The analysis of the factors influence on stock breeding in Volgograd Oblast during the pandemic

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Abstract. The article presents a model of analyzing the factors, influencing the stock breeding production volume in Volgograd Oblast during the pandemic. The suggested model can be used by state authorities for elaborating the programmes aimed at supporting the agriculture and strengthening Russia’s and Volgograd Oblast’s food security in particular. Besides, this model can be integrated into agricultural enterprises’ management systems, as it allows analyzing the internal and external factors’ influence on the agricultural producers’ financial and operational activities’ indicators. The model also helps developing the measures, which ensure the minimization of the aforementioned factors’ negative effect and the creation of new opportunities for production development. The application of this model helps discovering the stock breeding production growth reserves in the times of uncertainty. What is more, the factors, listed in the research can be used for analyzing the deviations of efficiency indicators from those, which were planned in the course of providing state support to stock breeding enterprises. The article presents the analysis of the external factors’ influence on the production volumes’ development in the framework of COVID-19 spreading in Volgograd Oblast.

1. Introduction
Almost all countries face new economic realia during the COVID-19, so it is highly important to react to the new external and internal environment and elaborate effective adapted systems of producing and selling the goods in the modern business environment [1,2]. Occupying one of the leading positions in providing food security, stock breeding is subject to the negative impact both of the world crisis and the pandemic [3].

The COVID-19 pandemic has determined the transformation of production and consumers’ behavior models, logistic chains and trade rules (including the world trade). Moreover, the instability of food supply influences certain goods markets, what in turn causes the changes in the most agricultural enterprises’ development strategies (some enterprises get new development opportunities, while the others have to reduce their production) [4].

Thus, the elaboration of methodological approaches to analyzing the factors which influence stock breeding in the time of COVID-19 pandemic is urgent for minimizing possible economic losses and finding extra production growth reserves.

The research goal is to create methodological approaches to analyzing the factors which influence stock breeding in the time of COVID-19 pandemic and find extra production growth reserves.

So, the following tasks are defined in the study:
• the model for analyzing the factors which influence the stock breeding enterprises’ production volume during the pandemic is developed;
• according to the methodic approach, the research presents the analysis of the external and internal factors’ influence on the stock breeding production volume growth in Volgograd Oblast.

The research object comprises the results of the stock breeding enterprises’ production during the pandemic.

The research object is the methodology of analyzing the external and internal factors’ influence on the stock breeding production volume growth during the pandemic.

2. Materials and Methods
The Agricultural Committee [5], Federal Russian Ministry of Agriculture Center for the Development of Agricultural Products’ Export [6] and Federal State Statistics Services’ [7] data is used as the research informational foundation.

The scientific investigation is carried out through generalization, systematization, grouping, content analysis and modelling. Besides, statistical methods have been applied for analyzing the factors’ influence.

3. Results
The stock breeding in Volgograd Oblast is the agriculture’s top priority direction, as it provides more than a half of its gross production and has a significant impact on ensuring the regions food security. That is why the state supports dairy and meat production first of all [8,9]. Nowadays a dairy complex plant intended for 2500 cattle heads is being raised in the Kalach District, a dairy farm intended for 480 cattle heads is being built in Staropoltavskii District and another dairy farm intended for 2400 cattle heads is being erected in Sredneakhtubinskii District[5]. These dairy facilities are being raised under regional building programmes. Another grant project aimed at supporting family stock breeding farms has been implemented since 2019.

The pandemic conditions determine a set of factors which influence the stock breeding production volumes. These factors can be distributed into internal and external [10]. The external factors are in turn distributed into direct and indirect (figure 1).

The internal factors are so diverse, that the research authors have distributed them into the following groups:

1) specialization of farms (types of products produced - the broader the specialization of a farm is, the more opportunities there are to minimize the pandemic’s negative impact on the raw food markets; on the production scales, etc.);
2) the availability of inventories (the availability of the necessary feed stocks, their quality (biological properties), breeding stock, the genetic potential of a farm, the availability of other necessary inventories for the development of production, etc., dependence on imported suppliers of raw materials);
3) the level of the logistics development (the development of economic ties, supply and sale logistics chains, focus on domestic producers and consumers, etc., since the breach of resources supply systems leads to the production cost increase);
4) the labor intensity (human resources, the level of production specialization and mechanization, the pandemic is the biggest threat to industries that largely depend on manual labor);
5) production capital intensity (the availability of necessary fixed assets, the lack of fixed assets can lead to a slowdown in the production volume growth in case the pandemic remains in the medium and long term perspective);
6) the use of innovative technologies (the level of the results of scientific and technological progress use in production process; development of innovative processes in: breeding, keeping and caring for the livestock, collecting and processing products; investments in R&D to adapt products and
packaging to new consumer demands) [11-16].

During the COVID-19 spreading, the main indicators of the production volumes’ development of livestock enterprises are largely determined by environmental factors, which can conventionally be subdivided into direct and indirect impact factors [17, 18].

The following factors refer to the first group:
1) the level of state support (setting maximum prices for basic foods, commodity interventions; a ban on the certain commodities’ export, subsidies for the domestic production development, grant support to agricultural producers, etc.);
2) the level of demand for agricultural products (the decrease in household income, combined with the instability of agricultural products prices, lead to a drop in demand for meat and dairy products in favor of vegetable products, the growth of online food purchases leads to an increase in demand for long-life products, while the exotic food is being replaced by the “comfort food” segment);
3) the inflation level (a rise of prices for energy resources and industrial products with the prices disparity has a negative impact on the agricultural enterprises’ performance indicators (for example, the production cost increase caused by the feed cost rise with a simultaneous decrease or stagnation of prices for meat will lead to the agricultural products profitability decrease);
4) the exchange rates (the instability of exchange rates affects the amount of imported food products and their price on domestic markets, in addition, the policies of exporting / importing agricultural products changes as a result of exchange rate fluctuations) [19-21].

Livestock breeding enterprises should not underestimate a set of external indirect factors, to which the following refers:
1) environmental (during the pandemic, the enterprises save on investments in environmental safety, as a result of which the quality of soil and air deteriorates, which ultimately affects the agricultural products performance indicators. The amount of global emissions and environmental pollution have reduced as a result of applying the measures for reducing the pandemic spreading (self-isolation), however, the demand for disposable personal hygiene items and the amount of medical waste that is not recycled has increased); [22].
2) political factors (the borders closure during the pandemic has led to the breach of supply chains, initiation of protectionist measures, etc.);
3) uncertainty factors (inability to make medium and long term predictions, lack of understanding the pandemic’s duration and the recovery period after it, the lack of specific, timely and effective measures stabilizing the situation, etc.).

The model developed suggested in this research is intended for analyzing the influence of internal and external factors on the livestock enterprises’ production volumes development during the pandemic. The model can be used both at the state level and the enterprises level (figure 1).

Finding new reserves for reducing the negative impact of the selected groups of factors and development opportunities on the indicators of livestock production is the result of applying the model. The result of using the proposed model will be:

- for government bodies - an opportunity to assess the level of the factors’ influence on monitoring indicators during the implementation of agricultural enterprises support programs to adjust the volume of government funding during the pandemic;
- for agricultural enterprises – finding the reserves for minimizing the factors’ negative impact in order to increase the efficiency of financial and economic activities [23].
Figure 1. The model for analyzing the external and internal factors which influence the stock breeding enterprises’ production volume during the pandemic.

Using the proposed methodology, the research authors suggest analyzing the external factors’ influence on the livestock enterprises production volumes development in Volgograd Oblast during the pandemic.

The dynamics of the main types of livestock products in Volgograd Oblast before the COVID-19 spreading is shown in figure 2.

Figure 2. The dynamics of the main types of livestock products in all categories of farms of Volgograd Oblast [7].

According to figure 2, the dynamics of production of the main livestock products types is positive. The average livestock and poultry for slaughter production growth rate is 100.86%, milk production - 101.56%.

The Volgograd Oblast’s livestock enterprises increased their production during the coronavirus pandemic (figure 3).
The analytics reflects the lag in livestock and poultry for slaughter production growth rates (90.5% compared to the same level the last year). The slowdown in the livestock and poultry for slaughter production was due to the influence of mainly external factors, which include the level of demand for agricultural products and the exchange rates.

A decrease in meat products consumer demand during the pandemic and an economic crisis (reorientation of the consumer demand for plant products, a decrease in the purchasing power of per capita household incomes for livestock products, as well as the closure of public catering enterprises for the self-isolation period) is the main factor in the decline of livestock production volumes in Volgograd Oblast. The growth rates of the livestock, poultry for slaughter production and milk and the purchasing power of per capita household incomes for livestock products in the Russian Federation, the Southern Federal District and Volgograd Oblast as of 01.07.2020 are shown in figure 4.

The analysis of the data presented in figure 4 shows that the lowest growth rate in the first half of 2020 compared to the same level in 2019 is observed in the Volgograd Oblast in terms of the “the purchasing power of per capita household incomes for livestock products” - 53.5%. The negative impact of this factor was slightly offset by a decrease in prices for agricultural products (inflationary factor).
The dynamics of agricultural products price indexes is shown in figure 5.

![Figure 5](image_url)

**Figure 5.** The dynamics of agricultural products price indexes by 2018-2020 quarters in the Russian Federation, Southern Federal District and Volgograd Oblast [7].

Volgograd Oblast’s export of agricultural products has also positively influenced the production of meat and dairy products (the volume of exports for the first half of 2020 amounted to 0.3 million USD, the products were exported to Kazakhstan, in 2019 there were no export supplies of livestock products) [7].

The external factor of direct impact “the exchange rates” is referred to the factors, negatively influencing the production of livestock products in Volgograd Oblast. In 2020, there is an acceleration the ruble’s devaluation, this factor can lead to the food inflation increase, which is especially important for import-dependent productions, which include the livestock industry. Poultry enterprises can face the strongest impact, as a result of the dollar’s exchange rate growth, what will increase the soybean meal, premixes, feed additives, amino acids’ prices. As a result, the cost of poultry products will rise (the share of imported raw materials in this production is about 30%) [6]. As it was noted above, the volume of meat and dairy products exports not significant in Volgograd Oblast, so there is practically no positive effect from the exchange rates’ growth [7].

Sufficient state level anti-crisis measures should be developed and implemented to support livestock producers during the pandemic: revision of national agro-industrial complex’s development strategies in favor of the domestic production development in order to maximize consumer demand at the expense domestic resources (subsidies, innovations funding, non-tariff barriers, reduction of quarantine measures and minimization of their impact on food transportation).

4. Conclusions
The conducted research allowed obtaining the following results:

- The model for analyzing the external and internal factors which influence the stock breeding enterprises’ production volume during the pandemic has been developed. This model can be applied: at the government agencies’ level to assess the level of the factors’ influence on the monitoring indicators in course of implementing agricultural enterprises’ support programs in order to adjust the amount of government funding during the pandemic and uncertainty conditions; at the business entities’ level to find the reserves to reduce the factors’ negative impact and increase the production volumes in order to increase the financial and economic activities’ efficiency (Authoring Maliy N.A.).
The analysis of the external factors’ direct influence on the production of the main types of livestock products in Volgograd Oblast during the pandemic has shown that such factors as “the level of agricultural products demand” and “the exchange rates” had a negative impact on this industry. The fall in demand was caused by a decrease in the purchasing power of the population, the closure of catering enterprises for the self-isolation period and a reorientation of consumer demand for plant products. The devaluation of the ruble mainly affected the production cost growth in the import-dependent agricultural producers (poultry production).

The following factors had a positive effect on the livestock production growth in Volgograd Oblast: an increase in the export of meat and dairy products to Kazakhstan and measures of state support at the federal and regional levels. However, it should be noted that the state support is not always available to most Volgograd Oblast’s livestock farms due to either their unprofitability or the products’ low profitability. The state support to livestock producers during the pandemic, should include strategic measures, promoting the domestic production to maximize consumer demand and ensure food security in the region.

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