CURRENT STATE AND PROSPECTS OF ANIMAL HUSBANDRY DEVELOPMENT IN UKRAINE

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Abstract

The article is devoted to current problems that arose in the field of animal husbandry due to Russian military aggression, temporary occupation of part of the territory, and active combat actions in Ukraine. The purpose of the article is to monitor the production and consumption of animal products, calculate losses of livestock and production of animal industries due to Russian aggression, and forecast parameters of their reproduction to achieve pre-war consumption and further development in the conditions of war.

In the course of the research were used the information base of the State Statistics Service, estimated indicators of the State Budget of Ukraine for 2023, information and analytical materials of the National Research Center Institute of Agrarian Economics on indicators of production of livestock products, and justification of investment projects for the creation of mini-farms. The following methodological tools were used in the research process: methods of statistical comparisons, namely, comparison of indicators, absolute and relative comparisons of changes in the value of a sign in relation to the base indicator; factor analysis - to determine the factors influencing the reproduction of livestock products to the pre-war level; functional analysis - to determine the dependence of production on livestock and animal productivity; balance method - for forming the balance of animal husbandry products; and calculation-constructive method - to determine the amount of investments for the restoration of livestock industries for production to the level of the pre-war period.

To determine the fund and the level of consumption of livestock products per person of the population, balance sheets were drawn up. It was established that the norms of consumption of livestock products are met only for poultry meat. The actual level of meat consumption in Ukraine is only 62.3% of the norm, including beef - 25.7%, pork - 71.1%. The forecast of production of livestock products was made based on the calculation of livestock losses and animal productivity in the territories temporarily occupied and affected by Russian aggression. According to our calculations, in 2022, the gross output of the studied branches of animal husbandry decreased compared to 2021 by 12.6%, or by EUR 227.5 million (from EUR 1.8 to 1.57 billion). Actual losses amount to EUR 477.5 million. In order to reach the pre-war level of consumption of livestock products, it is necessary to increase production of beef by 14.7%, pork by 5.8%, and milk by 8.5%. The number of investments to compensate for losses in the reproduction of meat and dairy cattle breeding and pig breeding industries is forecasted to

be EUR 790 - 875 million, including meat and livestock sector - EUR 480 million, dairy farming - EUR 357 million, pig farming - EUR 37.5 million.

The main influencing factors on the further development of animal husbandry have been established. The further development of the livestock industry will depend on the manifestation of the following factors: missile attacks by the Russian occupiers of Ukrainian territory, especially energy supply systems, and the ability of the armed forces of Ukraine to "close the sky"; demining the territory, restoring the logistics of commodity flows and export-import operations; provision of state support for the reproduction of destroyed and damaged productions of livestock products; the purchasing power of the population of Ukraine for products of animal origin; and the level of migration activity of the population in the country.

Key words: *Animal husbandry, Livestock industry, Production forecast, Level of consumption, Loss of livestock, Loss of production, Balance sheet, Volume of investments.*

1. Introduction

An important task of the country's food independence is a stable and balanced supply of livestock products to the agricultural market. The functioning of the livestock industry in conditions of constant imbalances and stagnation-regressive challenges leads to degradation of the market of agricultural products and causes a negative impact on domestic economy. The state of the agricultural market is characterized by the volume of supply of livestock products, the production of which depends on internal and external factors. Internal factors include a low level of modernization of technological processes of production, lending, and state support of agricultural enterprises and farms. External factors are primarily due to the Russian military attack on Ukraine with the temporary occupation of part of the territory in 2014 and the full-scale military invasion in 2022, which negatively affected the functioning of the livestock industry.

The consequences of aggressive military actions were the extermination of livestock complexes and livestock, disruption of logistics chains, blocking of sales markets, and reduction of production of livestock products. Accordingly, the sectors of dairy and meat cattle breeding and pig breeding have catastrophically reduced the production of raw materials for the processing industry, and poultry farming has lost foreign markets. Currently, local food markets are largely supplied by the products of small farms and peasant farms that have proven their resilience under martial law. In essence, small-scale agriculture confirmed the conclusion of classical agrarian economic theory that a peasant farmer will not stop farming even when it gives him a minimum income in the form of wages. Post-war reconstruction and further development of the livestock industry can be carried out in two ways - by investments for the restoration of large livestock complexes and the formation of small farms.

The problems of the functioning and development of the dairy and meat livestock industries are considered in the scientific works of Shiyan [1]. It has been established that a characteristic trend in the development of cattle breeding in Ukraine is the transfer of the industry from agricultural enterprises to households, which account for more than 70% of production. The priority directions for the activation of agricultural cooperation in the field of cattle breeding have been identified. An economic mechanism of a rational combination of large-scale specialized production and small subjects of agrarian business in cattle breeding is proposed.

Petrychenko [2], examines trends in the development of dairy farming and influencing factors on the economic efficiency of milk production. The author established the dependence of the level of consumption of milk and milk products on the level of income and the place of residence of the population, proposed the introduction of blockchain technology and smart contracts for all participants of the dairy market, and developed the model of dairy industry development.

Organizational and economic principles of development and the role of the dairy industry in the formation of food security in the conditions of Ukraine's integration into the European and global economic space are considered by Kozak [3]. Within the framework of the inclusion of new guidelines for global development, models of milk production and consumption, and scenarios of dairy product production forecasts for the long term are proposed.

Kovalenko [4], takes care of the problems of intensive development and increasing the efficiency of meat production. It has been proven that progressive technologies of cattle fattening increase the level of productivity and quality of products, reduce the cost price and increase the level of labor productivity and profitability of production. Optimization of sales channels for meat raw materials becomes an additional source of income.

Uhnivenko and Petrenko [5], and others highlight the scientific basis of ecologically clean beef production in specialized meat cattle breeding, including the advantages and disadvantages of the industry,

technological processes and reasons for restraining the development of meat cattle breeding in Ukraine.

Mazurenko [6], substantiates the advantages of innovation-oriented pig farming, which are implemented within the framework of models of innovative-adaptive and anticipatory innovative development. Based on the influence of the industry's investment attractiveness and connections between scientific organizations and specialized enterprises on innovation processes, models of the innovation system at the regional and industry level have been developed. The potential for intensification of production, acceleration of the processes of expanded reproduction of the industry, and growth of the domestic pig meat market to ensure that food independence of the country has been established.

The importance of the livestock sector for the development of the agricultural sector and the problems of increasing the concentration of livestock and poultry in large farms and reducing it in medium and small enterprises are mentioned by Kernasyuk [7]. It leads to deterioration of ecological situation, monopolization by producers of certain branch directions of domestic market of animal products, and a corresponding reduction of competition. Ensuring sustainable and balanced development of the agro-industry requires large, small, and medium-sized enterprises. These challenges can be solved by supporting livestock farming based on family-type farms, and at large enterprises by building biogas power plants.

Among foreign scientists, Eeswaran et al., [8], made a significant contribution to the study of problems of functioning and development prospects of animal husbandry. They conducted a thorough investigation of the main challenges affecting livestock systems in West Africa and suggested measures to improve the productivity of the farming system to improve the region's food and nutrition security.

Agus and Mastuti Widi [9,] studied the features and prospects of beef production systems in Indonesia. The authors analyzed Indonesian beef cattle production systems and considered issues related to current beef production systems that may become important for the future development of the beef production industry in Indonesia. Recommendations were made to improve breeding and reproduction, empower smallholder farmers, build the capacity of industry-related institutions to enhance technology transfer, and develop systems for industry development.

Mottet and Tempio [10], examined the current situation in the global poultry sector and modeled future trends for its sustainable development. The focus is on the challenges facing the sector, with a particular focus on four areas: food security, social issues (poverty reduction and equity), health (animal and human), and environment (natural resources and climate change).

Smith et al., [11], provided an in-depth study of the global beef market. The authors found that sustainability of beef production has different meanings in different geographical and socio-economic regions of the world. Natural resources, including land area, rainfall, feed availability, and the strength of country's economy are the main determinants of the perception of the sustainability of beef production. Enahoro et al., [12] devoted their research to the problems of livestock development in developing countries. The authors examined the current state of the meat trade and present plausible projections for the future, highlighting the impact of animal diseases on current and future trade dynamics.

Ijaz et al., [13], researched the global negative impact of the COVID-19 pandemic on global production, supply chains, and meat prices. The authors argue that integration between all stakeholders in the meat industry is critical to the resilience of the industry's supply chain to cope with such disruptive conditions that may arise in the future.

The purpose of the article is the operational monitoring of the production and consumption of livestock products, the calculation of losses of livestock and the production of products of the livestock industries due to Russian aggression, and the justification of the predictive parameters of their reproduction to achieve the pre-war level of consumption and further development in the conditions of military actions.

2. Materials and Methods

We will present a step-by-step algorithm for determining the forecast parameters of the production of livestock products in the conditions of military operations.

1. The consumption fund is determined from the balance of livestock production, which is formally described by the equation and determined by the formula:

$$F_c = \sum_{i=1}^{n} P_{vi} + S_{ci} + I_{mi} - N_{fi} - E_{xi} \qquad (1)$$

Where: F_c is product consumption fund, thousand tons; P_{vi} is volume of production of i type of products, thousand tons; S_{ci} is change in stock at the end of the year of i type of product, thousand tons; I_{mi} is import of i type of products, thousand tons; N_{fi} is expenses for non-food purposes of i type of production, thousands of tons; E_{xi} is export of i type of products, thousand tons; n is the number of types of products.

2. Losses of grain crops are determined by the formula: The level of consumption of livestock products per person of the population is determined by the formula:

$$C_{labs} = (F_{\dot{c}\,2023}/R_{p2023}) - (F_{\dot{c}\,2021}/R_{p2021}) \qquad (2)$$

$$C_{lrel} = \frac{F_{\dot{c}\,2023}/R_{p2023}}{F_{\dot{c}\,2021}/R_{p2021}} \times 100 \qquad (3)$$

Where: C_{labs} is the absolute consumption of products per person, kg; C_{lrel} is relative consumption of products per person, %; F_{c2023} is predicted consumption of i type of production in 2023, thousand tons; F_{c2021} is consumption of i type of production in 2021, thousand tons; R_{p2023} is population in 2023, million people; R_{p2021} is population in 2021, million people.

3. The relative consumption of livestock products per person per year to the consumption norm is determined by the formula:

$$G_{crel2022} = (C_{liabs2022}/N_{\dot{c}}) \times 100 \qquad (4)$$

$$G_{crel2021} = (C_{liabs2021}/N_{\dot{c}}) \times 100 \qquad (5)$$

Where: $G_{crel2023}$ is the relative consumption of products in 2023, %; $G_{crel2021}$ is relative consumption of products in 2021, %; $C_{liabs2023}$ is absolute consumption of i type of production in 2023, kg; $C_{liabs2021}$ is absolute consumption of i type of products in 2021, kg; N_{ci} is the rate of consumption of i type of livestock products, calculated according to the data of the Ministry of Health of Ukraine and the tastes and preferences of the population, kg [14].

4. The production of livestock products is formally described by the equation;

$$P_v = \sum_{i=1}^{n} L_i \times Q_i \times K_i \qquad (6)$$

Where: P_v is the production of products taking into account livestock losses and reduced animal productivity, thousand tons; L_i is livestock of i species of animals, thousand heads; Q_i is productivity of i species of animals, kg; K_i is the coefficient of losses of i type of production; n is the number of types of products.

5. Livestock losses are determined by the formula:

$$L_{abs} = \sum_{i=1}^{n} L_{i2022} - L_{i2021} \qquad (7)$$

$$L_{rel} = \sum_{i=1}^{n} (L_{i2022}/L_{i2021}) \times 100 \qquad (8)$$

Where: L_{abs} is the absolute loss of i-animal species, thousands heads; L_{rel} is relative losses of i-animal species, %; L_{i2022} is population of i-species of animals in 2022, thousand heads; L_{i2021} is population of i-species of animals in 2021, thousand heads; n is the number of animal species.

6. Productivity losses caused by disruptions in logistics, feeding, by animal stress in regions of hostilities have been empirically established at the level of 10%.

7. The calculation of the gross output of the livestock industries of Ukraine for 2022 is determined by the formula:

$$GP = \sum_{i-J}^{n} P_{vj} \times FP_j \qquad (9)$$

Where: GP is the total volume of production of gross livestock products, million UAH; P_{vj} is production of j type of product, thousand tons; FP_j is constant price of j type of product in 2016, UAH /ton; n is the number of types of livestock products.

8. Losses of livestock products of Ukraine in 2022 are determined by the formula:

$$AL = \sum_{j=1}^{n} P_{pj2021} \times P_{j\,2021} - \sum_{j=1}^{n} P_{vj} \times P_{j\,2021} \qquad (10)$$

Where: AL is the amount of livestock product losses, UAH million / USD million; P_{pj2021} is production of j type of livestock products in 2021, thousand tons; P_{j2021} is average price of j type of livestock products UAH /ton; P_{vj} is production of the j type of livestock products in 2022, thousand tons.

9. The number of livestock for the production of livestock products in 2022 to the level of 2021 is determined by the formula:

$$L_{abs} = \sum_{j=1}^{n} (P_{vj\,2021} - P_{vj})/Q_{j2021} \qquad (11)$$

Where: L_{jabs} is number of livestock to reproduce production up to the level of 2021, thousand heads; P_{vj2021} is production of j type of livestock products in 2021, thousand tons; P_{vj} is production of j type of product in 2022, thousand tons; Q_{j2021} is productivity of j species of livestock in 2021, kg.

10. Reproduction of livestock production in 2023 to the level of 2021 is determined by the formula:

$$P_r = \sum_{j=1}^{n} L_{jabs2023} \times Q_{j2021} \qquad (12)$$

Where: P_r is production volume, thousand tons; $L_{jabs2022}$ is the necessary population of j animal species to reproduce production up to the level of 2021, thousand heads; Q_{j2021} is productivity of the j animal species in 2021, kg.

11. Investments to reproduce the production of livestock products up to the level of 2021 are determined by the formula:

$$In = \sum_{j=1}^{n} L_{jabs} \times Cv_j \qquad (13)$$

Where: *In* is the volume of investments in the reproduction of livestock industries, USD thousand; L_{jabs} is livestock of *j* species of animals, thousand heads; C_{vj} is the cost of one place for keeping livestock, USD; *n* is the number of animals.

3. Results and Discussion

To assess the consumption needs of livestock products by the population, taking into account the import and export of milk and meat of cattle, pigs and poultry, the

actual product balances for 2020 - 2021 were used. The balance for 2020 is calculated for the population of 41.8 million people, and for 2021 41.4 million people (Tables 1 and 2).

Thus, the consumption norms of animal products are kept only on the meat of poultry. For further calculations on the basis of actual data on livestock (dairy cows, cattle, and pigs) and production, losses of animal industries in

Table 1. Livestock production balance for 2020, thousand tons

Types of products	Consump. per person, per year, kg	Population consumpt. fund	Production volume	Stock change at the end of the year	Import	Total resources (4 + 5+ 6)	Costs for non-food purposes	Export (3 - 7 - 8)
1	2	3	4	5	6	7	8	9
Meat - total (in slaughter mass)	53.7	2244.0	2478.0	-15.0	230.0	2723.0	6.0	473
including: - beef	8.1	337.0	345.0	-2.0	18.0	365.0	1.0	27
- pork	18.8	786.0	697.0	-4.0	96.0	797.0	1.0	10
- poultry meat	26.1	1089.0	1405.0	-9.0	113.0	1527.0	3.0	435
- other types of meat	0.8	32.0	31.0	0.0	3.0	34.0	1.0	1
Milk	201.9	8430.0	9264.0	171.0	691.0	9784.0	914.0	440
Livestock production balance for 2021, thousand tons								
1	2	3	4	5	6	7	8	9
Meat - total (in slaughter mass)	53.0	2191.5	2438.3	-8.0	260.2	2706.5	6.0	509
including: - beef	7.2	298.5	310.5	-1.0	17.0	328.5	1.0	29
- pork	19.9	824.1	724.0	-3.0	110.1	837.1	1.0	12
- poultry meat	25.0	1035.5	1373.5	-4.0	127.0	1504.5	3.0	466
- other types of meat	0.8	33.3	30.3	0.0	6.0	36.3	1.0	2
Milk	201.5	8336.9	8713.9	-26.0	781.0	9520.9	815.0	369

Source: Calculated according to the data of the State Statistics Service of Ukraine, 2022 [15].

Table 2. The actual level of consumption of livestock products by the population for the analyzed period to rational norms per person

Types of products	Actual consumption per person in 2020, kg	Actual consumption per person in 2021, kg	Consumption norms per person, kg	Actual consumption in 2020 to the norm, %	Actual consumption in 2021 to the norm, %
Meat - total (in slaughter mass)	53.7	53.0	85	63.2	62.3
including: - beef	8.1	7.2	28	28.9	25.7
- pork	18.8	19.9	28	67.1	71.1
- poultry meat	26.1	25.0	24	108.8	104.2
- other types of meat	0.8	0.8	5	16.0	16.0
Milk	201.9	201.5	380	53.1	53,0

Source: Calculated according to the data of the State Statistics Service of Ukraine, 2022 [15].

regions of military action and suffered from temporary Russian occupation were determined (Table 3).

Table 3. Regions of military operations

№	Region	Production losses in livestock industries, %
1	**Donetsk**	80
2	**Zaporizhzhya**	50
3	**Luhansk**	100
4	**Mikolayiv**	30
5	**Kharkiv**	30
6	**Kherson**	50
	Regions affected by temporary occupation	
1	**Kyiv**	5
2	**Sumy**	10
3	**Chernihiv**	10

Source: The result of the authors' research.

The production of products was determined by taking into account livestock losses and a decrease in animal productivity due to the disruption of technological processes and logistics (Table 4).

Cattle decreased by 13.5%, including fattening cattle by 13.1%, dairy cows by 13.7%, and pigs by 11.9%.

The total production of meat decreased by 10.6%, beef - by 19.8%, pork - by 10.2%, and milk - by 12.3%. Correspondingly, the volume of gross production in the livestock industry decreased (Table 5).

According to our calculations, in 2022, the gross output of the studied branches of animal husbandry decreased compared to 2021 by 12.6%, or by UAH 9.1 billion (from UAH 72.1 to 63.0 billion). As for the actual losses of livestock meat and dairy products in 2022, they amount to UAH 19.1 billion, or EUR 477.5 million, in value terms (Table 6).

As a result of the emigration of Ukrainians to other countries due to Russian aggression and people mortality rate because of military actions, the population of Ukraine decreased by 6.9 million people. Based on the consumption of livestock products (milk, beef, pork) per person of the population at the level of 2020 - 2021, the necessary production of products was calculated, which compensates for its losses to ensure the actual consumption of 34.5 million people (On the State Budget of Ukraine for 2023 [16], to the level of the pre-war period (Table 7).

Table 4. Forecast of animal population and production of livestock products

№	Indicator	2021	2022 (expected)	Deviation
	Animal population at the end of the year, thousand heads			
1	**Cattle**	2644.0	2287.0	-356.3
2	**including cows**	1544.0	1331.5	-212.5
3	**Pigs**	5608.8	4939.3	-669.8
	Production of products, thousand tons			
1	**Meat - total (in slaughter mass)**	2438.3	2179.0	-259.3
2	**including: - beef and veal**	310.5	249.0	-61.5
3	**- pork**	724.0	650.0	-74.0
4	**Milk**	8713.9	7642.4	-1071.5

Source: Calculated according to the data of the State Statistics Service of Ukraine, 2022 [15].

Table 5. Calculation of the gross output of the livestock industries of Ukraine for 2022

Types of products	Production, thousand tons			Actual prices of 2016, UAH/t	Cost in actual prices of 2016, UAH million			2022 to 2020, +, −	2022 to 2021, +, −
	2020	2021	2022		2020	2021	2022		
Beef	537.5	475.1	383.4	623.25	12371	10935	8824	-3547	-2111
Pork	966.7	971.2	874.0	23877	23082	23189	20868	-2213	-2321
Milk	9263.6	8714.0	7642.4	4367	40450	38050	33371	-7079	-4679

Source: Calculated according to the data of the State Statistics Service of Ukraine, 2022 [15].

Table 6. Calculation of livestock product losses in Ukraine in 2022

Types of products	Production, thousand tons		Average prices in 2021 UAH/t	Cost in actual price 2021, UAH million		Cost in actual prices of 2021, UAH million	Product losses, EUR million
	2021	2022		2021 p.	2022 p.		
Beef	526.8	421.6	40750	21467	17180	4287	107.2
Pork	987.8	886.6	37666	37207	33395	3812	95.3
Milk	8714.0	7642.4	10301	89760	78722	11038	274.6

Source: Calculated according to the data of the State Statistics Service of Ukraine, 2022 [15].

Table 7. Livestock production balance for 2023, (forecast) thousand tons

Types of products	Consump. per person, per year, kg	Population consumpt. fund	Product. volume	Stock change at the end of the year	Import	Total resources (4 + 5+ 6)	Costs for non-food purposes	Export (3 - 7 - 8)
1	2	3	4	5	6	7	8	9
Meat - total (in slaughter mass)	53.8	1857.7	2179.0	-14.0	215.4	2408.4	6.0	416
including: - beef	7.1	245.0	249.2	-2.0	6.4	257.6	1.0	12
- pork	19.7	679.5	650.0	-4.0	109.2	681.9	1.0	1
- poultry meat	26.3	907.7	1256.0	-8.0	94.8	1310.3	3.0	400
- other types of meat	0.7	25.6	24.6	0.0	5.0	29.6	1.0	3
Milk	189.7	6546.4	7162	-50.0	432.0	7644.0	669.6	428
It is necessary to produce products up to the consumption level of 2020-2021								
1	2	3	4	5	6	7	8	9
Beef	8.1	279.5	285.5	–	–	–	6	–
Pork	19.9	686.6	687.6	–	–	–	1	–
Milk	202.0	6969.0	7769.0	–	–	–	800	–

Source: The result of the authors' research.

In order to achieve the level of consumption of livestock products (beef, pork, milk) of the pre-war period, it is necessary to increase the production of beef by 14.6%, pork by 5.8%, and milk by 8.5%.

We determine the need for investments for the reconstruction of livestock premises, the reproduction of the animal population, and the specified production volumes to provide the population with livestock products through the use of the design of the cost of one place for keeping livestock. For fattening cattle, the cost of one place for keeping livestock is determined based on experimental data of the technical and technological solution of a family farm, adapted to EU requirements for fattening 25 young animals (Table 8).

The cost of one place for keeping pigs is determined based on the estimated data of the investment project for the creation of a mini farm in a personal peasant household (Table 9).

The cost of one place for keeping livestock in dairy cattle breeding on dairy complexes is determined according to the investment project of creating a farm with 560 Holstein cattle (Table 10).

Table 8. Investments in the creation of a family farm for 25 heads of young cattle for fattening*

Types of expenses	EUR
Construction of a farm	32683
Completing machines and technological equipment	20424
Costs for the purchase of livestock	3105
Costs for manure storage	2300
Total	58512

Source: The result of the authors' research and Postelga, Smolyar [17].

Table 9. Investment in the creation of a family pig farm for 60 heads for fattening 180 pigs per year

Types of expenses	Total, EUR thousand	The cost of one place for keeping one pig, EUR	%
A pigsty with a feedlot	11.7	195.0	61.1
Technical means and equipment	3.5	57.0	18.3
Costs for the purchase of pigs	2.2	36.8	11.5
Costs for manure storage	1.7	29.4	9.1
Total	19.1	318.3	100

Source: The result of the authors' research and Lupenko, Kysil et al., [18].

Table 10. Investments in the creation of a farm with a herd of 560 Holstein cows

Types of expenses	Total, EUR thousand	The cost of one place for keeping one cow, EUR	%
Construction	499.1	891.5	21.7
Purchase of cows	821.1	1466.5	35.7
Equipment	487.6	870.3	21.2
Biogas plant	492.2	878.6	21.4
Total	2300.0	4106.9	100

Source: The result of the authors' research and Rossokha, Petrychenk [19].

The cost of one place for keeping livestock when creating a family dairy farm for 10 cows is determined by experimental data of milk processing enterprises interested in the development of the raw material base to ensure their production capacity (Table 11).

To reproduce the parts of the dairy and meat cattle breeding and pig breeding industries destroyed by the war, which includes production and infrastructure facilities, means and production technologies to ensure the consumption of livestock products by the existing population of Ukraine to the level of the pre-war period, calculations of the need for livestock were carried out (Table 12).

According to our calculations, for the production that will ensure the actual consumption of livestock products (beef, pork, milk) by the existing population

to the level of the pre-war period, it is necessary to invest in:
- Beef production - EUR 480 million to create 8,200 farms for fattening 25 heads of cattle;
- Pork production - EUR 136 million to create 2,400 farms for fattening 180 pigs per year up to a weight of 120 kg;
- Milk production - EUR 357 million to create 155 dairy complexes for 560 heads with productivity of cows of 7,000 kg/year, or EUR 272 million to create 8,700 dairy family farms for 10 cows with productivity of 7,000 kg/year.

The total investments in the reproduction of the share of animal husbandry industries destroyed by military actions are from EUR 890 to 970 million. However, the following factors influence the reproduction of livestock industries and the subsequent formation of

Table 11. Investments in the construction of a family dairy farm for 10 cows

Types of expenses	Total, EUR thousand	The cost of one place for keeping one cow, EUR	%
Building	8970	897	28.7
Ventilation	4600	460	14.7
Lighting	1150	115	3.7
Drinker	3220	322	10.3
Milking machine	920	92	2.9
Comfort	2300	230	7.4
Manure storage	920	92	2.9
Tribal heifers	9200	920	29.4
Total	31280	3128	100

Source: The result of the authors' research and Rossokha, Petrychenko [19].

Table 12. Recovery volumes of production of livestock products in commodity and monetary form

Product type	The volume of unreceived products, thousand tons	%	Productivity, live weight, kg	The coefficient of conversion of animals into slaughter weight	Productivity, slaughter weight, kg	Livestock, thousand heads	The cost of one place for keeping of livestock, EUR	Total, EUR million
Beef	36,3	14,6	300	0,59	177	205	2341	480
Pork	37,6	5,8	120	0,73	88	428	318	136
Milk	607,0	8,5	–	–	7000	87	4107*	357
							3128**	272

Legend: * on dairy complexes; ** in farms.
Source: The result of the authors' research.

domestic consumption of livestock products:
- The duration of military operations on the territory of Ukraine and the existing level of risks of damage to livestock infrastructure;
- Setting up production and logistics to ensure the capacities of processing enterprises with raw materials, the amount of meat and dairy products, export-import operations;
- Realization of the potential of meat and dairy enterprises and farms in accordance with the current military situation;
- Provision of state support to the livestock sector of agrarian enterprises and farms;
- Formation of demand for the products of livestock industries;
- The level of activity of population migration in the country.

4. Conclusions

- As a result of Russia`s aggressive actions on the territory of Ukraine, 356,300 cattle were killed, including 212,500 cows and 669,800 pigs. The production of beef decreased by 19.7%, pork by 10.2%, and milk by 12.3%. The industries of meat and dairy cattle breeding and pig breeding suffered losses in terms of gross production of UAH 9.1 billion, and the actual losses amount to UAH 19.1 billion, or EUR 477.5.million.
- The war revealed the negative consequences of the agro-holding model of Ukrainian agriculture, extremely complicated the functioning of large-scale production due to environmental disasters on livestock complexes, the breakdown of logistics chains, and the blocking of product sales markets.
- Under the conditions of military action, the priority task of the agricultural sector has become the reliable provision of agricultural products and food to the population. At present, local food markets are largely provided by the products of farm and personal farming, which in conditions of cataclysms have proved the stability of their existence and development, and have shown advantages over large commodity production.
- To reach the volume of consumption of livestock products by the population, which decreased by 6.9 million people, to the level of the pre-war period, it is necessary to additionally produce 36.3 thousand tons of beef, 37.6 thousand tons of pork, and 607 thousand tons of milk. To reproduce the production of such a volume of meat and dairy products, it is necessary to invest UAH 26.3–28.8 billion in animal husbandry of the agricultural sector of the economy, which is EUR 890-970 million, including in meat cattle industry – USD 480 million, dairy farming – EUR 272–356 million, pig farming – EUR 37.5 million.
- Further development of the livestock industry will depend on the manifestation of the following factors:
a) Missile attacks by the Russian occupiers of Ukrainian territory, especially energy supply systems, and the ability of the armed forces of Ukraine to "close the sky";
b) State of production capacities of processing and food industry enterprises;
c) Demining the territory, restoring the logistics of commodity flows and export-import operations;
d) Provision of state support for the reproduction of destroyed and damaged productions of livestock products;
e) The purchasing power of the population of Ukraine for products of animal origin;
f) The level of migration activity of the population in the country.
g) The war in Ukraine caused the destruction of the established way of life of the population, internal and external markets for agricultural products and negatively affected the development of the agrarian economy. - However, the large-scale consequences of the war, which affected global shifts in the livestock industries of the agricultural sector, the depreciation of the national currency relative to the US dollar by 35.4%, the increase in food prices by 20-22%, and the decrease in the purchasing power of the population, can be understood and evaluated only in in the context of the entire set of changes in the national economy.

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