DOI: https://doi.org/10.30525/978-9934-26-494-8-24

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STRATEGIC GUIDELINES FOR AGRIBUSINESS DIVERSIFICATION THROUGH EXPANDING THE PRACTICE OF PRODUCING NICHE CEREAL CROPS

Summary

The purpose of the publication is to reveal the strategic priorities of agribusiness diversification through the prism of niche. To form the basis of the research, first of all, the economic value of the main niche grain crops was analyzed, the current state and dynamics of their production were assessed. The paper considers the importance and economic potential of growing niche crops. The main advantages of their production are highlighted. The main challenges have been identified and modern trends in agribusiness have been revealed, which lead to the spread of the practice of producing niche grain crops. The theoretical-applied and methodological principles of sustainable development, regenerative agriculture and niche production (in the context of the cultivation of niche grain crops) in their relationship and their fundamental principles, which can represent the theoretical-methodological basis for the formation of a niche diversification strategy of agribusiness, are summarized and substantiated. The main results of the research, representing a scientific novelty, were defined conceptual provisions for the formation of a long-term strategy for the development of niche production and proposed a mechanism for the introduction of niche diversification on the basis of sustainability. It was determined that the future of niche crops in the agricultural sector is promising, especially in the context of growing attention to sustainable development, environmental protection and the need for diversification.

Introduction

In recent years, the impact of climate change on agriculture has become more and more acute. Therefore, in the conditions of climatic changes and market conditions, agribusiness is increasingly starting to apply innovative strategies for diversifying types of economic activity.

Diversification is a recognized tool for the strategic modernization of the agricultural sector, which should be considered an effective management model for the development of a modern enterprise, which is aimed at strengthening competitiveness in the market of agricultural products and food and involves the reorientation of production within one industry to a more profitable type of production using interconnected skills and abilities of specialists.

In turn, the diversification tool is the spread of production of various niche crops. Cultivation of certain niche crops can provide a fairly high yield on small areas. This direction of economic activity is suitable for both small and micro agricultural producers, who currently suffer from low prices for products and problems with logistics when growing traditional agricultural crops. Niche cultures have their own advantages from the point of view of their production. The advantage is relatively little competition in this area. Often, such cultures do not require significant investments in the organization of production, but at the same time provide a high level of profitability.

In our opinion, diversification of agricultural production towards non-traditional and rare crops can help increase agricultural productivity, stabilize production, increase food security and reduce the risk of climate change. In the conditions of fairly high volatility of market prices for traditional marginal crops – sunflower, rapeseed and soybean – despite the peculiarities of the current situation, niche agricultural crops can be a reasonable alternative for profitable diversification of agribusiness, in particular for representatives of small and small farmers, grains are able to help prepare the agricultural sector for the challenges of the global warming.

Niche crops are an important tool for the recovery of agribusiness in the war and post-war period, as they stimulate innovation and provide additional income. They can help reduce the risks associated with changing conditions and contribute to a more sustainable and efficient agricultural sector. Cultivation of niche crops allows for increased food diversity, which is especially important in the context of food security, when it is necessary to provide food to the population in a country at war.

Therefore, the production of niche products opens up opportunities for the commodity producer to become a significant player, and for science to feel in demand in active niches of high-tech agricultural production.

Chapter 1. The importance of niche grain crops and modern trends in agribusiness, causing the spread of their production practices

According to the United Nations, the number of people affected by hunger worldwide rose to 828 million in 2021, an increase of approximately 46 million compared to 2020 and 150 million since the start of the COVID-19 pandemic. Accordingly, in 2022, the level of food security in the world has already reached an unprecedented level both in terms of scale and severity [41; 42].

As of the beginning of 2024, the Food and Agriculture Organization (FAO) estimated that more than 820 million people were still suffering from hunger worldwide, and one of the factors contributing to this dire situation is climate change [43]. The problems of food security affect all continents, the most suffering from malnutrition in African and Asian countries. According to forecasts, the problem of ensuring food security in the world will continue to worsen in the coming decades. Food prices are likely to rise due to climate change and world population growth, and demand for food products will increase accordingly. Thus, the Institute of World Resources expects that by 2050, the world demand for beef and lamb will increase by 30%, compared to 2006, and the greatest demand will be in China (+116%) and India (+138%) [44]. In addition, the state of food security in the world is also affected by the change in diet and approaches to nutrition in modern society. We are talking about a trend: the incomes of the population are growing, accordingly, food preferences are also changing. As much of the world is projected to become wealthier in the coming decades, demand for processed foods, meat and dairy products will increase. To meet this demand and the demand associated with population growth, more animals will have to be kept and fed, which in turn will increase the demand for grain. Food security is a serious problem in urban areas, and with the rapid development of urbanization, solving this problem is becoming increasingly important [40]. In general, the problem of food security in the modern world comes to the fore, and without solving it, it seems difficult to solve other acute economic and social problems [54]. A healthy and productive society is possible with adequate food security, which means reliable access to sufficient, safe, affordable and nutritious food at all times [59]. Considering this, the task of ensuring and maintaining food security is included in the list of UN Sustainable Development Goals, and is also in the field of view of the world community in general [37]. At the same time, numerous global challenges and risks significantly affect food security, especially in developing countries, so the formation of a sustainable food system based on coordinated economic, social and environmental policies is a priority task for the world community in the 21st century [57].

In this regard, various organizations and institutions in the world are working on the problem of ensuring food security and developing ways to solve it. For example, the European Food Security Crisis Preparedness and Response Mechanism (EFSCM), which was established to improve cooperation between the public and private sectors and assess risks in the event of a crisis, has developed a contingency plan to ensure food supply and food security during a crisis. This plan aims to ensure a sufficient and diverse supply of safe, nutritious, affordable and sustainable food to citizens at all times [42].

In particular, the plan envisages such measures to ensure food security as:

1) reduction of food waste and food loss (the relevance of this issue is confirmed by the fact that, according to estimates, in today's conditions, a third of the food produced is lost – food waste and food loss in monetary terms amount to about 750 billion dollars per year);

2) improvement of infrastructure, in particular in the context of optimization, which also guarantees the reduction of food losses and improves food security;

3) promotion of fair trade – access to food markets is needed not only by large commercial companies, small farmers should also receive a fair price for their products;

4) reducing the yield gap. Due to inefficient management methods, the yield of agricultural land in some places is much lower than it could be, so it is advisable to introduce crop rotations and use sustainable production methods and new technologies;

5) fight against climate change. The main causes of crop loss in many cases in today's conditions are droughts and floods, which in turn are a consequence of global climate change. Therefore, combating climate change will reduce crop failures;

6) develop diversification. Farming practices have already shown that focusing on one type of crop depletes the soil and makes the crop more vulnerable to diseases and pests, and farmers also face problems if their crops fail and they have no alternative. Therefore, diversification is important for ensuring food security;

7) elimination of indirect causes of a decrease in the level of food security. The level of food security is affected by the imbalance between imports and exports. Since not every country can grow all the food it needs, it is necessary to have sufficient capital to import food. It is important that healthy nutrition is financially accessible to all population groups [41].

In turn, the World Bank Group is working with a number of partners to build food systems that feed everyone, everywhere, every day and improve food safety. The bank is a leading financier of food systems. In the 2022 fiscal year, it allocated 9.6 billion dollars. USA of new IBRD/MAR commitments for agriculture and related sectors. The bank's activities include interventions and short-term programs that promote farming systems that use climate-smart practices and produce a more diverse food mix to improve the sustainability of food systems, increase farm incomes, and ensure greater availability of nutrient-rich foods. In addition, the World Bank supports long-term global food security programs.

In particular, the Bank implements the Global Agriculture and Food Security Program (GAFSP) – a global financial instrument that pools donor funds and directs additional financing for the development of agriculture along the entire value chain. Since 2010, GAFSP has reached more than 13 million smallholder farmers and their families, providing more than $1.3 billion in grants

for 64 projects in 39 countries, as well as $13.2 million in small grants to support producer organizations. In response to the COVID-19 pandemic, GAFSP allocated more than $55 million in additional grant funding [65].

The Food and Agricultural Organization (FAO) in the UN system is also working tirelessly to ensure food security in the world. This specialized agency is responsible for eradicating hunger, malnutrition and poverty in the world by promoting sustainable agriculture. FAO plays an important role in the development of policies and strategies to improve food security and nutrition security by providing technical assistance and support to countries in the development and implementation of national food security policies and strategies; promotes sustainable agricultural practices that help increase food production and improve farmers' livelihoods; supports small farmers by providing them with technical assistance, training and financial support; plays a key role in responding to food emergencies such as natural disasters, conflicts and other crises; provides emergency food aid, seeds and tools to affected communities to help them recover and rebuild [43; 44].

The key guidelines from FAO, the observance of which should ensure food security for all, are:

1) diversification of agricultural production, which involves encouraging farmers to grow a variety of crops to preserve soil fertility, minimize the risks of crop losses due to pests and diseases, and ensure a more balanced and nutritious diet for consumers;

2) supporting smallholder farmers who are key players in food production for local communities by providing them with access to training, credit and markets that can help them increase income and food security;

3) reducing food waste in order to save resources, reduce greenhouse gas emissions and ensure that more food reaches those who need it;

4) strengthening social protection through various programs such as food vouchers and school feeding programs that can help vulnerable populations gain access to food;

5) combating climate change by promoting climate-smart agriculture, investing in research and technology, and reducing greenhouse gas emissions [43].

In general, today, ensuring food security has become a key issue for countries with different levels of economic development, and the strategic role in improving food availability and achieving food security is assigned to the agricultural sector.

More and more scientists and practitioners agree that a possible method of eradicating hunger is a better food supply, which is primarily ensured by increasing the productivity of agriculture and expanding the range of agricultural land use [61]. But despite the rapid development of the agricultural

sector in the world, food security still remains a global and serious problem in some parts of the planet.

For example, the war, which has been going on for the third year in Ukraine, has caused destruction in the field of production and sale of agro-food products, which, in turn, has led to negative changes in the food market. Although Ukraine has sufficient food reserves, in the conditions of hostilities, the problem of ensuring national food security is significantly aggravated. Due to the war in Ukraine, the scale of agricultural production has significantly decreased and its structure has changed, therefore, it is likely that in the near future this will negatively affect the state of national food security. It is likely that certain changes will take place in the world food market as well.

And taking into account the role of the Ukrainian agricultural sector in the world food market, the problems of developing agricultural production and ensuring food security, especially in the context of military aggression against Ukraine, require further careful attention. Diversification is a recognized tool for strategic modernization of the agricultural sector. In particular, in our opinion, diversification of agricultural production towards non-traditional and rare crops can help increase agricultural productivity, stabilize production, increase food security and reduce the risk of climate change. After all, plants provide more than 80% of the food consumed by humans and are the main source of nutrition for livestock. In addition, in today's conditions, agricultural production is being transformed. This is due to a number of reasons, the main of which are: a decrease in prices for traditional grains, climate changes, and aggravation of logistical problems. Risks are growing and, accordingly, farmers have to: look for new profitable directions and additional opportunities both to optimize production and to save resources; be more flexible; react more quickly to changes. Today's conditions also force agrarians to make faster decisions, including regarding the introduction of the production of niche crops, to which attention is increasingly growing in the world and which are also called special or alternative crops. For example, the US receives $79.8 billion annually from niche crops alone, representing 17.6% of the agricultural value produced annually in the country [62].

The concept of "niche" production is not a new concept for the agricultural sector. For many years there has been a demand for niche crops. However, the demand for niche cultures is situational – it is implied that when a "niche" begins to be mass-produced, it is no longer considered a "niche" but a mass-produced culture. In many countries today, niche crops are one way to help existing and new agricultural enterprises achieve profitability and sustainability.

In Ukraine, for the majority of farmers, niche crops in general and niche grains, in particular, still do not have a significant market value, which is evidenced by the low level of interest of commodity producers in their

cultivation on a permanent basis. Of course, it is difficult to get 60-100% and higher profitability on niche crops from the first time, as it is possible in the case of some oil crops. However, there are more and more practical examples that confirm the significant and still unappreciated opportunities for diversifying agricultural exports and increasing the profitability of the grain industry through the introduction of niche crops into production. These opportunities are connected, first of all, with the development of organic agriculture and global trends in changing people's views on a healthy lifestyle. In this context, niche crops in general and niche grains, in particular, and the development of their production are attracting increasing attention.

In the current conditions of worsening food security in the world, new requirements for the formation of agrarian policy are emerging and the role of diversification of agricultural production is growing. In turn, the diversification tool is the spread of the production of various niche crops both under the conditions of traditional agriculture and on the basis of organic production. The potential of niche crops is determined by the opportunities to increase food security in the world and a number of other effects that can be achieved in the process of their production in the economic, agro-technological, ecological and social planes.

Talking about economic aspects, then niche crops allow to distribute market risk, are raw materials for products with high added value, are a source of additional income for farmers and, importantly, for representatives of small businesses. An example of the advantages of niche crops in the agrotechnological and ecological planes is, first of all, the diversification of crop rotations and the expansion of the biodiversity of crops, the improvement of soil conditions, and the prevention of climate change. Growing niche crops also plays an important role in the social sphere, as it can stimulate the development of small agrarian businesses, create additional jobs in rural areas and, in a certain way, ensure the development of rural communities.

A number of domestic and foreign scientists have investigated the development of niche crops from different points of view. Thus, B. Supikhanov investigates their role in the human food chain and draws attention to the change in the volume of their production in the direction of increase over the last decades [29]. L. Udova and K. Prokopenko consider niches as a new perspective for small farms [64]. Ratushna Yu. notes that niche crops are those that are not typical for the agro-industrial complex of Ukraine and therefore are not grown [24]. A group of scientists under the leadership of R. Vozhegova considers them as new opportunities for the agro-industrial complex of Ukraine in the conditions of modern threats and challenges [8]. N. Karasyova, in turn, investigates trends in the development of the world market of niche crops [13]. O. Petrova notes that niche leguminous crops are of significant economic interest [23]. Tretiak N. and a number of other scientists study the cultivation

of niche crops in the context of the prospects of eco-innovative agricultural production in Ukraine [63]. American scientists Neill C.L. & Morgan K.L. consider and analyze the production, financial, regulatory, price and human risks specific to the production of niche crops in the USA [55]. Other American scientists add that niche crops are more profitable than most traditional crops, but also have higher production risks [51]. It is also claimed that the development of the production of niche crops in combination with the development of animal husbandry is a possible tool for balanced and integrated development of agricultural production in the context of world food security [53]. A team of scientists headed by L. Gebrin-Bayda studies the cultivation of niche crops in the context of the prospects of eco-innovative agricultural production in Ukraine [46].

It is quite common to believe that so-called alternative/specialty crops can contribute to the diversification of crops in agriculture and the strengthening of human health and well-being through the expansion of the range of food crops [47]. Robert Hamlin, John Knight & Ron Cuthbert examine niches in agricultural production through the prism of the need for diversification, primarily for small and micro farmers [45]. Hye-Ji Kim, continuing the previous opinion, emphasizes that niche crops can contribute both to diversification in agriculture and to strengthening people's health and well-being by providing a diverse range of food crops [47].

In turn, studies show that diversified farming systems create more employment opportunities for the rural population without loss of profit for agricultural producers. In addition, promoting diversification, particularly through the spread of niche crops, is seen as a promising strategy to ensure sustainable livelihoods for farmers and adequate nutrition for households and society.

Also, niche crops are now considered very promising for the future of agriculture, and their distribution corresponds to the Sustainable Development Goals established by the United Nations [52]. Thus, scientists note that most niche crops (also known as rare, alternative, special, local) are resistant to abiotic stresses, suitable for marginal environments and form a wide pool of genetic resources for improving future crops. Incorporating such crops into existing farming systems can contribute to the creation of sustainable, nutritious, healthy and diverse food systems, especially in marginalized agro-ecological settings. It has been proven that a number of niche crops are characterized by high acclimatization and adaptation potential to conditions of high salinity, drought, waterlogging and in soils with low fertility [49]. And since marginal areas constitute a significant portion of available land, their utilization through the introduction of stress-resistant niche crops can potentially increase their agricultural productivity and thus improve food security by increasing food availability.

Many niche crops are known for their health benefits due to their content of bioactive compounds, including phytochemicals, vitamins, minerals and fiber. Therefore, the practice of growing certain niche crops in different regions of the world can contribute to increasing the diversity of food products, spreading healthy nutrition and meeting the needs for nutrients for human health and well-being [47].

Niche crops are high-value crop products, but their producers face relatively higher risks and increased production costs, so they should be introduced into crops with caution [38]. If there is no proper information on production technology, management and marketing, agricultural producers may face the risk of low economic profitability. On the contrary, with a thoughtful and professional approach to the cultivation of niche crops, agricultural producers can discover new market opportunities. In today's environment, the trend of healthy food is becoming more widespread, consumers are more and more willing to pay for new and unique products, so niche crops can help farmers gain access to regional, domestic and global markets with new products [47]. This statement, in our opinion, is especially relevant, given the wide variety of niche (alternative, special) cultures both in the world in general and in a separate region or country.

In general, it was found that researchers and experts have not formed a unified approach to the classification of signs of the separation of agricultural crops into a group of niches. Directly in agricultural production, they are those that are used in crop rotation as precursors of the main crops, as well as those that act as replacement crops for reseeding dead grain and/or oil crops.

Also, niche crops include agricultural crops whose production has not become widespread, but has a high economic, ecological and social potential. In turn, on the market, it is customary to call crops for which there is a situational or steadily increased commercial demand in a narrow segment of consumers, niche. As a rule, every two or three years there is a sharp increase in demand, followed by a decline.

Crops that have a wide market abroad and a constant demand that is minimally dependent on external factors are also called niche crops. These are not very common crops in mass production, but those that have a high level of profitability and potentially in the future can act as the foundation of the farm's budget.

Niche agricultural crops in the modern sense are also called crops that require a deep degree of further processing and are used in related industries, in particular pharmaceutical, confectionery, textile.

The main niche crops in Ukraine are oats, millet, rye, buckwheat, triticale, sorghum, amaranth, mustard, flax, beans, chickpeas, lentils, peas.

The production of niche crops actually attracts Ukrainian farmers with relatively high profitability. A positive aspect is also the diversification of crop

rotation and, as a result, the improvement of phytosanitary conditions in fields and soils. Usually, agricultural producers use "non-mass" grain and oil crops as a kind of "safety cushion". For example, since buckwheat is one of the latest (in terms of sowing time) spring crops, it is good to replant dead winter crops with it. Flax is also suitable for these purposes. To reduce losses caused by drought, some market participants are replacing traditional grains or oilseeds, such as drought-tolerant sorghum. In the conditions of fairly high volatility of market prices for traditional marginal crops – sunflower, rapeseed and soybeans – despite the peculiarities of the economic situation, niche agricultural crops can be a reasonable alternative for profitable diversification of agribusiness, in particular for representatives of small and small farms.

Therefore, an important theoretical achievement, based on already available practical experience, can be considered the unanimity of opinion that an example of the use of the strategy of niche diversification in the agricultural sector of the economy in recent years is the production of crops that have received the name of niche crops. Accordingly, we understand niche diversification as a direction of production that is oriented towards a certain niche. Diversification of agricultural production by adding niche crops with potentially high profitability is an effective way of using a small plot of land, therefore it is at the same time an incentive for the development of small and micro agrarian businesses.

In turn, the production of these crops is characterized by a number of specific features. Namely: the "niche" criteria include:

– the underdevelopment of a specific market;
– excess of demand over supply;
– low competition and fairly low organizational and economic barriers to entering this market;
– high purchase prices (in some cases);
– high level of profitability of crops and a fairly significant potential for its increase;
– positive experience of growing niche crops in many farms in different regions of the country;
– export orientation;
– opportunities to create products with high added value.

It is worth evaluating the prospects of each niche crop, in particular in terms of cereals, according to the following criteria:

– area of production, location of production (i.e. participation in crop rotation and climatic conditions of the growing area);
– export opportunities (the share of manufactured products that goes for export).

In recent decades, the world’s consumption of niche crops, which are primarily used for food production, has been increasing every year, so their

price is also increasing, and limited production at the same time allows maintaining the price at a stable high level. Therefore, there is an opportunity to strengthen the economic stability of the farm, as the market for these products is growing, and it is important for the agrarian to be the one who will take a place in it in time. Thus, taking into account the existing supply and demand, we can state that the market for niche crops in general and niche grains, in particular, is currently forming in the world. Based on this, we consider it legitimate and appropriate to use the concept of the market of niche grain crops, understanding by this the system of commodity-monetary relations that arise between its subjects in the process of production, storage, trade and use of niche grains and consumption of their processing products on the basis of free competition, free choice of directions of sale and processing and determination of prices.

Investigating the development of the market for niche crops, one cannot overlook the risks accompanying their cultivation. In the process of research and generalization of information, it was found that the main ones are:

– niche crops require specific knowledge of agricultural technology and logistics. If there is no suitable elevator nearby, this is a problem. If there is no work experience, it is a risk. The main problems currently faced by farmers with niche crops are related to the lack of experience in growing them;

– in some cases, a significant payback period;

– opacity of the market, lack of data. Quality is not standardized, as is the case with major crops. Standards are concentrated more in consumer countries than in the producer country;

– top traders are not present on the market of niche cultures, because it is a non-standard trade, where the demand markets are small;

– high price volatility. When demand volumes are small and supply changes rapidly, the percentage price movement is much greater than for staple crops. There are certain periods of time with a very high margin, but you need to be able to predict them based on the situation in the world market;

– limited market liquidity, it is often difficult to plan sales depending on market needs.

One of the challenges that producers of niche crops in general and niche grains in particular may face is harvesting. This is due to the fact that most of these crops require specialized harvesters or special devices for grain harvesters – those that will allow harvesting these crops with the least losses. For example, it is more appropriate to use bean harvesters or soybean attachments for harvesting lentils. For such crops as millet and flax, it is better to use a separate method of harvesting, which involves roller harvesters and roller pickers. In the case of sorghum, the most effective option for harvesting is by direct combining is also the use of a special harvester, which will allow obtaining the maximum yield of this crop.

Problems accompanying the development of niche crop production include the lack of established markets for many niche crops, which may make it difficult for farmers to find buyers for their products. In addition, a significant number of niche crops require specialized knowledge and equipment, which can increase production costs and make it difficult for new farmers to enter the market. Therefore, cultivation of niche crops in general and niche cereals in particular can be profitable, although not without problems.

The concept of niche crops in general and niche grains in particular is quite diverse. Generalization allows us to state that such cultures are those:

1) that can be used in crop rotation as precursors of the main crops;

2) acting as substitute crops for reseeding dead grain and/or oil crops;

3) for which there is a situational or steadily increased commercial demand in a narrow segment of consumers;

4) that have a wide sales market abroad and a demand that is minimally dependent on external factors and is especially related to the increasingly popular trend for a healthy lifestyle;

5) which are not very common in mass production, but have a high level of profitability and potentially in the future can act as the foundation of the budget of agricultural enterprises, primarily representatives of small and micro businesses;

6) that require further deep processing and are used in related industries, in particular pharmaceutical, confectionery, textile;

7) the production of which has not become widespread, but has a high economic, ecological and social potential.

By niche diversification, we propose to understand the direction of production, which is focused on a certain niche, the demand for products of which is formed by certain groups of consumers and which allows to minimize the risks of the production activity of enterprises.

In turn, the niche cereal market, taking into account the existing supply and demand, we propose to understand as a system of commodity-monetary relations that arise between its subjects in the process of production, storage, trade and use of niche cereals and consumption of their processing products on the basis of free competition, free choice of directions of implementation and processing.

In modern economic conditions, when planning his activities, the agrarian, as a decision-maker, determines: what to produce, how to produce and how much to produce. To answer these three different but interrelated questions, the farmer must consider alternative ways of using the resources available to him. It is also worth taking into account for which crops the conditions in the farming region are favorable – often they can be such for the production of some unique crops, which are called "niche". Different types of niche crops are grown in certain zones, strips and clusters depending on their agro-climatic suitability.

The return of interest in a number of crops that had been forgotten is determined by the significant benefits in terms of each of them: sorghum is a forage in arid areas; flax – cleaning of crops from harmful substances; peas – increasing the yield of successor crops; buckwheat, millet, oats, rye – a stable sales market; chickpeas – high prices on foreign markets [33]. The increase in demand for most niche crops in general and cereals in particular is caused by a significant increase in their export volumes in recent decades.

In recent years, niche production in general and the market of niche grain crops, in particular, have become quite a powerful driver of the development of small and medium-sized agribusiness. A significant number of agricultural producers see an alternative in niche crops, are looking for unique ways of earning, mastering unpopular niches, which gives them the opportunity to earn more profits and find promising sales markets. More and more specialists and practitioners are inclined to the fact that a balanced choice of a niche culture is one of the key factors of a successful business, of course, if the agro-producer can consider the possible nuances of cultivation and export.

According to expert estimates, in 2021 niche crops occupied the largest share in the domestic agricultural market in the structure of grain and leguminous crops, and the smallest in the structure of technical crops (4 and 0.8%, respectively). At the same time, during the last decades, as a result of a significant reduction in cultivated areas, crops such as oats, rye, millet, and buckwheat have moved into the niche group [10]. An important role in today's conditions is also played by the fact that the costs of growing and drying grain grow significantly and steadily, which forces producers to look for alternative crops. This led to the fact that in recent years, domestic agribusiness, choosing the grain direction of growing niche crops, gave preference to such crops as oats, rye, buckwheat, millet, beans, sorghum, triticale, rice, sweet lupine and vetch.

The development of agribusiness in today's conditions is also affected by climate change, which also forces farmers to pay attention to niche crops. For example, it is becoming more and more difficult to grow traditional crops due to prolonged and severe droughts. Farmers who want to engage in the production of drought-resistant niche crops should pay attention, for example, to sorghum: its production and export in Ukraine is steadily growing due to high demand in Africa and Pakistan. For normal vegetation, sorghum needs 25% less moisture than corn. Therefore, the drought resistance of this crop makes it possible to grow it in the south and east of Ukraine. The nutrients of corn and sorghum are quite similar, but the latter is cheaper. The productivity of sorghum is quite comparable to the productivity of corn, the profitability of the sorghum crop can reach 200%. In addition, this cereal plant is one of the valuable sources of biofuel. In general, sorghum culture surpasses popular corn in terms of efficiency and economy of raw material use. The only factors that

prevent the rapid spread of sorghum in Ukraine are the fact that the majority of Ukrainian agronomists are not yet familiar with effective cultivation technology and the lack of development of world markets for the crop. Accordingly, in order to grow drought-resistant niche crops, it is necessary to either have a certain sales market abroad, concluding an agreement with a reliable trader, or to look for buyers independently [14].

Nevertheless, today there is every reason to believe that in some regions, traditional crops will yield less and less profit, so it is now clear that niche crops, in particular grain crops, can help prepare the agricultural sector for the challenges of global warming. They can be an effective tool in mixed cultivation or as an additional crop rotation. As world experience shows, niche crops are often grown on a small scale and can bring significant profits to farmers. A variety of crops cover niches, from high-value fruits and vegetables to special grains and medicinal herbs.

In today's conditions, scientists and practitioners increasingly emphasize the importance and economic potential of niche crops [32], as they are capable of significantly diversifying the existing grain-oil specialization of Ukrainian agriculture and reducing the dominance of sunflower and rapeseed in the crop rotation, the excessive cultivation of which significantly depletes the upper layers of the soil. A number of other scientists and practitioners present the relevant criteria for classifying crops as niche, noting that the production of niche crops can be very profitable, have a number of advantages and provide a high level of profitability. O. Trofimtseva [31] believes that the production of niche products opens up an opportunity for "a small producer to become a big player." In the conditions of threats to the food security of the state and in the difficult economic conditions of many farmers, the production and processing of niche grain crops is quite capable of becoming one of the tools for stabilizing the situation in the domestic grain market [2; 21].

The advantages of the production of niche crops in general and cereals, in particular, and their processing products also include:

– relatively less competition from producers and buyers;

– possibilities of hedging and conclusion of long-term contracts; availability of the domestic market;

– high margin (mainly in a short period of time);

– often high market value, which allows farmers to earn significant profits from relatively small crops;

– the possibility to insure against such risks as adverse weather conditions for traditional crops, falling prices for them, or market overflow and intensifying competition;

– less susceptibility to weather conditions and diseases than traditional crops, which can help minimize the risk of crop loss;

– possibility to diversify crop rotation.

In turn, it was found that the cultivation of niche crops in crop rotation in itself also has a number of advantages:

– possibility to break the cycle of weeds, pests and diseases;

– greater opportunities for methods of cultural control of crops;

– the possibility to improve the structure of the soil, the level of organic matter and the availability of nutrients;

– opportunities to increase profitability and distribute market risks;

– the possibility of increasing the load on labor force and equipment during the year;

– possibilities to use different active substances of pesticides;

– a lower need for fertilizers, which, against the background of their constant price increase, is extremely important for farmers;

– the possibility of adapting crops to changes in climatic conditions.

In addition, niche crops, particularly grains, can also provide farmers with a unique opportunity to differentiate themselves from competitors in a crowded market.

Furthermore, along with the benefits for farmers and producers, the production of niche crops can also have a positive impact on consumers and the food industry in general. According to this, niche crops can provide consumers with a greater variety of food, which is important in the context of increasing food security in the world.

Modern food culture always demands new products, new tastes and fresher ingredients. Niche crops can be especially profitable for small growers who need to maximize their growing space. from the traditional comfort food culture prevalent during the pandemic, back to plant-based, often vegetarian, fresh healthy choices.

By expanding the variety of crops grown and types of food available, niche crop production can help support a more diverse and sustainable food system. It can also help promote healthier diets, as niche crops often have unique nutritional properties that traditional crops do not.

Accordingly, niche cultures in general and grains in particular are gaining special relevance against the background of the growing trend of healthy nutrition in the world.

Modern social trends focused on proper nutrition can be used to promote niche cultures – for example, oat-based drinks. You can even use the trend towards a varied and healthy diet – legumes, for example, can diversify people's diet. And in regions with a certain concentration of farms on which niche crops are grown or processed, the processes of creating chains of added value can be activated. In this case, cross-stage cooperation of all interested parties, financial resources for entering the market and good communication with consumers are important.

In modern economic conditions in Ukraine, opportunities for agricultural producers to achieve higher incomes thanks to processing and creation of added value are especially relevant. Value-added processing refers to the on-site conversion of raw agricultural products into ready-to-eat food products. Even small farmers can significantly increase their incomes by developing processing and creating added value by creating unique (and more valuable) combinations of products and by-products. Recent trends create new opportunities for manufacturers.

At the same time, any farmer who focuses on food fashion should take into account a number of points:

– trends, as a rule, come and go, so it should be borne in mind that niche crops in some cases may offer only short-term business benefits;

– niche grain crops are a real alternative with low costs and an attractive margin when there is not enough spring seed;

– there is a growing demand for all niche crops;

– different niche crop options offer additional benefits in key weed control with the required cultural practices.

According to forecasts, niche crops in general and cereals, in particular, will increasingly be grown not just for raw material sales, but for the production of finished products.

Experts emphasize that it is time for farmers to start following food trends. In recent decades, the so-called "food fashion" has formed, a trend that is largely influenced by the media, so producers can no longer ignore it. Existing pressures on commodity markets shape the potential of niche crops. For example, according to the consulting company Key International LCC [56], which deals with market research in the grain industry sector, farmers and oat producers in the Canadian prairies are considered to be among the main beneficiaries of the boom in oat drinks. Therefore, most of the country's large specialized companies engaged in the processing of oats into flour are working at full capacity to meet this new source of demand, even adding new technological lines. Oats are an important cereal crop for livestock feeding and human consumption [7].

At the same time, growing oats faces various diseases that can lead to a significant decrease in yield and deterioration of grain quality. Therefore, the use of effective and sustainable management of plant protection in the process of growing both oats and other niche crops has an important economic and ecological significance and falls into the field of attention of scientists. Thus, S. Volodin [9] was the first to formulate conceptual ideas and methodological approaches to the creation of fastplant technologies for rapid development and production of niche crops, features of their adaptation to market conditions and introduction into the system of artificial modular production. Oats and triticale are niche crops that were previously used almost

exclusively as animal feed. Instead, in the conditions of modern economy, their use in the human diet can mean the production of products with added value.

We also consider the following trends as favorable for the development of the production of niche crops, in particular cereals:

– after the pandemic, consumers buy more and more products online;

– supply chains are becoming shorter against the background of increasing e-commerce;

– opportunities for producers of niche agricultural crops to obtain carbon credits.

In general, we consider the trends accompanying the production of niche crops, in particular cereals, and the consumption of their processing products, which correspond to the trend of healthy food, as strategic guidelines for its spread and which should be used to promote this direction of agribusiness. Established linkages between farmers can be conducive to creating an efficient value chain. Cooperation between all stakeholders, financial resources to enter the market and good communication with consumers are factors that lead to success.

We cannot ignore the fact that the importance of niche grain crops is largely due to the fact that they are export-oriented and can potentially ensure the production of high-margin finished products from them by small and micro farmers.

We believe that the production of niche crops in general and niche grains, in particular, is a promising direction for the development of modern agriculture. Since more and more farmers are exploring the benefits of diversifying agriculture and using the potential of niche crop production, it is quite likely that the further development of a new direction of agricultural production will benefit everyone, from agricultural producers to consumers in the face of threats to food security and climate change.

Chapter 2. Theoretical-applied and methodological approaches to the formation of a niche diversification strategy of agribusiness on the basis of sustainable development

2.1. Diversification: essence, principles, risks and opportunities

We suggest using niche diversification as the basic platform for forming a strategy for the development of niche production and the market of niche grain crops.

Diversification (from the Latin. Diversus – different and facer – to do) – literally expanding the range of production of products or services, simultaneous development of several/many directions of production or service, technologically unrelated. The explanatory dictionary of the Ukrainian language offers the following definition of the concept of "diversification":

1) giving something a versatile, combined, multi-branch character. Expansion of economic activity into new areas (in particular, expansion of the product range, types of services provided, etc.);

2) the strategy of reducing the risk of entrepreneurial activity by distributing investments and other resources between several directions – the production of heterogeneous goods and the provision of various services. Penetration of enterprises in the industry that do not have direct production ties or functional dependence on the main industry in which they operate [6].

The dictionary of economic terms defines the concept of "diversification" as:

1) one of the possible directions of the company's investment policy, which involves investing funds in various types of securities in order to minimize portfolio investment risk, increase profitability, liquidity and increase capital;

2) expansion of the nomenclature (assortment) of goods and services produced (provided) by the enterprise in order to reduce the risk of possible capital losses and reduced income [26].

Also, the term "diversification" is interpreted from the point of view of general theoretical approaches as:

1) versatile development;

2) creation of several different production directions within the scope of one enterprise or industry;

3) access to new markets [5].

It is emphasized that the modern market mechanism creates an environment for production and commercial interaction of participants in the process of diversification and development of small and medium-sized agribusiness.

Foreign scientists, in particular Thompson A.A., Strickland A.J. and Griffin R. consider diversification from the point of view of enterprise development and unanimously claim that diversification:

1) provides for the expansion of the enterprise's range of goods through the release of related or new products, the production and sale of which can take place on the basis of the use of existing potential;

2) can manifest itself through the development of new directions in the company's activity.

Diversification of production in the agricultural sector is quite often considered by scientists and practitioners as an expansion of the nomenclature and assortment, which is implemented to increase the efficiency of economic activity, achieve economic benefits, and avoid bankruptcy of the enterprise. At the same time, it is considered mandatory to take into account the ecological and social needs of the population. Diversification is also associated with the expansion of the species diversity of products through the development of new industries [4]. We believe that this statement has the closest connection with the idea of spreading the production of niche grain crops and its functions in the modern world.

Ukrainian researchers also focus on the fact that diversification in agricultural production is used to increase the competitiveness of products and enterprises and increase sales by more fully meeting the needs of consumers, conquering new market segments, reducing risks, increasing the company's income through processing, and in some cases and sale of manufactured products to end consumers [3]. It can also be said that the diversification of production in agriculture is aimed at increasing profits by using market opportunities and achieving market advantages, as well as providing new jobs for the rural population.

The main reason for diversification is the desire of enterprises to reduce dependence on a narrow product range [1]. In our opinion, this is another argument in favor of the fact that the diversification strategy is especially relevant for niche production, which a priori is quite narrow. At the same time, diversification makes it possible to identify exactly the type of activity in which it is possible to most effectively realize the competitive advantages of both the industry and an individual enterprise.

As with any phenomenon, the diversification of production in general and agricultural production in particular has both a number of advantages and a number of disadvantages (Table 1).

It is clear that, like anything new, diversification can bring new challenges. In particular, these may be those related to:

– market development;

– lack of information on variety performance, management practices, post-harvest processing and storage;

– a limited selection of seeds and a complex process of plant propagation;

– unavailability of pesticides intended for niche crops;

– the need to modify or replace equipment, and sometimes manual labor may be the only viable option;

– possible additional costs in the process of harvesting, processing and storage;

– the imperfection of the infrastructure for processing, transportation, processing, storage and marketing;

– price fluctuations for niche crops [39].

At the same time, summarizing the disadvantages of diversification in the agrarian sphere, we consider them to be less significant, compared to the advantages, and such that can be overcome with proper strategic planning.

It is worth noting that a significant number of foreign scientists, such as Jafari H., Ahmadian M.A., & Tarhani A. [48] consider diversification through the lens of rural development. We agree with the researchers that unequal investment opportunities in industry and agricultural production and insignificant investments in the agricultural sector are the main problems in today's conditions (especially in Ukraine), which, in turn, cause the following

problems – lower productivity in agriculture, lower wages, lack of diversity in employment, unstable economic situation.

Table 1

The main advantages and disadvantages of diversification in the agricultural sector

Advantages	Disadvantages
– diversification makes it possible to use available material resources more efficiently;	– diversification does not always make it possible to use the advantages of specialized production;
– the right choice of diversification strategy makes it possible to increase the competitiveness of products, an enterprise or industry and increase product sales;	– an unsuccessful choice of diversification strategy can lead to economic losses;
– diversification contributes to effective provision of economic, food and environmental security of the state;	– possible weakening of the role of the main production at the enterprise or in the industry;
– diversification promotes the development of processing enterprises in the agricultural sector and increases their workload;	– managing diversified production is much more difficult compared to non-diversified production;
– the full use of natural resources and economic potential depends on the depth of diversification;	– diversification is impractical to apply with an imperfect concept of development;
– diversification of agricultural enterprises makes it possible to obtain a synergistic effect;	– an unsuccessful choice of diversification directions can lead to bankruptcy;
– diversification of the activities of agricultural sector enterprises reduces the degree of entrepreneurial risk due to the elimination of dependence on the production of one type of product.	– combining two or more enterprises or related industries that produce different types of products can lead to an increase in economic risks.

Source: compiled by the authors for [7]

Collectively, these problems cause widespread poverty, backwardness and instability in rural areas in economic, social and environmental aspects. Diversification is becoming increasingly important as a factor in expanding the potential opportunities of agricultural enterprises in the context of solving social problems of the rural population [30]. Therefore, the diversification of economic activity is a factor that will contribute to reducing the level of instability in rural areas in various dimensions and in the context of sustainable development.

Diversification also acts as a direction for the development of rural areas, considering the fact that in modern conditions quite dynamic changes are taking place in rural areas, which lead to the emergence and spread of trends in the countryside regarding the transition from agrarian mono-production to multifunctional diversified production.

The legality and expediency of the considered approaches to the interpretation of the concept of diversification are reflected in the Concept of the Development of Rural Territories (Decree of the Cabinet of Ministers of Ukraine dated 23.09.2015 No. 995-r), which states that the unsatisfactory socio-economic condition of rural territories is largely determined by the low level of diversification of their economy [19].

In addition, modern scientists single out the main directions of diversification, which may well be used in the strategy of developing niche production and the market of niche grain crops:

– multidisciplinary activity of agricultural enterprises;
– increase in the share of secondary production and industries;
– expansion of non-agricultural activities in rural areas to increase the income of the population [28].

We believe that the listed directions of diversification are a prerequisite for the production of niche grain crops and their processing in parallel with traditional agricultural production.

For a more complete study of the theoretical and methodological foundations of diversification, it is worth dwelling on its main principles [30]:

1) diversification is one of the elements of increasing the level of support for farmers in the face of modern threats and challenges;

2) diversification is an indicator of rural development. As a comment on this principle, it is worth noting that, for example, in the countries of the European Union, by creating new enterprises in rural areas, diversification was used as a real strategy for rural development;

3) diversification is an incentive for the production of various products and services and as an effective protection against the impact of a decrease in demand for certain goods;

4) diversification is an impetus to increase the level of aggregate family income of agricultural producers.

In general, we consider diversification, first of all, from the standpoint of the development of niche production in the agricultural sector. During the development of the methodological platform of the strategy for the development of niche production and the market of niche crops, in particular cereals, the concept of niche diversification was investigated on the basis of a dialectical approach.

First of all, we note that the concept of niche diversification in modern conditions is quite new both in general and in the sector of agricultural

production, in particular. At the same time, in recent decades, scientists and practitioners have paid increased attention to niche diversification, especially in the field of agricultural production. This is due to the fact that on the planet as a whole and in our country, in particular, the climate is radically changing and humanity, unfortunately, cannot resist it. So, for the past few years, scientists have stated that the southern regions of Ukraine are included in the desert zone. Considering this fact, the zone of risky farming in Ukraine has currently shifted 200-300 km to the north, due to which there was a need to change the species and varietal structure of crops, sowing dates and plant density [25]. Accordingly, agricultural producers are forced to pay attention to new or long-forgotten crops, that is, to diversify production at their expense in order to minimize risks.

The relevance of niche diversification is also determined by a number of other factors. Thus, in modern conditions, the global agro-food sector is largely influenced by the fashion for healthy eating, veganism and reducing the consumption of meat and dairy products as opposed to plant-based products. In fact, the world is undergoing a process of redistribution of food consumption: for example, in developed countries, the demand for plant-based products is increasing, while the demand for meat, dairy, and even fish products is decreasing; at the same time, in developing countries, the welfare of the population is increasing and meat consumption is increasing. Accordingly, agricultural producers should take into account the indicated trends in order to understand which areas of activity to develop in order to be guaranteed to receive profits.

The following are the main reasons for deciding to diversify one or another activity:

- growth of market share;
- entry of the enterprise into new markets;
- attractiveness of the chosen field of activity;
- coverage of various market segments;
- improvement of the financial and economic condition;
- effective management of production costs;
- rational use of enterprise resources.

In general, we suggest considering diversification from the following perspectives:

1) as one of the strategic areas of activity of agricultural producers engaged in traditional agricultural production – in this case, diversification can be manifested, for example, in the fact that agricultural producers introduce separate niche crops, in particular cereals, into crop rotations, grow them on separate areas or in parallel with the main crops;

2) as the main strategic direction of agricultural enterprises, which are mainly engaged in the production of grain crops, while diversifying crops with niche grains;

3) as a strategy for the development of the field of crop production as a whole. At the same time, the strategy for the development of niche production should cover the interests of both specialized enterprises and those for which the production of niche grain crops is one of the directions of diversification.

2.2. The concept of sustainable development as a prerequisite for niche diversification in agribusiness

In recent decades, the concept of sustainable development has been dominant in the world economy, and it does not lose its relevance even today. The term "sustainable development" officially appeared in 1980, when the World Conservation Strategy (WSC), developed by the International Union for Conservation of Nature (IUCN), was made public. In this strategy, a fundamentally new position was announced: since the development of humanity is inextricably linked with the preservation of nature, it must take place under the conditions of nature preservation. Since the end of the 80s of the XX century. the concept of "sustainable development" is spreading rapidly all over the world. In turn, the concept of sustainable development acquires the status of leading after the UN Conference on Environment and Development (1992, Rio de Janeiro), at which it was approved in the Agenda for the 21st century.

In the future, the idea of sustainable development was actively improved. In particular, within the framework of the UN Conference on Environment and Development (1992), the participants declared that sustainable development is the development of society that allows meeting the needs of the present and, at the same time, does not jeopardize the ability of future generations to meet their needs [36]. As part of the 70th session of the UN General Assembly in New York (September 2015), the UN Summit on Sustainable Development and the Adoption of the Agenda for Further Development after 2015 was held – it approved new development guidelines. In turn, the summarizing document of the next Summit "Transforming our world: the agenda in the field of sustainable development until 2030" approved 17 Sustainable Development Goals and 169 tasks [34]. All UN member states, including Ukraine, have joined the global process to ensure the goals of sustainable development. For this purpose, for the period up to 2030, active implementation of the adaptation process of the Sustainable Development Goals was initiated in Ukraine.

In particular, in 2017, the national report "Sustainable Development Goals: Ukraine" was published – it shows the results of adaptation of 17 global goals taking into account the specifics of national development. Prepared proposals regarding the goals of sustainable development in our country were provided

by representatives of a number of ministries, departments, government agencies, UN missions in Ukraine, various international organizations and business associations, public organizations and society. In 2017, the Sustainable Development Strategy of Ukraine until 2030 was also presented – it was the result of the analytical work of a team of Ukrainian experts within the project "Integration of provisions of the Rio Conventions into the national policy of Ukraine" [35].

The analysis of these documents makes it possible to state that the development of the production of niche agricultural crops in general and cereals in particular is closely related to the Sustainable Development Goals. For example, in the set of goals and objectives declared in the 2030 Strategy, considerable attention is paid to ensuring the transition to effective models of balanced consumption and production; balanced management of natural resources; preservation, restoration and balanced use of all terrestrial ecosystems. Thus, in the set of sustainable development goals presented in the national report "Sustainable Development Goals: Ukraine", goal № 2 provides for the development of agriculture, goal № 12 – responsible consumption and production, goal № 15 – protection and restoration of terrestrial ecosystems. The tasks within the framework of the last goal include restoration of degraded lands and soils using innovative technologies. In this, we see a direct connection with the advantages of growing niche crops in general and cereals, in particular, in the ecological plane, which are disclosed above.

Thus, the concept of sustainable development, which is based on three defining imperatives: ecological, which defines the conditions and limits of restoration of ecological systems after their exploitation; economic, which involves the formation of an economic system interconnected with the ecological factor of development; social, which asserts a person's right to work and well-being in conditions of environmental safety [27], we believe can become the basis for the strategic development of niche production and the market of niche grain crops. The goals of sustainable development of the agricultural sector [18], in particular:

– ensuring rational and balanced use of the existing natural resource potential, taking into account the potential opportunities for the future, reflecting the economic component;

– reducing the negative impact of humans on the environment – ecological component;

– increasing the level of employment and income of economic entities in the agricultural sector, which is a manifestation of the social component.

We believe that in order to achieve the goals of protection and restoration of land ecosystems, balanced use of terrestrial ecosystems, and restoration of degraded lands and soils based on the use of innovative technologies, it is

necessary to develop the production of niche crops, in particular cereals. The main arguments supporting this opinion are that:

1) some types of niche crops (in particular, from the cereal group) have the ability to improve soil quality;

2) a significant number of niche crops, including cereals, can grow on unproductive and degraded lands;

3) niche agricultural crops are a powerful tool that contributes to the biodiversity of ecosystems;

4) the cultivation of niche crops is a prerequisite for the development of a wide range of products with high added value.

In general, the cultivation of niche crops in today's conditions can contribute to the environ mentalization of agricultural production, the necessity of which is emphasized by scientists and practitioners. Cultivation of niche crops, such as drought-resistant cereals, is a promising model of steppe conservation, which is extremely relevant for the south of Ukraine in the climate crisis.

As revealed during the research, the cultivation of niche agricultural crops in general and niche cereals, in particular, involves the observance of the same principles that apply to the field of crop production in general:

– choice of culture;

– the location and size of the plot determined by the biological characteristics of a certain culture;

– selected seed material and sowing or planting crops in strictly defined terms for this plant, depending on the region;

– observance of necessary agrotechnical measures.

At the same time, world experience shows that the cultivation of niche crops on an industrial scale contributes to a more rational and efficient use of all material and non-material production resources, including the main factor of production in agribusiness – agricultural land. In addition to increasing the efficiency of the use of unproductive and depleted land, it is extremely important that the cultivation of niche crops contributes to the sustainable development of rural areas through the creation of new jobs, the development of appropriate infrastructure and the improvement of the standard of living of the population.

In addition to the fact that the development of niche crop production directly affects the implementation of the ecological goals of sustainable development, we believe that there is also a direct connection with such a goal of the 2030 Strategy as ensuring public health and goal No. 3 from the national report "Goals of Sustainable Development: Ukraine" – good health and well-being. The relationship between the production of niche agricultural crops in general and grains, in particular, and the goals of sustainable development in the context of ensuring the health of the nation is confirmed by the social significance of this direction of agribusiness. In particular, we are talking about

the advantages of niche grain crops in the social plane, disclosed above. First of all, niche cereals give the population access to products that correspond to the trend of healthy eating.

Thus, the niche direction of crop production in the aggregate of branches of the agrarian sector, in particular, and the national economy in general and its significant socio-economic importance is also confirmed by the relationship with the goals of sustainable development. In today's conditions, it is also important that foreign investors pay particular attention to the compliance of Ukrainian businesses with the Sustainable Development Goals – 2030. When entering foreign markets, this is considered a significant competitive advantage.

The latest trends in the development of agricultural production in the context of sustainable development, as revealed during the study, include the so-called regenerative agriculture. In the conditions of modern threats and challenges, the problem of providing the Earth's population with high-quality food products is becoming more and more acute, and the need to preserve the environment is growing [12]. Based on this, the search for, as well as the introduction of, new alternative intensive models of agricultural production is gaining more and more relevance. In addition, all such modern models are based on the concept of obtaining a high-quality crop without harming the environment. Currently, scientists and practitioners include the following as alternative methods of agricultural production:

– organic farming;
– biointensive mini-agriculture;
– biodynamic agriculture;
– low input sustainable agriculture – LISA;
– precision farming;
– regenerative agriculture [13; 17].

These models provide a deep understanding of the processes that take place in nature, are aimed at improving the structure of soils and reproducing their natural fertility, and ultimately contribute to the formation of ecologically sustainable agro-landscapes. Such alternative directions of agricultural production in the conditions of modern threats and challenges are gaining more and more popularity. And, for example, regenerative agriculture is increasingly being attributed to the agrarian trends of the new decade, along with efficient water use, technology of production processes, and niche diversification [17]. Considering the fact that the intensification of agricultural production during the last decades all over the world has significantly worsened the state of the environment, caused negative changes in all chains of ecosystems and the biological cycle, the concept of sustainable development has been supplemented by the idea of regenerative agriculture.

The history of mankind shows that the idea of regenerative agriculture was known to the ancient Aztecs. In parallel with traditional agriculture, they built artificial islands – Chinampa – on small rivers and lakes, and cultivated crops available to them on them. Such chinampas were completely regenerative agricultural systems – they did not need irrigation, as they had direct access to water, and did not harm the environment. The spread of the idea of regenerative agriculture in modern conditions is caused by the fact that the soils are in a catastrophic state and really need to be restored as soon as possible. Every year, humanity loses 0.3% of global food production precisely because of soil erosion and degradation, and 30% every 100 years [58]. Soil degradation and loss have paralleled the development of agriculture since its inception and led to the demise of ancient civilizations, including Mesopotamia, classical Greece, and ancient Rome. Also, soil degradation and loss caused the decline of the Piedmont region in the southeastern United States, which had long been a leader in the production of agricultural products. Scientists agree that soil degradation is largely due to human use of the plow. It has long been known that the US alone has lost about half of its topsoil in the country since John Deere started making plows in the 1830s. In general, the industrialization of agriculture in the world led to the fact that about 50% of carbon from the soil entered the atmosphere.

The modern term "regenerative agriculture" was introduced in the 1980s of the last century at the Rodale Institute (Pennsylvania, USA). The founder of this institution was Jerome Rodale, who was the first in the world to use the term "organic" in relation to food. The Rodale Institute is still a leading center for organic farming, teaching farmers the basics of organic production. In turn, the term "regenerative agriculture" was first used by J. Rodale's son, Robert Rodale, an American scientist and active popularizer of organic agriculture.

The practical meaning of regenerative agriculture is that agricultural producers who implement it use a crop rotation system in their activities, diversify agricultural crops and animals, minimally cultivate the soil, and do not pollute the land and water with chemicals. In fact, these are the main principles of regenerative agriculture, which are declared in today's conditions.

Scientists and practitioners have already proven that this type of farming makes it possible to restore both fertility and the ability to retain moisture and carbon to agricultural land. The idea of regenerative agriculture has been gaining popularity especially rapidly in the USA in the last few decades. In particular, in the state of California in 2017, a program was implemented that provided for the improvement of soils, which stimulated representatives of agribusiness to apply methods of regenerative agriculture. The mentioned program provided for subsidizing farmers in the amount of 29 million dollars during 2019–2020.

Since the 2000s, the idea of regenerative farming or regenerative agriculture has been rapidly gaining momentum in the world. As humanity becomes increasingly aware that it is losing the planet's soil at a catastrophic rate, in recent years more and more programs/projects have emerged with the primary goal of soil restoration. For example, in 2017, the journal "Nature" published a material in which business arguments were presented to confirm that both the profit of agricultural enterprises and their ability to maintain competitiveness are closely interconnected with soil health. Accordingly, it can be argued that the fight against soil degradation automatically allows to partially minimize economic risks in agribusiness.

In turn, the motto of World Soil Day, which was celebrated on December 5, 2019, was "Stop soil erosion, save our future." This motto was chosen to remind society about the important role of soils for human civilization. It is a well-known fact that healthy soils are the basis of agriculture and the productivity of agricultural enterprises and any economy in general. Healthy soils make it possible to grow healthy food, significantly reduce nutrient losses and greenhouse gas emissions, strengthen biodiversity and, crucially, enable crops to withstand climate change.

Thus, regenerative (restorative) agriculture is generally considered as an effective integrated approach to the cultivation of agricultural crops, vegetables and fruits, including niche ones, without the use of pesticides and chemical fertilizers. The goal of such activities is to stimulate the restoration of natural soils, increase biodiversity, efficient use of fresh water, adapt to climate change and improve the well-being of those who work on the land. It should be noted that the above is also inherent in the cultivation of niche agricultural crops, both in general and cereals, in particular.

As an approach to management, regenerative agriculture is truly complex, as it involves both the restoration of ecosystems and biodiversity, and the improvement of economic indicators of agricultural producers, because it is also characterized by a number of economic advantages. In particular, the use of regenerative cultivation technologies contributes to the creation of added value of farm products and lays the groundwork for further more efficient management [20]; systems of regenerative agriculture lead to an increase in the level of profitability, if compared with, for example, existing models of intensive cultivation of sunflower or corn. For example, in cornfields treated with insecticides, there are 10 times more pests than in fields that are free of insecticides. World practice shows that regenerative fields produce 29% less grain, but the profit in this case is 78% more, compared to traditional corn cultivation systems. It was found that the profit is positively correlated with the organic components of the soil, but not with the yield. World practice has repeatedly confirmed this [50].

Since the role of the economic component in the system of regenerative agriculture is decisive, there are reasons to say that in the future this type of management can become a significant competitive advantage, and then an indicator of the success of agribusiness.

In general, regenerative (restorative) agriculture is a system that makes it possible to achieve the following goals:

1) to obtain high-quality agricultural products and at the same time not harm the environment;

2) to enrich soils, increase biodiversity and increase the efficiency of natural resource use;

3) restore soils even after the most intensive exploitation.

The main theoretical-applied and methodological principles of regenerative agriculture, which should be taken into account in the process of forming a strategy for the development of niche diversification in agribusiness, are:

– increase in soil fertility;

– gradual improvement of the state of agroecosystems (soil, biodiversity, water);

– minimal mechanical soil cultivation, reduction of arable land areas, and in the future – a complete refusal to plow the soil;

– development of innovative agro-ecological methods on a permanent basis;

– abandonment of agriculture based on the cultivation of monocultures, instead – diversification of crop rotations, scientific justification of crop rotations with a set of niche agricultural crops, including cereals;

– rotational livestock grazing;

– abandoning chemical fertilizers and replacing them with compost, which can be obtained as a result of the decomposition of organic remains of plant or animal origin;

– creation of context-oriented projects and adoption of integral economic decisions on the basis of sustainable development;

– work with the whole, not with parts;

– management with the understanding that innovative agriculture on the basis of sustainability changes the world.

The latest studies show that if only 10-20% of the world's agribusiness is switched to a regenerative farming system, it is possible to sequester enough carbon to reverse climate change on the planet.

Along with the principles of regenerative agriculture, it is extremely important in methodological and practical terms in the process of developing a strategy for the development of niche production to adhere to the principles of this direction of agribusiness. In fact, we propose to regulate relations regarding the cultivation and sale of niche agricultural crops, in particular cereals, and the production of the final product from them on the basis of the following methodological principles:

– development in parallel with preservation of ecology;
– priorities for growing niche drought-resistant plants;
– ensuring the high quality of niche grain crops in accordance with modern standards;
– cooperation of business entities for the cultivation, processing and sale of niche crops in general and cereals, in particular;
– prioritization of domestic niche grains compared to imported purchases;
– observance and deepening of the scientific validity of the production of niche agricultural crops;
– legal regulation and promotion of niche production.

We believe that the observance of the set of methodological principles of regenerative agriculture and niche production can lead to a synergistic effect, in particular: contribute to the effective development of niche production and the achievement of the Sustainable Development Goals on a global scale.

The relevance and necessity of achieving the goals that are included in the concept of sustainable development is determined by a significant number of factors and factors, among which is the tendency to a progressive decrease in the level of yield of agricultural crops, which has been observed in the world in recent years. Thus, according to the experts of the International Institute for the Study of Food Policy (USA), "about 40% of the world's agricultural lands are characterized by a tendency to decrease the level of fertility, which is a serious threat to the future development of civilization" [12].

Therefore, against the background of threats to food security, which humanity has faced, the decrease in the yield of agricultural crops is not just a negative trend of modern times, but actually a warning for humanity. A warning from nature that we need to think and initiate changes. In this regard, numerous discussions in the circles of both scientists and practitioners ultimately boil down to the fact that regenerative agriculture is really a way out of the situation in which humanity found itself. As already mentioned, it has been proven by calculations that the restoration of soils using regenerative methods (the main ones are the cultivation of perennial and drought-resistant crops, the elimination of monocultures) can cause a number of positive factors, including increasing the yield of agricultural crops. One of the tools for achieving this goal, in our opinion, can also be the development of niche production. Therefore, regenerative agriculture is exactly the model of management that meets the modern needs of change.

In turn, we believe that when building a methodological platform for the development of a strategy for niche diversification of agribusiness, it is worth paying attention to such an effective tool of regenerative agriculture as the spread of the practice of crop rotation and the introduction into the structure of crops of niche crops, in particular cereals. Science and practice today have proven that long and diverse crop rotations increase biodiversity, allow to

successfully fight against plant diseases, insects and weeds, prevent soil erosion, contribute to the formation of organic matter and soil fixation, and generally improve soil quality. For example, in the Netherlands, the country with the most productive agriculture in the world, it is forbidden by law to violate crop rotation.

In addition, the crop rotation system can minimize the risks of crop yield reduction. It has been proven that the crop rotation system, provided that material costs are reduced by 50-70%, has an effect on productivity, while other factors: soil cultivation technologies, the use of fertilizers and the organization of the seed production system, the control of the number of weeds and diseases affect only 10, 20, 30 and 40%, respectively [15].

Therefore, it can be argued that crop rotation for agricultural producers is an effective risk minimization tool and, at the same time, a tool for sustainable use of land resources.

The Law of Ukraine "On the Protection of Lands" states that soil exhaustion is a consequence of non-observance of crop rotation – this is a violation of the bioenergetic regime of soils and a sharp decrease in the yield of agricultural crops as a result of "their unchanged cultivation or frequent return to the previous field of crop rotation, which leads to a deterioration of the quality of the soil, accumulation specific pathogens and weed seeds in the soil" [11]. According to FAO [12], "soil exhaustion" currently covers about 1,250 million hectares of agricultural land in the world and is the main cause of the loss of almost 25% of the world harvest. Whereas the use of scientifically based crop rotations in agribusiness eliminates the possibility of the occurrence and spread of "soil fatigue", as well as the accumulation of pathogens of any culture.

It is worth noting that the role and importance of the crop rotation system at different times attracted considerable attention. In ancient Rome, for example, they knew about the benefits of alternating cultures, although for a long time humanity could not understand why. The theory put forward by the Swiss botanist Decandole (1806-1893) also belongs to the first attempts to find out the benefits of crop rotation. He claimed that plants take both useful and non-useful substances from the soil. In the future, non-useful substances return to the soil and, accumulating there, delay the development of crops that are sown on the field repeatedly or for a long time. In turn, in the 19th century the German scientist Thayer also made attempts to explain the drop in yield in the case of unchanged sowing – as it turned out later, they turned out to be unsuccessful. Another German scientist, Justus von Liebig (1803–1873), one of the founders of agrochemistry, proved in his scientific works that:

1) if there is constant cultivation of agricultural crops, then the soil is exhausted and the yield decreases;

2) all field crops are divided into three groups – grain, technical and fodder;

3) alternation of crops in crop rotations is necessary, one of the confirmations of which is the theory of mineral nutrition of plants.

In parallel with Liebig's theory, another direction also developed – regarding the physical principles of crop rotation. In particular, one of the founders of agronomic soil science, Williams V.R. (1863-1939) in his research divided all cultures into two unequal groups: those that improve the physical properties of the soil and those that worsen them. According to this theory, crops that improve the soil structure should be sown in the crop rotation after crops that cause the destruction of the soil structure or do not have a positive effect on it. The scientist emphasized that such an alternation of cultures is mandatory and the authors of this study fully agree with him.

In the future, the theory regarding the need for crop rotation was improved and within its framework, all the reasons for crop rotation were combined into four groups – biological, chemical, physical and economic. Modern scientists have already proven in their research that in crop rotation, compared to monoculture, the yield of winter rye and oats increases by 1.5-2.0 times.

Also worthy of attention are the principles of crop rotation highlighted by the scientists of the NSC "Institute of Agriculture of the National Academy of Agrarian Sciences", in particular:

– local natural conditions should be considering when choosing crops for crop rotation;

– provide for the alternation of species and varieties of plants with different specific requirements for the nutritional regime and characteristic features of nutrient removal from the soil;

– it is worth considering the influence of crops that need a lot of moisture on the water regime of the soil and the next crop;

– it is necessary to withstand the alternation of cultures with weak and powerful root systems;

– it is necessary to saturate the crop rotation with intermediate crops, considering the fact that this allows for a more complete disposal of root and above-ground crop residues;

– promote the reproduction of biodiversity through the expansion of crop rotation, the introduction of different species and varieties, niche and intermediate crops before crop rotation;

– use compatible sowing and sowing of crops;

– select types and varieties of crops resistant to pests and diseases;

– limit the loss of moisture from the soil and systematically prevent the development of erosion processes;

– avoid repeated cultivation of crops of the same species (family) [15].

In addition to the listed principles, it is worth highlighting the fact that crop rotations have agrotechnical, reclamation, ecological and organizational and economic significance. The efficiency of almost all agrotechnical measures,

and therefore the economic efficiency, largely depends on how well the rotation of crops is correctly composed and maintained.

Guided by the discovered and generalized principles of crop rotation, a set of problems was formed, which will be solved by the introduction of the crop rotation system:

1) increasing soil fertility and rational use of its nutritional properties;

2) increasing the yield level of agricultural crops and improving the quality of crop production;

3) reducing the level of weediness of crops;

4) reduction of the harmful effects of wind and water soil erosion;

5) formation of normal conditions for the growth and development of plants, taking into account the various properties of land plots;

6) increasing labor productivity in crop production due to better organization of production processes in terms of mechanized field processing;

7) increasing the level of employment of the rural population, in particular in the case of the introduction of niche crops into the crop structure;

8) increasing the level of profitability of agricultural producers.

Thus, we consider crop rotation as an important biological and economic factor in the context of sustainable development and regenerative agriculture. The biological effect of this factor is manifested through its agrotechnical significance – more effective use of arable land, rational restoration and improvement of soil fertility. In turn, the economic efficiency of crop rotation is evaluated by the following indicators:

– gross output per unit area;
– costs of labor and material and technical resources per unit of area;
– payback of direct costs;
– costs of labor and resources per unit of finished products.

It is also significant that in today's conditions, the importance of crop rotation in Ukraine and the world is growing in the context of climate change. For example, in the south of our country, the risk of droughts, which are becoming longer and stronger, is increasing every year. Therefore, the cultivation of traditional agricultural, so-called, business crops is becoming more and more risky. In this regard, crop rotation should include drought-resistant crops, in particular niche grains, which can be an effective substitute for traditional crops in dry periods. Although currently most niche crops are grown in specialized crop rotations, but considering the need to change the attitude towards soils, climatic changes and the growing popularity of the trend of healthy food, the option of the appearance of drought-resistant niche grain crops on large areas is quite real in the near future.

We note that the saturation of crop rotations with niche grain crops should occur in combination with the so-called business crops that bring guaranteed profits to agricultural producers.

It is also important when implementing crop rotation to understand that, although this system is an important and effective tool in achieving the goals of sustainable development, it is not something stable and permanent. The structure of crop rotation, first of all, should be determined by the specialization of the farm, and it, in turn, by the zonal soil and climatic conditions and market conditions. Although the latter is extremely unstable in the conditions of modern threats and challenges. Given the variability of market conditions, crop rotations should be flexible in terms of crop placement and interchangeability. Along with crop rotation, it is allowed to have areas of re-sowing or even long-term placement of the same crop, if this is due to considerations of increasing the productivity of arable land or increasing the gross harvest of products and is accompanied by appropriate methods of nutrition, weed control, etc.

In today's conditions, for agricultural producers, the introduction of niche crops in general and niche cereals, in particular, into crop rotations can become a direction of niche diversification. Therefore, one of the areas of development of niche production and an effective tool of regenerative agriculture can be the practice of introducing certain niche crops, especially drought-resistant cereals, into crop rotations. The advantage of such a tool is the economic attractiveness of the production of these crops and the benefit for agricultural land from their cultivation. Therefore, the introduction of crop rotation in agricultural production is an urgent necessity in the context of the development of regenerative agriculture and the achievement of the goals of sustainable development. In particular, through the implementation of an effective strategy for the development of niche production.

Conclusions

In general, diversification of agribusiness allows for a number of advantages. First of all, it is that different cultures bring different advantages. While some niche crops command high prices, others provide benefits by enhancing biodiversity or increasing the yield of traditional crops in a crop rotation. And the cultivation of some niche crops, for example, can provide jobs in the rural community.

In addition, diversification is advisable in order to increase profitability. Cultivation of niche crops, primarily cereals, can expand markets and compensate for fluctuations in commodity prices. Therefore, the profit will not depend exclusively on any one market, as it can be, for example, when the producer grows only certain business crops. As today's markets expand with new product variety, agro-producers may find more opportunities, although challenges such as distribution bottlenecks may need to be overcome. However, new market supply chains offer farmers new opportunities to produce more value and preserve that value in the production process.

Diversification of agricultural production creates advantages for the environment. Ecosystems with greater diversity are usually more stable: they are better able to withstand negative impacts and can recover better than less diverse systems. The greater the diversity of plants, animals, and organisms that inhabit the soil, the more diverse the populations of beneficial organisms that fight pests. For example, healthy soils enriched and restored through crop rotation and cover crops promote root development and water penetration and are therefore less susceptible to disease. In the absence of large livestock enterprises nearby that would supply manure, which is typical for Ukraine in recent decades, an effective means of improving the condition of the soil is green manure – alfalfa, which suppresses weeds, clover, siderate peas or siderate lentils, etc. Reasonable crop rotations with the introduction of various niche crops to them ensure a significant improvement in the condition of the soil.

Diversification can also create benefits for rural communities. Communities can benefit from diversified agricultural enterprises. Direct marketing of alternative crops creates local opportunities for processing, packaging or selling new products. Cooperatives enable farmers to jointly invest in processing and marketing. Niche manufacturing can bring teams together through training and conferences. The transformation of people and the activation of groups is one of its main goals. Innovative grants that connect sustainable agriculture with rural community development are appearing more and more often.

We believe that niche diversification on the basis of sustainable development can reasonably be used as a competitive strategy for the development of niche production and the market of niche grain crops in Ukraine.

Thus, the generalized and substantiated theoretical-applied and methodological principles of sustainable development, regenerative agriculture and niche production (in the context of growing niche grain crops) in their relationship and their fundamental principles can represent the theoretical-methodological basis for the formation of a niche diversification strategy of agribusiness. Part of the provisions can be successfully adapted to the formation of a modern platform for the development of agricultural production in the conditions of existing threats and risks.

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