

**Publisher**<http://jssidoi.org/esc/home>**COMBINED FEED PRODUCTION IN KAZAKHSTAN'S AGRO-INDUSTRIAL SECTOR\*****Salima Mizanbekova<sup>1</sup>, Bakhyt Kalykova<sup>2</sup>, Gulzinat Ordabayeva<sup>3</sup>, Ilyas Mizanbekov<sup>4</sup>**<sup>1, 2, 4</sup>Kazakh National Research Agrarian University, Abay ave., 8, Almaty, Kazakhstan<sup>3</sup>Al-Farabi Kazakh National University, Al-Farabi ave., 71, Almaty, KazakhstanE-mails: <sup>1</sup>[salima-49@mail.ru](mailto:salima-49@mail.ru); <sup>2</sup>[kalykova\\_b\\_b@mail.ru](mailto:kalykova_b_b@mail.ru); <sup>3</sup>[gulzi200988@mail.ru](mailto:gulzi200988@mail.ru); <sup>4</sup>[miza88@mail.ru](mailto:miza88@mail.ru)

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**Abstract.** Feed mills are among the most socially important organizations of the agro-industrial complex. The combined feed they produce has high nutritional value and allows growing animals and poultry as efficiently as possible. Among the food and processing industry enterprises, special attention should be paid to the organizations of a single technological chain of the agro-industrial complex, including feed mills. Activities of those agricultural companies embrace not only the processing of agricultural raw materials (grain) and food industry waste but also the manufacturing of products that form the basis for fattening animals and poultry in the agricultural sector. It is necessary to equip enterprises with highly efficient equipment, use progressive technological processes, skillfully organize personnel work, and make qualified managerial decisions to produce competitive products and solve food security issues successfully. In addition, at the state level, the expansion of combined feed production is associated with the solution of import substitution of livestock products and the development of other related areas of the economy. Implementing innovative projects, including resource-saving tools, can help enterprise management fulfil its duties more successfully. Sustainable development of domestic livestock breeding and poultry farming depends on the state of the feed industry, which is determined by the availability of this industry's key resources, primarily raw materials. Knowing how much of the combined feed products is produced with raw material resources is essential. Despite the gradual increase in the output of combined feed over the past decades, there are still challenges associated with providing balanced dietary feed, including high consumption of combined feed per one ton of meat and dairy products. Besides, the organizational and economic relations of organizations comprising the agro-industrial industry must be improved.

**Keywords:** combined feed industry; livestock breeding; agricultural production; organizational and economic relations; market; quality; implementation; placement; growth; production

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**JEL Classifications:** Q01, Q13

## 1. Introduction

The studies of the state of the domestic compound feed organizations demonstrate that one of the strategic objectives of the industry is to transfer it to the trajectory of sustainable development by increasing the competitiveness of products through improving quality, increasing production efficiency, and introducing innovations. A comprehensive assessment and analysis of the trends in the development of production and

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economic processes are required to implement these strategic objectives in practice in conditions of limited financial capacity and insufficient state support. The goal is the complete use of the available resource potential both among individual subjects of the industry and in the context of the implementation of the development strategy of the agro-industrial complex as a whole in the long term (Kaliev & Moldashev, 2021).

The uneven placement of the compound feed industry and its inconsistency with raw material resources for grain production conditions significantly affect the inter-regional transportation costs of raw materials and compound feed. It is necessary to improve the placement of compound feed factories, considering future trends in the development of animal husbandry in the country.

Combined feed production is a metrically intensive process. It uses more than 50 types of raw materials and, on their basis, produces the same number of kinds of combined feed. It involves highly complex relations with suppliers and consumers.

Production links need to be more regulated due to the shortage of protein supplements. Feed mills gradually increase the share of grain components in the structure of feed (Mizanbekova, Tireuov & Aitmukhanbetova, 2022). Enterprises supplying protein and vitamin additives, feed enrichment concentrates, and urea concentrates to the enterprises producing combined feed in farms provide only 25-30% of the required volume. The production of protein and vitamin additives in the industry for the last 15 years stayed the same, and, in very recent years, it has sharply decreased, which is the reason for the insufficient supply of protein components to feed enterprises.

As a result, the farms' production capacity is only 400-500 thousand tons of combined feed per year. It is necessary to increase the production of combined feed based on raw materials remaining in farms, using protein and vitamin additives of the industrial output and local protein resources.

The organisation of production of combined feeds of the required assortment directly in farms, based on the existing structure of the herd, according to scientists' estimates, is economically feasible when farms are 50 km or more away from combined feed enterprises. Developing a compound feed industry in farms will provide not only rational use of grain forage for agricultural enterprises but also the production of compound feeds at a lower cost compared with compound feeds for enterprises in the compound feed industry.

## **2. Literature review**

The results of scientific achievements were accepted as an information-analytical and methodological basis in the analysis and assessment of the current state and trends in the development of the compound feed industry. Special attention in the studies was paid to production-technological and organizational-administrative processes of raw material base development (grain and leguminous crops), methods of solving scientific and production issues, formation of optimal market conditions, and activation of export supplies (Zakshevsky, Bogomolova & Vasilenko, 2020; Aduov et al., 2023; Pashkov et al., 2024; Taishykov et al., 2024).

The quantity of produced products, their quality, and their cost are the most critical factors that are detrimental to the feed industry development in Kazakhstan. The need to increase the production of feed and combined feed is related to the task of replacing imported livestock products.

Due to the number of obsolete machines and equipment used in the production of combined feed, feed milling enterprises, in most cases, are forced to import them. The imported machinery has high technological efficiency but is very expensive. In most cases, the prices of domestic technological machines and equipment for combined feed production are lower, but their quality needs to meet contemporary requirements. Increasing the scale of feed and compound feed production requires the resolution of import substitution difficulties and initiating growth in the economic sectors adjacent to this industry.

This is confirmed by studies of various associations of flour-milling, cereal, agricultural and other enterprises (corporations, clusters, etc.). As a rule, such integrated structures offer better quality at lower prices. The advantages of creating vertical complexes in other industries were discussed in the works of scientists (e.g., Petrikov, 2018; Mazzoni, 2020).

The effect is achieved by reducing transaction costs by supplying raw materials directly and eliminating the network of intermediaries. However, such decisions must consider the combined interests of the various parties involved in the feed and feed industry and the livestock industry through implementation through contractual, price, credit and administrative regulation.

The problems of improving the organizational and economic mechanism of sustainable development of enterprises for the production of combined feed in rural areas have a role in connection with the strategic importance of the combined feed industry in providing industrial, agricultural enterprises, and individual farms, with quality combined feed, a commodity in demand in world markets (Altuhov, Drokin & Zhuravlev, 2016; Kokenova et al., 2021; Croitoru et al., 2021; Mizanbekova, Bogomolova, & Dzhumabaeva, 2023).

Among the problems that need to be solved, it is necessary to highlight the imperfect structure of the feed industry, technical and technological backwardness of enterprises, insufficient innovation activity, the level of product quality standardization, underdevelopment of market infrastructure, inconsistency of management (both state and corporate sectors) to the tasks of adaptation of the feed industry to the processes of globalization (Gridneva et al., 2019). The efficiency of grain raw material utilization in processing is conditioned not only by protein additives but also by the very structure of the grain allocated for processing (Petrikov, 2018; Tokbergenova, Kiyassova & Kairova, 2018). Innovations will be a critical factor for the competitiveness of feed production and the whole agricultural sector (Montoya-Martínez, Parra-Cota & de los Santos-Villalobos, 2022; Stathatou et al., 2023; Sun et al., 2024; Hancz et al., 2024).

### **3. Research methodology**

In recent years, the state of the compound feed industry of the agro-industrial complex of Kazakhstan and new trends in its development have attracted the close attention of domestic economists. The domestic market of combined feed belongs to the agro-industrial complex's dynamically developing and promising sectors. More and more Kazakhstani enterprises working in the livestock industry realize the fact that the use of high-quality, balanced fodder affects the competitiveness of their products (Mizanbekova et al., 2017; Petrikov, 2018; Tireuov, Mizanbekova & Mizanbekov, 2020, Mizanbekova et al., 2021). The volume of fodder production, quality, and cost are the primary factors constraining the accelerated development of domestic livestock production. In addition, at the state level, the expansion of compound feed production is associated with the solution to the problem of the import substitution of livestock products and the development of other related areas of the economy.

Such interrelation of the combined feed industry with other spheres of agricultural production excludes the possibility of its one-sided study. Conducting a more detailed industry analysis as part of the organisational and economic relations system is necessary. Thus, as well as in several other spheres of economy, it is essential to consider the economic interests of subjects realized through contractual, price, credit and state regulation in these relations.

There are several economic problems in the fodder industry, the solution of which in the conditions of increasing economic opportunities in Kazakhstan, increasing state support of fodder producers, and a well-considered strategy of agricultural development based on intensification and technological renewal can lead to such growth of the fodder industry, which will allow to meet the internal needs of the agro-industrial complex and turn the country into the largest exporter of fodder and food.

It is necessary to align technical and organizational-technological factors with the institutional environment of the agro-industrial complex to achieve success and long-term and sustainable economic growth in the feed industry,

#### **4. Results and discussion**

The study's relevance is predetermined by scientific and practical interest in the structure of organisational and economic relations in producing and selling combined feed products as a single system. Existing in a particular economic space, the development of organizational and economic relations in the production and sale of combined feed leaves open a need to work out provisions in this area of agro-industrial output fully.

Organizational and economic relations should be considered fundamental in the study and analysis of the functioning of any economic system, including the agro-industrial complex because its essential content is always the links through which they are implemented.

As a rule, three main groups of production relations are distinguished: socio-economic, organizational-economic and technological. They characterize both the appropriation and the organization of agro-industrial production, hence the whole range inherent in the agro-industrial complex.

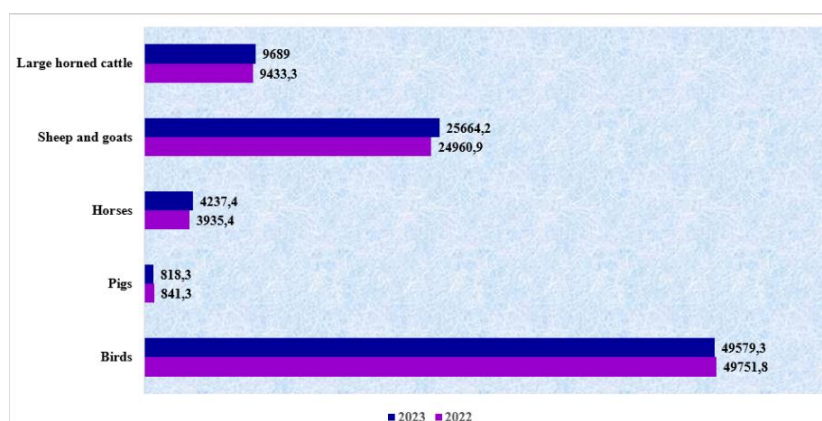
Organizational and economic relations are the central link in the overall system of production relations, as they are formed and function not within but at the junction of production relations and productive forces.

The organizational and economic relations are most susceptible to changes in the technical and economic base of agro-industrial production and the forms of its organization. They are susceptible to them and, in turn, directly affect the improvement of productive forces. These relations are formed as a complex system of interaction between diverse subjects of economic activity (individual producers, collectives, social groups, regions, states) about various kinds of productive resources, including the appropriation and subsequent organization of their production, exchange, distribution and consumption. In contrast, the mechanism of economic relations is a system of interconnected organizational and economic levers and incentives, which have a legal basis and are between each other.

Organizational and economic relations in the agro-industrial complex have several peculiarities. Firstly, they reflect and improve the interaction at all stages of the production process and thus contribute to the orientation of each branch involved to the final goals. Secondly, these ties mediate not only relations of exclusive economic order but also relations of production organization and management. Moreover, this aspect of economic inter-sectoral ties is increasingly intensified with the deepening of the division of labor, specialization and concentration.

At the basic level, specialization and concentration of production determine the development of an extensive and complex system between production units - agricultural, industrial, procurement, trade and others, interacting to achieve a high final result and constituting the organizational and production basis of the agro-industrial complex.

Number of livestock and poultry as of 1 August 2023, thousand heads (Figure 1).



**Figure 1.** Number of livestock and birds

Source: Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan  
<https://www.gov.kz/memleket/entities/stat?lang=en>

At the same time, enterprises that have economic independence and carry out their activities in the interaction process strive to achieve and realize internal interests. Consequently, the links between enterprises are designed to facilitate the implementation of the whole group of industrial-economic relations. Economic relations of economic entities in the agro-industrial complex, by the nature of their content, can be divided into relations of commodity producers with the state, relations between enterprises within the industry and relations between the spheres of the agro-industrial complex.

Improving inter-branch relations in the grain-product subcomplex is primarily associated with improving the gross grain harvest structure necessary to produce combined feed corn and legumes. The peculiarities of inter-branch relations of grain-product subcomplex are also determined by the fact that a significant part of production in the form of feed grain is directed to cattle and poultry directly or in the form of combined feed, i.e., inter-branch relations on the implementation of feed grain are closed within agricultural production.

However, fodder grain, which is a product of the grain-product subcomplex, can be partially replaced by fodder components coming from other subcomplexes: products of cultivation of perennial and annual grasses, wastes of fish, dairy, meat industry, etc., when producing combined feed.

Therefore, the need for feed grain and its efficiency depends on the feed industry's development level and its links with other sectors besides grain farming. An essential part of the relationship in agricultural production is the sale of feed grain to feed mills and combined feed to clients.

The conditions of these supplies are primarily determined by the size of feed mills, their location in the raw material base and consumers of combined feed. Combined feed enterprises and several others are among the most socially significant organizations of the agro-industrial complex. Their combined feed has a high nutritional value and maximizes efficiency in raising animals and poultry.

Among food and processing industry enterprises, special attention should be paid to the organizations of a single technological chain of the agro-industrial complex, including feed mills, whose activities are related not only to the processing of agricultural raw materials (grain) and food industry waste but also to the production of products that are the basis for fattening animals and poultry in agriculture.

To successfully solve food security problems and produce competitive products, it is necessary to equip enterprises with highly efficient equipment, use progressive technological processes, skillfully organize personnel work, and make qualified managerial decisions. The introduction of innovative projects, including the use of resource-saving tools, can help enterprise management to fulfil their duties more successfully.

The directions for improving the management of innovation projects at the sectoral enterprise are presented in Figure 2.

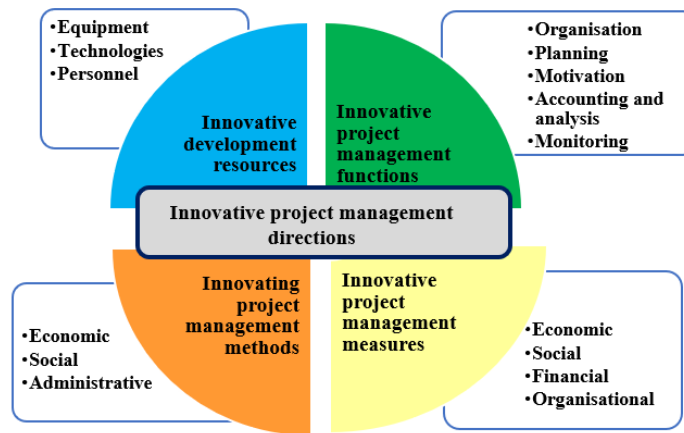


Figure 2. Directions for improving the management of innovation projects  
Source: the authors

In the compound feed industry, more than one-third of the capacity falls to the share of enterprises with a capacity of 300-600 tons per day. In the country, the enterprises of the combined feed industry prevail, the share of which in production has reached almost 88%. At the existing distribution of grain and livestock production, raw materials for combined feed production are delivered mainly by farms in Northern Kazakhstan, and the main part of consumers of fodder grain-combined feed plants are located in other zones of the republic. In this connection, significant volumes of intra-republican transportation of grain forage are inevitable.

Placement of the feed industry does not correspond to the number of livestock in different regions, which leads to irrational, product-increasing transportation of combined feed. Constant targeting of enterprises to search for the most efficient production options is the main advantage of the competitive market system. The enterprises produce what the consumer demands, applying perfect technology and available product enrichment agents—the market system of economic management functions without state regulation.

The feed industry in Kazakhstan is one of the most dynamically developing industries. In 2022, a growth of about 260% (compared to 2021) was noted for feed exports (Bureau of National Statistics). The combined feed market in Kazakhstan has good prospects for development - both domestically and internationally. The prospects of the feed industry in Kazakhstan are more comprehensive than those of the domestic market. Among the opportunities for industry development are supplies to China, Central Asian countries, Iran and Turkmenistan.

The tools for the development of these markets include substitution of raw material exports (wheat, barley, maize) in importing countries with ready combined feed by refunding subsidies for transport costs, obtaining permission from the Chinese state services for the import of combined feed, development of appropriate infrastructure (pelleting) and diversification of recipes.

There was a twofold growth in the dynamics of external supplies in January-February 2023, while the industry has a vast unrealized potential, primarily in domestic consumption. The total capacity of 66 feed mills operating in the country is 2.2 million tons of products per year. These sites produce full-fed balanced combined feed for all farm animals and birds. At the same time, the workload of the enterprises is only 41.6% (Bureau of National Statistics).

The uneven placement of the combined feed industry and their inconsistency in relation to raw material resources of grain production leads to significant inter-oblast transportations of raw materials and combined feed.

According to the updated Roadmap for the development of fodder production for 2023-2025, the country will have to achieve the following indicators: expand the sown area of fodder crops to 3.3 million hectares (3.1 million hectares sown in 2023); increase gross harvest of fodder crops to 5.1 million tons; increase the volume of combined feed production to 1.9 million tons in physical terms, in monetary terms - up to 140 billion tenge.

In 2023, two enterprises for producing ready-made animal feed were operated in Kazakhstan: in the Akmola and Zhambyl regions. The capacity of the facility in the Akmola region is 30 thousand tons per year, the amount of investment - is 1.3 billion tenge, and in the Zhambyl region - the capacity is 48 thousand tons per year, the cost is 4.5 billion tenge (Bureau of National Statistics).

In 2016, Hermes-4, together with foreign specialists, launched a feed mill in the city of Kostanai. The production facility is located in an industrial zone. It can fully supply the entire region and other regions of Kazakhstan, Uzbekistan and Turkey with combined feed.

Currently, the plant has reliable, productive equipment, elevators, drying facilities, research laboratories and warehouses for storing products. Resource tanks allow for storing of raw materials and finished products in large volumes and for a long time without quality reduction. The plant produces compound feeds of the highest quality for various animals, poultry and fish. The main products of the plant are combined feeds for feeding and fattening cattle, calves, pigs, horses, rabbits, broilers, chickens, fish, and bran and universal fodder mixtures. Combined feed production at the enterprise Hermes-4 is made in pellets and a placer, preserving all valuable substances in the mix. The laboratory researches popular recipes and produces compound feeds of its formulation. The assortment of feed mixtures is unlimited and depends on production needs and partners' needs.

In Kazakhstan, research has been conducted on quality animal feeds, and an innovative additive-product BioFeed for cattle feed has been developed, representing a phytobiotic feed mixture. The product is prepared to increase cattle productivity; it is a source of biologically active substances designed to stimulate the physiological processes of their digestion. Biologically active additives to feed are effective in increasing the immunity of animals; cattle eating this type of feed do not spend extra energy on digestion, and the productivity of the animal increases.

The extrusion method, a barothermal process that increases the feed's nutritional value and safety, is used to prepare feed. Extrusion is based on two processes - temperature and ultra-high pressure - which destroy harmful substances in the product and introduce the necessary feed vitamins with the utmost precision. If the extrusion method is not used, the efficiency of the feed is reduced by 50-55%, while the feeds in which the extrusion method was used are 95% efficient. The farms that will use this product can save twice as much feed. Phytobiotics are used in domestic products, and research and experiments are being carried out to replace feed antibiotics in recipes for productive animals since the use of phytobiotics in the formulation of fodder and feeds for productive animals is not a problem. Phytobiotics are plant extracts with antibacterial properties.

A food product intended initially for cattle is being developed for small and domestic animals.

It is necessary to improve the placement of feed mills, considering the perspective tendencies of the development of animal breeding in the republic, which needs deepening and specialization of feed mills.

Now, in the assortment of the produced products, combined feed for pigs (46%) and poultry (38.7%) prevails; more of it needs to be made for cattle (15%) and sheep (8%). This structure can be maintained if the needs of cattle breeding and sheep breeding are primarily met through the production of combined farm feed. However, the share of combined feed production shops located in the farms of the republic is only 0.4 per cent. As a result, about 5.0 million tons of concentrated fodder (50%) is fed to animals in crushed grain or unprocessed form (Bureau of National Statistics).

Processing of grain forage into complete combined feeds is restrained by the lack of non-grain part of resources (fats, grotes, meat-bone, fish meal, COM, CMCM, vitamin additives, dry yeast) and other components, the share of which now makes up to 20 % in the composition of combined feeds.

Production of combined feed is a material-intensive process; it uses more than 50 types of raw materials, produces as many kinds of combined feed on their basis, and involves highly complex industrial economic relations with suppliers and consumers.

The volume of allocated protein and vitamin additives, COC and urea concentrate to the shops producing combined feed in farms provides only 25-30% of demand. The production volume of protein-vitamin additives in the industry for the last 15 years has remained the same. It has sharply decreased in recent years, which is the reason for the insufficiency of combined feed enterprises with protein components.

As a result, the capacity of the workshops available in the farms can produce only 400-500 thousand tonnes of combined feed per year, which is 10-15% of their all-republican production. It is necessary to increase the production of combined feed based on raw materials remaining in farms, using protein and vitamin additives for industrial output and local protein resource development - both within the country and in the export direction. The total demand for finished feed in the Republic of Kazakhstan is about 4 million tonnes.

At the same time, in regions with sufficient raw material opportunities, the capacities of feed milling enterprises differ from the needs of livestock breeding. Thus, in the Kostanay region, at a specific weight of grain from the total volume of its production on republic 18,7 % and conditional livestock 9,4 %, the share of production capacities of combined feed plants from all-republican make only 5,8 %, in the Ural region - accordingly 6,1; 5,8 and 20 %, in Akmola region - 12; 6,9 and 3,3 %. (Bureau of National Statistics)

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The organisation of production of combined feeds of the required assortment directly in farms, based on the existing structure of the herd, according to scientists' estimates, is economically feasible when farms are located at a distance of 50 km or more from combined feed enterprises. Development of a compound feed industry in farms will provide not only rational use of grain forage of agricultural enterprises but also the production of



compound feeds of lower production cost in comparison with compound feeds of compound feed industry enterprises, as the estimation of grain in farms at costing of finished products is made at prices established based on the established production cost, which is much lower than the prices applied in industry.

The optimal solution is the creation of integrated formations that unite grain producers, feed mills, livestock complexes and poultry farms and establish direct links between grain producers and livestock producers based on contractual relations. This path, chosen by the country's poultry industry and individual pork complexes, allowed them to achieve a guaranteed supply of concentrated feed and reduce its purchase cost.

In recent years, dairy cattle breeding and poultry farming have been actively developing in Kazakhstan, so the demand for fodder will increase. A significant share of combined feed is consumed by poultry (53%), pork (39%), cattle and small ruminants (5% and 2%, respectively) (Bureau of National Statistics).

One of the main factors leading to low pig performance is their unbalanced nutrition. Such quantitative and qualitative indicators as the availability of energy, protein, amino acids (especially essential), vitamins and minerals characterize the completeness of combined feed and its optimality for each sex and age group of pigs.

Not only does the quality of the feed directly affect the productivity of pigs, but it also significantly impacts the composition of their waste and the environmental conditions for storing and utilizing it. For example, the limit of phosphorus in waste used for fertilizing agricultural land is 25 kg per 1 ha, and the concentration of phosphorus in waste depends on the composition of the feed. It can vary widely, including exceeding this figure. The application of ammonia also has its limitations - 135 kg of ammonia per hectare of agricultural land.

As a result, over-saturation of combined feed with phosphorus and deficiency of lysine and sulphur-containing amino acids of protein will significantly increase the phosphorus and ammonia content in the effluent. Consequently, using organic fertilizer with a significant imbalance of elements, especially its liquid fraction, may disturb the ecological balance in the soil.

Therefore, for Kazakhstan, the basis for the effective use of feed resources in the pig industry, along with the technology of their storage, preparation and distribution, is the improvement of nutritional standards of diets and their balance.

At the present stage of development of pig breeding in the country, when designing pig breeding enterprises, the advantage is given to complete combined feeds. It should be noted that granulated mixtures are more efficient in many respects than bulk mixtures. Until recently, a multi-component type of feeding was widely used: leguminous crops, backwash, cakes and meals, animal wastes, succulent fodder and potatoes. Because the latter kinds of forages require additional processing, this type of feeding is characterized by high resource intensity.

In the case of the proximity of a feed mill to the pig farm, the required stock of concentrated fodder can be reduced to 10 estimated days.

However, Kazakhstan's feed industry prospects are broader than the domestic market. Among the opportunities for industry development are supplies to China, Central Asian countries, Iran and Turkmenistan.

The tools for the development of these markets include substitution of raw material exports (wheat, barley, maize) in importing countries with ready combined feed by refunding subsidies for transport costs, obtaining permission from the Chinese state services for the import of combined feed, development of appropriate infrastructure (pelleting) and diversification of recipes.

Hungarian company UBM Group intends to build a feed mill in Kazakhstan. The enterprise's capacity will be at least 200 thousand tons of products; the country has great potential for launching production due to its strategic location, favorable conditions and availability of raw materials. The company can make a significant contribution to the development of production and management systems in the livestock sector in Kazakhstan.

UBM Group is the leading feed manufacturer in Hungary; the company is engaged in animal husbandry and trades in cereals. The company comprises 18 subsidiary organizations that export products to 15 countries.

Ukrainian cat and dog food manufacturer Kormotech will expand production in the Lithuanian city of Kėdainiai. The company will invest more than €60m in four production phases to be commissioned during 2025-2028. Kormotech launched its first overseas plant in Kėdainiai in 2020.

The company says the expansion will double its workforce in Lithuania, adding 200 new jobs over five years. Kormotech plans to launch its first new production line by 2025, adding a line each year until the four production lines are fully operational in 2028. As it expands, the company will be interested in finding qualified engineers, technologists and other highly specialized specialists in Ukraine and Lithuania. The company's management calls Lithuania its 'second home market'.

The successful experience of building and operating in Lithuania, favorable conditions in the free economic zone, support from InvestLithuania and a well-established network of partners and suppliers led to the decision to expand the company. The company employs around 1,300 people in five countries - Ukraine, Lithuania, Poland, Romania and the US. Kormotech is also expanding its production capacity. From 2022 to 2023, the company invested about \$14 million in modernizing dry feed production and expanding wet feed production by almost 70%.

There is a massive potential for combined feed within Kazakhstan. Many farmers in their farms try to produce their animal feed, and its use is much more favorable: costs are lower, the digestibility of animals is higher, and as a result, the cost of meat is lower. It is more profitable for farmers to sell grain at high grain prices and purchase combined feed for animals, which will lead to the development of a market of combined feed in Kazakhstan; agricultural producers will earn on both grain and meat (by reducing the cost of production)

For the industry to develop actively and systematically, the government must encourage farmers to use industrial compound feed for some time. It is necessary for buyers to feel the benefits and returns from combined feed to create this market. In this regard, processors propose subsidizing farmers' purchase of industrial combined feed for the first time.

Earlier, the passport 'Establishment of a feed mill' was added to the subsidy mechanism to reimburse part of the costs incurred by an agro-industrial complex entity for investment investments. The share of reimbursement for investment investments was 25 per cent.

Many industries produce feed meals from various ingredients in the United States and Canada. All raw materials are delivered to feed mills in a crushed form suitable for introduction into compound feed. Cereals are processed at specialized milling plants. Cakes, meals, cakes and other by-products of the food industry are processed into feed flour directly at the enterprises where they are obtained. Food processing plants have special workshops for processing by-products. All ingredients are ground into fine flour and delivered to feed mills in packaged or unpackaged form by specialized transport if the distance is at most 200 km.

Feed mills in the United States and Canada install a minimal number of hammer crushers only for occasional operations when unmilled raw materials, mainly corn, arrive for one reason or another. Mineral ingredients - salt, chalk, limestone - are processed where they are mined and delivered to feed mills in a crushed and dry state in special packaging that protects the ingredients from moisture migration from the air.

It should be noted that in the USA and Canada, the milling of cereal crops is often carried out by livestock farms, which produce feed flour in large quantities and use it to feed animals in a mixture with protein, vitamin and mineral supplements obtained from feed mills. Sometimes, farms have milling equipment and appropriate dosing and mixing facilities. Thus, feed mills in the USA and Canada need to be more engaged in grinding raw materials, a significant difference from feed mills in Western Europe. In Western European countries, a substantial portion of raw materials is milled at feed mills.

## Conclusions

Feed production in Kazakhstan has good development opportunities, and these opportunities are well represented both inside and outside the country. It is not rational to use grain in pure form for animal feeding. It is more important than passing processing on combined feed; raw material can be enriched and is more saturated for full use when considering dependence between different branches: production - processing - consumption. The final goal is to provide the population with livestock products.

The formation and production of technological and technical innovations for the feed and compound feed industry is becoming the most critical direction for developing enterprises. Another necessary step is acquiring modern models of the essential technological equipment of high productivity to meet the needs of the largest agro-industrial companies with an expanded range of products with existing capacities for the production of feed for livestock farming.

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