

Scientific and information support of animal husbandry - a tool to improve the efficiency of the industry in the republic of Kazakhstan

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Abstract. The purpose of considered research is to substantiate the need and determine the forecast of possible results of ensuring the availability of knowledge about modern technologies and results of scientific research in animal husbandry through scientific and informational support of agricultural products (based on training seminars). In the article the general state of animal husbandry in Kazakhstan is examined, the current problems of the industry development are identified, the relevance of animal husbandry's development to ensure food security in conditions of decrease in business activity is substantiated. As a possible direction for the development of the industry, the realization of program "Information support of the subjects of the agro-industrial complex on a gratuitous basis" is considered. The authors considered the measures for the realization of program "Information support of subjects of the agro-industrial complex on a gratuitous basis" in 2020 for achievement of research purpose. The costs of scientific and informational support of entrepreneurs represent the state's investments for these purposes. The authors summarized the forecast calculations of expected increase in cost of commercial livestock products using modern technological approaches to feeding, improving the structure of the herd, breeding, care and veterinary service, considered at special seminars for farmers. In the article the need for knowledge accessibility of modern technologies and scientific research on animal husbandry through scientific and practical seminars for agricultural producers is focused.

1 Introduction

Animal husbandry accounts for 40% of the gross output of world agriculture, where almost a billion people work in the world. Animal husbandry is one of the most dynamic industries of agriculture. Over the past decades, the industry has developed rapidly, and it is expected that demand for livestock products will continue to grow rapidly due to increase in population, increased prosperity and urbanization.

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Animal husbandry is one of the main directions in the agro-industrial sector of Kazakhstan, because it ensures the country's food security, employment and well-being of rural population. Animal husbandry provides the population of the republic with food, light industry – with raw materials. On average, up to 750 thousand tons of meat, more than 4,5 million tons of milk, about 2,5 million eggs, and 30 thousand tons of wool are produced annually in Kazakhstan. 43 percent of the country's population lives in rural areas, while the share of agriculture in the country's GDP is insignificant and amounts to 6.7 percent, which is evidence of low labor productivity and efficiency in comparison with other sectors of the economy and developed countries.

Animal husbandry has different levels of development in different countries of the world. In economically developed countries such as Europe, North America, Japan and in countries with economies in transition, Eastern Europe is a highly intensive, highly mechanized industry based on the same intensive and mechanized feed production. Animal husbandry in these countries is a highly commodity industry, closely related to the processing and marketing links of agro-industrial complexes. The main industries here are dairy farming, stable rearing of cattle for meat, pig breeding, highly mechanized poultry farming. In countries with large pastures, animal husbandry combines the features of extensive production (but well technically equipped), connected with other links of the agro-industrial complex. Cattle are raised here for meat, sheep are bred using pastures. This is typical, for example, for the South-West of the USA, Australia, New Zealand, South Africa, to a lesser extent for Ukraine, Russia and Kazakhstan, etc.

In developing countries, extensive animal husbandry has developed, using the possibilities of pastures and little connected with other branches of the agro-industrial complex. In these countries, meat and dairy farming is developed (at the same time, cattle are less productive than in Europe or the USA), pasture sheep breeding, in some places horse breeding, camel breeding, etc. The countries of Latin America (Brazil, Argentina, Mexico, Uruguay) and East Africa (Ethiopia) breed the most cattle for meat, while the countries of Southwest and South Asia (Iran, Turkey, India, Pakistan) breed sheep and goats.

In the United States, the presence of very large farms of so-called “meat factories” is characteristic, where many tens of thousands of bulls are fattened on them simultaneously. Pig farming is concentrated mainly in the corn belt. Pork, especially fatty, is in less demand in the USA than beef, so bacon fattening is developed. Poultry farming is highly developed, namely industrial fattening of meat chickens (broilers). Broiler production is the most industrialized branch of American agriculture, where the concentration of production and capital is especially high.

In Kazakhstan, animal husbandry is the most vulnerable part of agriculture, primarily due to the low efficiency of small farms, the absence of large cooperatives. The livestock industry of Kazakhstan in the last decade of the last century has undergone significant changes associated with structural shifts in the agricultural economy. The processes of privatization of agriculture during the formation of Kazakhstan led to the fact that livestock was distributed among a large number of small landowners and family farms. About 80% of animal husbandry products are produced in households today.

Weak organization of animal husbandry and processing is the reason for the low export potential of the industry's products. The dynamics of the number of farm animals and livestock production in Kazakhstan is shown in Figures 1 and 2. Charts are compiled according to the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan

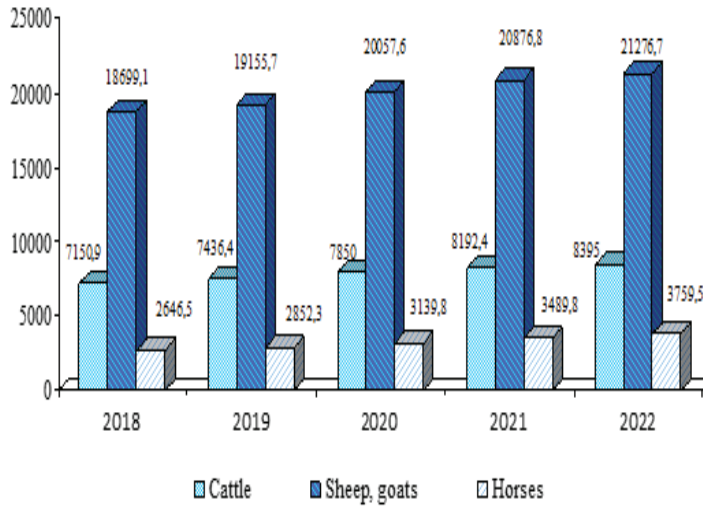


Fig. 1. Dynamics of the livestock of farm animals in Kazakhstan, thousand heads.

The relatively low competitiveness of livestock enterprises in comparison with producers of other countries is manifested in significantly less export activity and preferential orientation to the domestic market. Kazakhstan has resource opportunities to reverse the situation in the livestock market, both domestically and externally. The rise of the industry will have a multiplicative effect on development of processing sector of agro-industrial complex (AIC), and this means increasing the value chain of livestock products on the territory of Kazakhstan. The state understands that only highly developed agricultural production will serve as the basis for creation of new industries, in the food and light industry, and saving of food security in Kazakhstan.

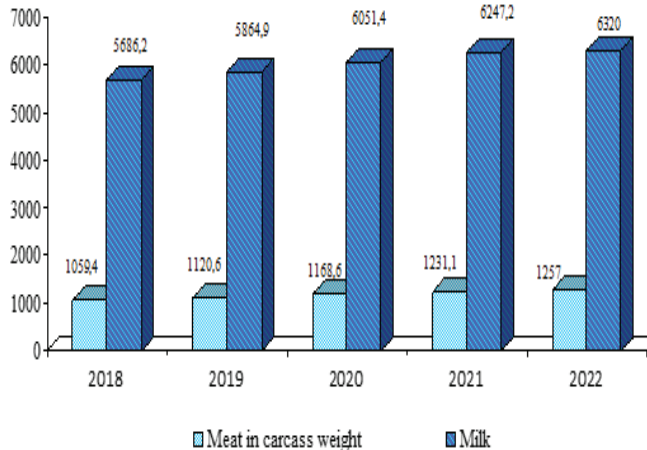


Fig. 2. Dynamics of meat and milk production in Kazakhstan, thousand tons.

Main problems of industry are: dependence on natural and climatic conditions; disparity in prices for agricultural products; weak technical, personnel and financial support; rapidly rising prices for production, technological and financial resources, use of outdated approaches in planning activity. The lack of sufficient financial resources and limited access to external sources of cheap and “long-term” financing negatively affect the logistics of production processes in cattle breeding. Scientific and informational support will provide

knowledge about advanced and effective technologies in animal husbandry, by conducting scientific and practical seminars, obtaining accessible consultations from leading scientists and industry specialists.

The object of research is scientific and informational support of professional activity of livestock breeders through realization of specialized state programs.

Realization of innovative projects in agriculture requires qualitatively new approaches and knowledge on animal husbandry's activity.

The relevance of the research topic is due to the fact that conditions have changed for conducting agricultural activity, namely:

- climatic, epidemiological, competitive challenges to national food security have intensified;

- product quality requirements have become more complicated;

- the need for use of resource-saving technologies and compliance with environmental requirements has increased;

- the priority of identifying internal production reserves of savings based on use of new technological approaches has been determined.

Currently, State programs for the development of animal husbandry are being realized in Kazakhstan, where significant funds have been allocated. The result of these programs should be increase in the fodder base, increase in the level of livestock, as well as the expansion of land for pastures and their equipment (including provision of seeds, equipment, improving the quality of specialists' work). In terms of animal husbandry, the projects are aimed at improving the technologies of organizing and conducting livestock activity for increase of industry's productivity, improvement of quality and increase the volume of products, with optimal costs. The state programs include: creating high-quality conditions for raising livestock, equipping farms and farms, commissioning proper pasture lands, expanding the feed base and creating various livestock complexes, improving livestock productivity. Main results of realization of these programs will be manifested in ensuring the competitiveness of the industry and food security of the country.

In the context of declining business activity, the agro-industrial complex (hereinafter AIC) of Kazakhstan, in particular animal husbandry, has become the object of special attention from the government, since even the UN has officially announced the threat of global food crisis [1].

There have been significant changes in animal husbandry, as well as in the entire economy of country, due to changes in property relations that occurred at the end of the last century. As a result of privatization, the livestock of farm animals was distributed mainly among peasant holdings and family farms. About 70% of products of the livestock industry in Kazakhstan are produced by small farms and personal farmsteads [2]. Small livestock enterprises have weak export potential, therefore they focus on domestic market for their products [3-5]. In domestic market, Kazakh agricultural producers don't always compete successfully with foreign producers. For example, Russian dairy products occupy leading position on the shelves of trading enterprises in Kazakhstan.

Nevertheless, the current situation can be radically changed in the direction of increasing the competitiveness of the country's livestock products not only in domestic market, but also in the external one. The rise of industry will have a multiplicative effect on development of processing sub-sectors of the agro-industrial complex, and this means increasing the value chain of livestock products in Kazakhstan. Highly developed agricultural production is the key to food security of our country and "locomotive" that pulls development of food and light industries.

Livestock development programs are aimed at bringing the industry to fundamentally new level of activity based on modern technologies for cultivation and exploitation of farm animals, taking into account stable breed characteristics [6-8]. In this regard, it is necessary

to make more accessible knowledge of modern technologies and scientific innovative developments in animal husbandry.

Information and empirical base of research is formed on basis of regulatory-legislative and program documents of the Government of the Republic of Kazakhstan, official data of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, analytical reviews, Internet resources, scientific research of Kazakhstani and foreign scientists. In the course of research, the author's own calculations were carried out.

Empirical research methods were used to collect and process practical material, such as: measurement, evaluation, statistical and economic analysis techniques, economic and mathematical modeling using computer programs. In research of main scientific issues considered in the article, general scientific and empirical methods of cognition were used: logical and systematic approaches, generalization, analysis and synthesis, juxtaposition, comparison. Thanks to combination of these methods, the systematic approach to implementation of research goal was provided.

2 Results and discussion

Among the programs for development of AIC, special place is occupied by budget Program for increase of availability of knowledge and scientific research, on free of charge basis [9,10]. The goal of program was to provide wide accessibility for producers of livestock products, information and knowledge about modern technologies for the cultivation and operation of farm animals. Including the presentation of best practices in the maintenance, feeding, breeding, herd formation, diagnosis of diseases in farm animals. In fact, by realization of this program, the state has declared the expediency of investing in improving the competitiveness of livestock products by ensuring the availability of scientific and practical information and professional advice to subjects producing and processing it.

Thematic seminars and consultations were held on the basis of applications from AIC subjects. These events popularized scientific developments for their practical application by farmers, taking into account the peculiarities and specialization of livestock enterprise.

Seminars and scientific consultations were held in a number of regions of Kazakhstan, namely: Zhambyl, Atyrau, Kyzylorda, North Kazakhstan, Mangystau, Turkestan, Almaty, East Kazakhstan, Kostanay, West Kazakhstan regions.

The seminars were conducted by experts who meet the qualification requirements and experience in the field of veterinary medicine and animal husbandry with academic degrees and titles, including invited foreign experts.

Data on the condition and maintenance of livestock were obtained from the management of farms and problems and questions arising in the course of their work were formulated. The experts proposed solutions based on the accumulated experience and long-term practice, as well as the possibility of their introduction into production and productive improvement of the economy.

During the seminars and consultations, animal breeders emphasized that the main problem of their activity is to provide animals with feed in right volumes and required quality. Scientists, specialists and animal breeders agreed on the need to introduce technologies for growing feed using hydroponics, providing livestock breeders with technology and equipment to create their own feed base. It was also noted that in the southern regions, cultivation of perennial grasses for livestock feed is relevant.

Low efficiency of the livestock industry, insufficient pace of its development in all regions, are connected with problems of organizing business processes in cattle and sheep breeding. Due to poor information availability, modern technological developments are little used to improve genetic potential and increase productivity of animals. The increase in profitability in breeding, in small commodity farms is depended on productivity of animals,

which in turn is determined by the level of breeding progress, artificial insemination, veterinary service.

The authors considered deviations of actual productivity of animals from their standard breed productivity indicators. The comparison was carried out according to the productivity indicators presented by scientific experts of Limited Liability Partnership “AK Kainur AGRO” in the context of breeds and regions. The most common animal breeds in a particular region were accepted for consideration. In all regions, it was noted that the normative productivity of animals, taking into account breed characteristics, isn’t actually achieved. The deviation is about ten percent. The deviation in animal productivity is associated with the problems of organizing business processes, such as: feeding, herd formation, veterinary care, breeding, product sales, etc. Disadvantages in organization of business processes in animal husbandry indicate professional gaps of livestock breeders, insufficient awareness of new technologies and approaches to solving zoo technical and veterinary tasks, lack of quality consultations.

According to authors’ calculations, the lost profit due to shortage of productivity types in the aggregate amounts to more than 10 percent in all considered directions of animal husbandry. So, there is a potential to increase commercial livestock production if losses are reduced by improving conditions of animal husbandry.

The improvement of animal husbandry largely depends on what knowledge, skills and competencies farmers have. There is definitely causal relationship between the professional knowledge of farmers and efficiency of animal husbandry.

Therefore, application of acquired knowledge and technologies at seminars and consultations held by scientific experts in 2020, farmers and livestock specialists in the practice of conducting their economic activity may have results expressed in the increase in marketable livestock products.

Unfortunately, there isn’t enough data in the official statistics on livestock production in Kazakhstan for a broad analysis, especially in terms of productivity. Based on information of experts and available data of information resources, forecasts were made about possible results of economic effect in animal husbandry of country. With the use of technological approaches to feeding, improving the structure of the herd, breeding, care and veterinary service, disclosed to farmers at special seminars, it is possible to get more than 10 percent increase in market value of sheep products in a year, and cattle and horse breeding products in three years.

The possible increase in marketable products was predicted taking into account inflation, expressed through increase in the price of products. For example, in the Almaty region, in three years the increase in marketable products in cattle breeding will amount to 34132 million tenge.

We will bring this future increase in commodity value to the current value, conditionally assuming the return on capital of 10 percent. Then the present value of the increase in the future commodity value of cattle breeding products in the Almaty region will be, according to forecast calculations, 25643 million tenge in three years, without taking into account the costs of purchasing fixed and working capital.

If we extrapolate this forecast for the whole of Kazakhstan, we can expect an increase in commercial cattle production in three years by 205599 million tenge, which in the current value will amount to 154470 million tenge.

The present value of the increase in future marketable products in four areas of animal husbandry in Kazakhstan, according to the authors’ calculations, may amount to: in three years: 180143 million tenge.

Such result can be achieved by making comprehensive investments in the equipment of circulating and fixed assets, technological renewal, zoo technical and veterinary service. Any investments will not be effective without special training and consulting of livestock

breeders, since all business processes of livestock activity must be implemented in accordance with modern requirements.

3 Conclusions

Based on conducted research, the following conclusions are made:

- livestock products of Kazakhstan aren't competitive in the foreign market, although the potential of industry is quite high;
- realization of innovative projects in animal husbandry requires the use of new effective science-based technologies for cultivation and operation of livestock;
- lost profit due to shortage of productivity types in the aggregate is more than 10 percent in all directions of considered animal husbandry, i.e. there is a potential to increase the marketable livestock products if losses are reduced by improving the conditions of maintenance.
- improving the productivity of animals depends on what knowledge, skills and competencies farmers have. Therefore, the application of knowledge and technologies obtained at scientific-practical seminars and consultations conducted by scientific experts for farmers and livestock specialists in practice of economic activity can have results expressed in a significant increase in commercial livestock products.

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