must be made every two years);
- the decision to extend preferential rates should be made based on an assessment of the effectiveness of the applied preference in a regional context using the methodology that was employed in this study.

The establishment of a maximum duration for the benefit is determined by the interests of both the state and entrepreneurs. The UAT is a preferential tax regime, and the provision of additional preferences within it is a temporary measure to stimulate the development of agricultural producers in the region, and it is associated with the loss of tax revenues for the budget. The period of validity is extended if the introduced measure is effective.

Thus, the sequence of actions proposed in this work allows for the increased efficiency of tax regulation tools by enhancing the targeting of their provision to participants in the agricultural sector. Ensuring food security and promoting sustainable agricultural development have been declared as priority tasks within the conceptual integration of economic, social, and environmental agendas by many countries. The implementation of tax policy regarding UAT in the territory of the Russian Federation contributes to solving the most important state tasks in the field of national (including food) security and the realization of import substitution. Future research plans to extend this methodology to other sectors of the economy.

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M. E. Kosov — setting goals and formalising the objectives of the work, formation of the research methodology, description of the obtained results, coordination of the authors' team, determination of further research directions.
A. O. Zvereva — formation of the initial data set, compilation of dynamic series, statistical and correlation analysis of values, description of the obtained values with the help of mathematical apparatus.
R. G. Akhmadeev — research and generalisation of the obtained results from the point of view of improving the tools of tax regulation of the agro-industrial complex.
E. V. Golubtsova — literature review on the studied problematic, justification of relevance, formation of the initial data set, economic interpretation of the results obtained through the use of mathematical tools of data processing.

Conflicts of Interest Statement: The authors have no conflicts of interest to declare.

The article was submitted on 14.10.2023; revised on 15.11.2023 and accepted for publication on 27.11.2023.
The authors read and approved the final version of the manuscript.