

Intersectoral adaptation of Ukrainian farms in the context of war

Liudmyla Bovsh*

PhD in Economics, Associate Professor
State University of Trade and Economics
02156, 19 Kioto Str., Kyiv, Ukraine
<https://orcid.org/0000-0001-6044-3004>

Alla Rasulova

PhD in Economics, Associate Professor
State University of Trade and Economics
02156, 19 Kioto Str., Kyiv, Ukraine
<https://orcid.org/0000-0002-0498-3433>

Larysa Hopkalo

PhD in Economics, Associate Professor
National University of Life and Environmental Sciences of Ukraine
03041, 15 Heroyiv Oborony Str., Kyiv, Ukraine
<https://orcid.org/0000-0003-3513-0502>

Ramis Rasulov

PhD of Technical Science, Associate Professor
State University of Trade and Economics
02156, 19 Kioto Str., Kyiv, Ukraine
<https://orcid.org/0000-0003-4140-3386>

Kamel Mouloudj

Doctor of Marketing, Professor
University of Medea
26000, Pole Urbain, Medea, Algeria
<https://orcid.org/0000-0001-7617-8313>

Abstract. In the current economic environment, farms must respond to the challenges of the external environment and look for mechanisms to adapt and overcome the crisis, as well as diversify their business as additional sources of income. Therefore, the study of possible cross-sectoral adaptations of farms is a relevant research topic. Therefore, the purpose of this article is to provide a scientific basis for the predicates of diversification of farms' activities in overcoming the challenges of war. The study is based on classical approaches to management and marketing, as well as foresight predicates of agricultural development. The content of adaptation directions of farms' development was interpreted using empirical methods. The article analyses the sources of risks and threats, identifies targets and key aspects of the formation of intersectoral adaptation of farms: metrics, goals and foresight competences. As a result of the study of macro trends in the security of the agricultural sector, hypothetical analytical generalisations were formed, due to the uncertainty of the timeframe of the war and the impossibility of calculating the expected losses. Thus, the study made it possible to formulate theoretical and practical insights

Article's History:

Received: 05.01.2024
Revised: 22.02.2024
Accepted: 12.03.2024

Suggested Citation:

Bovsh, L., Rasulova, A., Hopkalo, A., Rasulov, R., & Mouloudj, K. (2024). Intersectoral adaptation of Ukrainian farms in the context of war. *Ukrainian Black Sea Region Agrarian Science*, 28(1), 52-65. doi: 10.56407/bs.agrarian/1.2024.52.

*Corresponding author



into the formation of adaptation mechanisms in the strategic perspective. The author substantiates the need for systematic and continuous monitoring of threats and invasions by systematising traditional and forecasting new risks. The key determinants of foresight adaptation under the influence of global trends are formulated. The mechanism of its implementation is presented through the identification of areas of intersectoral adaptation. The study is of practical value, generating information for farms, rural communities, stakeholders and potential investors who can benefit from the foresight of prospects and expectations formed in the context of cross-sectoral adaptation of farms in the post-war period

Keywords: innovations; diversification; foresight adaptation; economic security; inter-sectoral partnership; agrotourism; land management

INTRODUCTION

In today's world, climate change, market and technological transformations pose new challenges for rural producers. Understanding and improving the cross-sectoral adaptations of Ukrainian farms is key to ensuring the productivity, efficiency and sustainability of the agricultural sector, especially in the context of growing military threats and losses from military aggression. Therefore, the study of intersectoral adaptations of farms is relevant.

The key role of farms in the development of the economy of territorial communities and the country as a whole is confirmed both in the academic field and by the government's stimulating policies. For example, G. Kukel *et al.* (2020) emphasised the significant social role of farming, which contributes to the creation of a significant number of jobs in rural areas. Farming as a source of investment in infrastructure, development of the rural economy, as well as contributing to the sustainability of local communities through taxes paid is reflected in the works of N. Bakhur (2020) and N. Bulavina *et al.* (2021). The multiplier effect of developed farming (in particular, the positive impact on food processing, logistics, trade, transport, tourism, etc.) is analysed by P. Bhattacharyya (2022).

The intersectoral adaptation of farms in the context of war is a complex and relevant topic, especially in the context of the current situation in Ukraine. The topic presented is cross-disciplinary, as it is at the intersection of scientific approaches of the agro-industrial complex and a set of industries that diversify farm activities: technology and innovation; transport and logistics; agrotourism; food processing and consumption; marketing and outsourcing; land management; financial institutions; healthcare, etc. Therefore, research papers that consider areas of cooperation and partnership with other sectors of the economy that contribute to the formation of additional sources of income for farms and the development of rural (local) communities are valuable for the study. Thus, there are many developments in the agricultural sector in the academic field. Current

research covers digitalisation (Bacco *et al.*, 2019) and the use of artificial intelligence (Holzinger *et al.*, 2023).

The escalation of a full-scale war on the territory of Ukraine poses challenges for farms and agriculture in general. Thus, online analytics shows the adaptability and ability to overcome war risks: Ukraine increased the share of agricultural imports to the European Union by 11% in January-September 2023 compared to last year (Tomczyk, 2023) and became the third largest supplier of agricultural products after Brazil and the United Kingdom (Prysiashna, 2023). It is an indisputable fact that the war has had a significant negative impact on the agricultural sector and agriculture in the country: destruction of agricultural production and processing infrastructure; agricultural machinery, crops and animals; loss of labour potential due to displacement and mobilisation; destruction of grain storage facilities and storage infrastructure; logistical difficulties; contamination and unusable land; embargoes on European markets – all these factors make it important to develop strategies to ensure the sustainability of the agricultural sector.

The need to develop mechanisms for adapting to the challenges of war and restoring agriculture in the post-war period is generating relevant interests among scientists, professionals and local communities. From a scientific point of view, these mechanisms need to be developed with the understanding that the "non-standard" reality of the Ukrainian economy, new problems and challenges cannot be solved by traditional approaches, and therefore require innovative thinking. First and foremost, this concerns Ukraine's positioning in the global world as an agrarian and digital state, which is characterised by the integrated development of industries and intellectual potential. Therefore, an empirical study of cross-sectoral adaptations is an important task for the recovery of agriculture, a significant share of which is represented by farms in Ukraine. Accordingly, the aim of the study was to examine the strategies and mechanisms used by farms in Ukraine to successfully adapt to the challenges posed by the

military conflict. The article is aimed at identifying the best ways to support and develop the agricultural sector in the face of unpredictable economic and social circumstances, contributing to the sustainable functioning of the industry in the context of military instability.

MATERIALS AND METHODS

The study is based on the interpretation of the theory and practice of intersectoral adaptations of farms in Ukraine. In this context, the research methodology is aimed at interpreting operational definitions and modelling key approaches to the formation of intersectoral adaptations of Ukrainian farms in the context of war.

The semantic analysis and contamination of the definitions of “adaptation” and “foresight” allowed to establish a link between the concepts and formulate an understanding of the context of “foresight adaptation”. The application of an integrated approach to the research methodology, consistent with the concept of “foresight adaptation”, allowed not only to analyse the aspects of farm survival during martial law, covering economic, social, environmental and other factors, but also to identify hypothetical areas of their adaptation through the use of cross-sectoral activities. Accordingly, the key approaches to intersectoral adaptation of Ukrainian farms were formed, which determined the focus of the study and priorities in the formation of foresight adaptations. A partnership model was also constructed, which focused on the key actors in the process of intersectoral adaptation of farms.

The analysis of the functioning of farming in Ukraine, which is seeking ways to survive and adapt during the war, is a multidimensional task complicated by a large number of factors affecting agriculture. The applied method of statistical data analysis allowed to get an idea of the dynamics of the number of farms, their activities, and to highlight the problems, needs and strategies for survival during the war. It is important to keep in mind that the data obtained is not fully representative, and only field research and on-site observations can provide more detailed information about the conditions faced by farmers during the war. This is due to the lack of complete official statistical reports. In determining the prospects for farm development, the dynamics of the number of farms during the military timeframe was analysed: from the beginning of the war in Ukraine to the date of the study (2014-2024), which operated under the threat of escalating hostilities and formed strategies for adaptation and development. The article assesses the stimulating interactions between the agro-industrial complex and the state based on the analysis of expenditure items from the Ukrainian budget for the agro-industrial complex in 2024.

The application of the horizon scanning method confirmed the positive prospects for the development of

farming in the post-war period. Based on the analysis of global trends in agriculture, digital innovations, etc., the directions of revitalisation of the agricultural sector were identified. The reference modelling helped to identify areas for inspiring cross-sectoral adaptations of Ukrainian farms and diversification of their activities. The main risks and areas of their management, in particular through intersectoral partnerships, were characterised. A robust procedure for exploratory and confirmatory analysis of the study of cross-sectoral adaptations was applied to a dataset collected through the processing of official statistics (Ministry of Agrarian Policy and Food of Ukraine, 2022; Ukrstat, 2024), as well as online data sources.

It should be noted that this study has a number of limitations that reveal issues that require additional research. Firstly, as of the beginning of 2024, many areas of priority agricultural development are under occupation and suffer from destruction. Therefore, it is difficult to assess and predict the extent of the damage. Secondly, due to the uncertain timeframe of the war escalation and the impossibility of quantifying losses and damage to land resources, material and technical resources, and the infrastructure of the agricultural sector, statements of foresight adaptations remain a priori probabilistic. Thirdly, analytics on agriculture during martial law is incompletely reflected, so analytics can only be generated from online sources.

RESULTS

The expediency of cross-sectoral adaptation, which is based on the entrepreneurial idea of using achievements, skills, technologies or strategies that have already been successfully used in other industries or areas of activity, is to achieve the goal of improving productivity, competitiveness or overcoming environmental challenges by business entities, including farms. The formation of cross-sectoral adaptations of farms is an important strategic task, as it allows to ensure the sustainability and development of the agricultural sector under martial law in Ukraine. The theoretical aspects of this process should be substantiated by the following approaches (Fig. 1). The systemic approach involves considering a farm as a complex system that interacts with other sectors of the economy in creating and organising the consumption of agricultural products. The synergistic approach, in turn, aims to create synergies, i.e. interactions that lead to a positive effect for all participants, including diversification of business income sources. The emphasis on innovation and technological progress is key to shaping cross-sectoral adaptations, as the introduction of the latest technologies, such as the Internet of Things, artificial intelligence, drones, and others, can improve production efficiency and ensure innovative development of farms in the production, service and logistics of agricultural products and services.

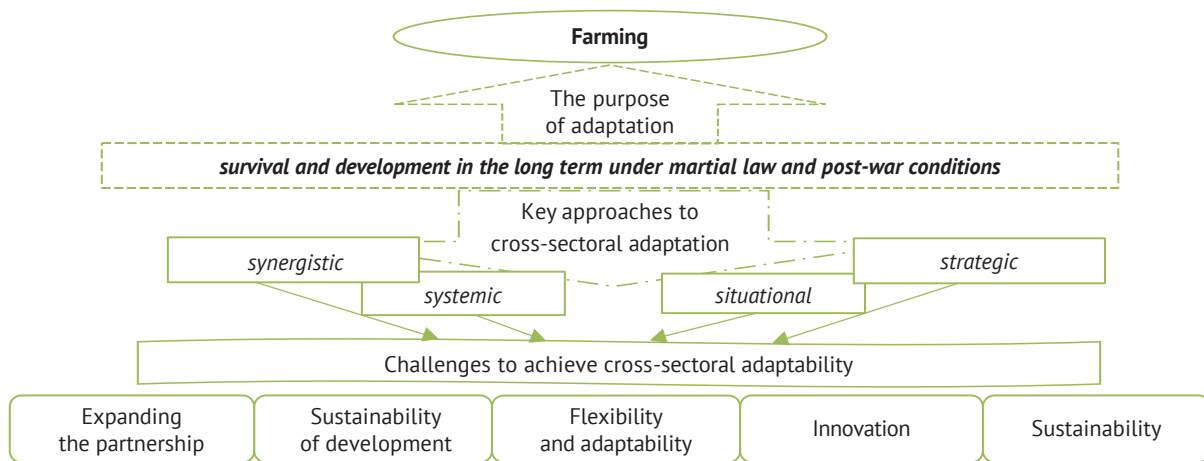


Figure 1. Key approaches to cross-sectoral adaptation of farms

Source: authors' development

The development of partnerships between farms and other sectors, such as industry, finance, tourism, education, etc., is important for the effective exchange of resources, ideas and experience. Strategizing for cross-sectoral adaptation involves developing long-term visions and plans that take into account not only internal but also external factors that may affect farms. Consideration of sustainability and resilience, flexibility and adaptability approaches build the necessary competencies of farmers to operate in a dynamic crisis environment and respond effectively to threats and risks. They determine

the success of farms in the current economic climate of Ukraine, where change has become the norm. Understanding and applying these concepts allows farmers not only to survive, but also to successfully adapt to the new conditions of military threats and innovate for sustainable development. Based on this, it can be stated that cross-sectoral adaptation of farms can include cooperation and interaction with different industries and sectors of the economy to achieve greater resilience and efficiency. Such cross-sectoral partnerships would be based on communication and comparative links (Fig. 2).

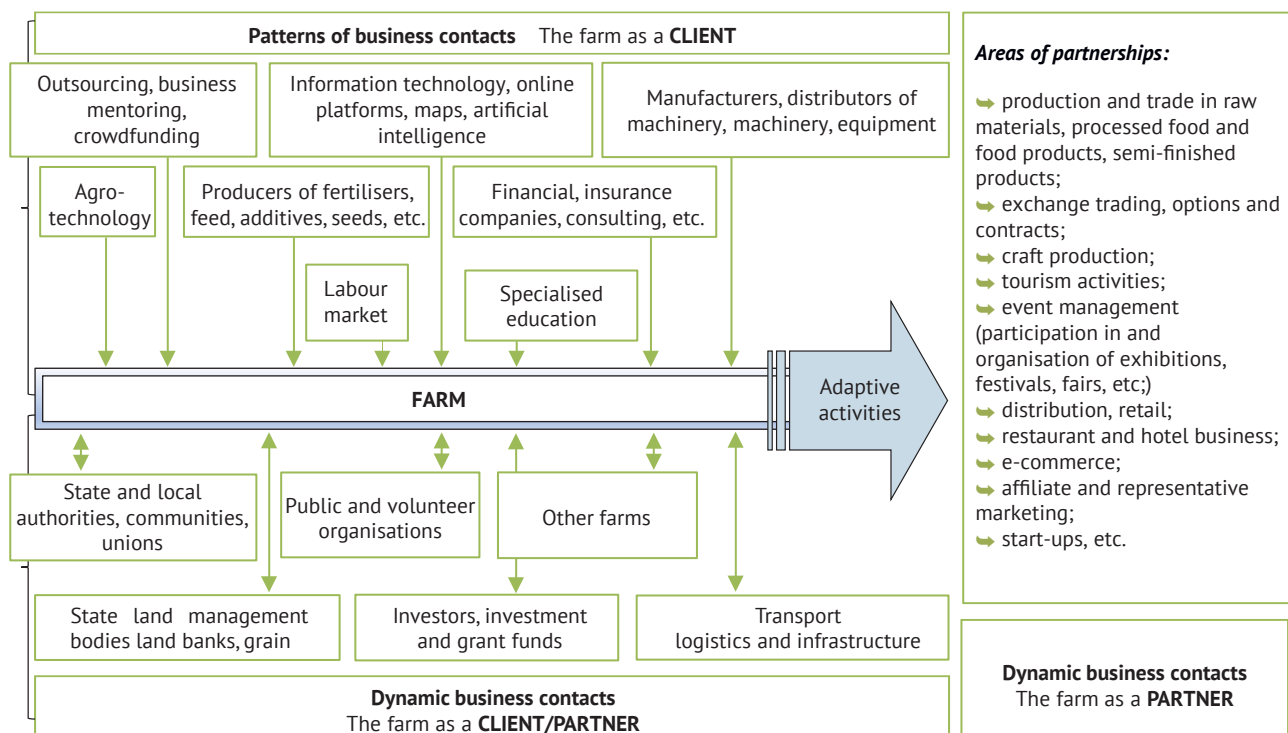


Figure 2. Model of partnership in cross-sectoral adaptation of farms

Source: authors' development

In the context of farming, the industries with which partnerships are formed are also comparators – those with which certain aspects of agriculture can be compared to gain important information, learning or best practices. Such benchmarking can help farmers improve their methods, optimise processes and achieve greater productivity.

In view of the above, it is reasonable to operationalise the term “foresight adaptation” as a tool for forecasting and strategizing anti-crisis and stress-resistant patterns of intersectoral adaptation of farms. The semantic analysis of the term “adaptation” in the works of M. Turko (2016), A. Voronina & A. Zenina-Bilichenko (2016) and Ya. Sikora (2022) revealed its consistent interpretation as a behavioural response to changes (challenges) in the environment. As for the term “foresight”, the Cambridge Dictionary (n.d.) defines it as the ability to judge the expected future correctly and plan your actions based on this knowledge. Foresight as a comprehensive competence-based approach to forecasting, which operates with a system of methods and tools for processing the information field to determine possible scenarios of

events, assessing the future state of a particular object (micro/macro system) and formulating strategies for the development of certain economic units, is described in the studies by L. Bovsh *et al.* (2023) and M. Bosovska *et al.* (2023). As a result, the contamination of terms allows to formulate foresight adaptation as a comprehensive competence-based approach to the formation of strategic behavioural responses of a business entity (farm) to changes (challenges) in the environment to determine possible scenarios for the unfolding of events in a certain frame.

The developed theoretical approaches allow to form the basis for considering practical insights into the intersectoral adaptation of farms in Ukraine and to determine further prospects for their development in the sector in intersectoral partnership. Before Russia's full-scale invasion of Ukraine, farm entrepreneurship and private households were actively developing. When considering the statistics on the development of farming in Ukraine, there is a tendency to increase the number of farms since 2016, when this figure has sharply decreased due to foreign policy factors (Fig. 3).

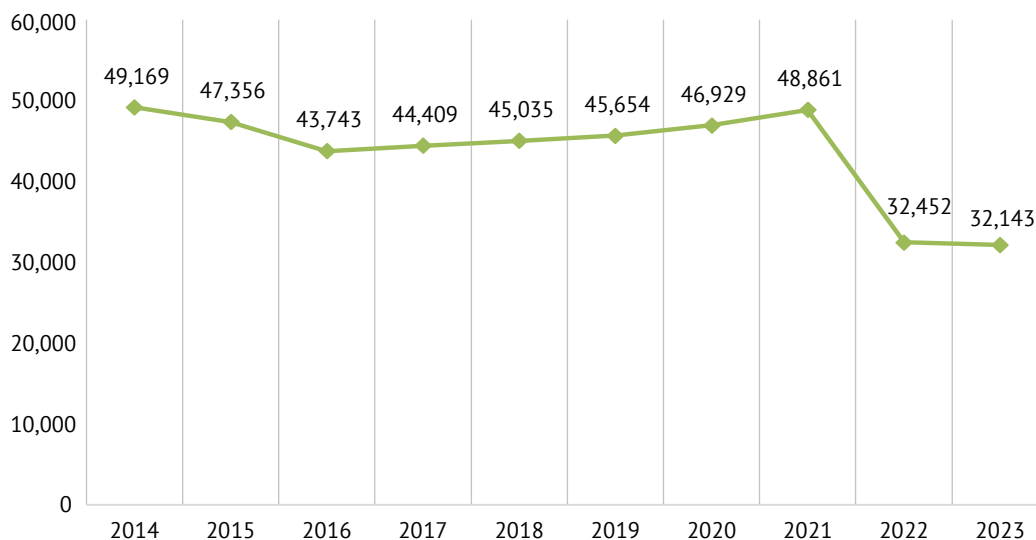


Figure 3. Dynamics of farming development in Ukraine, 2014-2023, units

Source: compiled by the authors based on I. Slobodianyuk (2023); Ukrstat (2024)

During the pandemic crisis, the number of farms has been steadily increasing. Thus, in 2019, 45,654 units were recorded, in 2020 – 47,803 units; in 2021, respectively, 48,868 farms (Ukrstat, 2024), which indicates the prospects for the development of farming and its investment attractiveness. With the outbreak of a full-scale war, a share of farms ceased operations due to being in the combat zone, in the temporarily occupied territories, or in the territories that have been de-occupied but are mined, destroyed, and in need of fundamental restoration. Thus, the risks

and threats are deepening and are determined by the uncertainty of both the timing of the end of the war and the forecasting of losses and damage to the ecosystem and agricultural land of Ukrainian territories. Therefore, it is important to study global trends and their impact on Ukrainian farms. It is proposed to summarise the main trends based on complementing the views presented in the scientific literature and online sources. For this purpose, the horizon scanning method was applied, the results of which are shown in Table 1.

Table 1. Markers for scanning the horizons of global trends in Ukrainian farms

| Key areas of focus | Horizon scanning, 2019-2021 | Horizon scanning, 2022-2023 | Prospects (post-war) |
|--|---|--|--|
| Internet of Things (IoT) systems in agriculture | monitoring the condition of plants and soil; decision-making based on Data Science; remote control of facilities (irrigation systems); automation of growing and harvesting processes (autonomous tractors and drones for spraying fertilisers or processing the field); use of sensors and biometric systems to monitor animal health and behaviour; accurate plant inventory and variety recognition using cameras and sensors; weather monitoring; integration with smart markets and digital communication and sales platforms | development of artificial intelligence and data analytics, overcoming the logistical challenges of war on digital communication platforms and marketplaces; further introduction of automated technologies (robots to perform tasks in the field), which improves efficiency and reduces labour costs in the face of «staff shortages» and physical harm to workers; the need to demilitarise agricultural land; cybersecurity threats | increasing the number of sensors to monitor various parameters, such as soil quality, plant health, weather and animal health; increasing the number of digital markets and platforms that bring together farmers, buyers and other participants to exchange information and agricultural products; expanding the use of drones, robots and cobots |
| Digital platforms and markets | total digitalisation started in 2019 during the lockdown and continued during the full-scale invasion: e-commerce and online trading platforms; mobile applications and web services; online sales of craft farming products; platforms for hiring freelancers and organising crowdsourced tasks; expansion of financial platforms and electronic payment systems for convenient online payments and transfers; the vigorous development of social media, blockchain technologies, agro- and IT technologies; business monitoring platforms for start-ups; government financial support for farms | | |
| Precision Agriculture | optimisation of field management, plant monitoring, efficient use of resources and sustainable production: use of global positioning systems (GPS) and global navigation satellite systems (GNSS) to accurately determine the location of tractors, equipment and plants; automatic driving technology; electronic mapping systems to create detailed field maps that help to effectively manage land resources | impossibility of use due to significant amounts of mined land, losses from the explosion of the Kakhovka hydroelectric power station, damage from shelling and risks of physical destruction; prevalence of partially automated farming | continuation of pre-war trends and the use of GPS and GNSS systems for field demining and land cultivation; technologies for precision tillage; improvement of cobots and drones for production processes |
| Genetic technologies and modification of organisms | improvement of genome editing technologies, in particular the CRISPR/Cas9 system, to increase plant yields and resilience; to create crop and livestock products with certain properties (increased nutrient content, quality); application of biotechnology to develop new plant varieties that can be grown in different climatic conditions and be resistant to extreme factors | creation of genetic jars and banks of varietal plants for biodiversity conservation | transition to eco-technologies for biodiversity conservation, improving plant resistance to stressful conditions, increasing productivity and reducing environmental impact, improving Gene Drive technologies to control pest populations and spread desirable genetic properties in natural populations |
| Organic farming and sustainability | the trend towards healthy eating (healthy properties of agricultural products, absence of chemical fertilisers and pesticides); growing attention to educating farmers about the benefits and techniques of organic farming, as well as training generations of farmers; increasing popularity of organic viticulture and winemaking | increasing the popularity of local and community initiatives that promote resource conservation and local development; development of new methods in the field of organic livestock farming that ensure sustainable animal husbandry and welfare | continuation of pre-war trends; increase in the area for organic farming; improvement of production methods and sustainable farming practices (crop rotation, use of green fertilisers and restoration of soil fertility, etc.); expansion of certification systems for organic production, obtaining organic status; increased participation of organic farmers in health markets |
| Global product market | spreading the concepts of vegetarianism, veganism, etc. (struggle for the market of meatless alternatives); introduction of new products of plant origin (vegetable proteins, dairy alternatives, etc.); increasing consumer interest in traceability of products, ethical production and sustainable development - the practice of using smart labels and QR codes on product packaging; research and development of new flavours, ingredients and combinations | promotion of products from local farmers, organic farming and products from the region, including due to the logistical problems of the military timeframe; search for channels for exporting products, embargoes of European markets, etc. | improving the use of smart technologies, artificial intelligence and blockchain to improve the technical aspects of supply and quality of agricultural products; increasing exports and expanding markets |

Table 1, Continued

| Key areas of focus | Horizon scanning, 2019-2021 | Horizon scanning, 2022-2023 | Prospects (post-war) |
|--|---|---|---|
| Direct sales and agritourism | increasing popularity of direct sales of products from farmers to consumers through consumer markets, rural fairs and direct sales from farms; intensification of agritourism (excursions, participation in agricultural work and rural recreation programmes, development of agritourism routes); expansion of agro-farmers' markets and specialized stores that sell the products of farmers and artisans | increasing interest in local food and local taste traditions, continuing trends in agritourism development | continuation and development of pre-war trends, creation of diversified farms, support of local communities in the development of agritourism and improvement of rural infrastructure |
| Risk management and insurance | main sources of risks: weather, price, production, financial, trade; objects of insurance: crops and livestock; insurance of trade and commercial risks; liability | insurance solutions for life, health and safety on the farm prevail, covering injuries and emergencies; property; cyber security | continuation of previous trends; development of insurance and incentive programmes for farmers aimed at reducing risks and promoting sustainable development |
| Education and support | cooperation with universities and training centres, separate video lessons in social media, webinars and mobile applications for training and development of farmers aimed at mastering the following competences: use of digital communication technologies; financial literacy; risk management and use of insurance instruments; use of innovative technologies (digital systems, robots (cobots), drones, artificial intelligence, modern agricultural technologies and «digital farming», etc.), support for women's farming | | |
| Developing strategies to adapt to climate change and reduce the environmental impact of production | development of methods aimed at preserving soil fertility, avoiding erosion and reducing the use of chemicals; introduction of «digital farming» for the point application of resources (water, fertilisers, pesticides) and optimisation of field cultivation; energy-efficient irrigation systems, solar panels, and energy-saving technologies to reduce emissions and dependence on unsustainable energy sources; increased attention to recycling and waste management to reduce negative environmental impact; development of strategies to optimise water use in agriculture, including technologies for rainwater conservation and use, as well as water management techniques; identifying and implementing risk management strategies that take into account possible risks associated with climate change and ensure the flexibility and resilience of agriculture in new conditions | overcoming the ecocide caused by the explosion of the Kakhovka hydroelectric power station and the flooding of agricultural land, identifying and implementing risk management strategies that take into account possible military risks, as well as derivative risks associated with climate change and soil fertility; developing strategies for adaptation to external threats, pandemics and man-made disasters | creation of agroecosystems to restore biodiversity and soil cover; agroecological practices (introduction of compatible crops, use of natural enemies of pests, avoidance of chemical pesticides); hydroponics and aeroponics systems (growing plants without using traditional soil); intensification of rural ecotourism as a way to generate income for farms and promote the conservation of natural resources; development and implementation of economic incentives for agro-ecological farms, («green loans»); involvement in global initiatives and work on sustainable agriculture standards to jointly address climate change and ensure sustainable production |

Source: authors' development based on V. Burkynskyi et al. (2022); R. Abbasi et al. (2022); O. Tabenska (2023)

Thus, the trends in farming, activated by the lockdowns of the coronavirus pandemic, indicate the use of digital technologies in communications and agricultural production, which provides consumers and farmers with new opportunities for interaction and development. Such technologies allow farmers to optimise their operations, reduce costs and increase yields, making precision agriculture a key component of modern agriculture. In addition, these aspects indicate a growing interest in organic farming and socially responsible sustainable production in 2019-2023.

These trends reflect the need for constant adaptation and implementation of the latest approaches to ensure the effective development of farming in the face of climate change, military and environmental challenges. The state and government agencies, through the legislative framework, budgeting and quota systems, create the basis for the development or hindering of agribusiness. In the second year of the full-scale war, the Government has allocated at least UAH 4.2 billion in the 2024 budget to support the agricultural sector (Table 2).

Table 2. Expenditure items from the Ukrainian budget for the agricultural sector in 2024

| Directions of budgeting | Volume, UAH million | Share, % |
|--|---------------------|--------------|
| Humanitarian demining | 2,000 | 47.5 |
| The program of partial compensation of the cost of agricultural machinery | 1,000 | 23.8 |
| Subsidies per hectare of agricultural land for activities in the de-occupied territories | 796 | 18.9 |
| Support of organizations of water users and farmers who use reclaimed land | 205 | 4.9 |
| Fish breeding complexes and raising of fry for stocking reservoirs, compliance with financial obligations to international organizations | 125.3 | 3.0 |
| Loans for farms on MTB | 80 | 1.9 |
| In total | 4,206.3 | 100.0 |

Source: developed by the authors based on the Ministry of Agrarian Policy and Food of Ukraine (2022); Agoreview (2023)

The priority of state support is the reintegration of the territories affected by the hostilities into the national agricultural sector. In particular, almost half of the budget is allocated to compensate for the costs of humanitarian demining of agricultural land, and 19% to restore operations in the de-occupied territories.

The government plans to allocate an additional UAH 1.37 billion in non-refundable grants for the creation or development of processing enterprises, including in the areas of horticulture, berry growing, viticulture and greenhouse construction. However, large agricultural enterprises and farmers are in no hurry to apply for the grant programmes because of the current format of subsidies:

- remains a situational measure of assistance, not a systemic regulatory and controlling activity for the responsible operation of the agro-industrial complex (AIC);

- does not play a key role in shaping the business model of large agricultural holdings and medium-sized agricultural companies due to the lack of such a need or the fact that their business does not meet the parameters of assistance programmes;

- creates bureaucratic obstacles to the preparation and submission of a package of documents;

- it is not always conducive to their involvement due to the current state requirements for granting, according to which the decision to issue a grant is made by the Employment Centre, not a banking institution or a specialised committee. The farmer is forced to spend the funds won on creating additional jobs and increasing wage/taxation costs rather than investing in processing, developing material and technical resources, agricultural technologies and promising areas of activity to create added value.

Thus, in the perspective of the post-war recovery of Ukraine's agricultural sector, the state of land and agricultural resources, the consequences of infrastructure destruction within the affected territorial communities, the spread of artificial intelligence and the reduction in human resource needs should be taken into account, so it is necessary to review approaches to state support for agricultural producers and the procedure for obtaining grants.

Based on the rationale for the term "foresight adaptation" and global trends in agriculture, the directions for inspiring the development of farming in Ukraine, which is the basis for inter-sectoral partnership, are systematised (Fig. 4).

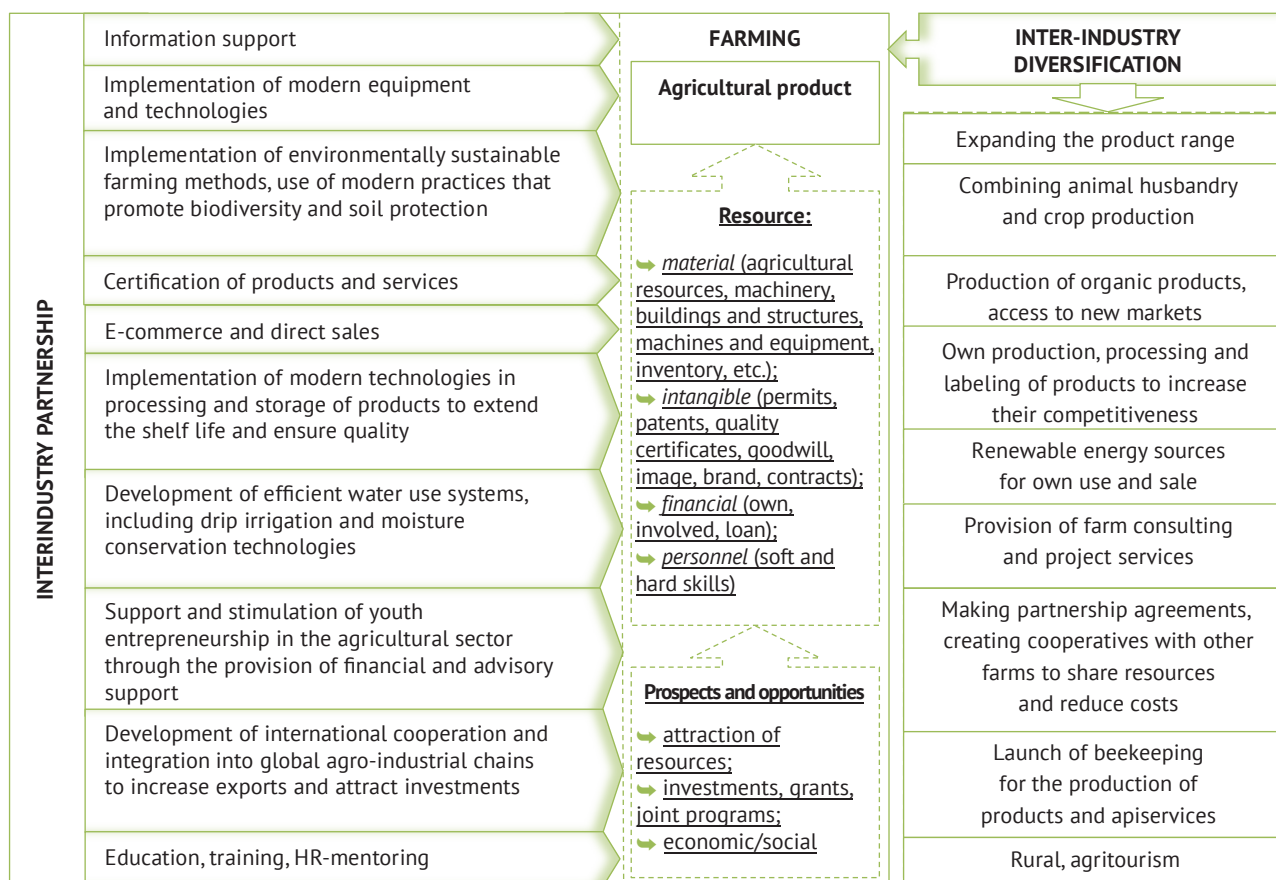


Figure 3. Reference model of inspiration for the development of farming in Ukraine

Source: authors' development based on Y. Chomei & T. Nanseki (2018); S. Neogi & B.K. Ghosh (2022); A. Bernzen et al. (2023)

Figure 4 shows that the prospects for diversification of farming development are described in many ways. Of particular note is the multidirectional expansion of the production range, which includes exotic or niche crops, environmentally friendly and organic crop and livestock products, which is a current trend.

Rural tourism and agritourism, as promising areas of adaptive development, also have many areas for organising additional sources of income and cooperation. World practice shows that the integration of farming and tourism activities is an integral part of the comprehensive socio-economic development of rural areas, and will also serve as an additional income for farmers, especially in the difficult socio-economic conditions of the military timeframe in Ukraine. And given the current realities, farmers need to quickly study demand, prepare interesting offers, effectively advertise them, establish quality service at reasonable prices, and cooperate with tour operators. Organising gastronomic tours and trips to farms with accommodation in rural green estates attracts tourists because it is a unique opportunity for them to:

- ↳ to be in an environmentally friendly environment and consume environmentally friendly products;
- ↳ to communicate with flora and fauna;
- ↳ learn about local traditions, customs and culture;
- ↳ get involved in agricultural work, including apinary, mowing, grazing, grape harvesting, etc;
- ↳ witness and participate in craft production;
- ↳ take part in recreational activities (e.g., wagon or boat rides, bird watching, fishing, etc.)

For entrepreneurs, this is one of the opportunities to organise a multi-vector mutually supportive business, which in the context of the crisis caused by the war can be an effective way of survival, as they can not only produce agricultural products, provide gastronomic and hospitality services, but also sell new knowledge and emotions about rural development, nature, ecology, landscape, etc. Such activities involve organising recreation on the basis of a farm using all resources as a base for tourist attractions.

In general, the theoretical and practical aspects of cross-sectoral adaptation of farms in Ukraine have

shown the possibilities of restoring agriculture and the Ukrainian economy in the post-war period. After all, the cross-sectoral nature of farming demonstrates the possibility of creating new businesses and start-ups involving both business and NGOs, as well as local communities and the government, which is a prerequisite for overcoming the war and post-war crisis, macroeconomic problems of unemployment and poverty.

DISCUSSION

The study aimed to develop hypotheses about the importance of farming in Ukraine for the development of local communities and the country. Accordingly, the question of the prospects of farming as a component of economic recovery policy in the war and post-war period became a matter of debate. The scientific sources studied confirmed this hypothesis with practical insights from other researchers. In particular, O. Vitryak & V. Tkachuk (2021), assessing the effectiveness of small farms, stated their key role in rural development. I. Bezhenar & O. Hryshchenko (2023) defined farming as a form of management that has become one of the leading in the world practice of developed countries due to its uniqueness and ability to adapt to the current challenges of the global economy, which is open to innovation and multi-vector development. The global scale of agricultural production as the most important pillar for human survival is emphasised in the article by X. Liu (2023). The prospects of farming as a highly profitable and fast-growing sector are annotated in S. Felix (2020). In addition, some authors also note the importance of farming as a social aspect in rural development. K.R. Terzano (2021) proves the psychological benefits, in particular for the development of schoolchildren in the process of their socialisation and environmental education. A collinear view is traced in the work of E.L. Chaverest (2023), where farms are considered in terms of volunteer assistance to communities: they provide food and employment for local residents, teach the younger generation about relationships with nature, etc. This confirms the view that farming has a positive social and economic impact.

However, farming is a seasonal activity. Accordingly, it needs financial support to maintain employees and fixed assets during periods of inactivity. This can be seen in the article by A. Bonanno (2019), which notes the unstable nature of the availability of jobs and income of agricultural enterprises, as well as the work by N. Patyka *et al.* (2023), which states that the development of Ukrainian rural areas is possible through the support of farming by rural territorial communities. Therefore, it is advisable to agree and emphasise the importance of intersectoral adaptations of farms, which

create significant opportunities for the development of farming and rural areas through diversification and partnership, as well as the use of the latest technologies. Since the main idea of cross-sectoral adaptation is to use the achievements, skills, technologies or strategies that are already successfully used in other industries or areas of activity and apply them in your own field in order to improve productivity, competitiveness or solve new problems, it is also worth agreeing with these arguments of researchers S.H. Chin (2022), J.K.L. Chan (2023) and K. Dashper (2023).

Consideration of the aspects of intersectoral adaptation of farms in Ukraine has brought up the aspect of diversification. The key studies are those of H.I. Ansoff (1957), who introduced the term “diversification” into the scientific vocabulary and developed a matrix used in decision-making on diversification, and L. Bovsh *et al.* (2020), who determined that the purpose of diversification of a business entity is to manage capital (investments) in order to distribute economic risk and create additional sources of financing. The prospects of the proposed measures as an effective way to diversify activities are confirmed by modern farms. Thus, in Ukraine, farms with integration into tourism are most common in Western Ukraine. One of the most popular is the “Western Snail” tourist route, which offers a full-fledged gastronomic tour with a farm tour (Horbohory, n.d.). They bring together producers who are ready to organise product tasting at the enterprise or in a tasting room. The cognitive and gastronomic purpose of the trip is promoted by Dooobraferma (Dooobraferma Official Website, n.d.), where the owner offers hard cheeses, honey, poultry, and Zinka (Zinka Official Website, n.d.), a brand focused on dairy goat farming, crop production, animal husbandry, gardening, and processing of animal products, etc.

However, studies have shown that farms do not always consider rural green tourism and the organisation of rural green homestays for tourists on their territory as one of the areas of business development, because the introduction of additional activities of farmers in the form of rural green tourism requires high-quality management, to see the real opportunities and risks from the introduction of this type of activity. Since the issue of farm development is closely related to the management of strategic resources (land, water, forests, etc.), which are subject to regulatory mechanisms and strict state control over their distribution and use, it is predicted that the directions of intersectoral adaptation of farms, including in terms of agritourism development opportunities, will correlate with changes in legislation in the field of land and natural resources (Water Code of Ukraine, 2023;

Land Code of Ukraine, 2024). Thus, analysing the results of research by S. Nikitchenko *et al.* (2022), it can be concluded that the intersectoral adaptation of Ukrainian farms in the context of war through the introduction of rural green tourism practices can be a significant support for the farm business as a whole.

Despite the fact that the implementation of intersectoral adaptive areas of farm development is expected to generate additional financial revenues, entrepreneurs face a number of problems: lack of experience; difficulty in finding the necessary information; uncertainty at the legislative level; remoteness of farm recreation centres from tourists (poor transport links); insufficient advertising; lack of support at the state level. Therefore, partnership support, based on the association of farm owners, is important – the All-Ukrainian public non-profit organisation “Union of Rural Green Tourism of Ukraine” (n.d.). Farm business owners have the opportunity to integrate into the tourism sector by diversifying their activities and business mentoring.

Thus, the analysis of studies on inter-sectoral adaptations of Ukrainian farms has shown that, while emphasising the main advantages of the sectoral activity itself, a sustainable search for new ideas, development opportunities through diversification and inter-sectoral partnerships is an integral part of scientific research. The main results of the study are similar and consistent with those presented in the works of other researchers.

CONCLUSIONS

The post-war recovery of Ukraine's economy is expected to be based on the traditionally developed and export-oriented sector of activity, which is agriculture. As an integral chain in shaping the food security of Ukraine and the world, it includes various areas: agriculture, livestock, fisheries, forestry, etc. Farming business has unique opportunities for development. Given Ukraine's favourable climate, land, landscape, and labour resources, the activities of agricultural entities, including farming, should be aimed at preserving and developing its financial independence, profitability, and export potential, which requires a scientific approach to developing appropriate tools.

The article scientifically substantiates the key approaches to intersectoral adaptation of farms, which are based on the principles of systemicity, synergy, innovation, sustainability, resilience, flexibility and adaptability of a business entity (farm). As a result of the study of patterns of intersectoral adaptation of farms, it is stated that it may include cooperation and interaction with various industries and sectors of the economy to achieve greater sustainability and efficiency. At the same time, the main goals (survival and development

of a farm) can be ensured by developing a foresight adaptation mechanism in the form of a comprehensive competence-based approach to the formation of strategic behavioural responses of a business entity (farm) to changes (challenges) in the environment to determine possible scenarios of events in a certain frame. This hypothesis was confirmed by analysing the dynamics of the number of farms in 2014-2023, which shows an upward trend despite the logistics crisis and military risks. A study of trend markers using the horizon scanning method showed that national farms should take into account global trends and agricultural development trends, as they will determine the preferences of agricultural consumers and the export goals of recipient countries in the future. In addition, the innovations presented here greatly simplify operations by optimising physical labour costs, minimising the risks of working on land with a potential mine risk, improving the quality of agricultural products, etc. However, like any innovation, they require financial support from state and local authorities, as well as private investment. This paper analyses the planned areas of expenditure to support the development of farming in Ukraine in 2024. In particular, to compensate for the costs of humanitarian demining of agricultural land and to receive non-refundable grants for the creation or development of processing enterprises, including in the areas of horticulture, berry growing, viticulture and greenhouse construction. For the effective use of state grants, attracted investments, etc., the reference model of development inspiration, which includes both business partnerships and diversification of activities, is proposed for practical use by farms. At the same time, diversification areas have been selected from practical insights – the activities of successful farms, which include the production of various types of agricultural products and position them both in direct sales and e-commerce.

Thus, overcoming the environmental and infrastructural damage, material and human losses, and sometimes critical destruction caused by the war, requires balanced state legislative and financial support, including changes to the regulation and organisation of land management, budgeting and the procedure for receiving grants by farms. The recommendations presented here are intended to facilitate the effective development of farms in the future. At the same time, it creates a basis for further research and discussion to address gaps in existing theories, improve understanding of new phenomena and trends in the macro environment, and explore fundamental issues that have not yet been addressed. Further research on adaptation mechanisms for agribusiness development could be aimed at identifying and substantiating theoretical and practical

insights into the formation and implementation of state policy in the field of e-government development and Ukraine's integration into the global information space in order to quickly adapt farms to the European and international agricultural market. None.

ACKNOWLEDGEMENTS

CONFLICT OF INTEREST

None.

REFERENCES

- [1] Abbasi, R., Martinez, P., & Ahmad, R. (2022). The digitization of agricultural industry – a systematic literature review on agriculture 4.0. *Smart Agricultural Technology*, 2, article number 100042. doi: [10.1016/j.atech.2022.100042](https://doi.org/10.1016/j.atech.2022.100042).
- [2] Agroveview. (2023). *For the year 2024, UAH 4.2 billion is planned for the agricultural sector: What do market participants think about it*. Retrieved from <https://agroveview.com/content/na-2024-rik-peredbacheno-42-mlrd-grn-dlya-apk-shho-pro-cze-dumayut-uchasnyky-rynku/>.
- [3] Ansoff, H.I. (1957). *Strategies for diversification*. Harvard Business Review, 35(5), 113-124.
- [4] Bakhur, N. (2020). The influence of the institutional environment on development of investment activity in the agricultural sector of the economy. *University Economic Bulletin*, 15(3), 7-20. doi: [10.31470/2306-546X2020-46-7-20](https://doi.org/10.31470/2306-546X2020-46-7-20).
- [5] Bacco, M., Barsocchi, P., Ferro, E., Gotta, A., & Ruggeri, M. (2019). The digitisation of agriculture: A survey of research activities on smart farming. *Array*, 3-4, article number 100009. doi: [10.1016/j.array.2019.100009](https://doi.org/10.1016/j.array.2019.100009).
- [6] Bernzen, A., Sohns, F., Jia, Y., & Braun, B. (2023). Crop diversification as a household livelihood strategy under environmental stress. Factors contributing to the adoption of crop diversification in shrimp cultivation and agricultural crop farming zones of coastal Bangladesh. *Land Use Policy*, 132, article number 106796. doi: [10.1016/j.landusepol.2023.106796](https://doi.org/10.1016/j.landusepol.2023.106796).
- [7] Bezhenar, I., & Hryshchenko, O. (2023). Farms in Ukraine: State and prospects for development. *Problems of Modern Transformations. Series: Economics and Management*, 9. doi: [10.54929/2786-5738-2023-9-04-14](https://doi.org/10.54929/2786-5738-2023-9-04-14).
- [8] Bhattacharyya, P. (2022). Climate smart agriculture: Special reference to conservation agriculture. In R. Saha, D. Barman, M. Behera & G. Kar (Eds.), *Conservation agriculture and climate change impacts and adaptations* (pp. 21-32). London: CRC Press. doi: [10.1201/9781003364665-3](https://doi.org/10.1201/9781003364665-3).
- [9] Bonanno, A. (2019). *Small farms*. New York: Routledge. doi: [10.4324/9780429306150](https://doi.org/10.4324/9780429306150).
- [10] Bosovska, M., Boiko, M., Bovsh, L., Okhrimenko, A., & Vedmid, N. (2023). Foresight (prevision) of development of the tourist system in Ukraine. *Problems and Perspectives in Management*, 21(4), 696-712. doi: [10.21511/ppm.21\(4\).2023.52](https://doi.org/10.21511/ppm.21(4).2023.52).
- [11] Bovsh, L., Hopkalo, L., & Rasulova, A. (2020). Idiversification approach to customer-oriented management of hotel and restaurant businesses. *Scientific Horizons*, 23(11), 88-100. doi: [10.48077/scihor.23\(11\).2020.88-100](https://doi.org/10.48077/scihor.23(11).2020.88-100).
- [12] Bovsh, L., Komarnitskyi, I., Prykhodko, K., & Oliynyk, O. (2023). Foresight of restaurant business development. Restaurant and Hotel Consulting. *Innovations*, 6(1), 8-26. doi: [10.31866/2616-7468.6.1.2023.278468](https://doi.org/10.31866/2616-7468.6.1.2023.278468).
- [13] Bulavinova, N., Burdenko, I., Lehenchuk, S., Tsaruk, I., & Ostapchuk, T. (2021). Trends in research of responsible investment in the context of sustainable development: Bibliometric analysis. *Agricultural and Resource Economics: International Scientific E-Journal*, 7(3), 179-199. doi: [10.51599/are.2021.07.03.11](https://doi.org/10.51599/are.2021.07.03.11).
- [14] Burkynskyi, B., Kupinets, L., Andryeyeva, N., & Shershun, O. (2022). Ukrainian agro-food sector in the context of global patterns of environmental innovation development. *Comparative Economic Research. Central and Eastern Europe*, 25(4), 45-63. doi: [10.18778/1508-2008.25.29](https://doi.org/10.18778/1508-2008.25.29).
- [15] Cambridge Dictionary. (n.d.). *Definition of "foresight"*. Retrieved from <http://surl.li/eftzh>.
- [16] Chan, J.K.L. (2023). Sustainable rural tourism practices from the local tourism stakeholders' perspectives. *Global Business & Finance Review*, 28(3), 136-149. doi: [10.17549/gbfr.2023.28.3.136](https://doi.org/10.17549/gbfr.2023.28.3.136).
- [17] Chaverest, E.L. (2023). Supporting small farms: How protecting local farms can protect local communities. *Futurum Careers*. doi: [10.33424/futurum416](https://doi.org/10.33424/futurum416).
- [18] Chin, C.H. (2022). Empirical research on the competitiveness of rural tourism destinations: A practical plan for rural tourism industry post-COVID-19. *Consumer Behavior in Tourism and Hospitality*, 17(2), 211-231. doi: [10.1108/cbth-07-2021-0169](https://doi.org/10.1108/cbth-07-2021-0169).
- [19] Chomei, Y., & Nanseki, T. (2018). Diversification strategy and business innovation in corporate rice farming. *Journal of Rural Problems*, 54(3), 117-124. doi: [10.7310/arfe.54.117](https://doi.org/10.7310/arfe.54.117).

- [20] Dashper, K. (2023). Gender and rural tourism. In H. Mair (Ed.), *Handbook on tourism and rural community development* (pp. 140-152). Cheltenham: Edward Elgar Publishing. doi: [10.4337/9781800370067.00019](https://doi.org/10.4337/9781800370067.00019).
- [21] Dooobraferma Official Website. (n.d.). Retrieved from <https://dooobraferma.com.ua/>.
- [22] Horbohory. (n.d.). *Western snail*. Retrieved from <https://www.horbohory.com.ua/?pwb-brand=ravlyk>.
- [23] Felix, S. (2020). Vannamei farming in India. In S. Felix, T. Samocha & M. Menaga (Eds.), *Vannamei shrimp farming* (pp. 1-5). London: CRC Press. doi: [10.1201/9781003083276](https://doi.org/10.1201/9781003083276).
- [24] Holzinger, A., Keiblinger, K., Holub, P., Zatloukal, K., & Müller, H. (2023). AI for life: Trends in artificial intelligence for biotechnology. *New Biotechnology*, 74, 16-24. doi: [10.1016/j.nbt.2023.02.001](https://doi.org/10.1016/j.nbt.2023.02.001).
- [25] Kukul, G., Roleders, V., & Semchuk, I. (2020). Estimation of employment in agriculture of Ukraine. *Demography, Labour Economics, Social Economy and Politics*, 1(75), 47-51. doi: [10.32782/2520-2200/2020-1-30](https://doi.org/10.32782/2520-2200/2020-1-30).
- [26] Land Code of Ukraine. (2024, January). Retrieved from <https://zakon.rada.gov.ua/laws/show/2768-14/ed20240101#Text>.
- [27] Liu, X. (2023). Sustainable intensification: A historical perspective on China's farming system. *Farming System*, 1(1), article number 100001. doi: [10.1016/j.farsys.2023.100001](https://doi.org/10.1016/j.farsys.2023.100001).
- [28] Ministry of Agrarian Policy and Food of Ukraine. (2022). *State support*. Retrieved from <https://minagro.gov.ua/pidtrimka>.
- [29] Neogi, S., & Ghosh, B.K. (2022). Evaluation of crop diversification on Indian farming practices: A panel regression approach. *Sustainability*, 14(24), article number 16861. doi: [10.3390/su142416861](https://doi.org/10.3390/su142416861).
- [30] Nikitchenko, S., Stepura, L., & Fedoruk, Y. (2022). Economic fundamentals of non-agricultural activity of Ukrainian farms. *Food Resources*, 10(18), 248-256. doi: [10.31073/foodresources2022-18-24](https://doi.org/10.31073/foodresources2022-18-24).
- [31] Patyka, N., Sokolova, A., Movchaniuk, A., Sysoieva, I., & Khirivskiy, R. (2023). Ukraine's rural areas in the conditions of decentralization and local self-government reform: Challenges and prospects. *Agricultural and Resource Economics: International Scientific E-Journal*, 9(3), 266-295. doi: [10.51599/are.2023.09.03.12](https://doi.org/10.51599/are.2023.09.03.12).
- [32] Prysiashna, L. (2023). *Ukraine became the third largest supplier of agricultural products in the EU*. Retrieved from https://biz.ligazakon.net/news/224589_ukrana-stala-tretm-za-velichinoyu-postachalnikom-agroproduktu-v-s.
- [33] Sikora, Ya. (2022). Adaptation as an object of scientific research: Psychological and pedagogical analysis. *Scientific Bulletin of Uzhhorod University. Series: "Pedagogy. Social Work"*, 2(51), 135-139. doi: [10.24144/2524-0609.2022.51.135-139](https://doi.org/10.24144/2524-0609.2022.51.135-139).
- [34] Slobodianyuk, I. (2023). *The end of farming in Ukraine?* Retrieved from <https://www.epravda.com.ua/columns/2023/03/13/697907/>.
- [35] Union of Rural Green Tourism of Ukraine. (n.d.). Retrieved from <https://www.greentour.com.ua/>.
- [36] Tabenska, O. (2023). Development of rural green tourism. *Economy and Society*, 52. doi: [10.32782/2524-0072/2023-52-10](https://doi.org/10.32782/2524-0072/2023-52-10).
- [37] Terzano, K.R. (2021). Psychological benefits of school farms for students. In A.A. Farag, S. Badawi, G. Lalli & M. Kamareddine (Eds.), *School farms* (pp. 92-104). London: Routledge. doi: [10.4324/9781003176558](https://doi.org/10.4324/9781003176558).
- [38] Tomczyk, G. (2023). *The European Union increased the import of agricultural products from Ukraine*. Retrieved from <https://www.farmer.pl/fakty/unia-europejska-zwiekszya-import-produktow-rolnych-z-ukrainy,139863.html>.
- [39] Turko, M. (2016). *The essence of the term "Enterprise's economic adaptability"*. *Eastern Europe: Economy, Business and Management*, 1(1), 15-19.
- [40] Ukrstat. (2024). Retrieved from <https://www.ukrstat.gov.ua/>.
- [41] Vitryak, O., & Tkachuk, V. (2021). *Evaluation of the efficiency of management of small farms in rural areas*. *International Scientific Journal "Internauka". Series: Economic Sciences*, 9, 121-127.
- [42] Voronina, A., & Zenina-Bilichenko, A. (2016). *Formation of an adaptive strategic management of organization development system*. *Global and National Economic Issues*, 11, 294-299.
- [43] Zinka Official Website. (n.d.). Retrieved from <https://zinka.ua/>.
- [44] Water Code of Ukraine. (2023, October). Retrieved from <https://zakon.rada.gov.ua/laws/show/213/95-%D0%B2%D1%80#Text>.

Міжгалузева адаптація фермерських господарств України в умовах війни

Людмила Андріївна Бовш

Кандидат економічних наук, доцент
Державний торговельно-економічний університет
02156, вул. Кіото, 19, м. Київ, Україна
<https://orcid.org/0000-0001-6044-3004>

Алла Миколаївна Расулова

Кандидат економічних наук, доцент
Державний торговельно-економічний університет
02156, вул. Кіото, 19, м. Київ, Україна
<https://orcid.org/0000-0002-0498-3433>

Лариса Михайлівна Гопкало

Кандидат економічних наук, доцент
Національний університет біоресурсів і природокористування України
03041, вул. Героїв Оборони, 15, м. Київ, Україна
<https://orcid.org/0000-0003-3513-0502>

Раміс Асимович Расулов

Кандидат технічних наук, доцент
Державний торговельно-економічний університет
02156, вул. Кіото, 19, м. Київ, Україна
<https://orcid.org/0000-0003-4140-3386>

Камель Мулудж

Доктор маркетингу, професор
Університет Медеї
26000, Полус Урбан, м. Медеа, Алжир
<https://orcid.org/0000-0001-7617-8313>

Анотація. В сучасних умовах господарювання, фермерські господарства повинні реагувати на виклики зовнішнього середовища та шукати механізми адаптації й виходу з кризи, а також диверсифікації бізнесу як додаткових джерел доходу. Тому опрацювання можливих міжгалузевих адаптацій фермерських господарств є актуальною темою дослідження. Відтак, метою даної статті стало наукове обґрунтування предикатів диверсифікації діяльності фермерських господарств у подоланні викликів війни. Підґрунтям дослідження стали класичні підходи менеджменту і маркетингу, форсайт-предикати розвитку аграрної сфери. Інтерпретацію змісту адаптаційних напрямів розвитку фермерських господарств було здійснено за допомогою емпіричних методів. В статті здійснено аналіз джерел ризиків та загроз, визначено цільові орієнтири та ключові аспекти формування міжгалузевої адаптації фермерських господарств: метрики, цілі та форсайт-компетентності. В результаті опрацювання макротрендів безпеки аграрної галузі було сформовано гіпотетичні аналітичні узагальнення, що пов'язано з невизначеністю таймфрейму війни та неможливістю прорахунку очікуваних збитків. Таким чином, проведене дослідження дозволило сформулювати теоретичні та практичні інсайти щодо формування адаптаційних механізмів в стратегічній перспективі. Обґрунтовано необхідність системного й безперервного моніторингу осередків загроз та інвазії шляхом систематизації традиційних та прогнозування новітніх ризиків. Сформульовано ключові детермінанти форсайт-адаптації під впливом глобальних трендів. Механізм її реалізації представлено через ідентифікацію напрямів міжгалузевої адаптації. Дослідження має практичну цінність, формуючи інформацію для фермерських господарств, сільських громад, стейкхолдерів та потенційних інвесторів, які можуть отримати вигоду від передбачувань перспектив та очікувань, що формуються в розрізі міжгалузевої адаптації фермерських господарств у пост-воєнний період

Ключові слова: інновації; диверсифікація; форсайт-адаптація; економічна безпека; міжгалузеве партнерство; агротуризм; землевпорядкування