

## MONITORING, ASSESSMENT AND DEVELOPMENT PROSPECT OF THE CEREAL CROP MARKET IN UKRAINE

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### *Abstract*

*The cereal industry in the aspect of ensuring the food security of the country, is a strategically important component of the grain food market, but requires solving a number of important problems in achieving sustainable development, increasing production volumes and increasing export potential on the world market. The production of cereals remains a problem industry, as demonstrated by the significant fluctuation and high level of prices for the main types of cereals. Mixed research methods were used in the analysis of cereal crop market data. The theoretical and methodological basis of the study was a dialectical method of cognition, a systematic approach to the use of general provisions of economic theory. Conducted studies of cereal crop cultivation in Ukraine evidenced that gross yield of buckwheat increases on an intensive basis - with a decrease of 11.3 per cent, an increase in yield of 21 per cent; tends to decrease in gross millet yield (62.3 per cent) under the influence of reduced acreage and yields, rice production remains stable. Growing and processing of cereals are concentrated in the Eastern and central regions of Ukraine, and rice - in the Southern part. Increase the efficiency of cereal crop production in Ukraine can be achieved through the use of production reserves associated with the intensification and optimization of the organizational and economic mechanism of the industry.*

**Key words:** buckwheat, rice, millet, economy, production dynamics, Ukraine

### INTRODUCTION

The current stage of development of the national economy of Ukraine is marked by a high level of self-sufficiency in the main types of food. In 2020, the level of production for domestic use in the territory of Ukraine in the group of cereals amounted to 323.3%. This indicates that production exceeds 3.2 times the volume of consumption in the domestic market.

The culture of consumption of cereals in Ukraine is quite high and is due to their use in the preparation of various dishes. Traditionally, in the diet of Ukrainians there were always porridge of different types of cereals and today they form the basis of the food supply of the population. Cereals are part of the group of cereals, which are the second most important in the nutrition of the population and the volume of processing, so they are given an important place in agro-industrial production. Grain production is an

important component of the specialization of agricultural producers, which aims to meet the needs of the domestic market for seeds, grains for food, fodder and technical purposes. At the present stage, manufacturers face the challenges of improving the quality characteristics of cereals, creating and expanding the cereal component of the export potential of the grain market [4, 6, 7, 11, 19]. The market of cereal crops is a system of economic relations between market subjects that arise in the process of production, storage, sale and consumption of cereals in conditions of free competition and market pricing, wide choice of directions, forms and methods of product sales and state market regulation and product quality control [3, 8]. Processing grain for cereals is an important processing industry in terms of value added, because cereals are the final product of consumption and their price is much higher than the price of raw materials. When processing rice, buckwheat and wheat grains

there is no waste, that is, they are fully liquid and are used as a feed base in livestock or raw material for further processing. These advantages form competitive positions in grain processing.

At present stage, Ukraine is part of the world of grain producers, and is also among the three leaders in the export of cereals. Ukraine is integrated into the world grain market, which is why changes in the world market affect the domestic grain market.

In Ukraine, almost all cereals are grown, from which cereals are produced, so the prospects for the development of the cereal market directly depend on the volumes of production, their yield and territorial, as well as the availability of grain reserves. But research on these indicators is complicated by the fact that cereals are not separated into a separate group, as cereals produce from almost all cereals - wheat, barley, oats, and corn. Grain production of cereals satisfies the domestic needs of the country, but the industry must have access to external markets [5, 10].

Cereals occupy an important place in the world food market and are not overlooked by scientific research.

Practically all grain crops from which cereals are produced are grown in Ukraine, so the prospects for the development of the cereal market directly depend on the volume of production, their yield, and zoning, as well as the availability of grain stocks. However, research on these indicators is complicated by the fact that cereals are not allocated to a separate group, as cereals are produced from almost all cereals - wheat, barley, oats, corn [14, 15, 21].

Development of domestic crude production for the security of the State is one of the main directions [13]. The study and identification of the main problems of the relevant cereal market development makes it possible to note the priorities of its development strategy, the implementation of which provides for active state intervention, which is ambiguous in the conditions of liberalization and integration into the world economic space [12]. In conditions when the state intervenes in the price formation in the market of cereal crops is negative, therefore, one way to address this

issue is to limit the State's intervention or subsidy of agricultural producers through commodity and financial interventions [9]. The application of market-based regulatory mechanisms in conjunction with the intensification of integration processes is another way of addressing this problem, which will provide an impetus for the effective development of the market for cereals [16, 18].

The main obstacles to the expansion of exports of Ukrainian products are the low quality of a large part of the raw materials and outdated processing technologies don't allow the manufacture of cereals, which meets European standards. But domestic producers of organic cereals are gradually increasing sales in the EU and North American markets. The expansion of domestic sales can be achieved through the integrated application of non-tariff restrictions and is not in conflict with WTO agreements. This calls for further research on the experience of developed countries in low-quality, low-quality dumped imports of cereals [20].

## **MATERIALS AND METHODS**

Strategic goals and the necessary condition for the development of the market of cereals are the production of high-quality grain, its rational use and the provision of raw materials to the processing industry in the required quantity.

In analyzing statistical data, mixed methods of research were used. The theoretical and methodological basis of the study was a dialectical method of knowledge, a systematic approach to the use of the general provisions of economic theory, scientific developments of domestic and foreign scientists on the formation of cereal cultures and their infrastructure.

In the process of studying the market of cereals, the generally accepted methods and techniques were used: a set of scientific methods of the abstract-logical method (induction, deduction, analysis, synthesis, analogy, comparisons) - in the process of studying the theoretical foundations of the formation and development of the market;

monographic method - used in the development of literary sources, legislative and other legal acts, in order to illuminate the views of scientists on the studied problem; the method of retrospective analysis - in the study of the main prerequisites of the formation and development of cereal crops; factor and graphical methods - in determining and studying the impact of the market situation on the development of the market.

The infobase of the research was made up of scientific works of domestic and foreign scientists on the problems of the studied issue, legislative and regulatory acts, materials of the State Statistical Service of Ukraine, sources of information and analytical materials of specialized organizations and periodical industry publications [1, 17].

## RESULTS AND DISCUSSIONS

The greatest food value and distribution in the domestic market of cereals are such crops as buckwheat, rice and millet, which are grown by different sizes and organizational and legal forms of farms. The share of sown areas for traditional cereal crops in 2020 in the total area of cereals and pulses in all categories of holdings is small - only 1.66% (1.04% under millet, buckwheat - 0.55%, rice - 0.07%) consequently, cereal grain production as a percentage of gross cereal production is even lower - 0.63% (millet 0.39%, buckwheat 0.15%, rice 0.09%), which indicates a lower level of yield compared to other grain crops [2].

Rice is grown only in the southern regions of Ukraine in special agro-ecological systems. Its production is quite stable and depends on the area of rice receipts - for 2016-2020 area of rice 10.5-12.7 thousand hectares and production volumes remain at the level of 54.6-69.2 thousand tons.

The dynamics of production indicators of the main cereal crops for 2016-2020 indicates a decrease in the area from which the yield of buckwheat was harvested by 45.3%. Since the yield remains at almost the same level, the gross yield of buckwheat also decreases 44.7% (Table 1).

Table 1. Dynamics of cereals production in Ukraine

Indicators	Years					2020 in per cent to 2016
	2016	2017	2018	2019	2020	
Buckwheat						
Area from which the crop is harvested (thousands of hectares)	153.7	185.3	113.3	69.2	84.1	54.7
Gross harvest in mass after finalization (thousand tons)	176.4	180.4	137.0	85.0	97.6	55.3
Yield (tons per hectare)	1.15	0.97	1.21	1.23	1.16	100.9
Millet						
Area from which the crop is harvested (thousands of hectares)	107.7	56.1	54.8	93.3	159.1	147.7
Gross harvest in mass after finalization (thousand tons)	189.7	84.4	80.5	169.7	256.1	135.0
Yield (tons per hectare)	1.76	1.50	1.46	1.81	1.61	91.5
Rice						
Area from which the crop is harvested (thousands of hectares)	12.0	12.7	12.6	10.5	11.2	93.3
Gross harvest in mass after finalization (thousand tons)	64.7	63.9	69.2	54.6	60.7	93.8
Yield (tons per hectare)	5.39	5.05	5.49	5.22	5.40	100.2

Source: official data of the State Statistics Service of Ukraine and original data calculated based on the data obtained.

The gross millet harvest in 2020 was a record level of 159.1 thousand tons, which is 47.7% more than in 2016. The yield of millet remains low - 1.40-1.81 tons per hectare, this is due to its cultivation in rain-fed conditions, with the use as an insurance crop under difficult climatic conditions for other cereals, taking aside under millet low-potential land. However, the drought resistance of the crop has a positive impact on its production volumes. In the context of global warming, the natural habitat of millet cultivation and its share in the area under cultivation are increasing. Also, the price of millet has a positive trend both in the domestic and foreign markets.

The volumes of production have a direct impact on the volume sales of products and, respectively, on the activity of processing

enterprises. Enterprises' implementation of the main cereal crops has different tendencies. The volume of realization of buckwheat in 2019 is almost half less than in 2018 - 27.2 against 51.5 thousand tons (Table 2).

Table 2. Volumes and average prices of the main cereal crops sold by enterprises

Crops	Years			2020 in per cent to 2018
	2018	2019	2020	
Implemented by enterprises - in total, thousand tons				
Buckwheat	51.5	66.3	27.2	52.8
Millet	41.1	55.0	96.9	235.8
Rice	27.1	28.7	25.3	93.4
Average realized sales prices, UAH/t				
Buckwheat	5,827.8	7,158.7	14,550.8	249.7
Millet	7,700.2	6,929.5	5,974.6	77.6
Rice	7,909.4	7,898.7	8,663.6	109.5

Source: official data of the State Statistics Service of Ukraine and original data calculated based on the data obtained.

Noted that the price of selling buckwheat increased by 2.5 times - from 5,827.8 to 14,550.8 UAH/tons, which is a consequence of the decline in production at the unsatisfied demand within the population, because buckwheat is the most popular and, at the same time, the most expensive cereals. It is on the market of buckwheat that there are significant price fluctuations due to the shortage of products, which influenced the decision of the state to introduce subsidies to producers for its cultivation in the amount of up to 5,000 UAH per hectare of harvested area. However, the grant didn't affect the decision of the agrarians to increase the area of buckwheat. The reasons lie in the peculiarities of cultivation of this crop, low level of agricultural equipment, significant risks of crop loss due to the influence of external climatic factors.

The implementation of millet by agricultural enterprises in 2020 is 2.35 times higher than in 2018. It is 96.9 thousand tons. The sale price has decreased from 7,700.2 to 5,974.6 UAH/t, or by 22.4 per cent.

The study of regional aspects of the implementation of buckwheat shows that production is concentrated in the central, western and eastern regions. In 2020, the most sold buckwheat agricultural enterprises of the Sumskyi region 4,434.1 tons (16.3%), Kyivskyi - 3,262.5 tons (12.0%) and

Khmelnyskyi - 3,174.4 tons (11.7%) (Table 3).

Table 3. Implementation of buckwheat by enterprises by region, tons

Regions	Year			2020 in per cent to 2018
	2018	2019	2020	
Ukraine	51,525.8	66,326.1	27,229.2	52.8
Vinnyska	5,062.1	4,798.5	2,620.8	51.8
Volynska	1,056.1	1,033.0	168.4	15.9
Zhytomyrska	5,563.4	5,285.0	1,957.8	35.2
Kyivska	6,653.2	8,836.3	3,262.5	49.0
Kirovohradka	1,249.3	2,558.0	743.9	59.5
Lvivska	3,877.1	1,407.9	941.1	24.3
Poltavska	1,852.0	2,903.3	890.5	48.1
Sumska	5,002.0	13,086.5	4,434.1	88.6
Ternopil'ska	3,050.2	2,168.7	1,822.1	59.7
Kharkiv'ska	4,089.6	8,350.8	1,888.6	46.2
Khmelnyska	4,187.1	4,750.6	3,174.4	75.8
Chernihiv'ska	6,058.2	4,881.3	2,633.7	43.5

Source: official data of the State Statistics Service of Ukraine and original data calculated based on the data obtained.

The volume of sales of buckwheat in 2020 in all regions decreased from 11.4% in Sumy region to 84.1% in Volyn. This represents that buckwheat is inferior to other crops in terms of profitability, so producers prefer other crops that provide higher results.

Millet is more evenly distributed throughout the country, it is grown in almost all regions. The leaders in 2020 are the Chernihiv'ska area in terms of production volumes 11,325.5 tons and the largest share among the regions of Ukraine - 11.7% (Table 4).

Table 4. Implementation of millet by enterprises by region, tons

Regions	Years			2020 in per cent to 2018
	2018	2019	2020	
Ukraine	41,061.8	55,048.6	96,870.5	235.8
Vinnyska	553.2	2,591.5	3,078.9	556.6
Dnipropetrovska	4,317.5	4,346.2	3,622.7	83.9
Donetska	340.0	2,272.9	3,313.0	974.4
Zhytomyrska	5,097.0	3,516.9	6,393.7	125.4
Zaporizka	4,079.6	4,762.9	10,496.6	257.3
Kyivska	1,476.0	3,892.0	5,790.1	392.3
Mykolaiv'ska	1,659.1	1,726.2	3,610.0	217.6
Odeska	3,709.3	4,311.6	7,672.0	206.8
Poltavska	3,022.8	4,352.1	6,937.6	229.5
Sumska	1,167.2	624.2	4,169.6	357.2
Kharkiv'ska	6,203.0	3,459.4	8,398.9	135.4
Kherson'ska	811.2	4,421.8	5,950.3	733.5
Cherkaska	1,003.7	1,492.5	4,158.0	414.2
Chernihiv'ska	2,903.8	3,791.3	11,325.5	390.0
Kyiv	1,183.9	*	5,153.7	435.3

Note: \* - trade secret (restricted access).

Source: original results calculated based on the data from State Statistics Service of Ukraine.

In the Zaporizka area 10,496.6 tons of millet were realized, in Kharkivska - 8,398.9 tons, which corresponds to 10.8 and 8.7 per cent of the overall indicator for the country in 2020. The highest increase in sales over the past three years provided Donetsk (9.7 times), Khersonska (7.3 times) and Vinnytska (5.6 times) area.

An important direction for improving organizational and economic relations between the subjects of the cereal crops market is vertical integration between producers, processing enterprises and intermediaries who sell products on the domestic and foreign markets, which, as a result, will contribute to better provision of their financial resources, a fair distribution of added value, material and technical support of production and economic processes, increasing the level of mechanization of processing, packaging, supply.

Of the total production volumes in 2020, processing enterprises received 4,589,407 tons of grain and leguminous crops. The processing structure is as follows - for compound feed - 53%, for flour - 42% and the share of cereals is only 5% (Figure 1).

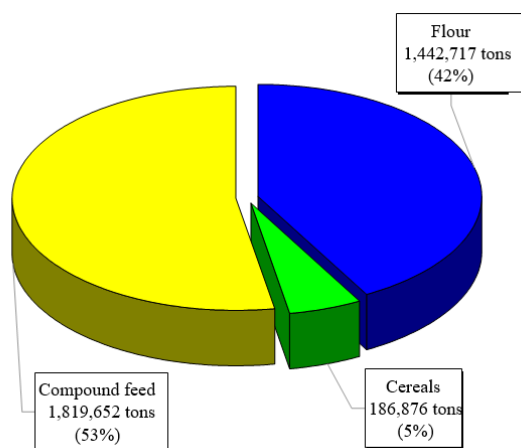


Fig. 1. Structure of processing of cereals, pulses enterprises engaged in their storage and processing in 2020, tons

Source: official data of the State Statistics Service of Ukraine.

The production rate of cereals in 2020 was 186,876 tons higher than in 2016, when 170,883 tons were produced - 9.4 per cent (Table 5).

Table 5. Processing of cereals, pulses in storage and processing enterprises, tons

Crops	Year					2020 in per cent to 2016
	2016	2017	2018	2019	2020	
Grain crops and leguminous crops	170,883	186,369	202,378	189,718	186,876	109,4
of which wheat	32,366	32,211	32,162	32,496	29,776	92,0
corn on grain	4046	3,690	917	*	1,526	37,7
barley	14,413	15,459	10,704	*	*	-
rye	679	715	576	451	485	71,4
oats	15,756	15,994	13,252	*	11,890	75,5
buckwheat	51,151	49,888	72,417	76,090	*	-
millet	9,213	15,004	8,153	9,653	*	-
rice	580	7,911	4	-	*	-
dried legumes	42,409	45,497	64,192	46,823	56,070	132,2

Note: \* - trade secret (restricted access).

Source: official data of the State Statistics Service of Ukraine and original data calculated based on the data obtained.

Of the total production of cereals in 2020, wheat accounts for 29,776 tons (15.9%), corn - 1,526 tons (0.8%), rye - 485 tons (0.3%), oat - 11,890 tons (6.4%), dried legumes - 56,070 tons (30.0%). For the group of cereals and barley processing enterprises did not indicate, exercising the right not to disclose data on the basis of ensuring compliance with the requirements of the Law of Ukraine «On State Statistics» regarding the confidentiality of information. One can only determine that the share of barley, buckwheat, millet, rice in the structure of production of cereals in 2020 is 46.6%. It is worth noting that rice is processed directly in the enterprises that produce it, therefore, its share in the overall structure of the processing industry is insignificant. The analysis can only be detailed at the enterprise level, which limits information and does not release data on rice sales.

In 2018, cereals accounted for 40% of the total cereal and legume cereals production (Figure 2).

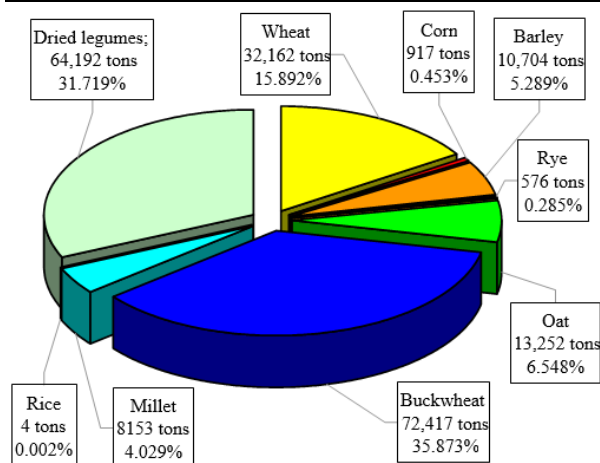


Fig. 2. Structure of cereal production in 2018.

Source: official data of the State Statistics Service of Ukraine.

The largest producers of cereals in Ukraine are the following companies: Cereal Ukraine, Terra, Shevchenkivskiy zavod, TOV «Nadiia», Altera, Art Foods, «Serpen», «Makfa», «Narodna», «Sto pudiv», «Takida», «Furshet», «Khutorok».

## CONCLUSIONS

The success of the resolution of the problem of increasing the economic efficiency of grain production involves the implementation of a comprehensive system of measures to increase the production and improve the quality of cereals while reducing labour and material costs per unit of production. The intensification of production as the main direction of economic growth of the branch of cereal crops is a complex, multi-factor process of application of efficient and environmentally friendly means and technologies on the basis of scientific and technological progress, innovation, use of improved forms, organization and wage, management and effective market mechanisms.

Industrial crops are an important component of the grain industry, the production of which saturates the domestic market with the necessary products. Agricultural enterprises that grow oats, buckwheat, millet, rice and provide raw materials processing enterprises form a supply in the market of cereals.

Studies of the dynamics and structure of the cultivation of these crops in Ukraine show that the gross yield of buckwheat is increasing on an intensive basis - with a decrease of 11.3%, the increase in yield is 21.0%; tends to decrease gross millet yield (by 62.3%) as a result of reduced sown area and reduced yields; rice production remains stable. Cultivation and processing of cereals are concentrated in the eastern and central regions of Ukraine, and rice - in the southern.

To increase of efficiency of production of industrial crops in Ukraine can be achieved through the use of production reserves associated with intensification and optimization of the organizational and economic mechanism of the industry, namely: 1) the introduction of a set of necessary organizational and economic measures that will maximize the potential productivity of industrial crops while minimizing the cost unit production costs; 2) the introduction of scientifically founded doses of mineral fertilizers, the use of plant protection agents and plant growth regulators; the use of intensive varieties and hybrids for the best predecessors; 3) reduction of crop losses during harvesting and storage; 4) transformation of the cost policy for purchasing high-quality seeds, efficiency of fertilizers and plant protection means and increase of endowment of farms with basic funds; 5) intensification of search of internal reserves optimization and reduction of expenditures on individual items; 6) development of all elements of infrastructure of cereal crops - construction, reconstruction and modernization of capacity for grain storage and processing; 7) substantiation and introduction of effective measures to stimulate and support the production of grain with to market conditions.

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