ECONOMIC AND LEGAL PRINCIPLES OF ECONOMIC GROWTH IN THE POST-CRISIS PERIOD

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- the lack of a clear scientifically grounded organizational and economic mechanism for the transfer of achievements of agricultural science and a significant lag in the industry in the process of mastering innovation.

3.3 Methodical approach to assessing the effectiveness of livestock production technologies

Food and economic security of the country is determined by the level of development of agricultural production, where cattle breeding occupies a special place in the share of total agricultural production. Increasing production and improving the quality of livestock products, despite the labor intensity of the industry, is a problem that is gaining increasing importance and relevance to meet the needs of the population for high-quality products of animal origin. The crisis situation in the agricultural economy has led to a decrease in the volume and efficiency of production of livestock products. The main reasons for the unsatisfactory provision of the population with dairy and meat products are: a sharp reduction in the number of cows, low livestock productivity, low concentration and mechanization of production, insufficient material incentives, price disparity for agricultural and industrial products; insufficient government support for agricultural producers.

Along with these reasons, it is important that in many regions of Ukraine there is no rational balance in the development of dairy and beef cattle breeding; imperfection of intraregional placement of livestock; economic disadvantages of reproductive and fattening farms. In addition, the high costs associated with the production of livestock products have led to a halt in their activities of enterprises, and most of the operating ones are still in crisis.

Livestock production in Ukraine in 2020 decreased in all categories, and especially significantly decreased the indicators of milk production in households – by 6.2%. Milk production last year amounted to 9.2 million tons, which is 0.4 million tons less than in 2019. Milk production in enterprises amounted to 2.7 million tons, which is 0.8% more than in 2019, and households produced 6.5 million tons, which is 6.2% less than the year before. Sales for slaughter of farm animals (live weight) amounted to 3.4 million tons or 98.9% to 2019. Meat production in enterprises was 2.2 million tons, a decrease of only 0.1%, while households produced only 1.1 million tons, which is 3% less than the year before. Milk production, unlike other livestock industries, provides producers with profits. In 2020, only milk production remained profitable in animal husbandry. Achieving 20.4% return on milk (0.6% less than in 2019) is not enough for expanded reproduction and attraction of investment resources. Milk production is technologically related to the cultivation of young meat, and this type of production traditionally remains unprofitable (-24, 2 in 2020). Therefore, in

general, the livestock industry is unprofitable for agricultural producers[1].

The level of profitability of milk production is negatively affected by the processes of rising prices for raw materials – feed, energy, veterinary, technical and technological. However, the increase in productivity of cows can offset the negative impact of increasing the cost of factors intensifying production[2].

It is possible to increase efficiency of cattle breeding thanks to resource saving which is reached at the expense of a complex of scientific and organizational, economic and technological actions directed on the most rational, economical use of all types of resources.

Ensuring the efficiency of resource-saving technologies in livestock through the proper implementation of organizational and economic mechanism for the use of innovative technologies in animal husbandry requires comprehensive development of the system of conditions and factors of agricultural production, which by their nature are very diverse and numerous, interconnected and interdependent. affect phenomena and processes and are themselves exposed as a result of socio-economic development and scientific and technological progress[3].

The introduction of resource-saving technologies in animal husbandry allows to reduce feed costs and at the same time increase animal productivity, reduce production costs, resulting in increased production efficiency with maximum accumulation of animal feed energy.

In this context, the study of the efficiency of livestock products on different technologies of milk production and milk productivity becomes especially relevant. Traditionally, the efficiency of production is characterized by cost indicators: the profit and the level of profitability. To objectively assess the efficiency of milk production, we propose to use the rate of return on energy. Energy efficiency of production is a category of technological relations, which are determined by the technical properties of means of production: power and productivity of energy, specific energy costs, features of animal husbandry technologies.

Thus, in conditions of economic instability and inflation, the economic efficiency of milk production should be calculated on the basis of energy assessment.

The idea of estimating energy costs can be realized if at the input all the components of the resources used to obtain the final volume of production were expressed in units of energy (MJ). Then the division of energy E (spent on production) by the obtained volume of production Q and is the energy consumption of the product, produced by this technology. Energy consumption of manufactured products is the energy accumulated in these products. Energy efficiency is expressed through the bioenergy coefficient η, which is quantitatively

[1] State Statistics Service of Ukraine. URL: http://www.ukrstat.gov.ua/

[2] Avercheva N.O. Economic analysis of milk profitability. *Agrosvit.* 2021/ №7-8. P. 109-120

[3] Boltyanska N.I. System of factors of effective application resource-saving technologies in dairy farming at the enterprise. *Scientific Bulletin of the Tavriya State Agrotechnological University*. 2016. V. 6, T. 3. P. 87-95.

equal to the ratio of energy consumption of final products to the specific consumption of total energy. To obtain 1 J of energy from livestock products, you need to spend several times more feed energy, namely: for milk and eggs – 4.5 J, pork – 5 J, poultry – 5.6 J, beef and lamb – 9 J feed energy. To determine the energy value of livestock products, it is necessary to sum up the energy value of all resources involved in production of this product[1]

The efficiency of livestock enterprises is determined by the level of growth of production and payback of resources. The main problem that needs to be addressed first is to halt the catastrophic decline in production and the number of cattle. It has been established that the reduction in the number of cows in Ukraine according to research by both economists and producers of livestock products is the reduction of livestock in most livestock enterprises, where the culling of livestock is constantly greater than their income, which can replenish at its own expense. reproduction or purchase. Experience in the operation of livestock enterprises, in which profitable production is carried out through the expanded reproduction of the introduction of the herd of first-born cows of their own breeding. In the conditions of small capacities of enterprises raising cows to renew the herd requires additional financial and material costs, which in most cases leads to unprofitable activities, in addition, the purchase of cows from other enterprises is complicated by the lack of necessary funds. According to the experience of other countries with developed cattle breeding, specialized enterprises for the directed cultivation of livestock for the reproduction of herds have been established in Ukraine. These enterprises had high economic results in terms of labor productivity, profits, profitability and animal productivity and quality of products supplied to livestock farms for the reproduction of herds, which led to a constant increase in livestock. Due to the economic justification of the revival of specialized enterprises for the purposeful breeding of first-born cows, which are a source of increasing livestock in livestock enterprises, the need to resume the activities of cooperative enterprises has been proven.

Note that one of the areas of livestock development is the use of improved thermal neutrality for livestock in the production of products that meet the biological properties of livestock, which provides a balanced level of energy nutrition and comfortable housing conditions, improving physiological condition and increasing livestock productivity. Important for increasing the level of livestock production are effective conditions of thermal neutrality of livestock, which are aimed at normalized conditions of animal nutrition through the use of cheap energy sources in the summer, which is one of the reserves to reduce costs for livestock production.

Thus, there is a need to systematize the factors influencing the efficiency of livestock production, where identifying theoretical and practical areas of energy efficiency of livestock enterprises, you can identify and systematize factors

[1] Berezyak I. Features of energy evaluation of dairy production. URL: http://base.dnsgb.com.ua/files/journal/Visnyk-Lvivskogo-Nats-agrar-univer/APK/2010_2/files/10bimcbp.pdf

influencing efficient production, identify areas for solving the problem of livestock enterprises, establish reserves to reduce material and monetary costs, etc. In addition, it is necessary to address the issue of rational use of feed energy in accordance with the productivity of livestock, in the direction of their efficient use as an energy resource that directly affects milk and beef production – this is one of the main energy saving factors of livestock production. The study of organizational, production and economic factors of livestock enterprises made it possible to determine a set of areas aimed at the development of livestock enterprises on the basis of energy savings

The level of economic efficiency of livestock breeding is formed under the influence of natural and cost factors, but we propose to use a profitable and energy-saving coefficient for an objective assessment of production efficiency, the calculation of which includes: profit, marketability of milk (or the percentage of preservation of live weight of young animals during transportation), energy value of milk (beef), energy value of feed.

In contrast to value, the system of energy indicators allows you to determine costs regardless of changes in prices over time, differences in currency systems, inflation and price distortions, as well as to compare different products and consumer values. From the standpoint of the cost of products, resource consumption should be standardized, economical, as cheap as possible, which would provide the prerequisites for competitive products. Planned and proportional supply of fuel and energy resources in the conditions of constant increase of technical potential is the foundation of effective functioning of such important branch of agriculture as cattle breeding.

We evaluated 10 variants of milk production technologies for the capacity of 200, 400, 800 cows and milk productivity per year per cow: 2500, 3000, 3500, 4000, 4500, 5000, 5500, 6000, 6500, 7000, 7500, 8000 kg.

Hopes from one cow per year are listed in the energy value of milk (MJ), taking into account the fat content of milk. When the fat content of milk is 3.8% – the energy value of 1 kg of milk is equal to 3.07 MJ (3.4). If the milk fat content is different, the proportionality coefficient in MJ is taken into account for each percentage change of milk (0.4), then E_{cm} 1 kg of milk is calculated by the equation $y = 3.07 + 0.4 (x – 3.8)$. The energy value of feed units spent on milk production from one cow is converted into metabolic energy, where one feed unit is 10 MJ.

The calculated profit-energy-saving coefficient (PESC) of milk production technology showed that for enterprises per 200 cows with milkings of 2500 kg of milk per cow per year in seven variants, it was below zero (from -0.1 to -0.71) and on average – minus 0,22 points (Table 1).

Table 1 shows that an increase in milk yield to 3,000 kg of milk per cow per year did not significantly change the level of PESC (average 0.02 points) in 50% of variants with a negative rate. Only at the level of 4000 kg of milk per year in three variants PESC was more than one, and at milking 5500 kg – in three variants PESC increased to 3 points. In total, in seven variants at different levels of milk yield (6500-8000 kg) PESC reached 3 points and in one variant at 8000 kg of

milk – 4.43 points. The obtained results of PESC technology evaluation showed that in most variants it is inexpedient to conduct the livestock industry in modern conditions at a capacity of 200 cows with milk yields below 4000 kg in variants 2 and 10; 4500 kg – 6 and 8; 5000 kg – 9; 5500 kg – 3 and 7; 6000 kg – 1 and 4; 7000 kg – 5 option.

Table 1 – Profit and energy saving coefficient of milk production technology of enterprises per 200 cows (points)

Hope milk, quintal	Technology options										Average indicator
	1	2	3	4	5	6	7	8	9	10	
25	-0,5	0,1	-0,4	-0,5	-0,7	0,1	-0,2	-0,1	-0,2	0,2	-0,2
30	-0,2	0,5	-0,1	-0,3	-0,7	0,4	-0,1	0,2	0,2	0,5	0,02
35	0,3	0,9	0,5	0,2	-0,5	0,5	0,3	0,5	0,3	0,8	0,4
40	0,4	1,1	0,6	0,4	-0,3	1,9	0,3	0,8	0,5	1,1	0,7
45	0,7	1,3	0,8	0,6	-0,2	1,3	0,5	1,3	0,9	1,6	0,9
50	0,8	1,6	0,9	0,8	0,1	1,7	0,5	1,8	1,2	2,0	1,2
55	0,9	1,8	1,1	0,9	0,3	2,1	1,2	2,0	1,5	2,4	1,4
60	1,2	2,1	1,4	1,2	0,4	2,3	1,4	2,3	1,8	2,8	1,7
65	1,4	2,4	1,8	1,8	0,7	2,6	1,9	2,7	2,1	3,1	2,1
70	1,6	2,9	2,1	2,1	1,0	3,1	2,3	3,1	2,5	3,5	2,4
75	2,0	3,2	2,7	2,6	1,4	3,4	2,5	3,4	2,8	4,0	2,8
80	2,3	3,7	3,2	3,1	1,6	3,8	2,9	3,9	3,1	4,4	3,2
Average indicator	0,9	1,8	1,2	1,1	0,3	1,9	1,1	1,8	1,4	2,2	1,4

Source: own research

In most of the reformed agricultural enterprises, the capacity of farms and complexes has been reduced to 100-200 cows, which affects the low level not only in terms of cow productivity, but also in terms of economic indicators. The conducted researches give reasons to conclude that milk production can be profitable under condition of rational use of resources and at milking of milk from a cow not less than 3500 kg a year.

The increase in the capacity of milk production enterprises to 400 cows showed that in six variants of PESC technology more than 1 point was achieved at the level of 3500 kg of milk, and in eight variants at milkings of 4500-5000 kg the coefficient is more than 2 points. At milkings of 6000-6500 kg the coefficient is more than 3 points, and more than 4 points at milkings of 7000-8000 kg of milk (table 2).

Thus, milk production enterprises with a capacity of 400 cows are more efficient and, according to PESC, have a significant advantage over enterprises with a capacity of 200 cows. Among the technology options, 4 options can be preferred, where PESC averages 2.7 points (keeping cows loose boxing, milking cows at the plant "Yalinka", distribution of feed – belt conveyor, removal of manure through the slotted floor in the floor manure storage). Virtually on the same level 4 and 10 option, in which the maintenance of cows loose loose combi-boxing, milking: in "Molokoprovod", feed distribution – KUT-10, manure

removal – conveyor US-15. Option 5 has the lowest score for PEOK, in which the keeping of cows is loose on a deep litter, milking on the "Tandem" installation, distribution of feed – KTU-10, removal of manure by bulldozer.

Table 2 – Profit and energy saving coefficient of milk production technology of enterprises per 400 cows (points)

Hope milk, quintal	Technology options										Average indicator
	1	2	3	4	5	6	7	8	9	10	
25	0,2	0,4	0,2	0,3	0,2	0,4	0,2	0,3	0,3	0,4	0,3
30	0,7	0,9	0,5	0,7	0,4	0,7	0,4	0,6	0,6	0,7	0,6
35	1,2	1,1	1,1	1,3	0,5	1,0	0,8	1,2	0,9	1,1	1,0
40	1,5	1,5	1,4	1,6	1,1	1,3	1,0	1,4	1,4	1,5	1,3
45	1,9	1,9	1,7	2,0	1,3	1,8	1,2	1,9	1,8	2,0	1,8
50	2,2	2,2	2,1	2,2	1,8	2,4	1,7	2,4	2,4	2,4	2,2
55	2,4	2,5	2,4	2,6	2,1	2,8	2,1	2,7	2,8	2,9	2,5
60	2,8	2,9	2,9	3,0	2,4	3,1	2,4	3,1	3,2	3,2	2,9
65	3,2	3,3	3,4	3,7	2,8	3,6	3,1	3,5	3,6	3,6	3,4
70	3,6	3,9	3,6	4,2	3,3	4,2	3,4	3,9	4,1	4,1	3,8
75	4,2	4,4	4,3	4,8	3,8	4,6	3,8	4,4	4,6	4,6	4,3
80	4,7	5,0	5,0	5,5	4,2	5,1	5,2	5,0	5,2	5,1	5,0
Average indicator	2,4	2,5	2,4	2,7	2,0	2,6	2,1	2,5	2,6	2,6	2,4

Source: own research

Other variants of milk production technology can be used provided that the genetic level of productivity and the creation of feeding conditions at the level of milk yield of 5000 kg per cow per year. The search to increase the efficiency of milk production conducted at enterprises with a population of 800 cows showed that PESC in all variants of technology at the level of 1 point are at milk yields of 3000-3500 kg. That is, the level of PESC is much higher than at the capacity of enterprises for 200 and 400 cows. For example, the average score for milking 3,500 kg at enterprises with a capacity of 400 cows was 1.0 points, and for 800 cows – 1.7 points, or 70 % more. The average score at milking of 5000 kg (400 cows) – 2.2 points, and for 800 cows – 2.5 points (Table 2). Among the variants of technologies, the average PESC is the highest 3.7 points in the eighth variant when keeping cows in combi boxes in a monoblock building, milking in "Molokoprovod", distribution of feed by a belt conveyor, manure removal – by a conveyor US-15. In enterprises with a population of 400 cows, option 4 was the best, and for 800 cows, on the contrary, PESC was rated the highest score. This is due to the fact that the increase in the number of 400 cows requires significant costs for the equipment of underground manure storage, slotted floor, etc., but not the return on additional costs.

Practically on the same level with the 4th variant, there is the 5th variant (2.2 points) when keeping cows loose on a deep litter, milking at the «Yalinka», distributing fodder – KTU-10, removing manure by a bulldozer. It is possible that the increase in the number of cows required additional costs to ensure their

comfortable keeping due to the significant amount of litter material and energy consumption when removing manure from the premises by bulldozer. The obtained results on determining the profit-energy saving coefficient of milk production technology at different power levels of 200, 400 and 800 cows and at 12 levels of milking cows per year from 2500 to 8000 kg, and 10 different technologies showed that due to metabolic processes in cows new approaches to assessing the effectiveness of milk production technologies are possible. It is proposed to take into account the energy value of feed, the energy value of the accumulated energy in the body of animals and the profits from the use of energy-saving technological solutions

Table 3 – Profit and energy saving coefficient of milk production technology of enterprises per 800 cows (points)

Hope milk, quintal	Technology options										Average indicator
	1	2	3	4	5	6	7	8	9	10	
25	0,4	0,2	0,3	0,2	0,2	0,5	0,5	0,6	0,5	1,0	0,4
30	0,8	0,6	0,5	0,6	0,6	1,2	0,9	1,0	0,9	1,2	0,8
35	1,4	1,3	1,6	1,3	1,1	1,9	1,8	2,3	1,9	2,0	1,7
40	1,6	1,6	1,7	1,6	1,4	2,2	2,1	2,6	2,2	2,4	1,9
45	1,9	2,1	2,0	1,6	1,7	2,5	2,5	3,0	2,5	2,8	2,3
50	2,2	2,1	2,2	1,8	1,9	2,9	2,8	3,4	3,0	3,2	2,5
55	2,4	2,3	2,6	2,0	2,2	3,2	3,1	3,8	3,3	3,7	2,9
60	2,9	2,6	3,2	2,2	2,5	3,6	3,5	4,3	3,9	4,2	3,3
65	3,4	2,9	3,6	2,6	2,8	4,0	3,8	4,9	4,2	4,7	3,7
70	3,8	3,3	4,0	3,12	3,2	4,5	4,2	5,4	4,7	5,5	4,2
75	4,5	3,8	5,3	3,46	3,8	5,2	4,6	6,0	5,4	6,1	4,8
80	5,9	4,5	6,4	4,21	4,8	6,1	5,2	6,9	6,1	6,8	5,7
Average indicator	2,6	2,3	2,8	2,1	2,18	3,1	2,9	3,7	3,2	3,6	2,9

Source: own research

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The fact is that the assessment of the biological characteristics of cows by metabolic processes allows to predict the feasibility of the dairy industry. In every building, room, there are animals and without taking into account their biological capabilities, the objectivity of economic calculations will be very close. Then intensive technologies do not always give positive results. We propose to assess the level of efficiency of technologies according to the profit-energy-saving coefficient of milk production on the basis of the developed scale, which defines five levels of efficiency of milk production technology: unacceptable, conditionally permissible, permissible, high, highest (Table 4).

The use of the proposed scale for assessing the level of efficiency of technology for PESC milk production showed that at a capacity of 200 cows at the level of efficiency it is advisable to provide conditions for housing cows at the appropriate level of genetic traits and conditions of their content and feeding (table. 5).

For enterprises with a capacity of 400 and 800 cows, the permissible level (P) of cow productivity is achieved with milk yields of 4500-5500 kg and 3500-

5500 kg, respectively. Given these circumstances, small farms cannot operate at a capacity of 800 cows. In addition, the main point of the agricultural enterprise is that the activity is not limited to the production of only one type of product. Thus, specialized enterprises for the production of livestock products have more favorable opportunities for the organization of production of medium and large capacity, the use of energy-saving equipment and facilities, the introduction of new energy-saving technologies, breeding work.

Table 4 – Scale of the level of efficiency of the technology according to the profit-energy-saving coefficient of milk production

The level of efficiency of technology	Symbol	Profit-energy-saving coefficient
Unacceptable	Un	to 1
Conditionally permissible	CP	1,01 – 2,00
Permissible	P	2,01 – 3,00
High	H	3,01 – 4,00
Highest	Hst	more than 4,01

Source: own research

Table 5 – The level of efficiency of the technology on the minimum milking of cows, the capacity of the enterprise and the energy saving coefficient of milk production

Enterprise capacity, number of cows	The level of efficiency of technology	Options									
		1	2	3	4	5	6	7	8	9	10
		Minimum milk yields per cow per year, quintals									
200	Un	55	35	50	55	65	40	50	40	45	35
	CP	60	40	55	60	70	45	55	45	50	40
	P	75	60	70	70	-	55	70	55	65	55
	H	-	75	80	80	-	70	-	70	80	65
	Hst	-	-	-	-	-	-	-	-	-	80
400	Un	30	30	30	30	35	35	35	30	35	30
	CP	35	35	35	35	40	40	40	35	40	35
	P	50	50	50	45	55	50	55	50	50	50
	H	65	65	65	60	70	60	65	60	60	60
	Hst	75	75	75	70	80	70	80	75	70	70
800	Un	30	30	30	30	30	25	30	25	30	25
	CP	35	35	35	35	35	30	35	30	35	30
	P	50	45	45	55	55	40	40	35	40	35
	H	65	70	60	70	70	55	55	45	50	50
	Hst	75	80	70	80	80	65	70	60	65	60

Source: own research

The use of the energy saving ratio is based on taking into account the profit per cow, milk marketability, energy value of milk, energy value of feed (feed units spent on milk production in MJ) and allows to predict or assess the level of efficiency of milk production technologies. The developed scale of the level of technology efficiency by the coefficient of milk production in five levels provides an increase in the objective assessment of existing milk production technologies and their forecasting in the development of design documentation for new

construction, reconstruction and technical re-equipment of livestock buildings of existing enterprises. The proposed method of evaluating the efficiency of milk production technologies by coefficient PESC can be used to predict the level of efficiency of technologies for the production of livestock products.

Estimation of energy value of forages and reception of additional production at the expense of action of the law of hereditary action and establishment of energy value of growth of live weight, milk and preservation in the room of energy balance, open new directions of reduction of natural energy sources and use of unconventional energy sources.

The organization of efficient meat cattle breeding involves the rational use of resources, the introduction of scientific and technological progress, reducing production costs and sales, increasing its competitiveness, as well as the use of economic evaluation of production results in terms of energy efficiency of livestock growth in young cattle at beef production. Determining the level of efficiency of beef production in terms of energy efficiency of live weight gain will reveal the internal reserves of agricultural enterprises by increasing production and minimize the import of raw meat into Ukraine.

Production efficiency reflects the influence of a set of interrelated factors that shape its level and determine development trends. In this regard, to assess the economic efficiency of milk production using the appropriate criteria and a system of interrelated indicators that reflect the requirements of economic laws and characterize the impact of various factors. One of the main factors for efficient milk production is the formation of a highly productive herd, as the dairy herd is the main means in the production of raw milk and the results of production of economic entities depend on its productivity. The best manifestation of the genetic potential of dairy cows occurs in the process of full feeding and proper housing conditions, moreover, the combination of these processes is a prerequisite for improving the productivity of the dairy herd[1].

The economic efficiency of beef meat production can be characterized by a system of indicators, in particular: cost, wage rate, selling price, profit and profitability. there is a need to develop and substantiate criteria and indicators based on the energy value of products[2].

On the basis of factor analysis, a study of the dependence of the profitability of milk and beef production in the regions of the country on energy indicators was carried out and a model of energy-saving production was developed using a multifactorial regression equation $y_{x_1 x_2} = a + \sum_{i=1}^{k} b_i x_i$.

To obtain the inverse matrix, we will use the method of complete elimination of the Jordan-Gauss variables. The vector is calculated and the matrix is used to

[1] Rutkevych T.I. Economic efficiency of milk production. Efficient economy 2015. № 12. URL: http://www.economy.nayka.com.ua/?op=1&z=4658

[2] Gorlachuk M., Liahovets V. Postgraduate of the Department of Management Life and Environmental Sciences. *Agrosvit*. 2017. №8. P. 54-59

find the vector of estimates for the multivariate equation. Thus, the energy-saving milk production model is described by the equation

$Y_{x_1x_2} = -3{,}45 + 7{,}68x_1 + 0{,}85x_2$. On the basis of factor analysis, the degree of influence on the investigated effective indicator of each of the factors introduced into the model was estimated at a fixed and average level of other factors. So, with an increase in the profitable-energy-saving coefficient by 1 point, the profitability of the production of 1 quintal of milk increases by 7.68%, and with an increase in the energy value of 1 quintal of milk per unit, the profitability will increase by 0.85%. The negative value of b_0 is quite natural, therefore, that the effective sign (profitability of milk) takes on a zero value long before reaching zero values of the factors, which is impossible in production activities. By substituting the obtained coefficients of factorial characteristics into the presented model, we obtain the theoretical values of the profitability of milk production.

Similarly, calculations of the dependence of the profitability of beef production on the profit-energy saving coefficient and on the energy evaluation of beef, which is described by the multifactor regression equation $Y_{x_1x_2} = -43{,}45 + 10{,}48x_1 + 8{,}16x_2$. Leads to a variation in the profitability of beef in the amount of 0.7. The total influence of the factors included in the model on the change in profitability is determined by the coefficient of determination, the value of which according to calculations is 0.89. It is impossible to manage economic phenomena, to predict their development without studying the nature and features of communication. In determining the impact on the profitability of beef production of the energy assessment of beef and the profit-energy saving coefficient, a close relationship is established between them, but given that the greatest influence on the change in profitability has the profit-energy saving coefficient, so it is necessary to determine The relationship under consideration is mathematically described by a correlation equation. The parameters of the equation are found using the method of least squares deviations of the observed values in from the values calculated by the formula of the correlation equation: $f(a,b) = \sum_{i=1}^{n}\left[y_i - \left(a + bx_i\right)\right]^2 \to \min$.

From an economic point of view, this means that increasing the profit-energy saving ratio by 1 point will increase the profitability of 1 quintal of beef by 8.16%, and increase the energy value of beef by 1 GJ – to increase profitability by 10.48%. However, only on the basis of partial regression coefficients it is impossible to determine which factor has the greatest influence on the profitability of beef, as well as in the development of which there are significant reserves for its increase. The regression equations can also be used to predict the possible expected values of the resultant attribute. The projected value of the profitability of beef production is determined by substituting the expected value of the factor trait into the regression equation. In particular, if we substitute in the equation the profit-energy saving coefficient of 0.95 points, we obtain the expected level of profitability of

beef 0.1%; 1 point – 0.6%; 2 points – 10.9%; 3 points – 31.3%, etc. Thus, to assess the results of livestock production, its efficiency, efficiency of use of components of the production process, with which the profit is obtained, it is necessary to calculate the energy-saving ratio, which is based on the energy value of feed, products, sales revenues, use of energy-saving technologies -economic solutions, which allows you to predict the conduct of the livestock industry.

The calculations show that the new method of estimating the production of livestock products at a profit-energy saving ratio allows to assess the conditions of economic efficiency of agricultural enterprises taking into account the energy value of products, which opens reserves for maximum production with minimum energy costs and increases efficiency.

The need for profitable operation of livestock enterprises for the production of livestock products in market conditions has aroused interest in finding ways to improve the elements of organizational and economic mechanism to increase its efficiency through monoblock construction of livestock buildings and the use of multi-storey cowsheds. mechanization and automation of production processes, the use of low-cost progressive production, rational organization of labor. Livestock enterprise is a special bioenergy production facility, which acts as a consumer of energy (in the form of direct and indirect energy consumption) and as a producer of food and energy used as fuel, fertilizers, etc. Therefore, there is a need to find cheap energy, among which a worthy place should be given to bioenergy, including biogas – the most versatile fuel. It is established that increasing milk yields to 50 quintals of milk per year and gains in live weight of young cattle from birth to sale in the range of 0.9-1 kg per day can simultaneously increase livestock production and yield of organic animal substrates.

The priority direction of energy saving at livestock enterprises is: introduction of less expensive conditions for keeping highly productive animals; self-sufficiency in energy resources; strengthening the fodder base and resuming the activities of large specialized livestock enterprises. In addition, the introduction of energy saving measures in livestock enterprises will reduce the cost of livestock resources and at the same time increase their productivity, reduce production costs – increase the efficiency of the enterprise. Improving the economic efficiency of dairy and meat enterprises depends on the use of a highly productive herd of animals in creating optimal conditions for keeping and feeding. To fully realize the genetic potential, it is necessary to provide animals with full energy energy, which is impossible without creating the necessary feed base. The efficiency of livestock production is determined by energy efficiency, which increases animal productivity and increases gross milk and meat production. The transition to resource conservation and energy efficiency can indeed improve the economic level of livestock enterprises and bring production to a profitable level. Thus, energy efficiency is aimed at solving such problems – it is to increase livestock productivity to the level of break-even production, while reducing costs to a minimum.

The efficiency of livestock production is influenced by technological

conditions of production, or production factors (genetics and reproduction, feeding and feed production, maintenance and milking), which take into account the level of technology intensity and the possibility of its optimization. It is assumed that the high level of technology and at the same time capacity utilization are positively related to the financial performance of the enterprise. For example, disruption of livestock reproduction technology can lead to lower offspring, heifers, increased costs for rearing offspring, and disruption of animal feeding technology can lead to a high percentage of culling from the main herd, reduced young growth and low livestock retention. In the future, this situation will lead to increased costs in the production of livestock products, which will affect the financial results of the enterprise. The formation and development of an agricultural enterprise is largely influenced by social factors: low wages, weak social security of agricultural workers, working conditions, outpacing the growth of other sectors of the economy. As a result, there is an outflow of agricultural workers in search of the highest paid job.

Cost-effectiveness and energy efficiency in livestock enterprises are formed in difficult economic conditions, where contradictions have intensified over the operation of a large number of small-capacity livestock enterprises in the production of livestock products with annual increases in money and material costs, labor costs, feed and irrational use of resources. unit of output. One of the ways to improve the economic situation of small-capacity livestock enterprises is to use an energy-saving approach. At the present stage of running livestock enterprises and achieving economic efficiency of products form a system of organization and management of production. This determines the special importance of an integrated approach to solving the problem of effective organization of all agricultural production, including livestock enterprises. Energy-efficient production of livestock products can become a methodological and practical basis for economic transformations in livestock enterprises.

The development of the concept of efficient energy-saving production of livestock products, in our opinion, should be aimed at a comprehensive approach to solving problems: in-depth justification of energy efficiency in livestock; use of biological potential of animals; providing them with appropriate standardized conditions of detention depending on the capacity of enterprises; determining areas for reducing labor intensity in the production of livestock products; power supply and its rational use; improving the production management system; application of progressive methods to increase productivity and product quality. The efficiency of operation and development of livestock enterprises in market conditions is a complex and multifaceted process that depends on a system of internal and external factors. The concept of efficient energy-saving production of livestock products is based on approaches to identify predictable and unforeseen factors aimed at stabilizing livestock enterprises and increase milk and beef production, adaptation of livestock enterprises to economic conditions with maximum rational use of resource potential, primarily through internal reserves of the enterprise.

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