Organizational and economic assessment of the use of agricultural land in the region (based on the materials of the Oryol region)

A A Titkov¹*, S P Suvorova¹ and N V Kukanova¹

¹Orel State Agrarian University named after N.V. Parakhin, 302019, Orel, Russia

E-mail: titkow91@mail.ru

Abstract. Features of the region, natural and climatic conditions and the composition of the land fund define the Oryol region as a zone of active agricultural production. A significant share of agricultural land (more than 82%) in the total land fund reflects the need to determine the efficiency of agricultural land users in the region. [8] The need for organizational and economic assessment of the use of agricultural land is determined by current trends in the field of agricultural land use and key indicators of the region, in particular, the share of the gross regional product accounted for by agricultural production. [1, 2] The paper presents a hierarchical grouping of land-use entities (agricultural organizations) according to the criterion of efficiency of agricultural land resources use in the conditions of economic activity assessment, which meets the set goal of the work. The work is complex in nature, summarizing the economic activities of 165 studied organizations included in the general sample. The developed hierarchy includes a total of 11 groups (0-10) and reflects the degree of efficiency of land use at the disposal of the analyzed agricultural producers.

1. Introduction
Agricultural land management is a complex and multidimensional process based on the use of new advanced technologies and basic experience in the process of choosing the best ways to improve the efficiency of the work carried out. The key aspect of assessing the efficiency of land use in agricultural production is the volume of output per unit area, which allows for a quantitative assessment of the efficiency of agricultural land use based on the analysis of the work of land-use entities. The presented question becomes particularly relevant in the context of studying the structure of the world land fund and the share of products accounted for by agriculture. Thus, it is worth noting that Russia, with 9% of the world’s farmland, produces only 1.34% of the gross domestic product of world agriculture. One of the reasons for this is the inefficiency of land relations, including the slow transition of land into the hands of responsible and efficient owners and users [6].

2. Materials and methods
The research is based on the works of national and foreign scientists, as well as the accumulated practical experience of the authors of the study. The sources of information were Reports on production, costs, prime cost and sales of crop production for 2014-2018 in the Oryol region, as well as data from the Regional report on the state and use of land in the Oryol region for 2019. The research is based on a systematic approach to applying the principles of hierarchy and structuring. The paper uses statistical research methods, in particular, the method of summarizing and grouping statistical
observation materials. The scientific novelty of the research is based on the use of the principle of hierarchy in the context of a systematic approach to the organizational and economic assessment of the use of agricultural land in the region.

3. Results

Agricultural land is a necessary and unchangeable condition for the existence and conduct of economic activity, playing a particularly important role for agricultural regions. [3] Natural and climatic conditions and the composition of the land fund of the region determined the nature of the main activities on the territory of the Oryol region. So, academician of the Russian Academy of Sciences N.V. Parakhin in his work “Main trends of sustainable development of the agro-industrial complex of the Oryol region” notes that the peculiarities of the region have defined it as a zone of intensive agricultural production”. [5] The agricultural type of work in the region is confirmed by the significant share of agriculture in the total volume of the gross regional product (19.9% in the last reporting period), which is reflected in the statistical reports. In the Oryol region, the volume of agricultural production by all categories of farms in the region for 2019 in actual prices amounted to 93.2 billion rubles, including 74.6% of crop production, 25.4% of livestock production, and 76.6% of the total volume was produced by agricultural organizations. [4] The Oryol region occupies a stable 7th place in the rating of regions that produce agricultural products. Taking into account the share and importance of agricultural production in the regional economy, we will make an organizational and economic assessment of the use of agricultural land in the territory of the Oryol region in the context of the use of data from recent reporting periods. Together with the analysis of the efficiency of using agricultural land resources, we will analyze land-use entities with the development of a hierarchical group based on the criterion of production of grain and legumes per unit of area at the disposal of the land user.

Based on the data of the investment portal of the Oryol region, in the last reporting period, there was a significant increase in the volume of products per capita. Thus, at the end of 2019, the region produced 126.1 thousand rubles per capita (in 2018 – 89.9 thousand rubles), which shows an increase in this indicator by 40% over the reporting period. [4]

During the reporting period, there was a high growth in crop production, comparable to the national trends. The fundamental share in the structure of crop production is accounted for by grain. According to the data of the Territorial body of the Federal State Statistics Service for the Oryol region, the total harvested area characteristic of grain and leguminous crops in the reporting period was 894.5 thousand hectares. The volume of grain and leguminous crops in the final weight was 3672.9 thousand tons, which exceeds the figures for 2018 by 479.1 thousand tons. The productivity of the grain field was 41.3 C/ha (36.7 C/ha in 2018).

Having studied the current state of the agro-industrial complex in the field of crop production, it was revealed that the main vector determining the direction of work is the production of grain and leguminous crops. In the presented conditions, we will determine the trends in the volume of land used for grain production in the region. [7] The results of the analysis of the composition of developed areas for the study period are shown in figure 1.
Figure 1. Dynamics of agricultural land areas used for crop production in the territory of the Oryol region.
Source: compiled by the authors based on Reports on production, costs, net cost and sales of crop production for 2014-2018.

The data in figure 1 indicate a steady increase in the volume of acreage in the region in conjunction with harvested areas for the reporting periods. The presented circumstances allow correlating the factors of growth in agricultural production with an increase in the volume of land resources consumed. [10] The revealed dynamics of growth in area used in agricultural production together with the growth of products, enables the assessment of profitability of land use in agricultural organizations of the Oryol region.

4. Discussion

Within the framework of the research, the existing agricultural organizations operating in the territory of the Oryol region, owning and using land resources in the framework of economic activity, are analyzed. The main sample for analysis included 165 agricultural organizations engaged in the production of agricultural products in the “crop production” sector, in particular, those engaged in the production of grain and leguminous crops. Total land area of the analyzed organizations as of the end of 2018 it amounted to 1181237 ha, including land for sowing grain and leguminous crops – 649455 ha, the total gross profit in the context of all analyzed organizations was 10226767 thousand rubles.

In the context of the analysis, we study the nature of the use of agricultural land in terms of evaluating the effectiveness of land resources used for the production of grain and leguminous crops. We will make an assessment based on the ratio of the total profit of the organization to the area under sowing of grain and leguminous crops in order to determine the dominant companies in the field of activity. Having determined the nature of the sample under study and the composition of the estimated indicators, we will group agricultural organizations, identifying the effectiveness of land use in order to assess the possibility of increasing the acreage and maximizing profits for production leaders.

Differentiation of the studied agricultural producers made it possible to identify the main outsiders of the market (companies of the “0” group) that showed a loss from economic activity in the reporting period:

Table 1. Reporting performance indicators of agricultural organizations of the “0” group.

| Name of the municipality/agricultural organization | Total land area | Area of ha sown (grain and legumes) | Profit (loss), rubles 2018 | Loss on the area in 2018, thousand rubles/ha |
|--------------------------------------------------|-----------------|------------------------------------|--------------------------|--------------------------------------------|
|                                                  |                 |                                    |                          |                                            |
|                                                  |                 |                                    |                          |                                            |
|                                                  |                 |                                    |                          |                                            |
|                                                  |                 |                                    |                          |                                            |
|                                                  |                 |                                    |                          |                                            |
The relatively small acreage of the analyzed “0” group companies reflects the diverse nature of the main part of the organizations, but the data obtained indicate a low level of management of available land resources, which led to a loss in the reporting period, reflecting the need to change the nature of the use of available land.

Further differentiation will be made in terms of determining the interval value of profit per 1 ha of sown area for the production of grain and leguminous crops in the context of the analyzed enterprises. The structure of agricultural producers according to the criterion of efficiency of use of agricultural land resources in the territory of the Oryol region is presented in table 2. Each individual position in this study is assigned a group number corresponding to the gross profit per 1 ha of sown area (10 groups with a positive financial result). The largest share in the total analyzed sample is made up of agricultural producers with a gross income of 1000-5000 rubles/ha. In numerical terms, this group includes 39 agricultural producers with an average size of the sown area for cereals and legumes in the amount of 2404 hectares.

**Table 2.** Structure of agricultural producers in the “crop production” sector according to the criterion of gross profit per 1 ha of sown area of grain and leguminous crops.

| Type of financial result (range of values) | Number of studied organizations | Specific weight in the total volume of the studied sample | Assigned group number |
|--------------------------------------------|---------------------------------|--------------------------------------------------------|-----------------------|
| Loss                                       | 11                              | 6.67%                                                  | 0 group               |
| Profit up to 1000 rubles/ha                | 10                              | 6.06%                                                  | 1 group               |
| Profit in the range of 1000-5000 rubles/ha | 39                              | 23.64%                                                 | 2 group               |
| Profit in the range of 5000-10000 rubles/ha| 28                              | 16.97%                                                 | 3 group               |
| Profit in the range of 10000-15000 rubles/ha| 31                             | 18.79%                                                 | 4 group               |
| Profit in the range of 15000-20000 rubles/ha| 17                             | 10.3%                                                  | 5 group               |
| Profit in the range of 20000-25000 rubles/ha| 6                              | 3.64%                                                  | 6 group               |
| Profit in the range of 25000-30000 rubles/ha| 6                              | 3.64%                                                  | 7 group               |
| Profit in the range of 30000-35000 rubles/ha| 5                              | 3.03%                                                  | 8 group               |
Profit in the range of 35000-50000 rubles/ha 6 3.64% 9 group
Profit of more than 50000 rubles/ha 6 3.64% 10 group

Source: compiled by the authors based on Reports on production, costs, net cost and sales of crop production for 2014-2018.

A significant share of agricultural producers in the analyzed period generated a gross profit of more than 20,000 rubles per 1 ha of sown area. According to the results of the analysis of the presented data, about 29 companies from the total sample are engaged in efficient use of land resources, receiving from 20,000 rubles/ha to 80,000 rubles/ha. In this situation, we additionally investigate the composition of companies that have the highest income within the analyzed sector (table 3).

Table 3. Reporting performance indicators of agricultural organizations of group 8-10.

| Name of the municipality/agricultural organization | Name of the municipality | Total land area | Area of ha sown (grain and legumes) | Profit, rubles 2018 | Profit per unit area in 2018, thousand rubles/ha |
|----------------------------------------------------|--------------------------|----------------|------------------------------------|---------------------|-----------------------------------------------|
| CC "Slavyanskoe" Verkhovskoy district              |                          | 4 395          | 1 720                              | 139 066             | 80.85233                                      |
| LLC "Ekaterinovka" Livensky district                |                          | 3 986          | 1 265                              | 70 244              | 55.52885                                      |
| LLC "Norovskoe" Livensky district                   |                          | 2 220          | 1 154                              | 80 674              | 69.90815                                      |
| LLC "Orelagroaktiv" Oryol region                   |                          | 1 097          | 360                                | 18 128              | 50.35556                                      |
| LLC "AgroSoyuz" Sverdlovskoy district               |                          | 1 000          | 235                                | 11 954              | 50.86809                                      |
| LLC "Grain products" Sverdlovskoy district          |                          | 2 500          | 1 870                              | 119 069             | 63.67326                                      |
| Farm "Horison" Glazunovsky district                 |                          | 573            | 160                                | 7 656               | 47.85                                         |
| LLC "Zalegosch-Agro" Zalegoschesky district         |                          | 15 696         | 6 695                              | 310 230             | 46.33757                                      |
| LP "Malinovskoe of Krasnozorensk region" Krasnozorensk y district |                 | 805            | 320                                | 13 312              | 41.6                                          |
| LLC "Khutorok" Livensky district                    |                          | 1 223.5        | 823                                | 32 998              | 40.09478                                      |
| PC "Oryol black soils" Oryol region                 |                          | 18 184         | 10 225                             | 367 436             | 35.93506                                      |
| LLC "AIC "Youth" Uritsky district                   |                          | 51 681         | 9 943                              | 376 754             | 37.89138                                      |
| LLC "Viking Agro" Verkhovskoy district              |                          | 4 503          | 2 310                              | 77 535              | 33.56494                                      |
| CHC "Kuban" Dolzhansky district                     |                          | 4 868          | 3 999                              | 136 041             | 34.01875                                      |
| LLC "Korotysh" Livensky district                    |                          | 7 698          | 4 135                              | 138 890             | 33.58888                                      |
| LLC "Orelagroinvest" Maloarkhangelsky district      |                          | 28 518         | 19 750                             | 636 523             | 32.22901                                      |
| LLC "AgroGard-Oryol" (LLC "Northern lights")       |                          | 56 763         | 30 046                             | 985 888             | 32.81262                                      |
Source: compiled by the authors based on Reports on production, costs, net cost and sales of crop production for 2014-2018.

Verkhovsky and Livensky districts of the Oryol region are unequivocal leaders in terms of the efficiency of agricultural land used. The presented data indicate a high level of income for these municipalities, which is quite predictable in view of the high bonus score for the territories under consideration (64 and 69 points, respectively). However, the geography of the enterprises under consideration reflects the prospective opportunities for obtaining an appropriate financial result in the conditions of proper organization of the use of available land.

Taking into account the results obtained, it becomes possible to justify the need to organize control measures for the subjects of the “0” group in the planned period, as well as subsequent monitoring of subjects in the range from “1” to “5” groups in the conditions of analyzing changes in the location indicators in the developed hierarchical group. Having estimated the share of agricultural organizations in a given interval, it can be concluded that about 82% of existing land-use entities in the region have the potential and resource potential in the form of land to increase the profitability of agricultural production.

5. Summary
Efficient use of land resources in agricultural production is an urgent issue of the modern land use system. The assessment of the efficiency of agricultural land use is carried out under various aspects, in particular, within the framework of an organizational and economic assessment that reflects the nature of the use of available resources. Identifying outsider companies that reflect low income or loss in the reporting periods allows determining the composition of entities that do not meet the requirements of effective land use, whose activities need to be controlled in more stringent conditions and deal with the redistribution of resources between more responsible land users. The developed hierarchical group, based on the organizational and economic assessment of the use of agricultural land, allows determining correctly the place of an agricultural producer in the total set of subjects of agricultural land use. In our opinion, the presented methodology will allow determining reasonably the possibility of subsidizing and providing additional state support (at the Federal and regional levels) for individual applicants for its receipt.[9] The presented research results will allow the region to assess the efficiency of land resources use at a higher quality level in the context of assessing economic activity and develop a set of administrative measures to influence the development of agricultural production in the region.

6. References
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