

## Pricing in the Market of Grain and Grain Products

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**Abstract:** This article is to study the current problems related to the formation of market prices of grain and its products. Significant attention is paid to the theoretical principles of operation processes and pricing on the grain market. The features of the grain price formation during transition to a social market economy and pricing peculiarities on commodity exchanges were identified. The algorithm of pricing in the grain market, which includes several stages, has been developed. The pricing experience in the foreign grain markets was analyzed in details. The analysis was performed using the data of the following countries: Poland, Czech Republic, Austria, Canada and China. The assessment data have indicated the advantages and disadvantages of state regulation of price level in the grain market and intervention operations and restrictions on export of grain as the market tools were characterized details. The general models and methods of pricing in the grain market were studied using the system analysis. The following models have been analyzed: expenditure, market demand and competitive. The problems related to the equivalent prices in the grain market were formulated. The current theoretical and methodological approaches to grain pricing based on cost analysis have been improved and expanded.

**Key words:** Grain market % Price % Pricing

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### INTRODUCTION

The global financial crisis of 2008 and 2010 emerged the extended discussion among economists on the state support to the agricultural sector. This is stipulated by both the high level of unemployment in the United States, European Union, Japan and other countries and the growing global food crisis, which resulted in a significant increase in retail prices for basic food [1]. Transition to a socially-oriented market economy raises the important problems of food pricing and raw materials for food processing industry as a basis for food safety of any country. Food security is not only the availability and accessibility of food and also the security in the broad sense of the word. Hunger means instability, conflicts and even violence. Therefore, the creation of an effective mechanism of pricing in the food market is one of the top priorities.

There are several variable factors significantly influencing the pricing in agrarian sector in conditions of developing market. They are followed by the market operators who determine the prices in industrial segments. In this context, the grain market in particular become

important because the grain traditionally belongs the priority role in ensuring of food security of the country; it serves as a source of raw materials for the manufacture of a number of industrial products; is an important source of a forage resources; is important in the formation of the state food export. The grain is the most important agricultural of international trade. Effective formation and functioning of the grain market, the competitiveness of the agricultural enterprises in the foreign market is possible only in conditions of complementarity of market self-regulation with state support of grain producers.

Thus, the conditions mentioned above stipulate the relevance of theoretical and practical significance of the present study.

Theoretical and methodological basis for the formation and implementation of the pricing in the crop market are reflected in the scientific studies of famous foreign authors as: D. Sumanac, R. Mendelson, N. Mason, R. Myers, I. Baoua, L. Amadou, L. Murdock, A. Gavanoas, C. Joseph and C. Lundstrom. The pricing problem in the agricultural sector for a long period of restructuring and transformation of economies and conditions of their

accession to the World Trade Organization is very important and widely discussed among Russian scientists, such as: S. Alekseev, A. Altukhov, A. Manichev, S. Shilovskiy, N. Pyzhikov, S. Trufanov, A. Tsvyrko, M. Borisov, etc.

However, the question of scientific substantiation of methods of state price regulation to achieve a balanced development of all sectors and encourage the production of value added goods remains scarcely explored. Formation of a more reasonable pricing policy in the present market both at the enterprise and at the state levels is hardly possible without the identification and analysis of factors that influence the formation of grain prices and determination of the price dynamics for this type of product, which generally require further studies in-depth in conditions of globalization and integration of economic systems.

The concepts of classical political economics, methods of economic and mathematical modeling, system analysis and methods of scientific cognition, synthesis, induction and deduction are the methodological base of the present study.

The purpose of present study is to investigate the specific features of the grain market functioning and the factors that determine the pricing procedure, considering the international experience of pricing in the grain markets and improvement of the methodological basis for establishing the price in the grain market.

**Theoretical Basis of Functioning and Pricing on the Grain Market:** Food markets as a system of economic relations are formed in the process of production, circulation and distribution of goods as well as cash flow and can be considered as a system of interrelated and interdependent elements. The grain market is a complex organizational and economic system with appropriate supply with grain and its products including the distribution, exchange and consumption. This is the organizational and economic relations between producers, processors, middlemen and suppliers based on the combination of independent economic subjects with the state regulation of the market [2]. The following assumptions are required for the efficient functioning of the market: economic independence and accountability, competitiveness and material and financial balance, access to information for all market participants, adequate and fair pricing. Experience shows the considerable complexity and contradictions related to imperfection and vulnerability of the efficiency of the grain market – the pricing procedures.

Pricing practice on the market of products and legumes and grain in general is characterized by frequent crises, lack of transparency, defective and unpredictable market conditions and the prices of grain sales by agricultural producers by instability. There is a significant fluctuation in production output, which also affects the yield of grain producers. Feature of grain production is that the formation of the grain supply is highly depended on weather conditions [3]. Instability in the gross grain harvest caused by weather-related factors, implies a low level of resource support from agricultural production and stipulates the instability of product supply to market. In conditions of low supply of grain market, the market price increases, thereby lifting the profitability of grain producers.

Assessment of features of the grain price formation in the market conditions demands for research to determine the production volume, structure of producers depending on economy type and management, industrial output. Agricultural producers shaping the price of their own products, includes all costs associated with the production and sale. At the enterprise level, the production costs and expected revenue are important pricing factors in the first steps. The purchase of fertilizers and petroleum products are the main expense items in agricultural entities. Therefore, the main purpose of state regulation of prices in agricultural production is a balance between the positions of producer and consumer purchasing capacity.

Over last several years, the pricing mechanisms have been improved significantly because the international traders have expanded their regional networks. As a result, grain producers have obtained some access to updated information on prices, but, this only can be applied to large businesses and farmers often do not have any possibilities. Partially, this occurs due to the current taxation system and farmer can gain the more profit if sale “just harvested” crops then make put any effort to sale the grain otherwise. The lack of single, clear and transparent system of forecasting and pricing is the considerable problem for small producers [4].

We assume that commodity exchange must be involved into solution of timely and profitable supply of grain. It is a unique tool for the market economy and a place where the real prices of goods and products that reflect everything: the cost of production and market conditions, forecasts for the next harvest, the economic conditions in general and the solvency of the market participants and the public and other can be established. Market prices are formed by daily trade of these products

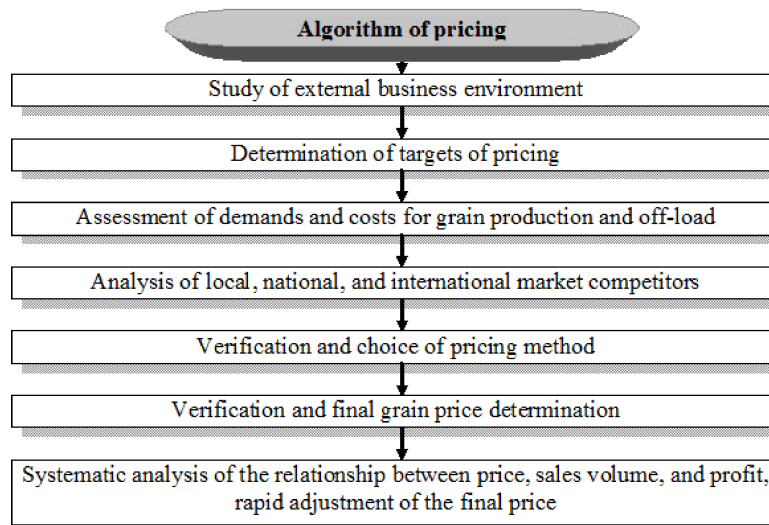


Fig. 1: Algorithm for determination of grain price

or forward contracts for these products with further price quotes. Transparent and honest pricing practically exclude any form of fraud and quotes serve as a guide for traders operating outside the exchanges [5]. Exchange trades of grain avoid the middlemen forming the mechanism of the real market prices. In all “grain” countries, the methods for grain pricing providing financing, commodity crediting, risk insurance and mechanisms to promote the grain export are developed long time ago.

In total, the conceptual framework of grain market functioning and peculiarities of pricing, it should be noted that the current approach to pricing is a complex and stage process. Analysis of the literature sources allows us to represent this process as a chain of successive steps:

- C Choice of targets;
- C Determination of demand;
- C Analysis of costs;
- C Analysis of competitors’ prices;
- C Choice of pricing methods;
- C Establishment of the final price.

We suppose that the algorithm of grain pricing should include the steps depicted in Figure 1.

**Foreign Experience Pricing of Grain Markets:** We have considered the established pricing experience in details of some world leaders in the grain production and export.

In *Canada*, the government is focused on price stabilizing and farm incomes in the production and sales of majority of agricultural products. Thus, the Law “On

the stabilization of agriculture” (1958) prescribes the minimum limit of prices for grain producers at a level higher 90% of the average market price over the previous 5 years. If market prices are below the average of the set limit price, the difference is returned to farmers in the form of compensation payments. Canadian government also pays the special subsidies to grain producers in drought years or years when crop prices are low and do not reimburse the cost of their production [6].

In *Austria*, the state regulation of prices for agricultural products is based on the law “On the pricing” which defines the types of agricultural products, which set the maximum and minimum prices. Price control on grain market occurs through specially created organization - Grain Fund. This is an independent administrative entity with legal status, which includes representatives of the Ministry of Agriculture and Forestry, Ministry of Finance, the Federal Economic Chamber and the “social partners”, the Associations of Chambers of Agriculture, the Association of Chambers of employees and the Association of Austrian Trade Unions. They define the minimum and maximum grain prices, regulate product supply to the market; issue export and import licenses, decide whether to grant export subsidies (50% of the funds from the state budget and 50% from the budget of the federal states) [7].

The grain price regulation in *China* is focused on setting the efficient prices, guaranteed by the state including futures. China remains “a two-tier price system” (governmentally fixed prices and different types of non-governmental prices). Grain prices are determined by the market, but with the direct supervision of the State

to ensure their level and stability. Support of the balance between supply and demand in the market realizes through a system of transitional insurance and reserve stocks of grain. These reserves are used to price regulation, commodity supplies to the market and mitigate fluctuations in output [8].

In *Poland* and the *Czech Republic*, the special government agencies (funds) are created to support market prices and ensure additional income to farmers by realizing a special program and accomplish the intervention operations during overproduction on national market. Agencies also establish export subsidies for grain [9].

It should be noted that in most developed countries, the common practice of government financing for the acquisition of capital goods for agriculture is widely distributed. Thus, the United States set the differential prices for diesel fuel for farmers. In Canada, the tax breaks and subsidies ensure the farmers to the fuel price at 50 - 60% off retail. In the European Union, the price subsidies for the purchase of equipment, modernization of farms, land reclamation are established.

Summarizing it can be noted that the foreign experience strongly testifies that the market economy can not ensure the self-regulation of grain market prices, which would create the conditions for sustainable development of agriculture. To eliminate the market imperfections, there is objective need to state intervention in the market pricing mechanism and it is clear that the impact of the intervention depends primarily on the level of validity of grain sale prices. Obviously, the government intervention and regulation of the grain market is not an absolute panacea. Like any other regulatory factor, it has certain disadvantages and characterizing by following features:

C Intervention operations are one of the basic economic factors of regulation of agricultural markets in general and grain market in particular. The practice of delayed formation of the state food stocks based on reduced prices and post-release mechanism of budget subsidies (after a temporary administrative regulation) results to nonrealized regulatory function of government intervention [10]. Intervention operations with grain and flour should be implemented during significant fluctuations in the market and solely on market prices and the mechanism of budget subsidies should be used for objective reasons when the price situation on the market can not be resolved through intervention.

C Similar requirements to the introduction of grain export restrictions, which may be appropriate only in exceptional and critical circumstances. These emergencies include the lack of grain in the national market in conditions when economic regulatory mechanisms do not work (for instance, due to lack of funds). Alternative measures of grain redistribution in favor of national consumers (refineries) include the limited range of bidders for the sale of intervention grain to the companies that buy grain for their own production needs; the distribution of compensatory interest rates for credits to purchase grain for its own needs to the end-users of grain; the development of forward purchases by refineries.

**Pricing Models in the Grain Market:** The practice of grain market pricing include the different methods to determine the initial price, which can be grouped into three models represented in Figure 2 considering the factors of pricing policy in agriculture in general, single enterprises and farms in particular.

Implementation of the models shown in Figure 2, involves the use of various methods of pricing, which in a market economy, are closely related. Gradual introduction of each subsequent model supposes the consideration of the previously introduced factors. One of the most common pricing models in the grain market is costly model ensuring the selling price calculation of products by adding a particular value to the production cost. One of the most known methods is "costs plus". The main problem of its application is the complexity of determining the level of the additional fund as long as there is no accurate way and form to calculate it.

We assume that this problem can be solved as follows. If the market is not limited by strict conditions, the manager, determining the price, should be guided by the following formulas of the method of "cost plus":

- C Production variable cost plus mark-up;
- C Total variable cost plus mark-up;
- C Production cost plus a mark-up;
- C Full cost plus a mark-up

Appropriate mark-up is calculated based on:

- C Variable production costs;
- C The full cost of production;
- C Total variable costs;
- C Full cost.

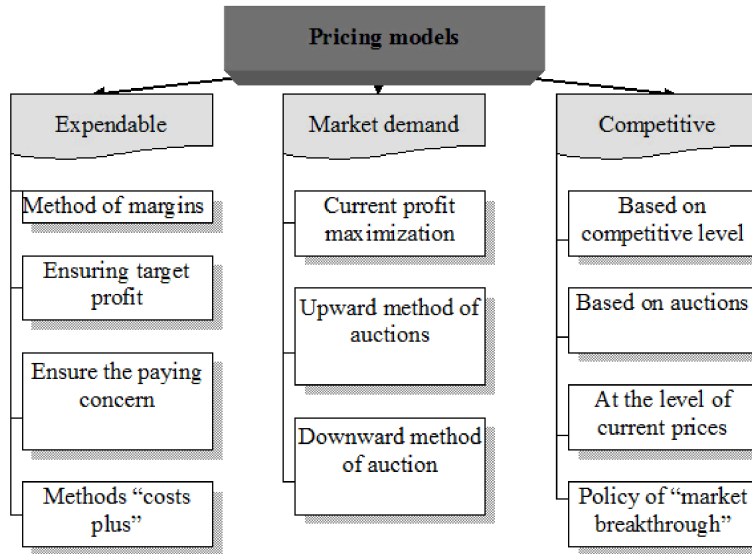


Fig. 2: Models and methods of pricing in the grain market [11].

We have considered the model of calculation of unit prices (for grain) and different methods of pricing.

$$M = \frac{p + tfc}{x \times tvc},$$

*Pricing model based on variable production costs.*

where *tfc* – total fixed costs, RUB.

$$P_o = vc + vc \times M/100,$$

*Pricing model based on the full costs.*

where  $P_o$  – price per 1 ton of grain, RUB; *vc* – variable production costs per 1 ton of grain, RUB; *M* – mark-up, %.

$$P_o = tc + tc \times M/100,$$

where *tc* – total cost of 1 ton of grain, RUB.

$$M = \frac{p + fpc + oe}{x \times vc},$$

$$M = \frac{p}{x \times tvc},$$

where, *p* – budget income, RUB; *fpc* – fixed production costs, RUB; *oe* – operating expenses, RUB; *x* – production output, tons.

Implementation of this methodical approach to price determination of grain and its products will enable managers to determine the prices at different stages of the production cycle of grain products.

*Pricing model based on the full cost of production.*

Some producers prefer to use the model of grain equivalent price. However, the question of objectivity, accuracy and validity of the model and the method of calculation provoke the debates on contradictions and advantages of this model to the accounting principles. We believe that if consider the grain producer as the owner of the land and property, then some of the components of the formula contradict to the laws of reproduction and economic growth as well as the accounting principles. According to the conceptual approach to the pricing, the formula of the unit price is as follows:

$$P_o = mc + vc \times M/100,$$

where *mc* – manufacturing cost of 1 ton of grain, RUB.

$$H = \frac{p + op}{x \times vc},$$

*Pricing model based on the total variable costs.*

$$EP = S_c + MP = S_c + CI \times C_{pm},$$

$$P_o = tvc + tvc \times M/100,$$

where *tvc* – total variable costs, RUB.

where, EP – equivalent price of 1 ton of product, RUB;  $S_c$  – standard cost per 1 ton of product, RUB; MP – mass of profit per 1 ton of product, RUB; CI – capital invested in the production of 1 ton of product, RUB;  $C_{pm}$  – profit margin coefficient.

Model is based on the equivalent price and represented by two main indicators: cost and capital intensity of agricultural products, i.e. land -, fund -, labor - and material-output ratio. Economically feasible index of unit costs of grain and its products provide a simple reproduction of the consumed resources of agricultural production and the rate of capital intensity - their expanded reproduction. Determination of equivalent price should be based on statutory or technological-normative parameters of resource expenditures in natural and value terms, what corresponds to statutory or technological-normative costs. The regulatory framework includes performance standards, the cost of fuel and lubricants, fertilizers, crop protection and other resources on the production of grain according to the technological maps. Base of standards consist of output quota, expenditures of petroleum, oil and lubricant, fertilizers, crop protection and other resources on the production of grain per the technological cards. Method of determining the equivalent price is in the substantiation of normative cost of production and marketing and the mass return on invested capital on the basis of the normative rate of return in economy. Therefore, the formation of an equivalent price of grain requires proper identification of its prime cost and invested capital in its production. Substantially, these components depend on patterns of ownership of production resources.

Summarizing the study results, we have concluded that the pricing on the market of grain and its products is rather complex mechanism, as uses the general economic laws and the specificity of agriculture. Peculiarities of the grain pricing are stipulated by part of the invested capital into the agricultural sector is the land resource as the main production mean. The concept of grain pricing should ensure the equal economic conditions in the agricultural sector and other sectors of the economy. In general, foreign countries are different in price regulation of the grain sector of agricultural production with different levels of effectiveness.

### CONCLUSION

In the socially-oriented economy, the price of grain must satisfy companies with various forms of management such as large agricultural enterprises, farms

and households. Price level should be sufficient to extended reproduction in the agricultural sector, therefore this sector forms the food security of the state and can provide a proper competitive position of any country in the world economy. To achieve this, existing theoretical and methodological approaches to pricing for grain based on information about costs were improved and expanded.

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