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## Formation and Development of the Processing Industry in the AIC of the Region

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**Abstract:**

*The theoretical grounding of the management system of animal feedingstuff milling of the region was performed. The facilities of animal feedingstuff milling are divided according to the degree of independence of business conducting and directions of sales of the products manufactured.*

*The factors of the internal and external environment of the animal feedingstuff milling of the region were considered. The analysis was performed and the tendencies in the development of animal feedingstuff milling of the region and the system of its management were revealed; the directions of the development of animal feedingstuff milling of the agrarian region were grounded.*

*The potential capacity of the regional market of animal feedingstuff for livestock breeding of the region was calculated. It was offered to form the body of economic management in the form of an independent legal entity bearing the responsibility for execution of the functions imposed on it to develop and implement the plan of development of animal feedingstuff milling – JSC Animal Feedingstuff Cluster of the Altai Territory.*

**Keywords:** *Management of animal feeding stuff milling, regional market of animal feedingstuff, animal feedingstuff cluster.*

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## 1. Introduction

Animal feedingstuff milling produces such main types of products as complete feeds and concentrates, protein and vitamin supplements (PVSs), feed mixes, premixes and microadditives, carbamide concentrate and PVS on the base of carbamide concentrate, milk replacer (regenerated milk) made according to the “dry” technology, steamed and rolled flakes (Great Britain, Italy) and “puffing” grain, liquid combined means – “liquid animal feedingstuff” (USA).

The intensive level of introduction of beef cattle breeding allows having 30-36% of production profitability. Especially high level of production profitability of beef is possible at the intensive growing and selling of heavy young stock (500 kg and more). Animal feedingstuff is the most important factor providing the production profitability of livestock breeding together with the breeding conditions. The planning of animal feedingstuff milling of the region acts as a type of the planned work of the management entity (economic management and the economic entities being the part of it) in the development of the directions of their development, selection of the most significant types of products and segments of consumers for regional livestock breeding inside the region, as well as outside, formation of the optimal combination of the used resources of crop growing and raw materials coming from the other branches of industry and formation of the development potential by means of consolidation of efforts of the industry members. Due to this, the problem of the development of animal feedingstuff milling and its management is rather urgent now. The objective of the research is to develop the theoretical and methodological provisions of improvement of animal feedingstuff milling of the region.

## 2. Materials and methods

Animal feedingstuff milling is characterized by the level of potential implementation, the location of the region regarding the foreign commodity markets and markets of agricultural raw materials and other factors of production that form the strong and weak points in its development. At the same time, the strong points in the perspective form the competitive advantages and the weak points are the sources of risk (Nazarov and Suslov, 2013; Lebedeva *et al.*, 2016; Yamova *et al.*, 2018). The animal feedingstuff milling of the region has some problems of development: economic entities are subjected to different bodies of economic management; there are no independent programs of support for animal feedingstuff milling, production facilities are loaded at 50% due to the low paying capacity of the manufacturers of agricultural commodities. Therefore, the problem of the development of animal feedingstuff milling is rather urgent now.

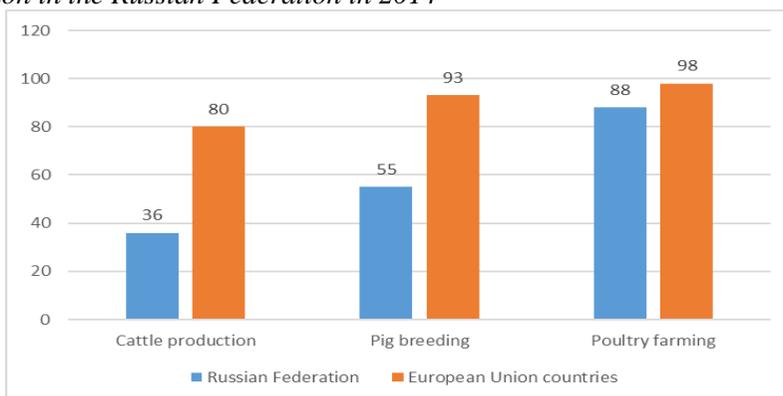
The theoretical and methodological base of the research was formed by the works of the classical authors and modern foreign and national scientists and economists of management of animal feedingstuff milling. For the execution of work, the

following methods of scientific research were used: monographic, economic and statistic, grouping methods, correlation and regression analysis (Plotnikov *et al.*, 2018a), abstract and logic, calculation and structural, comparative and analytical and other methods of research.

### 3. Results and discussion

Animal feedstuff is produced mainly in bulk (floury), granule or pellet forms. Their quality is determined by homogeneity (compositional uniformity), quality of the initial mix, content of vitamins, proteins, bone, and grass meal (Aleksandrov and Kosova, 2004; Denisov, 1970). In the European countries in 2014, the specific weight of complete feeds of the revealed groups varied from 80 to 98%. In Russia, it was about 36% for beef cattle, 55% for pig breeding, 88% for poultry breeding (Fig. 1) (Shkunkova and Postovalov, 1988).

**Figure 1.** Specific weight for complete feeds in the general structure of their production in the Russian Federation in 2014



Beef cattle breeding at the low level of productivity is certainly unprofitable. Its profitability is achieved at the crop percent of 80 calves per 100 cows and the average daily live weight gain of the young stock of min. 750 g. The change of even one indicator when maintaining the minimal level of the other leads to the change of the results of work of the branch. Thus, the increase in the crop percent from 80 to 95 calves per 100 average annual cows when maintaining the other indicators at the same level allows increasing the beef production by 8% and decreasing the prime cost of the products by 7%.

At the same time, the increase in the productivity of calves from 750 to 800 grams provides the growth of gross output by 10-13% and a decrease in costs for production of 1 centner of live weight gain of young stock by 10-12% (Ministry of Agriculture of the Russian Federation). Thus, the structure of livestock breeding and the level of its development are that basic external information that shall determine the internal structure of the sub-branch, connections between its elements –

economic entities, producing the animal feedingstuff from the various types of raw material, and as a result of the strategic management – the system of functioning allowing to reach the set strategic goal by the most efficient way (Grigoryeva, 2014, Gritsenko, 2013).

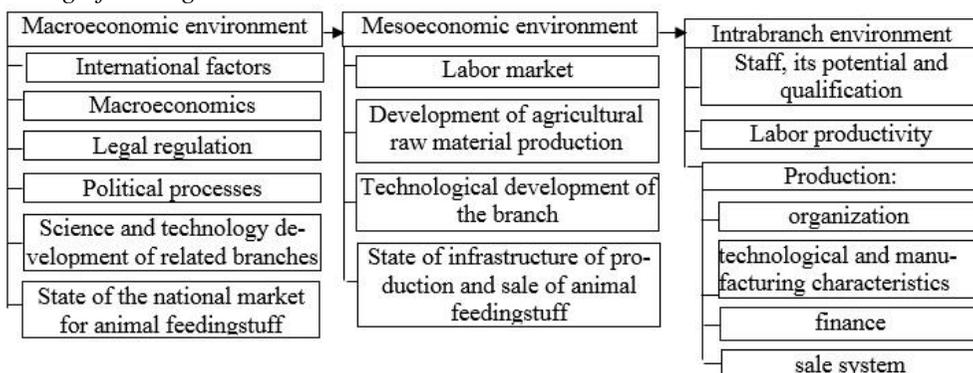
Now the management of animal feedingstuff milling of the most regions include implementation of such functions as strategic analysis, strategic planning, organization and regulation of implementation of the strategic solutions at two levels – branch regional level and level of economic entities (Voronkova *et al.*, 2018a; 2018b; Nagimov *et al.*, 2018; Polyakova *et al.*, 2018; Gamidullaeva, 2018).

According to the degree of independence in business conducting and directions of sales of the products manufactured, the authors divided the entities of animal feedingstuff milling into:

- large-scale grain mills, animal feedingstuff for them is an auxiliary type of production that is sold mainly outside the region;
- animal feedingstuff mills in the structure of agricultural enterprises of industrial type (poultry farms, pig farms, beef cattle breeding complexes of meat and milk directions), operating for satisfying the needs of its production and selling a part of products to the other entities of the branch;
- independent animal feedingstuff mills producing the second part of volume of animal feedingstuff or high tech specialized mills, working with a certain type of raw material (wheat, oat, barley, soy, etc.), or operating (most of them) the outdated technologies of grain processing, using a big share of forage, delivering the products mainly to the regional market;
- animal feedingstuff workshops at the enterprises processing various types of agricultural raw material (oil extracting plants, cheese plants, meat processing plants, the waste of which is bone left-over, skim milk, bones, etc.) delivering also the products mainly to the regional market.

On the one hand, the intra-industry inconsistency is typical for all these entities; it decreases the level of specialization. On the other hand, it is a decreasing range of produced animal feedingstuff; and the lack of interest of large-scale feedingstuff manufacturers to the agricultural micro-business of the region having the smaller effective demand than wholesale customers from other regions. The generalization of the results of studies of foreign authors (Kotler, 2006) translated into Russian and the works of national scientists (Parakhina *et al.*, 2009; Astashkina; Egorshin, 2009; Romanov, 2006; Strategic management, 2008) allowed systematizing the factors included into the generally accepted groups and adapting them to the animal feedingstuff branch of the region (Figure 2).

**Figure 2.** Factors of the external and internal environment of animal feeding stuff milling of the region



It is offered to refer the following factors to the factors that require analysis on the macroeconomic level in conformity to the animal feeding stuff milling:

- ✓ capabilities of the federal budget to support agroindustrial production, as the production without the state support cannot generate the growth of the volume of sales and, as a rule, it faces the sale problems;
- ✓ availability of the federal and regional state development programs of animal feedingstuff milling;
- ✓ inflation rates;
- ✓ credit terms for production;
- ✓ terms of tax and non-tax imposition of the entities of the large, medium and small business;
- ✓ the general level of economic development of the country, the stability of the economic situation.

The Altai Territory covers the area of 167,996 sq. km. About 2.4 mln people live in this territory; 44.3% of them are rural population. The total area of agricultural lands is 10,273.5 thousand hectares, including 6,567.4 thousand hectares of tilled fields and 3,428.9 thousand hectares of forage lands, which determines its agricultural direction. A share of agriculture of the territory in the gross regional product is from 18.5% to 20% depending upon the weather conditions. In the all-Russia volume of production of agricultural products, that is 3,790.8 bln rubles, a share of the Altai Territory was 121.3 bln rubles (3.2%) in 2014 (Official site of the Altai Territory).

Livestock breeding as the main consumer of the animal feedingstuff produced in the Altai Territory is a structure-forming and socially important branch of agriculture. In the industrial scale, it is represented by such subbranches as dairy and beef cattle breeding, pig breeding, poultry breeding, horse breeding, sheep breeding, velvet antler industry, beekeeping, fur-farming, fish-breeding. Besides, goat breeding, rabbit breeding, and beekeeping are developed in households (Table 1).

**Table 1.** Livestock of cattle and poultry (annual) in the households of all categories of the Altai Territory, thousand animals, indicator value per year

	2010	2011	2012	2013	2014
Cattle	900,2	902,5	874	839,76	833,28
including milk breeds	386,3	386,7	375,42	369,69	364,93
Pigs	567,6	569,6	613,4	616,9	605,47
Sheep and goats	213,9	215,6	225,94	233,13	245,76
Horses	72,2	70,5	68,4	66,95	65,46
Deer	24,8	24,1	23,92	24,06	24,63
Sheeps	196,7	197,9	207,93	214,39	225,7
Rabbits	75,7	86,8	96,2	92,6	91,6
Bird	10854,7	11202,2	10633,5	10786,1	10951,2
Adult bird - total	2162,2	2164,1	2266,39	2179,24	2272,74
Chickens and roosters	6620,7	7030,6	6576,63	6739,59	6993,87
Bees	164,9	185,6	181,1	184,8	188,4

The commercial beef farming is represented by the production of cattle meat, pork and poultry and mutton in smaller volumes. 336.3 thousand tons of meat in slaughter weight was supplied to the market in 2015. In recent years, the tendency was noticed to transfer to the small cattle breeding – sheep, goats, rabbits, and bees in private subsidiary farms (PSFs) (Fedorenko and Sadov, 2014). Cattle breeding is one of the most important subbranches of livestock breeding, which includes dairy and beef specialization. As of January 1, 2015, the cattle number of the Altai Territory was 834.8 thousand animals, including 369.7 thousand cows. In 2014, the territory took the 4<sup>th</sup> place in the rating of the regions of Russia of the cattle number (beef cattle). Beef cattle breeding of dairy breeds is of a great economic interest as it provides the stable (during a year) flow of financial funds and the main profit of the entire branch of livestock breeding.

Therefore, dairy cattle breeding is a leading subbranch of livestock breeding in the territory. 1,414.9 thousand tons of milk were produced during January-February 2014 in the households of all categories; milk yield per cow in agricultural organizations was 4222 kg. Among the regions of Russia, the Altai Territory is among the three leaders of milk production volumes (Savintsev, 2015). Egg laying poultry is widely developed in the region also. 10,867.6 mln eggs were produced in the territory during 12 months of 2014. Each of these subbranches uses its own type of animal feedingstuff to increase the profitability of its economic management. The abovesaid allowed adding the main elements of the management system relating to the animal feedingstuff production of the region by the following elements:

1. Tasks: the traditional tasks include the support in improvement of competitiveness of the animal feedingstuff branch in the markets, formation of conditions to increase the operating efficiency of economic entities when using the main factors of production and agricultural raw material, an increase in their investment attractiveness. The offered tasks include the consolidation of economic entities for

the formation of the united market space of the region, search for internal reserves based upon the competitive advantages of the territory, formation of conditions for self-development of the economic entities of the region, creation of the flexible system capable to adapt to the changes of the market situation (Akhmetshin, 2017a; Glebova *et al.* 2016; Gurieva *et al.* 2016).

2. Methods: the traditional methods include the direct financing of the development of certain types of animal feedingstuff depending upon the demand of livestock breeding of the region, stimulation of the investment activity of economic entities of the branch. The offered methods include the formation of favorable conditions for the development of small and medium business, engaged in animal feedingstuff milling, the development and implementation of the strategic development plans of animal feedingstuff production of the region, the formation of the specialized industrial and investment clusters, etc., (Akhmetshin *et al.*, 2017b; 2017c; Sycheva *et al.*, 2018a; Yemelyanov *et al.*, 2018).

3. Tools: the traditional tools include resource provision (labor, financial, territorial, organizational), software (departmental, grant programs, federal programs, regional programs, national programs) (Sycheva *et al.*, 2018b; Dmitrieva *et al.*, 2017; Sharafutdinov *et al.*, 2017; Ruslan Agarunovich, 2015; Akhmetshin *et al.*, 2018a). The offered tools include the institutional support (partnership of public and private sectors, development of cooperation connections inside the food industry and between the suppliers and consumers of animal feedingstuff). The prevailing types of animal feedingstuff in the territory are those produced at the large agricultural enterprises of the industrial type and in other sectors of animal feedingstuff milling for the public sector of agriculture (Table 2).

**Table 2.** Animal feeding stuff milling for the public sector of agriculture of the Altai Territory in physical terms, thousand tons

	2010	2011	2012	2013.	2014	2014 to 2010, %
Feed	499,8	530,9	496,8	519,7	540,14	108,1
Compound feed for birds	227,5	233,8	234,2	254,5	273,6	120,3
Feed for pigs	206,7	197,3	171,2	167,8	155,9	75,4
Compound feed for cattle	65,7	98,8	90,9	96,5	109,4	166,5

The volume of investments in fixed assets of the agricultural enterprises and enterprises of animal feedingstuff milling in 2014 exceeded by 2.9 times the level of 2010. Several plants of the territory – CJSC Aleiskzernoprodukt named after S. Starovoitov, JSC Melnik, CJSC Grana, JSC R&D Enterprise Soy Processing Plant Binaka possess the unique equipment for production of animal feedingstuff and modernize constantly the manufacturing process. But, in general, the use of production facilities in the animal feedingstuff milling of the territory is provided at 46.2% on the average (Savintsev and Gritsenko, 2015). The economic entities of animal feedingstuff milling demonstrate a positive financial result: the profitability level of the products and services sold by it exceeded 8.5% and for 10 years it grew

by 4.8%, debts receivable exceed 150% and they increased by 93.5%, accounts payable exceed 94%, they increased by 52.5%. Analyzing the external environment, the main attention was paid to the intraregional market of animal feedingstuff where livestock breeding, as the main consumer, is represented mostly by all types of agricultural animals. The main cattle population is concentrated in the agricultural micro-business (private subsidiary farm, farm enterprise, self-employed entrepreneur) – 55% of beef breeds and 59.7% of dairy breeds. Micro-business produces 57.1% of animal products of the territory.

However, beef and dairy cattle breeding, being the priority of the development of agriculture of the region, is not provided with animal feedingstuff to the full extent even in the public sector of agricultural production and the demands of agricultural micro-business are excluded completely from the sphere of interests of the state administration bodies. The state regulates the production of agricultural products on the base of the program and goal-oriented approach (Strategy of development of food and processing industry of the Altai Territory for the period till 2025). As a result of research, the potential capacity of the regional market of animal feedingstuff for the livestock breeding of the region was calculated – 2.1%, including also the intraregional proposal – 64% (Table 3). Considering that more than a half of the cattle population is concentrated in the micro-business, it can be presupposed that it is provided with animal feedingstuff at 0.1-0.3% and this proves the potential growth of the internal market of the animal feedingstuff.

**Table 3.** Compliance of the demands of the beef and dairy herd of the region to the production of animal feeding stuff in the Altai Territory in 2010-2014

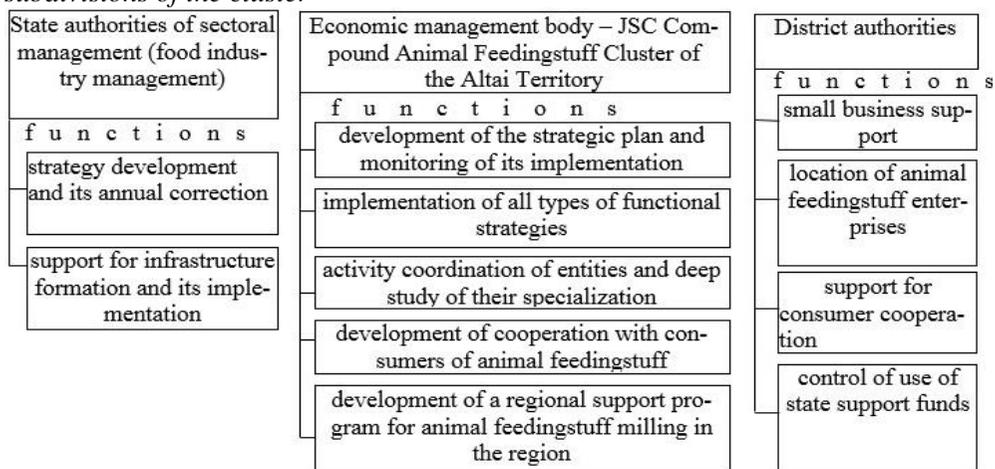
Indicators	2010	2011	2012	2013	2014
Demands of the public sector for animal feedingstuff, thousand tons, including (Cons)	589,09	615,63	582,05	506,75	512,40
beef herd, thousand tons	260,62	270,86	251,74	221,15	216,30
dairy herd, thousand tons	328,47	344,77	330,31	285,60	296,10
Production, thousand tons (P)	499,80	530,68	496,72	514,37	530,85
Import (I)	1392,8	1392,8	1559,0	3090,2	174,5
Export (E)	148,9	188,8	195,2	219,3	203,6
Balance (B = P + I – E)	1743,7	1734,68	1860,52	3385,27	501,75
Capacity of the regional market (level of compliance of balance to demands) (B : Cons × 100), %	296,0	281,8	319,6	668,0	97,9
Level of compliance of own production to demands, excluding export (P – E) : Cons	59,6	55,5	51,8	58,2	63,9

Animal feedingstuff milling has double submission: production located at agricultural enterprises is subjected to the chief administration of the farm, the production located at grain mills and meat processing plants is subjected to the administration of food industry. This decreases the efficiency of its management at

the level of the region and the state support in general and makes impossible its complex strategic planning (Kashevarov and Reznikov, 2016). The state support at the federal level is provided only to large-scale projects and at the regional level it is provided only by means of the programs of support for livestock breeding. In particular, in the Altai Territory within the framework of the program of dairy cattle breeding support, 67 animal feedingstuff plants were put into operation. And it is only in the collective sector of production.

Enterprises of the other branches of the food industry form and modernize animal feedingstuff milling on their own initiative: JSC Klyuchevskoy Elevator – the animal feedingstuff mill, group of companies Altairegiontreid – the enterprise engaged in advanced wheat processing and production of high-protein animal feedingstuff, JSC Altaimyasprom – the animal feedingstuff mill. In most regions, there is no economic management system of animal feedingstuff mill – unions, associations, clusters in the form of legal entities, etc. This situation allowed offering the formation of the body of economic management in the form of an independent legal entity bearing the responsibility for the execution of the functions imposed on it to develop and implement the strategic plan – JSC Animal Feedingstuff Cluster of the Altai Territory, a part of functions of implementation of the strategic plan shall be transferred to the district authorities (Figure 3).

**Figure 3.** Conceptual distribution of management functions between the structural subdivisions of the cluster



#### 4. Conclusion

As a result of the research, the strategic management functions of the animal feedingstuff milling of the region are divided among the three entities – a state branch entity (development of the strategy and its annual correction, support of formation of infrastructure of its implementation), a body of economic management (development of the strategic plan and monitoring of its implementation,

implementation of all types of functional strategies, development of the regional program of support for animal feedingstuff milling in the region) and municipal authorities (support of small business and consumer cooperation, territorial distribution of animal feedingstuff mills, control of application of funds of state support). It was offered to form the mechanism of support for the agricultural micro-business with the products of animal feedingstuff milling on the base of participation of the large and medium business, cooperation and state support. It is offered to include the material support for micro-enterprises of the branch into the function of large and medium animal feedingstuff mills, including the assistance in acquiring of the equipment that will allow 22 large animal feedingstuff mills changing the strategy of behavior in the domestic market and providing the complete load of the production facilities.

The demand of the territories for the location of private subsidiary farms that perform efficient dairy cattle breeding was calculated, in the animal feedingstuff plants (566 with annual output of 600 tons/year and 218 with the production volume of 1560 tons/year), the volume of co-financing to acquire them (it will require 7.1 mln rubles from the federal budget, 0.4 mln rubles from the regional budget and 3.2 mln rubles from the cooperatives consuming the animal feedingstuff, each of which will need about 40.0 thousand rubles). The directions of cooperatives' activity were grounded (production and consumption of animal feedingstuff, sale of products manufactured by the members of cooperatives).

It was offered to include the production of animal feedingstuff mixes and the whole range of services of their rendering by the agricultural micro-business into the functions of animal feedingstuff micro-enterprises. And to increase its paying capacity, the price for animal feedingstuff optimal to it (55.8% of the average price established in the regional market) and the mechanism of cost compensation to the manufacturers including the interaction of the entities, enterprises, processing the agricultural raw material, animal feedingstuff mills and the bank were grounded.

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