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Conference on Land Economy and Rural Studies Essentials**ECONOMIC SUPPORT OF FODDER PRODUCTION AS A  
FACTOR OF LIVESTOCK DEVELOPMENT**

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azzheurovam@mail.ru**Abstract**

At present, in Russia, despite the significant state support, a large number of problems remain in livestock, which is aggravated by instability in the foreign and domestic markets. The efficiency of the livestock industry is largely determined by its fodder resources. The structural changes that occurred in the Russian livestock industry in recent years have not solved the problem of providing livestock and poultry with full feed resources. In recent years, the country has actively developed the production of mixed feeds and premixes, but for most components of feed additives, our country maintains a high level of import dependence. From an economic perspective, the efficiency of fodder production is ensured by the optimal ratio of the fodder production (growing) cost and the profit received (the weight of the animal, the products obtained in the process of its maintenance). For most farms, fodder production is not the main economic component and, as a result, is financed by residual principle. To ensure the stable economic growth of the Russian livestock industry, it is necessary to create an effective fodder supply system. Recently, the rise in livestock production in the country requires a proportional expansion of fodder crop cultivation areas. It is possible to achieve an increase in fodder production due to the large-scale application of progressive technologies for growing fodder crops, increasing their yield; preparation and storage of feed; an increase in the proportion of high-protein feed crops; improving the quality of all feed products and profitability of agricultural enterprises.

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*Keywords:* Efficiency, fodder production, forage lands, livestock, mixed feed

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## 1. Introduction

The need to increase the competitiveness of the Russian livestock industry is beyond doubt, this can be achieved by improving the breed composition of meat and dairy animal species, developing and implementing intensive technologies for raising livestock and poultry, attracting investment to implement innovations and measures for economic modernization of production (Kastornov, 2020). The only way to meet these challenges is to create an effective system for providing feed (in terms of the amount and nutrients content in certain proportions) and proper conditions for farm animals raising.

One of the main factors which significantly affects the efficiency level of livestock industry management is the provision of agricultural enterprises with combined and concentrated feeds for fattening animals and efficient use of land, material, labour, and financial resources, improvement in feed production, which provides an increase in the production of competitive livestock products, lower costs of labour and means of production, increasing the efficiency of the resources inputs (Morozov & Rasskazov, 2019; Takiya et al., 2019).

Forage land is the main source of feed, forming the fodder base of any enterprise. An important source of feed remains waste from commercial crop production: products of grain processing, sugar beet, sunflower, etc. Traditionally, about 30% of arable land is allocated for forage crops in the field crop rotations (Arkhipova, 2020; Babushkin et al., 2019).

## 2. Problem Statement

The presence of potential opportunities and at the same time difficulties in the development of the Russian livestock industry indicates the need to improve the fodder base and create an effective fodder supply system.

The scientific hypothesis of the study is based on the assumption that in modern conditions, the prospects for fodder production development are determined by intensive production factors that imply an increase in the efficiency, safety and quality of fodder production.

## 3. Research Questions

The paper addresses the issues inherent in the hypothesis of the study, which implies that the prospects for the livestock industry development are determined by the state of fodder production. Accordingly, the article addresses the following tasks:

- to conduct an economic assessment of livestock industry and fodder production development;
- to identify the development trends and features of the domestic fodder market, taking into account economic, technological, organizational and other factors;
- to justify possible directions of fodder production intensification as an efficiency increasing factor of the livestock industry.

#### **4. Purpose of the Study**

The purpose of the study is to assess the state of fodder production and substantiate the prospects for its development in the context of improving the efficiency of the Russian livestock industry.

#### **5. Research Methods**

The research methods include such general scientific methods as logical and comparative analysis, review of information and statistical data. Quantitative assessment of the parameters determining the possibilities of the fodder production industry expanding was carried out on the basis of statistical indicators, by analyzing the dynamics and structure of production. The study was conducted according to the data of the Federal State Statistics Service of the Russian Federation for the period 2015-2020.

#### **6. Findings**

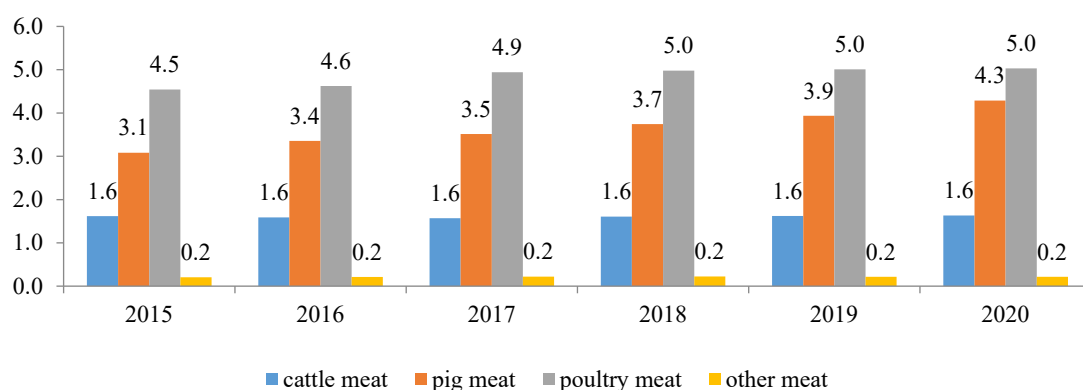
The volume of industrial production of fodder resources in agricultural enterprises of the Russian Federation remains at a fairly low level, so the problem of providing livestock producers with high-quality and affordable feed requires a more in-depth study from the perspective of constant changes in the socio-economic situation in the agro-industrial complex of the state and considering the livestock industry and fodder production as a correspondent pair (Minakov et al., 2020; Tretyakova et al., 2020).

The livestock industry is one of the priority sectors. The development of which has received increased state attention since the launch in 2006 of the national project "Development of the Agro-industrial Complex" later evolved into a state program. Government support has helped to solve some systemic problems, as well as attract significant investment in the industry, which, as a result, has allowed to reverse the trend of the industry degradation, restart many processes at a new level and achieve significant results for a number of indicators (Latruffe et al., 2017; Skvortsov et al., 2018). The production of poultry meat increased by 3 times, of pork – by 2 times. Instead of state-subsidized and independent farms, small feed mills, breeding centres and other related infrastructure, holdings with a complete production cycle from field to market began to consolidate leading positions on the market, especially focused on the efficiency of their own activities.

As a result, it was possible to meet the domestic needs of the Russian Federation for poultry and pork: against the background of accelerated growth in meat production, imports were systematically reduced, export opportunities appeared, supported by the efforts of the producers themselves (improving product quality, reducing production costs, recognizable brands), the state, and regulators, as well as a favourable global environment, including the low exchange rate of the ruble.

In 2018, Russia achieved full self-sufficiency in pork indicators and proceeded to increase exports. A similar situation developed in the poultry industry. In 2020, Russia exported more than 500 thousand tons of meat, which is 55% higher than in 2019. Pork exports increased by 2 times, reaching 187 thousand tons or \$ 324 million, and poultry exports – by 41%, reaching 285 thousand tons or \$ 419 million. Although the situation in the livestock segment remains difficult, in 2020, Russia increased beef exports by 2.9 times up to 16 thousand tons and by 3.3 times up to \$ 85 million.

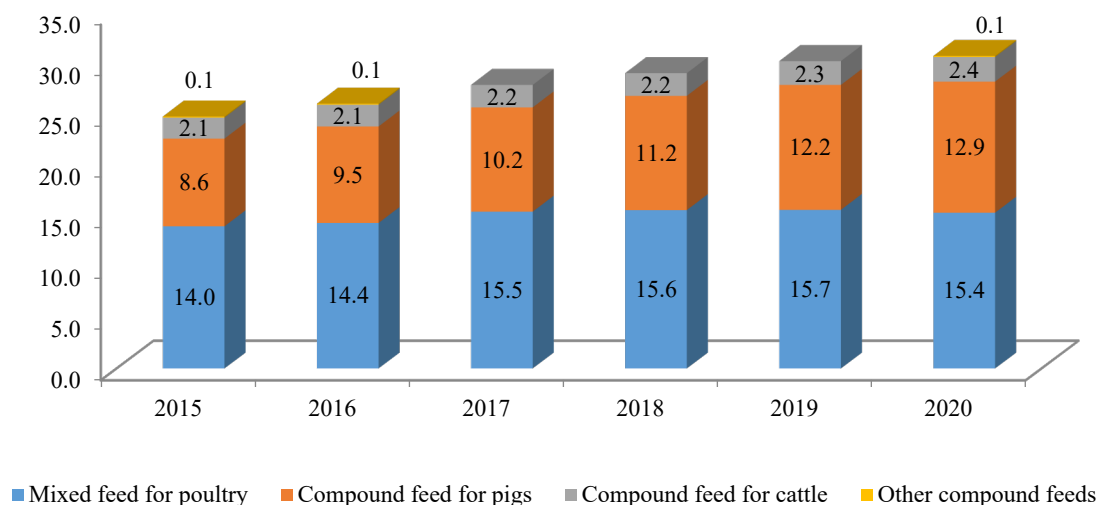
The total number slaughtered for meat production increased in 2020 compared to 2015 by 18%, reaching 11.2 million tons, the best indicators are presented for pork production (an increase of 39% up to 4.3 million tons) (Figure 01). The growth of livestock production indicators is mainly due to an increase in the productivity of animals, but not the growth of livestock. Thus, in 2020, the number of poultry and cattle decreased by 4.6% to 518.7 million heads and by 3% to 18 million animal units, respectively, while the porcine population increased by 20.8% to 25.8 million animal units.



**Figure 1.** Production of livestock and poultry for slaughter in the Russian Federation, million tons

Sustainable functioning, dynamic development and increasing the export of livestock products require ensuring the availability of high-quality fodder. In Russia, the fodder industry includes the following segments: production of ready-made fodder for farm animals and poultry; production of concentrates; production of premixes; production of feed additives. In the structure of ready-made fodder production for farm animals, the predominant share falls on compound feed – more than 89%.

In 2020, the volume of Russian production of compound feed for farm animals amounted to 30.8 million tons (Figure 02). In the production structure, 50% is accounted for compound feed for poultry. This is due to the fact that most large farms feed poultry exclusively with compound feed, which, given the significant number of livestock, determines the consumption volume. Almost 42% of the compound feed gross production falls on compound feed for pigs (Azzheurova, 2021; Minakov et al., 2020). In comparison with the results of 2015-2019, there was a shift in demand towards compound feed for pigs due to the growth of their livestock while reducing the number of poultry. The main problem of the domestic feed market is the dependence on foreign supplies of feed components and technological solutions for the construction of new and reconstruction of existing feed mills.



**Figure 2.** Production of compound feed in the Russian Federation, million tons

The Russian market of compound feed for farm animals has changed significantly in recent years. The domestic feed market is characterized by the following features:

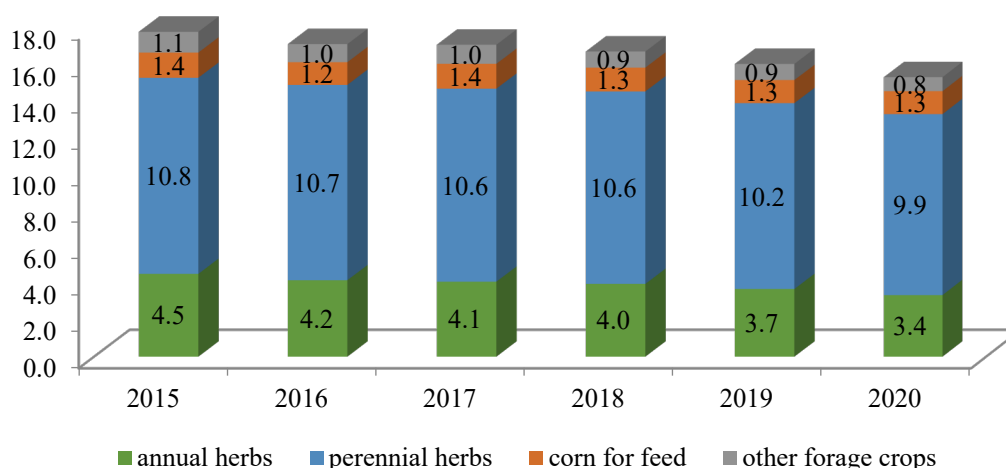
- demand for compound feed products has increased by an average of 4.5-5% per year over the past 5-6 years;
- current capacity of Russian feed mills is estimated at 36 million tons per year, and by 2025 they will amount to 45 million tons;
- share of compound feed for poultry will continue to increase, but the further market growth will be mainly provided by fodder for pigs;
- state support for aquaculture leads to the active production of feed for valuable fish breeds.

About 80% of the compound feed is produced within holdings and large farms. There are about 270 participants in the feed market, and the share of independent enterprises is decreasing every year. Gradually, agricultural holdings are moving away from purchasing compound feed from third parties and are reorienting to their own production. In this regard, the positions of independent feed producers are weakening. In the structure of compound feed production, 61% of output is accounted for agricultural holdings, 27% - for poultry farms, 10% - for independent plants, and 2% - for small-capacity feed mills. The vast amount of the compound feed in Russia is produced in the Central and Volga Federal Districts – about 43% and 20% of the output, respectively, and remote regions represent a niche for the development of independent producers. Thus, the current market situation leads to the following trends:

- integration of independent producers into the structure of agricultural holdings;
- vertical integration of independent producers (start to engage in livestock industry independently);
- partnership with large livestock companies;
- relocation of enterprises to remote regions where agricultural holdings are less developed than in the Chernozem or South regions;

- self-sufficiency of livestock enterprises with the fodder of their own production – a guarantee of cost reduction;
- increase in the cost of components has had a more negative impact on independent manufacturers – lower margins since prices for final products are rising with some delay;
- main consumers of the products of independent factories can be represented by small and medium-sized farms.

A negative aspect of domestic fodder production is the decline in the production of own feed as the basis of the feed base, so the decrease in the acreage of forage crops over the past six years was 13.2%, from 17.0 to 14.8 million hectares. In the structure of forage land, more than 67.3% is accounted for perennial grasses, 22.9% - annual grasses, 8.5% - corn crops for green plant material, and silage (Figure 03). Recently, the rise in livestock production in the country requires a proportional expansion of fodder crop cultivation areas.



**Figure 3.** Dynamics of forage crop acreage in Russia, mln ha

Despite all the difficulties, the fodder industry is developing better than many other sectors of the economy: the demand for feed remains stable, and the rapid change in logistics chains, the restart of the Chinese economy during the spread of coronavirus in Europe and the United States, business support in developed countries and other factors have avoided a shortage of feed additives and a sharp rise in prices.

The state of the fodder industry largely depends on demand, determined by the state of affairs in animal husbandry, and external supplies of feed additives, equipment and technologies (Minakov et al., 2020).

The discrepancy between the forage area and the volume of feed production to the available livestock and poultry is of dual nature – on the one hand, this is a "regional" discrepancy, and on the other, this is a discrepancy between the categories of farms. The shortage of feed in households is covered by receiving it as payment for labour, payment for rent of land and property shares, direct purchase of feed, and some of them are simply appropriated (Bounds, 2018; Nechaeva et al., 2019).

Recently, there has been a tendency in the agricultural formations of the country to gradually reduce the feed consumption for milk production. Indicators of feed costs per 1 hwt of milk for various categories of farms show that, in general, in subsidiary farms, significantly less feed is spent on the production of 1 hwt of milk than in public sector enterprises, which is one of the competitive advantages of commodity producers in the milk market (Capehart et al., 2018).

This situation indicates shortcomings in the proper provision of livestock with feed. Their elimination should take place in two directions: first, it is the optimization of the feed area according to the available livestock and increase its productivity, and secondly, it is the formation and functioning of the market for feed resources.

Thus, the livestock industry in comparison with crop production can significantly reduce the area of agricultural land required for production. Among all material costs included in the cost of agricultural production in general, feed accounts for about 28-30%; in the cost of livestock production – 68-73%. In the structure of livestock products cost, the largest share is accounted for feed costs. Recently, its share has slightly decreased due to the increased prices for machinery, energy, fuel, fertilizers, etc.

It is established that the growing demand of livestock for feed, the limited size of the feed acreage cause the need to intensify their own feed production as the basis of the feed reserve. Until recently, the main way to intensify fodder production was increasing yields by improving agricultural techniques for growing and breeding more productive forage-crop varieties. Studies of many scientists have proved that the intensity level of fodder production depends not only on the yield. The structure of the feed acreage had a significant impact on the intensity level of fodder production. Therefore, an important direction of fodder production intensification is its optimization, which takes into account a set of factors and measures in the industry.

To ensure a high production level of quality fodder and increase the efficiency of its use, it is necessary to pay special attention to the development of a scientifically based system of feed crop rotations, seed production of annual, perennial legumes and cereals, which will ensure the production of 70-80 hwt of feed units and 110-120 g of digestible protein per hectare of feed acreage. It is also necessary to develop new approaches to the use of the most productive varieties and hybrids of forage crops, comply with the requirements of harvesting and storage of feed according to the conditions of natural and climatic zones.

## **7. Conclusion**

The conducted studies have shown that the importance of fodder production is very significant for the industry since the current state and development of the livestock industry depend on the production efficiency, safety and quality of feed resources, and therefore the effective functioning of animal husbandry requires special attention to such strategic priority areas as stable state support (introduction of a system of indicators for financing the development of dairy and meat cattle breeding, the attraction of various types of investments, modernization of production processes), ensuring resource efficiency, improving the breed composition of animals and the pricing system, compliance with the requirements of world standards for the quality of production through improving the certification and standardization system, and the introduction of innovative and intensive technologies for farm animals raising.

The main provisions of the legislative framework also need to be improved, since it is necessary to pay much more attention to the modernization and development of the waterfowl and sheep farming industry, to provide regional programs for the use of state support for the restoration of high-yield dairy cattle, to develop measures to limit the existing risks from the functioning of livestock farms for the environment and the health of the rural population.

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