CLUSTER APPROACH TO THE DEVELOPMENT OF FOOD MARKET OF THE REGION: THEORETICAL AND APPLIED ASPECTS

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Abstract: The effective development of food market taking into account the interests of its participants predetermines a search of new approaches of their interaction. The cluster approach as the technology of management of development of food market of the region is the subject of this research. The aim of work is the justification of possibility of application of cluster approach to the development of food market as an organizational and economic mechanism allowing to compensate the problems noted in this work. For the justification of application of cluster approach to the development of food market of the region, its optimizing economic and mathematical model in the form of a multiple parameter problem of linear programming allowing to determine the optimum values of investment, production and financial parameters of functioning of food market of the region using the criterion of net present value is created and approved by the authors. It is revealed that the creation of agrofood cluster in the region will give an opportunity to reduce expenses in the scheme "production-processing-consumer" which will provide the growth of consolidated revenues by 2.25 times and will also allow to increase the product range and to strengthen the competitive positions of agriculture. As a result, the provision of population with food will improve, the rural economics of the region will be significantly strengthened, and the application of special tax regime (single agricultural tax) will allow to lower the tax burden, to simplify tax accounting and reporting for rural producers, to release a part of resources and to focus them on the development of agrofood cluster. The modeling of food market of the region with the use of cluster approach and the presented mathematical model also allows to support decision-making taking into account the requirements shown to the food supply of the population of the region in the quantitative and qualitative aspects.

Keywords: regional food market, cluster approach, mathematical modeling, expected economic effect, food resources (food)

INTRODUCTION

In modern society an important value is the person and the satisfaction of his needs, the main of which is the satisfaction of needs for food. The changes in policy, economy, culture, social sphere are performed for the person. In this context the value of development of food market, both of the whole country and its separate regions, is the key element of domestic policy of the state [1].

The years of reforms testify that the state and functioning of the food market and its infrastructure in our country remain a poorly adjustable and insufficiently organized process. In the marketing system the organized channels of wholesale trade are not created, the operational information support of participants of the food market is poorly adjusted, there is practically no logistic system of control of commodity flows, the domestic and international standards are not brought to the unified system. This circumstance provides the abnormality of reproduction process in the agricultural sector and, as a result, sharpens the contradictions between subjects of the food market (agricultural producers, processing enterprises and food sellers). The aforesaid causes an increase in distribution costs, provides an increase in price and decreases the competitiveness of agricultural production, raw materials and food [2, 3].

In this regard, the food market holds a special place in the system of local markets [4] as the market forming the level of satisfaction of necessary (physiological) vital needs of population which, in many respects, determine its social sentiment. Characterizing the level of food supply of the Kemerovo region, it is possible to note that following the results of 2014 the output of agricultural production in all the categories of producers was 49652 million rubles or 145.1%, as compared to the level of 2010, according to the effective prices. At the same time, the main volume of production is made in the households of the population and equals to 51%. 40.3% of volume fall to the share of agricultural organizations and 8.7% – to the share of country farms in 2014 [5].

Estimating the level of food supply of the population of the region for a five-year period (2010–2014 inclusive), it should be noted that there was an increase in consumption per capita: by 8 kg of meat and meat products (12.3%); by 12 pieces of eggs (4.6%) and by 7 kg of vegetables. Besides, there was an insignificant increase in the consumption of vegetable oil, potatoes, fruit and berries. The consumption of milk and milk products decreased by 12 kg (5.3%) and the consumption of bread and bakery products decreased by 12 kg (9.1%) during the analyzed period [6].

At the same time, in comparison with the recommendations for the rational norms of consumption of foodstuffs the imbalance of food of the population is noted. Thus, the consumption of bread exceeds the norm by 20 kg; potatoes – by 31 kg and eggs – by 10 pieces in 2014. The consumption of milk and dairy products is lower than normal by 105 kg and vegetables – by 60 kg. At the same time, the content of animal protein is lower than normal by 30.2 grams, and its total daily consumption, according to the physiological norms, was 76.5 grams in the food structure of the population in 2014 [7].

The provided data testify that the insufficient consumption of animal products, vegetables and fruit provides the unbalance of food, low content of vitamins and minerals, iodine and animal protein in it. The unbalanced, insufficient food can provide the nutritional restrictions and emergence of imbalance in the food ration of population of the region and the discrepancy of volumes of caloric content concerning the vital human need. It can also result in the discrepancy of established level of the cost of living with its authentic parameters [8].

An important point in the solution of the problem of food supply of the population of the region is the prediction of interaction of such processes as production and consumption. The essence of production is the satisfaction of consumers with food. The analysis of structure of average per capita consumption and its dynamics are a basis for calculations of expected indicators in prospects various in terms. Various methods of mathematical modeling allow to reveal adequately the arising regularities and to predict various socio-economic indices, and also to estimate the probability of their achievement.

For providing the population with food according to the recommended standards, it is necessary to reach the following outputs by 2020, thousands of tons: bread and bakery products – 277; meat and meat products – 198; milk and milk products – 898; potatoes – 264; vegetables – 370; eggs – 687 million pieces [8].

The next moment is the solution of the problem of realization of food products and the reliable quantitative assessment of the efforts put in them. The food market of the region which, logically, would have to consider the interests of producers, processors, sellers and consumers of food products can solve this problem. In practice, the food market does not bind all the entitled potential subjects together, and each of them functions separately [9, 10, 11].

Thus, the producers of food products can be presented by regional and external participants, as such, as the suppliers of finished goods and the suppliers of raw materials and semi-finished products. The regional producers processing their production also supply the market with it both in the finished form and in the form of semi-finished products via wholesale and retail. Personal subsidiary farms which, due to their limited access to the regional market, cannot fully influence its commoditization, should be allocated in a separate group of producers [12]. Thereof, personal subsidiary farms often act as the consumers of food products, as well.

Considerable volumes of deliveries of food from external suppliers of products both via intermediaries and directly from producers have a significant effect on the modern functioning of food market of the region [12]. Thereby, there is another subject in the food market of the region – the supplier, i.e. the intermediary, as is.

Let us note that the specifics of food market of the region is that agriculture, due to its spatial extent and temporary period of production of some types of products, demands a developed infrastructure (roads and warehouses). However, it is not capable to create and support this infrastructure because of the low profitability of production. As a result of developed adverse macroeconomic conditions, there is discrepancy in profitability of agricultural enterprises and other branches of economy. The low profitability of agriculture limits its opportunities to perform not only expanded, but also simple reproduction [13, 14].

An important aspect for development of food market of the region is the regulation of its activity by the state by the creation of necessary conditions of providing the poor segments of the population with food. Besides, the state regulates the food market by the establishment of quotas, duties, the organization of government procurement, and also by means of the organization of control of import of food.

Thus, the food market of the region is a complex structure which includes its above-named participants, on the one hand, which solves their general problem – the provision of population with food; on the other hand, all the participants are in unequal conditions for their effective activity as they act separately in the market space and often ignore the interests of each other.

The provision of effective development of food market and combination of interests of its participants on a parity basis predetermines the search of the new organizational and economic mechanisms capable to provide the population with food according to the scientifically based norms of consumption, and also the forms of interaction and mutually beneficial cooperation of its participants. In our opinion, the agrofood cluster can become such an organizational and economic mechanism.

The cluster, as an organizational and economic mechanism, does not only increase productivity at the level of the country, but, interacting in the market environment, can effect the activity of other clusters [15, 16, 17]. This circumstance predetermines the same attention to food clusters as to traditional ones, the development of which must improve. A specific feature of a cluster is an opportunity to put together the efforts of all the participants of food market in the territory of the region for the purpose of increase in its competitiveness, decrease in risks in the redistribution of commodity streams, fast adaptation of the pursued policy to the constantly changing market condition that fully meets the expectations of development of food market of the region.

Clusters have a unique potential to gain a synergetic effect on the basis of cooperation of various economic entities with the participation of public authorities and different infrastructures in the form of science and technology institutions and technoparks [18, 19].

In our opinion, the application of cluster approach to the development of food market of the region will provide the development of agriculture and processing industry, directly the food market itself and, as a result, will provide the food supply of the population with the products of high quality and in sufficient volumes.

On the basis of the performed analysis, it is possible to draw a conclusion that the knowledge of problems of functioning and development, assessment and regulation of the regional food markets is adequately presented in scientific literature and, at the same time, the attention is insufficiently paid to such aspects as the development of food markets in industrially developed regions taking into account their specifics and benefit of participants. This circumstance has determined the main directions of the presented research.

OBJECTS AND METHODS OF STUDY

The food market of the region acts as a research object in this work. The object of research is the assessment of efficiency of functioning of the food market and its development with the application of cluster approach. The aim of research is the modeling of development of food market of the region within the cluster approach for the identification of indicators of food supply of the population.

The following methods are used as the research methods in the work:
(1) The economic and mathematical modeling of development of food market;
(2) The numerical research of constructed model with the use of financial and analytical package of application programs which is described in detail in the work [20];
(3) The method of comparative analysis.

For the solution of the problem of assessment of efficiency of functioning and development of food market of the region we use the method of mathematical modeling.

The food market of the region is an example of large social and economic system, therefore during the assessment of efficiency of its functioning the problems of mutual coordination of operational, investment and financial streams, circulating in this system, arise. The description of processes in difficult systems demands the use of large number of data, which necessitates their automated processing. In turn, the efficiency of application of automated means of analysis is determined by the balance of mathematical models describing substantial processes in a difficult system.

Let us consider the following **substantial statement of the problem** of assessment of efficiency of functioning of food market of the region. Let there be n agricultural productions in the food market of the region using n various fixed business assets (FBA) for the production and sale (realization) of n types of products (meat, grain, milk, vegetables and so forth). At the same time, the technical and economic characteristics of FBA – the cost, service life and productivity of unit of FBA, and also the cost of unit of output of each type – are set. It is supposed that agricultural producers can use borrowed financial means in the form of credits or donations. It is required to determine the sums of investments, the volumes of production in total and of each production separately, and also the amounts of financing of food market of the region with which the discounted balance of strategic income (profit and estimation of cost of property) and strategic expenses (total investments), reflecting the added value of the regional production market for a certain period of time (the planning horizon), will be the maximum. We will treat in the problem stated above the functioning of food market of the region as the functioning of food cluster.

Mathematical statement of the problem.

Let us introduce the following symbols:
– y_k is the output of agricultural products of type k, thousand tons;
– m_k is the quantity of acquired fixed business assets for the output of agricultural products of type k, units;
– q_k is the expected demand for the products of type k in value terms, rubles;
– V_k is the design productivity of unit of fixed business assets of type k;
– T_k is the service life of unit of the main fixed business assets of type k, years;
– P_k is the cost of unit of products of type k, rubles;
– c_k is the average annual cost of unit of FBA of agricultural products of type k, rubles;

$- x_k = c_k m_k (k = 1, \ldots, n)$ is the investments (the cost of acquired FBA) of type k, rubles;

$- x_{n+k} = P_k m_k y_k$ $(k = 1, \ldots, n)$ is the proceeds from the sales of products of type k, rubles;

$- x_{2n+1} = Cr$, $x_{2n+2} = Dot$ is respectively a sum of credit and donations for the producer of agricultural products, rubles;

$- y_k = \dfrac{x_{n+k}}{P_k m_k} = \dfrac{c_k x_{n+k}}{P_k x_k} (k = 1, \ldots, n)$ is the output of products of type k, tons;

$- R = \sum\limits_{k=1}^{n} P_k m_k y_k$ is the total sales proceeds of all the types of products, rubles;

$- F = \sum\limits_{k=1}^{n} \beta_k R$ is the total salary fund defined as the expertly set percent β of proceeds R from the sale of all the products (a labour-output ratio), rubles;

$- I = \sum\limits_{k=1}^{n} x_k$ is the total investments of food cluster, rubles;

$- Am = T \sum\limits_{k=1}^{n} \dfrac{c_k m_k}{T_k}$ is the total depreciation charges for all the planning horizon T of all types of FBA, rubles;

$- z_k$ is the material inputs for the agricultural products of type k, rubles, defined in the form of the set percent p_k of the total expenses with the functioning of producer of agricultural products of type k;

$- \delta_k = P_k V_k / c_k$ is a relative indicator of efficiency (capital productivity) of type k of FBA;

$- r$ is the annual discount rate,

$- T$ is the planning horizon, years;

$- r_0$ is the annual rate of credit,

$- T_0$ is the term of credit in years,

$- I_{max}$, Cr_{max}, Dot_{max} is respectively the maximum sums of investments, credits and donations into the food cluster.

The net profit (after taxation) earned by each producer is described by the following expression:

$$W_k = \frac{1-\alpha_3}{1-p_k}\left(x_{n+k}\left(1-\beta_k\left(1+\alpha_4\right)\right) - \frac{T}{T_k} x_k \right)$$
$$\left(k = 1, \ldots, n \right), \qquad (1)$$

where α_3 is the rate of single agricultural tax (SAT), α_4 is the rate of assignments from the salary fund for obligatory insurance. Then the net profit W (after taxation) of the whole agrofood cluster is presented in the following form:

$$W = \sum\limits_{k=1}^{n} W_k .$$

Let us assume that in the course of their functioning all the enterprises of food cluster get the identical funds and are solvent, that is the following conditions are met:

$$Ds_k = \left(1-\alpha_3\right)\left(\frac{\left(1-\beta_k\left(1+\alpha_4\right)\right)}{1-p_k} x_{n+k} - \frac{1}{1-p_k}\frac{T}{T_k} x_k \right) +$$
$$+ \frac{x_{2n+1}}{n} + \frac{x_{2n+2}}{n} \geq 0 \left(k = 1, \ldots, n\right), \qquad (2)$$

where Ds_k is the current means of producer of products of type k. Then the current means Ds of the whole food cluster and the condition of his solvency can be presented in the following form:

$$Ds = \sum\limits_{k=1}^{n} Ds_k \geq 0 . \qquad (3)$$

The main factors influencing the stable development and effective functioning of any economic system are the following: 1) the demand for the output as the main market factor that allows to avoid the inefficient development of economic system because of overproduction; 2) The scientific and technical progress limiting the production capabilities of economic system with the characteristics and the level of development of fixed assets which are directly involved in the process of production and influence the volume and quality of products. Therefore, due to the functioning of food market of the region it is reasonable to bring in the following restrictions:

(1) $0 \leq P_k m_k y_k \leq q_k$ – the volume of sales of products of type k (in value terms) does not exceed the demand for it;

(2) $0 \leq y_k(t) \leq V_k$ – the production of type k in units of FBA does not exceed the volumes determined by the productivity of FBA (or by the level of scientific and technical progress).

We will consider the net present value J of agrofood cluster reflecting the added value of the below integrated structure as the criterion of efficiency (optimization) of agrofood cluster in the model of food market of the region:

$$J = T \cdot \frac{W + Am}{1+r_e} - I - \left(1 + \frac{r_0\left(12T_0 + 1\right)}{24}\right)Cr, \quad (4)$$

where $r_e = \dfrac{rT}{1-\left(1+r\right)^{-T}} - 1$ is the discount rate of the project on all the planning horizon considering the rate of inflation, requirements of profitability of investor and other risks for the entire period of functioning of agrofood cluster.

Considering the introduced symbols and formulae (1)–(4), the mathematical model of agrofood cluster of the region will take the following formalized form of static problem of linear optimum control:

$$J = T \cdot \frac{\sum\limits_{k=1}^{n} \sigma_k x_k + \sum\limits_{k=1}^{n} \gamma_k x_{n+k}}{1+r_e} - \left(1 + \frac{r_0\left(12T_0+1\right)}{24}\right)x_{2n+1} \to max$$

$$(5)$$

$$\begin{cases} -\theta_k x_k - \gamma_k x_{n+k} - \dfrac{1}{n}\left(x_{2n+1} + x_{2n+2}\right) \le 0, \\ x_{n+k} \le q_k, \\ x_{n+k} \le \delta_k x_k \quad (k=1,...,n), \\ \sum\limits_{k=1}^{n} x_k \le I_{max}; \quad x_{2n+1} \le Cr_{max}; \quad x_{2n+2} \le Dot_{max}, \\ x_k \ge 0 \quad (k=1,...,2n+2). \end{cases}$$

$$\theta_k = -\frac{1-\alpha_3}{1-p_k}\frac{T}{T_k}; \quad \sigma_k = \theta_k - \frac{1+r_e}{T}; \quad \gamma_k = \frac{\left(1-\alpha_3\right)\left(1-\beta_k\left(1+\alpha_4\right)\right)}{1-p_k} \quad (k=1,...,n).$$

The model (5) is a multiple parameter problem of linear programming after solution of which the optimum level of investments, production and, if necessary, credit resource for the financing of the current activity is determined. Tax flows, labor input, the material capacity of agricultural production, the characteristics of the fixed business assets (average annual cost, useful service), the characteristics of products (the cost and consumer demand for each type of agricultural production), the indicators of internal and external environment of functioning of agrofood cluster (the discount rate considering the rate of inflation and requirements of profitability of the investor and the planning horizon are considered in this model. The model (5) considers the main restrictions of activity of food cluster (solvency, the demand for production, the scientific and technical progress, restrictions of financing and so forth) taking into account the specifics of agricultural production of the region. This model can be the basis for the determination of expected economic effect of functioning of regional food cluster as:

(1) They consider high material cost intensity, characteristic of agricultural production (the specific weight of material inputs fluctuates at the level of 60–70 percent in the structure of costs of agricultural products);

(2) They consider the specifics of agricultural production in the form of increased wage (specific weight of wages of employees of the branch in the total proceeds from the sales of production of agroenterprises), which determines the low labor productivity and limits the competitiveness of the branch;

(3) They consider the increased service life of fixed business assets in the agrarian and industrial complex, significantly different from other branches of economy. More than 80 percent of machinery and equipment in agriculture used in production are outside the rated service life;

(4) They consider a special taxation scheme, characteristic of the agrofood specifics, in the form of single agricultural tax for agricultural enterprises significantly reducing the tax burden of agricultural producers and primary processors of agricultural raw materials;

(5) They consider the features of demand for production which is characterized by the relative constancy that distinguishes the agricultural branch from other branches of economy.

Let us note that linearity of the specified model allows to use the specialized package of investment analysis described in detail in the work [20].

RESULTS AND DISCUSSION

The scientifically based rational norms of consumption of food are developed based on ten main types of crop and livestock production. The agrofood cluster of the Kemerovo region will be focused on the production, processing and realization of the following types of products made in its territory: meat and meat products, milk, egg, grain, potatoes, vegetables.

According to the data of Department of agriculture and processing industry of the Kemerovo region, as a result of the financial and economic activity following the results of 2015, the following values of indicators were obtained by agricultural producers (Table 1).

According to the statistical data, [6] Table 2 gives the necessary indicators for entering the input information to the package and the approbation of created optimizing mathematical model of the agrofood cluster of the Kemerovo region.

The calculations performed by means of the optimizing package of application programs "Karma" became the result of our research [20]. The use of input data of the model for the main types of production (Table 2) allowed to determine the expected economic effect of activity of agrofood cluster of the Kemerovo region for the period till 2020 (Table 3).

Table 1. Basic data for creation of economic-mathematical model (2015)

Type of production	Capital productivity	Sales proceeds, million rubles	Average annual cost of fixed assets, million rubles
Meat and meat products k_1	1.30	9 031.18	6 935.7
Milk k_2	0.64	2 923.04	4 508.4
Egg k_3	1.59	3 382.15	2 128.4
Grain k_4	2.16	2 543.21	1 178.6
Potatoes k_5	2.25	557.91	247.3
Vegetables k_6	0.63	1 019.05	1 612.9

Table 2. Key input parameters of the agrofood cluster of the region

Content	Name	Reference value	Measurement units
Quantity of types of production	n	6	–
Planning horizon	t_0	10	years
Maximum sum of investments	I_{max}	1 200 000	thousand rubles
Maximum sum of credits	Cr_{max}	0	thousand rubles
Maximum sum of donations	Dot_{max}	800 000	thousand rubles
Rate of the unified agricultural tax	α_3	0.06	–
Rate of assignments for insurance premiums	α_4	0.2	–
Specific weight of material inputs in total of expenses	p_1 p_2 p_3 p_4 p_5 p_6	0.72 0.72 0.72 0.72 0.72 0.72	–
Percent of sales proceeds for contributions to the payment fund	β_1 β_2 β_3 β_4 β_5 β_6	0.137 0.137 0.137 0.137 0.137 0.137	–
Annual cost of business assets of k type	c_k	1) 6 935.7 2) 4 508.4 3) 2 128.4 4) 1 178.6 5) 247.3 6) 1 612.9	million rubles
Annual proceeds from the sales of production of k type	R_k	1) 9 031.18 2) 2 923.04 3) 3 382.15 4) 2 543.21 5) 557.91 6) 1 019.05	million rubles
Annual discount rate	r	0.25	–
Annual credit rate	r_0	0.16	–
Creditterm	T_0	5	years
Service life of the fixed business assets of k type	T_k	40	years

Table 3. Expected economic effect of activity of agrofood cluster of the region by 2020

Type of production	Proceeds from the sales of agricultural producers (before the creation of agrofood cluster), million rubles	Proceeds from the sales of agricultural producers (after the creation of agrofood cluster), million rubles	Economic effect	
			million rubles	times
Meat and meat products k_1	9 031.18	13 590.3	4 559.1	2.17
Milk k_2	2 923.04	13 473.2	10 550.2	4.61
Egg k_3	3 382.15	7 848.8	4 466.7	2.32
Grain k_4	2 543.21	3 531.9	988.7	1.39
Potatoes k_5	557.91	719.2	161.2	1.29
Vegetables k_6	1 019.05	4 614.3	3 595.3	4.52
Total	19 456.54	43 777.7	24 321.2	2.25

Let us note that the statistical data of agricultural production for the period of 2015 and the production of the main types of products for the period till 2020, taking into account the rational norms of consumption and expected population of the region are taken as the basis of predicted calculation in Table 3 [6].

The total economic impact of agricultural producers of the Kemerovo region during the production of six types of crop and livestock products can be 24 321.2 million rubles by 2020. After the creation of agrofood cluster the highest growth of proceeds is possible due to the realization of milk and vegetables by 4 times and more, from the realization of meat, meat products and egg twice and more. The proceeds from the production and sale of grain and potatoes will increase to a lesser extent (by 30–40 percent).

In the agro-industrial complex of the region (before the introduction of cluster approach) the lowest capital productivity of producers of milk and vegetables is noted, which indicates a low level of proceeds with a high cost of fixed assets for this production. The creation of agrofood cluster will allow to determine the need for credit resources, to optimize investment flows and material capacity of agricultural production. It will also allow producers of milk and vegetables to maximize their proceeds.

When forming an agrofood cluster it is very important to make the right choice of tax regime. The existing tax law allows to apply such a tax regime that will allow to perform the activity of agricultural enterprise most effectively.

In this research the account of tax component is based on the application of one of the special tax regimes for agricultural producers – the single agricultural tax (SAT). One of the terms of application of SAT is the self-determination of agricultural producers. According to Chapter 26.1 of the Tax Code of the Russian Federation, the single agricultural tax can be applied by agricultural producers if the share of agriculture in their total income from the realization of

their products is not less than 70 percent [5]. The single agricultural tax is characterized by the fact that the tax reporting is quite simple and gives the opportunity to reduce the tax base by the sum of losses which can be received following the results of the previous tax periods. Besides, the low rate of 6 percent of the income reduced by the sum of expenses together with only 20 percent of assignments for compulsory social insurance of labor of employees make this special tax regime quite attractive for rural producers.

The creation of agrofood cluster will provide the changes in the tax system both of the organization and its members. The changes of tax regimes for basic farms and processing enterprises will be performed centrally, according to the scheme (Fig. 1).

This circumstance will cause essential changes in tax accounting and tax reporting which were as follows before the formation of agrofoodcluster (Fig. 2).

On the basis of primary documents of accounting, registers of primary tax accounting are formed (if there is no difference between the tax and accounting, then the accounting documents are at the same time the registers of tax accounting) from which tax declarations, provided to tax authorities, are formed.

The agrofood cluster will have a vertically arranged consolidated account, including tax accounting. Only the primary registration documentation will be formed at the level of each division, and the summary reporting, which will be reported to tax authorities via electronic means of communication according to the tax law, will be formed at the level of the head company.

As a result, the system of tax accounting and reporting of the agrofood cluster and the institutes, which are part of it, will be as follows (Fig. 3). At the same time, it does not mean that there will be not any synthetic reporting at the level of units, it will be reported from the head company to its production units, besides, internal reporting will be formed.
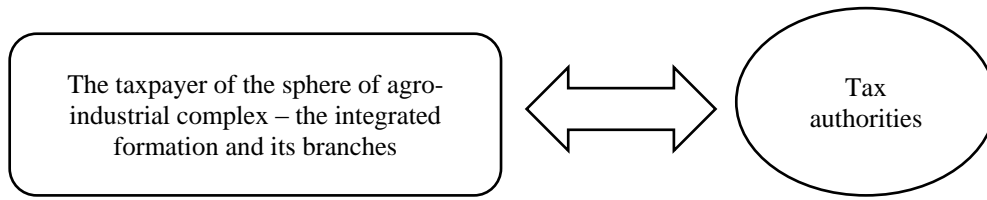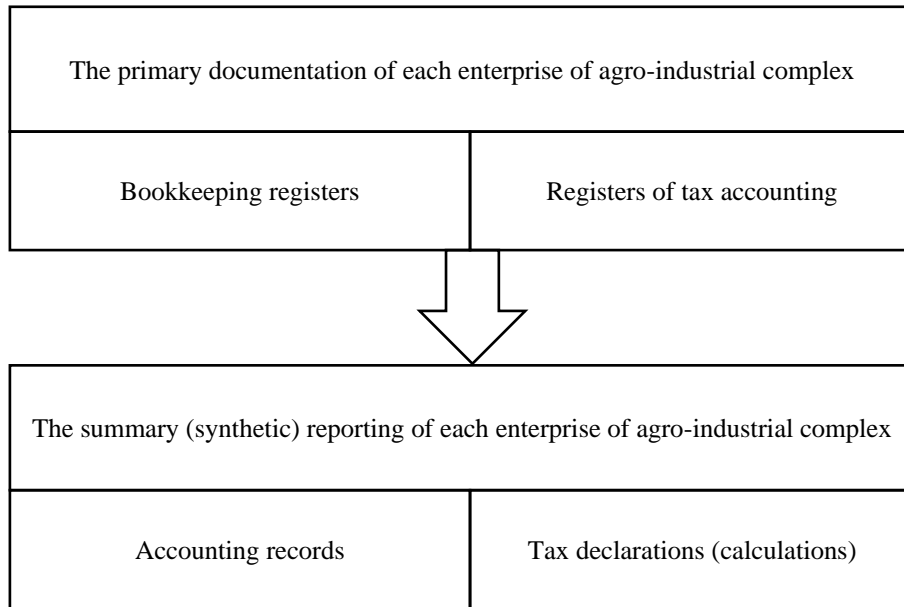
Fig. 1. Tax relations in the agrofood cluster.

Fig. 2. Existing tax accounting and reporting in the agro-industrial complex of the region
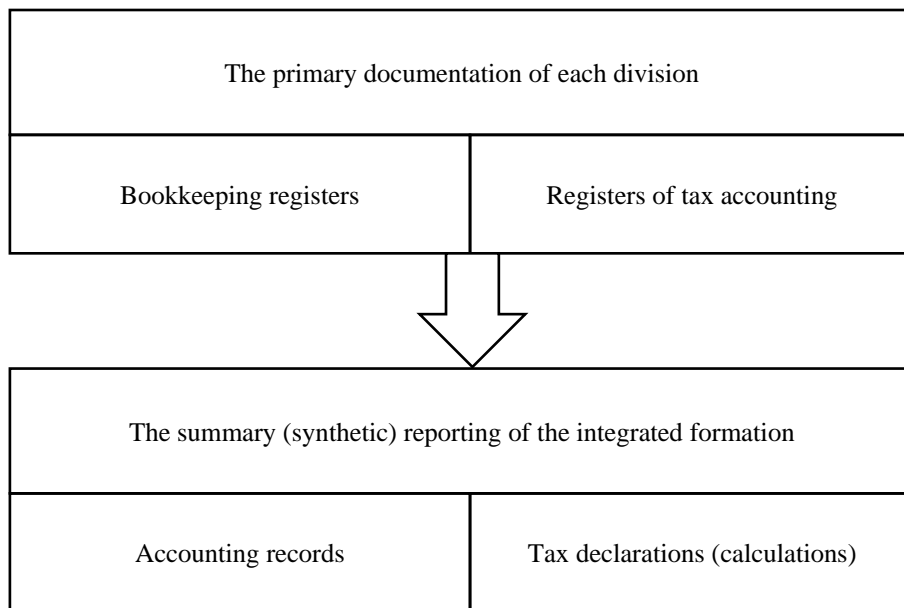

Fig. 3. Formation of tax accounting and reporting in the agrofood cluster

There is the centralization and distribution of tax duties in this system of relations. Besides, the existence of centralized account solves the personnel problem concerning the qualified financial personnel. The tax relations in the sphere of tax control will change in the agrofood cluster, too: firstly, the internal tax control necessary for the formation of summary reporting will be introduced from the head company; secondly, the approach to the performance of tax audits will change as the requirements for the companies having branches will cover them.

Along with other advantages, the tax relations which will allow to release a part of financial assets which can be aimed at the general development of agrofood cluster and, as a result, at the increase in food supply of the population of the region will be improved in the agrofood cluster.

It should be noted that the social security of the population with various income, especially that of lower-income strata, substantially depends on food supply and, as a result, will provide an increase in the quality of its life.

Thus, an agrofood cluster including the production, storage and realization of agricultural products characteristic of such an industrial region as Kuzbassin is described in the work on the basis of economic and mathematical modeling. The created model is quite universal and allows to make a predicted assessment of economic efficiency of functioning of agricultural producers, to reveal an economic capacity of agricultural branch of any region, and also to develop scenarios of development of regional agrofood cluster according to the recommended scientifically based norms of food supply of the population of the region taking into account the interests of agricultural producers. It is reasonable, for the immediate consideration of interests of society (social efficiency), to add one or several criteria to model (5). Now authors consider the following options of criteria: 1) the maximization of income of consumers of products of the cluster (with the purpose to increase a solvent demand for production); 2) the minimization of damage to the environment in case of use of ecologically dirty production technologies.

This circumstance gives the grounds to claim that an agrofood cluster in the region will give the chance: to considerably reduce expenses in the scheme "production-processing-consumer"; to increase the range of foodstuffs and to strengthen the competitive positions of agriculture; the application of single agricultural tax will allow to lower a tax burden, to simplify tax accounting and reporting for rural producers. It will improve the provision of population with food and will significantly strengthen the regional rural economics. The creation of regional integrated formations in the form of clusters will provide an increase in the sustainable economic development of not only the agrarian sphere, but the region in general, and also to be one of the tools for the solution of strategic tasks facing the agrofood sphere.

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