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Organisational and economic aspects of production and sale of niche crops

Abstract. Despite the significant advantages of producing niche crops, producers often face several challenges, such as imbalances in supply and demand, high resource intensity and a significant share of intangible costs, which complicate large-scale implementation and require in-depth scientific analysis to find effective solutions. The study aimed to develop and substantiate an economic mechanism for the production and sale of niche grain crops. In the course of the research, the following scientific methods were used: data collection and analysis, bibliographic method, method of economic analysis, modelling and logical generalisation. The study provided a comprehensive assessment of the current state of production and sales of niche cereals in Ukraine, namely: buckwheat, rye, oats, millet, sorghum and rice. The analysis included estimates of area, gross harvest, yield, domestic consumption, imports and exports. The study showed a significant reduction in the area under niche grain crops in 2022 caused by military operations in Ukraine. The area under rice decreased by 93.8%, sorghum by 76.7%, millet by 55.8%, rye by 47% and oats by 19.1%. The study calculated the total normative food requirement for the production of niche cereals and concluded that the food requirement for rye bread (20.3%) and rice (12%) produced in Ukraine is insufficiently met. An assessment of imports of niche cereals showed that rice traditionally accounted for the largest share of imports: 81.18% in 2015, 82.39% in 2022 and 98.76% in 2023. Based on the results, an economic mechanism for the production and sale of niche crops, including resource provision, production organisation, logistics, marketing, financial analysis, efficiency control and state regulation, was compiled. The results of the study are of practical value for producers of niche crops seeking to diversify their operations, adapt to market and climate change, and increase the economic efficiency of production and marketing

Keywords: niche crops; innovative diversification strategies; exports; imports; marketing; logistics

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INTRODUCTION

The production of niche crops helps diversify the agricultural sector, reduce dependence on traditional products, adapt to market and climate change, and increase export potential and economic efficiency. Despite the prospects of niche grain production, producers often face several challenges caused by imbalances between supply and demand, which lead to financial losses due to unprofitable sales of products, as well as difficulties in scaling up production due to high resource intensity and a significant share of intangible components in the cost of production. Given these features, there is a need for a deeper study of the problems associated with the production and sale of niche cereals and the justification of ways to overcome them.

The issue of niche crop production is becoming particularly relevant in the context of current challenges, including climate change and economic instability. In this regard, most researchers and practitioners define niche crops according to the following key criteria: underdevelopment of the relevant market, excess of demand over supply, low level of competition in the production sector, high purchase prices, significant profitability of cultivation, and the possibility of producing several value-added products from niche crops.

Scientists also concluded that niche crops are promising as a direction of production diversification, which is of interest to both small farms and large agricultural companies, as well as the importance of producing these crops for the formation of a set of economic, environmental and social effects. In particular, V. Tomashewskyi (2024) noted that in modern conditions, diversification of agricultural production through the cultivation of niche crops is of relevance, as it reduces the risks of losses associated with the shortage or death of traditional crops, as well as improve soil conditions through crop rotation diversification. N. Vasylieva & D. Nazarenko (2025) argued that diversified sustainable production will significantly reduce the risks of operating in the agricultural sector during wartime.

The study by T. Mirzoieva *et al.* (2024) revealed in detail the potential and economic importance of niche crops in the example of oats and millet due to their inherent advantages in

economic, environmental, agrotechnical and social terms, multifunctionality and the possibility of producing a variety of products with high profitability. The importance of implementing a strategy for diversifying the production activities of agricultural producers was noted by M. Ilchuk *et al.* (2023b). Following the study, diversification in the agricultural sector will ensure the sustainable development of the industry, as this strategy can be used to reduce operational risk, achieve increased financial synergies, stabilise revenues, increase credit opportunities, and change the profile of the enterprise.

Some scientific studies addressed factors that may affect the sale of niche crops. In particular, A. Dibrova *et al.* (2024) analysed the impact of the cost of mineral fertilisers on the development of the rye market and found that an increase in the cost of mineral fertilisers by 50%, 100% and 150% did not affect the average yield, harvested area and gross harvest of this niche crop. A.V. Kucher *et al.* (2021) identified the factors that affect the export potential of niche crops in the context of sustainable development of enterprises and regions. The researchers divided them into natural (soil fertility, land resources, climatic conditions) and anthropogenic (efficiency of production and sales management in an unstable market environment). The interaction of these factors determines the level of efficiency and competitiveness, which directly affects the export of niche products.

The environmental aspect related to the adaptation of the agricultural sector to climate change was studied by W.L. Carrasco-Chilón *et al.* (2023). The study analysed rye as a dual-purpose crop and concluded that due to its high nutritional value and yield, it can be grown for livestock feeding in acidic soil and lack of precipitation, and for grain production in the rainy season. B. Brockmueller *et al.* (2022) proposed an innovative approach to niche cereal cultivation, which consists of using winter rye sown in spring as a living mulch for weed control in organic cereal systems.

Despite a significant number of scientific studies on the production and sale of niche crops, the issues of improving the efficiency of these processes remain insufficiently studied.

In particular, the aspects of optimisation of economic processes, improvement of the sales system, adaptation to market conditions and introduction of innovative approaches to increase the competitiveness of niche crop products require further analysis. The study aimed to develop and theoretically substantiate an economic approach to the production and sale of niche grain crops.

MATERIALS AND METHODS

The following methods were used to conduct the study: data collection and analysis (desk research), bibliographic method, method of economic analysis, modelling and logical generalisation. The desk research method involved the use of data from the State Statistics Service of Ukraine for 2015, 2020-2023, concerning the commodity structure of Ukraine's foreign trade (Commodity structure of foreign trade..., 2016; 2021; 2022; 2023; 2024), areas, gross harvests and yields of agricultural crops by type and by region (Areas, gross harvests and yields of agricultural crops..., 2021; 2022; 2023; 2024), harvesting of agricultural crops, fruits, berries and grapes in the regions of Ukraine in 2015 (Harvesting of agricultural crops..., 2016); statistical data published by Statista for the 2021/22-2023/24 marketing years (Domestic consumption of grains in Ukraine..., n.d.).

To calculate the volume of gross harvest of niche cereals (rye, oats, rice, buckwheat, millet) to meet the food needs of the Ukrainian population, the Resolution of the Cabinet of Ministers of Ukraine No. 780 (2016), data from the State Statistics Service of Ukraine on the population of Ukraine (estimated) as of 1 February 2022 (Population by region..., 2022) and cereal (flour) yields (Grain technology, n.d.) were used. The data obtained as a result of the desk research became the basis for economic analysis, which not only identified key trends and patterns, but also substantiated scientific hypotheses and formulate reasonable conclusions. In addition, the results of the analysis became the basis for further research on the development of effective strategies and recommendations for practical implementation.

To collect and analyse the data, the bibliographic method was used, which involved the processing of various sources of information

listed in the list of references, including scientific articles (Demianenko, 2024; Tomashivskyi, 2024), regulations (Resolution of the Cabinet of Ministers of Ukraine No. 780, 2016; Resolution of the Cabinet of Ministers of Ukraine No. 1424, 2021; Resolution of the Cabinet of Ministers of Ukraine No. 886, 2021) and a statistical collection (Harvesting of agricultural crops..., 2016). the method provided comprehensive data on the production of niche crops. This method was used in the introduction and discussion section to identify promising areas for further research, as well as to emphasise the uniqueness of the interpretation of the results in the context of modern scientific achievements.

The method of economic analysis was used to identify patterns and trends in the production and sale of niche crops in Ukraine. It was used to analyse the dynamics of sown areas, harvested areas, gross yields, and yields of niche crops in Ukraine, as well as domestic consumption of these crops, exports and imports. The modelling method was used to build an economic mechanism for the production and sale of niche crops, and the method of logical generalisation was used to draw conclusions and develop proposals. These methods were used to develop an economic mechanism for the production and sale of niche grain crops and to substantiate proposals for markets for their sale.

RESULTS AND DISCUSSION

By 2022 (Fig. 1), Ukraine was actively developing the production of grain crops that can be classified as niche crops due to their small sown areas, which do not exceed 150-200 thousand hectares, according to the study. These crops include rye, oats, rice, sorghum, buckwheat and millet. Traditionally, they were substantial in the national agriculture, meeting food, feed and industrial needs both in the domestic market and in export trade. However, starting in 2022, due to the hostilities in Ukraine, there has been a significant reduction in the area under these crops, as shown in Figure 1.

In 2023, the area under buckwheat increased only compared to 2015. This is due to its strategic importance for the domestic market, as well as the introduction of state support to produce this crop. The Procedure for the Use

of Funds Provided for in the State Budget for Financial Support of Agricultural Producers (Resolution of the Cabinet of Ministers of Ukraine No. 77, 2017) defined the mechanism for using funds from the Ministry of Agrarian Policy under the programme 2801580 “Financial Support of Agricultural Producers”.

The mechanism and direction of state support for agricultural producers through the allocation of budget subsidies per unit of cultivated land was approved by the Resolution of the Cabinet

of Ministers of Ukraine “On Approval of the Procedure for Using Funds Provided in the State Budget for State Support to Agricultural Producers through the Allocation of Budget Subsidies per Unit of Cultivated Land” (Resolution of the Cabinet of Ministers of Ukraine No. 886, 2021). Under programme 2801580 “Financial support for agricultural producers”, subsidies per hectare of buckwheat crops were provided from 2021 to ensure stable production based on domestic demand (Budget subsidies for sowing..., n.d.).

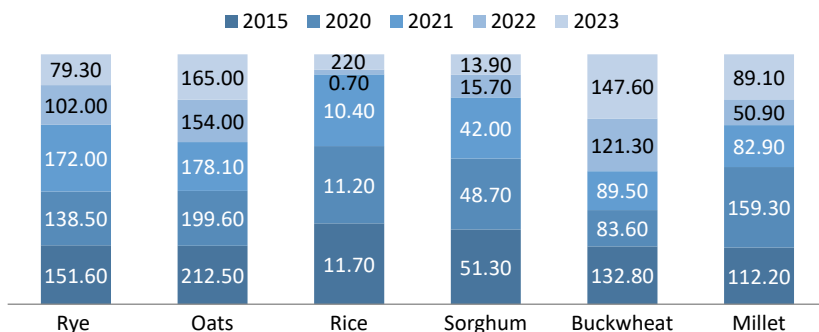


Figure 1. Sown areas of niche grain crops in Ukraine, thousand hectares

Source: compiled by the authors based on Areas, gross harvests and yields of agricultural crops... (2021; 2022; 2023; 2024), Harvesting of agricultural crops...(2016)

The level of development of niche grain production is assessed primarily by the dynamics of harvested areas, gross harvest volumes, and yields. In 2023, compared to 2015, there was a significant decrease in the area

under niche crops harvested, except for buckwheat. The area under buckwheat increased by 15.8% in 2023, and its increase was due to the introduction of state subsidies from 2021 per 1 ha of crops (Table 1).

Table 1. Dynamics of harvested areas, gross yields and yields of niche crops in Ukraine

4,272.7	Year					2023 to 2015, %
	2015	2020	2021	2022	2023	
Total area harvested, thousand hectares						
Rye	150.8	137.8	171.6	101.5	78.4	52.0
Oats	210.5	199.0	178.0	153.5	164.8	78.3
Rice	11.7	11.2	10.1	0.7	2.2	18.8
Sorghum	50.6	47.2	41.7	15.2	12.9	26.0
Buckwheat	127.7	84.1	91.9	121.0	147.9	115.8
Millet	112.8	159.1	87.1	49.1	87.9	77.9
Gross harvest, thousand tonnes						
Rye	3,910.7	4,567.8	5,931.5	3,140.3	2,311.8	59.1
Oats	4,885.1	5,100.0	4,679.0	3,785.1	4,272.7	87.5
Rice	625.1	606.8	494.8	30.9	110.8	17.7
Sorghum	1,882.8	1,065.6	1,731.6	403.1	423.7	22.5
Buckwheat	1,281.0	976.4	1,057.8	1,476.9	2,107.2	164.5
Millet	2,132.6	2,560.5	2,049.9	905.8	2,035.2	95.4

Table 1, Continued

Crop	Year					2023 to 2015, %
	2015	2020	2021	2022	2023	
Yield per hectare of harvested area, hwt						
Rye	26.0	37.2	38.1	34.2	30.9	118.8
Oats	22.7	28.0	27.2	24.9	28.1	123.8
Rice	53.4	54.0	49.3	41.7	49.9	93.4
Sorghum	42.4	23.6	46.6	28.3	35.3	83.3
Buckwheat	9.9	11.4	9.9	12.0	14.4	145.5
Millet	19.8	16.4	23.2	19.2	20.1	101.5

Source: compiled by the authors based on Harvesting of agricultural crops... (2016), Areas, gross harvests and yields of agricultural crops... (2021; 2022; 2023; 2024)

The war in Ukraine can also be attributed to the decline in the gross harvest of niche crops. In 2022, compared to 2021, there was a 47% decrease in the gross harvest of rye, a 19.1% decrease in oats, a 93.8% decrease in rice, a 76.7% decrease in sorghum, and a 55.8% decrease in millet. The gross harvest of buckwheat in 2022 increased by 39.6% compared to 2021 due to the introduction of state support for this crop (Table 1). In 2023, compared to 2015, yields of rice decreased by 6.6% and sorghum by 16.7%, while yields of rye increased by 18.8%, oats by 23.8%, buckwheat by 45.5%, and millet by 1.5%, mainly due to weather conditions.

Climatic conditions have a significant impact on the yield of niche cereals, as they determine the quality of the grain, the length of the growing season, and the level of risks associated with droughts, frosts, or excessive moisture. O.V. Vasylenko *et al.* (2024) noted that rye requires moderate rainfall (400-600 mm per season), and in 2022 and 2023 the amount of rainfall in the spring was excessive compared to the long-term norm in Ukraine, the yield of this crop during these years decreased compared to 2021. Sorghum and millet yield also decreased due to drought tolerance,

while buckwheat yields increased due to favourable weather conditions in 2022-2023.

Oats were the most consumed niche grain product in Ukraine. In the 2021/22 marketing year, the domestic consumption of oats in the country was 465 thousand tonnes. In the next 24 months, the consumption of this crop decreased by 9.7%, and a significant decline was recorded in the 2022/23 marketing year. Rye was the second most consumed crop, with domestic consumption of 365 thousand tonnes in the 2021/22 marketing year and down 3.6% in the 2023/24 marketing year. Millet ranked third in terms of domestic consumption, but in 2022/23 it decreased by 58% due to the occupation of the territories specialised in growing this crop. Buckwheat consumption in Ukraine remained stable, ranging from 110-150 thousand tonnes per year. The demand for healthy food and gluten-free products has stimulated the cultivation of sorghum, which is used to produce functional and dietary products. However, this crop has not yet become widespread, and its domestic consumption was 70 thousand tonnes in the 2021/22 marketing year and decreased by 85.7% in the 2023/24 marketing year (Table 2).

Table 2. Domestic consumption of niche grain crops in Ukraine, thousand tonnes

Production	Marketing year			2023/24 before 2021/22, %
	2021/22	2022/23	2023/24	
Rye	365	277	352	96.4
Oats	465	405	420	90.3
Rice	115	79	88	76.5
Sorghum	70	10	10	14.3
Buckwheat	110	145	145	131.8
Millet	214	90	215	100.5

Source: compiled based on the research department Domestic consumption of grains in Ukraine... (n.d.)

The production of niche crops such as rye, buckwheat, millet and oats is important to ensure a stable supply of quality food for the population. In the face of climate change and economic challenges, these crops could become key to maintaining national food security. Starting in 2022, the licensing of rye, millet and buckwheat exports was introduced to protect the domestic market and ensure stable supplies. In the context of war, economic instability and disrupted logistics chains, preserving strategic grain stocks can avoid shortages and price spikes for socially important products (Resolution of the Cabinet of Ministers of Ukraine No. 1424, 2021).

By calculating the total food need for the production of niche cereals based on the consumption norms approved at the state level for the main social and demographic groups of the population (Resolution of the Cabinet of

Ministers of Ukraine No. 780, 2016), the population as of 1 February 2022 according to the State Statistics Service of Ukraine (Population by region..., 2022) and cereal yields after grain processing (Table 3), it was concluded that there is an insufficient food need for Ukrainian rye bread and rice, despite the ban on rye exports.

In particular, the normative demand for rye bread in Ukraine is met by only 20.3%, and for rice groats by 12.4% (Table 3). The production of other niche grain crops fully met the food needs of Ukrainians in 2023, namely the normative food demand for oat groats was met by 837.6%, buckwheat by 132.6%, and millet by 121.9%. Rice consumption in Ukraine exceeded its production, confirming the need for import to meet domestic demand. Rice imports in 2023 contributed to nearly full coverage of food needs, as demonstrated in Table 4.

Table 3. Calculation of the volume of gross harvest of niche grain crops to meet the food needs of the population of Ukraine

Crop	Consumption rates		Cereal (flour) yields, %	Total food demand (estimated), thousand tonnes	Coverage of the normative food requirement in 2023, %
	per 1 person, kg/year	total, tonnes per year			
Rye	21.3	877.6	70.0	1,140.9	20.3
Oats	0.8	32.9	45.5	51.0	837.6
Rice	1.6	65.9	65.0	89.0	12.4
Buckwheat	2.9	119.5	67.0	158.9	132.6
Millet	3	123.6	65.0	166.9	121.9

Source: compiled by the author based on Grain technology (n.d.), Resolution of the Cabinet of Ministers of Ukraine No. 780 (2016) and Population by Region... (2022)

Table 4. Imports of niche grain crops to Ukraine, tonnes

Production	2015		2020		2021		2022		2023	
	tonnes	%	tonnes	%	tonnes	%	tonnes	%	tonnes	%
Rye	28	0.03	1,859	1.04	1,331	1.02	116	0.11	90	0.12
Oats	0	0.00	761	0.42	410	0.31	12	0.01	5	0.01
Rice	84,656	81.18	112,161	62.45	81,780	62.78	86,894	82.39	76,548	98.76
Sorghum	7,627	7.31	193	0.11	382	0.29	314	0.29	32	0.04
Buckwheat	6,022	5.77	32,397	18.04	24,579	18.87	9,152	8.68	502	0.65
Millet	5,953	5.71	32,226	17.94	21,773	16.72	8,982	8.52	331	0.43
Total	104,286	100	179,597	100	130,255	100	105,470	100	77,508	100

Source: compiled based on Commodity structure of foreign trade... (2016; 2021; 2022; 2023; 2024)

Table 4 shows that in 2015, 2020-2023, rice occupied the largest share in the structure of imports of niche grains, namely 81.18% in 2015, 82.39% in 2022, and 98.76% in 2023. This is due

to the limited climatic conditions for growing it in Ukraine, high costs of irrigation, equipment, energy, stable domestic demand and cheap imports. The 17.6% increase in rice imports in 2023

compared to 2015 is due to a decline in rice production in Ukraine due to the occupation of the southern regions, which were its main producers.

Low imports of all other niche crops can be explained by sufficient domestic production and insignificant demand for these products on the domestic market. Even though most of the products of niche cereals are consumed on the domestic market, their production may be promising for international trade. Buckwheat, oats, sorghum, and rye are in demand in the EU, Asia, and North America, which opens up opportunities for expanding Ukrainian exports.

An analysis of statistical information on the production and export of niche cereals in Ukraine determined that export sales are insignificant compared to production (Fig. 2). The largest exports were of sorghum compared to production. This figure was highest in 2022 at 176.8%, and lowest in 2021 at 34.6%. The surplus

of exports over production of sorghum is determined by the use of previous years' stocks, re-exports, and difficulties in registering the harvest during the war, as regions with favourable soil and climatic conditions for growing this crop are concentrated in the South of Ukraine. Millet was the second largest export crop. This figure was the highest in 2021 at 81.7%, and the lowest in 2015 and 2023 (27.2% and 33.9%, respectively). In 2021, an increase in the gross harvest of rye to 593.1 thousand tonnes was noted, which exceeded domestic needs. Due to high rye yields, limited domestic consumption and increased external demand caused by low yields in Europe, rye exports in 2021 amounted to 23.0%, the highest in the study period. Other crops accounted for a small share of exports, however, Figure 2 shows a significant export potential for niche cereals such as oats, buckwheat and millet.

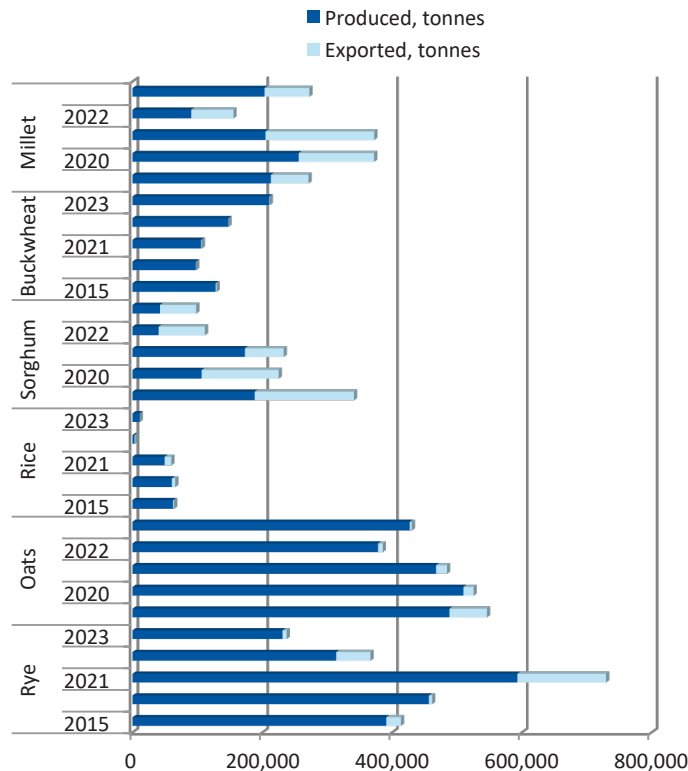


Figure 2. Production and export of niche grain crops to Ukraine, tonnes

Source: compiled based on Commodity structure of foreign trade... (2016; 2021; 2022; 2023; 2024), Areas, gross harvests and yields of agricultural crops... (2021; 2022; 2023; 2024), Harvesting of agricultural crops... (2016)

One of the issues for farmers growing niche crops is the marketing efficiency. As the market for these products is limited, farmers may face difficulties in establishing stable sales. In contrast to other agricultural products with well-developed logistics infrastructure and demand, niche crops require a special approach. Furthermore, a larger supply may cause additional price reductions due to increased competition. This involves finding new markets, improvement of consumer awareness, and establishment of cooperation with distributors and processing companies.

Among the factors causing difficulties in the sale of niche grain crops, the following is notable: small acreage compared to major export grains such as wheat, corn and barley; priority on domestic consumption, which prevents the formation of large export consignments; unstable global demand for niche grains; the need for separate logistics infrastructure due to the small consignments of niche grain crops, potentially economically damaging; the requirement to comply with the certification standards of

importing countries to enter international markets; the lack of state support programmes for the production of niche grain crops.

To improve production and sales of niche crops, it is necessary to develop an economic mechanism that contributes to the industry. Justification of the economic feasibility of niche crops requires a comprehensive assessment of the production efficiency and sales, as this can be fully assessed only after the sale of products. Determination of economic efficiency should include not only the costs but also an analysis of market conditions, supply and demand, pricing, logistics costs and profitability. Only an integrated approach can be used to form an objective view of the economic feasibility of niche crops and ways to optimise production and commerce.

The economic mechanism for the production and sale of niche grain crops, which is shown in Figure 3, ensures a balanced combination of elements that will increase the efficiency of production and sales of niche crops, ensure competitiveness and improve sales.

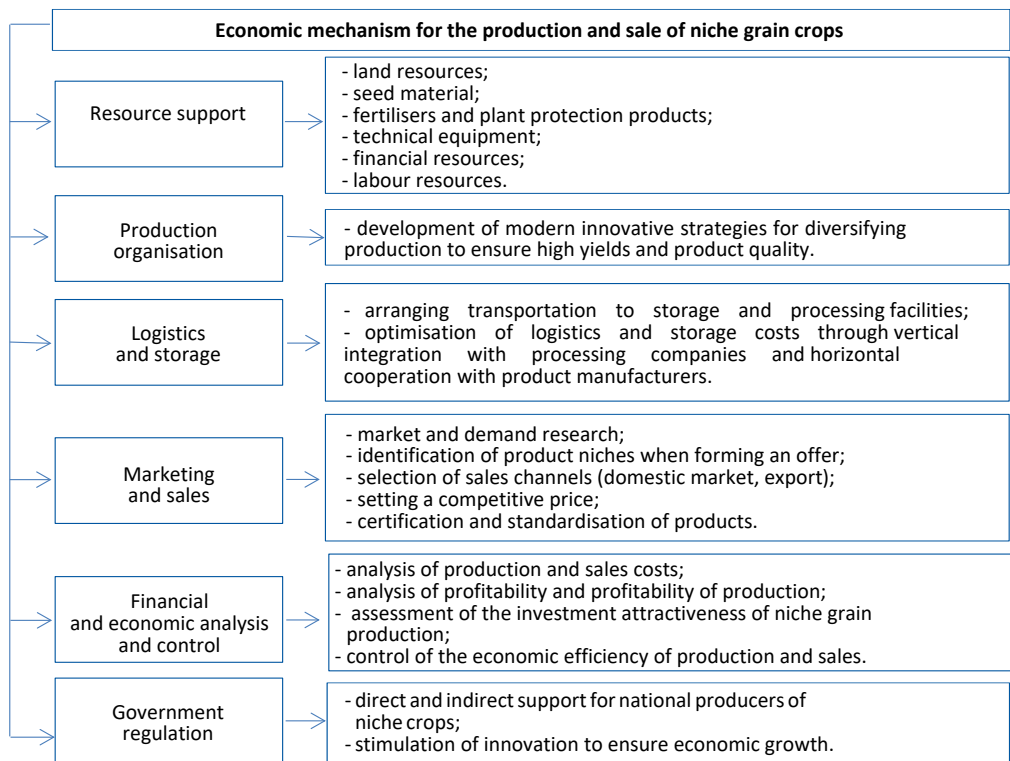


Figure 3. Economic mechanism for the production and sale of niche grain crops

Source: compiled by the authors based on O. Fedirets (2021), T. Demianenko (2024)

Modern innovative strategies for diversifying the production of niche cereals, which are part of the Production Organisation component (Fig. 3), should include the introduction of advanced agricultural technologies, the use of varieties resistant to climate change, optimisation of production processes, digitalisation of agribusiness and the application of environmentally sound management practices. Such strategies should be aimed at increasing the efficiency of production and land use, expanding market opportunities and strengthening the competitiveness of the agricultural sector. Improving the structure of cultivated areas using small plots of land (land shares, plots unsuitable for large-scale production) will enable economic entities to make the most effective use of available land resources, while expanding crop areas through niche grain crops will contribute to the diversification of agricultural production through more efficient use of crop rotation, technology and labour resources.

Greening of agricultural production involves the introduction of environmentally friendly technologies, reducing the anthropogenic impact on the environment and increasing the resilience of agroecosystems. The cultivation of niche crops such as rye, oats, buckwheat, millet, sorghum and rice will contribute to this process due to their unique agronomic and environmental characteristics. Rye and buckwheat actively improve soil structure, preventing soil erosion, while sorghum and millet are highly drought-resistant, reducing the need for water resources. Oats are known for their ability to improve soil biological activity and serve as a natural phytosanitary element in crop rotations.

Based on the study, it is possible to conclude that the economic mechanism for the production and sale of niche cereals is a system of interrelated components, including resource provision, organisation of production processes, logistics and warehousing operations, marketing strategy, financial and economic analysis, performance monitoring and government regulation. Its main goal is to ensure the rational management of production, sales and market development of niche cereals, contributing to their competitiveness and sustainability in the market.

The unique capabilities of niche cereals identified in the study are confirmed by the

American scientist J. Klein (2022), who noted that oats have the potential to clean groundwater due to the high absorption capacity of its root system, which can absorb and retain nitrates. S.M. Kalenska & N.V. Novytska (2024) noted that the cultivation of niche cereals reduces the use of chemical fertilisers and pesticides, as many of them have natural resistance to pests and diseases, namely Sorghum, thanks to the high content of tannins in the grain and a waxy coating on the leaves, has natural resistance to many pests and fungal diseases. Buckwheat contains natural phytoncides that inhibit the development of diseases and repel some pests, including aphids millet, thanks to its dense grain shell and undemanding growing conditions, is less susceptible to fungal diseases and pests rye has high natural resistance to many diseases, including smut fungi and root rot, and is less susceptible to pests than wheat; oats are relatively resistant to diseases, especially rust and root rot, and contain anti-nutritional substances that reduce their attractiveness to pests.

An important aspect of a modern business environment is the reduction of the carbon footprint of agricultural production by reducing energy consumption for soil cultivation and reducing greenhouse gas emissions. The use of niche crops in mixed agroecosystems and organic farming will help create balanced ecological chains that support the natural processes of regulating soil fertility and biological balance. In the process of greening agricultural production, the state is central by providing the legal, economic and organisational framework for the introduction of environmentally friendly technologies. In particular, the provision of government subsidies and preferential loans to producers using organic technologies, as well as tax incentives for enterprises implementing environmentally friendly farming methods, will help ensure the greening of niche grain production.

This statement is also supported by M. Ilchuk *et al.* (2023a), concluding that to slow down soil degradation caused by the loss of organic carbon and to improve the agro-ecological situation in Ukraine, it is necessary to introduce a system of economic incentives for measures aimed at restoring soil fertility. To do this, an environmental tax should be introduced for agricultural producers in case of violation of the

scientifically based structure of sown areas, which will help preserve the natural balance of soil resources and ensure sustainable development of the agricultural sector.

The proposals of the authors of the study on the need to develop an economic mechanism for the production and sale of niche grain crops, which will contribute to the development of the industry, coincide with the views of other researchers. T. Demianenko (2024) noted that the economic mechanism serves as the foundation for ensuring the effective functioning of economic systems at all levels, from the individual enterprise to the national economy, and is the main tool for stimulating economic growth. O. Fedirets (2021) defined the organisational and economic mechanism of enterprise development as a set of interrelated methods, tools means and regulatory levers that ensure effective management of organisational and economic processes. Its main task is to contribute to the achievement of the strategic goals of the enterprise, adapt to changes in the internal and external environment, as well as to increase the competitiveness and sustainability of the enterprise in a dynamic market.

The results of the study on the feasibility of selling niche crops on the domestic market, developing the processing and creating cooperatives of niche producers, also confirmed the findings of other scientists. L.O. Boiko (2024) noted that to minimise the risks of growing and selling niche crops, farmers need to incorporate not only the agronomic features of their production but also develop effective market integration strategies. This may include diversifying sales channels, establishing cooperatives to enter the market together, entering long-term contracts with buyers, and developing their processing facilities to produce value-added products. Only a comprehensive approach that combines modern agricultural technologies with business strategies will enable producers to successfully integrate niche crops into their agribusinesses and ensure their competitiveness both in the domestic and foreign markets.

Other researchers also concluded that niche crops are highly profitable. L. Boiko (2023) concluded that an important argument for diversifying agribusiness by introducing certain

crops into crop rotation is that most of them have a higher market price than conventional crops. The price of buckwheat can be as high as 20 thousand UAH/t, and its profitability in 2020 was 54.7%, and in previous years it was 100%. O. Titarenko (2022), having conducted an economic assessment of the efficiency of grain sorghum cultivation, concluded that, according to the technology of growing this crop, the costs per unit area ranged from 21,322 to 22,697 UAH, excluding land rent and other additional payments, and the cost of sales of the products produced ranged from 53,227 to 70,921 UAH/ha, which indicates the economic feasibility of growing grain sorghum under modern economic conditions. S. Kalenska & V. Naidenko (2019) determined that a profit of 28.9 and 25.4 thousand UAH/ha can be obtained by growing grain sorghum hybrids Brigga F1 and Burggo F1, respectively. S. Volodin (2021) noted the significant potential of oats in diversifying Ukrainian agricultural exports and increasing the profitability of the grain industry, which the author attributes to global trends in healthy lifestyles and organic farming.

The statement that some cereals are characterised by high drought tolerance, which can be used to be successfully grown in regions with unstable climatic conditions, correlates with the findings of M. Van Zonneveld *et al.* (2023) on analysis of niche crops in the context of climate change in sub-Saharan Africa (SSA). The study believed that these crops can open up significant opportunities for diversifying agricultural production, which is an important strategic step towards overcoming hunger and ensuring a balanced diet. The proposal for green agricultural production through the introduction of niche cereals is in line with the opinion of A. Burliai *et al.* (2021), argue that the greening of agriculture is an essential condition for the sustainable development of society and is recognised as one of the key concepts of the present era.

The study significantly contributed to the expansion of the scientific and theoretical basis for organising the production and sale of niche crops, by substantiating the strategic directions of development of this segment of the agricultural sector. The proposed economic mechanism for the production and sale of niche

grain crops is a tool for improving the efficiency of agricultural production, strengthening the competitiveness of Ukrainian producers and ensuring sustainable development of the industry in the context of market transformations and changes in the external environment.

CONCLUSIONS

The study demonstrated that in 2023, compared to 2015, the harvested area of niche crops decreased significantly, except buckwheat, which increased by 15.8% due to government subsidies introduced in 2021. The decrease in the area in 2022 was mainly caused by the military actions in Ukraine. The area under rice decreased by 93.8%, sorghum by 76.7%, millet by 55.8%, rye by 47% and oats by 19.1%. In the 2021/22 marketing year, oats were consumed in Ukraine the most – 465 thousand tonnes, but over the next two years, these volumes decreased by 9.7%, with the biggest decline in the 2022/23 marketing year. Rye was the second most consumed grain, amounting to 365 thousand tonnes, but in the 2023/24 marketing year, its consumption decreased by 3.6%. Millet was the third most consumed product, but in the 2022/23 marketing year, its volume decreased by 58% due to the occupation of the producing territories. Buckwheat consumption was stable at 110-150 thousand tonnes per year. The demand for gluten-free products stimulated sorghum cultivation, but due to the low popularity of this product, its consumption decreased by 85.7% from 70 thousand tonnes in the 2021/22 marketing year to 10 thousand tonnes in the 2023/24 marketing year.

Based on the calculation of the total food demand for niche grain production, it was concluded that the normative food demand for rye bread (20.3%) and rice (12%) produced in Ukraine is insufficiently met. Rice consumption in Ukraine has consistently exceeded domestic production, which necessitates imports to cover domestic needs. In 2023, imports of rice almost fully covered the food needs of the population, and this crop traditionally occupied the largest share in the structure of niche grain imports: 81.18% in 2015, 82.39% in 2022, and 98.76% in 2023. Although most of the niche grains were consumed domestically, crops such as buckwheat, oats, sorghum, and rye have export potential due to

demand in the EU, Asia, and North America. The analysis of statistical information shows insignificant exports of niche grains compared to their production, except sorghum, which in 2022 exceeded production by 176.8% due to residues, re-exports and difficulties in registering the harvest. Millet is in second place, with the highest exports recorded in 2021 (81.7%). Significant exports of rye in 2021 (23.0%) were driven by a high harvest, low domestic consumption and demand from the EU. The main challenge for agricultural producers specialising in niche crops is to establish an effective sales system. The results of this study indicated that Ukrainian producers of niche crops should focus primarily on the domestic market, and in case of overproduction, consider export prospects. This conclusion is based on several factors identified in the course of analysing the production and marketing of these products.

The production of niche crops is an important component of food security, especially in times of economic instability. It helps to avoid shortages and price fluctuations, reduce import dependence and provide the food industry with quality raw materials. The effective functioning of the economic mechanism in this area involves the development of domestic processing, which creates added value, and new jobs and supports domestic producers. Niche cereals, such as sorghum and millet, are suitable for growing in the face of climate change and lack of precipitation due to their drought tolerance, which makes them economically viable in the face of a shortage of traditional products. Expanding the cultivation of rice and rye, which are partially imported to Ukraine, will help stabilise prices and avoid shortages. The introduction of such crops contributes to the greening of agricultural production, the rational use of land resources and the production of environmentally friendly products with high added value.

To improve the efficiency of production and sales of niche grain crops, an economic mechanism was developed to promote the development of the industry. It includes a balanced combination of its interrelated components, namely resource provision, organisation of production processes, logistics and warehousing operations, marketing strategy, financial and

economic analysis, performance monitoring and state regulation. Its main objective is to ensure rational management of production, sales and market development of niche grains, thereby contributing to the competitiveness and sustainability in the market. Prospects for further research include a comprehensive analysis of the economic efficiency of production and sales of niche crops, including the impact of organisational and economic factors on profitability, logistics and marketing aspects of sales, the level of competitiveness in different markets, and

the development of state support mechanisms, incorporating economic transformations and climate change.

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Організаційно-економічні аспекти виробництва та продажу зерна нішевих культур

Анотація. Попри значні переваги виробництва продукції нішевих зернових культур, товаровиробники часто зіштовхуються з низкою проблем, таких як дисбаланс попиту й пропозиції, висока ресурсоемність і значна частка нематеріальних витрат, що ускладнює масштабне впровадження та потребує глибокого наукового аналізу для пошуку ефективних рішень. Метою статті була розробка та обґрунтування економічного механізму виробництва та продажу продукції нішевих зернових культур. У процесі дослідження застосовувалися такі наукові методи: збір та аналіз даних, бібліографічний метод, метод економічного аналізу, моделювання та логічного узагальнення. В дослідженні проведено всебічну оцінку сучасного стану виробництва та продажу продукції нішевих зернових в Україні, а саме: гречки, жита, вівса, проса, сорго та рису. Аналіз включав оцінку площ, валових зборів, урожайності, внутрішнього споживання, імпорту та експорту продукції. Дослідження показало значне зменшення площ під нішевими зерновими культурами у 2022 р. спричинене військовими діями на території України. Площі під рисом скоротились на 93,8 %, під сорго – на 76,7 %, під просом – на 55,8 %, під житом – на 47 % та під вівсом – на 19,1 %. В статті проведено розрахунок загальної нормативної продовольчої потреби у виробництві продукції нішевих зернових та зроблено висновок про недостатньо забезпечену продовольчу потребу в житньому хлібі (20,3 %) та рисі (12 %) українського виробництва. Оцінка імпорту продукції нішевих зернових показала, що рис традиційно займав найбільшу частку в структурі імпорту: 81,18 % у 2015 р., 82,39 % у 2022 р. та 98,76 % у 2023 р. На основі дослідження розроблено економічний механізм виробництва та продажу нішевих зернових культур, що включає ресурсне забезпечення, організацію виробництва, логістику, маркетинг, фінансовий аналіз, контроль ефективності та державне регулювання. Результати дослідження мають практичну цінність для виробників нішевих зернових культур, які прагнуть диверсифікувати діяльність, адаптуватися до ринкових і кліматичних змін та підвищити економічну ефективність виробництва і збуту

Ключові слова: нішеві культури; інноваційні стратегії диверсифікації; експорт; імпорт; маркетинг; логістика