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SUSTAINABLE TRANSFORMATION OF ACCOUNTING IN AGRICULTURE

Purpose. *The purpose of the article is to model the paradigm of accounting and reporting development in the context of the sustainable agricultural enterprise.*

Methodology / approach. *In the process of working on the article, general scientific methods and methodological techniques were used, in particular, monographic and system analysis (formation of accounting information to take into account sustainable development); methods of comparative analysis (when studying the transition from a traditional accounting system to sustainable accounting); grouping (for grouping accounting types by user groups and information); structural-and-logical compilation (when formulating the conceptual foundations of information to take into account sustainable development); modeling (when building a model of the concept of sustainable accounting and a map of internal and external stakeholders of the enterprise in terms of the level of influence, interest and direction of the formation and use of reporting information); process approach (when developing a paradigm for the development of enterprise reporting in the field of sustainable development); abstract-logical (theoretical generalization and formation of conclusions); graphical method (with a visual display of economic phenomena and processes in time and space); system-functional (to generalize the theoretical and methodological aspects of sustainable development accounting). These methods were the methodological basis of the study.*

Results. *To determine the category of sustainability accounting and the concept of its reporting, the types of entrepreneurial capital were studied, and the characteristics of information that arises as a result of the implementation of economic, social, and environmental activities. In addition, the main users of information, their goals, and their needs were identified. As a result, management and financial accounting for sustainable development were highlighted. The functioning of the institution of sustainable development reporting of agricultural enterprises is based on its "paradigm" as a set of generalized ideas, hypotheses, and methodological approaches shared by the scientific community, acceptable to other institutions, and formalized in the form of scientific theories. In the case when, within the framework of existing theoretical postulates, a scientific institute cannot effectively solve the issues, there is a need to change its paradigm. The proposed paradigm of accounting and reporting will not only orient the development of accounting to the prospects for the transition of mankind to a harmonious economy but also facilitate the acceleration of this transition through the introduction of progressive accounting systems.*

Originality / scientific novelty. *Due to all findings and conducted research in modeling a new system of accounting and reporting for agricultural enterprises we could generate the definition of "sustainability accounting", which, on the one hand, the segmental, and on the other – the organic component of the enterprise accounting system and the institution of accounting in socio-economic relations, which is organized at the request of the policy of sustainable development, has a corresponding theoretical, methodological and organizational methodological support and is identified in accounting policy, operational, statistical and financial reporting, which provides an*

organizational and methodological focus on the construction of such accounting by enterprises.

Practical value / implications. *The main provisions of the article are brought to the level of methodological generalizations and applied tools, the use of which allows adopting a new holistic concept for the formation of accounting and analytical support for the sustainable development of the institutional units of the agrarian sector. The recommendations outlined in the article are fully consistent with modern trends in the development of socio-ecological and economic relations in society, therefore, they can be used in the formation of modern institutional accounting methodology in the context of sustainable development.*

Key words: *accounting, sustainable development, financial accounting, management accounting, concept, information users, reporting.*

Introduction and review of the literature. In the context of the integration of each country into the global space and with the transition to international accounting and reporting standards, many large agricultural enterprises practice the development of environmental and social policies, a comprehensive program for its implementation, planning of environmental protection, and social security measures, financial analysis, and environmental audits. However, the standards and rules that cover all components of accounting for environmental management and social activities (accounting for sustainable development) of agricultural enterprises: accounting for environmental and social assets, liabilities, results, and their reflection in environmental and social reporting, have not been developed yet.

Under modern conditions, the importance of social and environmental security is manifested in the expenditure of resources for the restoration and protection of the environment, for the satisfaction of social security at a decent level, which implies the need to reflect on these issues in accounting. The sustainable development of a country depends on taking into account environmental and social factors in all sectors of society. The increased attention to environmental and social problems entails an increase in the demand for information characterizing the state of the natural environment and the impact of human society on it. Information, which is the basis of scientific knowledge and practical activity, plays an important role in solving urgent environmental and social problems for society, the need to take them into account in economic forecasting and development.

It is difficult to overestimate the importance of accounting and analytical support of the reporting management system for the sustainable development of an agricultural enterprise. These two objects are interconnected. The effectiveness of the company's management is largely determined by the reporting and the quality of its accounting and analytical process of information support. The importance of sustainable development reporting is increasing with the transition to a new economy – "knowledge economy" or "accounting 4.0". Requirements for accounting and analytical support of agricultural enterprises' sustainable development reporting in the knowledge economy are determined by a new, qualitatively higher level of management and decision-making, the choice of sustainable development targets, the emergence of new accounting objects, the disclosure of information about which in the global information environment will ensure the company's transparency and

adequacy value-added process management systems.

The problem of the study of accounting and analytical support for reporting sustainable development of agricultural enterprises is characterized by the following important aspects related specifically to sustainable development, such as the concept of accounting for environmental development, the nature of sustainable development management reports, the needs of stakeholders in sustainable development reports, the information content of sustainable development reports, directions and ways of disclosing corporate reporting on sustainable development, the role of accountants in the field of corporate social responsibility as a factor of sustainable development, professional and accounting standards for the formation of reporting on corporate responsibility in the context of economic, environmental and social activities. In addition, the complex process of summarizing the previous aspects, fundamental research, and regulatory documents related to sustainable development, actualize studies where the content, disclosure, reporting, adjustment, and others differ depending on the economy.

Domestic scientists and practitioners around the world at different times have contributed to the formation of the legal, organizational, methodological, economic foundations for the formation and actualization of agricultural enterprises' sustainable development: I. Zamula [1], A. Kireitseva, I. Zamula [2], V. Zhuk [3], O. Sokil [4], N. Bulavinova [5], S. Legenchuk [6] and other. However, the studies are still not completed and require improvement by the challenges of the present sustainable existence of the three main components of the dynamic environment: economic, social, and environmental.

The works of subsequent scientists researchers are devoted to the generalization of the methodological foundations of the formation of the concept of accounting for sustainable development: M. Bennett, P. James [7], R. Burritt [8], S. Schaltegger, R. Burritt [9–11], O. Sokil [12], V. Zhuk [13], O. Pasko [14–16], I. Zamula [17], A. Bahar [18] and other. However, the development of the study of accounting for agricultural enterprises' sustainable development (environmental and social) is just beginning to gain popularity in the scientific community of individual countries.

The works of many scientists are devoted to the problematic aspects of accounting and analytical support for the formation of sustainable development reporting and through their improvement, among which special attention deserves improvements (some of them in agriculture): B. Ballou [19], O. Sokil [20], I. Makarenko [21], O. Pasko [14–16], K. Rahman, M. Bremer [22], S. Azam [23], V. Hyk [24]. Despite a large number of publications on this topic, the problems of accounting and analytical support for the formation of reports on the sustainable development of enterprises remain completely unresolved.

The purpose of the article is to model the paradigm of accounting and reporting development in the context of the sustainable agricultural enterprise. This goal is achieved by solving the following tasks: 1) transformation of the traditional accounting system into sustainable development accounting for agricultural enterprises; 2) study of the constituent parts of agricultural sustainable development

accounting; 3) modeling sustainable development reporting for agricultural enterprises including the interests of stakeholders.

Results and discussion. *Transforming traditional agricultural accounting systems into sustainability accounting.* The World Commission on Environment and Development regulates that balanced development takes into account an aggregate asset that is constant or increasing over time. This asset is made up of industrial capital (cars, factories, roads), human capital (human health, knowledge, and skills), and environmental capital (forests, air, water, and soil quality). The country must consume an amount of the asset that does not reduce the total stocks of potential [25]. But, in our opinion, the main capital objects for accounting for sustainable agricultural development are entrepreneurial, financial, human, social, and environmental, the clear definition of which requires thorough research.

Some scholars argue that natural capital is based on physical reserves and estimates of profits or rents earned using world prices and local costs [26; 27]. This definition is not comprehensive because it does not take into account all the characteristics of natural capital, particularly agricultural. Natural capital is not man-made but differs greatly from the state of nature as a result of human intervention. It can be decomposed into human capital and natural capital proper [7]. This definition is not exhaustive from the point of view of the concept of sustainable development of agriculture, since it does not fully reflect its content.

Other scientists have thoroughly investigated the essence of natural capital and came to the conclusion that natural capital is reserves consisting of life-supporting systems, biodiversity, renewable and non-renewable resources that are used by people or are of interest to them [25; 27].

Entrepreneurial capital is an entrepreneurial idea, a method, and means of manufacturing raw materials or finished products, a way of imparting new properties and quality characteristics to a product – all that is commonly called "know-how" [28], that is, they are assets that are directly or indirectly accounted in the production of goods or the provision of services to make a profit.

Financial capital should be understood as cash and other financial assets that are accumulated by a business entity to make a profit and/or ensure a continuous production process [29]. Social capital is the potential of mutual trust and mutual assistance rationally formed in interpersonal relationships, acting as such a specific category of resources as non-economic capital [30]. Human capital is a form of investment in a person, his/her general and special education, the accumulation of health from birth to working age, migration and economically important information, in certain spiritual stability and intellectual mobility [31].

Thus, the results of the activity of five capitals (entrepreneurial, financial, human, social and environmental) can be correlated and generalized, respectively, into three types of accounting, embodying the general system of economic accounting for sustainable development of the agricultural enterprise (Figure 1).

Environmental capital is a conditional component of the enterprise value, which consists of assessing the harmfulness of actions or counteractions to environmental

protection and affects the return on total capital and the ratio of profitability and risk in the process of enterprise development [32].
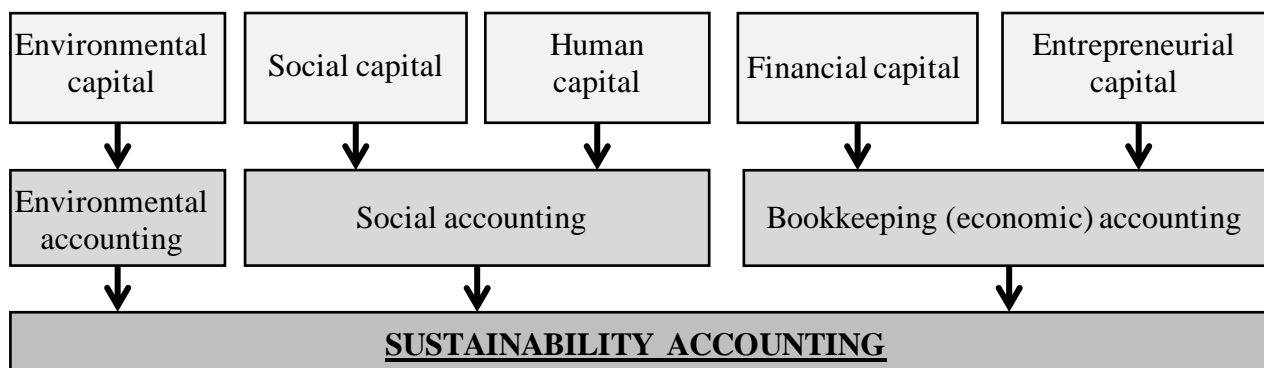
Figure 1. Formation of accounting information for sustainability accounting of the agricultural enterprise

Source: authors' own elaboration.

All information coming from the five types of capital should be sorted by types of accounting using methods by their functionality to generate reliable and impartial information for external and internal users. The proposed distribution of information, the purpose of which is to minimize the receipt of incorrect or distorted data, requires clear regulation. There is no hesitation that it depends on the agricultural company which categories of presented information will work best for it. Therefore, the recommendations for reporting are to keep the coverage as wide as possible. To search for a combination of formation and submission of the necessary reporting information, you may need a matrix for assessing the sustainability of an enterprise, illustrating its capabilities in the direction of ensuring and promoting sustainable development (Table 1).

Table 1

Matrix for assessing the prospects of the enterprise's agricultural transition to sustainable development

Capital	Three types of states in which the company manifests itself		
	As a business	As a place of development, research, learning	As a member of a community or society
Entrepreneurial capital	Rational use of property	Advantages in development, research, study	Promoting the improvement of public relations, information, and advocacy activities
Financial capital	Save money. Using a progressive costing system	Competitions at the international/regional level	Modernization of risk management
Human capital	Attracting and retaining qualified staff	Providing an experience for students and graduates; expanding employment opportunities for graduates	Education and training of employees even after employment
Social capital	Ensuring skillful management of activities	Anticipating opportunities for growth and self-improvement of employees	Active participation in external social development programs
Environmental capital	Efficient use of resources	Introduction of new means of saving natural resources	Preservation and improvement of the environment

Source: authors' own elaboration.

Even if the elements of the matrix from Table 1 on determining the scale of action on the formal accounting process of an enterprise take place over a certain

period, then analyzing the whole picture of consistency makes sense in a global context to identify the risk for the agriculture.

The concept of generating accounting information for sustainable development of agriculture makes it possible to establish that such accounting, in contrast to the traditional financial accounting system that generates financial flows and stocks through reporting on financial condition and profitability, additionally provides an opportunity to obtain information that can be considered in three different dimensions:

1. Time of formation of information – in this dimension, information can be provided on a specific date about the status of assets and liabilities, or, within a certain period, for example, their movement for a certain period;

2. Place of formation of information – what kind of information is included in the financial reporting (internal and/or external);

3. Information ownership – information influences the formation of economic, social, or environmental results, disaggregated by five types of capital.

The traditional accounting system of the agricultural enterprise does not take into account not only the social and environmental aspects of the formation of a general system of accounting for sustainable development but also the factors of external influence of information. To eliminate these shortcomings, the authors proposed the concept of transition from the traditional agricultural accounting system to accounting for agricultural enterprises' sustainable development (Figure 2).
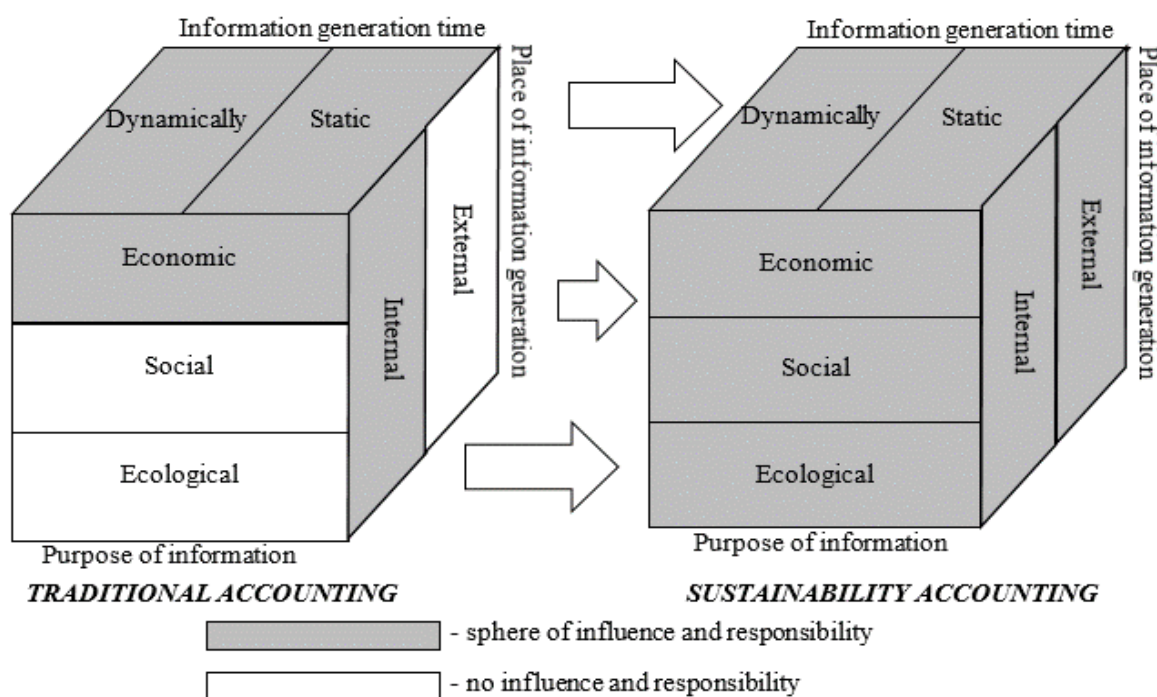
Figure 2. Model of transition from the traditional accounting system to sustainability accounting of the agricultural enterprise

Source: authors' own elaboration.

The aforementioned transition concept requires readjustment and adaptation, including the implementation of the following measures for agricultural enterprises:

1. Transformation of the statement of financial performance (statement of comprehensive income), requiring additional information on the costs and benefits associated with economic, social, and environmental activities.

2. Extension of the standard classification by groups of income and expenses (profit and loss) to cover external losses and benefits for the environment, society, and the economy, not taken into account by traditional accounting.

3. Expansion of the balance sheet (statement of financial position), taking into account the entire range of assets, including intangible assets such as brand value, human capital, or reputation about permanence, and hidden liabilities, including those associated with permanence risks.

Restructuring the statement of financial performance of the agricultural enterprise (statement of comprehensive income) will lead to the emergence of a derivative agricultural accounting system. This system should take into account the internal financial flows associated with the implementation of economic, social, and environmental obligations. The costs and benefits that have already been accounted in determining the bottom line require reorganization in the chart of accounts, for example, previously hidden links to generating environmental costs or hidden savings. To achieve this goal, the authors propose the use of "internal accounting of agricultural enterprises' sustainable development", designed to detail the information generated by the existing traditional accounting system, and re-presented in the context of the elements of constancy of current costs associated with the corresponding social and environmental income (in terms of income or expenses management accounting).

Internal sustainability accounting is an integral part of the overall sustainability accounting system and a source of information for internal users: owners or management personnel, and therefore can constitute a commercial business secret.

The introduction of new accounts to summarize external losses and benefits for the environment, society and the economy requires a reorientation of the existing chart of accounts. While internal sustainability accounting records information related to financial flows and it is already recorded somewhere in the financial statements of an enterprise, there is a possibility that information related to revenues and expenses of external influences has not been taken into account yet. The solution to this problem is the use of "external sustainability accounting of the agricultural enterprise".

Concept of sustainability accounting in agriculture. Above, the authors have developed two approaches to solving the problem of determining the conceptual conditions of accounting for sustainable development, including the formation and differentiation of external and internal accounting for sustainable development of agriculture, which are the objects of interest of various users of information. Addressing the issues of different stakeholders requires individual approaches to accounting. Some accounting systems can provide general information to all interested parties, and some – to a certain circle, depending on the nature of the information and user rights (Table 2).

Table 2

Structure of accounting types by user groups and required information

Users of information	Traditional accounting information				Sustainability accounting information			
	Financial accounting		Managerial accounting		Internal accounting for sustainable development		External accounting for sustainable development	
	Monetary indicators	Natural indicators	Monetary indicators	Natural indicators	Monetary indicators	Natural indicators	Monetary indicators	Natural indicators
Buyers and customers	■				◘	◘	■	■
Suppliers	■				◘	◘	■	■
Employees	◘			◘		◘	■	■
Society	■					◘	■	■
Government organizations, funds	■				◘	◘	■	■
Owners	■	■	■	■	■		■	■
Potential investors	■	■		■		■	■	■
Other users	…	…	…	…	…	…	…	…
■ – full interest and full access to information								
◘ – partial interest and partial access to information								

Source: authors' own elaboration.

According to Table 2, each type of accounting can be presented both in monetary and physical terms. As for financial accounting, its usual personification is the value expression of indicators, but this does not exclude the possibility of presenting information in physical terms. This is confirmed by the usual statutory and regulatory reporting through the notes to the annual financial statements. In turn, management accounting provides information in most cases in physical terms. After preliminary axiomatic statements, it can be generalized that each of the traditional types of accounting can be presented in the form of indicators both in kind and in value terms. The indicators of internal and external accounting for sustainable development are similarly comparable. However, several differences characterize information and its ownership according to the traditional agriculture and ecological-social accounting system:

• from a material point of view, sustainable development accounting differs significantly from traditional accounting. Sustainable development accounts for environmental and social impacts, while traditional accounting is monetary;

• environmental, social and monetary information is often obtained from different sources;

• environmental information is needed for various purposes by a wider range of stakeholders than monetary information;

• information about the environment has different quantitative indicators of quality and quantity (for example, kilograms) compared to financial information (for example, value-added in monetary terms).

However, there are several obstacles preventing enterprises from introducing environmental accounting [33; 34; 35]:

• expenses are subject to deduction from net profit only after they have been incurred. As a result, there is no incentive to take into account obligations, including environmental ones;

• as investors are closely monitoring the amount of profit per share, businesses are postponing measures that could lead to a decrease in profits;

• excessive complexity of allocating the costs of environmental protection measures in terms of total costs;

• lack of specific recommendations for providing information on environmental protection activities and the organization of environmental accounting at enterprises.

Typically, traditional accounting and sustainability accounting in agriculture are recognized as two different categories of "sub-accounting". But this is not an obstacle to their integration, as information from both categories of accounting can be combined through a separate analysis of environmental performance indicators for use by internal and external users. External and internal accounting for sustainable development is combined through environmental performance indicators, which require the integration of these two systems [36; 37].

The features of internal and external accounting of agricultural enterprises' sustainable development can be characterized as follows:

1. Internal accounting for sustainable development is designed to collect information on the activities of environmental and social systems, expressed mainly in physical terms, for internal use by the owners and administrators of the enterprise. Such information complements and expands the normal management accounting system. Methods for measuring the impact of production activities of an enterprise on the environment are the basis for making rational management decisions. In the last decade, various methods have been developed to calculate emissions of pollutants and damage to environmental capital. Therefore, internal sustainability accounting is a prerequisite for any environmental and social management system.

2. An analog of the usual financial accounting system, or rather its extension, is external accounting for sustainable development, the information of which is intended for external users interested in overcoming environmental and social problems, namely, the general public, the media, shareholders, environmental (or social) foundations, non-governmental organizations, etc. Over the past ten years, leading businesses have published separate external environmental reports, thereby ensuring public scrutiny of their environmental and social impacts. Many of these reports are issued annually and contain information on emissions of pollutants, etc.

Traditional accounting systems and differentiated environmental and social sustainability accounting systems handle information caused by environmental and social issues and can be integrated into corporate sustainability accounting [38]. The definition of sustainability accounting in agriculture is that it is a type of accounting that addresses:

• activity and its variations;

• registration, analysis of transactions, and reporting;

• environmentally-related financial implications and environmental implications of a particular economic system [39].

Such an approach to defining sustainable development accounting can neutralize the need to integrate monetary and environmental issues. But there is a second definition of it, which embodies a broader content than internal accounting for sustainable development and includes both monetary and non-monetary measures for the formation of internal reporting [40]. In addition, the International Federation of Accountants (IFAC) defines sustainable accounting as "... managing environmental and economic performance through the development and implementation of appropriate environmentally-related accounting systems and practices. This may include reporting and auditing in some companies, and environmental management accounting usually includes life cycle costing, full cost accounting, benefit assessment, and strategic environmental management planning" [41]. From this definition, it is clear that IFAC does not see an analytical distinction between monetary and non-monetary aspects of environmental and social management accounting. In IFAC terminology, these two aspects are called Environmental Management Accounting [7].

The main difference between the two points of view is that M. Bennett and P. James in the definition of accounting for sustainable development additionally include material flows that have an impact on the environment, expressed in physical units [7]. Consequently, this accounting is purely monetary, but rather an information system of natural and monetary units. A logical continuation of the concept of sustainable development accounting is the allocation of auxiliary systems, derivatives of the traditional accounting of the so-called systems 1.0–3.0 (Figure 3).
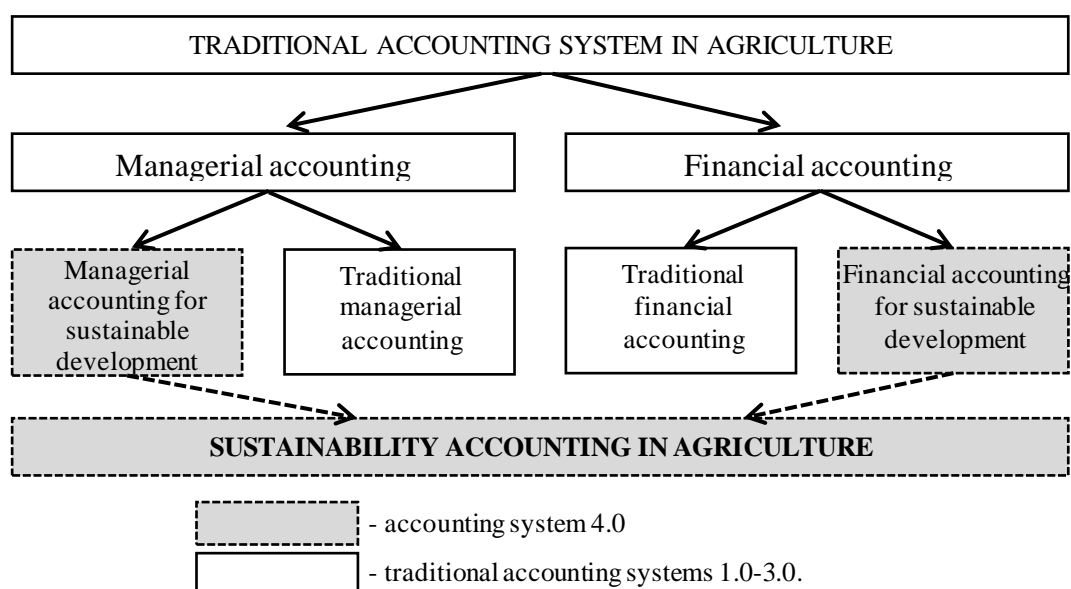
Figure 3. The concept of generating information for sustainable development accounting in agriculture

Source: authors' own elaboration.

Consequently, management accounting for sustainable agricultural development

includes environmental and social-oriented aspects and results of the impact on the environment (social) environment in value and natural terms for making internal management decisions. In turn, financial accounting for sustainable agricultural development includes environmental monetary aspects as well as physical measures of environmental impacts for reporting purposes to external stakeholders. This second category of accounting system should include accounting relationships with specific external stakeholders, whether their informational interest is financial, social, or environmental.

The prerequisites for structuring sustainable agricultural development accounting information are the need to integrate environmental, social, and financial issues into one category; the conceptual division into internal and external accounting is based on the fact that the level of detail and aggregation of information and the degree of confidentiality differ between the needs of management and other interested parties; traditional accounting in physical units existed even before the development of accounting systems based on sustainable development. For example, performance characteristics, expressed in physical units, have long been used in most conventional management accounting systems.

A reasoned comparison of the advantages and disadvantages of different approaches to the definition of sustainable agricultural development accounting allows us to form a common understanding of it. This will facilitate its communication and lobbying among managers and other interested parties. The author proposes to carry out the convergence of views by comprehensively detailing the characteristics of the definition of accounting for sustainable development in the context of monetary and natural definitions in orientation to the past and the future (Table 3).

Sustainability Accounting in Agriculture (SAA) is a combination of value and in-kind accounting, and, if necessary, the result of the integration of environmental, social, and financial components of activities. Therefore, a definition of SAA is proposed as a general category, which includes both Sustainability Monetary Accounting (SMA) and Sustainability Natural Accounting (SNA), as shown in Table 3.

SMA includes a standardized system of financial and management accounting, which measures the value of the interaction of the ecological environment, society, and the enterprise. SMA is a system for recording the results of economic activities in monetary terms related to the environment and social environment. It is a tool for strategic and operational planning, provides a basis for decision-making, is a means of achieving desired goals or objectives, and acts as a control and reporting tool.

SNA also acts as an information inventory for making internal management decisions. However, unlike SMA, the focus is on the company's environmental and social impact on the environment, expressed in physical terms. The SNA tools are designed to collect information on environmental and social impacts in physical units, primarily for internal management use. Accordingly, the SNA performs the following functions:

• as an analytical tool designed to identify environmental and social strengths and weaknesses;

• as a decision-making tool related to identifying the impact on the environment and social environment;

• as a measurement tool that is integral to other environmental measures such as eco-efficiency;

• as a meter of direct and indirect control of environmental consequences;

• as a catalyst, providing an active position for internal and external communication;

• as one of the means of achieving and promoting sustainable development of society as a whole.

Table 3

Matrix of characteristics of sustainability accounting

Indicators		SUSTAINABILITY ACCOUNTING IN AGRICULTURE (SAA)			
		Sustainability Monetary Accounting (SMA)		Sustainability Natural Accounting (SNA)	
		Short-term focus	Long-term focus	Short-term focus	Long-term focus
Focus on the past	Regular information	Accounting for social and environmental expenditures (variable costing, absorption pricing, ABC method, etc.)	Accounting for expenses and income for the use of social, human, and environmental capital	Accounting for the movement of inventories and material values	Accounting for impacts on environmental and social capital
Focus on the past	Special information	A realistic estimate of environmental costs	Efficient costing of the production cycle, calculation of target environmental and social costs	Assessment of post-short-term environmental and social impacts	Production life cycle inventory. Assessment of investments in the environment and social environment
Focus on the future	Regular information	Environmental and social operational budgeting and budgeting of environmental and social capital in monetary terms	Long-term planning of social and environmental expenditures in value terms	Budgeting the physical component of the environment (budgeting based on the ABC method)	Long-term planning of social and environmental expenditures in kind
Focus on the future	Special information	Environmental and social expenses of future periods	Assessment of investments in environmental and social projects. Manufacturing Life Cycle Budgeting and Target Pricing	Response environmental impacts (subject to short-term restrictions on activities)	Assessment of environmental and social investments. Analysis of the life cycle of a specific project

Source: authors' own elaboration.

Another determinant of the classification of sustainable agricultural development accounting is time. Environmental and social problems are predominantly long-term. Considering this, accounting systems and corresponding analysis tools can be grouped as a retrospective – looking to the past (for example, the analysis of economic activity), and with a focus on the future (for example, budgeting). The adoption of internal management decisions, regardless of the duration of action, is accompanied by the accumulation of both regular information

(general accounting systems that regularly generate information for management) and special information (specific accounting methods that create information as a basis for making specific decisions) [8]. To visualize the characteristics of sustainable agricultural development accounting, the authors compiled a matrix in which the above approaches to the SNA and SMA are correlated with different types of management decisions (Table 3). The data in Table 3 indicate a wide coverage of SAA of different approaches, the choice of which is carried out depending on the context of the decision, the goal, and the level of management.

The structure of the integrated SAA model presented in our study can be used in the broader context of environmental and social accounting. Accordingly, sustainable development accounting can be classified according to the following criteria:

- At the place of formation and provision of information: internal and external.
- According to the form of the information provided: monetary and natural.

The carried out research allows forming a comprehensive concept of sustainability accounting (Figure 4).
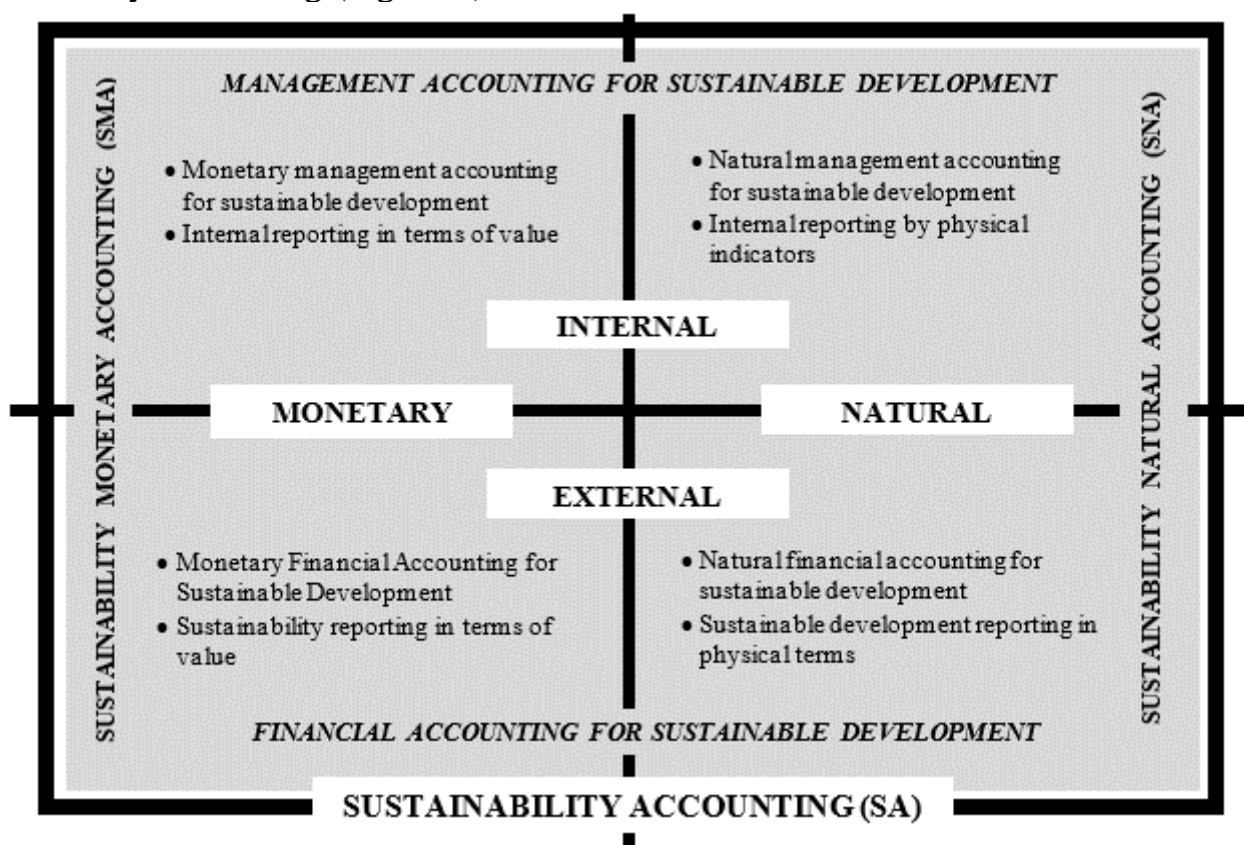
Figure 4. A comprehensive model of the concept of sustainability accounting in agriculture

Source: authors' own elaboration.

Paradigm modeling of sustainable agricultural development reporting. Studies of work in the field of sustainable development reporting [6; 42; 43; 44; 45] allowed us to establish criteria for the internal and external benefits of the implementation, preparation, and publication of reports on the sustainable development of enterprises. These advantages and disadvantages, of course, are not final, but their impact may be

different on the external and internal environment of the enterprise (Figure 5).
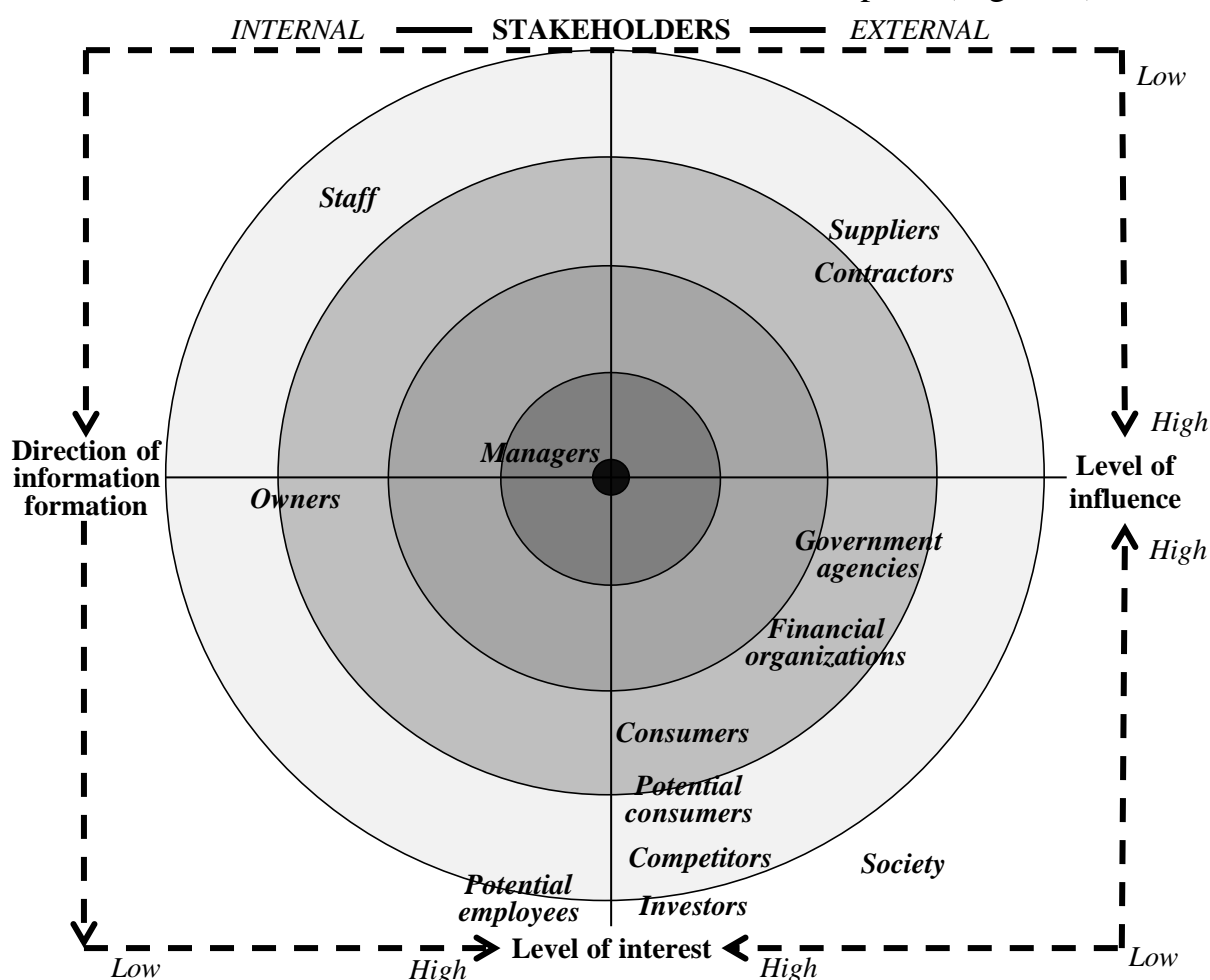
Figure 5. Map of internal and external stakeholders of the agricultural enterprise by the level of impact, interest, and direction of generation and use of sustainable development reporting information

Source: authors' own elaboration.

The developed map of stakeholders is the basis for the formation of a mechanism for agricultural accounting and analytical support for reporting sustainable development and the formation of a system of priority interests of interested information users and their harmonization with the interests of other strategically important stakeholders. Managers or top managers of enterprises are the final chains in the process of generating financial and non-financial reporting, who are entrusted with the management process for generating sustainable development reporting.

Some scientists define the management process as the activity of the subject of management to coordinate the joint work of the organization's personnel to achieve its goals, which is the unity of three components: content, organization, and implementation technology. The management process includes certain categories: managing and controlling systems of the organization, management functions, management methods, management decisions, communications, and leadership [46]. From the point of view of agricultural enterprises' sustainable development and

reporting, the management process should cover not only all processes before the formation of the sustainable development report, but also be continuous and with feedback: content (tasks) – planning – organization – implementation – evaluation – content (tasks). This is the methodology of the process of accounting and analytical support for sustainable development management.

The process of forming integrated (non-financial) reporting is a process that has a completion. This process includes two stages: 1) preparation of a methodological base for the formation of an integrated report; 2) organizing the collection of information [47]. In our opinion, the methodology of the process of accounting and analytical support for reporting the sustainable development of agricultural enterprise is cyclical and contains a preparatory stage and a phase of organizing and reporting the sustainable development of an enterprise, followed by verification, disclosure, analysis of stakeholder feedback.

Thus, after studying scientific developments in the field of research on sustainable development reporting and observation, there is a need for a graphical reflection of the management system of accounting and analytical support for the formation of reporting on the sustainable development of the agricultural enterprise (Figure 6).

Figure 6. Management support system for the reporting formation of sustainable development of agricultural enterprise

Source: authors' own elaboration.

M. Koryagin and P. Kutsyk in their monographic research consider the "paradigm shift of financial statements" – the transition from the totality of financial and non-financial statements to the paradigm of integrated accounting statements and the gradual process of its finalization and formation. The main idea of drawing up integrated reporting by effectively combining internal information resources is to bring together in a single report the information necessary for making strategic

management decisions, in particular, in terms of management, value creation, and preservation and management of the strategic stability of the enterprise [48].

A similar thought is shared by S. Adams and R. Simnett, noting that integrated reporting is a new reporting paradigm, holistic, strategic, adaptive, meaningful, and relevant to different time dimensions [49]. Consequently, the main feature of the new paradigm of sustainable agricultural development reporting is the orientation of the accounting and analytical process towards eco-social and economic factors creating the added value of the enterprise, as a result of which sustainable development reporting is more appropriate for stakeholders and other users.

Stakeholders, of course, have their vision and require not only reporting on financial results but also non-financial ones, which leads to the formation of a group of factors influencing the analytical processes of reporting sustainable development. That is, the role of perception of non-financial information is determined and a management system for analytical activities is formed.

As noted by L. Donaldson and J. Davis, relationships with stakeholders are "the most important asset that managers must manage, which is the ultimate source of organizational wealth" [50]. It is these relationships between groups and individuals interested in the activities of a particular enterprise that are explored by stakeholder theory, based on which the vision of the stakeholders of the past, present, and future results of the enterprise is formed. From the point of view of any party, the enterprise considers the totality of interests and relations of other parties, and external stakeholders with their vision are the legislators of the strategy for the formation of sustainable development reporting.

It is interesting for further research to identify three strategies for the formation of agricultural enterprises' non-financial reporting [51; 52; 53; 54]:

1. An arbitrary form, which in practice is the most common form of a report, is intended for external users and does not require a social audit.

2. Comprehensive reports:
   - a comprehensive report using the Triple Bottom-Line method;
   - a comprehensive report on the London Benchmarking Group;
   - a comprehensive report on the corporate citizenship group method.

3. Standardized reports (according to Sunshine standards; GRI; AA1000; SA8000).

The enterprises' sustainable agricultural development reporting is developed according to any strategy that is equally subject to internal verification and external assessment by specific stakeholders. Large and medium-sized companies can afford to be verified by external auditors. For small and micro-enterprises, the very desire and awareness of the formation of sustainable development reporting is a shift in the information and innovation process.

The modern concept of accounting tends to neglect the environment and social issues, which leads to its inefficiency since the use of resources is about maximizing their value in the long term associated with the activities of the enterprise.

The sustainable development reporting process is based on generally accepted

and specific principles, which differ in part from the principles of financial reporting defined by national accounting regulations (standards). Consequently, the reporting of agricultural enterprises' sustainable development is derived from the financial reporting, slightly modified and expanded.

Integrated reporting enables corporate enterprises to provide insight into the relationship between organizational strategy, management, financial performance, and the social, environmental, and economic context of operations. There is no standard format for an integrated agricultural report, therefore the International Committee on Integrated Reporting has formulated the basic principles that should guide its preparation. However, problems remain associated with the development and implementation of integrated reporting in practice [55]. The very definition of the limits of measurement of indicators of eco-social and economic activity in the framework of sustainable agricultural development is the main task of future scientific and methodological developments and standards.

Other scholars in the study of non-financial reporting pay attention to the combination of accounting and analysis of social reporting, which it considers non-financial. In addition, it defines the main tasks of social accounting – collection, processing, the transmission of information about the economic, environmental, and social state of the enterprise, its employees and stakeholders, and analysis – comparison of actual and planned indicators of non-financial reporting; factoring and SWOT analysis over several years; providing suggestions for the use of certain indicators in a particular enterprise [56]. Based on the combination and interdependence of accounting and analysis of non-financial reporting, we visualized the vector of implementation of sustainable development reporting within the framework of enterprises' goals (Figure 7).
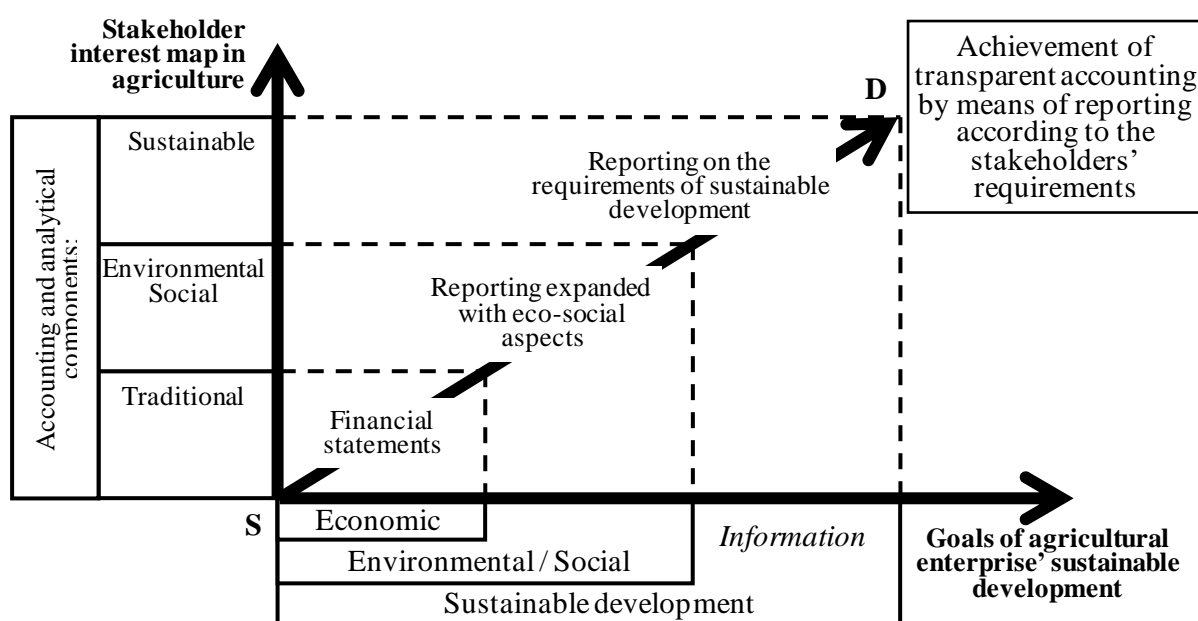
Figure 7. Development paradigm of enterprises' sustainability reporting in agriculture

Source: authors' own elaboration.

The separation of non-financial from financial reporting in agriculture is constantly carried out thanks to the introduction of new classification signs and the corresponding types of accounting and analysis in the aspect of the responsibility of sustainable development. Additional classification criteria include the goals of the enterprise and the measure of their compliance with the norms of social responsibility. Vector SD of Figure 7 covers the use of all types of accounting and analytical support for eco-social and economic development.

The functioning of the institution of sustainable agricultural development reporting is based on its "paradigm" as a set of generalized ideas, hypotheses, and methodological approaches shared by the scientific community, acceptable to other institutions, and formalized in the form of scientific theories. In the case when, within the framework of existing theoretical postulates, a scientific institute cannot effectively solve the issues, the necessary change in its paradigm. The new paradigm should not only orient the development of accounting to the prospects for the transition of mankind to a harmonious economy but also facilitate the acceleration of this transition through the introduction of progressive accounting systems.

Some agricultural manufacturers are not aware of the purpose of the formation and presentation of non-financial information, and sometimes they are not able to reflect it through:

1. Lack of research on sustainable development in general and reporting in particular;

2. Attention of researchers and stakeholders in the study of the role of accounting and analytical support of corporate social responsibility and the provision of sustainable development reports only for large enterprises;

3. A limited conceptual framework for reporting on sustainable development, which narrows the characteristics of accounting in the context of principles, procedures, reports, benefits, indicators of sustainable development;

4. Neglect of social and environmental conditions of management, and focus on economic results;

5. Isolation of the analysis of key success factors in the formation of competitive advantages;

6. Insufficient level of qualifications of personnel in the formation of sustainable development reports.

Conclusions. Based on our research, we characterized the management system for accounting and analytical reporting of sustainable development of an agricultural enterprise as registration, generalization, transformation, and transmission of information on the eco-social and economic state, internal and external influence of the enterprise into command information for appropriate actions and decisions of stakeholders. This purposeful programmable or secondary control system should be aimed at achieving the final goal (generating sustainable development reporting) using the methodology for managing accounting and analytical support for generating sustainable development reporting in a deterministic or arbitrary program/regulation mode. Management of the system of accounting and analytical support for the

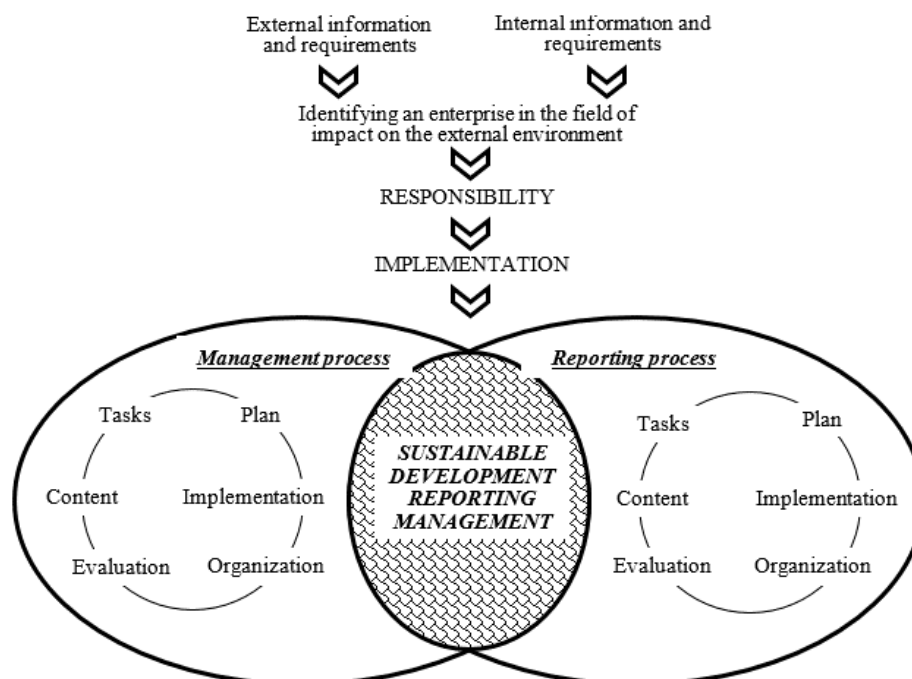formation of reporting of sustainable development of the agricultural enterprise and its components and processes to increase the efficiency of the enterprise's functioning occurs even at the stage of awareness of eco-social responsibility, global planning of economic activities, creation of an enterprise, formation of a production base, development, formation, and functioning. Efficiency management is determined by the adequacy of the system of accounting and analytical support for reporting sustainable development.

Using the hermeneutic research method, the concept of sustainable development reporting and its alternatives (non-financial reporting, social reporting, corporate social reporting), and our observations, we have formed a characteristic of the paradigm of agricultural enterprises' sustainability reporting as a system for generating information in three options:

1. "Report on sustainable development of the enterprise", which is an appendix to the financial report and is characterized by the preparation of a separate report according to the selected and generally accepted system or standard.

2. An "alternative sustainability report" is characterized by the publication of a separate or short sustainability report. An example would be an environmental report, social report, corporate responsibility report, corporate social responsibility report, etc.).

3. An "enhanced financial statement" is a "taxonomy of financial reporting" or an extension of conventional financial and economic information with the social and environmental performance of small and micro-enterprises. This type of reporting is the best alternative to the preparation of comprehensive financial reporting for sustainable development.

The entire system of generating and servicing reporting will be carried out by "Sustainability Accounting in Agriculture", on the one hand, the segmental, and on the other – the organic component of the enterprise accounting system and the institution of accounting in socio-economic relations, which is organized at the request of the policy of sustainable development, has a corresponding theoretical, methodological and organizational methodological support and is identified in accounting policy, operational, statistical and financial reporting, which provides an organizational and methodological focus on the construction of such accounting by enterprises.

The following developments are of practical importance: the conceptual foundations for the development of sustainable accounting are formulated, which are based on the growing functionality of managerial and financial accounting under the new economic conditions; a paradigm for the development of sustainable development reporting is proposed, which is based on the synergistic interaction of a map of stakeholders' interests in the goals of the functioning of an agricultural enterprise under modern conditions and the scientific definition of future changes in accounting and analytical support for business operations in accordance with the requirements of sustainable development policy.

Prospects for further research are the formation of a sustainable development

accounting methodology with the definition of goals, objectives, objects, subjects, methods, functions, and key aspects of such accounting. Also, future practical research will be devoted to the standardization of accounting and analytical support, in particular, the methodology for reporting the sustainable development of enterprises by their size and specialization.

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GLOBAL INITIATIVES ON IMPLEMENTATION OF ZERO HUNGER POLICY

Purpose. *The study aims to analyze critically the system and functions of specialized agencies, programs and United Nations (UN) funds that ensure the implementation of the second goal of sustainable development (GSD2), to identify the components of global initiatives for the successful implementation of the Zero Hunger Policy.*

Methodology / approach. *The methodological approach of the study are theoretical provisions and practical recommendations for the formation of the food supply system, economic theory, which determines the patterns of food distribution, scientific works of domestic and foreign scientists on sustainable development of the agricultural sector to achieve Zero Hunger. The following methods were used in the research process: statistical (regression analysis of the assessment of factor's impact on the level of daily energy value of food consumed in households in Ukraine), monographic (mechanism of GSD2 implementation in the global dimension), historical method (the UN's composition and function in guaranteeing GSD2 implementation), systematic analysis (composition and roles of international institutions within the United Nations in guaranteeing GSD2 implementation), direct analysis and synthesis (areas of FAO's activities in ensuring the implementation of GSD2 at the national level) etc.*

Results. *The study found that global initiatives for successful implementation of the Zero Hunger Policy are based on three components: regulatory support, the activities of international organizations coordinated by the UN, and the implementation of the GSD2 framework and programs at the national level, which support most countries across the globe interaction with the Food and Agriculture Organization (FAO).*

Originality / scientific novelty. *Theoretical provisions regarding global initiatives for the implementation of Zero Hunger Policy have further developed: the main functions of specialized agencies, programs and UN funds that ensure the implementation of GSD2 were systematized, the degree of their spread and influence was determined; it was proved that FAO had a significant potential comparative advantage in assisting countries to meet new challenges in GSD2 monitoring; it was found that the activities of FAO together with partners to ensure global processes for the implementation of GSD2 include different areas.*

Practical value / implications. *The obtained results are important for building a network of institutional and international cooperation for the successful implementation of Zero Hunger government policies.*

Key words: *Global Initiatives, Zero Hunger, GSD2 monitoring, GSD2 implementation mechanism, international institutions, Ukraine.*

Introduction and review of literature. The world community has recognized the importance of the problem of food security and has realized that its solution is to ensure the sustainable development of agriculture. This confirms several resolutions, programs, strategies and policies that have been helping the relevant institutions to

implement across the globe for seven decades in order to make significant progress in the implementation of GSD2.

National governments do not always adopt and disseminate Zero Hunger practices offered by international institutions and programs. Mostly, the rejection of the offered practices is politically justified by national identity and significant dissimilarities in different areas of countries' activity, while governments and, especially, businesses are guided by economic interests, perceiving any social programs as a priori economically unprofitable. However, this position, as it is shown by the research, is not justified, because the commercial and non-commercial components complement each other. In particular, Farooq et al. [1] have proved that non-profit orientation can be promoted and maintained in commercial business, and social and environmental development depends on social and environmental protection.

Of course, there are critical differences between countries starting from ethical norms of behavior accepted in society up to natural and climatic conditions and available resources in a given area, which significantly affect the limits of opportunities for quality nutrition of the population. In Nghe An (Province of Vietnam) the main source of income for farmers is plantation forests and livestock, while forest lands comprise more than 90 % of households [2], which is not typical for Ukrainian farmers at all. However, it should be understood that engagement in the programs does not have an aim to establish uniform approaches and practices for all. On the contrary, the creation of communication platforms involves discussions aiming at the identification and taking into account all the differences to develop specific measures for each country, based on the common experience and knowledge of a wide range of experts.

Developing countries are often simply not fully aware of existing international institutions, the scope of their functions, the programs they implement, and their participation in such projects. The study by Puig et al. [3] found that there was a significant gap between what governments in developing countries perceive as key factors and barriers to technology transfer and what technology programs can offer according to the UN Framework Convention on Climate Change. In this regard, the scientists are giving advices in how governments can solve this problem in practice.

Not only the programs but also the tools offered by international institutions for sustainable development level's assessment can be successfully used by national governments, local authorities and businesses. Mamun and Yaya [4] explain how to use the Multidimensional Poverty Index methodology as an effective tool for assessing the influence of assistance in Poverty Reduction and Zero Hunger Programs. Moreover, such experience is useful for countries that have not developed national indicators of GSD achievement yet, where the analysis of sustainable development is conducted by individual scientists on their methods and their initiative because the national system of indicators is not developed.

In general, it should be noted that some countries are trying to withdraw from participating in international programs, including for such reasons as the requirement of openness and transparency in their implementation, as well as compliance with certain rules and procedures that are the same for all participants. Such countries, due

to their domestic policy of secrecy and limited access, along with aggressive policies of interference to the activities of other states, do not follow generally accepted rules, and on the contrary – they try to establish and impose their demands, without respect for freedoms, democracy and interests of other participant parties. In particular, the study of Manulak [5] showed that powerful countries, headed by the United States, strived to maximize the autonomy of the United Nations Environment Programme (UNEP) secretariat and the developing countries wanted to ensure strong intergovernmental control over the UNEP secretariat.

On the other hand, scientists observed that the UN actors are initiating actions to shape the norms of global trade, and thus – food security. In particular, Margulis [6] proves "that UN actors have influenced the discourse, agenda and outcomes of trade negotiations by analyzing three cases: (1) the FAO orchestrating a Uruguay Round agreement in favor of food insecure developing countries; (2) the World Food Programme's blocking of trade rules on international food aid during the Doha Round negotiations; (3) a proposal by the UN Special Rapporteur on the right to food for a legal waiver to protect public food stockholding that was taken up by the World Trade Organization (WTO) member states in 2013".

However, in our opinion, such a position is quite justified – the UN does not defend the interests of an individual country, but protects the right of every person, and creates opportunities for humanity as a whole to live in dignity.

Among the countries, joining international programs to achieve Zero Hunger, not all can achieve certain goals. Mostly, this can be applied to developing countries like Pakistan that have the same domestic, political, and economic problems [7]. Emediegwu and Monye-Emina [8] state that despite the significant resources and efforts put by the Government of Nigeria to achieve the first Millennium Development Goal (MDG1) in trying to halve the share of the poor by 2015, this task has not been accomplished due to uncoordinated political actions in related areas and problems of poverty, corruption, etc.

Problems of implementation of the best practices into national Zero Hunger Programs do exist, but the findings of Hall [9] show that they do not lay within the economic plane, at least the economic component is not decisive. In particular, the scientist determined that the main factors in the ambiguity of international programs, disseminated by governments in terms of their implementation into national policy, are the spread of adaptation measures and the difficulties in tracking and monitoring of the assistance in an adaptation of Zero Hunger practices.

Taking into account the experience of other countries, it is expedient to carry out the process of implementation of the best world practices for achieving Zero Hunger into the national policy in cooperation with scientific institutions and educational establishments. Facultad Regional Multidisciplinaria de Chontales (FAREM Chontales) works grounding on these principles, where the work of the Faculty in performance with the GSD is addressed within the framework of Public Policies of Nicaragua. Within this framework, two programs that the Faculty is developing are analyzed: The Observatory Program for Quality of Life and Development of Health

Education (OCAVIDEPS) and University in the Country (UNICAM). The Observatory for Quality of Life and Health Education Development Program (OCAVIDEPS) is a strategy developed by FAREM Chontales with the support of Excellency Dos Hermanas City Council in Seville, Spain, in order to face psychosocial risks and poverty, to meet the needs of the population, mainly children, adolescents and young people, since it is a very vulnerable sector and therefore responds to environmental risk factors. Likewise, the Faculty participates in the project "Universidad del Campo" (UNICAM), which was implemented by UNAN-Managua within the framework of the UE ALFA program. It is a project aimed at the inhabitants of rural areas of the country [10]. The study of the Indian school showed that "in such a complex societal issue if a school operates on a complex spectrum of activities with state-mandated compulsory education elements and with practical training to guarantee the financial and moral appreciation of graduates in the local community, with the functional involvement of the community, including the organization and operation of various adult education and income enhancement programs along with opportunities that fit into the cultural environment, all this with the underlining principle of environmental awareness and sustainability, has the potentials to eradicate extreme poverty and all the horrors associated with it" [11].

The policy of international institutions regarding engagement of governments into solving the problem of hunger at the national level, and engagement of institutions and organizations at the regional level, through the creation of a quality communication platform has positive practical results. For example, studies by Benevenuto and Caulfield [12] have shown "how transport policies can effectively tackle the intergenerational poverty transfer". Scientists Zakaria et al. [13] investigated the influence of microcredit upon the achievement of GSD1-2 and the improvement of life quality of the poor by the Malaysian government. Considering COVID-2019 pandemic's impact upon the quality of life of the world's population, the results of these studies are of interest to many national governments. The influence of companies' policies about nutrition in the workplace upon productivity indicators have shown that they will obviously be useful for any enterprise, institution and organization, regardless of the country [14].

Thus, the influence of international institutions and programs in achieving Zero Hunger is undoubtedly significant, and the application of the best practices by governments at the national and local levels in a solution of hunger issue can notably reduce the expenses of financial, human and time resources. However, taking into consideration the obstacles to this process, in particular the lack of awareness of potential participants about such international programs, it is advisable to present such institutions, their functions and programs systematically and comprehensively, and in a single document. Thus, the subject of the study includes a critical analysis of the system and functions of specialized UN agencies, programs and funds in ensuring the implementation of GSD2 and establishing the degree of their dissemination and impact on achievement of goals.

The purpose of the article. The study aims to critically analyze the system and

functions of specialized agencies, programs and UN funds that ensure the implementation of GSD2, to identify the components of global initiatives for the successful implementation of the Zero Hunger Policy.

Results and discussion. *1. The GSD2 implementation mechanism in a global dimension.* Schematically, work on GSD2 implementations in the global dimension is as follows (Figure 1): the results of monitoring global changes are the basis for creating regulatory support in the GSD implementation system, but for various reasons they cannot be automatically implemented into national practices – for implementating regulations and their adaptation at the national level are joined by international institutions, which ultimately contribute to the implementation of the GSD in each country, taking into account its particular problems.

| PLAN | ACTION | RESULT |

Global level
Legal support

- resolutions
- declarations
- framework
- codes
- methods

Global and national levels
Activities of international organizations

- resource mobilization
- building alliances
- providing recommendations
- strengthening the institutional environment

National level
Implementation of the GSD

- programs
- plans
- strategies

Figure 1. Mechanism of GSD2 implementation in the global dimension
Source: developed by the authors.

In order to trace the genesis of changes in the food security system as a result of the impact of the adoption of appropriate policies and programs, it is necessary to systematize them, which in a global dimension is a challenge. At the same time, it should be noted that the UN is the fundamental institution in the formation of the regulatory system and international institutions (Figure 2).

2. International institutes in the UN for the implementation of GSD2. Successful implementation of global GSD2 policies in national systems is possible through the effective work of international institutions. Of course, their goals and scope are much broader than indicated in Figure 3, however, we have noted only those that are directly relevant to the implementation of GSD2.

Thus, only following the results of the 74th session in 2019, the UN General Assembly, on the proposal of the Second Committee on economic and financial affairs, which, among other things, addresses sustainable development, adopted 46 resolutions, of which 28 gave recommendations on the implementation of GSD2.

UN functions for the implementation of GSD2

Legal support Resolutions of the UN General Assembly	Establishment of programs, funds, specialized agencies and other UN entities that play an important role in reaching the GSD2

Transforming Our World: A 2030 Agenda for Sustainable Development 70/1 from 09/25/2015

Agricultural development, food security and nutrition 70/223 of 12/22/2015; 71/245 dated 12/21/2016; 72/238 dated 12/20/2017; 73/253 dated 12/20/2018; 74/386 of 12/19/2019

Programs and foundations
• United Nations Development Program (UNDP)
• World Food Program (WFP)
• United Nations Children's Fund (UNICEF)
• UN – Women (UNW) structure

Announced 17 goals of sustainable development and 169 related tasks that are complex and indivisible character for the entire world community

Recommendations for the implementation of the Agenda are provided

Specialized institutions of the UNPO
• United Nations Food and Agriculture Organization (FAO)
• World Food Security Committee (CFS)
• International Fund for Agricultural Development (IFAD)
• World Health Organization (WHO)

Figure 2. The UN's composition and function in guaranteeing GSD2 implementation

Source: developed by the authors.

For instance, the scope of activities of the World Health Organization (WHO) include:

- health systems (WHO acts as a global security guard for health information and collaborates with countries to strengthen mechanisms for the creation, exchange and use of high-quality information resources);

- non-communicable diseases (non-communicable diseases account for more than 70 % of all deaths in the world, eight out of ten of these occur in low- and middle-income countries);

- promoting lifelong health (promoting lifelong health concerns all of WHO's activities and takes into account the need to address environmental risk factors and social determinants of health, as well as gender, justice and human rights);

- infectious diseases (WHO is working with countries to expand and ensure sustainable access to prevention, treatment and care in HIV, tuberculosis, malaria, and to reduce vaccine incidence);

- preparedness, surveillance and response (WHO supports countries in enhancing their national capacity to manage health risks in the event of emergencies to prevent, respond to, and recover from emergencies).

| CORE FUNCTIONS | DISTRIBUTION AND IMPACT |

UN Programs and Funds

United Nations Development Program (UNDP)	poverty eradication	170 countries, 31 million people
World Food Program (WFP)	food assistance in emergencies working with communities to improve nutrition and increase sustainability	83 countries, 86.7 million people, countries affected by conflict and prolonged crises
United Nations Children's Fund (UNICEF)	protects the right of children to adequate and quality food	190 countries; Programs: (1) Feeding infants and young children; (2) Trace elements; (3) Food security in emergency situations; (4) Nutrition and HIV / AIDS
UN structure – women (UNW)	protects women's right to adequate and quality food, defend gender equality women in access to resources, expanding opportunities for women	45 countries; Programs: (1) Women's Political Opportunities; (2) Economic empowerment of women; (3) Elimination of violence against women; (4) Peace, security and humanitarian actions; (5) Planning and budgeting

Specialized UNPO agencies

Food and Agriculture Organization of the United Nations (FAO)	heads international efforts to combat hunger	152 countries; (Figure 4–6)
Committee on World Food Security (CFS)	coordinating teamwork to ensure food security and quality nutrition	recommendations and policies on a wide range of issues related to food security and nutrition
International Fund for Agricultural Development (IFAD)	village investments to improve food security, improve household nutrition and increase their incomes	21 billion USD in low-interest grants and loans for projects that have reached about 491million people
World Health Organization (WHO)	development of indicators, monitoring and measures of the impact of GSD2 implementation on health and well-being	working out proposals to improve the diet of children under 5, pregnant and lactating women, the elderly

Figure 3. The composition and roles of international institutions within the UN in guaranteeing GSD2 implementation

Source: systematized by the authors [15–23].

For the implementation of GSD2, the main functions of WHO are:

- developing indicators, monitoring and measuring the extent to which sustainable

agriculture policy promotes health and well-being;

- develop proposals for improving the diet to prevent stunted growth and depletion of children under 5 years old, meet the nutritional needs of adolescent girls, pregnant women and lactating women, the elderly.

In Ukraine, in addition to the already mentioned indicators, a significant impact on the level of nutrition is exerted by such social and economic levers of influence as household size, household location, food expenditures, income level and the presence of children. There was used a regression analysis to determine the degree of influence of the factors described above on the level of nutrition (Figure 4, Table 1).

Influence factors	X_1 – average household size, individuals; X_2 – the share of households, which are located in urban settlements, %; X_3 – the share of population with per capita equivalent total income per month that is below the actual subsistence level among the population of the group, %; X_4 – the share of total household expenditures on food, %; X_5 – the share of households with children under 18 years of age, %
Effective feature	Y – amount of calories consumed by 1 person, kcal
Regression equation	$Y = -1636.5478x_1 - 8.3168x_2 - 25.6628x_3 + 39.7968x_4 + 62.3809x_5 + 4402.1038$

Figure 4. Regression analysis of the assessment of factor's impact on the level of daily energy value of food consumed in households in Ukraine

Source: calculated by the authors.

The findings of regression analysis showed a close relationship between factor and result features, therewith: the increase of average household size per 1 person, the share of households located in urban settlements by 1 % and the share of the population with per capita equivalent total income per month that is below the actual subsistence level by 1 %, the energy value of the diet will decrease by 1636.8 and 26 kcal, respectively; and with the increase in the share of total expenditures of households on food and the share of households with children under 18 years of age by 1 %, the energy value of the diet will increase by 38 and 62 kcal, respectively (Table 2). This substantiates the conclusions made earlier.

Table 1

Input data for regression analysis of the factors' impact upon the level of daily energy value of food consumed in households in Ukraine

Region	X_1	X_2	X_3	X_4	X_5	Y
Vinnytsia	2.47	47.5	28.2	47.3	35.6	3420
Volyn	3.03	52.4	37.6	53.0	48.9	3092
Dnipropetrovsk	2.37	84.0	35.8	48.6	34.6	2919
Donetsk	2.33	84.7	44.6	53.0	35.1	3291
Zhytomyr	2.51	56.2	40.3	48.5	38.3	3160
Zakarpattia	3.49	40.6	31.5	49.1	55.1	3217
Zaporizhzhia	2.46	76.7	38.7	39.7	35.7	2655

Continuation of Table 1

Region	X_1	X_2	X_3	X_4	X_5	Y
Ivano-Frankivsk	3.00	45.1	18.7	45.0	48.0	3392
Kyiv	2.62	57.8	48.5	52.1	37.4	2552
Kirovohrad	2.32	61.8	33.6	46.4	33.4	3043
Luhansk	2.28	69.9	32.9	45.4	29.0	2712
Lviv	3.02	63.3	31.1	51.7	46.2	2982
Mykolaiv	2.55	68.3	43.9	46.3	40.0	2844
Odesa	2.65	68.6	35.7	53.3	38.8	2960
Poltava	2.37	60.5	23.5	39.7	32.3	2935
Rivne	3.14	49.0	44.6	56.1	48.3	2930
Sumy	2.40	66.9	38.1	45.6	34.8	3093
Ternopil	2.93	45.6	32.7	41.5	46.7	2991
Kharkiv	2.44	80.2	34.4	47.2	34.0	2791
Kherson	2.49	62.9	45.0	52.1	36.7	3151
Khmelnytsky	2.63	52.8	38.6	48.0	39.8	3131
Cherkasy	2.35	54.6	35.9	48.2	34.8	3299
Chernivtsi	2.90	44.0	39.4	42.3	51.5	2964
Chernihiv	2.30	60.1	31.1	45.9	33.8	3467

Source: developed by the authors according to the data of State Statistics Service of Ukraine.

Table 2

Findings of regression analysis of the factors' impact on the level of daily energy value of food consumed in households in Ukraine

$m_5, m_4, m_3, m_2, m_1, b$	62.3809	39.7968	-25.6628	-8.3168	-1636.5478	4402.1038
$se_5, se_4, se_3, se_2, se_1, se_b$	19.4123	10.1975	6.2259	3.7859	422.7090	568.7897
R^2, se_y	0.6419	160.9784				
F, df	6.45	18				
SS regr., SS resid.	836152.35	466452.61				

Y =-1636.5478x1 – 8.3168x2 – 25.6628x3 + 39.7968x4 + 62.3809x5 + 4402.1038

F, Fcrit.	6.45	2.93	The assumption of relationship abscence is not confirmed			
t-statistics	3.213481	3.902593	4.121954	2.196762	3.871571	7.739423
TDIST	0.002409	0.000522	0.000320	0.020687	0.000559	0.000000
Comparison of evaluation	effective feature	effective feature	effective feature	effective feature	effective feature	

Note: m_5, m_4, m_3, m_2, m_1, b – coefficients for variables in the regression equation; $se_5, se_4, se_3, se_2, se_1, se_b, se_y$ – averages of absolute values of deviations of data points from the average; R^2 – coefficient of determination, F – Fisher's criterion calculated to assess the adequacy of the constructed model; Fcrit – Fisher's criterion is critical; df – the number of degrees of freedom; SSregr. – fraction of variance, which is described by the regression equation (sum of squares due to regression); SSresid. – the proportion of variance that is not taken into account when writing the equation (residual sum of squares); TDIST and t-statistics are standard errors (auxiliary values used to check the significance of model coefficients).

Source: calculated by the authors.

3. FAO's activities in ensuring the implementation of GSD2. We should note that among the international institutions in the GSD2 implementation system, the most

significant is the influence of the FAO, the Committee on World Food Security (CFSP) and the International Fund for Agricultural Development (IFACS).

In its activities, FAO sets out five strategic goals.

1. *Assist in overcoming hunger, eliminating food insecurity and malnutrition.* FAO is expanding the capacity of all stakeholders to implement governance, coordination and broader partnerships for more targeted and coordinated action to eliminate hunger and malnutrition; helps countries ensure that policy, investment and action plans are evidence-based; assists countries in producing reliable data, statistics and enhancing analytical capacity; works with partners to monitor progress, assess the impact and draw lessons from their efforts on food security and nutrition [24].

2. *Make agriculture, forestry and fisheries more productive and sustainable.* FAO supports the development of effective governance mechanisms, policies and laws for the transition to sustainable agriculture; develops tools to monitor progress towards sustainable agricultural development and assist countries in their implementation; ensures that international commitments to sustainable agriculture are supported by national laws and policies [24].

3. *Promote poverty reduction in rural areas.* FAO helps countries to develop rural diversification strategies and policies that help create decent jobs and skills for rural workers, especially young people and women; supports the empowerment of farmers to improve access to and sustainable management of natural resources, better access to markets, technologies and services to increase their productivity and generate income; supports national statistical processes for collection and analysis of rural poverty and agricultural development trends, facilitates monitoring of Sustainable development goals related to rural poverty [24].

4. *Introduce efficient agricultural and food systems.* FAO collects and shares market access and development information. FAO helps countries more fully participate in global and regional markets through increased trade; strengthens financial mechanisms to support the growth of agriculture and the food industry; develops the capacity of regional organizations to promote efficient food markets [24].

5. *Increase resilience to threats and crises.* FAO supports countries and regions in mobilizing adequate resources to reduce and manage poverty in agriculture, food and nutrition to ensure sustainability; assists countries and communities in developing mechanisms to collect, analyze and disseminate data for monitoring, preventing and responding to crises and threats to agriculture, food security and nutrition; protect and provide humanitarian assistance to protect livelihoods of vulnerable farmers before, during and after emergencies; builds and promotes partnerships and synergies with academic, public and private agencies, the UN to work together to achieve sustainable development [24].

In general, FAO's GSD2 implementation can be organized in three directions (Figure 5).

Monitoring of GSD2 implementation and measurement of progress		
The goal – is to monitor global and national changes in the implementation of the GSD2 **The task** – to create a reliable system indicators that converts GSD2 to a management tool to help countries develop policies and allocate resources	**Global processes** **The goal** – a system of unified standards, regulatory approaches and policies for implementing the GSD2. **The task** – to adapt existing and create new ways in which food and agriculture contribute to economic, social and environmental development	**Global partners** **The goal** – a platform for sharing information, building partnerships and alliances **The task** – exchange of ideas and positive experiences to solve similar problems of ctries in the process of GSD2 implementation

Figure 5. Areas of FAO's activities in ensuring the implementation of GSD2 at the national level

Source: generalized by the authors [24; 25].

In partnership with Rome-based agencies and other partners, FAO leverages its own interdisciplinary knowledge and experience to develop indicators that can monitor effectively progress towards GSD2 in different countries.

To ensure the development of the best and most relevant indicators, FAO is working closely with the United Nations Statistics Commission (UNSC) and the Inter-agency and Expert Group on GSD (IAEG-SDG) from 28 countries. FAO can support countries in monitoring at least 25 of the 230 GSDs identified by the IAEG-SDG. These indicators relate to GSD 1, 2, 5, 6, 12, 14 and 15 and include both established and emerging indicators in areas where FAO has unique experience and knowledge in monitoring GSD2 implementation and measuring progress as a leading UN specialized agency in the field of food security and sustainable development. The objectives mainly cover areas such as the cessation of hunger, the elimination of food and malnutrition, and the rational use of natural resources.

FAO has significant potential comparative benefits in helping countries meet new GSD2 monitoring challenges and has already initiated several projects with partners (Figure 6):

1. With the Global Strategy to Improve Agricultural Statistics [26], the largest in the history of the Agricultural Statistics Capacity Building Initiative, FAO is developing guidelines for new cost-effective methods for collecting food and agriculture data on education and training of statistics workers, as well as providing technical assistance for the development of sectoral strategic plans, institutional coordination and verification of new statistical tools [24; 25].

2. FAO also directly supports countries in enhancing their ability to use national surveys to monitor the GSD2 [24; 25]. To promote consistent implementation of GSD2 indicators in FAO national statistics, it advises countries on the best ways to collect and analyze food intake data to assess malnutrition and to implement the Global Food Insecurity Experience Scale module [16; 27].

3. FAO, in collaboration with the World Bank (WB), has launched a Global Survey Hub 2020 to support countries in the development and implementation of comprehensive agricultural surveys that will collect data to monitor many agricultural and food security goals, as well as GSDs, such as small business productivity and revenue goals and equal access to land.

4. According to many other indicators related to ecosystems and sustainability of natural resources, FAO collects data from officially approved national agencies. In some cases, information provided by member states is enriched by other sources of data [24; 25]. For example, remote sensing of land use and land degradation is possible through the Collect Earth Online 2019 project [28].
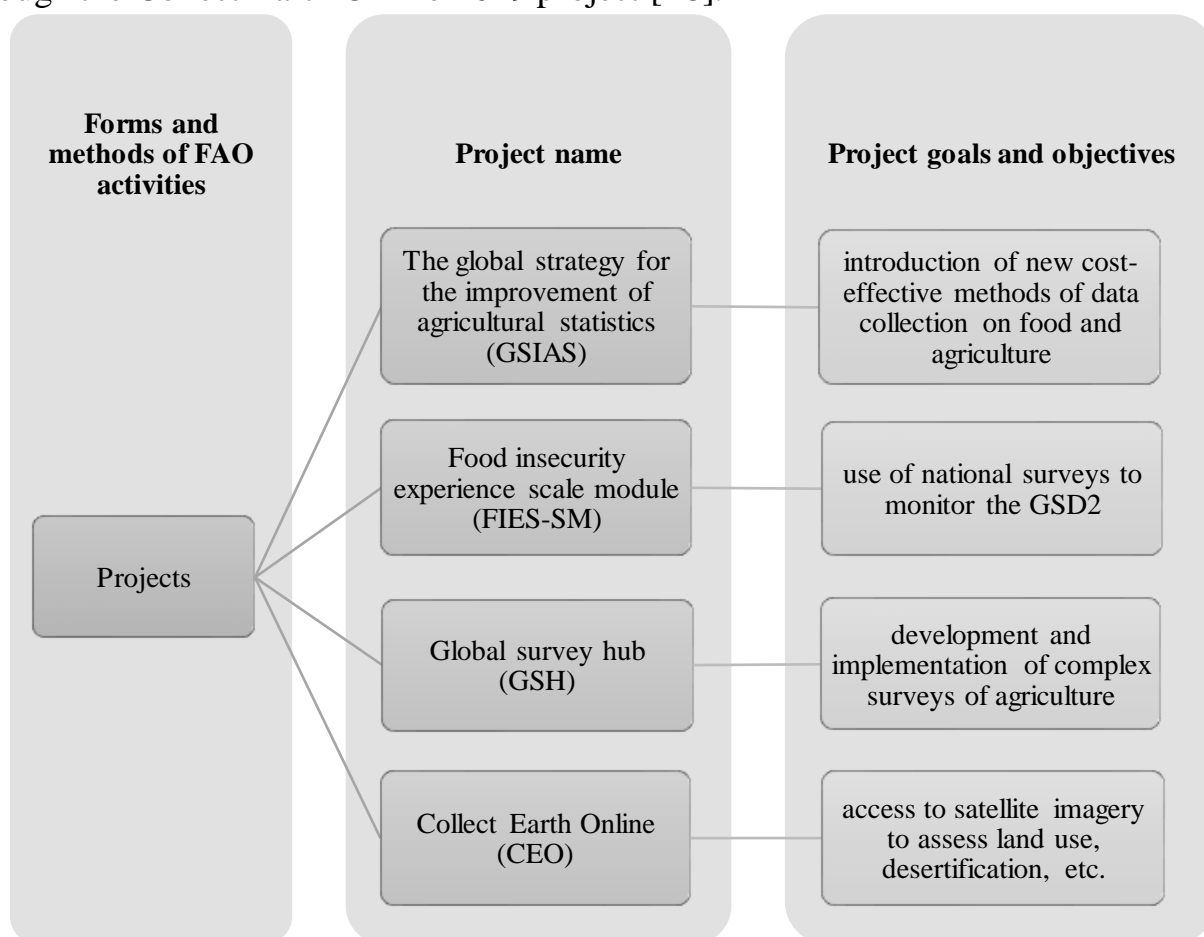
Figure 6. FAO's activities in monitoring GSD2 implementation and measuring progress

Source: generalized by the authors [17; 24; 26; 27; 28; 29].

GSD2's great ambitions can only be achieved through collaboration (North-South, South-South and tripartite) and global partnerships between many participants and across a wide spectrum. FAO participates in global processes and partnerships to ensure that GSD2 goals truly reflect countries' perspectives on their development and recognize the many ways in which food and agriculture contribute to economic, social and environmental development.

FAO participates and frequently chairs, deploys or represents the Technical

Secretariat for major interagency and multilateral alliances, including the United Nations Standing Committee on Nutrition (UNSCN), the World Food Security Committee (CFS), the United Nations High-Level Task Force on Global Food (HLTF), UN-Energy, UN-Water, and UN-Oceans (Figure 7).
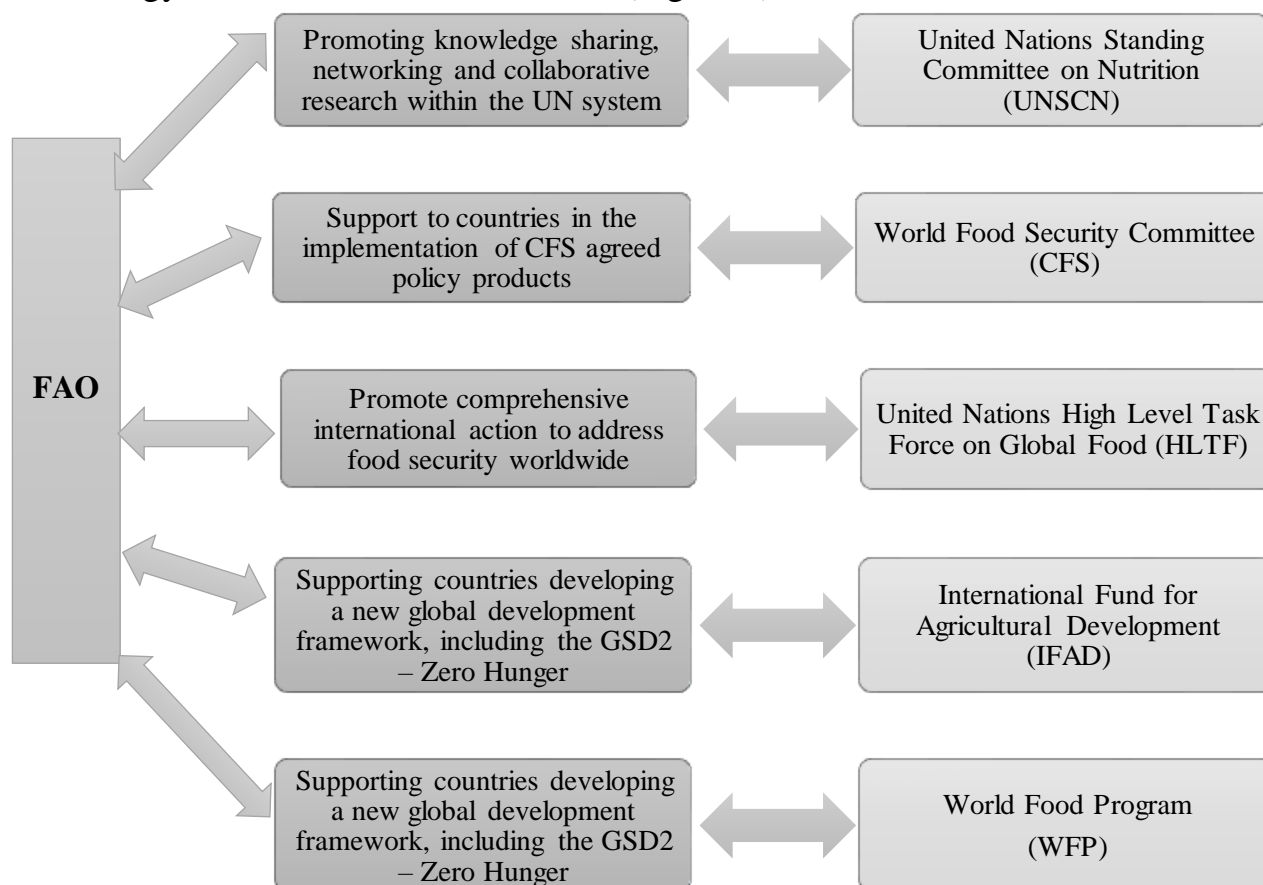
Figure 7. FAO's leading interagency and multilateral alliances
Source: generalized by the authors [24; 25].

FAO's cooperation with the International Fund for Agricultural Development 2020 and the World Food Program 2020 play a significant role in supporting countries developing a new global development framework, including GSD2 – Zero Hunger. This close relationship is ongoing as work is currently focused on metrics to measure global goals and objectives, with a focus on the productivity of farmers and small-scale agrarians and the implementation of comprehensive agricultural surveys.

The most productive, in terms of assisting in the implementation of GSD2 guidelines, frameworks and policies by national agencies, is FAO's cooperation with the World Food Security Committee (CFS). FAO is a key partner of the World Food Security Committee, a major international and intergovernmental platform that brings together all stakeholders in a joint work on food security and nutrition for all, led by a joint Secretariat of the Rome-based agency and support participation of CFS in the implementation of GSD2. FAO supports countries in the implementation of CFS agreed policy products, such as Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security [30], Principles for Responsible Investment in Agriculture and Food Systems [31] and the

Framework for Action for Food Security and Nutrition in Protracted Crises [32], which addresses several GSDs, and in particular GSD2. FAO also supports CFS policy discussions aimed at identifying global challenges and policy gaps to facilitate global thematic reviews of progress in the GSD2 implementation system over the next 15 years.

FAO's activities with partners in securing global GSD2 implementation processes include different areas (Figure 8).

- *Building a framework*
- *Promoting policy dialogue*
- *Addressing climate change*

Increasing resilience of people, communities and ecosystems

Conservation and protection of ecosystems, increasing resource efficiency

- *Promotion of guidelines, standards, best practices*
- *Global forums*
- *Support for research*

Promoting effective management of natural and human systems

Protecting and improving the lives of rural populations and social well-being

- *Resource and investment mobilization*
- *Strengthening the institutional environment*

- *Women and land tenure*
- *Editions and recommendations on these issues*

Figure 8. FAO's activities towards ensuring global processes for GSD2 implementation

Source: generalized by the authors [24; 25; 33–45]

Resource and investment mobilization. FAO's new food and agriculture investment strategy addresses both the 2030 Agenda and the Addis Ababa Action Agenda (AAAA), which helps countries to develop and implement quality investment proposals and mobilize resources for GSD2. FAO helps also countries increase their capacity to develop and implement stakeholder investment.

Addressing climate change. United Nations Climate Change Agreement: Paris Climate Change Agreement 2015 continues. The Paris Agreement unites all countries in the common cause of climate change adaptation and adaptation through enhanced support and assistance to developing countries. The Paris Agreement requires all parties to make every effort through United Nations Climate Change: Nationally Determined Contributions 2015 and to intensify these efforts in the years to come. These countries are now turning to the international community for support in meeting their commitments and reporting on their Nationally Defined Contributions over the coming years. FAO, in addition to building relationships with the Ministries of Environment and Finance to participate more actively in national processes, also works with the Green Climate Fund (GCF) and other potential donors interested in financing

climate action.

Provide evidence and policy recommendations. With increasing focus on partnerships and various sources of funding, such as South-South cooperation, FAO is increasingly focusing on outreach and technical support. As part of the GSD2 commitments to reaching FAO's Zero Hunger by 2030, FAO and the World Food Program have estimated the additional investment needed to address extreme poverty and hunger at 265 billion UAH annually between 2016 and 2030 [24]. FAO's technical assistance includes developing public investment management strategies and policies. Support for public investment will also be aimed at creating favorable conditions for private investment.

Women and land tenure. For rural women and men, land is often the most important asset for a household to support production and provide food and income. Therefore, the Sustainable Development Goals Knowledge Platform [42] places particular emphasis on women's rights to land. GSD encourages reforms that give women equal rights to economic resources and access to land ownership. Based on FAO technical recommendations, two indicators were adopted to measure GSD5a. The FAO gender and land rights database, which includes over 84 country profiles and the Legal Assessment Tool (LAT) [41], provides country-level information to monitor progress towards GSD.

Promotion of guidelines, standards, best practices. The Global Agenda for Sustainable Livestock (GASL) is a multilateral stakeholder partnership in the livestock sector committed to the sustainable development of the sector. It also addresses the social, environmental and economic aspects of animal husbandry growth: a growing scarcity of natural resources, climate change, poverty, food security and global threats to animal and human health. It focuses on three main areas: global food security and health; equity and growth; resources and climate [39]. The agenda uses GSD17 (Partnership) goals as a key mechanism for achieving GSD2.

Building a framework. An important element to achieving sustainable development is the Sendai framework for disaster risk reduction 2015–2030 (SFDRR) – a 15-year voluntary, non-binding agreement that recognizes that the state plays a leading role in disaster risk reduction, but responsibility must be distributed to all parties, including local governments and the private sector [45]. In line with its four priorities, the FAO sustainability program strengthens early warning and risk monitoring systems, integrates a disaster risk reduction framework into agricultural policy, promotes best practices in disaster risk reduction, supports emergency response and resistant recovery of the economy after crises and shocks.

Promoting policy dialogue. The second international conference on nutrition (ICN2) was a high-level intergovernmental meeting focusing on global malnutrition in all its forms. The meeting was attended by more than two thousand participants, including representatives from more than 170 governments, 150 civil society representatives and nearly 100 business representatives [38]. Two key summary documents – the Food and Agriculture Organization of the United Nations: Rome Declaration on Nutrition 2014 and the Framework for Action on Food Security and

Nutrition in Protracted Crises 2015 – were signed by the participating governments to call on world leaders to develop a national policy to eradicate malnutrition and transform food systems to make food diets accessible to all.

Strengthening the institutional environment. FAO has taken the lead in improving information on the agricultural market – a key component in avoiding future food price crises and excessive volatility – by hosting the agricultural market information system (AMIS). The agricultural market information system is an interagency platform for improving the transparency of the food market and responding to food security policies. The platform was launched in 2011 by the G20 ministers of agriculture following the global rise in food prices in 2007/08 and 2010. In order to bring together major agricultural suppliers, AMIS assesses global food supplies (focusing on wheat, maize, rice and soybeans) and provides a platform for policy coordination in a context of market uncertainty [34]. Most importantly, AMIS promoted political dialogue and mutual learning between participating countries, for example by regularly meeting with national coordinators within the global food market information group 2011 and the AMIS rapid response forum [35].

Global forums. The FAO global forum on agricultural research 2003 is a unique multilateral forum for open dialogue, knowledge sharing, alignment of priorities and catalyzing collective action in agri-food research and innovation [46]. The partners of the forum are working to ensure that agricultural research and innovation through research, knowledge, education and entrepreneurship delivers the best results for the development of agricultural farmers and rural communities. Soils provide an unparalleled value to society through ecosystem services (providing food, fiber, fuel and biological materials, regulating water quality, nutrient cycling, regulating climate and floods), providing a high level of return on investment in Sustainable Soil Regulation (SSR). The introduction of SSR has many social benefits, especially for small farmers who are directly dependent on local soils. The partnership aims to promote the SSR at all levels. GSD2 recognizes that security and nutrition require the creation of effective sustainable agricultural production, which is not possible without the SSR.

Research support. The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), adopted by the FAO conference in November 2001, is the only binding international agreement, which relates directly to the sustainable management of Plant Genetic Resources for Food and Agriculture (PGRFAs). The multilateral system for accessing genetic resources and sharing the benefits of ITPGRFA provides the necessary cooperation between countries to exchange PGRFAs for agricultural research and breeding, providing an important impetus to continue developing, preserving and providing PGRFAs to the global community to promote food security.

Conclusions. It was concluded that the following steps should be implemented:

1. Initiatives on Global zero hunger policy have been identified to be based on three components: regulatory support, the work of international organizations coordinated by the UN, and the implementation of the GSD2 framework and programs at the national

level, which support most countries around the world through interaction with FAO.

2. The main functions of the specialized agencies, programs and UN funds in ensuring the implementation of GSD2 are systematized, the extent of their distribution and impact is determined.

3. It is argued that in general terms, FAO's GSD2 implementation can be organized into three areas: monitoring the implementation of the GSD2 and measuring progress; global processes; global partners. Such distribution is determined by the specificity of goals and objectives according to the specific activity and level.

4. FAO has been shown to have significant potential comparative benefits in helping countries meet new challenges in the GSD2 monitoring area, in particular through the implementation of projects: the global strategy to improve agricultural statistics (GSIAS); Global Food Insecurity Experience Scale module (FIES-SM); Global Survey Hub (GSH); Collect Earth Online (CEO).

5. It has been identified that FAO's work with partners in securing global processes for the implementation of GSD2 involves different areas: mobilizing resources and investment; addressing climate change; providing evidence and policy advice; women and land tenure; promotion of guidelines, standards, best practices; frame construction; promoting policy dialogue; strengthening the institutional environment; global forums; research support.

Further research should be focused on the mechanism of EU countries' positive experience implementation while solving similar issues of GSD2 realization, where it is possible and appropriate for the national economy, as well as on developing new approaches to business conduct, forming a platform for information exchange, creation of partnerships and alliances, which at all levels are guided by the principles of Zero Hunger and Zero Poverty.

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JEL: M40, Q01, Q14

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TRANSPARENCY OF AGRICULTURE COMPANIES: RATIONALE OF RESPONSIBLE INVESTMENT FOR BETTER DECISION MAKING UNDER SUSTAINABILITY

Purpose. *The purpose of the article – to explore transparency under sustainability among agricultural companies in Ukraine (company "Kernel") and the Czech Republic (company "Agrofert") with further recommendations and implications related to reporting.*

Methodology / approach. *Qualitative estimations of sustainability transparency are based on Sustainability Transparency Index (STI) calculations. Methodology of this index is based on binary estimations of a number of transparency criterions including links to sustainability information; existence of sustainable development policy; availability of sustainability and SDG reports; disclosure according to ESG criteria and specifics SDGs as well as other relevant goals related to SDG and sustainable development.*

Results. *Sustainability transparency from 2016 till 2019 in Agrofert and Kernel was almost the same. But since 2019 after Kernel introduced a number of steps to increase its transparency the situation has changed dramatically. STI index has increased from 32 in 2019 to 80 in 2021. STI values for Agrofert were unchanged in 2020 (the latest available period of analysis). As a result, Kernel's financial results and indicators have demonstrated significant improvement both absolute and relative. For example, net profit increased by more than 1000 %, investment cash-flow by 100 %, ROE – by 500 % and ROIC by 140 %.*

Originality / scientific novelty. *New empirical results based on qualitative estimations of sustainability transparency for the agriculture companies from different countries are provided. Current study covers the existing research gap, proved by bibliometric analysis tool, for instance in pure academic discussion in measurement, comparison and benchmarking of agricultural companies' transparency for the responsible investment purpose. Recommendations for sustainability transparency improvement are proposed. They are intended on better perception of sustainability ideology and incorporation of ESG/SDG criterion by agriculture companies in Ukraine and especially Czech Republic, levelling the informational asymmetry and moral risks for their investors and create better investment rationale for decision making under sustainability.*

Practical value / implications. *The most efficient steps include the following ones: development and implementation of sustainability policy; emergence of specific reports based on ESG criteria; implementation of SDGs in activity of the company with further prioritization of these criteria within two groups. Further study in this field might be devoted to sustainability transparency comparison for agriculture companies in different branch in Ukraine and Czech Republic. Spreading the scope*

and sample of research allows making cross-industries STI benchmarking analysis.
Key words: *sustainability, transparency, agriculture, investment.*

Introduction and review of literature. Agriculture plays a fundamental role in daily life, providing livelihoods for one-third of the global population and enabling food production. The sector accounts for 9.5 % of gross domestic product (GDP) across developing countries and 26 % of GDP for the least-developed countries in the world. In 2018, agriculture added 3.3 trillion USD to the world economy, up 50 % from 2008. Agriculture is one of the key spheres to achieve Sustainable Development Goals (SDGs), because it deals with food security, hunger, waste-free production and reduction of environmental pollution. Agriculture provides impact on the multiple SGDs from "No Poverty" (SDG 1) to "Zero Hunger" (SDG 2) and "Sustainable Consumption and Production" (SDG 12).

According to the Global Institutional Investor survey (MSCI Investment Insights, 2021), over three-quarters (77 %) of investors increased ESG (Environmental, Social and Governance) investments "significantly" or "moderately" in 2020, with this figure rising to 90 % for the largest institutions (over 200 billion USD of assets). Despite the evidence that sustainable management practices are important for business, ESG-efforts in agriculture are very limited. Low perception of sustainability ideology and poor ESG/SDG disclosure by companies brought up high level of informational asymmetry and moral risks and create challenges to responsible investment rationale for agriculture companies in Ukraine and the Czech Republic.

International private sector investment flows to developing and transition economies in agriculture fell by 57 % in 2020 because of the COVID-19 pandemic (UNCTAD, 2020). Decrease in such investments affected food security mostly in developing countries and transitive economies. Ensuring rationale for investment in agricultural companies, taking into account the post-pandemic sustainable recovery (Environmental, Social and Governance ESG investment) and progress in sustainable agriculture is the most relevant for SDG 1 "No poverty", 2 "Zero hunger" and 12 "Sustainable consumption and production" (UNCTAD, 2016). These goals are primary associated with agriculture investment according to GIIN (Sunderji et al., 2020) and the highest affected by investment drop (SDG 2 "Zero Hunger" (68 %), "No Poverty" (57 %). The basis for responsible investment decision-making in agriculture companies is their sustainability reporting and level of accountability, transparency within the progress of certain SDGs according to main stakeholder's requests (Brin & Nehme, 2021).

Information transparency is a key element in the context of sustainability within the Investment Policy for Sustainable Development (IPFSD) of the International Conference on Trade and Development (UNCTAD, 2015), a key component of corporate governance under the Principles of Corporate Governance (OECD) and the country G20 (G20/OECD), a guarantee of the company's compliance with global challenges and needs of society and stakeholders and investor in the first place (GRI).

The fundamental principle of Food and Agriculture Business Principles (FAO) is

"encourage good governance and accountability", which requires agriculture companies to be transparent and highlight their influence, and stakeholder value creation. The focus of agricultural companies on these principles is an indicator of their high environmental and social responsibility. Achieving a certain level of transparency helps to increase the companies' investment rationale and the ability to allocate and recoup investments in SDGs (FAO). The key areas for the sustainability disclosure for agriculture companies' stakeholders, Sustainability Assessment of Food and Agriculture systems guidelines (SAFA, 2014; AccountAbility, 2015) include: good governance, environmental integrity, economic sustainability and social well-being. It allows creating a transparent and comprehensive framework for highlighting key stakeholders' sustainability requests in this sector of the economy. Nevertheless, according to Gardner (2019) the issues of transparency and sustainability in global agriculture supply chains are poorly investigated and there is a need to develop ways in which transparency can improve sustainability governance.

Ukraine's adoption of a national SDGs target system in 2017 unites it with the global community. However, the level of SDGs progress in Ukraine compared to the 50 leading countries in the world is low – 47th out of 193 countries in the 2020 Global SDG Indicators Database (Sachs et al., 2020). The Czech Republic demonstrates higher progress in SDG achievement comparing to Ukraine (8th out of 193). However, significant challenges in SDG 2 achievement and its investment provision remain for both counties. Sukhonos & Makarenko (2019) showed that stakeholder engagement and transparency were covered only in the biggest Ukrainian agriculture companies. At the same time, SDGs 2 and 12 are partially integrated into sustainability investment strategies and reporting of Ukrainian agriculture companies (CSR Ukraine, 2020; The UN Global Compact Network, 2021).

The Czech Republic has fully integrated the requirements of Directive 2014/95/EU into national legislation (Member State Implementation of Directive 2014/95/EU, Amending Act No. 563/1991 Coll. On Accounting) according sustainability disclosure. However, according to the Ministry of Industry and Trade of the Czech Republic, the Preparation of the National Action Plan for Corporate Social Responsibility in the Czech Republic 2019–2023 is on schedule. So, the level of ESG/SDG transparency in both counties is relatively low.

Low perception of sustainability ideology and pure ESG/SDG disclosure by other companies brought up high level of informational asymmetry and moral risks and create challenges to responsible investment rationale for agriculture companies in both countries. One more important reason for deepening these challenges is emerging character of the scientific research in the field of agriculture companies' transparency and investment rationale under sustainability.

Using different techniques of bibliometric analysis, a literature review of agriculture company's transparency issues was made. Specific search queries (Table 1) were addressed to the following data bases: WoS (analyzed within in-built instruments), Scopus (in-built instruments), Google Scholar (Publish or Perish (PoP).

All search queries on these databases were performed for the period 2015–2022

in accordance with the adoption of the SDGs in 2015. The most relevant subject area was for Scopus – Business, Management and Accounting, for WoS – Business and Management. There were no subject area restrictions when using Publish or Perish for Google Scholar. The most relevant search topics, as well as the most cited articles, were selected from the search databases.

Table 1

Static analysis of agriculture companies' transparency and other relevant queries in academic literature over the period 2015–2021 as of April, 1, 2022

Searched term	Found results		
	Scopus	PoP	WoS
Transparency	771	<1000	2308
Sustainability AND Transparency	212	870	308
Sustainability Transparency AND Investment	58	210	145
Sustainability Transparency AND Ukraine	10	120	5*
Sustainability Transparency AND Czech	5	62	2
Sustainability Transparency AND Investment AND Agriculture	3	10	4

Note. * 2 articles are dubbed in WoS and Scopus.

Source: compiled by authors via WoS, Scopus in-built instruments, and Publish or Perish.

In particular, scientists have various approaches to studying the transparency in agricultural companies in different ways, using different regions and branches. However, these studies give the transparency an important role in promoting SDGs values. Gisladottir et al. (2021) on the example of agricultural companies engaged in the sustainable management of renewable resources in Ukraine, Iceland and Romania emphasize the importance of access to the sphere not only of large, vertically integrated companies, but also small players, which increases transparency in agriculture. Abdullah (2020) on the example of agricultural companies in Southeast Asian region proves the link between sustainability transparency and firm performance. Santos et al. (2021) examining the level of transparency of the 150 largest agricultural holdings in Brazil, proves that it depends on the segment of the company, media pressure, the degree of environmental pollution and is important for promoting CSR policy.

In contrast to previous research in a sectoral or regional context, the study of global food supply chain and agriculture supply chain transparency shows the importance of modern blockchain and digital technologies for agricultural companies to increase trust between stakeholders and chain companies (Cole et al., 2019; Francisco & Swanson, 2018; Koberg & Longoni, 2019; Pandey, 2022; Kamble et al., 2020).

The national context of Ukraine and the Czech Republic in ensuring companies' transparency is a relatively new topic. In particular, Czech researchers focus on the general issues of transparency and corporate sustainability, improvement corporate social performance through sustainability indicators (Dočekalová et al., 2015; Dočekalová et al., 2018; Krechovská, 2019). Particular issues of agricultural companies' transparency are insufficiently covered.

In Ukraine, companies' sustainability transparency studies focus on accounting

and reporting (Vasyl'eva et al., 2017). Experience of agro-industrial companies is a pioneer (Sukhonos et al., 2018). At the same time, the majority of previously analyzed works on the world, Ukraine and the Czech Republic does not sufficiently highlight the importance of transparency of agricultural companies under sustainability.

The purpose of the article – to explore transparency under sustainability among agricultural companies in Ukraine (company "Kernel") and the Czech Republic (company "Agrofert") with further recommendations and implications related to reporting. The obtained results will be applicable to enhance sustainability transparency in Ukrainian and Czech agriculture companies.

Methodology. This research is concentrated on conceptualization of the sustainability transparency in agriculture companies and its impact on financial performance and investment rationale for better responsible investment decision making process. The following methods were applied: instruments and specific software of bibliometric analysis (Publish or Perish, Vos Viewer, Google Trends, Google Books Ngram Viewer, In built Scopus and WoS tools), clustering analysis. These methods were used to characterize the scientific achievements in the field of transparency and investment attractiveness of agricultural companies.

The method of parameter normalization was used in the calculation of the Sustainability transparency index (STI), which, along with the methods of comparative and benchmark analysis, allowed studying the state of sustainability information and SDGs of leading agricultural companies in Ukraine and the Czech Republic.

As part of the sustainability transparency assessment, STI indices were calculated for each companies' sustainability reports for the period under study. Its value was obtained by the method of normalization of the index parameters.

The index questionnaire was based on a number of criteria that allows characterizing comprehensively the level of agricultural companies' sustainability transparency in Ukraine and the Czech Republic:
- links to sustainability information;
- existence of sustainability policy;
- sustainability and SDG report;
- management report;
- disclosure according to ESG criteria;
- disclosure on SDG;
- other relevant goals related to SDG and sustainable development.

Based on their binary estimates [0; 1], the number of verified criteria was determined, the STI value was calculated by the method of their normalization according to formula (1) and the level of transparency of Kernel's and Agrofert's reports within the analyzed period 2015–2021 was determined.

$$y = \left(\frac{x-min}{max-min}\right) * k, where\ x \neq min, \qquad (1)$$

where *y* – STI meaning;
min; *max* – minimum and maximum number of evaluation criteria;
x – number of verified criteria;

k – maximum index value (100).

The value of the index for each company for each reporting period is interpreted using a 100-point scale:

- A [80; 100];
- B [60; 80];
- C [40; 60];
- D [20; 40];
- E [0; 20].

Results and discussion. Mapping the results of the literature review (413 publications) using the VOSviewer software (Figure 1) allowed us to conclude that over the past 7 years, the prevailing issues of transparency (information transparency) in connection with sustainability and supply chains (yellow cluster). In addition, an important aspect is the management of these chains and the use of modern digital technologies (blockchain) in such management. The link between yellow cluster transparency and investment decision-making (red cluster) in current research is mediated through the purple sustainability cluster. This link confirms the relevance and importance of the chosen topic. At the moment, the sectoral aspect of agricultural companies' transparency within the bibliometric map is not traced in detail in current academic studies that confirms the novelty of the study.
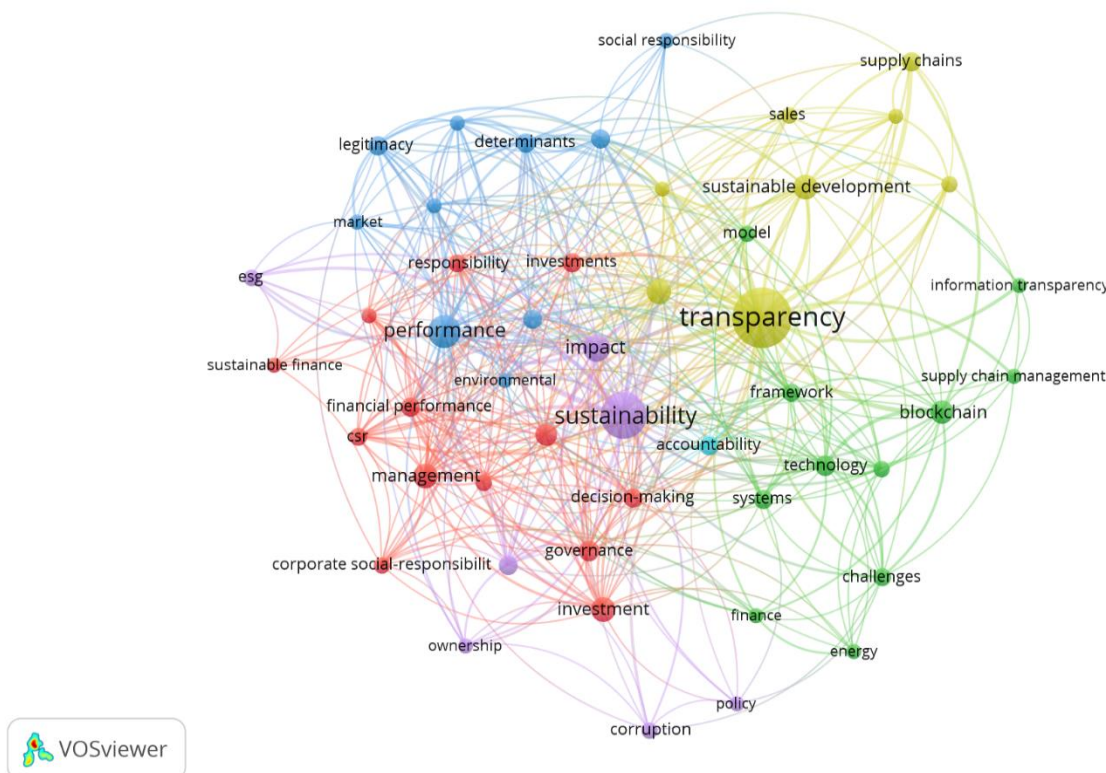
Figure 1. Co-occurrence network and visualisation of keywords Sustainability Transparency and Investment Agriculture in 2015–2022
(number of publications = 413)

Source: complied by authors within the data from Scopus, WoS and Publish or Perish by VOSviewer.

The study of the activity of Internet users in 2015–2022 (Figure 2) shows a distinction between Sustainability Transparency and Investment Agriculture, given the significant gap in the frequency of such searches throughout the analyzed period.
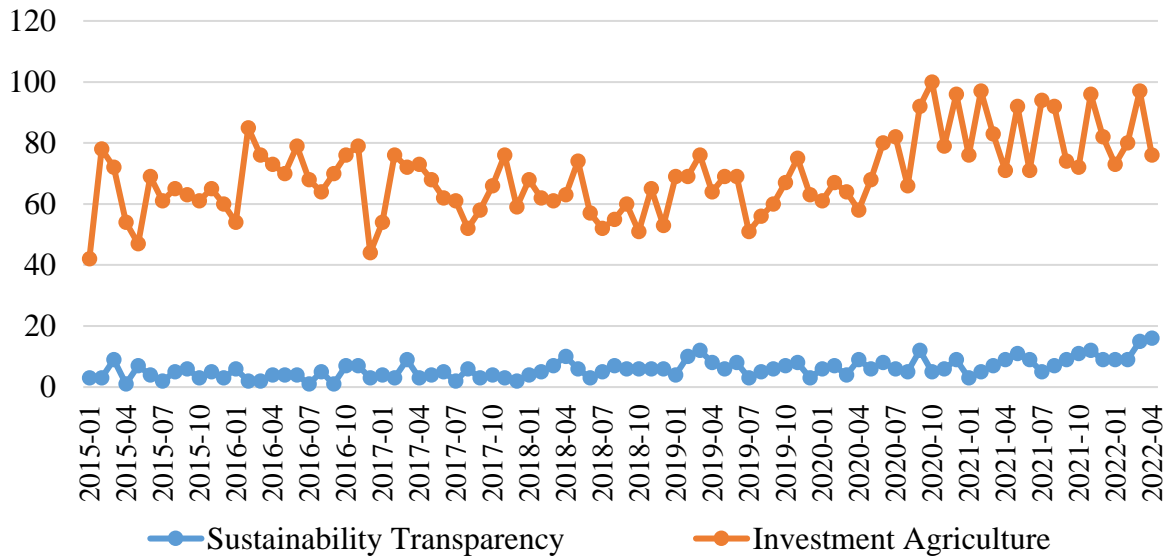
Figure 2. Internet users queries of keywords Sustainability Transparency and Investment Agriculture in 2015–2022

Source: complied by authors within the data from Google Trends.

Similar findings can be made within tools Google Books Ngram Viewer. The frequency of mentions in the digitized collections of Google Books of the terms Sustainability and Transparency is much lower than the terms Investment Agriculture (Figure 3).
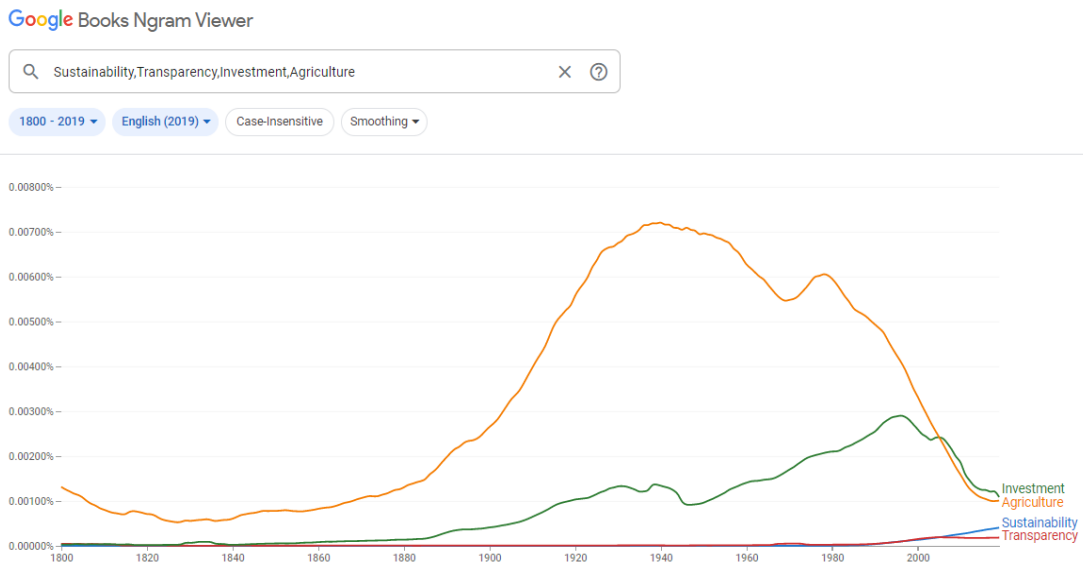
Figure 3. Ngram of keywords frequency "Sustainability Transparency AND Investment Agriculture" in Google Books

Source: complied by authors via Google Books Ngram Viewer.

These results of mapping research, studying the frequency of research terms in Google Books sources and queries of Internet users confirm the previous results of the review of scientific papers. Limited understanding the role of sustainability

transparency in investment decisions in general, and agricultural companies in particular was proved.

Given the prevalence of research on the study of transparency at the level of supply chains, we propose to consider the transparency on the corporate level. We use the example of the two largest agricultural companies in the Czech Republic and Ukraine – Agrofert and Kernel.

Agrofert is one of the biggest companies in the Czech Republic (ranked as the fourth most important firm according to the list of CZECH TOP 100) and the biggest agricultural company. It is hundred times bigger then other Czech agriculture companies (Dominant CZ, AGRO CS, NAVOS, Cerea, Primagra, ZZN Pelhřimov, AgroZZN, AGRO 2000 etc). Also it is the only Czech agriculture company with freely available reports.

Kernel is the largest producer and exporter of sunflower oil in Ukraine. It is the first company in the national agricultural companies ranking Latifundist in 2021 by the level of land bank square in 2021 (Latifundist, 2022). Kernel exports its products to more than 80 countries. Since November 2007, the company's shares have been traded on the Warsaw Stock Exchange (WSE) and demonstrate good investor returns. In 2020, Kernel joined the UN Global Compact – the world's largest corporate sustainability initiative as a Signatory.

The use of companies sustainability reporting data for 2015–2021 is commensurate with the selected period for scientific sources research. This data allow determining companies transparency level, identifying investment rationale. The outlined tasks were the basis for evaluating the reporting of leading Ukrainian and Czech agricultural companies and specified in the framework of the sustainability transparency assessment using the STI index.

For Agrofert and Kernel, all available sources of sustainability reporting were analyzed. About Kernel, sustainability information is available as a section in the company's annual reports from 2012 to the present. It indicates a long disclosure and transparency history, as well as ability of making comparisons.

Agrofert uses the following types of reports for the purposes of information disclosure: annual consolidated report, CSR report and Agrofert in numbers annual report. Publication of these reports is not systematic. CSR reports are not available for 2015, 2016 and 2019 periods. Annual report is missing for 2019. Details on availability of reports are presented in Table 2.

Table 2

Analysis of sustainability related disclosure by company "Agrofert"

Report type / Year	2015	2016	2017	2018	2019	2020	2021
Annual report	+	+/-	+/-	+/-	-	+	-
CSR report	-	-	+	+	-	+	-
Agrofert in numbers report	+	+	+	+	+	+	-

Note. "+" – report is available in English on the company site, "+/-" – report is unavailable in English on the company site, but can be found in Czech in other sites, "-" – report is unavailable.

Source: prepared by authors based on information from the "Agrofert" official site (https://www.agrofert.cz/en/download/annual-reports).

Based on thorough analysis of information disclosure on sustainability, SDG and CSR by Agrofert, STI index for this company is calculated over the period 2015–2020 (Table 3).

Table 3

Agrofert's STI calculations

Parameter	2015	2016	2017	2018	2019	2020
Links to sustainability information	1	1	1	1	1	1
Existence of sustainability policy	0	0	0	0	0	0
Sustainability and SDG report	0	0	1	1	0	1
E	1	1	1	1	1	1
S	1	1	1	1	1	1
G	1	1	1	1	1	1
C	1	1	1	1	1	1
SDG 1	0	0	0	0	0	0
SDG 2	0	0	0	0	0	0
SDG 3	0	0	0	0	0	0
SDG 4	0	0	0	0	0	0
SDG 5	0	0	0	0	0	0
SDG 6	0	0	0	0	0	0
SDG 7	0	0	0	0	0	0
SDG 8	0	0	0	0	0	0
SDG 9	0	0	0	0	0	0
SDG 10	0	0	0	0	0	0
SDG 11	0	0	0	0	0	0
SDG 12	0	0	0	0	0	0
SDG 13	0	0	0	0	0	0
SDG 14	0	0	0	0	0	0
SDG 15	0	0	0	0	0	0
SDG 16	0	0	0	0	0	0
SDG 17	0	0	0	0	0	0
Other goals	1	1	1	1	1	1
Verified parameters	6	6	7	7	6	7
STI	24	24	28	28	24	28
Transparency level	D	D	D	D	D	D

Note. At the moment of paper preparation, 2021 report for the Agrofert was not available.
Source: authors' calculations.

Results for the case of Kernel over the period 2015–2021 are presented in Table 4. According to a comparative analysis of STIs calculated by the surveyed companies, during 2015–2018 the level of transparency of companies was relatively low – level D. In 2017 and 2018, Agrofert's transparency level was slightly higher than Kernel's in this respect. However, starting in 2019, Kernel's sustainability information is more complete, comparable and detailed, which is reflected in higher STI values and the corresponding level of transparency – C in 2020 and B in 2021 (Figure 4).

We conducted a comparative analysis of the both company transparency level according to the verification criteria. In particular, according to the criteria of links to sustainability information, the Kernel corporate website is characterized by a friendly

interface, a sustainability tab information is available on the title page of the website (Kernel, 2022). Its review provides a holistic view of the company's sustainability policies (environmental protection, responsible employer, local community support, product quality assurance) and, above all, umbrella policy on sustainable development and CSR. ESG transparency of Agrofert can be described as very poor. Corporate site doesn't have any mentions related to ESG and sustainable development. Still some information related to sustainability can be found in annual reports as well as in "CSR" and "Agrofert in numbers" reports.

Table 4

Kernel's STI calculations

Parameter	2015	2016	2017	2018	2019	2020	2021
Links to sustainability information	1	1	1	1	1	1	1
Existence of sustainability policy	0	0	0	0	1	1	1
Sustainability and SDG report	0	0	0	0	1	1	1
E	1	1	1	1	1	1	1
S	1	1	1	1	1	1	1
G	1	1	1	1	1	1	1
C	1	1	1	1	1	1	1
SDG 1	0	0	0	0	0	0	0
SDG 2	0	0	0	0	0	1	1
SDG 3	0	0	0	0	0	0	1
SDG 4	0	0	0	0	0	0	1
SDG 5	0	0	0	0	0	0	1
SDG 6	0	0	0	0	0	0	1
SDG 7	0	0	0	0	0	1	1
SDG 8	0	0	0	0	0	1	1
SDG 9	0	0	0	0	0	0	1
SDG 10	0	0	0	0	0	0	0
SDG 11	0	0	0	0	0	0	0
SDG 12	0	0	0	0	0	1	1
SDG 13	0	0	0	0	0	1	1
SDG 14	0	0	0	0	0	0	0
SDG 15	0	0	0	0	0	1	1
SDG 16	0	0	0	0	0	0	0
SDG 17	0	0	0	0	0	0	1
Other goals	1	1	1	1	1	1	1
Verified parameters	6	6	6	6	8	14	20
STI	24	24	24	24	32	56	80
Transparency level	D	D	D	D	D	C	B

Source: authors' calculations.

Based on the criterion of existence of sustainability policy, its appearance at Kernel in 2019 allowed to integrate efforts to targeting, monitoring and reporting on the company's goals in the field CSR and achieve higher transparency. In particular, its main provisions are aimed at defining the goals, principles, concepts and procedures of responsibility and sustainability reporting. This policy stipulates that Kernel regularly provides sustainability and CSR information in its annual report in

accordance with current legislation and international standards, Global Reporting Initiative principles (Kernel sustainable development and CSR policy, 2019).
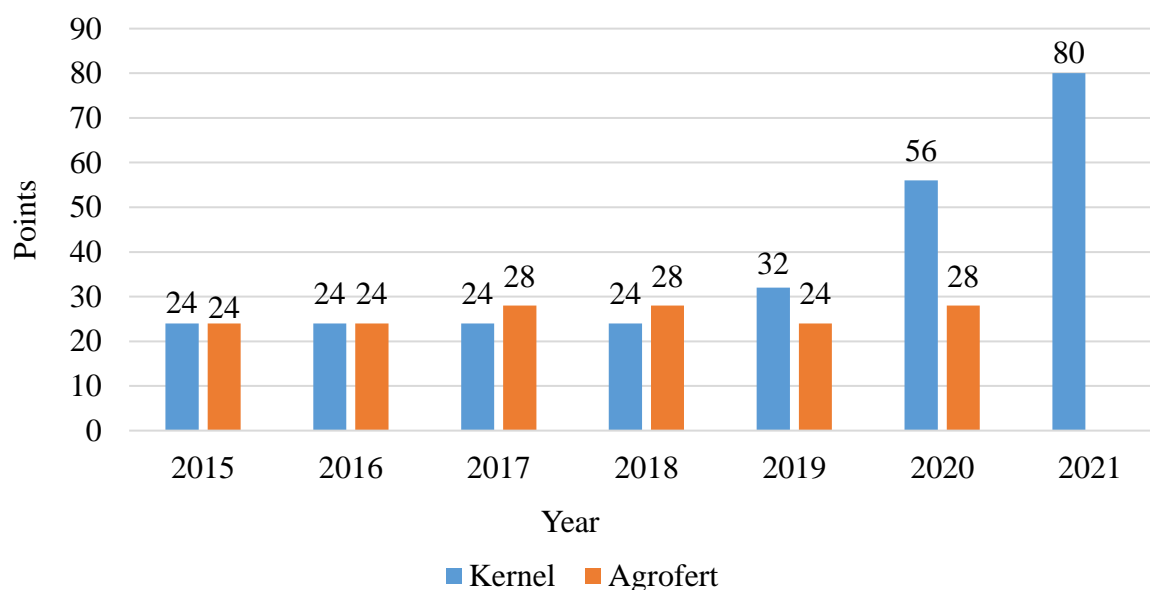
Figure 4. Comparative dynamics of Kernel and Agrofert STI in 2015–2021, points

Source: authors' calculations.

Formal sustainable development policy is not available through public sources of "Agrofert" (site and reports). In the presence of the Sustainable Development and SDG report, Kernel, as already mentioned, on year-to-year basis includes a separate section on sustainability of the annual report, since 2012. Kernel systematically covers its initiatives in this area in accordance with the GRI G4 Guidelines since 2015 and full GRI standards within the appropriate level of materiality from 2017. In "Agrofert" specific Sustainable Development or SDG Reports are absent as well as reporting on specific ESG-criterions.

The systematic preparation of the Kernel management report according to the national accounting legislation requirements began in 2019, since the amendments to the Law on Accounting and Financial Reporting in 2018. Nevertheless, corporate governance reports, strategic management reports and top management statements were part of the company's annual reports on the composition, structure, diversification, remuneration of management staff and capital management.

Formal information related to and Ecological, Social and Government issues in Agrofert is presented in annual CSR reports. For example, social responsibility projects of Argrofert are described there as well as the code of ethics and environmental projects of the company. An important element of transparency in Kernel sustainability disclosure is disclosure according to ESG criteria. The company disclosed these essential aspects of its activities, including and anti-corruption policies in all reports under study, addressing current initiatives and projects to each according to the GRI index. Anti-corruption information for the case of Agrofert can be found in the official site of the company in the form of Det Norkse Veritas statement for the achievement of "Fraud and Corruption Resistance Profile". Some information related to anti-

corruption issues can be found in annual reports of the company.

Disclosure on SDG, in our opinion, is a key criterion of transparency in the field of sustainability, as it highlights the company's efforts not only in accordance with the three key components of sustainable development and relevant ESG criteria, but also global SDG, their targets and individual indicators. The incorporation of SDGs into Kernel's activities in 2020 (SDGs 2, 7, 8, 12, 13, 15) allowed companies to reach the next STI level in the higher group – C. In 2021, the list of SDGs was expanded. The company divided them by priority – SDGs 2, 7, 8, 13, 15, 17 are assigned to the group of SDG of the highest priority. SDGs 3, 4, 5, 6, 9, 12 are of the second priority (Kernel annual report, 2021).

Disclosure on SDG is missing in publicly available information for the case of Argofert. There are no mentions related to this issue on the corporate site. Annual reports (all of the available types) do not consist any mentions of SDGs: overall and specific Goals as well. ESG criterions are not mentioned as priorities or objects of interest from Argofert.

As part of the other relevant goals related to SDG, in addition to its commitment to implementing the CSR, Kernel set ambitious benchmarks for meeting the EU's 2022 Taxonomy on Sustainable Development objectives (Kernel annual report, 2021). In annual reports of Agrofert, some mentions related to environmental obligations of the company can be found.

As seen, Kernel has done some crucial steps in sustainability transparency. Key of them include sustainable development policy and ESG reports. As a result, the level of transparency increased by 150 %. Financial results and indicators have demonstrated significant improvement both absolute and relative. For example, net profit increased by more than 1000 %, investment cash-flow by 100 %, ROE – by 500 %, and ROIC by 140 %. At the same time Agrofert was much less convincing in its dynamics: net profit increased by 119 % (almost 10 times less than for the case of Kernel), investment cash-flow decreased by 32 % (Table 5).

Table 5

Some financial result of Agrofert and Kernel

Parameter	Kernel (mln USD)			Agrofert (mln CZK)		
	2018	2021	% Change	2018	2020*	% Change
Net profit	56	643	1048	1720	3760	119
Investment cash-flow	195	397	104	12000	8172	-32

Note. * The latest available period.
Source: authors' calculations.

The key metrics is investment cash-flow. The aim of transparency is to send a clear signal for investors. Kernel has done it well after changes in reporting in 2019. Agrofert clearly has failed. Signals to investors are extremely important nowadays, when, as we noted earlier, 77 % of investors increased ESG investments "significantly" or "moderately" (MSCI Investment Insights, 2021). In 2020 among the largest investors ESG investments demonstrated growth by 90 %.

That is why it is crucial for Agrofert to change its approach to sustainability

transparency. The most efficient steps include the following ones: development and incorporation of sustainability policy; emergence of specific reports based on ESG criteria; incorporation of SDGs in activity of the company with further prioritization of these criteria withing two groups. Reproduction of these steps by Agrofert will increase its sustainability transparency and send appropriate signals to different stakeholders: not only to investors, but to state, business partners, personnel, international community, etc.

Conclusions. Agriculture is extremely important element of sustainable development. A lot of SDGs can't be implemented without this sphere. Information transparency is a key element in the context of sustainability. Benchmarking analysis shows that among 2300+ academic papers related to transparency issues only 4 explore them for the case of agriculture companies (WoS data): direct evidence of a lack of attention. This paper explores transparency under sustainability among agricultural companies in Ukraine (company "Kernel") and the Czech Republic (company "Agrofert"). For this, annual reports from Kernel and Agrofert over the period 2015–2021 are analyzed. Qualitative estimations of sustainability transparency are based on STI calculations. Methodology of this index is based on binary estimations of a number of transparency criterions including links to sustainability information; existence of sustainability policy; availability of sustainability and SDG reports; disclosure according to ESG criteria and specifics SDGs as well as other relevant goals related to SDG and sustainable development.

Results of calculations show that sustainability transparency from 2016 till 2019 in Agrofert and Kernel was almost the same. But since 2019 after Kernel implemented a number of steps to increase its transparency and the situation has changed dramatically. STI index has increased from 32 in 2019 to 80 in 2021. STI values for Agrofert were unchanged in 2020 (the latest available period of analysis). The most efficient steps include the following ones: development and incorporation of sustainability policy; emergence of specific reports based on ESG criteria; incorporation of SDGs in activity of the company with further prioritization of these criteria withing two groups.

First of all, for Agrofert it is obligatory to develop holistic approach to CSR, ESG and SDG management and adopt necessary policies in this field for making corporate reporting under the rules of Directive 2014/95/EU and more comprehensive requirements of EU efforts on Taxonomy on Sustainable Development promotion. In addition, qualitative and quantitative indicators of company sustainability disclosure need to be revised and constant monitoring with GRI priority areas of disclosure for agriculture companies. Incorporating ESG and SDG criterion in Agrofert corporate sustainability reporting should grounded on focus study of the main stakeholders (eg investors, regulators) informational needs. Reproduction of these steps by Agrofert will increase its sustainability transparency and send appropriate signals to different stakeholders: state, business partners, personnel, international community, investors etc. Kernel's financial results and key indicators, especially investment metrics, provide clear evidences in favour of efficiency.

Secondly, for Kernel our recommendation are intended on further integration of targeted SDGs into corporate strategy and monitoring process on the whole levels on operation and contributing to disclosure on EU's 2022 Taxonomy on Sustainable Development as a further step or sustainability transparency enhancing.

This recommendation lies in line with the basic goals of IPFSD, OECD, FAO, SAFA and UNCTAD for accelerating responsible investment in UN SDGs system via strengthening agriculture companies potential for overcoming hungry and poverty. Making agriculture companies more sustainable transparent not only in Czech Republic and Ukraine under the approach of GRI, AccountAbility, CSR Ukraine, The UN Global Compact Network, Directive 2014/95/EU is a crucial step for better investment decision making process, perception of sustainability ideology and incorporation of ESG/SDG criterion, levelling the informational asymmetry and moral risks for their investors.

Nevertheless, current study has some limitations. Spreading the scope and sample of research with using more sustainability reports of agricultural companies in different industries of agriculture in Ukraine and Czech Republic allows making cross-industries STI benchmarking analysis.

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ACCOUNTING FOR TRANSACTIONS COSTS OF AGRICULTURAL PRODUCERS IN THE SHADOW ECONOMY

Purpose. *The purpose of the study – to explain the features of disclosure of transaction costs in the accounting of agricultural enterprises, taking into account the peculiarities of the shadow economy; to identify the main factors that lead to transaction costs and make suggestions for improving their accounting.*

Methodology / approach. *The main methods used in this study are: statistical analysis to assess the dynamics and cost structure of agricultural enterprises; graphical and analytical methods used to determine the level of the shadow economy; theoretical generalization and comparison, induction and deduction are used to reveal the content of transaction costs and their values for agricultural producers; the current state and trends of the shadow economy in Ukraine in general and in the agricultural sector in particular are assessed through synthesis and economic analysis.*

Results. *The role of transaction costs as an institutional economic category in the activities of agricultural producers and their impact on the growth of shadow economic processes in agribusiness is studied. The article shows that the share of transaction costs of agricultural enterprises is significant, and this reduces the efficiency of these enterprises. About 8 mln ha of agricultural land are used unofficially, which is about 25 % of all cultivated agricultural land in Ukraine. The classification of factors that contribute to the development of the shadow economy in Ukraine, in particular, the shadow agricultural market, and increase the transaction costs of agricultural producers has been improved. The factors of occurrence of transaction costs and flaws of their coverage by the accounting are investigated, recommendations on their reflection in the accounting are given. The possibilities of reducing the level of transaction costs are substantiated, in particular, due to their more correct accounting, the implementation of information systems and the formation of marketing service cooperatives.*

Originality / scientific novelty. *The transaction costs of agricultural enterprises were further studied. For the first time, the relationship between the main problems of agricultural producers, transaction costs that arise and accounting sub-accounts, which will allow more accurate accounting of these costs, is schematically presented. Our own vision is proposed to identify the transaction costs of agricultural producers under the influence of non-institutional economic theory, their reflection in the methodology of accounting and their minimization through actions of formal and informal accounting institutions.*

Practical value / implications. *The results of the study can be used in business operations of agricultural producers, in particular, the peculiarities of accounting for transaction costs are recommended to be taken into consideration when forming the accounting policy of the entity and also judgment of a professional accountant to be considered. It is also recommended to introduce accounting engineering, ie the format of joint management actions.*

Introduction and review of literature. After a deep recession in the transition period of the 1990s, the agricultural sector of Ukraine's economy is growing. Thus, starting in 2013, the added value created in it reached the level of the early 90's, which indicates that agricultural producers are increasingly creating value in the Ukrainian economy, although the gross output of agricultural products remains below 1990 levels. The value added of agriculture per hectare in Ukraine is only a share of similar indicators of other European countries and competitors in world agricultural markets. According to research of V. Budziak and O. Budziak in 2018, value added per hectare was 440 USD in Ukraine, compared to 1100 USD in Poland, 1400 USD in Brazil, 1700 USD in Germany, and 2450 USD in France [1].

Under market conditions, domestic new agricultural formations have faced the problem of cost structure, which is not directly related to changes in the volume of products, works performed and services provided. At the end of the last century, the winner of the Nobel Prize in Economics, D. North pointed out that transaction costs tend to increase, require significant resources and are an important component of the formation of the shadow economy [2; 3]. Their growth is observed in agribusiness, where a significant amount of production, due to flaws in formal rules and the operation of informal institutions falls on the shadow sector, which creates monopolies, forms a significant percentage of costs that do not directly affect the cost of agricultural products.

Many domestic and foreign scientists have studied the impact of the shadow economy on the economic development, in particular on agriculture. Thus, work by V. Ilin et al. [4] is devoted to the study of methods for estimating the volume of the shadow economy. Their article claims that today the shadow economy has become an integral part of the country's economy. This, on the one hand, is a positive factor – according to the authors – because it helps solve a number of complex socio-economic problems of the state, but on the other hand, the size of the shadow economy in Ukraine's gross domestic product (GDP) is so large that it threatens national security.

The results of studies by A. Vysochyna et al. [5] quantify the negative impact of the shadow economy. Thus, an increase in the ratio of the shadow economy to GDP by 1 % leads to a decrease in the Global Innovation Index by 0.5 points (the sample consisted of 9 countries – Azerbaijan, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia and Ukraine. The considered time period is 2008–2018, but for Ukraine this is not proven separately – because there are more significant obstacles to innovation (institutional inefficiency, regulatory shortcomings, etc.), although they are also closely intertwined with the shadow processes in the economy.

It is worth noting works by H. Mishchuk et al. [6], which demonstrate that the shadow economy has a negative impact on the standard of living of the part of the population whose income is generated from the redistribution of tax revenues.

All this indicates the importance of considering the factor of the shadow economy in the assessment and accounting of economic activity, including agricultural enterprises. Let's pay attention to a research by P. Quesado et al. [7], who found out that many agricultural managers put accounting and cost control in the background, using only simple control of expenses. Moreover, costs are taken into account in their simplified sense, without a proper classification. This is usually due to the fact that farmers have little knowledge (low level of education) or because they do not realize the importance of adequate cost management for the development of agricultural businesses.

At the same time, in the process of economic activity, each agricultural producer incurs transaction costs that have a significant impact on the financial condition of the enterprise and "support" the shadow sector. As their size is constantly growing, there is a need to take them into account when making management decisions, to ensure their separate accounting and take appropriate action to minimize shadow schemes in agribusiness.

The problem of transaction costs of agricultural producers of Ukraine is associated with the processes of formation of a diversified economy in the countryside, a significant impact on management decisions and the impact on the formation of the shadow economy. Among the main researchers called neo-institutionalists (an updated type of economic institutionalism), there are four Nobel laureates – D. North, R. Coase, O. Williamson and E. Ostrom [2; 3; 8; 9; 10]. In addition, we can note such neo-institutional theorists as A. Alcian, G. Demsetz, A. Greif, J. Barzel, T. Eggertsson, D. Atsemoglu, S. Chung and related areas of theory, such as the analysis of property rights, economic analysis of law, theory of public choice, constitutional economics, theory of collective action, economics of transaction costs, the approach of the main agent, the theory of contractual relations and comparative economic systems. What they have in common is that, unlike neoclassical economics, they are not based on the assumption that the institutional framework is predetermined, but is seen as the object of study. The term "new institutional economy" is used as a general term by different authors for different combinations of these approaches.

O. Williamson and T. Ghani [9], who are ones of the founders of the theory of contracts, define the task of minimizing transaction costs by eliminating the sources of their occurrence. Domestic scientists P. Haidutskyi, O. Kantsurov, G. Kireitsev, V. Litvinenko, O. Laburtseva Y. Popko, O. Sokil, L. Vasa, O. Vlasenko, I. Volkova, D. Liudvenko I. Zamula, V. Zhuk also studied the nature and accounting of transaction costs in agriculture in different periods [11–19], as well as others scientists. In fact, scientists began to pay attention to the importance and significance of accounting for transaction costs of economic entities in domestic agricultural practice at the beginning of the 21st century.

Recently, more and more attention is paid to the study of transaction costs of agricultural producers in foreign countries. In this context, we would note M. Georgiev and A. Roycheva, who studied the transaction costs of agricultural

holdings in Bulgaria. In particular, they developed an analytical framework for practical research into the new institutional economics in agriculture. It covers relationships between agricultural contracts, institutions, markets, property rights and effects of transactions and transaction costs [20].

J. Ismail and H. Tundui [21], studying the transaction costs of agricultural enterprises in Tanzania, emphasize transaction costs as the cost of finding and collecting information and services related to it, as well as the cost of negotiating contracts, and the cost of monitoring and performance of such contracts. These researchers also include part of transportation costs in transaction costs. They emphasize the importance of studying these costs, especially if the distance between producer and consumer is large and the transport infrastructure is poorly developed.

Researchers J. Hou and X. Huo [22] show that levels of the farmers' market participation are mainly determined by the proportional transaction costs and price, while their market integration depends on the fixed transaction costs and price. This suggests that, in order to lower the transaction costs and to enable specialization and market participation, it is necessary to invest and construct the farming infrastructure, update the rural information system, improve the structure of farmer households, and subsidize the cooperative organizations.

Also, the study of transaction costs is carried out by Italian researchers S. Ciliberti et al. [23], Polish researchers K. Mroczek-Dąbrowska and M. Gorynia [24], Turkish researchers A. Aydemir et al. [25], and in the works of many other scholars. It is obvious that despite the fact that a significant number of both domestic and foreign researchers have devoted years to their study in the field of transaction costs, a significant number of issues related to the importance of their reflection in accounting remains unresolved and therefore requires further investigation. In particular, the following question remains under-investigated: by how much segregation and improvement in accounting for transaction costs will contribute to better management of agricultural enterprises, especially under conditions of the shadow economy.

The purpose of the article. The purpose of the study – to explain the features of disclosure of transaction costs in the accounting of agricultural enterprises, taking into account the peculiarities of the shadow economy; to identify the main factors that lead to transaction costs and make suggestions for improving their accounting.

Results and discussion. The process of agricultural production is associated with the occurrence of costs. D. North states: "The total cost of production consists of resource investments of land, labor and capital, and capital is used for transformation, changes in the physical properties of products (size, weight, color, location, chemical composition, etc.) and for implementation transactions – the establishment, protection and enforcement of property rights to products (the right of use, the right to receive income from use, the right to exclude the use by others and the right to exchange) … ie production costs are the sum of transformation and transaction costs" [2; 3, p. 46].

A study of the impact of transaction costs on operations of business entities was started in the 30s of the last century by R. Coase. Based on a number of his articles,

representatives of the new institutional economic theory, formed the famous Coase theorem, which, in fact, comes down to the fact that if there were clear guarantees of property rights and transaction costs approached zero, there would exist a hypothetical mutual trust that would drive a reduction in such costs. In this sense, the classical economic theory derived the basic tenets of operations of business entities, without taking into account transaction costs.

The economic literature provides many approaches to the interpretation and classification of transaction costs. Characteristically, in the institutional theory "there is no clear definition of transaction costs", although in neoclassical economic theory there is also no clear definition of production costs. In the context of the subject of our article it is worth noting such researchers of agricultural economics as P. Haidutskyi and V. Zhuk [12; 13; 14], who defined transaction costs as the cost of supporting business activities, often dependent on the institutional environment. They proposed the following classification:

- costs of business operation (not production, but rather organizational and legal support);

- cost of finding and collecting information required for conducting business (and not just for concluding and implementing contracts);

- cost of concluding agreements and monitoring the implementation of their conditions (including the costs of preventing opportunistic behavior of counterparties and competitors and losses from the negative impact of such behavior);

- costs of lobbying own interests through professional associations and organizations;

- costs of "staff compliance" (search, training and reskilling of employees);

- costs of establishing and maintaining contacts (with stakeholders who have potential or real institutional interests in business);

- costs due to institutions of public trust (costs for independent business evaluation, costs for mandatory audit, etc.);

- costs of socio-environmental compliance.

This classification largely corresponds to the classification proposed by the Corporate Finance Institute [26]. In general, supporting such a classification of transaction costs, we can conclude that these are costs that are directly related to institutional theory and arise under the influence of the functioning of formal and informal institutions of society.

One of the evidences of the importance of understanding and taking into account the accounting of transaction costs is also the opinion of the farmers themselves, which was obtained through sociological surveys. Thus, according to a sociological study conducted by O. Vlasenko and I. Volkova [18], the heads of 32 agricultural enterprises of Zhytomyr region were asked to assess the availability of transaction costs. The results of the study are presented in Figure 1.

The presented data illustrate the significant predominance of losses (funds that cannot be accounted for and in accordance with the formal accounting rules attributed to costs, ie in fact the value of lost business opportunities) over costs (costs that can

be considered indirect). According to the survey, between 74 % and 91 % of respondents incurred transaction costs.

In our opinion, the liberal economic reforms that started in Ukraine's agriculture in the mid-1990s were initiated without taking into account the impact of transaction costs. The idea was to create a small or medium-sized farming business that would reduce administrative and overhead costs and, through innovation, increase productivity and reduce basic production costs. The problems of newly created producers were exacerbated by the inconsistency of actions in the markets of material resources and agricultural products, which became key in the formation of the shadow market, as it gave rise to a large number of intermediaries. These intermediaries were not directly involved in agricultural production, and transferred much of the value added from sales to the shadow sector. High prices for material and technical resources purchased for its production from intermediaries "laundered" working capital, which prevented producers from developing their business and stimulated the growth of transaction costs.
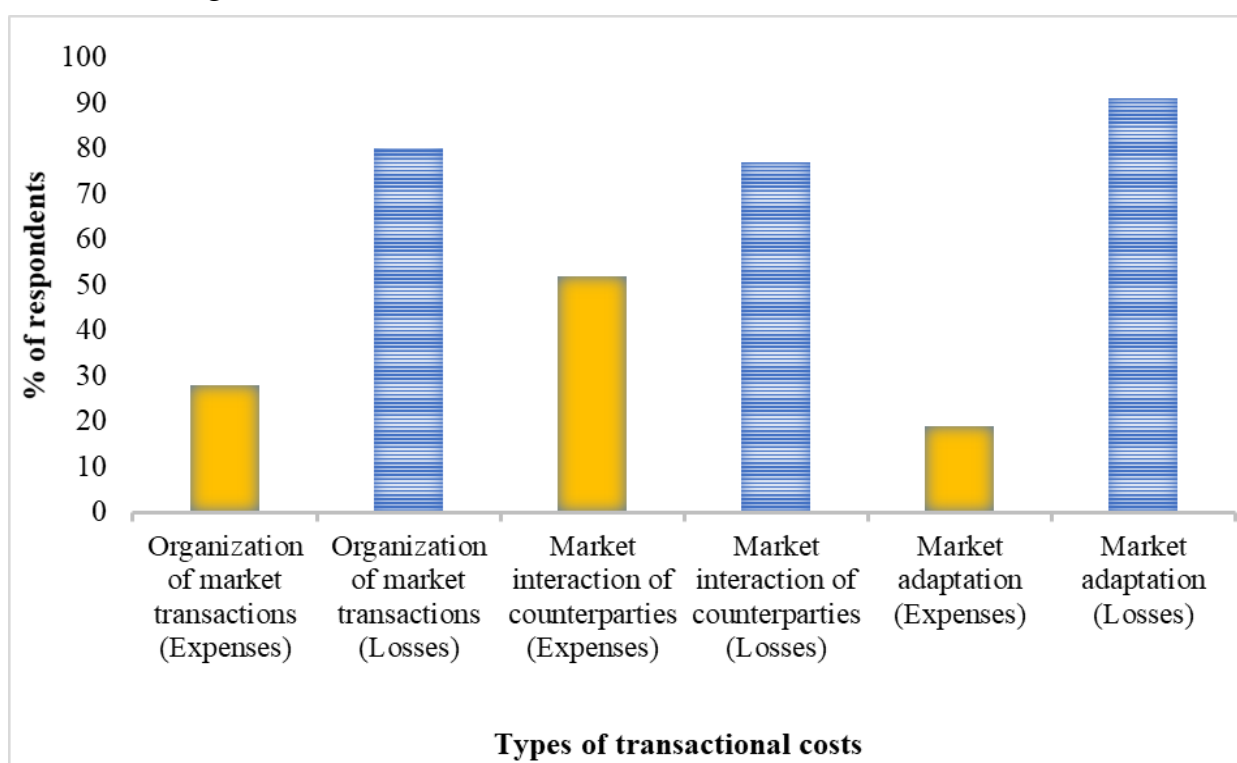
Figure 1. Distribution of respondents' answers on the presence of transaction costs in terms of expenses and losses, %

Source: based on [18].

To understand the importance of studying the transaction costs of agricultural enterprises, we will consider the cost structure of these enterprises over the past three years, paying attention to indirect costs, because these costs are most associated with transactional (Table 1).

As can be seen from the data, the share of indirect cost, which most likely includes part of the transaction costs, is quite high – it is higher than labor cost almost three times, although there is a tendency to reduce it in 2019–2020 (while the total

cost increases). In a shadow economy, transaction costs, especially if they have a corruption component, may be reflected in other cost items that are not related to them, at first glance. On the other hand, the real labor cost can be much higher than stated – because of the salary paid by cash in envelopes. Therefore, official statistics, taking into account information on the level of the shadow economy in Ukraine, may differ to some extent from the real situation in the agricultural sector. This will also apply to transaction costs, which are significantly prone to shadowing.

Table 1

Costs structure of agricultural production (services) in all enterprises of Ukraine in 2018–2020[1]

Types of costs	All enterprises[2]		Including private farms	
	mln UAH	% total costs	mln UAH	% total costs
Costs structure in 2018				
Costs – total	442993.4	100.0	68397.4	100.0
Direct costs – total	247997.2	56.0	41524.8	60.7
Labor costs	25234.4	5.7	3467.8	5.1
Other direct costs – total	95016.8	21.4	15597.1	22.8
Indirect costs – total	74745.0	16.9	7807.7	11.4
Costs structure in 2019				
Costs – total	463271.6	100.0	78580.2	100.0
Direct costs – total	266918.0	57.7	47299.5	60.2
Labor costs	29729.6	6.4	4435.4	5.6
Other direct costs – total	98849.9	21.3	18696.2	23.8
Indirect costs – total	67774.1	14.6	8149.1	10.4
Costs structure in 2020				
Costs – total	441529.6	100.0	76567.4	100.0
Direct costs – total	245959.8	55.7	44138,4	57.6
Labor costs	29932.5	6.8	4682.1	6.1
Other direct costs – total	103553.9	23.4	19718.9	25.8
Indirect costs – total	62083.4	14.1	8028.0	10.5

Notes. 1. Data exclude the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and a part of temporarily occupied territories in the Donetsk and Luhansk regions.

2. Information is compiled by enterprises with the main economic activity "Growing of non-perennial crops", "Growing of perennial crops", "Plant propagation", "Animal production", "Mixed farming", "Support activities to agriculture and post-harvest crop activities" and "Processing and preserving of poultry meat" (codes 01.1 − 01.6 and 10.12 by NACE Rev. 2 – 2006).

Source: compiled on the basis of [27].

According to experts, about 8 mln ha of agricultural land are used unofficially (Table 2), which is about 25 % of all cultivated agricultural land in Ukraine (excluding the Autonomous Republic of Crimea and the temporarily occupied districts of Donetsk and Luhansk regions) and about 12 % of agricultural products are produced in the shadows. At the same time, according to B. Kelmanson et al. [28], in European countries up to 20 % of agricultural GDP is in the shadows: eg. 15 % in Italy and Poland, 12 % in Germany and Spain, 20 % in Turkey.

Table 2

Distribution of agricultural land of Ukraine by types of land use, 2020

Indicator	Land area, mln ha	Weight, %
Total agricultural land that can be cultivated*	33.0	100.0
Land is legally cultivated by legal entities	21.9	66.0
Used by rural households (up to 1 ha) – low risk of shadow tillage	1.5	5.0
Used by rural households (from 1 to 5 ha) – a high risk of shadow tillage	1.5	5.0
Potential shadow tillage	8.1	25.0

Note. * Area of arable lands of Ukraine.
Source: calculated according to the State Geocadastre of Ukraine and own research.

A significant part of land in Ukraine is taxed under the preferential taxation system (60 %), 6 % – is on the general system. Households are mainly payers of land tax (34 %) (Table 3).

Table 3

Distribution of agricultural lands of Ukraine by types of taxpayers, 2020

Indicator	Land area, mln ha	Weight, %
Total agricultural land that can be cultivated*	33.0	100.0
Cultivated by payers of unified tax (preferential taxation system, group 4)	19.8	60.0
Cultivated by payers of income tax (under general taxation system)	2.1	6.0
Used by rural households, registered within rural settlements (land tax payers)	5.3	16.0
Used by individual persons registered outside rural settlements (payers of tax land)	5.8	18.0

Note. * Area of arable lands of Ukraine.
Source: calculated according to the State Tax Service of Ukraine.

However, it is obvious that about 44 % of the land available to households is used for production of marketable products (Table 4). Although they are not properly taxed. There is no cost accounting in these households either.

Table 4

Agricultural lands of Ukraine used by households, 2020

Area of land under cultivation, ha	Number of households, thsd. units	Share of households, %	The total area of land under cultivation, ha	Share area, %	The average area of land under cultivation, ha
0–1.0	3586.5	79.7	1510596	28.0	0.4
1.1–5.0	751.5	16.7	1494639	28.0	2.0
5.1–10.0	99.0	2.2	670194	13.0	7.0
More 10.0	63.0	1.4	1643571	31.0	26.0
Total	4500.0	100.0	5319000	100.0	1.2

Source: calculated according to the State Geocadastre of Ukraine and own research.

Consider the level of the shadow economy in Ukraine in general, and its share in agriculture in particular (Figure 2). Recent studies show that the volume of Ukraine's shadow economy in 2020 reached 30 % of the country's GDP (1.25 trillion UAH of

GDP in 2020) and grew by 3 percentage points over the year. This is stated in a study by the Ministry of Economy of Ukraine [29; 30].

The growth of the indicator was influenced by the introduction of quarantine measures and the desire of businesses in such conditions to reduce the risk of losing limited resources. The growth of the "shadow" level was lower than during previous crises, in particular – the crisis of 2014. At the same time, the traditional channels of shadowing have changed, which has grown among all types of economic activity.

However, the researchers of Kyiv School of Economics – O. Niv'ievskyi and O. Halytsia [30] note – and we agree with them – that there is no comprehensive and accurate study that could give a detailed assessment of the shadow market. Research conducted by KSE provides the following information: market participants estimate that about 40 % of cereals, 10–30 % of oilseeds are sold informally and about 30 % of agricultural land is cultivated informally. Thus, in general, the perceived share of shadow agricultural markets and land is about 30 %, which roughly corresponds to the share of Ukraine's shadow economy as a whole. However, there are studies that show that Ukraine's shadow economy accounts for almost half of GDP [31].
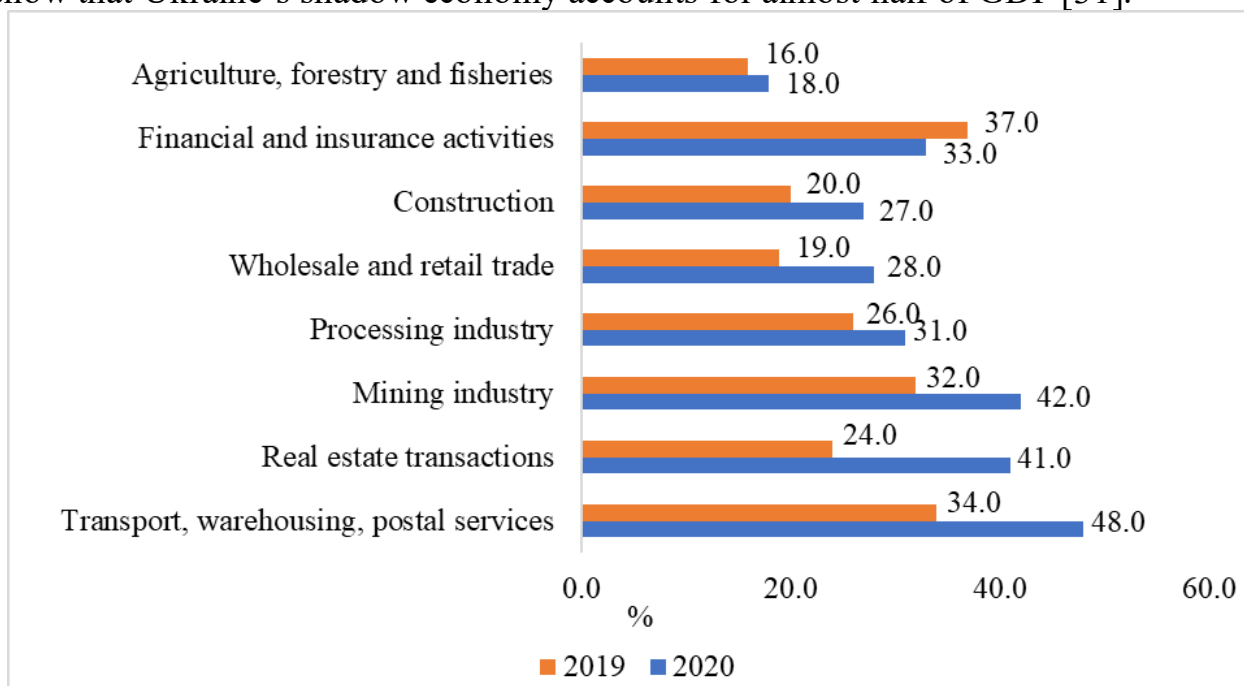
Figure 2. The level of the shadow economy by type of economic activity (% of the volume of official activity according to foreign economic activity)
Source: [32].

It can be concluded from the Figure 2 that agriculture is much less exposed to shadowing than other areas. However, in our opinion, this is not entirely true. It is quite difficult to single out the shadow economy in agriculture, as logistics schemes link it to other industries, including mechanical engineering, chemical fertilizer production, processing and other industries, so the shadowing factor has a general effect.

Researchers identify a number of factors that contribute to the development of the shadow agricultural market in Ukraine and increase transaction costs. In

particular, studies by O. Tylchyk et al. show the following groups of determinants of the shadow economy: 1) social; 2) economic; 3) legal [33]. Having also read the study of the State Financial Monitoring Service of Ukraine and based on the development of other sources [34], we propose the following classification of factors of growth of the shadow agricultural market (Table 5).

Table 5

Factors of growth of the shadow agricultural market

Factors of general influence	Factors specific to the agricultural sector
Low level of protection of property rights (including intellectual) and investors' rights	A significant percentage of informal land lease agreements and the general state of land management in Ukraine
Tolerant attitude of society to the shadow economy, high level of corruption	High level of shadowing of the supply chain of agricultural producers with material values
Low liquidity of stock market	
Imperfection of the judicial system	Dispersion of agricultural enterprises in order to avoid taxation
Optimization of hiring costs, through payment of remuneration "in an envelope"	Abuse and corruption in the field of land relations
Inefficiency of the banking system	Existence of agricultural enterprises operating without proper registration
The presence of uncontrolled territories occupied by Russia	Small and even medium-sized farmers have limited access to bank lending
Complex and costly tax administration and VAT-related corruption	

Source: authors' development on the basis [15; 16].

Significant "shadowing" of agro-industrial relations leads to a decrease in the efficiency of agricultural enterprises due to inefficient allocation of resources, and causes a shortfall in budget revenues. However, in our opinion, this is not all the negative consequences. It is obvious that the agro-industrial sector is developing extremely fast, and we are talking primarily about scientific and technological progress in this area. So, let's look at the study the future of agriculture, published recently in the journal Economist [35]. It describes in detail the main directions and achievements in the field of new technologies: approaches to irrigation, genetic engineering, the use of drones to control crops and work of workers, etc. It is obvious that in the conditions of the shadow economy and high transaction costs, domestic agricultural enterprises are limited in access to these technologies, which may have negative consequences in the long run. After all, the implementation of such technologies usually requires bank lending, or other sources of financial resources that are not available to everyone.

In the realities of Ukrainian agribusiness, business owners and farmers face challenges that lie beyond their specific competencies. In many cases, this is due to institutional factors, especially informal ones, which generate transaction costs. Therefore, an entrepreneur who is better at manipulating these costs or dealing with officials is more successful than one who is only concerned with production. Transaction costs of agricultural producers, which are difficult to "reproduce",

according to modern accounting methodology, are facts that occur in the external environment and are not part of the enterprise system, however, change the behavior of the system.

Thus, Figure 3 shows the general scheme of construction of accounting for the activities of agricultural enterprises.
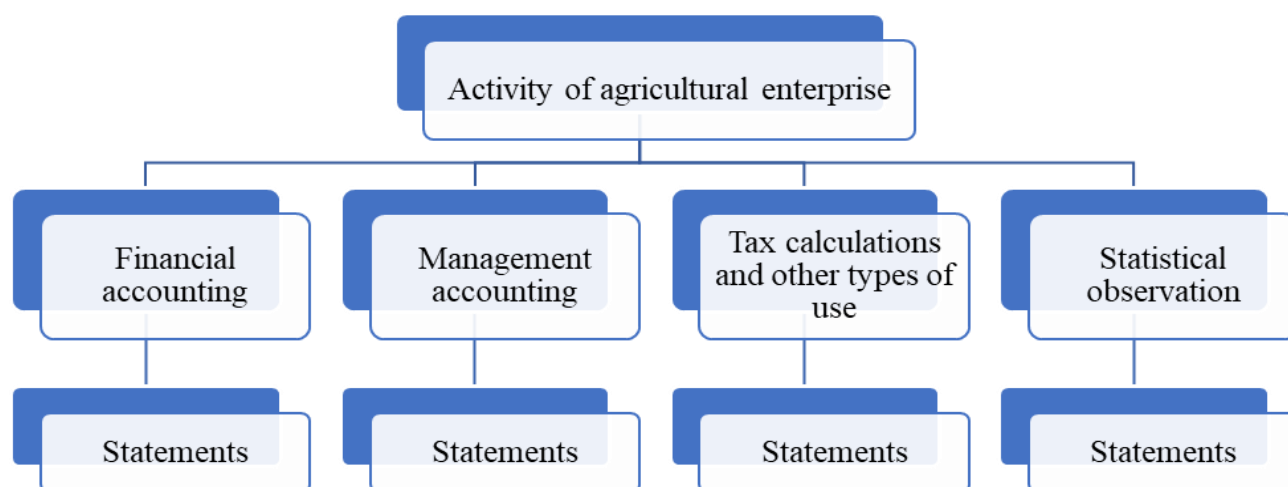
Figure 3. Formation of information in the accounting of agricultural enterprises
Source: authors' development on the basis [15].

Given that statistical observations are usually used to obtain information that is not formed by financial and management accounting, it is advisable to divide all business records, which collect factual information, into:

- business accounting, information which characterizes the activities of enterprises;

- statistical observations, which are designed to obtain information that is not reflected in the reporting of enterprises. The latter can be collected by statistical authorities at enterprises, if they either do not report (for example, household farms), or data are not contained in the report (except for observations aimed at verifying the accuracy of already submitted data);

- observations that allow obtaining data on other events in society (family budget, censuses, etc.).

All these elements will take into account, amongst others, transaction costs, but they cannot always be properly identified and taken into account in full.

Figure 4 shows the relationship between the main problems of Ukrainian agricultural producers (according to expert estimates), the transaction costs that arise (some of them can be formally measured, and some remain unidentified) and the reflection of these costs in accounting. Expert assessments are presented mainly by data, "Harvest Country" – an enterprise of the Sumy region, which is engaged in growing crops. It is part of the structure of the MHP agro-industrial holding; as well as other experts.

Of course, in addition to these specific problems, experts also identify others of a general nature: legislative turbulence, inconsistency of public policy in the agricultural sector and taxation, pressure on business from fiscal and regulatory

authorities [36]. In addition, weather and climatic factors are always relevant for this area of activity. It is also worth noting the cost of corruption.

As can be seen from the Figure 4, the problems of agricultural producers lead to certain transaction costs, which need to be reflected in accounting. This scheme also suggests possible sub-accounts that will allow accounting for transaction costs more fully and accurately. That is, this scheme allows tracking the relationship between the problems of agricultural producers and improvements in accounting, which will more accurately reflect the monetary costs.
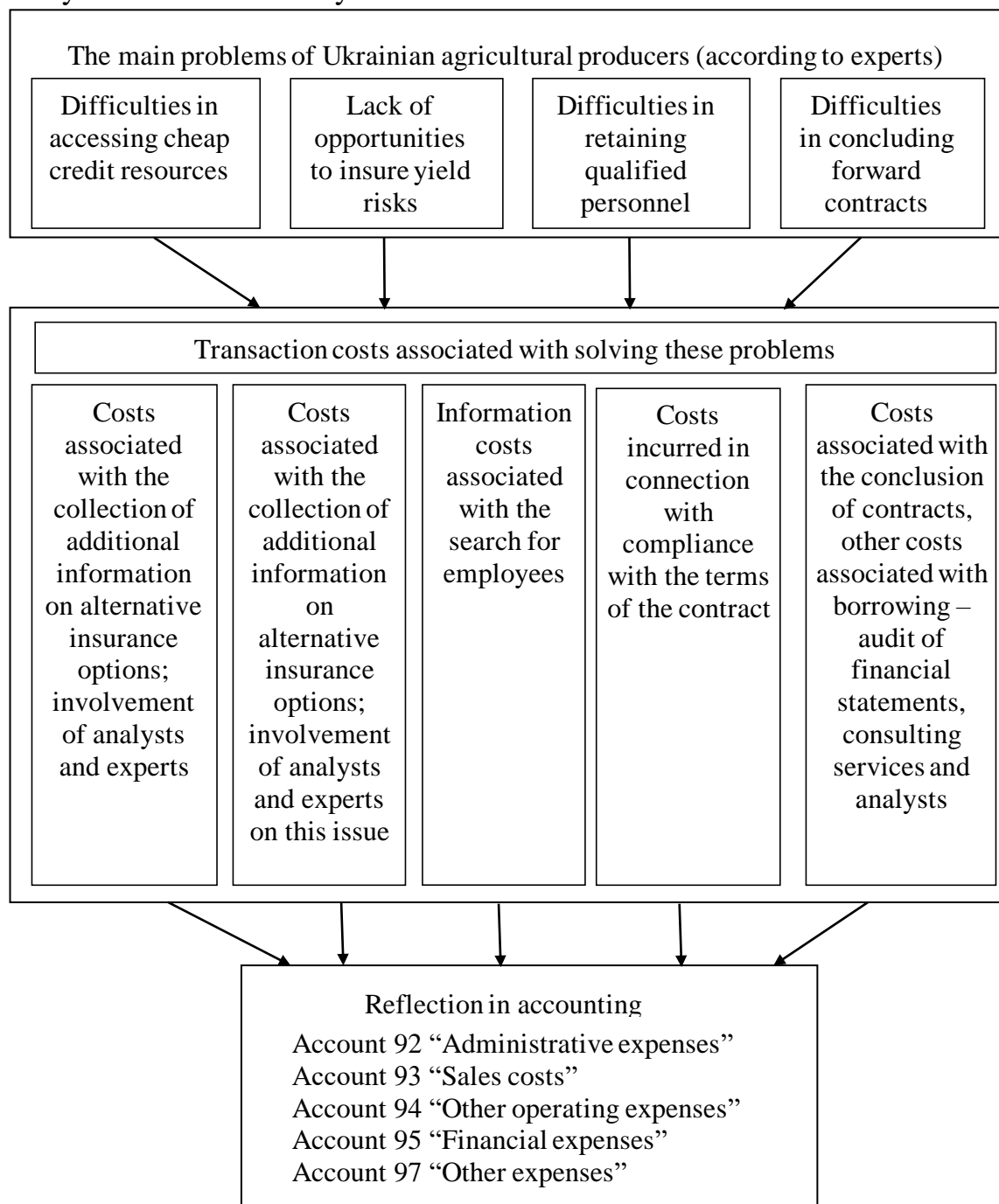
Figure 4. The relationship between the main problems of agricultural producers, transaction costs and their reflection in accounting
Source: own development based on [36].

In our opinion, the transaction costs associated with the activities of agricultural producers (according to Figure 4) can be identified quite clearly, and according to experts, and according to investigation of O. Miasyshchev [29] they can be high. Therefore, we consider it appropriate to indicate in analytical accounting the nature of the origin of these costs and to form more detailed accounting information for enterprise management, indicating the peculiarities of the formation of these costs [37].

According to domestic scholars, it is advisable to allocate a separate class of accounts in the Chart of Accounts: it can be a quite stand-alone class (several accounts) or additions to the 8th class of accounts. Thus, let's refer to some recommendations on this question. Ukrainian scientists, in particular, D. Liudvenko [19], propose to allocate separate sub-accounts within the framework of the accounts shown in Figure 4. Developing further and complementing his approach, we propose to account 93 "Sales Costs" to provide the following sub-accounts:

- 9311 "Transaction costs associated with the conclusion of sales contracts";
- 9312 "Transaction costs associated with the implementation of the terms of the sales contract";
- 9313 "Transaction costs associated with the collection of consumer information";
- 9314 "Other transaction costs of sales activities".

It should be noted that the allocation of sub-accounts can be carried out by the managing entity in accordance with the peculiarities of its activities and the vision of the need for this accountant and head of the enterprise.

These issues, in our opinion, should be included in the accounting policy of the enterprise and developed not only at the level of accounting but also at the level of enterprise management, because it is more complete reflection in cost accounting (taking into account transaction costs, which, without proper treatment, are disguised under other types of costs, and it is not possible to estimate their amount adequately) that will enable a more accurate analysis of costs, assessment of their level and impact on performance, and making the right management decisions.

An important feature of the object under study is the lack of categories, transaction costs, in the formal accounting rules, both domestic and international. Although the considered accounting rules are of a recommendatory nature and determine the conceptual provisions for the formation of accounting information on such costs as: costs of research and development, losses from depreciation of inventories, bad debts and more. However, we do not find definitions of transaction costs. This indicates that according to the formal rules, the transaction costs can include part of the operating and a significant part of the costs of the period, which are accounted for in accounts of class 9 (92, 93, 94 accounts, respectively). It should be borne in mind that the principles, methods and procedures of accounting for costs to reflect them accurately in the financial statements of the entity are reflected in the accounting policy.

In the same way, the institution of professional judgment of an accountant,

which is an economic entity, finds its expression and should be reflected in accounting if it does not comply with accounting legislation. Also, management decisions regarding the reflection of accounting objects, including costs, can be made by an accountant on the basis of the legally prescribed principle of predominance of substance over form, when transactions are accounted for according to their essence, and not only on the basis of legal form.

One of the ways to develop further the accounting of transaction costs, and most importantly their optimization by business entities can be creative accounting, which can act as accounting engineering, ie the format of joint management actions to ensure compliance with strategic goals and requirements of the management vertical. This has a significant effect on minimizing the transaction costs, which are directly related to the effectiveness of decisions.

In turn, the founders of situational accounting theory draw attention to the need to focus accounting on the facts that are valuable for business management through a scheme of economic situations that can be used in possible decision-making models. In addition, it is based on the situational nature of the formation of primary accounting information, which creates the preconditions for inclusion in the objects of accounting objects of the environment, information about which ensures the adoption of sound management decisions [22].

With the widespread use of information systems and internet technologies, which leads to a change in the logic of economic processes, new ways of coexistence of business entities in agribusiness are being formed. In this sense, their economic communication system is interactive, that is, the direct connection of sellers and buyers through websites on the internet. As a result, transaction costs are automatically reduced, as network platforms displace traditional intermediaries and consumers cooperate directly with manufacturers, minimizing transaction costs and bringing in a large number of small agricultural producers out of the shadows, possibly through the formation of marketing service cooperatives. For their founders, they should become "controlled intermediaries" that create competition with commercial structures, as well as help producers to integrate in those areas of agribusiness that provide additional economic benefits. As practice shows, service cooperation should be developed both on a territorial and sectoral basis. Marketing service cooperatives are organizations that, without attracting significant capital funds, show the benefits for agricultural producers that they receive from group actions outside of production activities, minimize transaction costs and the shadow economy. The mission of the service cooperative is also the social aspect of increasing the welfare and quality of life of members of the cooperative and their families, the level of their education and culture, the development of social infrastructure in rural areas.

Conclusions. The reorganization of collective agricultural enterprises and land privatization formed a diversified agricultural economy of Ukraine, characterized by high transaction costs, which caters for a significant shadow economy. In general, transaction costs are costs that accompany the relationship of economic parties in the

conclusion of contracts, they are one of the central concepts of the new institutional economy. The article reviews the study of transaction costs by domestic and foreign researchers, and shows that the share of indirect costs, that are most likely to include part of transaction costs, is high in agricultural enterprises of Ukraine (more than 14 % of total costs), although there is a tendency to reduce it by 2.8 percentage points within 3 years. This indicates the need to reflect them in the account properly, in order to use the data for further analysis and management of this type of costs. It is also noted that the high share of transaction costs reduces the efficiency of agricultural enterprises, so reducing their level is a priority, and it is the most adequate reflection of these costs in accounting that contributes to solving this problem.

Based on the study of scientific sources, the authors classified the factors that contribute to the development of the shadow economy in Ukraine, in particular, the shadow agricultural market, and increase the transaction costs of agricultural enterprises. According to the data on the level of the shadow economy by type of economic activity, it can be seen that agriculture is largely affected by the shadow economy both directly and through interaction with related activities (processing, trade, etc.). About 8 mln ha of agricultural land are used unofficially, which is about 25 % of all cultivated agricultural land in Ukraine. Correct reflection in the accounting of transaction costs allows taking into account more fully the costs associated with the shadow economy, which will allow making more informed decisions about costs and management of the enterprise as a whole.

According to the formal rules, the object of accounting is only those transaction costs that are the result of business operations of the entity and recorded in the primary documents and the implementation of which does not contradict domestic law. Practice shows that the methodology of cost accounting does not provide information on a significant amount of transaction costs that can be identified and measured by elements of the method of accounting. Formal tools for the formation of information about the objects of accounting in modern conditions can be the accounting policy of the business entity and the professional judgment of the accountant. This can be transformed into the formation of creative accounting and act as accounting engineering, ie the format of joint management actions. The article presents the authors' vision of the relationship between the main problems faced by agricultural producers at present, transaction costs incurred in solving them and possible adjustments in the accounting system, in particular, indicates which accounts can be used and the feasibility of appropriate sub-accounts.

It is noted that the widespread use of information systems and internet technologies leads to automatic reduction of transaction costs, due to the fact that network platforms are displacing traditional intermediaries, and consumers are directly cooperating with manufacturers. Another opportunity for reducing transaction costs is the formation of marketing service cooperatives that help producers integrate into those areas of agribusiness that provide additional economic benefits and minimize the shadow economy in agriculture.

Prospects for further research on this topic are a more detailed study of the factors of the shadow economy, in particular, conducting detailed sociological surveys on the opinion of businesses on this issue, further study of the relationship between factors affecting the activities of agricultural producers and transaction costs and presenting it in the form of an econometric model with its further processing.

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WHY AGRICULTURAL POLICIES FAIL AND TWO CASES OF POLICY FAILURES IN ALBANIA

Purpose. The purpose of this study is to identify the causes of economic policy failure in general and agricultural policy failures in Albania in particular. At the same time, the very concept of policy failure is a matter of our interest. To achieve our goal, we have conducted a basic literature review. The most important aspect of interest in the study is the investigation of two cases where agricultural policy in Albania has failed.

Methodology / approach. To conduct the study we use several methods: a review of general literature in relation to government policy failure; review of specific literature regarding farm size and cooperation; review of national policy or strategic documents regarding agricultural and rural development in general and farm size and cooperation in particular; review of national statistical evidence about farm size and cooperation in Albania, and data from international sources such as The Global Economy.

Results. The study is based on the widely recognized evidence that the concept of failure is multidimensional and not uniquely defined. The study contributes to identifying and summarizing some of the main causes of policy failures. Government policies generally fail when intervention leads to inefficient allocation of resources and an overall decline in people's well-being when they do not increase production, productivity, or revenue, or when society does not achieve the policy objectives set. Policy failures are generally related to the weakness of institutions. Institutions are weak when they fail to perform effectively the three basic functions that are commitment, coordination, and cooperation. In the case of agricultural policies in Albania, the study analyzes the extremely low level of collective action and the small size of farms, which has remained almost the same and fragmented throughout the 30–year period of economic and social transition. Strong institutions responsible for drafting and implementing legislation and developing policies, characterized by the professionalism and high performance of their staff, are the only guarantee for achieving the policy objectives for sustainable agricultural development and accelerating the process of Albania's integration into the European Union.

Originality / scientific novelty. The literature points out that: (1) government effectiveness, (2) rule of law and (3) weak control of corruption are the root causes of all policy failures, including agricultural policy failures. We analyze the data on these indicators for Albania and some other countries in the Western Balkans region and try to draw conclusions about their impact on the two policy failures we are interested in, which are the serious lack of collective action in the agricultural sector and the small size of farms in Albania. No previous research has been focused on agricultural policy failures, at least in Albania.

Practical value / implications. The study may be useful for the discussion and evaluation of the impact of policies, and performance of related institutions in Albania. It emphasizes not only the need of reforming these bodies but also suggestions for future research on policies and their effectiveness

in Albania and beyond.

Key words: *agriculture, policy, corruption, government, effectiveness.*

Introduction and review of the literature. Agriculture is an important sector of the Albanian economy. It provides about 18 % of GDP and employs about 41 % of the country's workforce. In the period 1997–2018, agricultural GDP has increased by about 4.2 % annually in nominal terms or 2.44 % in real terms. There are more than 350,000 farms operating in Albania with a size of about 1.26 ha with an average of 4.7 plots. Both farm size and the number of plots per farm has not changed much over the years [1].

The literature evidences problems in relation to the competitiveness of Albanian farms [2], market access [3; 4], but also regarding the low productivity of labor and land [5; 6]. Regarding the availability and use of agricultural inputs, Albanian agriculture is characterized by problems with irrigation, drainage, quantity, and quality of inputs used [7], access to credit as well as availability and quality of advisory services. In terms of social capital, Albanian agriculture is characterized by a low level of vertical or horizontal cooperation [8]. Moreover, Albania is characterized by high fragmentation of farmland and researchers believe that this is a reason for low farm productivity, though it seems to be not supported by all empirical evidence [9]. Both small farm size and fragmentation may have a critical influence on the level of commercialization and the degree of subsistence character of farming in Albania [3].

These problems are related to the strategies and policies of agricultural development, and not only of agricultural ones, in terms of how adequate and effective they have been to address the problems of agricultural development. Therefore, this situation requires serious analyses to identify the development gaps, by firstly accepting their existence not only in the technical aspect but above all in the political aspect, in the sense of potential failures and related responsibilities, as well as the need to address them in a rapid and effective way.

In our research, we focus on two major problems: the small size of Albanian farms and the low level of cooperation between farmers. We want to highlight and identify the dynamics and progress made towards increasing farm size and cooperation and conclude whether or not government agencies failed in both of these aspects.

When does a policy fail? Although A. Smith [10] believed in market mechanisms and evaluated them because he was a free market lover, he also acknowledged some of its limitations. The government, or "sovereign" as he put it, performs tasks such as national defense, justice and public works (roads, waterworks, schools, etc.), and public institutions. If they were produced by the individual then benefits would not be because at the individual level they would be lower than the costs [11; 12]. The state, therefore, should intervene in the economy via various economic and social policies. Agricultural and economic policies, in general, are expressions or instruments of government intervention in the economy in general and agriculture in particular.

However, just as the market has its failures, so can the government fail in its interventions. Failures in development policies are common and ubiquitous events.

Therefore, it is not surprising that sometimes government interventions are ineffective, unequal, and biased [13].

But what do we mean by policy failure? There is no a unique definition of policy failure, and different authors look at it from different perspectives. Some authors argue that imperfections of government can be called its failures [14]. Other authors argue that we are dealing with a government failure when a measure of governmental economic policy, or even government inaction, worsens the market distribution of resources while reducing also economic well–being [15]. Government fails when its intervention leads to inefficient resource allocation and an overall decline in welfare [16]. On the other hand, it is often said that policies fail because they do not boost production, productivity, or revenue [13], in other words, failures are related to production, productivity, and revenue. Further, policies are considered to have failed when the expenditures made under them are inefficient, but also when they simply do not achieve their objectives.

The failure or success of a policy is determined by the established rules and the respective transaction costs and the reaction of key actors to these policies [17]. Often, government interventions in the economy, in the case of agriculture as well, can be very costly in terms of administration and implementation, as much as they can reduce or completely eliminate the benefits from the programs or policies. In this case, they can be qualified as failures [13].

Some authors think that policies are not a failure in themselves; it is increasingly accepted that policies do not fail because of them, i.e. inherently, but because of the process of their implementation [18].

What are the main types of intervention, or roles that government can play in the economy through its policies? Different authors put it in different ways but the differences between them are generally not much distinctive. According to neoclassic economists, the tasks of government are allocation, distribution, and stabilization [12]. Government, in general, can be involved in four types of social or economic activities or interventions: supply of services, taxation, subsidizing, and regulation of the economy [19]. The consequences of this intervention can be evaluated on the basis of allocative efficiency, efficiency X (efficiency X is maximizing production at the lowest cost even if markets are imperfect), and egalitarianism (equity) of the intervention results. The role of government lies in allocating resources, distribution or redistribution, creating legislation, protecting the country, subsidizing and taxation, lending, regulation (e.g. food security and safety, protecting the environment), purchasing goods and services, redistributing transaction income, and various payments [20; 21].

Referring to the agricultural sector, it can be said that government intervention in agriculture is motivated to some extent by the so–called "farm problem", according to which farms have low and unstable incomes [12]. Some of agricultural policies that governments can implement to foster the agricultural sector are the rehabilitation of the irrigation system, the promotion of collective action among farmers, and the subsidizing of prices of agricultural products. It is extremely important to understand,

however, that subsidizing prices to fall below market levels, to stabilize them at levels that are away from real production costs or marginal social costs, might not increase the allocative efficiency [22]. Then, if price subsidy mechanism fails to increase the efficiency it can be considered an unconscious policy failure. However, it also depends on what the policy objective has been. If pricing policy has had another objective, rather than efficiency, then it may not be called a failure. Nevertheless, in the case when government intervention aims at the regulation of production and its distribution (e.g., by fixing prices, quantity ceilings, or specific requirements relating to the quality of goods) the efficiency of the program could not be achieved because regulation can be captured by producer groups or lobbies [22] and in this case, the policy may fail. In another case, by raising taxes the government may promote the gray trade or tax evasion [23], and here failure can be a fairly obvious product of this policy, so much that the effectiveness of the policy itself can be questioned.

The degree of policy failure is a problem in itself. The degree of failure of a policy is an empirical rather than a theoretical issue [19], so it can simply be assessed by empirical methods. On this basis, we are able to discuss the extent of the failure or the negative consequences that may have resulted from the policy failure.

Why government policies can fail? Reasons or causes of policy failure are numerous and sometimes very complex. The debate on this topic is wide and different authors bring their perspectives and arguments.

Failures may occur because policy outcomes are often unpredictable; the goals of the interventions often are not or cannot be clearly stated; enforcement or negotiation systems are often too complex and may not work; government control over enforcement agencies is often inadequate; laundering transaction costs (such as administrative costs), and the propensity of politicians to pursue their own rather than the public interest [20]. A real cause of policy failure could be the pursuit of political self-interest by politicians and civil servants that are charged with drafting or implementing policies, which can result in serious implications regarding the resource distribution and use. Other reasons, as literature highlights, are pressures by stakeholders, failure to conduct cost-benefit analysis properly; political myopia, which means that politicians see more short-term interest in politics and prefer quick solutions to difficult problems by neglecting analysis of long-term effects; regulatory capture, i.e. when policies or regulations are made in the interest of certain groups without considering the interests of other groups [23].

According to the World Bank, failures in development policies, including the agricultural ones, are related to the degree of the effectiveness of the policies. Policy effectiveness has three determinants: commitment, coordination, and cooperation. If the institutions do not perform well these three functions, then the effectiveness of the policy will be low, so the policy may fail [24]. Commitment as a failure determinant is about supporting policies over time so that promises can be kept. Commitment to providing public services affects the degree of cooperation of people or their groups. Coordination is about shaping expectations to enable complementary action. Coordination is very important, especially in developing countries, to foster investment

and innovation. Cooperation is about limiting opportunistic actions and preventing free-riding, a phenomenon that has to do with people's unwillingness to contribute or their tendency to avoid paying for goods, public services, or taxes. Cooperation between development actors must be sustained over time. Some factors that make cooperation sustainable over time are the stability of the bargaining power of the actors, the low probability of strong shocks or changes, transparency, the actors' confidence in the effect of the policies, as well as the structural connections of the actors. Equal opportunities for all individuals for benefits, services, such as services for health, education, employment, promote businesses and the cooperation of different individuals or groups of individuals and reduce free-riding [24].

The relative political power of the actors, the so-called asymmetry of power, has great implications in terms of who wins and who loses from politics, but also in the capture of power and clientele. This can restrict to a large extent, or vice versa, empower the factors of the policy effectiveness, i.e. can greatly influence its success or failure. Exclusion from the policy of individuals or groups of individuals who have or show any interest in development problems can also have serious implications for their outcome [24].

The initial stage of the policy-making, policy design, could have serious implications in the policy success or failure. As literature points out, the policy making could be improved, by participation, by enhanced dialogue and focused education [25]. Participation in policy or policy-making depends not only on the power of the actors but also on the barriers that may exist to participate in the policy-making process. If people or groups of people are prevented from participating, they will challenge the political process and may reduce its effectiveness. Participation in the policy process and policy co-ownership can increase the willingness of people or their groups to obey policy measures voluntarily. Otherwise, policies can also have the opposite effect of what is expected [24].

The reasons for government failure can be limited information, limited government control over the consequences of its actions, limited control over the bureaucracy, restrictions from political processes (lobbying, pressure from interest groups, etc. [21]. The failure also comes because the public sector is less efficient than the private one. This is due to the differences that both sectors have in incentives and constraints, either at the individual level or at the level of organizations or companies.

As literature highlights, the causes of the failure of government intervention in the economy can be also myopic regulation, or regulation in one aspect regardless of domino effects or the effects of policies in other aspects; high costs of regulation related to the implementation of interventions and behaviors imposed on the individual as a result of interventions; inadequate or costly methods chosen by the government to carry out the adjustment; myopia and ignorance of voters, who prefer and better understand short-term benefits and do not fully understand complex policies and their effects, especially long-term ones; public sector employees are less productive than those engaged in the private sector.

Some authors emphasize the important role of information in the failure of

government policies. Often, policies are adopted in the absence of complete information. Lack of information limits the government from making objective decisions [13]. As literature points out, there is a law called the law of unintended or unannounced consequences. According to this law, the actions or interventions of the government have unintended effects as well. But the unintended consequences when it comes to government intervention programs can increase the costs of programs by making them very costly in relation to the real needs calculated based on their initial objectives [13], thus reducing their efficiency and leading these programs to failures.

Other reasons for a policy failure are the lack of motivation to increase profits, reduce costs and increase the efficiency of the people working in the public sector, the large bureaucracy in this sector, and the conflict between the political and economic interests they have. Two directions on how failures can be avoided in these cases are the introduction of incentives for benefits and introduction of performance indicators for employees in the public sector, ensuring that competition in tendering is based not only on the most economical or lower offer but ensuring at the same time that service standards are met [17]. A major cause of government failure could be the dynamic nature of the policy-making process that the incumbent government cannot commit to measures that have to be adopted by the next government [15].

Another source of government failure is uncertainty about the consequences of policies. This may be due, as in the case of economic policy measures taken under asymmetric information, to the inability to predict the future impact of economic policies that are adopted now. One lesson to learn in this case is that in order to be effective, economic policy measures have to be well-defined [15]. It should also be borne in mind that government policies can be limited in their effect and can also worsen welfare due to the complexity of economic measures, which can be difficult for public opinion to understand. Simple policies are easier to explain and more easily approved by the public.

In a more interdisciplinary setting, taking into account laws, institutions, and the economy, the theory of government failure has recently been enriched arguing that this may be due to inefficient drafting of rules for the economy functioning. This could be too specific, or too broad, arbitrary, unfair, and in conflict with other rules the government has issued to address other (perhaps even uneconomic) issues [15; 26].

Other authors [18] formulate reasons of policy failure somewhat differently. There are four important sources of policy bankruptcy: overly optimistic expectations for policy results, distributed governance (distribution of roles or responsibilities) in their implementation, non-cooperative policy-making, and unexplained changes in the policy cycle. Contributors of over-optimism are complexity (underestimating supply challenges); evidence base (insufficient, non-objective, inaccurate, and out-of-date information on costs, deadlines, benefits, and risks); misunderstanding of stakeholders (optimism about the ability to approximate different views); behavior and incentives; challenge and responsibility (decision-makers might seek short-term effects).

Regarding distributed governance, an example would be the policy where central and local government can share certain responsibilities, e.g. for the rehabilitation or

maintenance of the irrigation and drainage system. Regarding sudden and unexplained changes, we can mention the tendency of politicians to be irresponsible for policy outcomes because they know that, usually, they can leave office without consequences in case of policy failure. As a result, more and more politicians are prone to short-term policy effects. The way to limit over-optimism to the solution is the good preparation for the implementation phase, which would result in better policy-making. To limit the negative effects of the distributed (e.g. decentralized) governance the solution is to prioritize tasks or responsibilities and track them down, which would lead to better policy monitoring. To make the policy more cooperative, the solution is to support implementation, which would result in better policy impacts. To limit the negative effects of unexpected or unexplained changes the solution is to review implementation, which would result in better policy learning. Harford emphasizes that it is already clear that institutions are important for the development and reduction of poverty, and they are the key to understanding poverty in developing countries. Nevertheless, it is difficult to transform a bad institution into a good one. Corruption is also an important factor, but unfortunately, as he points out, it is not easy to change a corrupt government [27].

The causes of policy failure in the agricultural and rural sector may also be inefficient governance, poor policy-making (also due to pressure from farmers' associations or organizations, restrictions and bureaucratic and procedural burdens on the application, strict criteria needed to fulfill in order to be eligible to apply, etc.), as well as the pressure from dominant actors at the local level (e.g., on how funds are allocated) [17]. According to a study analyzing in the case of Cameroon, the factors of agricultural policy failure can be divided into three groups: (1) natural factors (such as price fluctuations, epizootic diseases, rainfall); (2) agricultural policies (such as those on inputs and their prices, mismanagement of funds due to operational weaknesses, financial difficulties); (3) population–related factors (rural exodus, land problems, sociological factors such as lack of collective action, etc.) [28]. Some of these factors may be present in the case of Albania too.

The civil society has to play a critical role to avoid policy failures. Its role is welcomed, as literature highlights, in several aspects, such as ensuring institutional accountability and transparency regarding the monitoring and management of public finances, and enhancing public participation in the design and implementation of rural development strategies [25].

The purpose of the article. The goal of this study is to contribute to the analyses and recognition of agricultural policy failures, focusing on two of them: the lack or weak collective action in the agricultural sector and the very small and fragmented farms, by suggesting ways to improve the situation.

Material and methods. To conduct our research we used the following methods:
- review of literature on government policy failure;
- review of national strategic policies/documents regarding cooperation between farmers, or farm size;
- review of statistical evidence on farm size and cooperation;
- descriptive statistics and graphical display.

We used statistical data on farm size over the years, data on the number of farmer organizations in Albania, as well as data from international sources, such as The Global Economy.

Results and discussion. The Albanian agricultural policy has not have been immune to failures. In almost 30 years of transition, it has failed in achieving several of its objectives. Some of them may have achieved but at a high cost, or they may have fostered or created inequalities between groups of farmers, or between different areas of the country. Thus, two obvious failures of Albanian policy, which we believe are not the only ones, are weak collective action between farmers and very small farm size not changing over time.

Failure 1: Weak collective action between Albanian farmers. Collective action between farmers (horizontal cooperation) and cooperation of farmers with other actors-companies or organizations along the value chain (vertical cooperation), is considered an important factor to increase farmers' bargaining power and access to the market. This is more important in the case of very small farmers, as they are in the case of Albania [29]. Cooperation helps farmers to negotiate more favorable prices and conditions in selling their products and buying agricultural inputs. But not only that, among other things the cooperation can also facilitate farmers' access to credit, investment and advisory services they need to produce, sell, storage, and process their products. Cooperation can also facilitate innovation, introduction of new techniques, technologies and/or production methods. All this can foster their capacity to compete and be successful in the market.

Baldwin and Wyplosz [30], while analyzing the market competitiveness of countries in transition towards the EU integration, and 'desirable' anti-competitive behavior, emphasizes the importance of fair public policies that increase competitiveness, instead of unfair policies (e.g., subsidies) that may reflect simply the interests of the stakeholders involved in the agricultural production or trade, or the lack of professionalism. These unfair policies can make companies more dependent on aid (e.g. subsidies) instead of increasing their market competitiveness. When they change (e.g. when the policy cycle changes), companies that have previously been somewhat competitive leave, *de facto*, the market because of their worsened competitiveness.

Research asserts the presence of anti-competitive behavior and the worrying lack of cooperation between farmers and other actors in the value chain in Albanian agriculture [8]. Studies have shown that the conditions for the cooperation to begin and improve after the fall of communism in Albania have existed and still continue to exist, but policies, programs, and measures to support cooperation have not been sufficient or appropriate [31].

The legal framework for cooperation in Albania mentions three different types: mutual cooperation companies, non-profit organizations, and agricultural cooperation companies. As data show, horizontal cooperation between farmers in Albania is at a very low level. In 2016, for which data are available, there were operating 179 farmers' groups (NGOs) in total with 3366 members. In-group interaction between farmers has occurred in two other ways: agricultural cooperatives and mutual cooperation societies

(MCS). Across the country, there were 21 MCS with 1488 members and 19 Associations for Reciprocal Cooperation (RCA) with 260 members. According to [32] the total number of members in these groups is 5114 and presents a very small proportion of the total number of farms (Figure 1).
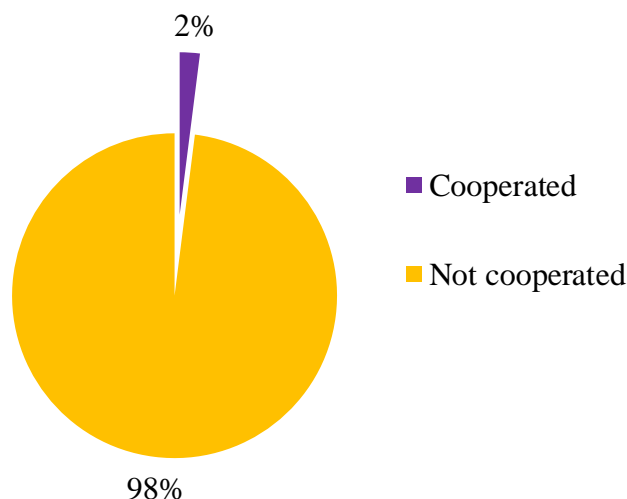
Figure 1. Cooperated *vs.* non-cooperated farmers in Albania
Source: [32].

Other studies show that factors that discourage cooperation among farmers are many: insecurity regarding private property, weak rule of law and high level of corruption, old mentality on cooperatives, lack of drivers to get out of the status-quo; lack of loans or high loan interest rates [6; 33]; lack of awareness of farmers about the benefits that could be derived from cooperation; high prices of agricultural inputs (e.g. there is no production of basic inputs in the country); lack of skills, technical and managerial knowledge and poor legacy [2; 34], the underdeveloped mentality of farmers to working in groups, farmers' adverse attitude and disbelief towards the role and benefits of cooperation, this due to but not only negative cooperation experiences in the past communistic regime. There are also opinions that public policy has not been serious and not at all active in favor of cooperation [32].

Poor interaction between farmers and agricultural development institutions is a key factor for the underdevelopment of cooperation and not the only one. Public advisory services, as one of the instruments for promoting cooperation, are scarce and unprofessional and do not respond to the needs of farmers [33]. Other research also emphasizes that main factors, which affect the willingness of farmers to cooperate, are farm size, availability of irrigation, production volume, and business climate [13; 35].

In our experience, there can also be a range of other factors that have influenced the actual situation of collective action between farmers. Among them could be the inefficient, incomplete, or delayed legislation framework on cooperation (for example incomplete secondary legislation such as decisions to be prepared and issued by the Council of Ministers, regulations, etc.); dispersed farmland property in many small, sometimes extremely small, plots as a factor contributing to limited initiatives and stimuli for cooperation among farmers; lack of substantial and continuing state financial support for farmers to motivate them for collective action concerning

production, financing, and marketing (for example participating in common investment projects for the production, storing, sale of products or buying of farm inputs).

Failure 2: Very small and fragmented farms of Albania. Land reform carried out (based on the law No. 7501, July 1991) resulted in small farms and fragmentation into many small plots, often far from the farmer's residence, which also led to the fact that the land remained unused [36]. As a result of the reform, about 480 thousand small family farms were created with 1.8 million plots and with an average size of plots of 0.25 ha.

Currently, 80 % of the total area of agricultural land has passed into private ownership, while 20 % has remained in state ownership. The average farm size changed slightly over the years. In the mid-90s the average farm size was 1.05 ha with 3.3 plots per farm. In 2011 there were 388697 farms with a size of 1.26 ha with 4.7 plots with an average of 0.27 ha [9]. The average farm in Albania gradually increased from 1.04 ha in 2000 to about 1.16 ha in 2014 [30, cit. INSTAT, 2012, 2017]. Figure 2 indicates the dynamics of farm size over years. No data on actual farm size are made available from the official sources (INSTAT). Because of this, usually, researchers tend to refer to 2012 or 2014 data when they need to discuss farm size. In our research, the farm size for the year 2020 is our very optimistic forecast.
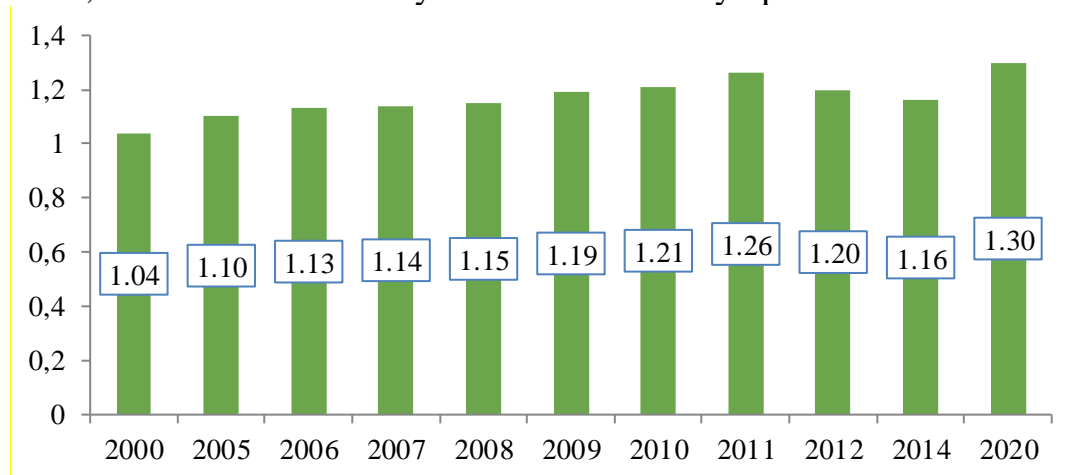
Figure 2. Farm size dynamics in Albania, ha

Source: [37; 1].

Table 1 indicates that Albanian farms are not only small in their average size but that the majority of them or about 67 % of farms are less than 1 hectare in size and only 9.3 % are bigger than 2 hectares.

Table 1

Farm structure by size in Albania

Farm size	Number	Percent	Cumulative
Up to 1 ha	215034	66.9	66.9
1–2 ha	76550	23.8	90.7
2–3 ha	20073	6.2	96.9
3–5 ha	6299	2.0	98.9
5–10 ha	1665	0.5	99.4
Above 10 ha	1871	0.6	100.0
Total	321492	100	-

Source: [1].

Albania has the smallest farm size in the region, actually less than 1.3 ha. In 2013, Macedonia had a farm size of 1.85 ha; in 2016 in Slovenia, it was 6.9 ha. In 2014, Montenegro had 6.3 ha, Serbia – 3.7 ha, Romania – 3.6 ha, and Greece – 4.8 ha [38]. In Kosovo, farms with a size of less than 2 ha occupy only 25 % of the total agricultural land of almost 200 thousand ha [39]. According to INSTAT [1], there were about 352315 agricultural families in Albania, where the average area of land owned by each family was about 1.16 ha. About 46 % of farms had an area under 1 ha, while 86 % of them were under 2 ha [40]. It is interesting that, despite the increase in farm size, the number of parcels for a farm in Albania did not change; the number of parcels for a farm remained around 4.6 and the parcel size ranges from 0.20 ha to 0.30 ha without any clear trend over time [30].

Politics wanted and indeed supported overly optimistic, perhaps utopian, forecasts, given the complex challenges of increasing farm size over time. Table 2 below shows that government agencies covering the agriculture sector expected that by the year 2010 there would not exist farms less than 1 hectare at all, and farms bigger than 3 hectares would constitute about 40 % of all farms.

Table 2

Farm size and structure in Albania as expected

Year	Farm size	Percent
2000	0.1–2 ha	90 %
2010	1–3 ha	60 %
2000	2–5 ha	9 %
2010	3–8 ha	30 %
2000	>5 ha	1 %
2010	>8 ha	10 %

Source: [41].

Figure 3 below shows the actual and targeted farm size for the years 2013 and 2020.
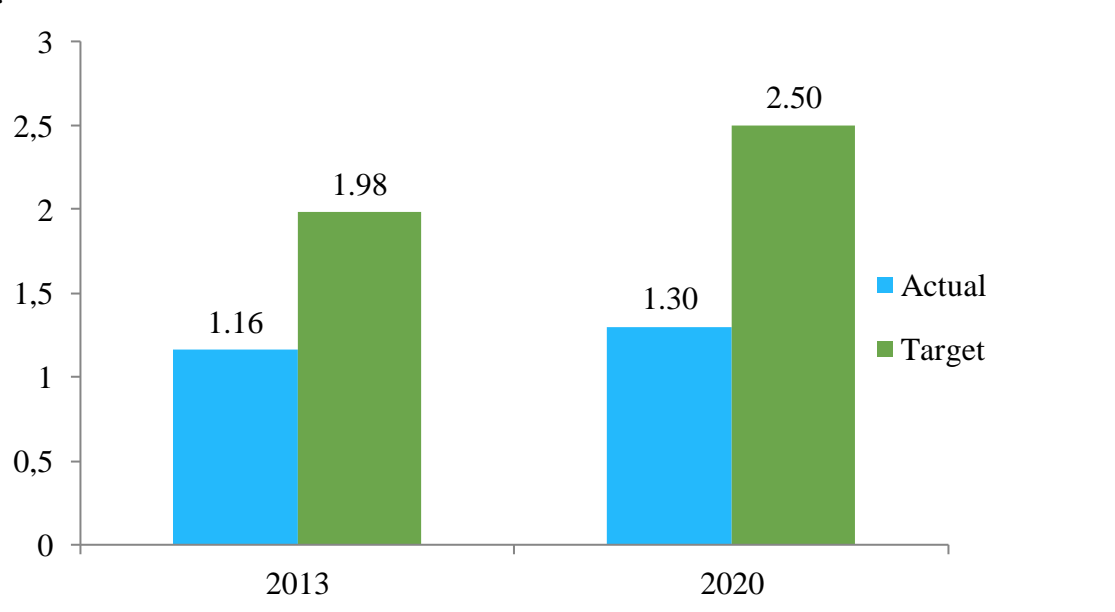
Figure 3. Actual and policy-targeted farm size in Albania
Source: data from [42; 43].

According to the cross–sector strategy of rural development 2007–2013, the farm would increase from 1.1 ha in 2007 to 1.98 ha in 2013, while the strategic objective of the Inter-Sector Strategy for Rural and Agricultural Development 2014–2020 was increasing the size of the farm by the year 2020 to at least 2.5 ha [43].

It is difficult to understand why these predictions were so unrealistic, or how little support this objective obtained in the context of agricultural policy. Small and almost static farms in Albania are already for so many years an undisputed reality. Despite the fact that three decades have passed since the beginning of the reform, the farm continues to be small and fragmented, as a result of reforms carried out but also missing or ineffective development policies, with significant consequences in the underdevelopment of the land, products and inputs markets, as well as the lack of horizontal or vertical cooperation.

There has been and still is a debate, even internationally, about the economic effects of the small farm size. Economists and agricultural specialists in Albania think that small farms brought consequences regarding the volume of the production, but also regarding land degradation and non-use of adequate technologies, etc. [9]. The small farms along with the lack of controls on the quality of inputs and agricultural products, the underdevelopment of marketing channels (due to lack of trade knowledge and market information), are seen as strong reasons for the low degree of competitiveness of Albanian products [44]. Although there is actually a debate as to whether smaller farms are less productive or less efficient than larger ones, larger farms have some obvious advantages over smaller ones. Such are the advantages of benefiting from economies of scale, and the preferential access to markets for agricultural products and inputs [45, cit. Hall and LeVeen, 1978].

As literature points out, small farms are one of the reasons for the underdevelopment of the market of agricultural products and inputs because smaller farms are at a disadvantage compared to larger ones in terms of access to markets. During the Albanian transition, the low level of productivity in agriculture was justified by the fragmented farms, seen as an obstacle to the mechanization of works, effective consulting services, better access to credit and new technologies, as well as poor rural infrastructure [44].

Albanian farms usually have low economies of scale. However, economies of scale can affect farm productivity [45]. The low rate of production, below what is called the "critical mass" associated with the small size of the farm, can also be a limiting factor to reach the market and thus can be a limiting factor to the farm competitiveness. However, the literature shows that there are ways to reduce the negative effects of small size. Lerman [29] points out that contract farming can be one of the ways in which market access disadvantages for smallholders can be alleviated through agreements with large processors, traders, or input suppliers. Even horizontal or vertical organization (cooperation) is one of the best options that small farmers can use to compensate for the so-called "curse of smallness", i.e. the disadvantages they have because of being small.

According to [29], in terms of trade, farms sell less than 30 % of production. Even

data from INSTAT [1] show that average production sales fluctuate around 30 %. While the World Bank points out that the retail system is highly fragmented and poorly integrated with the wholesale system [46]. Other data sources reveal even more pessimistic figures. Small farms (with an average of 0.5 ha) sell 12 % of production, while those with an average size of 1.6 ha sells 16 % of production [47]. Regarding sales markets, about 55 % of farmers sell in the local market while 54–61 % sells informally. In the value chain, the Albanian farmer has a passive position, due to the lacking negotiating power and asymmetry in information. In the value chain, the farmer does not enable the creation of added value for his/her own benefit. This situation is also affected by the weakness of activities at the farm level in relation to the storage, post–harvest handling, and processing of agricultural products.

Farm fragmentation has been shown to have a negative effect on both farm productivity and efficiency [29]. Misuse or inefficient use can also come from poor farm management capacity. Small farms, such as those in Albania, are to a large extent at a disadvantage compared to larger farms also in terms of the availability of machinery and equipment. Although, the solution to this problem is known, it is the widespread use of machinery rental services or the creation of groups of machinery for shared use [29]. As we mentioned above, according to the Agricultural Extension Strategy 2001–2010, small farms in Albania would be reduced very quickly in their number. Besides, farms under 1 ha would not exist by 2010. In 2010 farms with more than 3 ha would occupy about 40 % of the total number of farms and those over 8 ha with about 10 % [41]. However, small farms still today make up the vast majority of the number of farms in Albania and these objectives have not been achieved, not to mention that the reality is far from these objectives set almost two decades ago.

We can argue that a major cause of very small farms created by the land reform in Albania is the legislation adopted for the distribution of the agricultural land; the land was given to all agricultural families that before reform used to work in the agricultural cooperatives based on the principle "land to the tiller". Moreover, keeping in mind that agricultural land is very scarce and the proportion of population engaged in agriculture very high, this kind of legislation had a crucial impact by creating a large number of small farms.

The underdeveloped agricultural land market is another reason of little progress in increasing farm size over years. Reasons for that were and remain insecure property rights; high land transaction costs; agricultural land as a safety net; delays in the compensation of land ex-owners that have contributed not only to not enough secure property rights but also to a negative investment climate, limited opportunities for off-farm employment in rural and urban areas as well, and missing or ineffective policies to meet the strategic targets concerning farm size.

Another factor contributing to this status quo, as literature points out, is that a large part of the agricultural land is not used and the fiscal legislation on the non-use of land, using it ineffectively, or not selling it, is absent or inadequate. This is so for purely political reasons because farmers constitute a large electoral group and this group can determine the loser and the winner in any electoral process.

Major causes of policy failures. As the literature has evidenced [17; 27], failure to increase farm size and promote cooperation cannot be unrelated to the overall institutional "capacity to fail" of a country. We argue that the key indicator that can explain everything for the success or failure of government policies, which improves or worsens every performance indicator, is the trio "effectiveness of governance", the "rule of law" and "control of corruption". The magnitude of this trio is related to the weakness or efficiency of law drafting and law enforcement and implementation institutions and development policies in Albania, which hinders drafting adequate policies, reduces the effectiveness of implementation, frequently leads to their failure.

The effectiveness of governance in Albania is expressed in scale (-2.5; 2.5), as shown in Table 3, throughout the transition, beyond the left and right political wings, has been low although some tendency to improve is remarkable. Historically, in terms of this indicator, Albania has been and remains at the worst levels in the region.

Table 3

Government effectiveness

Years	Albania	Serbia	N. Macedonia	Slovenia
2006	-0.52	-0.21	-0.11	0.96
2013	-0.32	-0.09	-0.05	1.01
2019	-0.06	0.02	0.00	1.08

Source: [48].

In terms of the rule of law, Albania is also at a very low level, being the worst in the region as by 2019 data (Table 4).

Table 4

Rule of law

Years	Albania	Serbia	N. Macedonia	Slovenia
2006	-0.68	-0.53	-0.53	0.91
2013	-0.52	-0.33	-0.20	1.00
2019	-0.41	-0.12	-0.24	1.12

Source: [48].

The Corruption Perceptions Index in 2005 was -0.79, down slightly from 2013 to -0.7 and a further decrease occurred in 2018 to -0.52, remaining, however, worse than in some other countries of the region (Table 5).

Table 5

Corruption Perception Index

Years	Albania	Serbia	N. Macedonia	Slovenia
2005	-0.79	-0.41	-0.45	0.91
2013	-0.70	-0.30	-0.05	0.73
2018	-0.52	-0.37	-0.36	0.87

Source: [48].

Thus, the very low levels of cooperation in Albania and the stagnation of low-farm-size and fragmentation in an economic environment that is under rapid transformation, among others due to the high degree of cooperation (e.g. economies of scale, social, technological innovation, etc.) are not casual. The lack of cooperation, regardless of the reasons whether it is a consequence of failure to achieve objectives or

comes from inactivity or poor governance, constitutes a failure. Because of missing cooperation, farmers and the agricultural sector as a whole have lost many opportunities for development and consolidation, which in detail were outlined above.

Conclusions. Small farm size and lack of cooperation in the agricultural sectors are two but maybe not the only failures of the governments' policy. This can be explained by failures to meet policy objectives, or failure to achieve large-scale cooperation between farmers or along the value chain. The small and fragmented farms and lack of cooperation have brought negative effects to farmers and the agricultural sector as a whole.

In both cases the policy-makers must learn lessons and reflect on the need to improve not only policy design but also policy implementation to foster development and accelerate the integration of the country into the EU. For the reasons analyzed in the study, there could be an appeal for policy makers to learn lessons from former failures to promote cooperation, starting perhaps with a long-term-strategy, properly supported and consulted with farmers but also with other stakeholders, such as input suppliers, agribusiness, banks, universities, etc.

The leaders of the institutions are the determinants of the way they function, i.e., the results and the predictability of the policy results. This would ensure faster and more sustainable development, which in fact is what the Albanian model of development failed to do during the transition. Moreover, the advancement of the integration process requires joint and coordinated institutional responsibilities in the decision–making process, monitoring and implementation. This goes hand in hand with the need to optimize national development objectives and implement the concept of knowledge as a basic input in governance.

Although inefficient formal institutions deprive citizens of their contribution to development and may turn the objective of EU integration into a zero–sum game, we believe that the only and universal key that can change the situation is to build strong and inclusive institutions for the design, monitoring and implementation of development programs and policies.

Strong institutions mean functional independence beyond left and right political wings. They require professionalism, motivation, high staff performance, regular and independent monitoring and quality evaluation of policies.

This study has some limitations. Recent data about cooperation and farm size are not public and officially available. This implies some difficulty in comparing policy objective targets with actual figures, in particular in relation to farm size. The above discussion of farm size and farmer cooperation has ruled out climate change and globalization, which are in fact two difficult challenges that can have serious implications for both confronting and the needing to cooperate for small farmers. In these circumstances, it would be very important to discuss how small, in terms of viability and sustainability, farms could be in the conditions of Albania. The results of this research can facilitate and optimize the entire process and policy actions regarding farm size and cooperation. Furthermore, in our research, we found no evidence of assessments made by government agencies of why they failed to meet the objectives

regarding farm size and cooperation, and what they plan to do in the future to accelerate this process. Further research is needed to obtain information on this and to hopefully trigger effective action in this regard in the future.

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CONSERVATION AND DEVELOPMENT OF HUMAN RESOURCES THROUGH THE RETURN MIGRATION POLICY

Purpose. *The purpose of the article is to develop the theoretical and methodological foundations for the study of return migration policy based on its information support, including regression analysis and authors' sociological research on return intentions of Ukrainian migrants.*

Methodology / approach. *The mathematical tools were used for the assessment of Ukraine's economical losses, related to migration. With the help of the sociological method (survey) migrants' intentions and main motives to return were investigated. Stepwise regression model was built for identification of main factors of Ukrainian population's international migration. Besides, general scientific methods were used in the study, such as: analysis, generalization, systematization, tabular and graphical.*

Results. *Analysis showed the lack of statistical and sociological information on international migration (particularly return migration) of Ukrainian population. It substantiates the need for improving the system of information provision of migration policy. The results of the survey of the migrants from the Carpathian region of Ukraine (conducted in 2020) show low level of their readiness to return. According to the answers to the questionnaire, there are two main circumstances that could motivate migrants to return: high level of wages and general improving of economic situation in Ukraine. Due to the regression model it was found that the emigration of the population is influenced by the following factors: average monthly wages, gross regional product per capita, foreign direct investment per economically active person and the share of the population with incomes below the subsistence level. The article provides main benefits and ways of implementation of the return migration policy. Particularly, circular migration is considered as a good way to slow down losses of human resources. It is beneficial for all institutional units of the migration process.*

Originality / scientific novelty. *The methodology for the consequences of international migration study is improved. In particular, the formula for determination of migration losses through the calculation of economic activity losses is proposed and calculated for the first time. The theoretical foundation of return migration policy is developed. In particular, the model of return migration process on the individual level is elaborated. The sociological tool for the return migration investigation is developed and tested.*

Practical value / implications. *The practical recommendations for the human resources conservation are worked out. The questions for the survey, developed by the authors, could be used in further investigations in this issue. The model of return migration process is useful for developing a comprehensive return migration policy, which could support migrants at all stages of this process: decisions making, movement and reintegration.*

Key words: *international migration, return migration, circular migration, human resources, migration policy, Ukraine.*

Introduction and review of literature. The human potential is the main value

of each society and important precondition for the national development. But intensification of international migration processes and its poor regulation leads to the losses of human potential for certain countries, donors of the workforce. Ukraine is one of them. In recent decades, it belongs to the top-10 countries of origin for international migrants. Generally, the number of emigrants from Ukraine amounted to 6 million persons in 2020 [1, p. 16]. Temporary labor and educational migration is growing rapidly, often transforming into permanent one [2, p. 12–14]. For example, the number of Ukrainian students abroad has increased from 32.9 thousand persons in 2009 [3, p. 9] to 77.6 thousand persons in 2019 [2, p. 14]. Restrictive measures implemented in many countries in response to the coronavirus pandemic spreading have significantly affected the intensity, course and direction of migration processes in the world, but have not stopped them. At the same time, under the quarantine conditions most of Ukrainian labor migrants decided to stay abroad (even without work) instead of returning home [4]. The problem of migration losses and the need to preserve human potential is still relevant for Ukraine because of many negative consequences, connected with poorly regulated international migration. The main ones are as follows: demographic losses (in case of permanent migration); loss of the most competitive productive workforce, 'brain drain'; high costs of training of specialists, who continue to work outside the country; lack of contributions to pension and social funds (in case of illegal migration); loss of migrants' qualification, deterioration of their health; worsening of family relations, family breakdown and so on. It exacerbates the need for finding new decisions and migration policy improvement.

Different aspects of the theoretical and methodological foundations of migration policy are developed in a range of recent scientific publications [5; 6; 7]. Due to the intensification of immigration processes to the developing countries, research on immigration policy and currant issues of migrant integration are becoming popular. For example, institutional and legal perspectives for EU strategies for the integration of migrants from the third countries are highlighted in the studies of European researchers [8]. One of the latest valuable research concerns the analysis of factors that affect the immigration policies of different countries and determination of the role of ecological factors [9].

It is well known that agricultural sector is one of the most popular for employment of Ukrainian migrants [10, p. 41]. Due to the great impact of international migration on this sector in developing countries, it has aroused the interest of scientists and caused a number of interesting studies in different countries. First of all, they concern immigrants' farming and employments' problems in rural areas [11; 12; 13].

Return migration studies are mostly presented by the scientific works devoted to certain countries, programmes or projects. For instance, overview over return migration policy measures developed in Latvia and their evaluation in the light of return migrants' perspectives are presented in the chapter of the book "The Emigrant Communities in Latvia" [14]. Evaluation of the assisted voluntary return and

reintegration pilot program in Canada was made by Canada Border Services Agency [15]. In Germany very interesting study was devoted to analysing the role of life satisfaction for migrant return intentions [16]. The comprehensive analysis of existing instruments of return migration policies in more than ten countries was conducted by the experts of the International Center for Migration Policy Development [17]. Evaluation of return and reintegration policies in eight OECD European countries was carried out by researchers of this organization [18].

Nowadays there are several global return migration projects initiated by the host European countries. For example, the Programme "Migration for development" is being carried out in Germany (term: 2017–2023). The focus is on professional training and advice on the migration and reintegration in the country of origin. In total, the programme has already provided almost 952 thousand individual measures [19].

Despite the valuable contribution to migration studies made by the Ukrainian scientists [20; 21; 22; 23; 24], there is a shortage of research concerning properly return migration issues in Ukraine. Furthermore, the problem of migration losses of human resources together with insufficient state regulation require further research and finding new solutions.

The purpose of the article. The purpose of the article is to develop the theoretical and methodological foundations for the study of return migration policy based on its information support, including regression analysis and authors' sociological research on return intentions of Ukrainian migrants.

Results and discussion. Nowadays there is no universally accepted definition of return migration. In the context of international migration, this term is defined by the International Organization for Migration as "the movement of persons returning to their country of origin after having moved away from their place of habitual residence and crossed an international border" [25, p. 186]. Such return can be implemented in voluntary or forced way. For statistical purposes, the United Nations defines returnees as "persons returning to their country of citizenship after having been international migrants (whether short-term or long-term) in another country and who are intending to stay in their own country for at least a year" [26, p. 94].

This study focuses on all forms of voluntary return of international migrants to their origin country, regardless of their further intentions. Consequently, such types of return migration can be distinguished: permanent (return of international migrants to their origin country for permanent residence – resettlement); temporary (with the intention to go abroad again to perform work or provide services). Return migration can be classified by different temporalities [27]. So, we distinguish between long-term (for the purpose of long stay) short-term and circular type of temporary migration.

The most widespread type of international migration in Ukraine is labor one. But there is no precise information on this issue. However, the estimations from 3 to 5 million are widespread [28]. Much smaller is the number of those, who got a job abroad with the help of private employment agencies (Figure 1). It is growing permanently and in 2020 was 86.3 thousand persons. However, it is known that only

very small part of all labor migrants use this way of employment.
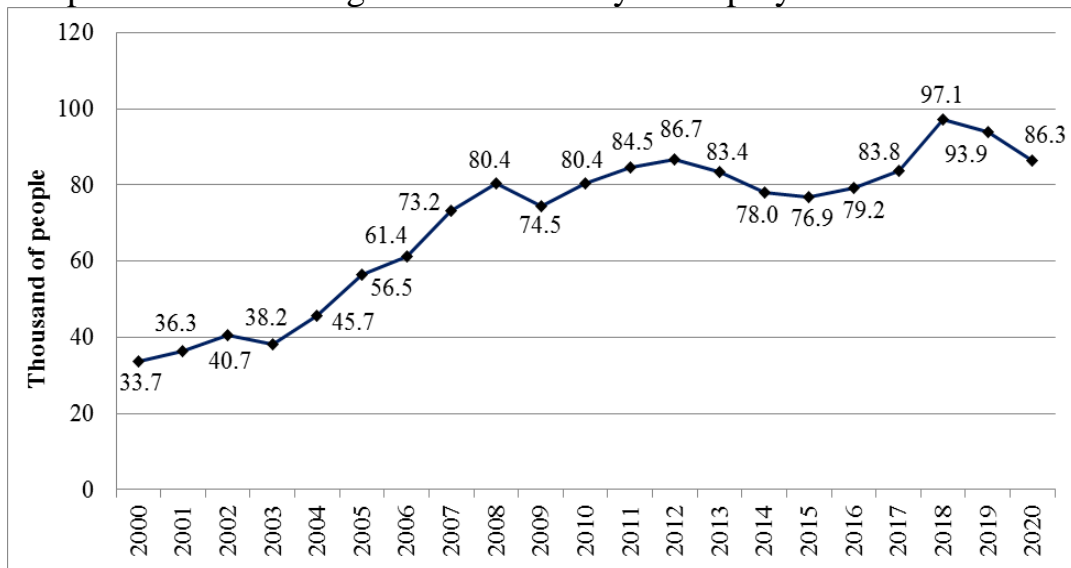
Figure 1. Dynamics of the number of Ukrainian citizens employed abroad by the private employment agencies, 2000–2020

Source: built by the authors based on data [29].

Thus, there is a lack of statistical and sociological information on international migration (particularly return migration) of Ukrainian population. Studies of temporary labor migration are fragmentary in Ukraine. For example, the State Statistics Service of Ukraine conducted only three national surveys with different frequency (in 2008, 2012 and 2017), devoted to the international labor migration issues. Due to these investigations, we can estimate that in average approximately 40 % of Ukrainian labor migrants returned home [30]. At the same time, statistics on international permanent migration is available. Analysis of its dynamics over the past 8 years shows that the number of population returning to Ukraine is very small, compared to those who emigrate (Figure 2).
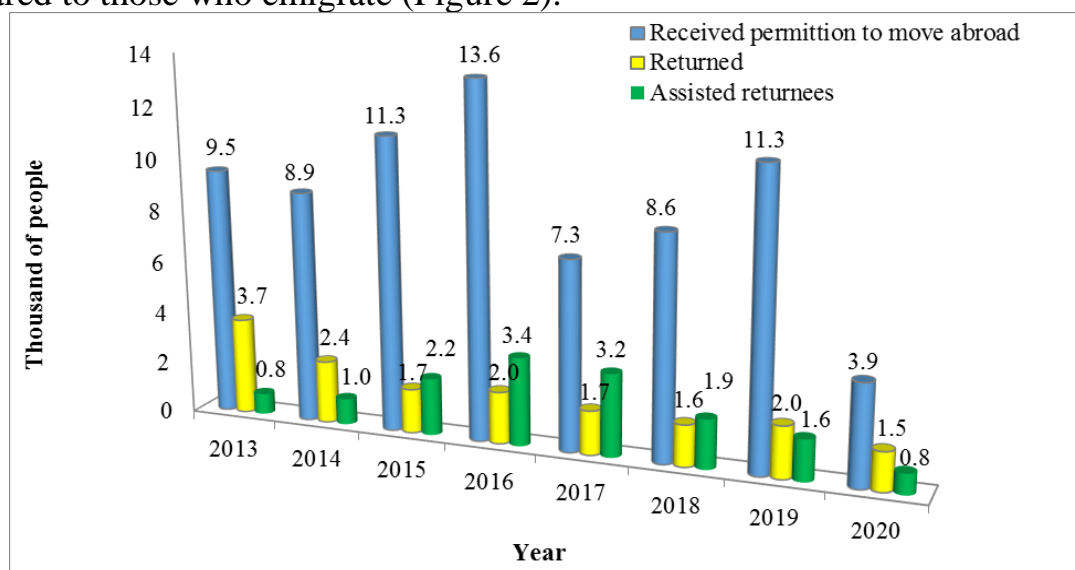
Figure 2. Dynamics of international migration of the population of Ukraine, 2013–2020

Source: built by the authors based on data [29; 31].

In 2020 there were only 1.5 thousand returnees, which is two times less than in 2013. Additional information about returnees from Ukraine is available due to the IOM's publications on assisted voluntary returns (Figure 2). Such statistics do not exclude the possibility of a double count. In any case, precise estimation of returns is not the aim of this study, but it is important to show general tendencies and problems.

The growth of migration flows from Ukraine is also evidenced by statistics on first residence permits issued in the European Union. In particular, citizens of Ukraine have been received the highest number of such permits since 2014. And this number has a tendency to increase, except 2020 when the flow of residence permits dropped generally as a result of pandemic (Figure 3). Generally, more than 0.5 million of Ukrainian citizens annually receive residence permits in Europe for the last years, mainly for employment reasons (for example, in 2020 it was 85.8 % of all permits) [32].
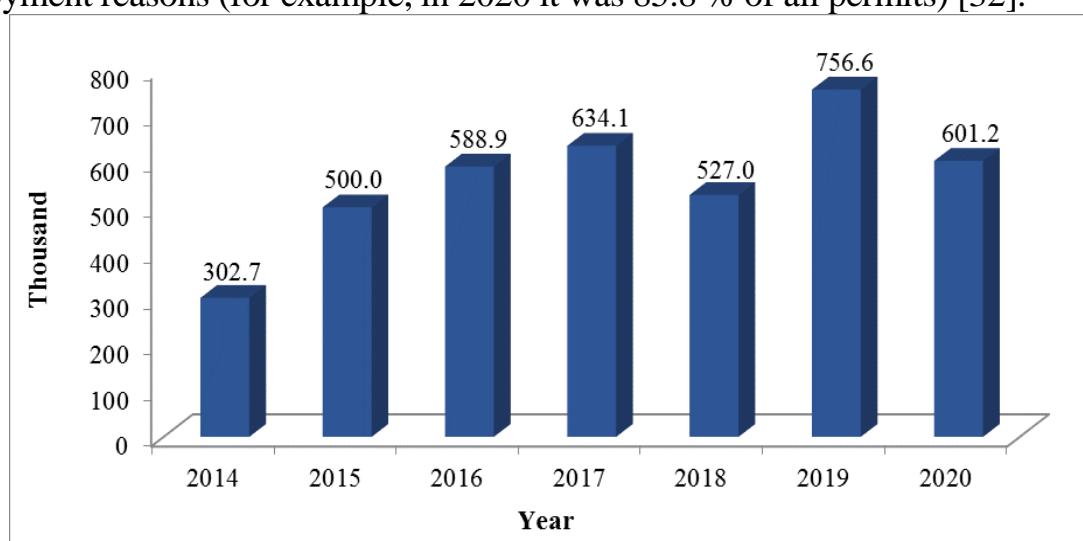
Figure 3. First residence permits issued in the European Union for citizens of Ukraine, 2014–2020

Source: built by the authors based on data [32].

In addition to demographic losses Ukraine, as a donor of workforce, carries also general migration ones. Usually, migration losses are estimated through the underproduction of GDP of origin country [33]. Nevertheless, such calculation is problematic in Ukraine because of luck of necessary information about those, who leave, such as: employment status before migration, level of incomes in the origin and host countries. In addition, the amount of remittances should be considered, which are spent in the homeland. Based on the Lopez' and Murray's methodology for measuring losses of healthy years of life [34], we propose to determine migration losses through the calculation of economic activity losses. Since labor migration can have different durations, it is reasonable to calculate the annual losses in person-years of migration (formula 1).

$$LN_A = N_A \times \sum_{i=1}^{n} p_i \times \frac{t_i}{12},$$

(1)

where LN_A – loss of economic activity, person-years;

N_A – economically active population, thousands of people;

t_i – period of time, spent in labor migration, month, $i \in [1; 12]$;

p_i – probability of external labor migration.

Using formula (1), we estimated that in 2010 – the first half of 2012 the loss of economic activity amounted to approximately 590 thousand person-years annually, or 2.64–2.67 % of the economically active population of the country annually. During 2015–2017, this indicator was 877.8 thousand person-years annually (calculated on the basis of data from sample surveys on labor migration in Ukraine [30, p. 9]), or from 4.85 to 4.92 % of the economically active population. The increase in losses for that period of time is caused by the increase in the frequency and duration of labor migration as well as by the decrease in the number of economically active population.

Thus, estimation of migration losses is an essential part of migration policy information support and an important precondition of setting its main priorities and efficient measures elaboration. Besides, development of the return migration policy instruments has to be based on consideration of needs and intentions of migrants. Sociological studies can provide such information. Currently there are separate projects and initiatives at different levels to study this issue. For example, we use the results of a sociological survey of international migrants from Ukraine curried out by the authors in the working group (State Institution "Institute of Regional Research named after M. I. Dolishniy of National Academy of Sciences of Ukraine"). The collection of primary information was conducted in March – April 2020. In order to study return intentions the online questionnaire was distributed through the social networks and modern means of communication among adult migrants from the Carpathian region of Ukraine (Zakarpatska, Ivano-Frankivska, Lvivska and Chernivetska oblast (provinces)) which were abroad at the time of the study. One hundred sixty three migrants took part in the survey, of which 55.2 % were female and 44.8 % – male. Most of the respondents were young people in the age of 30 (37.5 %) and 31–45 (50.8 %); the share of middle-aged people (46–60 years) was 6.8 %, elderly – 4.9 %. The average age of the respondents was 35 years.

The results of the survey show that the most common answer to the question about the intentions of migrants to return to Ukraine is: "I would like to return, but I do not see any prospects for myself in Ukraine" (31 %). Another 12 % of respondents have such intention, but they have not decided yet. Every tenth migrant intends to return, but not in the near future. Only about 4 % of respondents decided to return home soon. And the same number of migrants will return after completing training, internships or projects. The share of people living in Ukraine, but sometimes moving abroad to work, is 16.6 %. Another 6 % often travel to Ukraine and live there for some time. The Ukrainians, who will definitely not return to their homeland are 16.6 %.

Thus, the share of migrants who have definitely decided to return to Ukraine is quite small. Under such conditions, it is important to find out what circumstances could motivate migrants to return. The results of the survey show that main motivation factors could be the high level of wages and the improvement of the economic situation in Ukraine (Table 1). In total, the majority of respondents

indicated them (92.6 %). Such result is not surprisingly, because it is well known that wages are one of the most important factors of international migration not only in Ukraine but also in many other countries [35].

Table 1

Circumstances that could motivate migrants to return (in % of the number of observations*, several options were allowed)

Answers	%	Rank**
High level of wages	51.6	I
Improving the economic situation in Ukraine	41.0	II
Family reasons	18.0	III
Guaranteed opportunity to find a job	17.4	IV
Cessation of the war	17.4	IV
Favourable conditions for doing business	16.1	V
Reaching retirement age. Opportunity to receive in Ukraine a pension earned abroad	14.9	VI
Job loss in the host country	6.8	VII
Health problems, disability	5.0	VIII
Effective policy of reintegration of migrants (eg, provision of subsidized housing, favourable conditions for deposits or investments, etc.)	3.7	IX
Opportunity to receive free education in Ukraine	1.2	X

Notes. *Some temporary labor migrants (8 %) didn't choose any option; almost each of the tenth respondents would not return to Ukraine in any case.

**The ranks of significance are defined by the frequency of the choice of a particular answer.

Source: survey data, 2020.

To sum up, vision of individual prospects or improving the economic situation in Ukraine are very important factors that could motivate migrants to return. It is worthwhile to mention that according to the sociological research lack of seeing prospects or confidence in the future is also a very important 'push' factor of international migration [36].

The development of socio-economic policy measures for human resources conservation primarily requires research on the main factors causing external migration in order to their further regulation. That's why the significance of 20 main factors in terms of regions of Ukraine (2004–2018) which may affect the migration activity of the population were analyzed. Using the method of stepwise inclusion of factor variables in the regression model, several regression equations were constructed. After testing for multi-collinearity four the most significant factors were selected. Consequently, the regression equation is as follows:

$$Y = 2.4 - 1.85x_1 - 0.73x_2 - 0.07x_3 + 0.08x_4, \tag{2}$$

where Y – emigration rate, persons per 10000 populations;

x_1 – average monthly salary per employee, USD;

x_2 – gross regional product per capita, USD;

x_3 – foreign direct investment per one economically active person, USD;

x_4 – the share of the population with income below the subsistence level.

In the first model (Table 2), the value of the coefficient of determination $R^2 = 0.27$ shows that about 27 % of changes in the emigration rate can be explained

by salary. Addition of the second factor, which characterizes the gross regional product per capita, led to an increase in the coefficient of determination to 0.67. The third factor improved the regression model, but only slightly. Generally, the Table 2 shows that the fourth model best describes the changes that may occur in migration processes. The coefficient of determination ($R^2 = 0.76$) shows that 76 % of the changes in the value of the emigration coefficient for the analyzed period is due to the factors included in the model. An indicator of the closeness of the correlation for the regression model is the multiple correlation coefficient R, which is equal to 0.87. It indicates a close correlation between the emigration rate and the explanatory variables in the equation.

Table 2

Regression analysis of the emigration rate in Ukraine

Model	Indicator	B	Std	t (21)	p-level
1	const	2.72	1.24	2.21	0.03
	x_1	-0.63	0.5	-4.30	0.00
	R^2	0.27	-	-	-
2	const	3.75	0.74	5.03	0.00
	x_1	-2.55	0.41	-6.22	0.00
	x_2	-0.77	0.11	-6.77	0.00
	R^2	0.67	-	-	-
3	const	2.72	1.05	2.6	0.01
	x_1	-2.04	0.55	-3.71	0.00
	x_2	-0.78	0.11	-6.92	0.00
	x_3	-0.09	0.06	-2.15	0.04
	R^2	0.71	-	-	-
4	const	2.4	0.99	2.42	0.02
	x_1	-1.85	0.52	-3.56	0.00
	x_2	-0,73	0.11	-6.77	0.00
	x_3	-0.07	0.06	-2.15	0.04
	x_4	0.08	0.04	2.11	0.04
	R^2	0.76	-	-	-

Source: built by the authors.

For checking the regression model for adequacy the F-test was founded (F = 16.6). It is bigger than its critical (tabular) value (Fcrit. = 2.64). Thus, with the reliability of 95 % it can be concluded that the accepted mathematical model is adequate and on its basis it is possible to draw economic conclusions.

To determine the degree of weight and the direction of influence of each factor on the variation of the dependent variable, the coefficients of elasticity were calculated. The result shows that one percent increase in average monthly salary (x_1) and the constant values of other factors included in the model, may reduce the value of the emigration rate by 3.91 %. A similar increase in the value of gross regional product per capita (x_2) and foreign direct investment (x_3) may lead to reducing of outcome variable by 2.97 % and accordingly 0.17 %. At the same time, an increase in the share of the population with income below the subsistence level (x_4) is likely to increase the emigration rate by 0.05 %. Hence, the indicators of gross regional

product and the size of the average monthly salary have the greatest influence on the change in the value of the number of emigrants. In general, according to the constructed regression model, we can conclude that if the values of all factors increase by 1 %, the resulting variable will decrease by 7 %.

Based on the regression model, we assess the probable possibilities of further development of the migration situation in the short term (5 years) until 2023 with different scenarios (Table 3). To predict the number of external emigrants by 2023, we use a scenario approach, which creates several options for possible changes in the values of key indicators that affect the economic situation and migration aspirations in Ukraine: optimistic, tendentious and pessimistic.

The tendentious scenario assumes the preservation of existing trends in Ukraine's economic development (continuing the trend of rising wages on the background of slow devaluation of the national currency), GRP growth per capita with a slight decrease in direct investment per economically active person. Pessimistic and optimistic ones deviate slightly from the trends of recent years in a positive or negative direction.

Table 3

Predicted values of the main factors and results for 2019 and 2023

	Indicators	Actual values (2018)	Predicted values for 2019 and 2023					
			Optimistic		Tendentious		Pessimistic	
			2019	2023	2019	2023	2019	2023
Input variables of the model	Average monthly salary per employee, USD	325.9	387.2	771.6	351.5	475.4	299.8	248.7
	Gross regional product per capita, USD	70.2	82.4	257.3	72.1	135.1	74.8	109.5
	Foreign direct investment per one economically active person, USD	1761.8	1775	1827	1727	1659	1691	1560
	Exchange rate, UAH/USD	27.2	26.9	25.9	27.8	30.0	29.9	43.8
	The share of the population with income below the subsistence level	4.3	4.1	2.7	4.3	4.0	4.5	5.5
Result	Number of emigrants, thousands of people	610.7	531.8	112.1	599.4	456.7	782.9	993.6

Source: built by the authors.

The results of the forecast confirm the hypothesis that material factors have a significant impact on migration activity of the population. Thus, in the optimistic scenario (doubling the average wage in dollar terms and reduction by half the share of the population with incomes below the subsistence level) the number of emigrants may decrease 5 times by 2023 – from 610.7 thousand persons in 2018 up to 531.8 thousand persons in 2019 and up to 112.1 thousand persons in 2023. If the current trends continue, the number of emigrants is also likely to decrease slightly to 456.7 thousand persons in 2023. Decreasing of indicators of material well-being, investment climate deterioration alongside the military and political crisis, financial

instability may cause new waves of migration and increase the number of emigrants to 993.6 thousand persons in 2023. As the official statistic shows, the number of emigrants in 2019 was 554.5 thousand persons [37, p. 159]. It gives grounds for conclusion that the prediction came true according to the optimistic scenario. But it concerns only official permanent migration. Nowadays, it is no doubt that Ukraine is one of the biggest donors of human and labour resources for post-soviet and European countries. In our previous studies we grounded that one of the priorities of state migration policy of Ukraine has to be: reducing the pace and scale of emigration. We called it the concept of "inhibition of migration losses" of the country's human potential (the word "inhibition" means "slowing down", "holding"). In this case, the inhibitors are measures of migration policy and other spheres of public administration, which contribute to reducing the scale and pace of international migration. The main directions of the implementation of the proposed concept are presented on the Figure 4. They can be divided into general and special ones. Separate general blocks, which do not provide the development of special migration policy measures but influence the migration potential of the population, are shown by long rectangles at the top and bottom in the Figure 4.
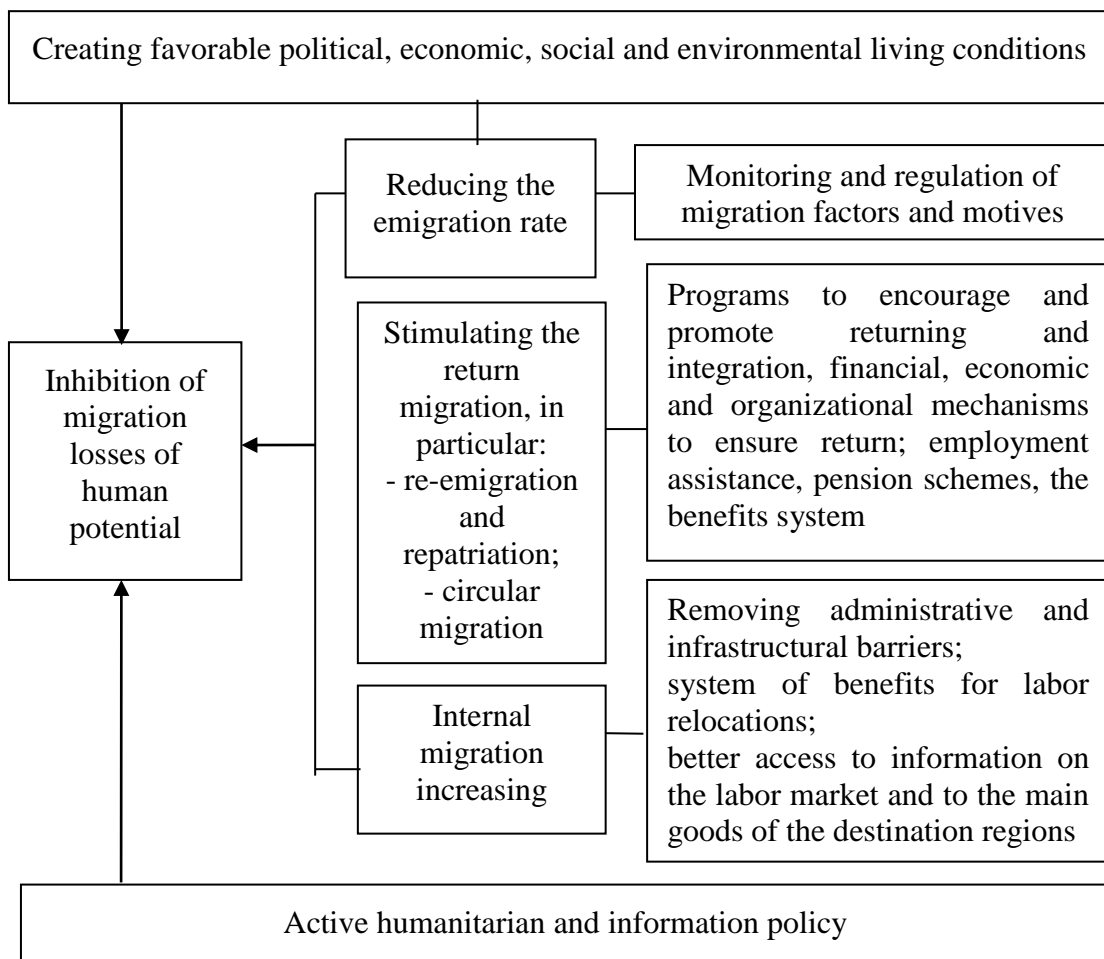
Figure 4. Ways of inhibiting migration losses of human potential of Ukraine
Source: authors' own elaboration [38, p. 81].

Naturally, that high level quality of life, appropriate conditions for socio-

economic development and self-realization of the citizens can reduce their migration potential. There are also three special blocks in the figure: reduction of the emigration flows, stimulation of the external return migration and strengthening the internal migration of the population. It is worth noting that the action of inhibitors should not restrict the human right to free choice of residence and freedom of movement. This study focuses on one of the central block of the scheme, which concerns voluntary return migration. The importance of return migration was stated in Ukraine at the national level in 2017. In particular, one of the main goals of the Strategy of the state migration policy of Ukraine for the period up to 2025 is: "to create the necessary conditions for the return and reintegration of Ukrainian migrants into the Ukrainian society" [39]. But mechanisms for achieving this goal have not been established yet. The Verkhovna Rada has a government project of the low "On Amendments to Certain Laws of Ukraine Concerning Introduction of Assistance for the Economic Reintegration of Migrant Workers", which aims to encourage the return of migrant workers to Ukraine and prevent them from re-emigrating. However, it has not been adopted yet. Among the current measures it is only the program 'Available loans 5–7–9 %' [40].

Generally, the world practice shows a number of different well developed measures for reducing migration losses. For example, one of the most important components of human losses issue is emigration of high skilled persons, which leads to the problem of "brain drain". Possible policy responses were classified by the specialists of International Labor Organization as the "Six Rs" (cited by [41, p. 9]): 1. Return of migrants to the countries of their origin. 2. Restriction of international mobility to foreign workers 3. Recruitment of international migrants. 4. Compensation for human capital losses. 5. Resourcing expatriate 6. Retention: through educational sector policies and through economic development.

Restrictions of international mobility and the requirement for compensation the costs for specialists' training contradict the laws of market relations and the fundamental principles of a democratic society, as well as Ukraine's European integration intentions. In particular, freedom of movement and free choice of residence is guaranteed by the article No. 33 of the Constitution of Ukraine [42]. Therefore, these two options (second and fourth) are not acceptable for the state. Given the limited financial and technical capabilities, attracting highly qualified specialists from abroad is not enough promising measure of Ukraine's migration policy. Instead, the development of the motivational mechanisms for return of highly qualified specialists and creation of favourable conditions for their reintegration are regarded as more appropriate options for developing countries [41, p. 9]. The implementation of these measures should take place on the background of improving the security situation, promoting the rule of law, ensuring the availability of housing, economic development, improving circumstances for the development of science and education in general. After all, European experience shows that improving the protection of human rights and the general economic situation of the country (the donor of labor force) contributes to the return of migrant workers [43, p. 137].

However, it can be achieved in the long run.

One of the important policy measures to preserve and increase the human potential of the country is to use the resources of migrants and diasporas. It is about creation of the international enterprises, performance of joint projects, the organization of trainings, performances, lectures of migrants from Ukraine who wish to share the knowledge and abilities acquired abroad, to apply them for development of the homeland. Moreover, in the context of European integration and intensification of international migration of the population of Ukraine, it is required to change the approach from "brain drain" to "brain exchange and circulation" [41, p. 18] or "brain gain" [44]. Ukraine, as a signatory to the General Agreement on Trade in Services (GATS), should make efforts to make full use of the potential of the fourth model of service provision (presence of an individual). After all, this model is one of the most promising ways to develop circular migration.

The concept of circular migration took an important place in the formation of the common European Union migration policy in 2005. Since circular migration arises in accordance with international agreements (controlled and organized), it is regarded to be an effective alternative to illegal migration [45].

The main features of the circular migration are: time limitations (temporality) of staying and working abroad; the recurrence of migration movements over a period of time; voluntariness and legality [45]. Generally, the development of the model of circular migration involves: concluding appropriate agreements with recipient countries of labor; improving the pension system for migrant workers with the involvement of countries where they are employed; establishing a system of close cooperation with migrants during their staying abroad. Some experts on public administration and migration policy believe that the systematic circular migration will contribute to the legalization of dual citizenship [45]. In addition, the integration formations (for example, CIS, EU, APEC, etc.) create favourable conditions for the functioning of the circular migration. In particular, there are fewer administrative barriers (eg, lack of visa regime), better infrastructure and socio-economic relations, a simplified system of border control between the member states of a particular association.

It is argued that the model of circular migration is beneficial for all institutional units of the migration process – "triple-win solution" [46, p. 1]. In particular, it allows the country of origin of the migrant to receive remittances earned abroad, to prevent the loss of human resources, as well as to provide "brain circulation" and "brain gain" [45]. The destination country meets the labor market demand for labor at the expense of workers from abroad and at the same time avoids many of the negative consequences associated with permanent migration. It is about significant costs for integration of migrants, their social security, social tensions in society connected with segregation or separation of representatives of certain migration groups, etc. For the migrants themselves, circular migration provides an opportunity for legal employment, social security, a higher level of payment for their work, as well as the acquisition of new knowledge and useful experience. In addition, this model of

migration expands the freedom of choice of residence, receiving social benefits and services, spending earned money, as well as prevents the destruction of social contacts and family relationships.

It is worthwhile to mention that migrant's decision to return depends on variety structural, policy and individual factors and returning is a complex process, which consists of several stages (Figure 5). There is variety of "push" and "pull" factors in origin and host countries, the strength and direction of which depends on individual attributes (age, gender, educational level, social status etc.) and personal scale of values.
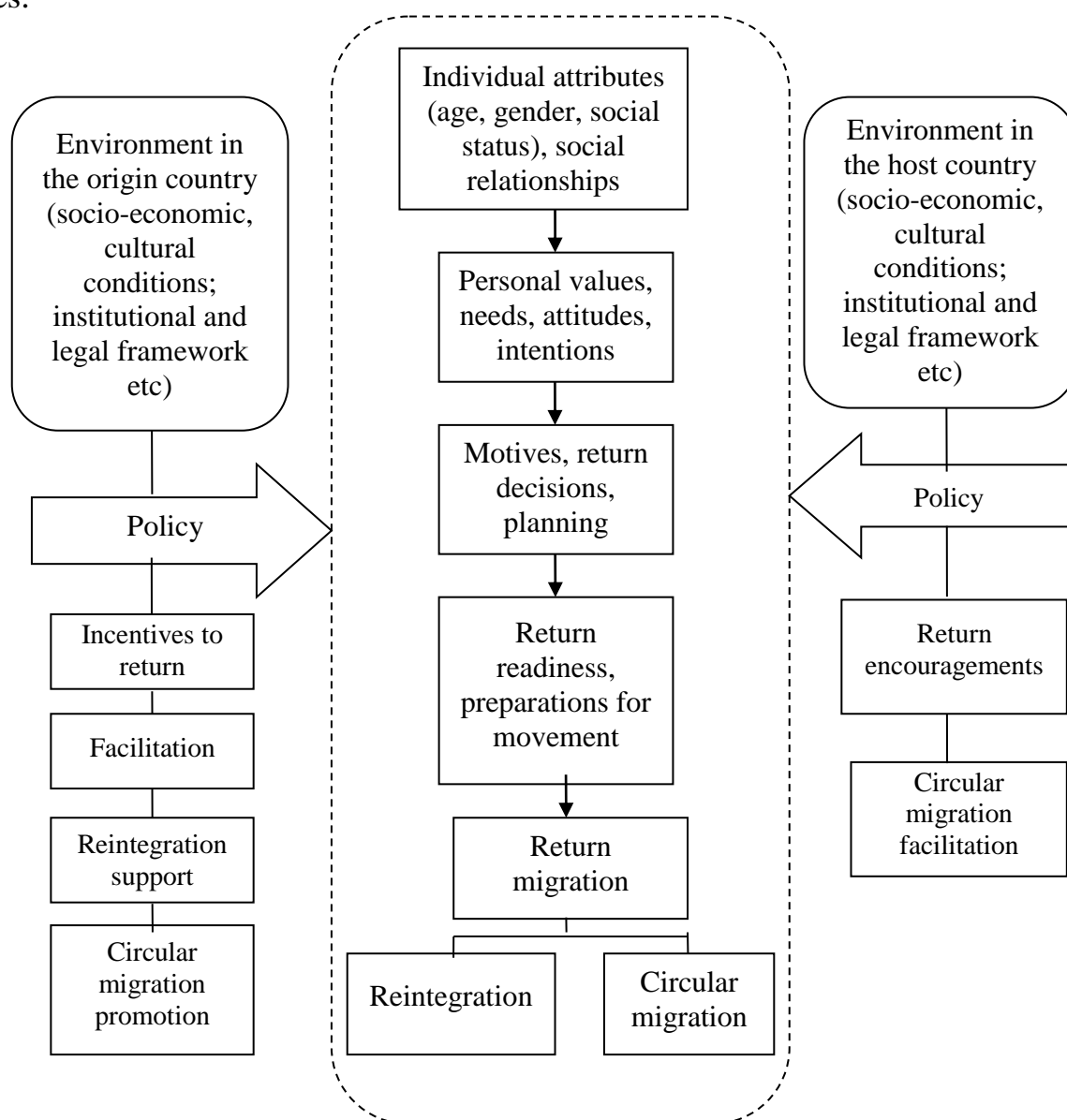
Figure 5. Return migration process: individual dimension

Source: authors' elaboration.

Special migration policy measures of both countries can significantly influence on decision making and readiness to return. That is why it is very important to develop effective policy instruments for supporting migrants at all stages of this process: forming motivation to return, movement and reintegration. In addition, those

returnees, who would like to participate in circular migration should get such an opportunity and support from the state.

Thus, effective return migration policy development is a complex process, which requires using all kinds of mechanisms: regulatory and legal (for example, special laws, re-emigration programs, agreements with host countries etc.), administrative (circular migration quotas), socio-economic (employment and business opportunities, migrants' remittances stimulation, improving the pension system), socio-cultural (cultural reintegration system, educational services for returnees and their children) and information (system of information dissemination, which concerns ways to return and opportunities in origin country for returnees).

Consequently, prospects for further research on this theme are developing mechanisms for new workplaces creation and promoting entrepreneurship for solving the problem of returnees' employment. Ukraine is an agrarian country, owning a significant part (8–9 %) of the world's black soils [47], has a high potential for agricultural development and for increasing employment in this sector. Moreover, this sector is the most promising under the conditions of European Green Deal implementation. That's why future research and developing of recommendations should take in consideration existing world experience in large-scale industrial agriculture and forest concessions progress and in starting up organic farming, for example [48; 49; 50].

Conclusions. Migration loss of human potential is one of the most significant negative consequences of external migration. It is a threat to the national security of the state and to its existence in general. Migration has to become an essential part of strategic planning of Ukrainian policy. The main task is not to stop migration but to maximize its benefits and minimize disadvantages. Effective return migration policy is one of the ways for solving this problem.

The sociological study showed a low level of migrants' readiness to return to Ukraine. One of the important reasons for such situation is that they do not see any prospects for themselves or their children in the native country. Factor analysis and the results of the sociological research give grounds to the conclusion that the reasons for migration and return migration are mostly economical. It means that the socio-economic mechanisms have to be used for regulation of return migration. In particular, the following problems need to be solved: approximation of social standards to norms of the European Union (first of all, raising the minimum salary and ensuring the timeliness of its payments); improving employment opportunities for the economically active population; overcoming corruption at all levels of society. It can raise population's optimistic expectations and vision of individual perspectives in Ukraine.

Along with the use of economic measures and the solution of the most acute socio-economic problems, it is also important to develop information, educational and cultural policies in order to form a positive image of Ukraine. So, it is an actual requirement to the Ukrainian state authorities for developing an attraction return policy, which aim is to stimulate and motivate Ukrainian migrants to return to their

origin country. On the next stage of return process it is important to facilitate it and then to give reintegration support or to introduce the model of circular migration. Developing of a comprehensive return migration policy can minimize negative effects of international migration for both origin and host countries, as well as for migrants themselves and for their families.

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FORECASTING AGRICULTURAL COMMODITY PRICE USING DIFFERENT MODELS: A CASE STUDY OF WIDELY CONSUMED GRAINS IN NIGERIA

Purpose. This study highlights the specific and accurate methods for forecasting prices of commonly consumed grains or legumes in Nigeria based on data from January 2017 to June 2020.

Methodology / approach. Different models that include autoregressive integrated moving average (ARIMA), artificial neural networks (ANN), seasonal decomposition of time series by loess method (STLM), and a combination of these three models (hybrid model) were proposed to forecast the sample grain price data. This study uses price data on widely consumed grains, such as white maize, local rice, imported rice, and white beans, in Nigeria from January 2017 to June 2020.

Results. Our result indicates that ARIMA is the best applicable model for white maize and imported rice because it is well fitted to stationary data, as demonstrated in the sample period. The STLM is more appropriate in forecasting white beans. As white beans are highly seasonal in Nigeria, it further explains why the STLM model fits better in forecasting prices. The production of local rice is inconsistent in Nigeria because of erratic rainfall and stiff competition from the importation of rice from other countries. Therefore, and consistent with the analysis, the hybrid model is the best model applicable to local rice because it captures varying trends exhibited in the data.

Originality / scientific novelty. This study suggests most accurate forecasting techniques for specific agricultural commodities in sub-Saharan African countries. It considers forecasting prices of commonly consumed grains and legumes in Nigeria and traded worldwide, such as imported rice, local rice, beans, and maize.

Practical value / implications. The study highlights the importance of appropriate forecasts for policymakers, producers, and consumers to enhance better decision making and serve as an underlying incentive to guide the allocation of financial resources to the agricultural sector, which determines the structure and degree of sectoral growth.

Key words: grains, agriculture, forecasting, hybrid model, Nigeria.

Introduction and review of literature. Currently, price anticipating methods of agriculture sector can be segregated into two sorts i.e., qualitative and quantitative forecasting approaches. As an addition to the techniques of forecasting prices for agricultural products, the qualitative forecasting techniques generally do not dominate the usual position with small accuracy and big subjectivity. Depending on the distribution of time, quantitative forecasting techniques can be divided into

econometric technique, time series analysis technique, and intelligent forecasting technique. The econometric technique discovers the supportive economic theory to the research gap, then puts forward the hypothesis, and forms the econometric technique to affirm the hypothesis (Gogas et al., 2022; Khedr et al., 2021; Li & Leung, 2021; Sriboonchitta et al., 2013; Huang et al., 2012). Nevertheless, most empirical research does not verify that the anticipation effect of the classic econometric technique is better than that of the time series analysis technique (Martín-Rodríguez et al., 2012). Hence, the time series analysis technique was substituted with the econometric technique in the 1990s. Due to the perplexity and stalemate difficulty of price forecasting agricultural products, price volatility always reveals the features of repeated brunt, unpredictability, etc. The advantage of self-adaptation, self-learning, and self-organization possessed by the intellectual anticipation technique corresponds to the features of market price volatility of agricultural products. Therefore, in recent times, the intellectual anticipation technique has been progressively applied to the forecasting agricultural price. Intelligent prediction techniques usually comprise artificial neural network, chaos theory, entropy analysis, extreme learning machines, radial basis function, and support vector regression.

The agricultural sector contributes significantly to the Gross Domestic Product (GDP) in Nigeria, accounting for 20.85 %, 21.2 %, 21.91 % in 2017, 2018, and 2019, respectively (World bank, 2019). Agriculture is a common source of employment in sub-Saharan Africa, employing about 60 % population. Agriculture accounts for 90 % employment in the rural areas and a source of livelihood for 10–25 % of urban households (OECD-FAO, 2016). National census data in various countries around the world showed a gradual increase in the number of people employed in agriculture (Pattnaik et al., 2018; Huang & Yang, 2017; Lowder et al., 2016; Yeboah & Jayne, 2015). Development in the agricultural sector is determined by the prices of agricultural commodities, which indicates their scarcity or surplus. Besides, prices serve as incentives that drive the allocation of resources and fairly define the structure and extent of economic growth (Ferrara et al., 2022; McNerney et al., 2022; Akintunde et al., 2012). Developed nations and developing countries (e.g., Nigeria) benefit from agricultural commodity price forecasting because it helps in forecasting food security and alerting policymakers by detecting the warning signs of an impending crisis early in the crop marketing year (Wang et al., 2022; Xu & Hsu, 2021; Sabu & Kumar, 2020; Antonaci et al., 2014; Araujo et al., 2012). Hence, this study provides accurate forecasting techniques for specific agricultural commodities in sub-Saharan African countries. Price fluctuates all year round; therefore, understanding the trend of such fluctuations helps producers, consumers, and policy makers in better decision making. Generally, when price increases, a household will spend more of its disposable income on food compared with the income spent before the price increase (Van Wyk & Dlamini, 2018).

Recently, few studies have examined forecasting of agricultural commodity prices in Africa (Zhang et al., 2020; Tomek & Kaiser, 2014). This study addresses the

gap as it considers forecasting prices of widely consumed grains and legumes in Nigeria, such as imported rice, local rice, beans, and maize. These products are essential to overcome food deficit, increase income of households, reduce expenditures, and increase revenue for manufacturing industries. Nigeria is the most populated country in Africa, thereby making it the highest consumer of grains in tropical and Sub-Saharan Africa (USAID/MARKETS 2010). Commodities consumed in high proportion in Nigeria play a significant role in the prices of such commodities in Africa. The U.S. Department of Agriculture (USDA), Production, Supply and Distribution (PSD) production dataset for the years 2012/2013 and 2016/2017 produce marketing years indicate that the production of corn in Nigeria is between 7.0 and 7.8 million metric tons (PSD 2017). Maize is among the most significant crops and staple foods consumed in Nigeria. Nigeria is the 10th largest maize producer in the world and the major producer in Africa with a yearly production of more than six million metric tons (USAID/Markets, 2010). The demand for maize grain is increasing due to its enormous usage as raw material used by poultry farms, breweries, food, and beverage industries.

Beans are one of the largest produced legumes in Africa, with Niger and Nigeria producing more than 75 % of the total beans/cowpeas (Walker et al., 2014). Beans are an essential food legume and a ready source of protein for the masses, particularly in West Africa. Besides, it is a vital component of crop farming methods in sub-Saharan Africa because beans can be grown as a single crop, inter crop, or relay and combined with millet, sorghum, and maize (Boukar et al., 2011; Kamara et al., 2010; Manda et al., 2020). Beans are an important source of relatively low-cost protein that does not require cold storage, thus making it affordable for low-income households. It is popularly referred to as the 'poor man's meat' (Mishili et al., 2009). Nigeria produces the largest amount of beans in the world and is the largest importer and consumer in the Sub-Saharan Africa (Alene & Manyong, 2006; Mishili et al., 2009; Manda et al., 2020).

In Nigeria, rice is a prominent staple food among the agricultural commodities consumed. Rice cultivation is common mainly in the rice farms clustered in the northern to the middle belt in Nigeria. Rice consumption has increased by 10 % per year because of shifting consumer preferences (Akande, 2003). Ebuehi & Oyewole (2007) found that many Nigerians prefer imported rice brands rather than local rice varieties, mainly because local rice is not processed to meet international standards. The fluctuating prices of agricultural commodities have a substantial effect on the population's well-being and on the outputs and inputs of agricultural production. Therefore, this study underscores the specific and accurate methods for forecasting prices of commonly consumed grains or legumes in Nigeria. Accurate forecasting of grain prices will help agricultural policy makers, producers, and consumers to make informed decisions to ensure optimal profit, risk reduction, and build resistance against food insecurity, and farmers can decide the quantity to produce and the prices to set when cultivating crops (Dorosh & Haggblade, 2003; Vågsholm et al., 2020). Badmus & Ariyo (2011) showed that forecasting helps policy makers with regard to

production, price structure, and consumption of maize in Nigeria. Agricultural commodity prices can also help in predicting inflation. Tule et al. (2019) examined the predictability of agricultural commodity prices in Nigeria's inflation forecast. Their result indicated that agricultural commodity prices can individually predict food and headline inflation. Considering the use of various variables to estimate and forecast agricultural prices, appropriate models suitable for accurate forecast of individual commodities prices should be developed, because each commodity is likely to exhibit different characteristics or a trend during price determination. Hence, this study underscores forecasting of the most commonly consumed grain in Nigeria using the appropriate forecast models.

In forecasting agricultural commodity prices, studies have used various models with interesting results. Odior (2014) examined the effect of macroeconomic policy indicators on agricultural performance in Nigeria. The study employed a one-step dynamic forecast model to analyze this effect with annual time series data from 1970 to 2012. The findings showed that monetary aggregate, change in technology introduced over time, public spending on agriculture, rate of inflation, exchange rates, and nominal interest rates significantly influence the gross domestic product in Nigeria. Joshua et al. (2019) employed the Dicky-Fuller Test and simple exponential smoothing model to forecast beans prices in Adamawa state, Nigeria. The exponential smoothing model suggested an increase in beans prices. Agricultural production is risky in that it affects producers and consumers, hence the need for long-term strategies to mitigate these risks. Rashid & Jayne (2010) highlighted that farm income would increase by 30 % if effective risk management strategies are used. Appropriate statistical models should be used to understand these risks. Higgins et al. (2015) used the normalized difference vegetation index (NDVI) to identify and control for differences in productivity conditions for the prices of millet in three West African countries (Niger, Mali, and Burkina Faso). They found that NDVI information positively improves price forecast, which helps in the timely detection of food insecurity and with the planning and execution of a response. Nigeria is vulnerable to food insecurity because agriculture depends on rainfall and is a means of employment to most of its population. Zakari et al. (2012) forecasted production of two staple food grains (millet and sorghum) using the ARIMA model based on data for 1970–2010. They established that by 2030, the overall production of grains would be approximately 12678 thousand tons, with sorghum and millet production at nearly 1574.8 thousand tons and 4503 thousand tons, respectively. Such forecasting information will help policy makers to reduce the nation's vulnerability to food insecurity as regards price structure, production, and consumption.

The trend of food prices consumed locally and for export is an important budgetary tool for government agencies and food aid programs (Ackello-Ogutu, 2011; Schnepf, 2016; Sanusi, 2018; Kitenge & Morshed, 2019). Few among the existing studies analyze agricultural prices with specific techniques to forecasting commonly consumed grain prices in Africa. Chen et al. (2010) used the asset-pricing method to forecast world agricultural prices. They found that the indices of the

exchange rate and equity market of Australia, Canada, and New Zealand can forecast the changes of major food and agricultural commodity prices. Conversely, Taylor et al., (2006) forecasted crop prices for soybeans, corn, and sorghum in Kansas, United States, using historical averages augmented with the current market data. They found that this method improved the accuracy of forecasts based on post-harvest data. Zhang et al., (2020) used a model selection framework to forecast grain prices. Support vector regression (SVR), artificial neural network (ANN), and extreme learning machine (ELM) were used as prediction models. Their results suggested that less grain features are a feasible methodology to improve the model selection performance, and for grain produce, varying distributions of the time series characteristics are suitable for price forecasts. Forecast models for agricultural prices perform differently for each forecast period; therefore, the forecast period is essential for selecting the right forecast model. This issue remains underexplored in the literature on the model selection framework to forecast prices of agricultural commodities. To fill the gap in literature, this study suggests specific and suitable model selection framework comprising time series features for forecasting agricultural commodity prices for each grain considered. In this study we propose an appropriate forecasting model for each grain price over time with detailed insights to the procedure used in the selection.

This study is presented as follows: section 2 presents the purpose of the article, as well as materials and methods; the results and discussions are reported in section 3; the study is concluded in section 4.

The purpose of the article. This study highlights the specific and accurate methods for forecasting prices of commonly consumed grains or legumes in Nigeria based on data from January 2017 to June 2020.

Material and methods. Data on grain prices used in this study are obtained from the National Bureau of Statistics (NBS) in Nigeria; the data is available on request and also available on the bureau website. These prices were collected from the local governments across states, and it reflects the actual household prices. The average of commodity prices is collected every month and reported by the states, and then the country average is the combined average of all states. Data from respondents were gathered by more than 700 staff located in all states of the federation. These staff members are supported by supervisors, who are also monitored by internal and external observers. To maintain the standards of data collection, the NBS audit team conducts random selected verification of the collected prices. From these data, we selected the most widely consumed grains and legumes across the country: white maize, local rice, imported rice, and white beans. All grain prices consist of 42 periods from January 2017 to June 2020. In Figure 1, white beans and white maize show a relatively downward trend toward the end of 2019, after which both increase progressively. Local and imported rice show a similar pattern of a relatively stable trend for both until the third quarter and a gradual rise.
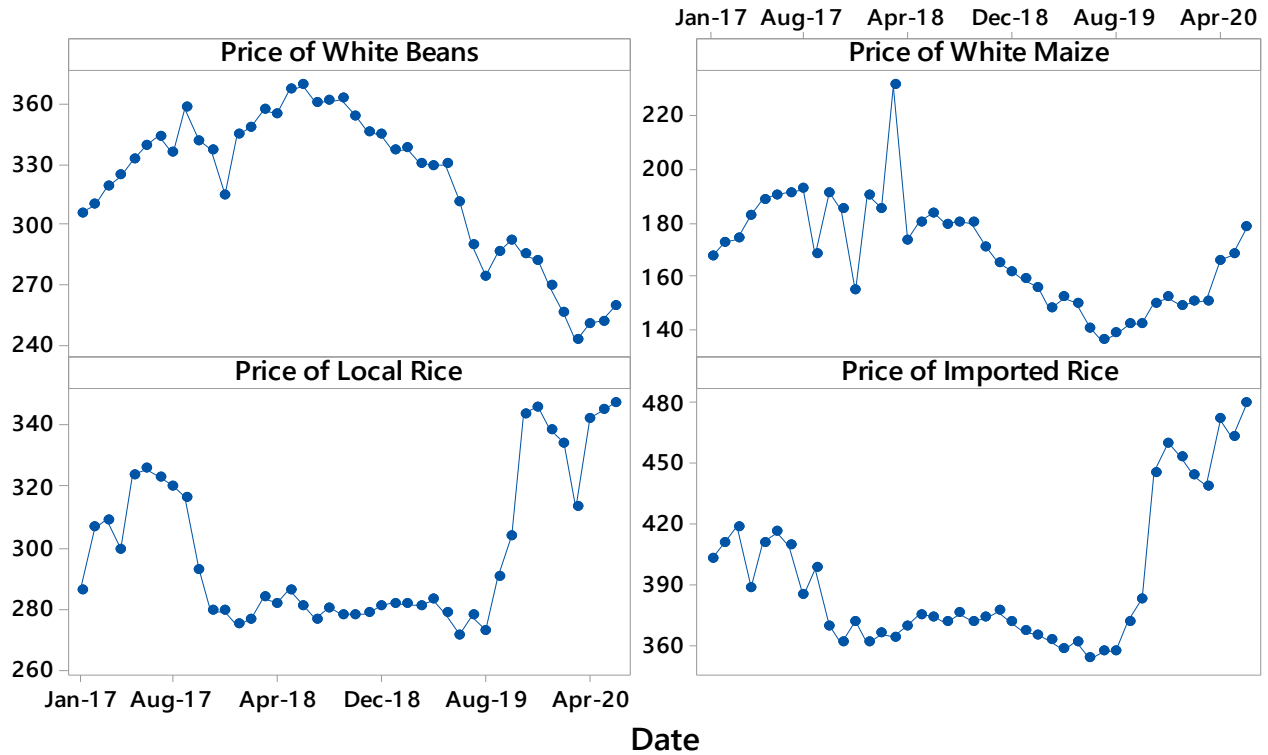
Figure 1. Time series plot of white beans, white maize, local rice, and imported rice

Source: authors' work.

Measures of forecasting accuracy. The best forecasting model was chosen based on three forecasting criteria: mean absolute error (MAE), root mean squared error (RMSE), and mean absolute percentage error (MAPE). Either MAE or RMSE is used to compare forecasting methods on a single data set, whereas MAPE is used for comparing the forecasting accuracy on data with varying time series with different measures. Thus, RMSE is an appropriate criterion if the data are free of extreme values, while MAE is superior in the presence of outliers (Pei & Li, 2019; Hyndman & Koehler, 2006). For example, based on MAE, the efficiency ratio of the suggested forecasting model relative to the benchmark model Ω, is defined as:

$$\Omega = \frac{MAE_p}{MAE_b}, \tag{1}$$

where MAE_b and MAE_p are from the benchmark and proposed models, respectively. A ratio less than 1 shows that the proposed forecasting model is more efficient than the benchmark model, and if Ω tends to 1, then the two forecasting models are nearly equivalent, or else, the proposed model works poorly (Safi & White, 2017).

1. ARIMA model. The typical $ARIMA(p,d,q)$ model is given by Box et al. (2015):

$$\phi(B)\nabla^d Y_i = \theta(B)\epsilon_i, \tag{2}$$

where, $d \geq 1$ is the degree of differencing; $\nabla = 1 - B$ is the differencing operator;

B, which is the *lag* operator, is defined as $BY_t = Y_{t-1}$, the operator that explains the prior value of the series. $\phi(B)$ And $\theta(B)$ are polynomials of degree p and q in B, respectively:

$$\phi(B) = 1 - \emptyset_1 B - \emptyset_2 B^2 - \cdots - \emptyset_p B^p \qquad (3)$$

And

$$\theta(B) = 1 - \theta_1 B - \theta_2 B^2 - \cdots - \theta_q B^q \qquad (4)$$

The best fit ARIMA model is selected according to AIC, AICc, or BIC value.

2. STLM. Seasonal and trend decomposition using loess method (STLM), developed by Cleveland et al. (1990), is a versatile and robust method for decomposing time series. Loess is a method for estimating nonlinear relationships. STLM can be robust to extreme values; consequently, these values will not affect the estimates of the trend cycle and seasonal components. In addition, STLM can handle any type of seasonality.

3. Artificial neural network. The nnetar function is used in fitting the ANNs. This function is described as feed-forward neural networks with one concealed layer and lagged inputs for forecasting univariate time series. This function fits Neural Network Autoregressive models NNAR (p, P, k). For the nonseasonal time series, the default is the optimum number of lags, which give the AIC, for a linear auto regressive (p) model (Hyndman, 2006).

4. Hybrid model. The hybrid model fits numerous individual model specifications to allow easy creation of collective forecasts. The hybrid model consists of a combination of three models: ARIMA, ANN, and STLM. Each component of the hybrid model captures its specific trend inbuilt in the model. For example, STLM is used for highly seasonal data, ARIMA is used for stationary data that is linear, ANN is used for nonlinear data.

Results and discussion. This section presents the empirical results of the models used for forecasting the price of legume and grains (white beans, white maize, local rice, and imported rice) using four approaches: the ARIMA, STLM, ANN models, and the hybrid combination of the three models.

In this study, the Anderson-Darling (AD) normality test was used to confirm if the residuals after approximation for the four models followed a normal distribution. The normality test yielded the following *p*-values for the following legumes and grains for the four models, Hybrid, ARIMA, STLM, and ANN, respectively: (1) white beans residuals: 0.5787, 0.3629, 0.06149, and 0.01706, (2) white maize residuals: 0.0549, 0.02835, 0.01366, and 0.0006516, (3) local rice residuals: 0.4596, 0.002722, 0.3162, and 0.09366, and (4) imported rice residuals: 0.5856, 0.01944, 0.5379, and 0.005839. The tests for normality for the residuals of the four data sets indicate that the normality assumption was not satisfied for all models. Given that the data are not normally distributed (without loss of generality), to compare the performance of the models through the four datasets, forecasting accuracy measure MAE was used over the forecasting period for each model. Smaller values of MAE indicate higher forecasting accuracy. Therefore, the ratios of the MAE of the hybrid

model to those of the ARIMA, STLM, and ANN models were analyzed.

Table 1 lists the complete empirical results for MAEs using the actual and predicted values of ARIMA, STLM, ANN, and Hybrid models. The forecasting model is chosen based on the forecasting criterion MAE. The efficiency ratio defined in equation (1) is used for this selection.

Table 1

MAEs of ARIMA, STLM, ANN, and Hybrid models

Dataset	Statistics	ARIMA	STLM	ANN	Hybrid
White Beans	RMSE	1127.85	1039.65	11020.39	3191.14
	MAE	30.35	27.67	100.26	52.60
	MAPE	11.93	10.93	39.04	20.57
White Maize	RMSE	376.98	880.48	518.45	542.09
	MAE	16.36	27.15	18.64	20.72
	MAPE	9.99	16.99	11.33	12.77
Local Rice	RMSE	1346.17	1904.68	5628.13	147.75
	MAE	35.15	41.98	73.27	9.15
	MAPE	10.28	12.30	21.77	2.76
Imported Rice	RMSE	5720.83	6124.17	9598.73	7039.68
	MAE	74.44	77.15	97.01	82.86
	MAPE	16.22	16.82	21.16	18.06

Source: authors' work.

The ANN model is applied to white beans with an average of 1,000 networks, which is a 2–25–1 network, with 101 weights and an estimated noise variance of 3.302. The result shows that the best fit model was the ARIMA (0,1,0) and an estimated noise variance of 127.8 (with $AIC = 255.72$, $AICc = 255.84$, and $BIC = 257.21$). For the STLM model, simple exponential smoothing with multiplicative errors is fitted. The estimated values of the model smoothing parameters are $\hat{\alpha} = 0.7796$, with the initial level $l_0 = 412.015$, and the estimated noise variance equal to 0.00072 (with $AIC = 281.4043$, $AICc = 282.2043$, and $BIC = 285.9834$). The corresponding MAEs of ARIMA, STLM, ANN, and Hybrid models equal 30.35, 27.67, 100.26, and 52.60, respectively. This result shows that the relative efficiencies of STLM model to the ANN, ARIMA, and Hybrid models equal Ω = 0.2759, 0.9115, and 0.5260, respectively. Therefore, the STLM model is more efficient compared with ARIMA and is superior to the ANN and Hybrid models for white beans data. However, given the second choice in this case, the ARIMA model can be used because it is almost as efficient as the STLM model, although it is not a perfect substitute.

The ANN model is applied for white maize with an average of 1,000 networks, which is a 3–25–1 network, with 126 weights and an estimated noise variance of 0.00008. For the ARIMA model, the result shows that the best fit model was the ARIMA (0,1,1) and an estimated noise variance of 210.3 (with $AIC = 273.52$, $AICc = 273.92$, and $BIC = 276.52$). For the STLM, simple exponential smoothing with multiplicative errors is fitted. The estimated values of the model smoothing parameters are $\hat{\alpha} = 0.5636$, with the initial level $l_0 = 168.3865$, and the estimated noise

variance equals 0.00736 (with AIC = 306.3208, AICc = 307.1208, and BIC = 310.8999).

The corresponding MAEs equal 16.36, 27.15, 18.64, and 20.72 for ARIMA, STLM, ANN, and Hybrid models, respectively. This result shows that the relative efficiencies of the ARIMA model to the STLM, ANN, and Hybrid models equal $\Omega = 0.6026$, 0.8777, and 0.7897, respectively. Therefore, the ARIMA model is more efficient than ANN and is superior to the STLM and Hybrid models for white maize data. However, as a second choice for this grain, the ANN model could be considered. The ANN model is applied for local rice with an average of 1,000 networks, each of which is a 2–25–1 network, with 101 weights and an estimated noise variance of 3.85. For the ARIMA model, the result shows that the best fit model was the ARIMA (0,1,0) and estimated noise variance of 81.32 (with AIC = 240.8, AICc = 240.92, and BIC = 242.29). For the STLM, simple exponential smoothing with multiplicative errors is fitted. The estimated values of the model smoothing parameters are $\hat{\alpha} = 0.9999$, with the initial level $l_0 = 299.4986$, and the estimated noise variance equals 0.000807 (with AIC = 266.9505, AICc = 267.7505, and BIC = 271.5296).

The corresponding MAEs for these models equal 35.15, 41.98, 73.27, and 9.15 for ARIMA, STLM, ANN, and Hybrid models, respectively. This result indicates that the relative efficiencies of the Hybrid model to the STLM, ARIMA, and ANN models equal $\Omega = 0.2181$, 0.2605, and 0.1249, respectively. Therefore, the Hybrid model is superior to the ARIMA, STLM, and ANN models for local rice data. The ANN model is applied for imported rice with an average of 1,000 networks, each of which is a 2–25–1 network, with 101 weights and an estimated noise variance of 3.221. For the ARIMA model, the result shows that the best fit model was the ARIMA (0,1,0) and an estimated noise variance of 127.8 (with AIC = 255.72, AICc = 255.84, BIC = 257.21). For the STLM, simple exponential smoothing with multiplicative errors is fitted. The estimated values of the model smoothing parameters are $\hat{\alpha} = 0.7796$, with the initial level $l_0 = 412.015$, and the estimated noise variance equals 0.00072 (with AIC = 281.4043, AICc = 282.2043, and BIC = 285.9834). The MAEs equal 74.44, 77.15, 97.01, and 82.86 for ARIMA, STLM, ANN, and Hybrid models, respectively. This result indicates that the relative efficiencies of the ARIMA model to the STLM, ANN, and Hybrid models equal $\Omega = 0.9649$, 0.7674, and 0.8983, respectively. Therefore, the ARIMA model performs more efficiently than STLM, and is superior to the ANN and Hybrid models for imported rice data. However, as a second choice, the STLM model should be considered.

Figure 2 illustrates a comparison of the forecast for the grains using the best forecasting model with the actual values. It shows that the predicted values are close to the actual values; therefore, it substantiates the valid use of the suggested models. After feeding the model with data from November 2019 to June 2020 and repeating the procedure the forecasts for the four products for the following 8 months, that is,

July 2020 to February 2021 is shown in Table 2 and Figure 3.
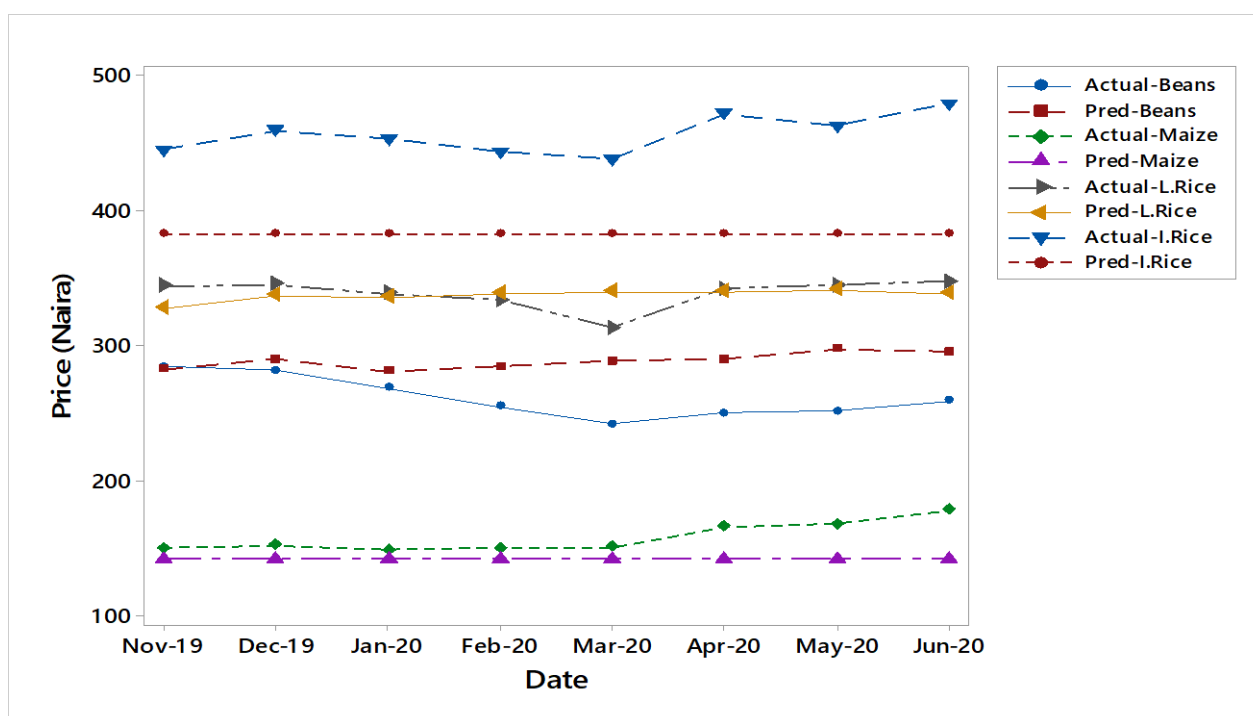
Figure 2. Forecasts and actual values for grains

Source: authors' work.

In our forecast, using the best model for each grain, white beans and local rice show a declining trend in prices, whereas white maize and imported rice show a relatively stable trend for the forecasts. The prediction intervals are preserved from the individual component models and use the most extreme values from each individual model, producing conservative estimates for the performance of the combination of the models.

Table 2

Forecast for all grains using the full data

Date	White Beans (STLM)			White Maize (ARIMA)			Local Rice (Hybrid)			Imported Rice (ARIMA)		
	Point	Lo	Hi	Point	Lo	Hi	Point	Lo	Hi	Point	Lo	Hi
Jul-20	256.0	234.2	277.9	170.2	143.4	197.0	346.4	322.3	373.1	479.7	449.2	510.3
Aug-20	251.1	220.4	281.9	170.2	140.4	200.0	348.3	314.0	385.9	479.7	436.5	523.0
Sep-20	262.1	224.5	299.7	170.2	137.7	202.7	340.8	295.5	392.9	479.7	426.8	532.7
Oct-20	248.7	205.3	292.1	170.2	135.2	205.1	323.7	272.4	396.1	479.7	418.6	540.9
Nov-20	244.3	195.8	292.8	170.2	132.9	207.5	328.6	281.3	404.8	479.7	411.3	548.1
Dec-20	248.7	195.6	301.9	170.2	130.7	209.7	328.0	278.8	415.3	479.7	404.8	554.7
Jan-21	241.6	184.2	298.9	170.2	128.6	211.7	326.5	277.2	412.6	479.7	398.8	560.7
Feb-21	241.5	180.1	302.8	170.2	126.6	213.7	325.5	273.7	418.0	479.7	393.2	566.3

Source: authors' own calculations.

This study used different forecasting models to exploit the capabilities of the ARIMA, ANN, STLM, and the hybrid model that combines these three models in time series forecasting of grain prices in Nigeria. The forecasting performance was compared on the basis of the residuals for these models using data for some of the

most widely consumed grains in the region. The study further enumerated, explained, and discussed the various forecasting approaches and the criteria used for choosing a forecasting technique to provide the best result for each grain price. These results show that there is no universally suitable technique for all grains; rather, the forecast of each grain performs better with a specific model.
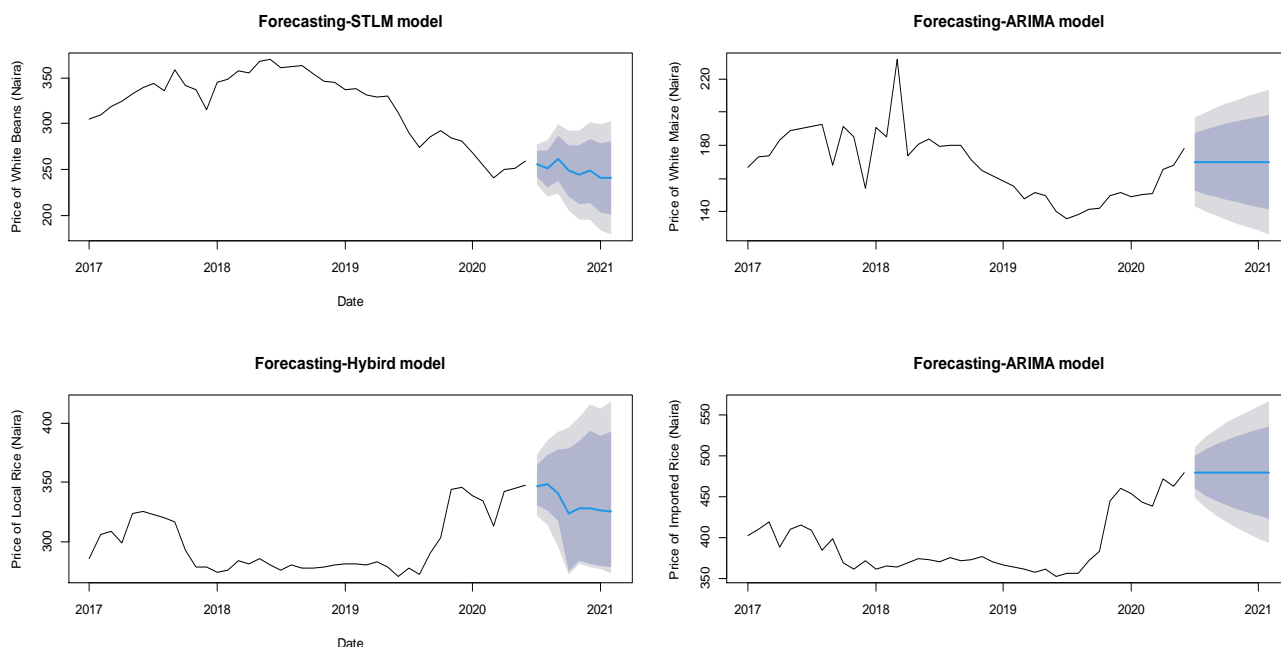
Figure 3. Forecasts for the four grains

Source: authors' work.

The study finds that ARIMA is the best applicable model for white maize and imported rice because it is well fitted to stationary data, as demonstrated in the sample period. Imported rice shows a relatively stable trend because specific quotas are allowed into the country every year, which provides some stability in its price, which also explains why the ARIMA model is the most suitable forecasting model. However, the STLM is more appropriate in forecasting white beans. As white beans are highly seasonal in Nigeria, it further explains why the STLM model fits better in forecasting prices. The production of local rice is inconsistent in Nigeria because of erratic rainfall and stiff competition from the importation of rice from other countries. Therefore, and consistent with the analysis, the hybrid model is the best model applicable to local rice because it captures varying trends exhibited in the data. For future research, we will answer questions such as; if the model decided for each grain is consistent for countries with similar characteristics for a wider range of commonly consumed grains in Africa. In addition, it will be important to test whether the importation and exportation of grains play a significant role in the forecasting methods that are chosen to forecast agricultural commodity prices. Consequently, we may apply the hybrid model for analyzing longitudinal data for African countries.

Conclusion. This study uses price data on widely consumed grains, such as white maize, local rice, imported rice, and white beans, in Nigeria from January 2017 to June 2020 to forecast grain prices. Different models that include autoregressive

integrated moving average, artificial neural networks, seasonal decomposition of time series by loess method, and a combination of these three models (hybrid model) is proposed to forecast the sample grain price data. This study contributes to the literature on accurate forecasting of agricultural commodity prices, and the analysis underscores the importance of providing the appropriate forecasts for policy makers, producers, and consumers for better decision making. Accurate agricultural price forecasts serve as a basic incentive to guide in the allocation of financial resources to the agricultural sector, which determines the structure and degree of sectorial growth. As prices fluctuate all year round, having information on future agricultural prices will improve planning and enhance food security.

The study finds that ARIMA is the best applicable model for white maize and imported rice because it is well fitted to stationary data, as demonstrated in the sample period. The STLM is more appropriate in forecasting white beans. As white beans are highly seasonal in Nigeria, it further explains why the STLM model fits better in forecasting prices. The production of local rice is inconsistent in Nigeria because of erratic rainfall and stiff competition from the importation of rice from other countries. Therefore, and consistent with the analysis, the hybrid model is the best model applicable to local rice because it captures varying trends exhibited in the data.

For future studies, a multivariate analysis can be performed to explore variables that explain the movement of grain prices. Also, a mixed data analysis approach could be used to see the effect of daily agricultural stock prices on future prices of grain commodities given different frequencies in available data.

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FINANCIAL WELL-BEING OF TERRITORIAL COMMUNITIES AND THE ECONOMIC GROWTH OF THE REGIONS OF UKRAINE: ASSESSMENT AND MODELING OF INTERRELATION

Purpose. The purpose of the article to assess and model the interrelation between the financial well-being of territorial communities (TCs) and regional economic growth in Ukraine under conditions of uncertainty.

Methodology / approach. The empirics of assessment and modeling of a causal relationship between the financial well-being of TCs and economic growth of regions is based on: the construction of time series for empirical parameters of territorial communities' financial well-being (substantiation of structural elements of financial well-being, TCs clusterization by the criteria of profitability, and calculation of integral coefficients); multidimensional estimation of regional economic growth (multiplicative approach, principal component analysis); detection of impact ("pressure" force) of TCs' financial well-being on the paces of regional economic growth (index and regression methods).

Results. Based on the results of the integral assessment with preliminary clusterization of TCs by their revenues, the article reveals that in 2020, the weighted average level of TCs' financial well-being in Ukrainian regions was the highest in Zakarpattia (0.592), Kherson (0.534), Zaporizhzhia (0.513), and Chernivtsi (0.512) oblasts, while the lowest – in Ivano-Frankivsk (0.281) oblast. In 2010–2020, Ivano-Frankivsk (0.48 %), Poltava (0.06 %), Rivne (0.16 %), Ternopil (0.25 %), Khmelnytskyi (0.35 %), and Chernihiv (0.54 %) oblasts demonstrated higher annual average economic growth paces, while Dnipropetrovsk (-0.86 %) and Kherson (-0.94 %) oblasts – negative ones.

Originality / scientific novelty. The article enhances the methodological approach to the complementary assessment of TCs' financial well-being and regional economic growth, which has contributed to modeling the ability of territories' economies to increase investment-economic capacity and the causal relationship between economic growth determinants and the financial capacity of territorial communities in regions.

Practical value / implications. The article offers and substantiates the action-oriented approach to the assessment of regional economic development. Its implementation contributes to making the spatial breakdown of the system's economic condition and building the architectonics of economic progress determinants to determine the "divergence areas" of regional development.

Key words: economic growth, territorial community, region, Ukraine, financial well-being, financial capacity, causality.

Introduction and review of literature. Aggravation of crisis phenomena in Ukraine (caused by both external and internal triggers) produces disturbing trends that affect the financial-economic system and multiply negative effects both in the country and territorial communities. In this sense, the issues of determining the financial well-

being level of TCs as an essential indicator of economic, managerial, and security stability and resilience under conditions of uncertainty are becoming increasingly important. Considering the change of organization of financial relationships on various levels of public management in Ukraine, assessment of the impact and modeling of the relationship between the financial well-being of territorial communities and the economic growth of regions they belong to is of practical interest. The available methodological framework of the research of TCs' financial well-being is fragmental and incomplete and doesn't help to carry out a comprehensive analysis and simulation modeling and prediction of financial well-being's impact on regional economic growth and thus the development of timely measures to achieve the balanced development of territories. Therefore, it is high time to elaborate a set of tools that will be based on the understanding of the evolution of the welfare concept in compliance with the principles of data accessibility, indicators universality, and capacity for comparative analysis.

In our opinion, financial well-being should be regarded as an indicator that shows the financial condition of an entity (financial and property assets) and a set of characteristics of a competitive living environment from the viewpoint of opportunities for people to receive decent income, realize and develop personal capacity under conditions of security and freedom of choice. Financial well-being is defined by the income level, but its absolute equivalent isn't an objective measure of financial well-being. A higher income level can be eliminated due to: (1) availability of one source of income that instantly causes a significant decline in an entity's well-being in case of crises (loss of job, disability); (2) solely consumption-based (forced or conscious) economic behavior of an entity that limits the capacity of income sources differentiation and further growth of well-being; (3) additional expenditures caused by the need to buy drugs and medicine, maintenance of disabled family members, additional expenditures on housing and transport, etc. A high well-being level is a criteria feature of the quality of life and living standards, while financial well-being is the feature of securing the self-sufficiency of residents of territorial communities.

Scientific research shows that the galaxy of current studies is based on the individualization of well-being analysis in the context of self-assessment when the well-being on an individual level is a complex indicator of wellness and normal living activity, the experience of positive emotions, opportunities for development and communications, control over life, and the sense of one's goal (Huppert, 2009). Meanwhile, the subjective assessment of well-being by the population can be objectivized and supplemented with the most significant statistical data. Accordingly, the results of calculating the happiness index show that income, social assistance, and health that can be quantified impact the happiness level the most (Helliwell et al., 2019). With regard to the information on emotional perception of well-being by the population, it can be the ground for the public policy if average well-being scores are considered (O'Donnell & Oswald, 2015).

The complex assessment of well-being with the combination of sociological and statistical parameters is an essential information basis for efficient public and regional policies. The unification of methodological approaches to well-being assessment

allows comparing its level among different types of territories and socio-demographic groups. Therefore, the issue of creating an integrated and multidimensional well-being parameter that would be based not only on subjective (individualized) estimations remains open (Ruggeri et al., 2020).

The critical analysis and generalization of various approaches to the analysis of well-being show the development of numerous assessment methodologies. Some share of them is used by international organizations, creating the ground for interstate comparisons – Human Development Index, Happy Planet Index, OECD Better Life Index, International Living Index, Consumer Confidence Index, Genuine Progress Index, etc. (Hagerty et al., 2001; Sharpe, 1999). These indices are promoted as the 'beyond GDP' approaches, indicating the lack of objectivity from the viewpoint of assessment of economic well-being (Berik, 2018). Some states are testing the methodology of calculating the Index of Sustainable Economic Welfare (ISEW), which allows calculating the contribution of a state (region) to the general level of well-being by calculating the benefits and losses from economic activity (Bleys, 2013).

Meanwhile, there are some initiatives on localization of well-being assessment by calculating how it is influenced by specific conditions (Cylus & Smith, 2020). Scientific research on TCs' well-being is increasingly relevant. The states with long-lasting local governance traditions test the methodologies of TCs' well-being calculation that cover the parameters of education, human resources activity, income, and housing (McHardy & O'Sullivan, 2004). Mostly environmental and infrastructural problems and peculiarities of securing the well-being of the population in certain types of settlements, including rural and remote ones, are in the focus of TCs' wellbeing research. Despite the features of TCs, well-being is considered as the factor and result of their resilience (Maybery et al., 2009). The prerogative of creating economic conditions for well-being remains on the national level, while TCs receive the main functional liabilities regarding the introduction of social innovations and maximum civic engagement (Kluvánková et al., 2018). Social entrepreneurship is considered as an efficient form of securing the TCs' well-being at the intersection of economic and social goals. Social entrepreneurship entities operate in the strategic for domestic consumption industries, and they can provide assistance to socially vulnerable categories of the population (Mckinnon et al., 2021). However, social priorities are relevant for the developed TCs, while the financial component of well-being remains more significant for developing TCs and those under conditions of uncertainty.

Well-being assessment across its components allows substantiating the capacity of certain directions of public and regional policies. The concept of financial well-being outlines the economic factors of its generation: an economic interpretation of well-being stipulates the consideration of income impact resulting in a higher consumption level (Fuentes & Rojas, 2001). Methodological approaches to the assessment of financial-economic aspects of well-being generation were first addressed in the late 1980s, when economic well-being was suggested to be calculated based on the following parameters: consumption, expenditures, life expectancy; income distribution (poverty, unequal income); accumulation of production resource reserves

(finance, housing, natural resources, environmental costs, human capital, investment); security (unemployment, diseases, disintegration of families, ageing) (Osberg, 1985). Testing of the methodology in Canada, the USA, and some OECD countries allows solving a range of conceptual issues, namely detecting the problems of the shadow economy, taking into consideration the life expectancy, modeling the risks of unemployment and poverty in old age, determining financial losses from diseases, etc. The integration of parameters of impact on the environment, despite the difficulties in the monetary assessment of pollution parameters, has become the most significant conceptual problem (Osberg & Sharpe, 2002).

The development of the financial well-being analysis methodology includes methodological approaches to the assessment of its impact on other progressive processes. The relationship between the well-being of the population and environmental condition is proven, so it raises the issue of a new category of "nature's well-being" (Brymer et. al., 2019). The understanding of well-being as utility and sustainable development goals remains relevant and requires the harmonization of methodologies for evaluating these categories (Neumayer, 2007). Coordination of social, economic, and environmental goals is still the relevant discussion regarding the development of sustainable human well-being that needs balance with the departure from utopian models (Michalos, 1997). Assessment of the impact of financial well-being on economic growth is an urgent scientific task that combines social and economic aspects of progressive changes. The results of the assessment are important for decision-making since they allow applying a critical "pressure" of financial well-being on the economic growth of a territory (state, region) and its ability to increase investment capacity (Voznyak et. al., 2022). However, methodological developments should take into account the parameters that would represent the quality-of-life features of economic progress (Ferrara & Nisticò, 2015; Khirivskyi et al., 2022; Storonyanska et al., 2021; Vasyltsiv et al., 2021).

Well-being should serve as an alternative indicator of economic growth (as opposed to GDP), indicating the limits in quantitative parameters and being the catalyst of transition to a social model less dependent on growth (Thiry, 2015; Rushchyshyn, et al., 2021). Methodological developments regarding the evaluation of the impact of well-being on economic growth should be tested by different countries considering their specifics since, for instance, developing countries can have lower causal effects due to the vicious circle of poverty as they face financial instability and unfair income distribution (Islam et al., 2017; Voznyak et al., 2021).

The impact of well-being on economic growth should be researched both holistically and across individual components, showing their significance. These can be both the main parameters of income and consumption and the parameters of the social relations and social capital system (Zakharov et al., 2020). The indicators of social capital have a stronger impact on subjective estimations of well-being in developed societies than personal demographic and family features (Hooghe & Vanhoutte, 2011). The impact of economic parameters on well-being in subjective estimations is less significant in the developed countries where the basic needs of the

population are satisfied: the wealthier is the society, the more well-being is defined by social relationships and job satisfaction, while income remains the decisive factor for developing countries (Diener & Seligman, 2004).

Despite the progressive nature of ideas regarding the growing role of social aspects in the well-being of the population, they acquire these features if the basic needs related to economic processes are met. Therefore, the development of financial well-being assessment methodology as an indicator of the impact of economic factors on the population remains a relevant scientific task. Methodological approaches to the assessment of financial well-being at the national level require an adaptation considering territorial specifics – regions and territorial communities. Modeling the relationship between the processes of territorial communities' well-being generation and the economic growth of regions they belong to is among the essential results of methodological adaptations. The practical significance of obtained results for further development of regions and territorial communities increases under conditions of uncertainty as the financial well-being of TCs as a set of determinants is defined by the efficiency of realization of a territory's economic capacity and the level of financial capitalization of obtained results. Therefore, regional economic growth correlates with the financial capacity of TCs, the economic behavior of households, and conditions of rational financial decision-making.

The purpose of the article to assess and model the interrelation between the financial well-being of TCs and regional economic growth in Ukraine under conditions of uncertainty.

Methodology. The methodology of assessing the impact of TCs' financial well-being on regional economic growth includes the following consequent stages: (1) construction of a series of empirical indicators of territorial communities' financial well-being based on the spatial approach; (2) calculation of regional economic growth coefficients in Ukraine based on the temporal approach; (3) assessment of the impact of TCs' financial well-being on regional economic growth.

Stage I. The following indicators were selected following the principles of data accessibility, universal parameters, and capacity of comparative analysis by the criteria of dynamics and space to assess the financial well-being of Ukrainian TCs (for 2017 and 2020): revenues of the general fund per capita, USD; budget subsidiarity level, %; capital expenditures per capita, USD; the share of management staff cost in the revenues of general fund, %. 12 TCs were selected to carry out the research within each region of Ukraine and further divided into 3 groups by the profitability criteria (the most profitable, moderately profitable, and the least profitable).

To construct homogeneous time series of indicators for each group of TCs within a region we use normalization by the formula (1) for stimulating and destimulating indicators (2):

$$a_{it}^{sn} = {x_{it}^n}\big/{x_{\max t}^N}, \quad (1) \qquad\qquad a_{it}^{dn} = {x_{\min t}^N}\big/{x_{it}^n}, \qquad (2)$$

where a_{it}^{sn}, a_{it}^{dn} – normalized values of the i stimulating and destimulating

indicator for the n TC in t period;

$x_{\max t}^{N}$, $x_{\min t}^{N}$ – maximum and minimum values of the i indicator in t period within the N set of TCs in a region;

The mixed method of data normalization and additional condition (formula 3) are applied for the subsidiarity level indicator since it can have a controversial nature of the impact on the TCs' financial well-being.

$$a_{it}^{sn} = 1 - {x_{it}^{n}}\Big/{x_{\max t}^{N}}, \text{ if } a_{it}^{sn} < 0, then\ a_{it}^{sn} = 1 \qquad (3)$$

The weight coefficients within each group of TCs for a selected set of territories are calculated following the principal component analysis, and the integral coefficient of a TC's financial well-being is constructed based on the multiplicative approach.

Stage II. There are numerous approaches to the assessment of regional economic growth in global and domestic economic discourses on the grounds of overcoming the negative socio-economic development trends in some areas and maintaining sustainable development, as well as based on the assessment of an innovation-oriented economy and following the smart specialization direction. Therefore, the lack of universal, valid, and consolidated empirical parameter constitutes the methodological vacuum in the research of regional economic growth.

The suggested assessment approach is grounded on growth coefficients of the indicators of the economic system development. The data of regional statistical offices served as the statistical basis for the calculation of regional economic growth parameters in Ukraine. The information-analytical framework of assessment was developed and parameters were selected following the principles of validity, universality, and comparability.

The following indicators were selected to assess the regional economic growth in Ukraine: GRP per capita, USD; capital investment per capita, USD; foreign direct investment per capita, USD; consumer price index, %; the volume of sold products (goods, services) by small businesses per one employed, thousand USD; personal income tax per capita, USD; corporate income tax per one enterprise, USD.

Taking into account the fact that the indicators have different dimensions and orientations, the correct normalization will help bring the indicators to the [0; 1] range and compatible series. The economic growth indicators are normalized based on the calculation of the growth coefficients by the chain method (4):

$$a_{it}^{n} = {x_{it}^{n}}\Big/{x_{it-1}^{n}}, \qquad (4)$$

where x_{it-1}^{n} – the value of the i indicator of the n oblast in t-1 period;

a_{it}^{n} – growth coefficient of the i indicator for n oblast in t-1 period.

The construction of an empirical regional economic growth parameter in Ukraine stipulates the use of the multiplicative approach following the principal component analysis. The suggested authors' methodology allows revealing the structure of relationships between indicators and constructing integral coefficients of economic growth based on the temporal-spatial approach. This method for calculating the integral coefficients of economic growth also takes into account the non-linearity of social and

economic processes by the use of the logarithm function.

Stage III. The impact of TCs' financial well-being on economic growth paces is detected based on the calculation of press index and press factor by the formulas (5–6):

$$IndPr_n = \frac{\left(FW_n/EG_n\right)_t}{\left(FW_n/EG_n\right)_{t+1}}, \tag{5}$$

$$FPr_n = 1 - IndPr_n, \tag{6}$$

where $IndPr_n$ – the force of impact ("pressure") of TCs' financial well-being on the economic growth of the *n* region;

FW_n – TCs' financial well-being of the *n* region;

EG_n – economic growth level of the *n* region;

t – period;

FPr_n – factor of financial well-being's impact on economic growth paces of the *n* region.

The press index shows how much the regional economic growth paces change if TCs' financial well-being level changes by 1 % for a certain period. If the press factor exceeds zero ($FPr_n > 0$) and the parameter grows in dynamics, there is an effect of "direct impact", i.e. the reduction of the financial burden on the economic system of the region at the growing financial well-being of TCs. If the press factor is below zero ($FPr_n < 0$) and is decreasing in dynamics, economic growth is limited due to the lack or minimum maintenance of the TCs' financial well-being.

Results and discussion. *1. Empirics of territorial communities' financial well-being: spatial approach.* The results of the evaluation based on the suggested methodology allow arguing about the following issues. In the analyzed period, an excessive transfer dependence of local budgets on public budget can be observed. The lack of harmonized liabilities division does not stimulate local governments to increase their base of local budgets. Financial indicator of budget subsidiarity level had the highest weight significance in Vinnytsia oblast in 2017 (260.5 %), indicating the excessive dependence of TCs' capacity in the region on the centralized financial assistance (Table 1). In 2020, the highest weight values were observed for the indicator of the general fund revenues (31.02 %), while the indicator of capital expenditures had the lowest weight significance. TCs in Volyn oblast faced the structural transformation of weight coefficients in 2017–2020 toward the reduction of budget subsidiarity and general fund revenues from 26.29 % to 23.11 % and from 29.31 % to 26.23 %, respectively. In 2017, TCs of Dnipropetrovsk oblast had the highest values of weight coefficients of financial well-being by the determinants of general fund revenues (26.81 %) and capital expenditures (26.13 %), while in 2020, all financial determinants had high weight values, excluding the budget subsidiarity level (21.94 %).

For TCs in Zaporizhzhia oblast (2017), general fund revenues and budget subsidiarity level had much higher weight coefficient values than other financial determinants (33.74 % and 35.43 % against 15.53 % and 15.30 %). Yet, in 2020, the weight significance of the share of management staff cost in the total general fund

revenues increased to 23.09 % at the reducing weight of capital expenditures to 11.28 %. A similar situation with the relationship between weight coefficients was observed in the TCs of Ivano-Frankivsk oblast, where the financial determinant of capital expenditures had a critically low value in 2017 (8.52 %) compared to the other indicators that ranged from 29.38 % to 31.20 %. The trends show that the orientation of local governments on the increase of their territorial development capacity remains low. In 2020, the situation changed, so the structure of financial determinants' weights was optimized.

Table 1

Weight significance coefficients of financial well-being indicators of TCs in Ukrainian regions, 2017, 2020, %

TCs in regions	2017				2020			
	Parameters							
	General fund revenues	Budget subsidiarity level	Capital expenditures	The share of management staff cost in the total revenues of the general fund	General fund revenues	Budget subsidiarity level	Capital expenditures	The share of management staff cost in the total revenues of the general fund
Vinnytsia	25.76	26.05	24.54	23.65	31.02	26.66	13.26	29.06
Volyn	29.31	26.29	25.22	19.17	26.23	23.11	23.83	26.82
Dnipropetrovsk	26.81	22.49	26.13	24.57	27.19	21.94	25.01	25.86
Donetsk	28.22	21.62	23.65	26.50	27.76	25.76	27.12	19.36
Zhytomyr	26.52	23.71	24.40	25.36	29.73	24.49	26.24	19.53
Zakarpattia	25.71	24.23	24.44	25.62	27.25	24.24	22.03	26.48
Zaporizhzhia	33.74	35.43	15.53	15.30	30.80	34.82	11.28	23.09
Ivano-Frankivsk	31.20	30.90	8.52	29.38	27.07	25.64	22.71	24.58
Kyiv	25.00	25.00	25.00	25.00	30.38	17.57	28.45	23.60
Kirovohrad	22.51	33.27	12.75	31.47	28.17	16.83	27.73	27.27
Lviv	29.75	29.66	10.81	29.78	26.90	22.07	25.93	25.09
Luhansk	30.38	30.09	23.63	15.89	42.79	43.52	3.87	9.82
Mykolaiv	26.43	25.24	25.80	22.53	28.98	26.41	27.36	17.26
Odesa	30.17	30.97	24.43	14.43	26.39	23.26	24.11	26.23
Poltava	30.97	8.90	30.01	30.12	30.87	19.64	26.03	23.47
Rivne	27.66	23.78	22.46	26.10	27.44	24.38	21.96	26.22
Sumy	30.26	27.01	22.48	20.26	28.77	23.35	22.35	25.52
Ternopil	28.69	25.53	25.00	20.78	25.18	24.13	24.89	25.79
Kharkiv	39.14	22.24	32.25	6.37	28.72	20.80	27.80	22.68
Kherson	28.30	27.91	21.81	21.99	31.91	31.97	14.82	21.30
Khmelnytskyi	27.00	24.67	25.43	22.89	28.82	24.80	22.44	23.95
Cherkasy	25.28	26.67	20.34	27.70	28.74	18.71	26.01	26.53
Chernivtsi	28.55	28.76	17.09	25.61	30.80	31.00	9.57	28.63
Chernihiv	31.81	30.12	18.05	20.02	26.96	25.56	23.38	24.11

Source: calculated based on the data (Financial capacity of ATH).

The balance method of analyzing the weight coefficients allowed detecting that in 2017, Zaporizhzhia (33.74 %), Chernihiv (31.81 %), Poltava (30.97 %), Sumy (30.26 %), Odesa (30.17 %), and Luhansk (30.38 %) oblasts had the highest weight values of the financial well-being determinant of the general fund revenues. In 2020, Vinnytsia (31.02 %), Zaporizhzhia (30.80 %), Kyiv (30.38 %), Poltava (30.87 %), Kherson (31.91 %), and Chernivtsi (30.80 %) oblasts entered the group of regions with high weight significance of revenues determinant. It is worth mentioning that there weren't any TCs in 2017 where the weight by the revenues indicator exceeded 40 %. Meanwhile, in 2020, the weight coefficient of the general fund revenues for the TCs in Luhanska oblast was 42.79 %.

The value of the weight significance coefficient for the indicator of budget subsidiarity level in 2017 was the highest for the TCs in Zaporizhzhia (35.43 %), Ivano-Frankivsk (30.90 %), Kirovohrad (33.27 %), Luhansk (30.09 %), Odesa (30.97 %), and Chernihiv (30.12 %) oblasts and the lowest in Donetsk (21.62 %), Poltava (8.9 %), Kharkiv (22.24 %), and Dnipropetrovsk (22.49 %) oblasts. Meanwhile, in 2020, the situation with the significance of budget subsidiarity changed drastically, so the level of TCs' budget dependence on subsidies reduced, showing the growth of TCs' financial capacity. By the way, an essential reduction of weight significance of budget subsidiarity level was observed for TCs in Kyiv (from 25.0 % to 17.57 %), Kirovohrad (from 33.27 % to 16.83 %), Cherkasy (from 26.67 % to 18.71 %), and Chernihiv (from 30.12 % to 25.56 %) oblasts. Some TCs in Ukrainian regions demonstrated the opposite picture, namely Poltava (subsidiarity weight increased from 8.9 % to 19.64 %) and Kherson (from 27.91 % to 31.97 %) oblasts.

Weight coefficients of the capital expenditures indicator in 2017–2020 were quite volatile. The maximum coefficient value in 2017 was recorded for TCs in Poltava oblast (30.01 %) and in 2020 for Kyiv (28.45 %), Kirovohrad (27.73 %), Mykolayiv (27.36 %), and Kharkiv (27.80 %) oblasts. It indicates a positive trend since the role of TCs in economic dynamics adjustment on the local level increases, and the growth of capital expenditures is essential for the solution of priority tasks related to regional economic stabilization. It is worth mentioning that the TCs in regions with low general fund revenues demonstrate the lowest weight coefficients of the financial indicator of capital expenditures, for instance, the TCs in Luhansk (3.87 %), Chernivtsi (9.57 %), and Zaporizhzhia (11.28 %) oblasts. The increasing significance of capital expenditures and growing capital expenditures in the total structure of TCs' budget expenditures allow investment in large infrastructural projects, secure the capacity of important economic sectors, promote the new jobs in all qualification categories, and foster the generation of central budget revenues (corporate tax revenues, personal income tax revenues, etc.), thus assuring that the government performs its social obligations.

The empirical parameter of TCs' financial well-being in Ukrainian regions is calculated based on a multiplicative approach. Taking into account the unequal creation of TCs in the regional dimension in 2017, the value of the parameter was calculated following the principle of data accessibility. The TCs for 2020 were selected based on

the cluster approach – four TCs in each category of the highest, moderate, and lowest general fund revenues. Interestingly, in 2017, Honcharivska territorial community had the highest financial well-being empirical parameter value in Vinnytska oblast (0.816), and Losynivska – the lowest (0.205). Meanwhile, in 2020, Vinnytska TC had the highest financial well-being level (0.980), and Murafska – the lowest (0.092). Slobozhanska TC was the leader by the financial well-being parameter in Dnipropetrovsk oblast in 2017 (0.912), but its well-being level decreased to 0.683 in 2020. Instead, Troyitska TC demonstrated the highest well-being parameter value (0.947). The trend of changing financial well-being empirical parameters for TCs in Lviv oblast is quite interesting. Trostyanetska (0.925) and Davydivska (0.801) TCs had the highest values in 2017 and Slavska (0.850) and Solonkivska (0.694) in 2020.

The average level of TCs' financial well-being in Ukrainian regions in 2017 ranged from 0.370 to 0.744. Kirovohrad (0.744), Sumy (0.647), Luhansk (0.634), Kharkiv (0.620), and Cherkasy (0.606) oblasts were among the leaders by the average TCs' financial well-being level (Figure 1a). Dnipropetrovsk (0.377) and Ternopil (0.370) oblasts were the outsiders. In 2020, the average level of TCs' financial well-being in Ukrainian regions ranged from 0.281 to 0.592. The highest values of TCs' financial well-being parameter among territorial communities with moderate financial well-being levels were in Zakarpattia (0.592), Kherson (0.534), Zaporizhzhia (0.513), and Chernivtsi (0.512) oblasts (Figure 1b). Interestingly, the lowest level of TCs' financial well-being was in Ivano-Frankivsk oblast (0.281). The average level of TCs' financial well-being declined in all oblasts, excluding Zakarpattia oblast.
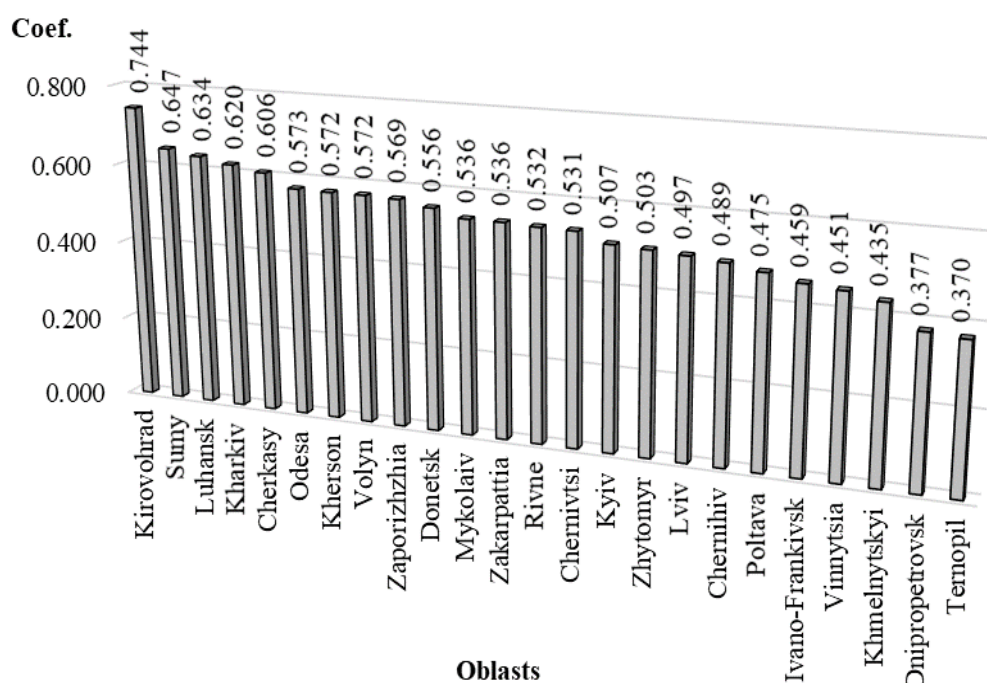
Figure 1a. The weighted average level of TCs' financial well-being in Ukraine: regional breakdown in 2017

Source: compiled based on the authors' calculations.
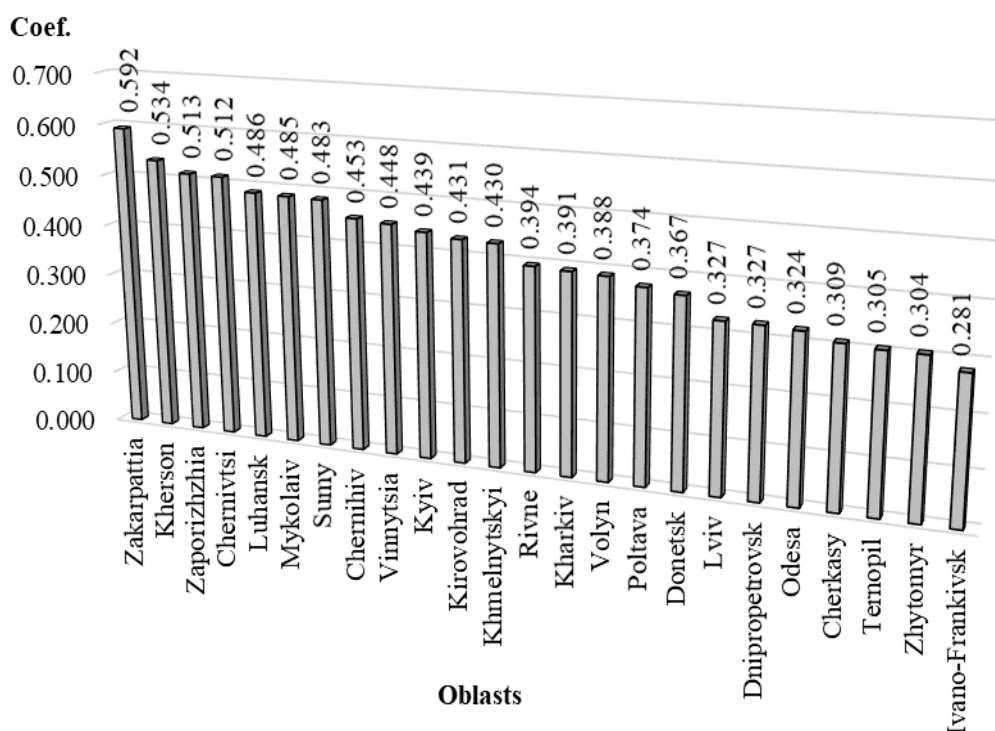
Figure 1b. The weighted average level of TCs' financial well-being in Ukraine: regional breakdown in 2020

Source: compiled based on the authors' calculations.

2. Empirics of economic growth in Ukrainian regions: temporal approach.

The calculated empirical parameters of economic growth in Ukrainian regions in 2011–2020 show the regress of regional economic systems. The empirical parameters of economic growth in Vinnytsia and Volyn oblasts in 2011 were 1.163 and 1.099, respectively. They declined to 0.949 and 0.952, respectively, in 2020. The same situation was in other oblasts. In 2011, the level of economic growth in Dnipropetrovsk oblast was 1.118, in 2017 – 1.223, and in 2020, the level declined to 0.914 (Table 2). Interestingly, 2016–2017 showed the economic recovery on the regional level, but the systemic crisis has generated economic stagnation, affecting economic growth paces. Kyiv oblast demonstrated positive economic recovery paces in the analyzed period, excluding 2014–2015 and 2020. Economic growth in Lviv oblast in 2011 was 0.784. The recovery of economic capacity to the level of 1.080–1.118 was observed in 2015–2016.

Average annual economic growth paces in Ukrainian regions verify the hypothesis of the low level of the territories' endogenous development, excessive financial dependence on revenues from the public budget, and the financial inability of TCs to meet their and delegated obligations, secure the development of social infrastructure, and implement economic reforms (Figure 2). Ivano-Frankivsk (0.48 %), Luhansk (0.11 %), Poltava (0.06 %), Rivne (0.16 %), Ternopil (0.25 %), Khmelnytskyi (0.35 %), and Chernihiv (0.54 %) oblasts in 2010–2020 demonstrated the positive average annual economic growth paces. Dnipropetrovsk (0.86 %) and Kherson (0.94 %) oblasts showed the most negative average annual economic growth paces.

Table 2

Empirical parameters of economic growth in Ukrainian regions, 2011–2020

Regions	Years/coefficients									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Vinnytsia	1.163	1.072	1.165	0.756	0.889	1.082	1.188	1.199	1.157	0.949
Volyn	1.099	1.100	1.219	0.761	0.909	1.021	1.161	1.138	1.228	0.952
Dnipropetrovsk	1.118	1.101	0.994	0.760	0.957	0.962	1.223	1.176	1.111	0.914
Donetsk	1.209	1.051	1.112	0.591	0.736	1.038	1.171	1.305	1.017	0.955
Zhytomyr	1.123	1.149	1.040	0.840	0.821	1.095	1.158	1.170	1.142	0.987
Zakarpattia	1.165	0.937	0.933	0.926	0.905	1.158	1.109	1.098	1.150	0.927
Zaporizhzhia	1.066	1.046	1.009	0.753	0.969	1.107	1.199	1.093	1.038	0.992
Ivano-Frankivsk	1.274	0.981	1.012	0.736	1.112	1.108	1.109	1.078	1.132	1.048
Kyiv	1.125	1.096	1.094	0.741	0.976	1.092	1.102	1.133	1.139	0.944
Kirovohrad	1.307	1.109	1.067	0.861	0.791	1.095	1.100	1.099	1.114	0.984
Lviv	0.784	1.434	1.213	0.607	1.080	1.118	1.125	1.148	1.186	0.963
Luhansk	1.139	1.081	1.066	0.622	0.566	1.044	0.981	1.055	1.092	1.011
Mykolaiv	1.095	0.959	1.097	0.711	1.008	1.134	1.130	1.048	1.204	0.939
Odesa	0.937	1.146	1.055	0.768	0.910	1.101	1.132	1.082	1.080	0.976
Poltava	1.032	1.227	1.089	0.741	0.883	1.133	1.171	1.146	1.216	1.006
Rivne	1.149	1.160	1.094	0.664	1.009	1.007	1.234	1.093	1.112	1.016
Sumy	1.192	1.039	1.051	0.733	1.091	1.110	1.107	1.094	1.132	0.990
Ternopil	0.986	1.083	0.960	0.841	1.283	0.797	1.163	1.183	1.087	1.025
Kharkiv	1.171	1.124	1.107	0.670	1.016	1.036	1.054	1.127	1.119	0.974
Kherson	1.136	1.036	0.989	0.812	0.846	1.070	1.216	1.102	1.203	0.906
Khmelnytskyi	1.149	0.979	1.282	0.666	1.103	0.898	1.193	1.145	1.070	1.035
Cherkasy	1.063	1.115	1.074	0.430	1.608	1.109	1.102	1.232	1.069	0.976
Chernivtsi	1.119	1.057	1.020	0.787	0.773	0.985	1.180	1.101	1.197	0.966
Chernihiv	1.148	1.093	1.012	0.809	0.892	1.138	1.331	1.166	1.094	1.054

Source: compiled based on the authors' calculations.
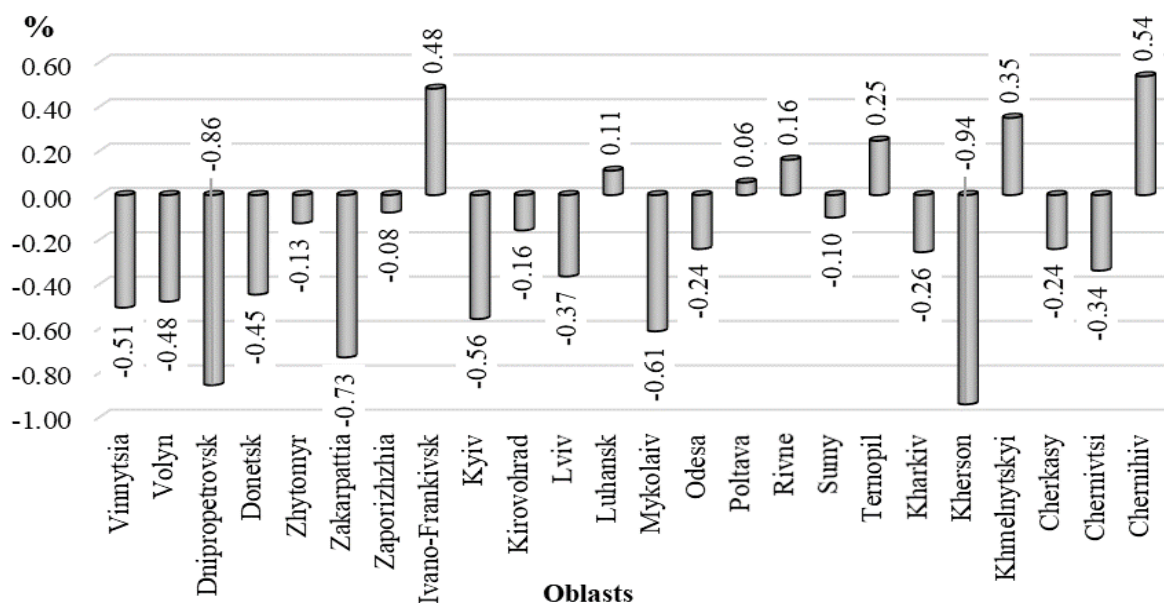
Figure 2. Average annual economic growth paces in Ukrainian regions, 2010–2020, %

Source: compiled based on the authors' calculations.

3. The impact of TCs' financial well-being on regional economic growth. The results of the analysis show that there is a kind of a "pressure" effect in Ukraine that is displayed in the ability of the territory's economy to increase its capacity and is accompanied by the growing favorable impact of financial well-being on regional economic growth. It is worth mentioning the inconsistency and differences between economic growth paces at the regional level and the paces of the change of parameters that characterize the TCs' financial well-being. Therefore, the favorable impact of TCs' financial well-being grows in the regions with a consistent trend toward the growth of economic capacity and GRP paces. The results of the research show that economic growth at the level of 1 % can be expected for Vinnytsia, Dnipropetrovsk, Zakarpattia, Zaporizhzhia, Kyiv, Mykolayiv, Kherson, Khmelnytskyi, Chernivtsi, and Chernihiv oblasts subject to the improvement of TCs' financial well-being (Figure 3).
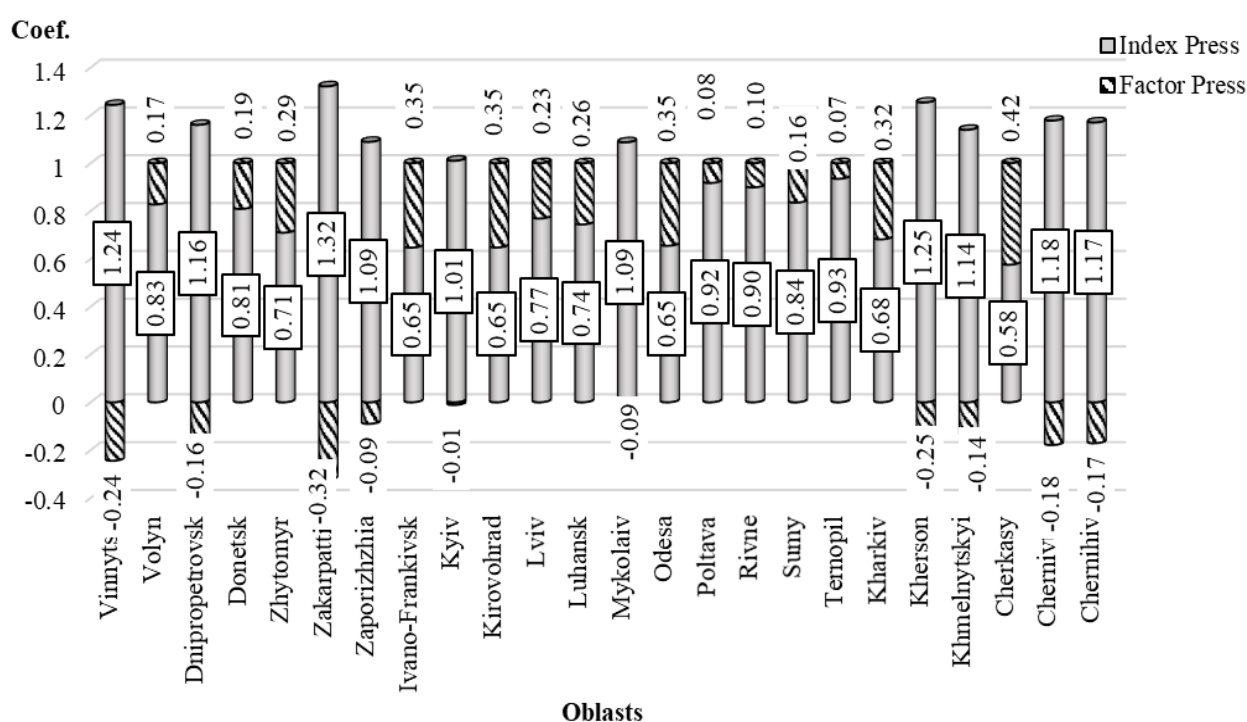
**Figure 3. The impact of TCs' financial well-being on economic growth
in Ukrainian regions, 2010–2020**

Source: compiled based on the authors' calculations.

The TCs' financial well-being has a direct impact on economic growth of territories in Cherkasy, Donetsk, Zhytomyr, Volyn, Ivano-Frankivsk, Kirovohrad, Lviv, Luhansk, Odesa, Poltava, Rivne, Sumy, Ternopil, and Kharkiv oblasts. The reverse relationship between the development of the regional economic system and TCs' financial well-being is recorded for the rest of the Ukrainian oblasts.

Regional economic growth as a determinant of reproduction of intensive economic capacity increase and regional financial development has a causal relationship with the TCs' financial well-being. Therefore, the TCs' financial well-being depends on regional economic growth determinants and the level of financial independence that is the result of the financial decentralization reform implementation. For instance, the level of TCs' financial well-being in Lviv oblast has a direct impact

on capital investment and GRP at the level of 0.05 % and 0.02 % with the statistical probability of 90 % and 95 %, respectively (formula 7).

$$FD_t^{LV} = (2.706^{**})^{0.631} + (1.076^*)^{0.047} CInv_t^{LV} + (3.650^{**})^{0.016} GRP_t^{LV} - (2.251^*)^{0.002} ICP_t^{LV} \qquad (7)$$

$$R^2 = 0.958 \quad DW = 2.22$$

where FD_t^{LV} – the level of TCs' financial well-being in Lviv oblast in t period;

$CInv_t^{LV}$ – capital investment in Lviv oblast in t period (growth coefficients per capita, USD);

GRP_t^{LV} – GRP in Lviv oblast in t period (growth coefficients per capita, USD);

ICP_t^{LV} – consumer price index in Lviv oblast in t period (%).

The priority directions of regional economic growth in Ukraine include the development of high financial well-being level in territorial communities provided the maintenance of their financial resilience and autonomy, development of competitive advantages, planning of socio-economic processes in the medium and long run, and the minimization of risks and threats from the implementation of economic goals and tasks. Indeed, only efficient use of the funds from local budgets can help achieve the cumulative economic effect, create value added, and increase the TCs' investment capacity as the regional development determinant.

Conclusions. The financial well-being of territorial communities constitutes a set of determinants that define the efficiency of territorial economic capacity implementation and the level of financial capitalization. The parameter of TCs' financial well-being in Ukrainian regions (selected based on the cluster approach – four TCs in each group with the highest, moderate, and lowest general fund revenues) was the highest in Zakarpattia (0.592), Kherson (0.534), Zaporizhzhia (0.513), and Chernivtsi (0.512) oblasts and the lowest in Ivano-Frankivsk (0.281) in 2020 and Dnipropetrovsk (0.377) and Ternopil (0.370) oblasts in 2017.

The construction of empirical parameter of regional economic growth in Ukraine based on the multiplicative method and principal component analysis has allowed revealing the structure of the relationship between the indicators and calculating the integral coefficients of economic growth based on the temporal-spatial approach. Ivano-Frankivsk (0.48 %), Luhansk (0.11 %), Poltava (0.06 %), Rivne (0.16 %), Ternopil (0.25 %), Khmelnytskyi (0.35 %), and Chernihiv (0.54 %) oblasts in 2010–2020 demonstrated the positive average annual economic growth paces. The highest negative economic growth paces were recorded in Dnipropetrovsk (-0.86 %) and Kherson (-0.94 %) oblasts.

Further research can cover the examination of the temporal and causal relationship between regional economic growth and financial well-being across two vectors – TCs and households, as well as substantiation of the need to increase the financial capacity of TCs and secure the resilience of Ukrainian households following the development trends in a specific time lag.

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SOCIAL CAPITAL OF RURAL TERRITORIAL COMMUNITIES IN UKRAINE: PROBLEMS OF STRENGTHENING AND DIRECTIONS OF THEIR SOLUTION

Purpose. *The purpose of the article is to identify current problems of strengthening the social capital of rural territorial communities in the context of administrative and territorial reform with the definition of directions for their solution.*

Methodology / approach. *The paper uses general scientific methods of analysis and synthesis to collect, process, and systematize the results of scientific research; abstract-logical and critical analysis – to identify possible risks due to the implementation of administrative-territorial reform; statistical – for data collection and systematization; method of comparisons – to identify the compliance of the dynamics of various forms of social capital to the potential of communities; graphic – to visualize the results of the assessment of the new spatial configuration of socio-territorial communities and the dynamics of accumulation of various forms of social capital; correlation and regression analysis – to determine the impact of certain indicators of social capital development on the economy of rural communities; induction and deduction – to substantiate the main directions of social capital development of rural communities in modern conditions.*

Results. *Restrictions on the development of social capital accumulation have been identified, which include: shadowing of interaction and low trust in social institutions, individualization of behavioral strategies, growth of economically inactive and socially vulnerable groups, and formation of networks of discriminatory relationships, spreading of norms of destructive social behavior, as well as the risks that may arise in the new spatial configuration of socio-territorial communities. It is established that the administrative-territorial reform at the local level has created certain preconditions for strengthening the potential of horizontally and vertically integrating social capital. It was found that the dynamics of territorial identification of the population of Ukraine in relation to their community is negative and indicates low social capital at the local level. The dynamics of forms of horizontally integrating social capital of rural communities, which are represented by agricultural cooperatives, farms, and inter-community cooperation, are analyzed and it is found that the potential of their development in Ukraine has not been realized yet. The necessity of implementation of systemic decisions on the development of social capital of communities to achieve the main goals of decentralization of management is proved. The main directions of the development of social capital of rural communities are substantiated taking into account modern features of their development.*

Originality / scientific novelty. *The specifics of the formation of social capital of rural communities as small local communities are analyzed, taking into account the main determinants of influence, which include increasing territorial mobility and maintaining the asymmetry of spatial development in the direction of the center-periphery, the choice of adaptive behavioral strategies due to changes in the territorial identification of the population and the assessment of opportunities to achieve a certain level of well-being in the community. The main directions of social capital development as a prerequisite for uniting and mobilizing internal resources for rural development are substantiated based on existing problems and identified potential risks due to the reform of local self-government and territorial organization of government. Scientific and methodological bases of*

research on social capital at the local level under conditions of social and economic instability are improved.

Practical value / implications. The results of the study will be useful for local governments of territorial communities formed as a result of local government reform and territorial organization of government, as well as district and regional state administrations, which focus on promoting inclusive community development and self-sufficiency.

Key words: decentralization, trust, communication networks, rural communities, social capital.

Introduction and review of the literature. Rural settlements of Ukraine have become part of territorial communities (TCs), which allows them to increase their ability to solve problems at the local level, especially in terms of improving the quality of social services, and increasing employment potential at the place of residence. A certain share of rural settlements became the centers of newly formed rural TCs or became part of them as a parity component, the rest joined the urban communities, thus forming mixed communities. As a result of decentralization in Ukraine, a new spatial configuration of territorial communities has been formed, which differ significantly in development potential and opportunities for social capital accumulation. Administrative and territorial reform has changed the basic spatial, structural, managerial, and financial characteristics of rural development, increasing the influence of endogenous factors necessary for the formation of social capital structures.

Under the conditions of decentralization of rights, powers, and responsibilities based on subsidiarity, which is the basis of administrative-territorial reform, the accumulation of social capital of newly formed territorial communities is the key to their self-sufficient development. Decentralization implies the existence of concerned actors, including residents, entrepreneurs, and local authorities, who would be able to take responsibility for the development of local communities and have the competence to do so effectively. The formation of networks of the interaction of these entities based on observance of universal values, moral norms, social responsibility, solidarity, and trust is a strategic direction for the development of territorial communities under modern conditions. It is especially important to form effective institutions to represent the interests of small communities in rural TCs, many of which have several socio-economic problems due to labor market constraints, demographics, and social and transport infrastructure. The difference in resources for the development of the various rural settlements that are part of the TC and the significant socio-economic disparities between them requires careful study of these aspects to minimize possible social risks. It is necessary to study the problem of the development of social capital of communities under the new conditions and minimize restrictions and barriers in this area, justification of promising areas of social capital development from the standpoint of the interests of local communities.

Theoretical aspects of the accumulation of social capital at the level of small communities in the context of the neighborhood were studied by T. Coppens et al. [1]. It considers the neighborhood about the social capital of people living within the spatial proximity and their readiness for joint collective action to achieve the public good, for example, ensuring informal social control in the settlement [1]. H.-J. Kim points out

that neighborhoods with residents with higher socioeconomic status are more likely to lead to collective action, and poverty does not contribute to the organization of collective action for the benefit of the community [2].

As a resource for community development, social capital is considered in studies [3–7]. In particular, J. Salinas and S. Sastre-Merino consider social capital as a resource that can contribute to financial attraction and growth of the rural population, sustainable local development, and strengthening of the social function of financial institutions in rural areas. Particular attention is paid to solidarity funding [3]. The study [5] analyzed how social capital affects the results of resource use. The interaction between income distribution and social capital development through the group's financial ties has been identified, which may lead to incentives for cooperation. In [6] the positive influence of the social capital of communities on the corporate social responsibility of firms is proved. The study of J. Susan and H. Xiaobing revealed the positive impact of trust and sociability on the formation and effectiveness of agricultural cooperatives, the authors proposed ways to improve their development policy [7].

Important aspects of the study of social capital are reflected in scientific papers [8–11], which pay attention to the impact of community characteristics on the development of their social capital. Geographical features of mechanisms of social capital development based on community practices are reflected in [8]. It emphasizes the importance of informal mechanisms and interactions that provide access to local knowledge. The influence of the peculiarities of rural development on the formation of social capital is highlighted in the scientific work of the authors' team [9]. M. Phillips explores the links between social capital, the level of well-being of the population, and the characteristics of the community. Against this background, the interpretation of infrastructural and culturalist concepts of social capital is carried out [11].

Studies of factors influencing the development of social capital have become widespread [12–16]. Thus, M. Davenport and R. Hassan with the help of factor analysis of structural and cognitive social capital in the rural community justified comprehensive measures for its development [12]. The study [13] made a comparative assessment of the factors for the formation of social capital of two domestic agricultural holdings and substantiated the key approaches to measuring the social capital of the agricultural sector. An assessment of the impact of leadership in rural communities on the development of their social capital was conducted in the work of M. Mathews [14]. It was carried out through the study of micro-sociological processes, which include everyday behavior and interaction to form networks of relationships that are relevant in connection with the existing problems of local development. S. Nakano and A. Vashizu identified factors that increase social capital and proved that the use of advanced information and communication technologies in smart cities contributes to this. It has been confirmed that the social capital of residents who use advanced technologies is higher than the social capital of those who do not [15]. The paper [16] examines the changes in social capital in the dynamics and its relationship with socio-demographic and socio-economic factors to take into account the identified results in

improving local policies for sustainable social development.

Research on the development of social capital of territorial communities in Ukraine is being actively conducted. Research [17–18] highlights the role of social capital in the formation and functioning of territorial communities. They were held at the stage of community unification and emphasized the use of social capital to intensify this process. The approach of considering the territorial community as a result of the formation and reproduction of interactions between its members, which are independent subjects of social action, which are characterized by unity and common goals, objectives, and interests based on common living conditions [19].

The results of the research of scientists create a complex information-theoretical basis for understanding the essence of the development of social capital of local communities. Research in this area is mainly aimed at studying various factors influencing the formation of social capital or the impact of certain components of social capital on the development of rural communities. However, the issues of social capital development at the stage of newly formed communities as a result of administrative and territorial reform remain insufficiently studied. The probable risks that arise and the substantiation of the directions of strengthening the structural components of social capital for newly formed communities need to be studied.

The purpose of the article. The purpose of the article is to identify current problems of strengthening the social capital of rural territorial communities in the context of administrative and territorial reform with the definition of directions for their solution.

Results and discussion. Decentralization of management has significantly changed the system of multilevel vertical connections (central government – local governments) and horizontal (inter-municipal cooperation, interaction of mayors with newly created territorial communities, interaction of TG representatives with district centers). A fundamentally new conceptual basis for an extensive system of relationships involves the intensification of processes related to the strengthening of social capital at the community level, which is territorial communities. It is important to note that the delegation of certain powers to the field does not reduce the level of responsibility of the central government to promote and support the successful development of local communities. The participation of the state is only transformed from directive to stimulating and supportive, and local government is intensified in the direction of influencing the realization of the existing development potential.

Given this, the logic of our study is to analyze the state of horizontal social capital of rural communities by assessing the dynamics of the number of agricultural cooperatives, farms and inter-community cooperation agreements. Then analyze the impact of specific factors on the development of social capital of rural communities, which include: the level of income that can be obtained at the place of residence; territorial identification of the population, which influences the choice of behavioral strategy for the formation of social capital; digitalization of everyday life; features of society development under market conditions. Taking into account three components: the results of the analysis, socio-economic and demographic situation of rural

settlements and changes in the configuration of relationships, responsibilities and powers as a result of administrative-territorial reform to identify complex risks of social capital development of rural communities. And the final stage is to justify on the basis of the identified risks the priority areas of social capital development of newly formed rural territorial communities, covering the main structural components of social capital, which include trust and relationships.

The formed new administrative-territorial structure of Ukraine consisting of 1469 TCs and 136 districts (on average, the district has 11 TCs) significantly simplified communication between them and ministries, state funds, regional and district state administrations, and donor organizations. Thus, at the local level, certain preconditions have been created for strengthening the potential of horizontally and vertically integrating social capital. In Ukraine, in the process of decentralization, 627 rural TCs were formed, which accounted for 42.7 % of their total number. In the regional context, there is a significant variation in this indicator – from 65.4 % in Chernivtsi to 19.2 % in the Luhansk region (Figure 1). In seven of the 24 regions of the country, the share of rural TCs exceeds half, and in five regions – less than a third. On the average, the number of villages that are part of the TC ranges from 8 to 9 in Chernivtsi and Zakarpattia oblasts, respectively, and to 30 in Kharkiv. However, only 14.1 % of the country's population lives in rural communities. Due to differences in the inter-settlement structure, Chernivtsi and Zakarpattia oblasts lead in this indicator (34.5 and 31.6 %), and Donetsk and Kharkiv oblasts occupy the lowest positions – 3.4–4.0 % respectively. The average population of rural TC in Ukraine is about 8 thsd. people and ranges from 6 thsd. in Zhytomyr, Zaporizhzhia, Luhansk, Sumy, and Chernihiv oblasts to 12 thsd. – in the Lviv oblast.
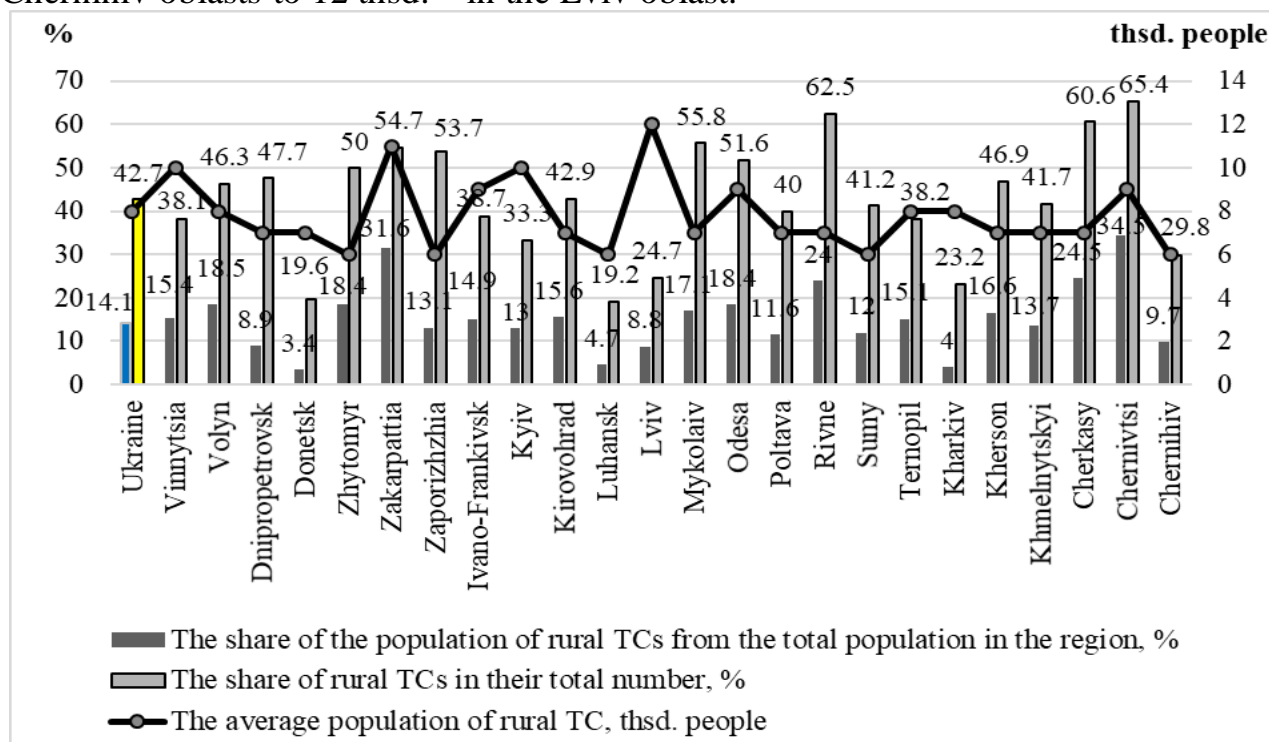
Figure 1. Rural TCs of Ukraine in the regional context, 2021

Source: calculated and built based on [20].

Social capital is a network of connections, social norms, and trust that foster interaction between for-profit and common interests. The amalgamation of settlements generates a new impetus for integration processes at the local level and the strengthening of social capital as a resource of trust and partnership – on the one hand, and causes certain social risks as a result of changing the status quo – on the other. The amalgamation of territorially close village councils usually does not cause new problems, as such administrative-territorial units develop previously formed social ties. The situation is different in mixed territorial communities due to asymmetry in socio-economic and demographic developments against the background of the weakness of civil society institutions that have to represent and protect the interests of the population. A separate group consists of TCs, which included the population on the borders of the former administrative districts (their total number of 76 communities or 5.2 %). They have relatively well-established links with the community center, due to the inertial processes of the former district centers taking over the functions of rural settlements, which have experienced population decline. With each variant of unification of territorial communities, the tasks of developing effective horizontal and vertical connections are actualized.

The type of relationship that is most characteristic of the local community is the neighborhood. If group social capital is formed based on common values and views (friendship), professional interests (labor collective), and commercial interests (for example cooperative), the place unites very different people in values, norms of behavior, and level of education, profession, etc. The need and ability for the spatial organization of life is the basis of the local community.

Social capital is accumulated in the presence of extensive and strong internal horizontal and vertical links, solidarity, which consists in identifying and accepting common interests and goals of local groups, practices of joint activities in addressing local issues or local groups in the community, forming and strengthening horizontal and vertical trust. The larger the territory occupied by the local community, the more pronounced the core and periphery. Often the size of the territory affects the degree of formality of the community.

The asymmetry of spatial development in the direction of the center-periphery is preserved. Despite the administrative-territorial reform, one of the goals of which was to improve the living conditions of the population regardless of location, the strength of the asymmetry of spatial development remains, which affects the territorial mobility of the population and determines the fragmentary functionality of communities. The latter is not always a place to work or receive social services for the population living in them. Under such conditions, the value of the community as a territorial resource for implementation decreases. Attitudes towards it, and the degree of activity and interaction in the community are changing.

The Internet and social networks as a result of scientific and technological progress can be tools to form communication networks, accelerate interaction, and under conditions of low civic activity a tool to distract from it through the virtualization of everyday life. As a result of increased population mobility and depopulation, the

relationships of the community are delocalized. We agree with B. Vellman [21, p. 228], who noted that in modern society, communities have moved from groups based on close residence with clear boundaries to networks that serve as a source of socialization, have blurred boundaries, and change frequently. B. Wellman noted that for a community it is important not how close people live to each other, but what they do for each other.

Conceptual features of the development of society under market conditions actualize those aspects of the individual that determine its passivity in public life. The main function of people in these circumstances is to consume. Powerful marketing and mass media work on this concept. Over time, the concept of smart consumption has emerged, but it has not become widespread yet. Hyperbolization of consumption in market relations, underestimation of labor, and popularization of life on credit cause an increase in personal passivity in terms of civic activity. In Ukraine, this is happening against the background of exaggeration of the service function of the state, which represents itself and is perceived by the majority of the population as a provider of social or administrative services. And although the service function is one of the main in the state, its excessive hyperbolization against the background of maintaining the paternalistic sentiments of the population causes a certain form of new paternalism. The socially active function of the resident is supplanted by the role of the consumer of public services. In addition, the exaggeration of the role of the consumer intensifies egocentrism, the emphasis shifts to meeting needs, overestimating the value of things and finances, and sources of social capital are often non-economic (altruism, charity, moral satisfaction with their results, etc.).

From 2000 to 2020, there were changes in the identification of the country's population (Figure 2). Thus, the share of the population who consider themselves primarily residents of their community decreased from 31.3 to 23.9 %. At the same time, the share of the population who consider themselves primarily citizens of the country increased from 41.0 to 61.7 %. The maximum acceleration of multi-vector dynamics was observed in the period from 2004 to 2015. During this time, two revolutions took place in Ukraine (Orange and Dignity Revolution), which could affect the growth of identification at the state level through patriotism, independence, and the definition of the vector of development of the country. However, Figure 2 shows that the decline of local identification began before the revolutionary events and continues after them. Unfortunately, this trend may also indicate a low level of social capital at the community level. Perception of the place of residence as a service space, not as a place for the development of which there is a responsibility.

The paternalistic strategy of behavior, which has been practiced for decades in the administrative-command management system, influences the formation of social capital. Under the conditions of changing the ideological paradigm of development of independent Ukraine, which provides for more individual freedom and, consequently, responsibility, the paternalistic strategy of behavior contradicts modern conditions of development. However, it remains effective to this day, although it tends to weaken. The impact of this strategy is perceived by citizens and is noted as the main reason that hinders public initiative. Passivity, indifference, and disbelief in one's abilities have

taken the lead in answering the question of what hinders people's participation in the activities of public organizations, associations, or public initiatives? Paternalistic sentiments are declining in dynamics, but remain quite significant. Thus, the share of people who stated that they lack the initiative and independence to solve life's problems increased from 33.6 % in 2000 to 48.5 % in 2020 [22, p. 235].
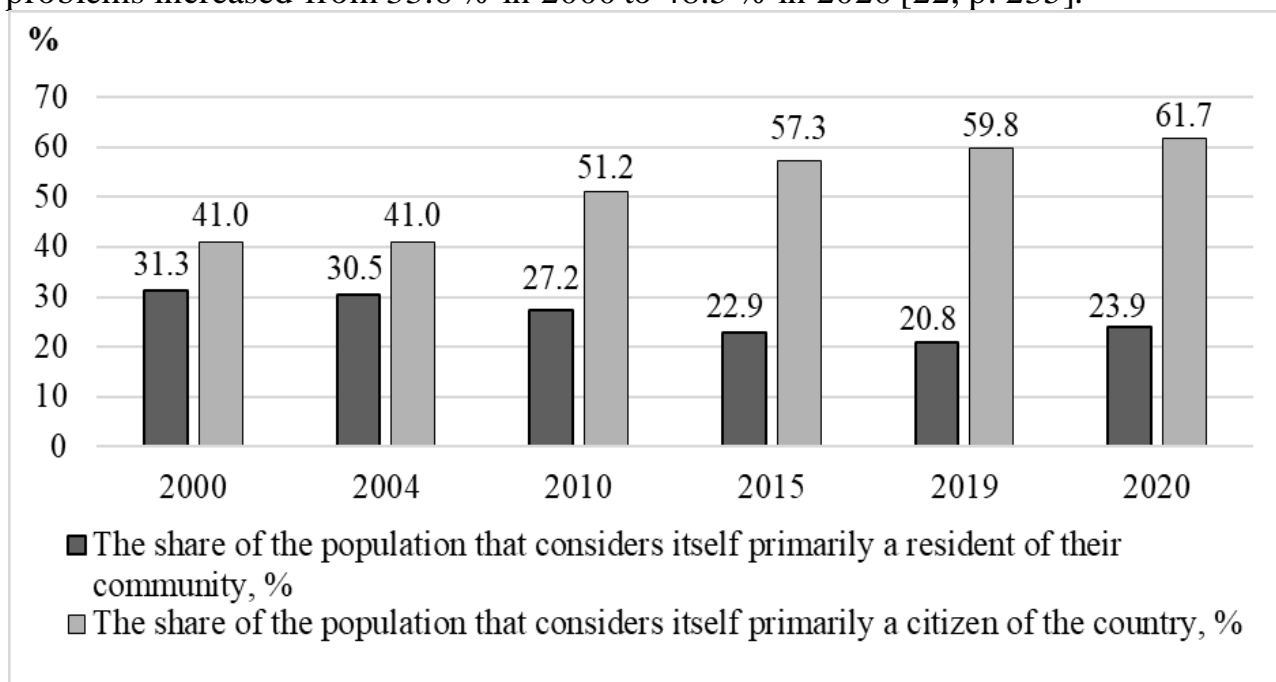
Figure 2. Dynamics of territorial identification of the population of Ukraine, 2000–2020

Source: built based on [22, p. 350].

The economic crisis is affecting the formation of social capital in the community as low labor costs, and lack of jobs within daily transport accessibility lead to a reduction in time and effort for community activities, establishing and maintaining relationships and interactions in the community. About 34,0 % of respondents explain such a low public initiative as the lack of free time and 20.4 % by financial problems in the family and the need for additional earnings.

The formation of social capital is determined by the choice of strategy of the behavior of the population. In poverty, a person in most cases chooses a life strategy in one day, it can't predict and influence their lives in the long run. The more chronic poverty becomes, the greater the feeling of insecurity and self-doubt. Fear and insecurity paralyze activity and promote mistrust. Social capital is formed through the accumulation of positive information about the constructive activities of the subjects of interaction.

Confirmation of the existence of economic constraints in the accumulation of social capital is evidenced by the share of the population with incomes up to 5 thsd. UAH (at the actual subsistence level, which in 2020 was 4546 UAH), which amounted to 39.4 % of the total population. According to international criteria, the poverty line was less than 5.5 USD a day. The above group (39.4 % lives on 6 USD or less per day. The incomes of communities per capita are not high either. Thus, in 2020,

based on the analysis of 872 united territorial communities, incomes per capita amounted to 5200 UAH, and expenditures amounted to 6986 UAH [23].

Compared to its seven neighboring countries, Ukraine has an outsider position in terms of gross domestic product (GDP) per capita at purchasing power parity. This affects not only the perception of the community as a promising place for efforts, including the accumulation of social capital but also the country as a whole. Thus, in the ranking of countries by GDP (in purchasing power standards – PPS) per capita, Ukraine ranked 90th and is the last among neighboring countries (Figure 3). Compared to Poland and Hungary, GDP per capita is 2.5 times lower. As a result, experts estimate that 2.7 mln Ukrainians work abroad, which does not contribute to the accumulation of social capital not only at the level of local communities but also at the level of families.
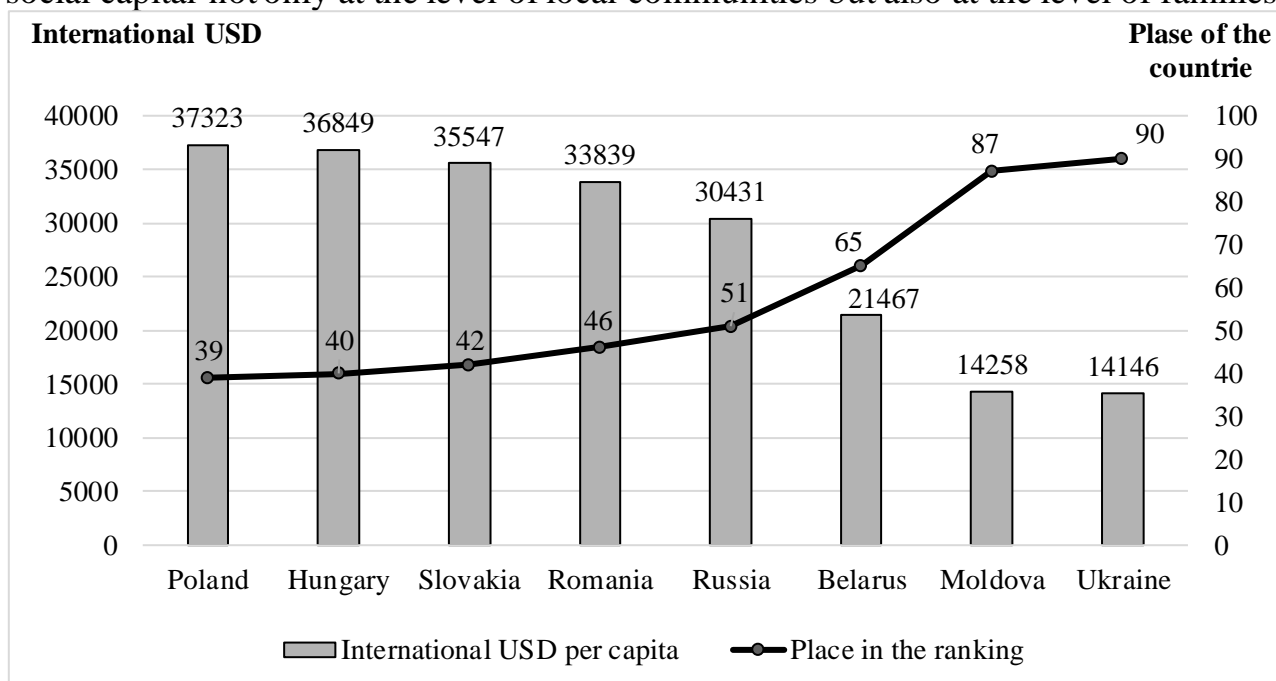
Figure 3. Ukraine and neighboring countries in terms of GDP (PPS) per capita, 2021

Source: built based on [24].

Among the main forms of social capital important for the development of rural TCs, horizontal integration should be singled out. It is represented by forms of the cooperative movement, inter-settlement interaction and cooperation, farming, realization of the potential for initiatives. Due to statistical information on the spread of various forms of social activity at the level of individual settlements, it is difficult to assess the potential of this capital. However, certain ideas can be formed based on the dynamics of farming and agricultural cooperatives as promising forms of building horizontally integrating social capital. Most farms in Ukraine are a family type with an average number of employees in one farm at the level of 3 people. Their number per 10 thsd. economically active rural population fluctuates in dynamics. The lowest rates are observed in 2018 and the inhabitants of 59 farms per 10 thsd. economically active rural population (Figure 4). However, in 2019–2020, it increased significantly to 85 units. The development of family farms has a significant potential for strengthening

productive social ties in the countryside, meeting the need of active state support.
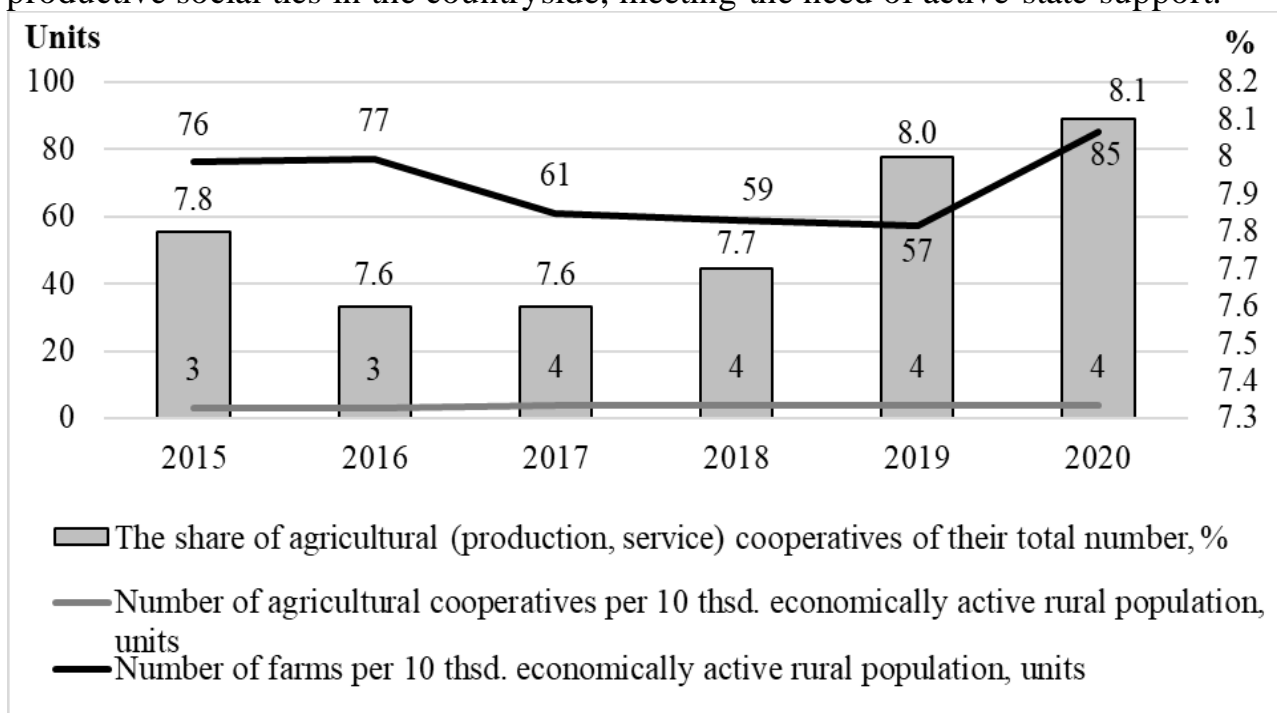
Figure 4. Dynamics of agricultural cooperatives and farms in Ukraine, 2015–2020

Source: calculated and built according to the State Statistics Service of Ukraine and the Ministry of Development of Communities and Territories of Ukraine.

In Ukraine, there were only 4 cooperatives per 10 thsd. economically active rural population in 2020. For comparison, according to our estimates, this figure in France reached 9 cooperatives. Between 2015 and 2020, the number of agricultural cooperatives increased by 282 units, but ranged from 7.6 to 8.1 % of the total number of all cooperatives in the country, remaining one of the most promising forms of management in agriculture with state support.

To assess the impact of the cooperative movement on the rural economy, we conducted a correlation and regression analysis between GDP in agriculture, forestry and fisheries and the number of agricultural (production and service) cooperatives, which showed a strong relationship. The variation in GDP in the studied sector during 2010–2021 in Ukraine by 75.9 % depends on the variation in the number of agricultural cooperatives (Figure 5), the correlation coefficient $r = 0.871$ is high. The estimated value of the Student's t-test is 3. Its critical value is 2.074, with a significance level of $\alpha = 0.05$. The differences are statistically significant, so there is a relationship between these indicators. The *F*-test is estimated to be 31.5 and is greater than the tabular value of 4.96, which indicates that our regression model is significant. The development of cooperatives in rural communities has potential due to the raw material nature of agriculture, a high degree of small-scale production in rural households, a high share of owners of land shares that lease them (38.8 % of all owners). With state support, the cooperative movement can be a promising tool for strengthening the economy of rural communities.
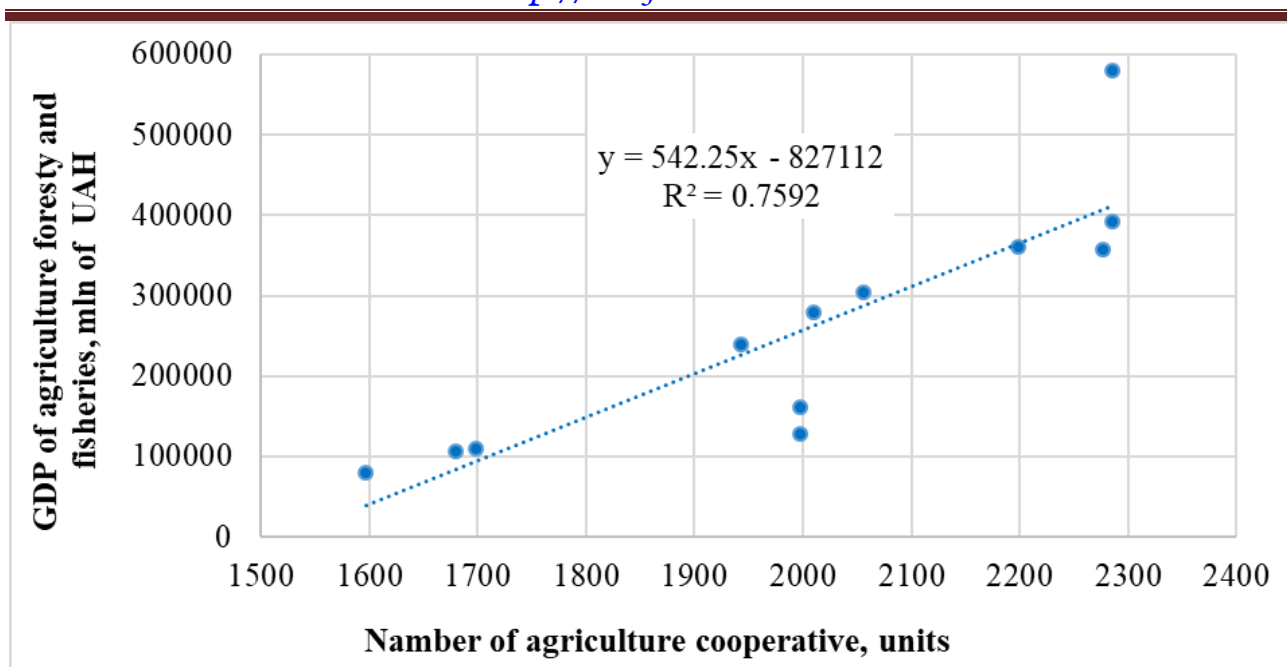
Figure 5. Influence of the number of agricultural cooperatives on the GDP in agriculture, forestry and fisheries in Ukraine, 2010–2021

Source: calculated and built according to the State Statistics Service of Ukraine.

The accumulation of horizontally integrating social capital of communities is based on the mechanism of inter-municipal cooperation. The total number of concluded agreements on such cooperation in 2020 was 4 times higher than in 2015 due to the active implementation of new practices of intersettlement cooperation in this period (Figure 6). The main form of cooperation agreements between communities were joint projects.
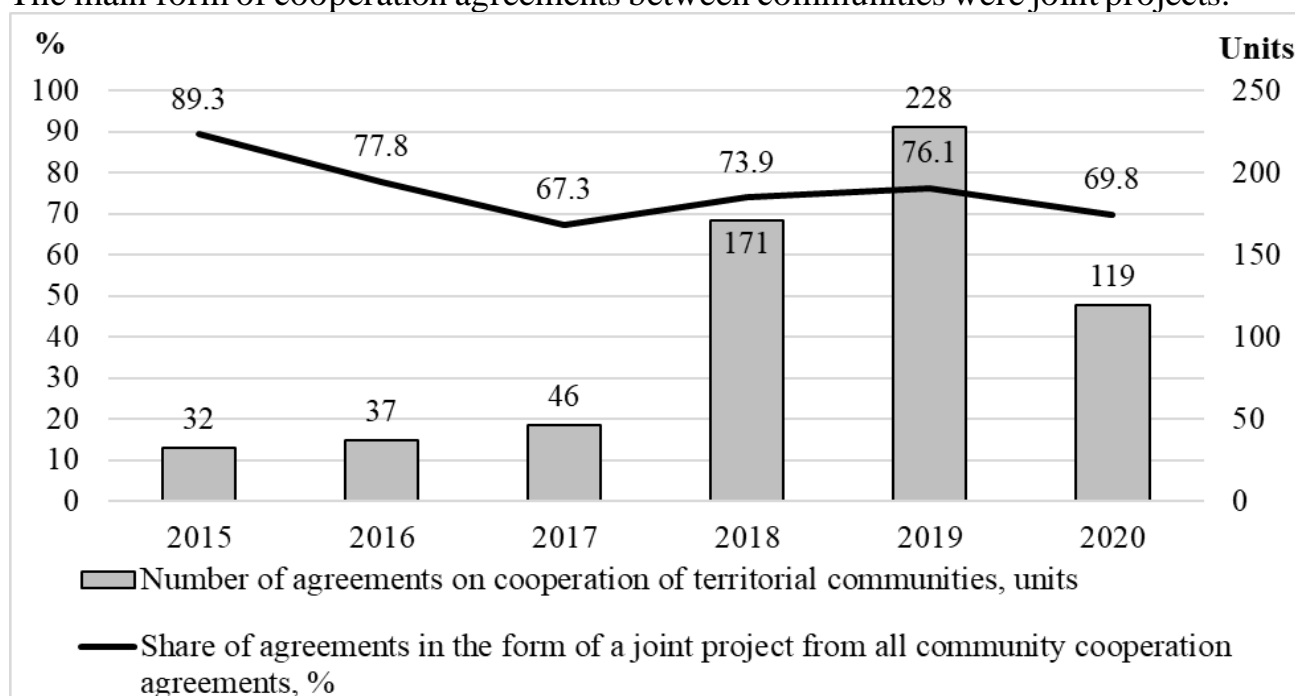
Figure 6. Dynamics of the number of agreements on cooperation between communities in Ukraine, 2015–2020

Source: calculated and built according to the State Statistics Service of Ukraine and the Ministry of Development of Communities and Territories of Ukraine.

Their share in the structure of various forms of contracting, although decreasing in dynamics from 89.3 in 2015 to 69.8 % in 2020, remains predominant. Despite the significant positive dynamics of community cooperation, its potential remains unrealized to the fullest.

Positively assessing the results of the administrative-territorial changes in terms of strengthening the potential of social interaction, it should be noted that any changes in the status quo within the administrative-territorial entities cause certain risks of a systemic nature. *Firstly,* there are significant risks of discrimination against rural communities that have become part of urban communities, forming mixed-type TCs, which account for 56.3 % or 810 communities in the country. The idea of such an association is to increase the influence of cities on rural development. In this regard, it is worth noting that the State Strategy for Regional Development for 2021–2027 identifies the formation of economic, infrastructural, socio-cultural connectivity, and integration at the national, regional, and local levels as one of the important development priorities for the future [25].

According to the logic of reforms and the experience of other countries, it was initially assumed that the disappearance of administrative barriers would strengthen integration processes due to the impact of the urban environment, especially business practices, on trends and living space in rural areas. Unfortunately, these expectations have not materialized yet due to the weak and inefficient links between different types of communities. Under conditions where village elders are appointed by the head of the community and not elected by the residents, and the directions of using the local budget are determined by the deputies by voting (the number depends on the size of the settlements they represent) there is a high risk of discrimination united communities. Therefore, there is a need to create an effective system of checks and balances within the TC itself to prevent discrimination against individual communities.

Secondly, there are possible risks of abuse of power in the management of territorial communities. The assertion of universality and expansion of the functions of local self-government often occurs against the background of unproductive interaction of various branches of government – legislative, executive, and judicial. Democratic, and therefore socially significant tools for the development of territorial communities, have not become widespread in the practice of local government as the most effective at the local level of government. Under such conditions, there is a high probability of abuse of power, imbalance of interests of the subjects, and growth of social tension in the community.

Thirdly, the risks of growing inequality and social exclusion of the rural population due to the latifundization of rural areas. Unfortunately, Ukraine still has political and economic preconditions for the spread of social irresponsibility – a highly polarized social structure with significant property stratification and inequality, an oligarchic monopolized structure of the rural economy with corrupt principles of big business, the practice of non-compliance with laws both among public authorities and citizens of the country. Under the conditions of functioning of the land market against the background of the formed powerful agro-corporate structures on the one hand and

peasants of owners of land shares, most of which in the presence of financial restrictions cannot use their land for economic activity and are compelled to lease it. Landlessness of some peasants may occur, which will affect even greater conservation of rural poverty and migration of the rural population.

These risks may be manifested against the background of existing problems of social capital development of rural settlements, which include:

Shading of interaction connections and low trust in social institutions. The reorganization of agricultural production and change of its structure causes a reduction in the total number of employees and acceleration of the dismissal process at the initiative of the administration. Given the shortage of jobs in rural areas and problems in organizing their own business, a significant number of peasants are unable to find employment at their place of residence or within acceptable transport accessibility. Under such conditions, the population resorts to models of labor behavior focused on shadow activities, often ignoring the rules of legality and social responsibility.

Individualization of behavioral strategies and low trust. The process of individualization as a consequence of market behavior causes completely different social effects, as it depends on the conditions of implementation of specific economic goals and objectives. The strengthening of the general tendencies of individualization inherent in the market system is a challenge for most of these communities, as cohesion around solving common tasks at the local level is significantly more difficult. Most members of rural local communities prioritize solving their own household's life problems. Public affairs are relegated to the background, which worsens the social climate in the community. Thus, the processes of individualization are quite ambiguous in terms of building the potential for productive interaction and the possibility of its transformation into social capital. Under conditions when socio-economic instability becomes chronic, selfishness in interaction increases, and a short radius of trust is formed, which is usually limited to the family.

Growth of economically inactive and socially vulnerable groups. Under conditions of unsuccessful adaptation to new conditions, antisocial phenomena, especially alcoholism and drug addiction, spread in territorial communities. Under conditions of problems with the satisfaction of basic life needs, the criminal activity becomes more active. In rural communities, this is facilitated by the overly deformed social structure of the population in terms of wealth. The high share of people with incomes below the subsistence level and a wide stratum of the poor make up the largest share in this structure. The middle class, which is the driver of the accumulation of social capital in rural areas, does not play a leading role in these processes yet. Chronic poverty shapes the worldview of citizens who are desperate on their own and with paternalistic guidelines. Distrust of government deprives communities of faith in better prospects. Prolonged accumulation of experience of negative practices essentially blocks their activity, and hence the development of social capital in rural communities.

Forming networks of discriminatory relationships. Violation of the principle of parity of interaction of subjects as a common phenomenon in the realities of rural society only strengthens the economic position of the strong side, i.e. powerful

agricultural business structures as representatives of large capital and external entities about the territory of economic activity. By subordinating economic activity to the production of rent-oriented profits, they try to form and consolidate a new form of monopoly on the use of land, property, a network of infrastructure facilities with the support of their interests by local authorities or its passive position of an outside observer, which discriminates against rural rights.

Dissemination of norms of destructive social behavior. Due to the passivity of civil society, and its non-interference in social conflicts, the manifestations of irresponsible behavior of government agencies were gradually transformed into a kind of management norms, which are perceived by society as necessary elements in the current bureaucracy. Often, demonstrating the practice of double standards and unfulfilled social promises, changing the previously adopted conditions for the implementation of certain management decisions, they consciously or unconsciously destroy the foundation of consolidating principles of rural communities, based on trust and partnership between interacting parties. The atmosphere of irresponsibility in the country and its regions is created by too frequent changes in the electoral system, unpredictable reorganization changes at the highest levels of government, especially at the level of executive bodies against the background of weak civilian control over their activities or its complete absence.

The problems of uniting rural territorial communities and strengthening their social capital, as well as the risks of disintegration processes, require systemic solutions to achieve the main goals of decentralization. Analysis of legal documents and several studies on this issue [25; 26; 27; 28] makes it possible to determine the expected results of decentralization: the transfer of a significant share of resources, powers, and responsibilities to local governments to eliminate excessive centralization to increase the effectiveness of management decisions and reduce bureaucracy; improving the logistical and financial support of local communities, restoring infrastructure and reducing the risk of man-made disasters, limiting the fragmentation of administrative-territorial units, which is the reason for the low level of professionalism of local government officials; achieving self-sufficiency of territorial communities as a result of their consolidation and population growth in the new administrative-territorial boundaries.

It is pertinent to note that the delegation of certain powers, resources, and responsibilities to the localities, as well as the increase in the number of communities, does not automatically increase managerial efficiency and social inclusion. Financial support of territorial communities is a consequence of an inefficient local economy due to the lack of a sufficient budget base for their development. An important role in these processes belongs to the mechanism of resource allocation within the TC, which can be discriminatory for small rural settlements that are part of them. In addition, the high fragmentation of the development of administrative-territorial units is not always the result of the low level of professionalism of local government officials but depends on many factors, including the democracy of electoral procedures. The growth of self-sufficiency of rural communities, their ability to meet the needs of the population

through their efforts based on financial independence, and the capacity of local governments is the integral effect of ongoing reforms.

On the way to the successful unification of rural territorial communities, there is trust in government structures at various levels as a sign of strong social capital. In the context of decentralization of management, the central government becomes a full partner of local government in the development and financing of economic and social projects of local development. In Ukraine, at the regional level, with the support of the U-LEAD with Europe program and the Ministry of Community and Territorial Development of Ukraine, Centers for Local Government Development have been established. They carry out active educational and consulting activities on administrative-territorial reform, ignoring the problem of low professional level of officials. According to the current legislation of Ukraine, the requirements for a candidate for the position of TC chairman are limited to age restrictions (at least 18 years) and the presence of Ukrainian citizenship in the complete absence of requirements for the level of education or work experience. It is quite natural that according to the results of the survey of village council chairmen and deputies, a significant part of them were not ready to develop effective strategies and programs for community development in the future due to a lack of necessary knowledge and experience. In particular, among respondents in Bila Tserkva and Uman districts, 55 and 72 % were identified as such persons, respectively. At the same time, 43 and 32 % of respondents stated that they need educational services in the form of training; 30 and 39 % – have master's programs [29, p. 156]. Thus, the need to intensify the activities of the Centers for Local Government Development to improve the educational and qualification level of officials remains unrealized. This negatively affects the process of development and implementation of TC development strategies and projects. To cover as many officials as possible with these services, it is necessary to form a platform and identify effective mechanisms of influence at the district level.

Due to the significant expansion of functions and powers and the growing responsibility of local authorities for the development of territorial communities, it is advisable to revise the legislation to strengthen the requirements for local government officials (education, work experience, skills, priority and quality of its improvement). To stimulate the activity of local self-government, international standards of public administration in Ukraine and incentives to increase the effectiveness of their activities (financial, administrative, reputational, etc.) should be gradually introduced. Experts in the field of public administration note the need to implement tools of public control over the activities of local governments [30]. However, under conditions of low social capital of communities with a passive-expected strategy of the behavior of residents, and distrust of existing government institutions, it is problematic to count on the effectiveness of public control tools. The high share of the poor population, targeted at solving local problems in difficult socio-economic conditions, creates a kind of "institutional trap" for the accumulation of social capital in rural areas.

Under such conditions, it is important to focus on the implementation of tools to stimulate the development of social capital, which will be aimed at forming and

strengthening ties, the practice of interaction between stakeholders of community development (local government, residents, entrepreneurs, investors, institutions); involvement in joint planning and organization of activities, implementation, and control of community development plans and projects; accumulation of trust between stakeholders through joint actions, using various forms of work in the community, which are initiative groups, clubs, training centers, societies, self-help groups; formation of transparent information space of local self-government bodies. The main directions of the development of social capital of rural TCs in Ukraine are coordination of common interests, creation of a basis for interaction, due to which networks of connections, and accumulation of trust are formed (Figure 7).

DIRECTIONS OF FORMATION OF SOCIAL CAPITAL OF COMMUNITIES

COORDINATION OF COMMON INTERESTS
- Forming a common vision of community development prospects;
- Joining forces to solve local problems;
- Formation of communication platforms and decision-making motivation system;
- Establish transparent procedures for resolving conflicts and disputes;
- Coordination of stakeholder efforts.

FORMATION OF NETWORKS
- Creation of multifunctional centers of social development;
- Project development focused on supporting local initiatives;
- Facilitating the creation of associations of business entities and landowners;
- Creation of integrated intra-community systems: common labor market, transport infrastructure and information communication;
- Development of public-private partnership.

ACCUMULA-TION OF TRUST
- Assistance in starting your own business;
- Creating a system of information and consulting services;
- Creating a system of preferential support for entrepreneurs implementing socially significant projects for the community;
- Introduction of the practice of public reports and discussions, creation of conditions for public control over the movement of budget and borrowed funds.

Figure 7. The main directions of development of social capital of rural TCs in Ukraine

Source: developed by the authors.

It should be noted that various interest groups of members of rural territorial communities (formal and informal) are formed against the background of unfavorable

public moods, especially depression, anxiety, and despair. Therefore, it is important to focus on the tasks arising from the common vision of the real opportunities for job creation, including in the field of entrepreneurship at the place of residence. It is necessary to coordinate the efforts of public administration bodies with public organizations, educational institutions, and international organizations, as well as to coordinate national and international programs in the field of the development of territorial communities.

Strengthening the social capital of rural territorial communities in terms of their consolidation should be based on the formation of an established system of relationships focused on:

- dissemination of the practice of multifunctional centers of social development (school-garden, leisure centers, centers of cultural and household services, recreational and medical institutions) to unite community members based on increasing the degree of territorial accessibility of services;

- implementation of social activity projects with a grant support mechanism to provide start-up capital to communities, implementation of their initiatives in such areas as public transport (to overcome isolation in rural areas), energy conservation, and environment;

- formation of communicative relations between different types of communities that are part of TC, through the creation of an integrated and efficient labor market; optimizing the scale and improving the activities of social institutions to ensure the constitutional rights and guarantees of citizens; development of the transport network, quality and intensity of passenger transportation services within the community and to the basic centers of territorial development;

- support (organizational, informational, financial) consolidation of small (personal farms) and medium-sized producers (farmers) to improve the competitive environment and balance the impact on the socio-ecological development of rural settlements; promoting the uniting of small landowners in an association to defend their interests;

- creation of a single information base and system of dissemination of information both on the territory of the country and abroad, on investment opportunities and prospective projects of development of rural territorial communities;

- formation of an effective system of stimulation of business structures that implement projects and programs aimed at improving the socio-economic situation in rural settlements (job creation, increase tax revenues, provision of information and consulting services, improvement of transport links);

- promotion of entrepreneurial initiative through state support in starting your own business (elimination of bureaucratic obstacles, information, and consulting services), identification and elimination of problems in the business environment (monopoly, breach of obligations to tenants).

Conclusions. At the new stage of implementation of tasks of decentralization of management at the level of rural territorial communities the tasks of strengthening vertically and horizontally integrating social capital based on the development of

various forms of fruitful partnership are actualized. The study identified limitations in the development of social capital accumulation of communities, which include: shadowing of interactions and low trust in social institutions, individualization of behavioral strategies, growth of economically inactive and socially vulnerable groups, the formation of networks of discriminatory relationships, proliferation norms of destructive social behavior. At the same time, the administrative-territorial reform has created favorable conditions for the development of the social capital of communities at the local level.

Analysis of the dynamics of forms of horizontally integrating social capital of rural communities, represented by agricultural cooperatives, farms, and inter-community cooperation, revealed their unrealized potential for development in Ukraine. In particular, per 10 thsd. economically active rural populations in 2020 there were only 4 agricultural cooperatives, 85 farms, and 119 agreements on inter-municipal cooperation. The impact of the indicators of social capital development of oblasts on their economy has been assessed by correlation and regression analysis of the gross regional product volume and the number of inter-municipal cooperation agreements, self-organization bodies, and cooperatives. As a result, it was found that there is a significant relationship only with the latter indicator: the variation in gross regional product by 75.9 % depends on the variation in the number of cooperatives. The main directions of the development of social capital of rural communities are substantiated taking into account modern features of their development, which are represented by coordination of common interests, creation of a basis for interaction, due to which networks are formed and trust is accumulated.

Prospects for further research in this area are the study of mechanisms influencing the development of social capital of communities at different levels of administrative and territorial management and improving scientific and methodological approaches to designing social capital development at the level of rural territorial communities. The implementation of the results of such research would significantly contribute to the development of self-sufficiency of territorial communities based on inclusiveness.

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СВІТОВІ ТЕНДЕНЦІЇ ТА ПЕРСПЕКТИВИ РОЗВИТКУ РИНКУ ЗАСОБІВ ЗАХИСТУ РОСЛИН

Мета. *Метою дослідження є визначення перспектив формування та розвитку ринку засобів захисту рослин у сільському господарстві на глобальному та національному рівнях, аналіз структури використання пестицидів і виявлення країн, що лідирують за обсягами застосування, експорту та імпорту пестицидів у світі.*

Методологія / методика / підхід. *Під час дослідження використано загальнонаукові та спеціальні методи дослідження, а саме: монографічний (при дослідженні теоретичних і методологічних основ формування та розвитку ринку хімічних засобів захисту рослин); аналіз рядів динаміки (розрахунок прогнозних показників й основних сценаріїв розвитку обсягу використання пестицидів у світі та в Україні); метод порівняння (оцінка показників використання пестицидів); абстрактно-логічний (теоретичні узагальнення та формулювання висновків). Вихідною базою дослідження стали дані Міжнародної організації з питань продовольства та сільського господарства при ООН (ФАО) та Державної служби статистики України.*

Результати. *Аналіз сучасних світових тенденцій розвитку ринку хімічних засобів захисту рослин показав, що він щороку має тенденцію до нарощування обсягів виробництва; більшість економічно розвинених країн світу продовжують застосовувати значні обсяги засобів захисту рослин. Дослідження свідчать, що основними виробниками світового ринку засобів захисту рослин є китайські агрохімічні монопольні компанії, які постійно нарощують обсяги збуту засобів захисту для галузі рослинництва. Доведено, що найбільшими експортерами та імпортерами пестицидів є країни Європи. Установлено, що використання пестицидів підприємствами України свідчить про їх більш високу волатильність, порівняно із прогнозними показниками щодо світового рівня. Запропоновано шляхи вдосконалення державної політики за додержанням чинного законодавства щодо використання пестицидів у сільськогосподарському виробництві та гарантування безпеки їх застосування у відповідності до світових стандартів якості й вимог ЄС, зокрема, Європейського зеленого курсу.*

Оригінальність / наукова новизна. *Виявлено, що за останні роки спостерігається стійка тенденція щодо застосовування у світі значних обсягів хімічних засобів захисту рослин, проте в Україні вони скорочувалися. Визначено основні причини зниження використання пестицидів в Україні для останнього десятиліття. Уперше розраховано прогнозний рівень використання пестицидів у світі та в Україні на період до 2030 р. за різними сценаріями (очікуваний, оптимістичний, песимістичний).*

Практична цінність / значущість. Результати дослідження мають важливу практичну цінність для виробників та експортерів при формуванні ринку хімічної продукції у світі. Здійснено розрахунки прогнозних рівнів використання пестицидів, які дають змогу виявити наявні та перспективні проблеми застосування пестицидів на рівні країн світу. Значущість мають визначені основні показники світового ринку пестицидів і структура їх використання, які є важливими компонентами у визначенні державної політики у сфері пестицидів й агрохімікатів.

Ключові слова: засоби захисту рослин, сільське господарство, прогноз, ринок пестицидів, імпорт та експорт пестицидів.

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GLOBAL TRENDS AND DEVELOPMENT PROSPECTS OF THE MARKET OF PLANT PROTECTION PRODUCTS

Purpose. The aim of the study is to determine the prospects for the formation and development of the market for plant protection products in agriculture at the global and national levels, and to analyze the structure of pesticide use and identify countries leading in terms of use, export and import of pesticides.

Methodology / approach. During the research general scientific and special research methods were used, namely: monographic (in the study of theoretical and methodological foundations of the formation and development of the market of chemical plant protection products); analysis of time series (calculation of forecast indicators and main scenarios for the development of pesticide use in the world and in Ukraine); method of comparison (assessment of pesticide use indicators); abstract-logical (theoretical generalizations and formulation of conclusions). The starting point of the study was the data of the International Food and Agriculture Organization of the United Nations (FAO) and the State Statistics Service of Ukraine.

Results. Analysis of current global trends in the development of the market for chemical plant protection products has shown that it increases production every year; most of the economically developed countries of the world continue to use significant amounts of plant protection products. Studies show that the main leaders in the world market for plant protection products are Chinese agrochemical monopoly companies, which are constantly increasing sales of their own production of plant protection products for the crop industry. It is proved that the largest exporters and importers of pesticides are European countries. It is established that the use of pesticides by Ukrainian enterprises indicates their higher volatility compared to global forecasts. Ways to improve the state policy on compliance with current legislation on the use of pesticides in agricultural production and ensure the safety of their use in accordance with international quality standards and the requirements of EU, in particular the European Green Deal, are proposed.

Originality / scientific novelty. It was revealed that in recent years there has been a steady

trend towards the use of significant amounts of chemical plant protection products in the world, but in Ukraine they have been declining. The main reasons for the decline in pesticide use in Ukraine over the last decade are identified. For the first time, the forecast level of pesticide uses in the world and in Ukraine for the period up to 2030 was calculated according to different scenarios (expected, optimistic, pessimistic).

Practical value / implications. The results of the study have important practical value for manufacturers and exporters in shaping the market for chemical products in the world. The calculations of the forecast levels of pesticide use were carried out and it was possible to identify the current and future problems of pesticide use at the level of the world. The main indicators of the world market of pesticides and the structure of their use are important, which are considerable components in determining the state policy in the field of pesticides and agrochemicals.

Key words: plant protection products, agriculture, forecast, pesticide market, import and export of pesticides.

Постановка проблеми. На засіданні Бюро Президії Національної академії аграрних наук України (НААН) у грудні 2021 р. зазначено, що реалізація програми Європейського Союзу (ЄС) European Green Deal (Європейський зелений курс) зумовлює потребу перегляду наявних підходів до організації й ведення сільського господарства, зокрема й у частині агрохімічних практик захисту рослин [1]. Як наголосив президент НААН Я. Гадзало, «необхідність застосування наукових підходів для формування бачення майбутнього галузі, яка здатна успішно конкурувати у світі, вимагає від науковців проводити дослідження щодо розвитку ринку засобів захисту рослин з урахуванням світових тенденцій. Також важливо запропонувати технологічні рішення, які запобігатимуть економічним та екологічним втратам і сприятимуть розвитку українського сільського господарства» [1].

За останні десятиліття світове виробництво сільськогосподарських товарів і послуг значно збільшилося. Засоби захисту рослин відіграли важливу роль у стимулюванні цього зростання, як й інші технологічні інновації. Однак, надмірне використання таких ресурсів, як хімічні засоби захисту рослин, має супутній вплив на навколишнє середовище [2] та здоров'я людей. Пестициди є токсичними хімічними агентами (переважно органічними сполуками), які застосовують у навколишньому середовищі для боротьби зі шкідниками сільськогосподарських культур і переносниками збудників хвороб [3]. Токсичність пестицидів для людини коливається в дуже широкому діапазоні й може бути гострою, субхронічною або хронічною [4; 5]. Актуальність цього питання посилюється у зв'язку з тим, що у світі загрозливих масштабів набуває ситуація зі збільшенням обсягів поширення неякісної та фальсифікованої продукції засобів захисту рослин.

Країни, що розвиваються, зазвичай залежать від розвитку сільського господарства, тому часто стають місцем призначення заборонених та суворо обмежених хімічних речовин [6]. У країнах, що розвиваються, залишки пестицидів часто трапляються в овочевих культурах, загалом їх значно більше, ніж у промислово розвинених країнах [7]. Безумовно, зазначені організаційні та

еколого-економічні проблеми ринку засобів захисту рослин є особливо актуальними для України, сучасний стан розвитку економіки якої істотно залежить від рівня розвитку агропромислового сектора.

Наявність особливостей діяльності аграрних товаровиробників і підвищення соціально-економічної значущості аграрного сектора економіки зумовлюють необхідність розробки та обґрунтування методичних умов, спрямованих на вирішення багатовимірних і різнобічних проблем забезпечення сталого розвитку агропромислового виробництва [8]. У сільському господарстві України відбулися глибокі зрушення у виробничій структурі підприємств та в структурі виробленої продукції. При цьому проблеми формування міжгалузевих економічних відносин на всіх етапах розвитку агропромислового виробництва є надзвичайно актуальними [9], особливо в теперішніх умовах. Починаючи з 2014 р. агрохімічна промисловість переживає період спаду, зокрема, через низькі ціни на врожай і низьку рентабельність фермерських господарств [10]. Отже, забезпечення ефективного розвитку всіх сфер агропродовольчого комплексу потребує залучення інвестицій, зокрема іноземних, з урахуванням Європейського зеленого курсу, що передбачає посилення процесів переходу до зеленої економіки [11]. Однією із причин незначного надходження іноземних інвестицій в економіку країни є недосконале регулювання нормативно-правової бази у сфері інвестиційних правовідносин, тому є потреба в розробці чіткої стратегії і тактики щодо залучення іноземних інвестицій [12]. Залучення інвестицій в екологічно орієнтовані інвестиційні проєкти та програми має базуватися на посиленні екологічних аспектів інвестиційної політики як частини стимулюючої підсистеми економічного механізму сталого розвитку сільських територій [13].

У рамках Європейського зеленого курсу передбачається скорочення використання пестицидів на 50 % до 2030 р. Тому, на думку вчених НААН, нині зберігається висока ймовірність заборони на українському ринку окремих діючих речовин засобів захисту рослин, серед яких широко вживані препаративні форми гліфосату, інсектициди неонікотиноїдної групи та ін. [1]. Водночас частина із зазначених діючих речовин є важливими для сталого розвитку сільського господарства й перегляд їхніх реєстрацій з можливою дальшою забороною за відсутності рівнозначних альтернатив нині може мати негативні наслідки, зокрема: зростання частки фальсифікованих засобів захисту рослин у зв'язку з відсутністю дозволених альтернатив; погіршення якості врожаю; підвищення цін на кінцеву продукцію; втрати експортних позицій української агропродукції на світових ринках; зменшення валютної виручки; втрата статусу України як надійного партнера на міжнародній продовольчій арені [1]. Крім того, зниження прибутковості аграрних підприємств послабить їхню спроможність щодо розширеного відтворення виробництва та розвитку сільських територій, що може мати негативні мікро- та макроекономічні ефекти уже тепер та віддалені соціально-економічні наслідки в середньостроковій перспективі. Тому особливого значення набуває необхідність установлення

реальних екологічних ризиків і загроз застосування вказаних діючих речовин, визначення потенційних економічних наслідків за одночасного пошуку ефективних альтернатив [1]. Таким чином, дослідження питання формування та розвитку світового ринку хімічних засобів захисту рослин у сільському господарстві є актуальним і необхідним.

Аналіз останніх досліджень і публікацій. Дослідники в статті [14] доводять, що потреба в захисті від шкідників сягає корінням у глибоку давнину, коли в якості пестицидів використовували як органічні, так і хімічні речовини. У статті [15] авторами доведено, що пестициди – це отрутохімікати, які застосовують на сільськогосподарських угіддях, міських зелених насадженнях із метою захисту рослин від різних хвороб. Автори робіт [16; 17] відзначають, що пестициди – це речовини або суміші речовин, які в основному використовують у сільському господарстві або в програмах охорони здоров'я, щоб захистити рослини від шкідників, бур'янів або хвороб, а людей – від хвороб, що передаються переносниками, таких як малярія, лихоманка денге та шистосомоз. Типовими представниками пестицидів є інсектициди, фунгіциди, гербіциди, родентициди, регулятори росту рослин та ін.

Окремі дослідники також наголошують на тому, що пестициди класифікують на основі способу їх дії з метою досягти бажаного ефекту, тобто ділять на пестициди контактної та системної дії [18]. Засоби захисту рослин є активними речовинами, які дозволяють фермерам контролювати різних шкідників, і, таким чином, є одним із найважливіших ресурсів у сільськогосподарському виробництві [19]. Отже, засоби захисту рослин відіграють важливу роль у забезпеченні виробництва продукції рослинництва.

Так, J. Cooper і H. Dobson у своїх дослідженнях посилаються на низку переваг від використання хімічних засобів захисту рослин, серед яких: покращений термін зберігання продукції; менша трудомісткість прополювання; зменшення кількості пального; підвищення врожайності; захист садових рослин [20]. Багато фермерів у країнах, що розвиваються, вважають використання пестицидів найкращим засобом захистити свої посіви від шкідників [21].

На переконання таких вітчизняних учених як Л. В. Василенко та О. А. Корчинська, «…ринок пестицидів має перебувати під жорстким контролем держави для запобігання використання застарілих, екологічно небезпечних хімічних засобів захисту рослин» [22]. Наприклад, наразі в Китаї режим контролю виробництва пестицидів підлягає серйозним реформам [23].

За даними Міжнародної організації з питань продовольства та сільського господарства при ООН (*Food and Agricultural Organization*) (ФАО), лібералізація ринків сировини, яку часто називають успішною ринковою реформою, може призвести до неефективного використання пестицидів із високими зовнішніми витратами [24].

При купівлі й використанні неякісних пестицидів й агрохімікатів згідно зі стандартом ISO 1750:1981 (зі змінами) сільськогосподарські товаровиробники не тільки втрачають урожай сільськогосподарських культур, а й завдають

шкоду здоров'ю людини через споживання продукції рослинного походження. Отже, основною характеристикою пестицидів як небезпечних речовин є їхня токсичність, яка залежить від хімічних і фізичних властивостей їх діючих речовин. Тому питання додержання чинного законодавства щодо використання інсектицидів, фунгіцидів, гербіцидів, родентицидів та регуляторів росту рослин в аграрному секторі економіки має перебувати під контролем держави.

Пестициди широко використовують у сучасному сільському господарстві, оскільки вони є ефективним й економічним способом підвищення якості та кількості врожаю, що формує продовольчу безпеку населення, чисельність якого у світі постійно зростає. Хоча пестициди корисні з погляду рослинництва, широке їх використання може мати серйозні наслідки для екосистеми, оскільки пестициди прямо чи опосередковано забруднюють повітря, воду, ґрунт і загалом екосистему, що загрожує здоров'ю живих істот [25]. Разом із цим, питання, які пов'язані з охороною ґрунтів та забрудненням підземних вод залишками пестицидів [26], залишаються поза належною увагою.

Незважаючи на опрацювання тематики сучасного стану ринку засобів захисту рослин в аграрному секторі економіки, визначення перспектив формування та розвитку ринку хімічних засобів захисту рослин у сільському господарстві залишається ще недостатньо дослідженим.

Мета статті. Метою дослідження є визначення перспектив формування та розвитку ринку засобів захисту рослин у сільському господарстві на глобальному та національному рівнях, аналіз структури використання пестицидів і виявлення країн, що лідирують за обсягами застосування, експорту та імпорту пестицидів у світі.

Виклад основного матеріалу дослідження. У нинішніх ринкових умовах соціально-економічного й фінансово-економічного розвитку держави базовою метою формування майбутньої моделі економіки України є активна та цілеспрямована політика щодо стану ринку сільськогосподарської продукції, організаційно-функціональних зв'язків між суб'єктами господарювання ринку, цінової політики на сільськогосподарську продукцію, стану світового ринку засобів захисту рослин у сільському господарстві.

За оцінками зарубіжних спеціалістів, одна третина обсягів сільськогосподарської продукції у світі виробляється завдяки застосуванню засобів захисту рослин [27]. Інші дослідники також наголошують на тому, що без використання засобів захисту рослин втрати плодів, овочів і зернових від шкідників, хвороб і бур'янів досягли б 78 %, 54 і 32 % відповідно [28]. Науковці також звертають увагу на те, що відмова від хімічних засобів захисту рослин призведе не тільки до різкого скорочення обсягів виробництва продуктів харчування, а й до їх здорожчання. У такій ситуації експорт бавовни, пшениці та соєвих бобів зі США знизився б на 27 % і було б втрачено 132 тис. робочих місць [29]. Згідно з розрахунками вчених НААН, у зв'язку з можливою забороною на українському ринку окремих діючих речовин засобів захисту рослин сумарні втрати аграрного сектора через недобір урожаю, зниження

якості продукції та додаткові витрати на внесення інсектицидів-замінників можуть збільшитися на 36,8–74,9 млрд грн, що в доларовому еквіваленті дорівнює 1,3–2,7 млрд дол. США [1]. Екологічні втрати, які проявляються у збільшенні витрат прісної води на обробку посівів, зростуть у діапазоні від 4,9 до 6,8 млн м^3, викидів CO_2 – від 89,4 до 92,4 млн кг щорічно [1]. У разі заборони гліфосату за відсутності рівноцінних альтернатив втрати аграрного сектора можуть сягнути 31,0–55,2 млрд грн або 1,25–2,23 млрд дол. США; водночас додаткові викиди CO_2 становитимуть 23,7–47,4 млн кг щорічно [1]. Зазначені екологічні наслідки є особливо важливими в умовах глобальних змін клімату в напрямі потепління й необхідності адаптації до них [30].

Основні показники, що свідчать про глобальні тренди використання пестицидів у світі й окремих континентах протягом 1990–2019 рр., нами представлено в табл. 1. Отже, як видно з наведених даних, у загальносвітовому масштабі в період 1990–2019 рр. простежується тенденція до збільшення обсягів застосування пестицидів у сільському господарстві.

Незважаючи на відносно стабільні показники, досягнуті в останнє десятиліття, загальне використання пестицидів у 2010-х рр. зросло більш ніж на 50 % порівняно з 1990–ми роками. Регіонами, які демонструють найвищі темпи зростання стосовно загального обсягу використання пестицидів, є країни Америки та Океанії – обсяги використання в яких збільшилися у 2,2 та 3,2 рази відповідно. Єдиним регіоном, країни якого зменшили використання пестицидів, є Європа, де загальне зменшення становило 12106 т, або 2,5 %. В Україні за період 1992–2019 рр. застосування пестицидів у сільському господарстві зазнало істотного скорочення – на 42447 т (63,6 %). Також тенденцію до зростання в загальносвітовому масштабі демонструє показник використання пестицидів з розрахунку на 1 га посівної площі (табл. 2).

Найвищі темпи зростання інтенсивності використання пестицидів з розрахунку на 1 га демонструють країни Північної та Південної Америки й Океанії. Для України ж характерне зменшення цього показника, особливо в період після 2014 р., що пояснюється, зокрема, зниженням курсу національної валюти і, як наслідок, збільшенням вартості пестицидів для вітчизняних виробників.

Основні тенденції зміни показників світового ринку пестицидів протягом досліджуваного періоду представлено на рис. 1. Наведені дані свідчать, що найбільшими експортерами та імпортерами пестицидів є країни Європи.

У 1990 р. у США та Європі функціонувало більше десяти великих агрохімічних компаній, але до 2009 р. кількість цих суб'єктів господарювання скоротилася до шести великих через злиття та поглинання (M&A), а саме Syngenta, Bayer, BASF, Dow Chemical, DuPont і Monsanto [32]. У 2015 р. відбулося злиття Dow і DuPont, а у 2016 р. – купівля китайською національною компанією ChemChina корпорації Syngenta (найбільшого світового виробника засобів для захисту рослин і насіння), а також укладення угоди між німецьким концерном Bayer й американським виробником генно-модифікованого насіння

та гербіцидів Monsanto [33].

Використання пестицидів у 1990–2019 рр., т

Роки	Світ	Азія	Америка	Африка	Європа	Океанія	Україна
1990	2303814	1112444	613026	65943	490495	21906	x
1991	2280831	1113523	604015	62720	478041	22532	x
1992	2342257	1174614	630832	54424	456087	26300	66772
1993	2405554	1215704	633247	49613	479029	27961	61843
1994	2566746	1344511	684646	51088	461303	25198	56915
1995	2710806	1458036	708221	56930	457541	30078	51986
1996	2816477	1515464	749379	58553	457815	35266	47058
1997	2939864	1575539	793337	59460	473574	37954	42129
1998	2999157	1585999	836266	60754	475247	40891	37201
1999	3114984	1683746	866579	63010	464270	37379	32272
2000	3082416	1642107	893710	63873	444951	37775	27344
2001	3060157	1628435	894181	64503	436299	36739	22415
2002	3099190	1671441	882220	67492	446488	31549	17487
2003	3196567	1695429	970788	69668	423610	37072	12558
2004	3379358	1780650	1046892	73236	437458	41122	15344
2005	3452191	1819577	1069296	71280	452835	39203	23022
2006	3501115	1887955	1064169	77360	430487	41144	28833
2007	3790471	2015116	1203949	75614	457516	38276	36476
2008	3838038	2042592	1184114	79227	482385	49720	54081
2009	3754920	2094753	1115971	79611	420342	44243	36445
2010	4014569	2156871	1277525	84706	447148	48319	62535
2011	4109891	2203215	1272747	92543	487569	53817	79492
2012	4152377	2212554	1293859	98119	492886	54959	90815
2013	4111617	2149760	1325297	99987	485163	51410	86782
2014	4165398	2174335	1330973	98734	505258	56098	78201
2015	4125890	2151365	1332665	97585	487109	57166	64987
2016	4160980	2173387	1319146	97450	501331	69666	51772
2017	4185592	2185233	1338328	102100	490260	69671	38558
2018	4141023	2177222	1306782	107023	480270	69726	25343
2019	4168778	2148810	1363996	107864	478389	69719	24325
Зміни (+/-) 2019 р. до 1990 р.	1864964	1036366	750970	41921	-12106	47813	-42447*
У %	81,0	93,2	у 2,2 р.б.	63,6	-2,5	у 3,2 р.б.	-63,6

Примітка. * До показника 1992 р.

Джерело: сформовано авторами на основі [31].

Китай належить до країн, де першими почали застосовувати хімічні засоби захисту рослин. У 1950 р. Китай почав виробляти інсектицид гексахлорциклогексан, а у 1957 р. у Китаї збудовано перший завод із виробництва пестицидів на основі фосфатоорганічних сполук [34].

Таблиця 2

Використання пестицидів з розрахунку на 1 га у 1990–2019 рр., кг

Роки	Світ	Азія	Америка	Африка	Європа	Океанія	Україна
1990	1,55	2,15	1,63	0,32	1,34	1,03	x
1991	1,53	2,15	1,61	0,30	1,30	1,06	x
1992	1,58	2,08	1,69	0,26	1,43	1,32	1,94
1993	1,62	2,15	1,71	0,23	1,52	1,35	1,80
1994	1,73	2,38	1,85	0,24	1,47	1,19	1,66
1995	1,82	2,58	1,92	0,26	1,47	1,50	1,51
1996	1,90	2,69	2,04	0,26	1,48	1,57	1,38
1997	1,97	2,80	2,16	0,26	1,52	1,57	1,24
1998	2,01	2,82	2,27	0,27	1,54	1,66	1,10
1999	2,08	2,98	2,35	0,27	1,52	1,42	0,96
2000	2,06	2,92	2,42	0,28	1,46	1,41	0,82
2001	2,05	2,89	2,41	0,28	1,45	1,33	0,67
2002	2,08	2,96	2,39	0,29	1,50	1,21	0,52
2003	2,13	2,99	2,63	0,29	1,43	1,45	0,38
2004	2,24	3,12	2,83	0,30	1,48	1,47	0,46
2005	2,28	3,18	2,89	0,29	1,54	1,36	0,69
2006	2,32	3,30	2,87	0,31	1,47	1,55	0,86
2007	2,51	3,52	3,25	0,30	1,57	1,50	1,09
2008	2,54	3,57	3,22	0,31	1,65	1,87	1,62
2009	2,48	3,64	3,06	0,31	1,44	1,49	1,09
2010	2,64	3,75	3,48	0,33	1,54	1,71	1,87
2011	2,69	3,81	3,48	0,35	1,68	1,57	2,38
2012	2,69	3,82	3,53	0,36	1,70	1,60	2,72
2013	2,66	3,70	3,61	0,36	1,67	1,51	2,58
2014	2,69	3,74	3,63	0,36	1,75	1,62	2,32
2015	2,66	3,68	3,63	0,36	1,68	1,70	1,93
2016	2,68	3,70	3,61	0,35	1,74	2,13	1,54
2017	2,68	3,70	3,62	0,37	1,70	2,09	1,15
2018	2,66	3,69	3,54	0,39	1,67	2,07	0,75
2019	2,69	3,68	3,70	0,39	1,66	2,10	0,72
Зміни (+/-) 2019 р. до 1990 р.	1,14	1,53	2,07	0,07	0,32	1,07	-1,22
У %	73,5	71,2	у 2,3 р.б.	21,9	23,9	у 2 р.б.	-62,9

Примітка. * До показника 1992 р.

Джерело: сформовано авторами на основі [31].

У сільськогосподарському виробництві застосовують багато пестицидів, які вважають занадто небезпечними для використання в розвинених країнах, тим не менш, вільно експортують до країн, що розвиваються [35]. Є загальний ризик імпортних пестицидів, які входять до складу нових продуктів й експортуються в інші країни [36]. Як лідер у світових справах, США повинні допомагати контролювати й виявляти на світовому ринку пестициди, експорт яких заборонений, та ті, які незареєстровані для використання [35].

Підхід Китаю до безпечності експорту харчових продуктів акцентує увагу на створенні мережі закритого постачання елітними експортно-орієнтованими

компаніями та фермами, які можуть продемонструвати, що вони запровадили відповідний контроль безпеки та мають високі санітарні стандарти, кваліфікований персонал і контроль над сировиною для гарантування безпеки своєї продукції [37]. Різні рівні залишків пестицидів у різних країнах можуть істотно порушити торгівлю у світі [38]. Тому вплив на навколишнє середовище агроекспортного виробництва у світі залишається важливим питанням [39].
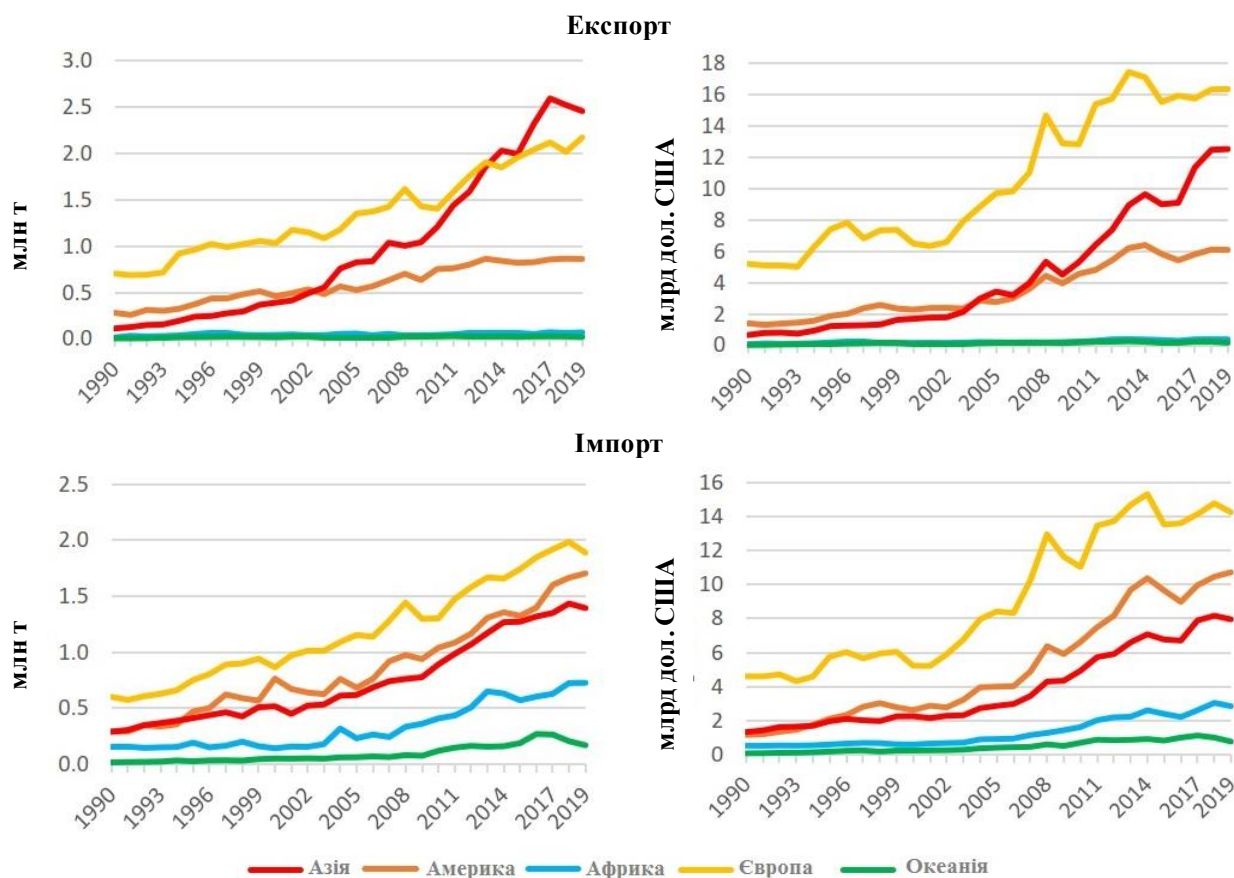
Рис. 1. Основні показники світового ринку пестицидів у 1990–2019 рр.

Джерело: побудовано авторами на основі [31].

На загальносвітовому рівні загальне використання пестицидів у сільському господарстві у 2019 р. залишалося стабільним, дорівнюючи 4,2 млн т активних інгредієнтів. Середній світовий рівень застосування пестицидів з розрахунку на площу посівних угідь становив 2,69 кг/га, коливаючись у розрізі континентів від 0,39 кг/га в Африці до 3,70 кг/га в Америці.

Світові обсяги торгівлі пестицидами у 2019 р. досягли приблизно 5,6 млн т готової продукції на суму 35,5 млрд дол. США, при цьому використання пестицидів на площу посівних угідь зросло з 1,55 кг/га у 1990 р. до 2,69 кг/га у 2019 р. У структурі застосування пестицидів (рис. 2) зростає частка гербіцидів з 38,7 до 53,3 % від загального обсягу, що зумовлено збільшенням обсягу їх використання на 1330530 т або у 2,5 рази.

За загальним обсягом використанням пестицидів у 2019 р. Україна перебувала на 22-му місці серед країн світу, при цьому мала майже потрійне відставання від Індії, яка перебувала на 10-му місці (рис. 3). Це можна пояснити

різницею площ сільськогосподарських земель. Якщо ж брати до уваги показник внесення пестицидів на одиницю площі, то Україна (0,72 кг/га) також не входить до ТОП-10, що, своєю чергою, можна пояснити більш тривалим операційним циклом вітчизняних сільськогосподарських підприємств. У світі до числа лідерів за інтенсивністю використання пестицидів (кг/га) у 2019 р. належали такі країни: Трінідад і Тобаго (24,96), Сент-Люсія (19,60), Еквадор (14,03), Гонконг (13,75), Тайвань (13,35), Китай (13,07), Ізраїль (12,74), Беліз (11,34), Південна Корея (10,59) та Колумбія (7,08).
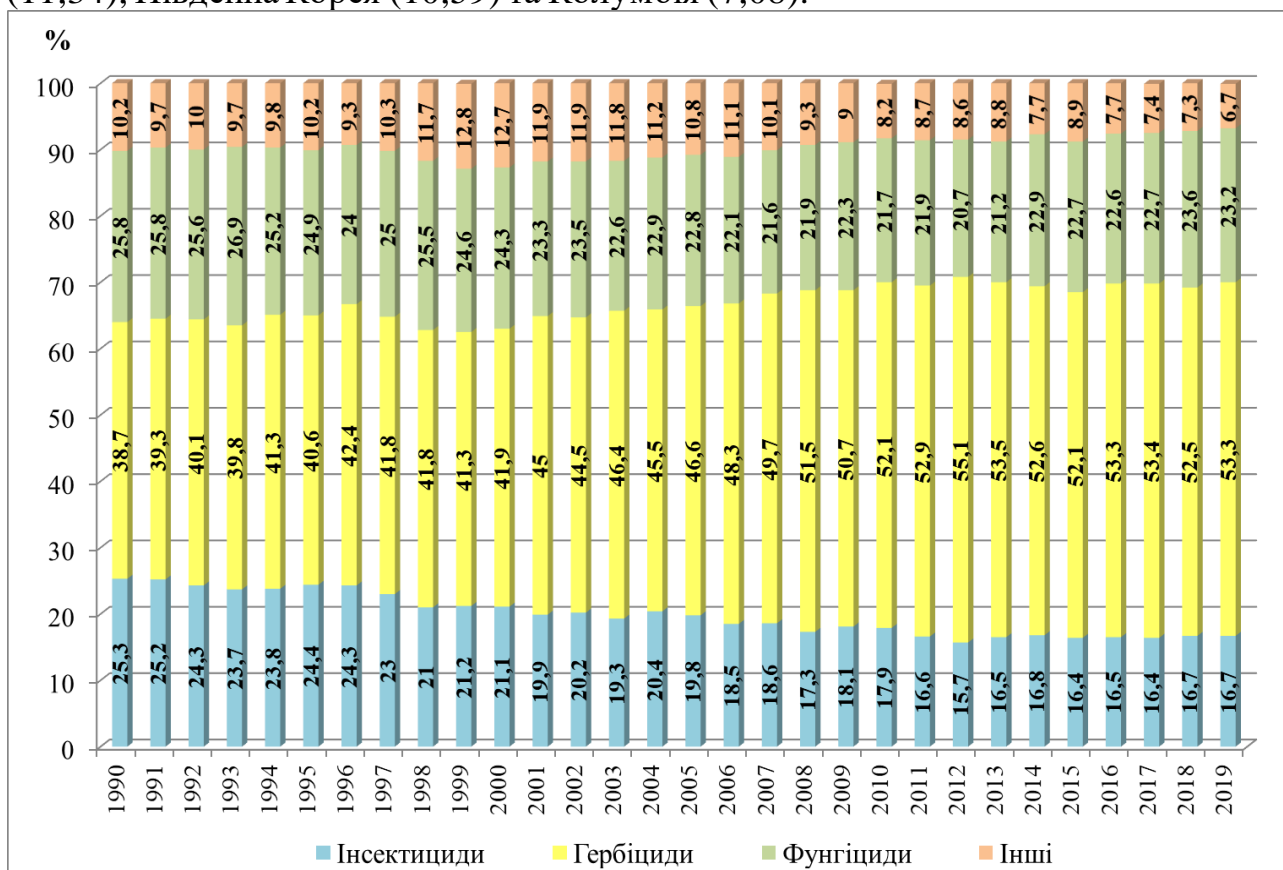
Рис. 2. Структура використання пестицидів у 1990–2019 рр., %
Джерело: побудовано авторами на основі [31].
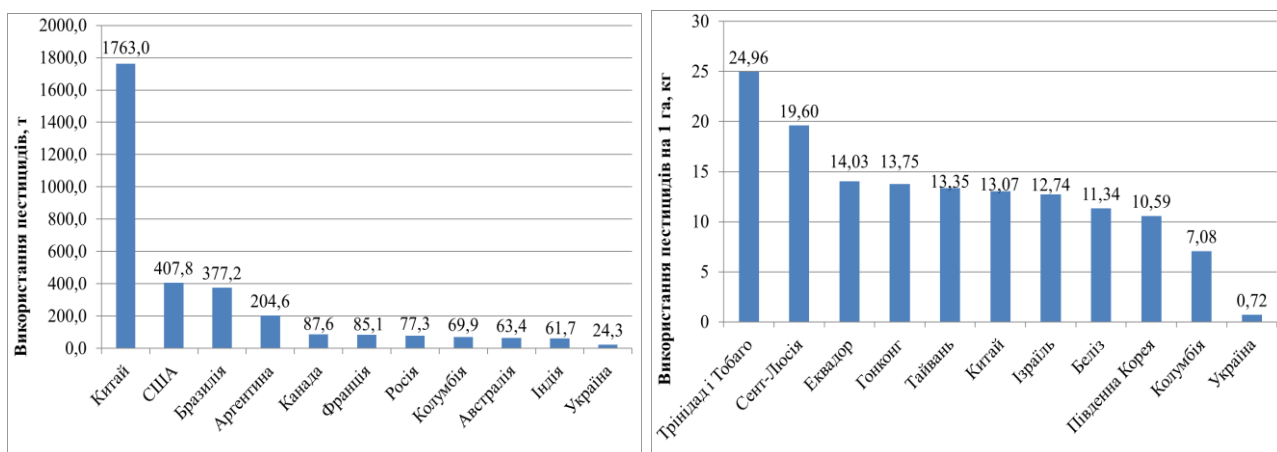
Рис. 3. Країни-лідери за використанням пестицидів, 2020 р.
Джерело: побудовано авторами на основі [31].

Аналізуючи динаміку інтенсивності використання пестицидів у світі, слід звернути увагу на їх ефективність. Для вимірювання виробничої ефективності використання пестицидів учені запропонували індекс співвідношення витрат/вигід, який відображає обсяг використання пестицидів для виробництва певної кількості врожаю за рік [40]. Згідно із цим індексом, на глобальному рівні ефективність використання пестицидів зростала протягом 1990–2007 рр., проте починаючи з 2007 р. знижувалася. Серед основних країн найбільші обсяги використання пестицидів (г/кг урожаю) протягом 2010–2014 рр. були в Бразилії (1,883), за якою слідували Японія (1,846), Мексика (1,678), Китай (1,243), Канада (0,979), США (0,873), Франція (0,708), Німеччина (0,673), Великобританія (0,550) та Індія (0,089) [40]. Отже, не завжди більший обсяг застосування пестицидів з розрахунку на 1 га площі забезпечував вищу виробничу ефективність.

Для оцінки зміни обсягів використання пестицидів у світі нами розраховано три можливі сценарії розвитку показників у динаміці: песимістичний, очікуваний та оптимістичний.

Для розрахунку прогнозних значень показників за умов песимістичного сценарію розвитку економічних явищ і процесів ми використовували рівняння тренду вигляду: $y = a_0 + {}_{\log}a_1$.

Прогнозування показників за очікуваного сценарію розраховано з використання лінійного тренду: $y = a_0 + a_1$.

Оптимістичний сценарій розвитку нами розглядався у вигляді рівняння тренду: $y = a_0 + {}_{\exp}a_1$.

Здобуті рівняння тренду мають такі параметри:

– очікуваний сценарій: $Y = 2271744 + 64309,1$ (середня відносна помилка – 3,66 %);

– оптимістичний сценарій: $Y = 2315482 + \exp^{0,99024}(1,13\%)$;

– песимістичний сценарій: $Y = 1982360 + {}_{\log}643091\,(1,69\%)$.

Як свідчать прогнозні розрахунки, у 2025 р., очікуваний обсяг загальносвітового використання пестицидів становитиме 4879,3 тис. т, за оптимістичного сценарію – 5233,1 тис. т, за песимістичного – 3802,8 тис. т. У 2030 р. очікуваний рівень загальносвітового використання пестицидів становитиме 5232,0 тис. т, за оптимістичного сценарію – 5917,2 тис. т, за песимістичного – 3802,8 тис. т. Як свідчать показники надійності, найбільш стійким є оптимістичний прогноз.

Основні прогнози за масивом даних (табл. 1) про використання пестицидів у світі наведено нами на рис. 4. Параметри рівнянь підтверджують тенденції до збільшення застосування пестицидів у світовому масштабі.

Слід розуміти, що на прогнозні показники істотно можуть вплинути різні чинники, зокрема пандемія Covid-19 та російська військова агресія в Україні. Разом із тим, розраховані сценарії доцільно враховувати при формуванні державної політики у сфері сільського господарства.

Аналогічним чином розраховано прогнози використання пестицидів в Україні. Рівняння тренду мають такі параметри:

– очікуваний сценарій: Y = 67524,7 – 1505,4 (5,17 %);
– оптимістичний сценарій: Y = 69381,9 + exp^{0,926182} (4,27 %);
– песимістичний сценарій: Y = 74298,8 – $_{\log}$ 15054 (4,62 %).
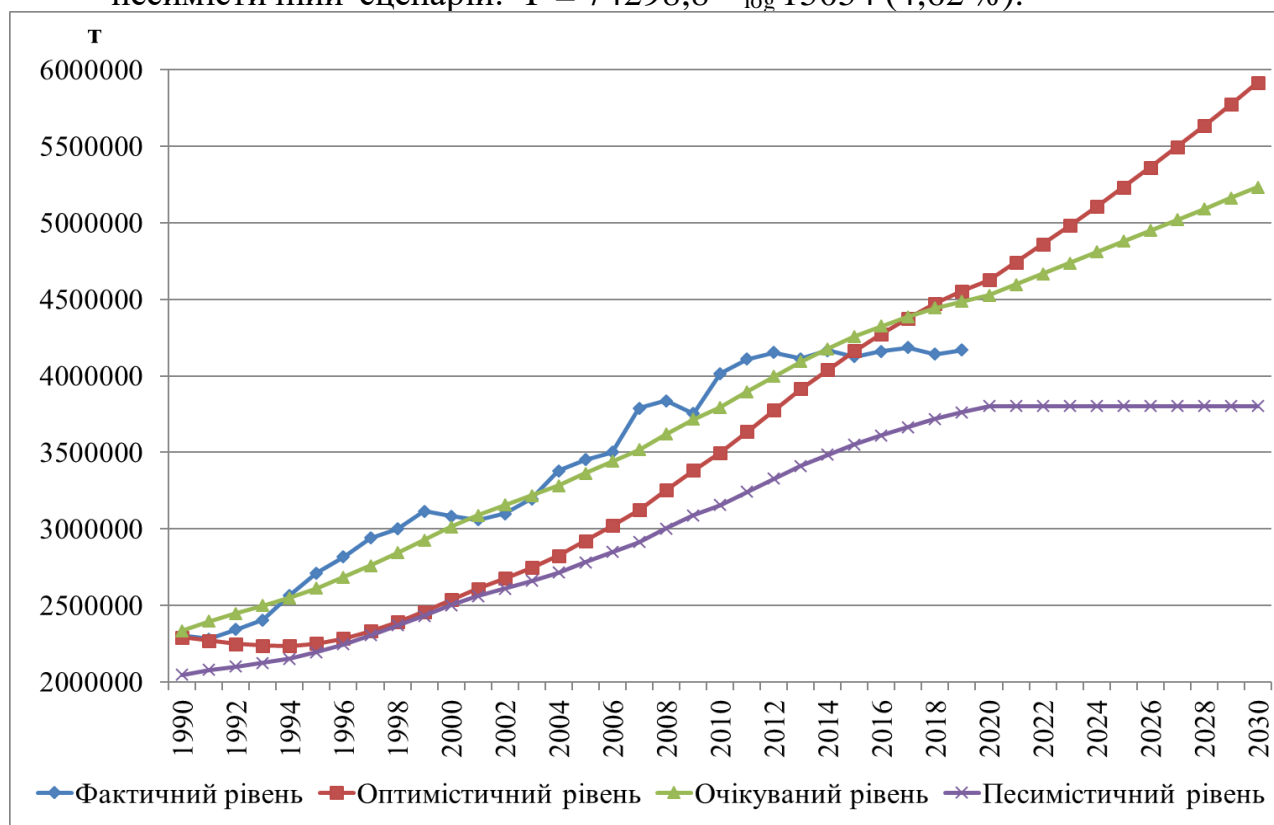
Рис. 4. Прогнозний загальний обсяг використання пестицидів у світі на період до 2030 р., т

Джерело: розрахунки авторів.

Основні прогнози за масивом даних про використання пестицидів в Україні (табл. 1) представлено на рис. 5. Як свідчать прогнозні розрахунки, у 2025 р. очікуваний обсяг використання пестицидів в Україні становитиме 41,4 тис. т, за оптимістичного сценарію – 55,3 тис. т, за песимістичного – 46,7 тис. т. У 2030 р. очікуваний загальний обсяг використання пестицидів в Україні становитиме 41,9 тис. т, за оптимістичного сценарію – 61,9 тис. т, за песимістичного – 46,7 тис. т. Як свідчать визначені показники статистичної надійності, найбільш стійким є оптимістичний сценарій прогнозу.

На відміну від загальносвітових тенденцій, для України характерні періоди істотного зниження використання пестицидів, зокрема протягом 1990-х та 2010-х років. Якщо для першого періоду зниження використання пестицидів в Україні можна пояснити загальним зменшенням сільськогосподарського виробництва, то для останнього десятиліття зниження загального обсягу використання хімічних засобів захисту рослин, на наш погляд, відбувається як за рахунок покращення технологій застосування препаратів, використання засобів захисту рослин в оптимальних дозах, здійснення постійного контролю за якістю (що зумовлює використання меншої кількості більш якісних пестицидів), так і через застосування технологій органічного землеробства.
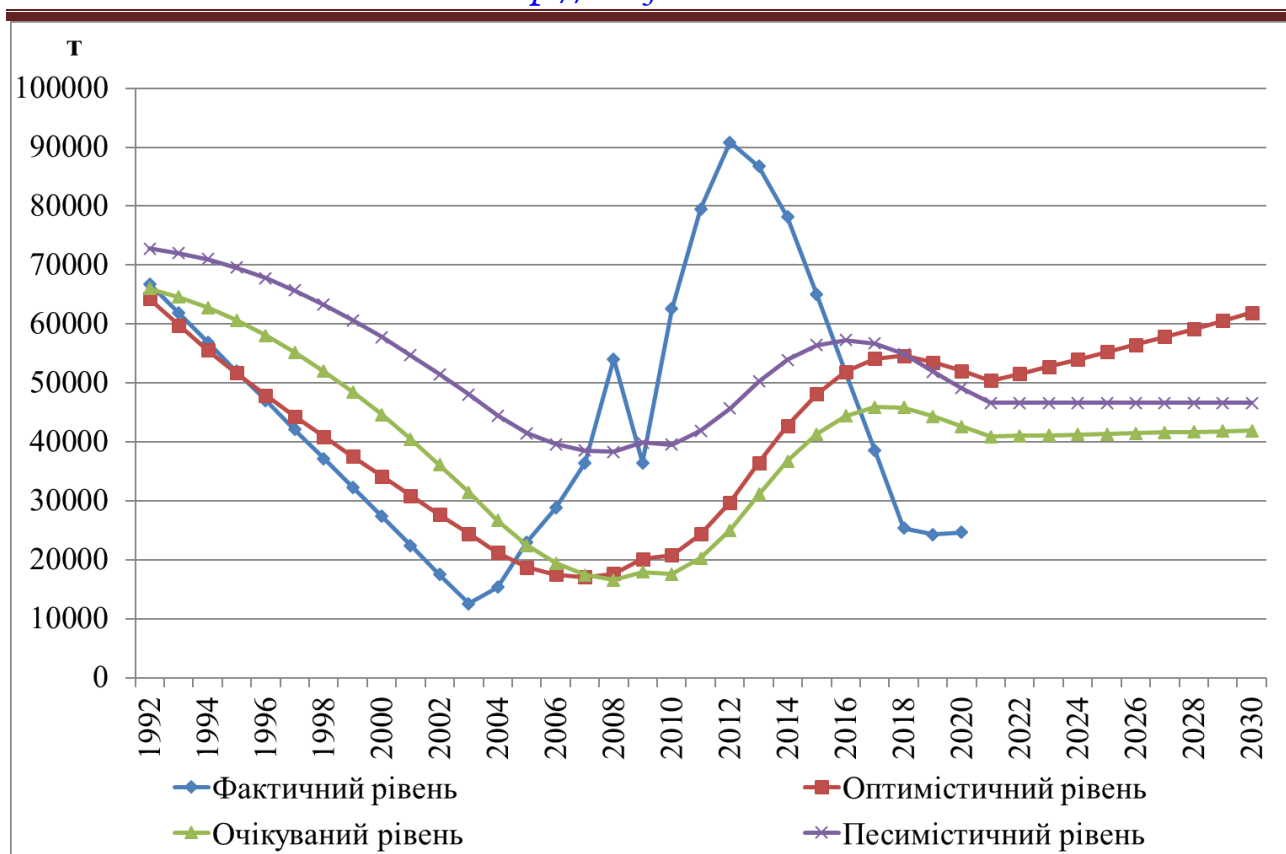
Рис. 5. Прогнозний загальний обсяг використання пестицидів в Україні на період до 2030 р., т

Джерело: розрахунки авторів.

Рівняння тренду для відносного показника (використання пестицидів з розрахунку на 1 га) у загальносвітовому масштабі мають такі параметри:

– очікуваний сценарій: $Y = 1,53 + 0,393$ (середня відносна помилка – 3,85 %);

– оптимістичний сценарій: $Y = 1,59 + \exp^{0,9871}$ (11,67 %);

– песимістичний сценарій: $Y = 1,35 + {}_{\log}0,3931$ (15,81 %).

У 2025 р., як свідчать прогнозні розрахунки, очікуваний рівень внесення пестицидів з розрахунку на 1 га посівної площі у світі становитиме 3,14 кг, за оптимістичного сценарію – 3,33 кг, за песимістичного – 2,48 кг. У 2030 р. у світі очікуваний рівень внесення пестицидів з розрахунку на 1 га посівної площі становитиме 3,30 кг, за оптимістичного сценарію – 3,73 кг, за песимістичного – 2,48 кг. Як свідчать показники надійності, найбільш стійким є очікуваний прогноз.

Основні прогнози за масивом даних (табл. 2) про інтенсивність використання пестицидів у світі наведено на рис. 6.

Рівняння тренду для цього показника в Україні мають такі параметри:

– очікуваний сценарій: $Y = 1,96 - 0,34$ (середня відносна помилка – 51,10 %);

– оптимістичний сценарій: $Y = 2,01 + \exp^{0,9278}$ (40,72 %);

– песимістичний сценарій: $Y = 2,11 + {}_{\log}0,343$ (65,59 %).
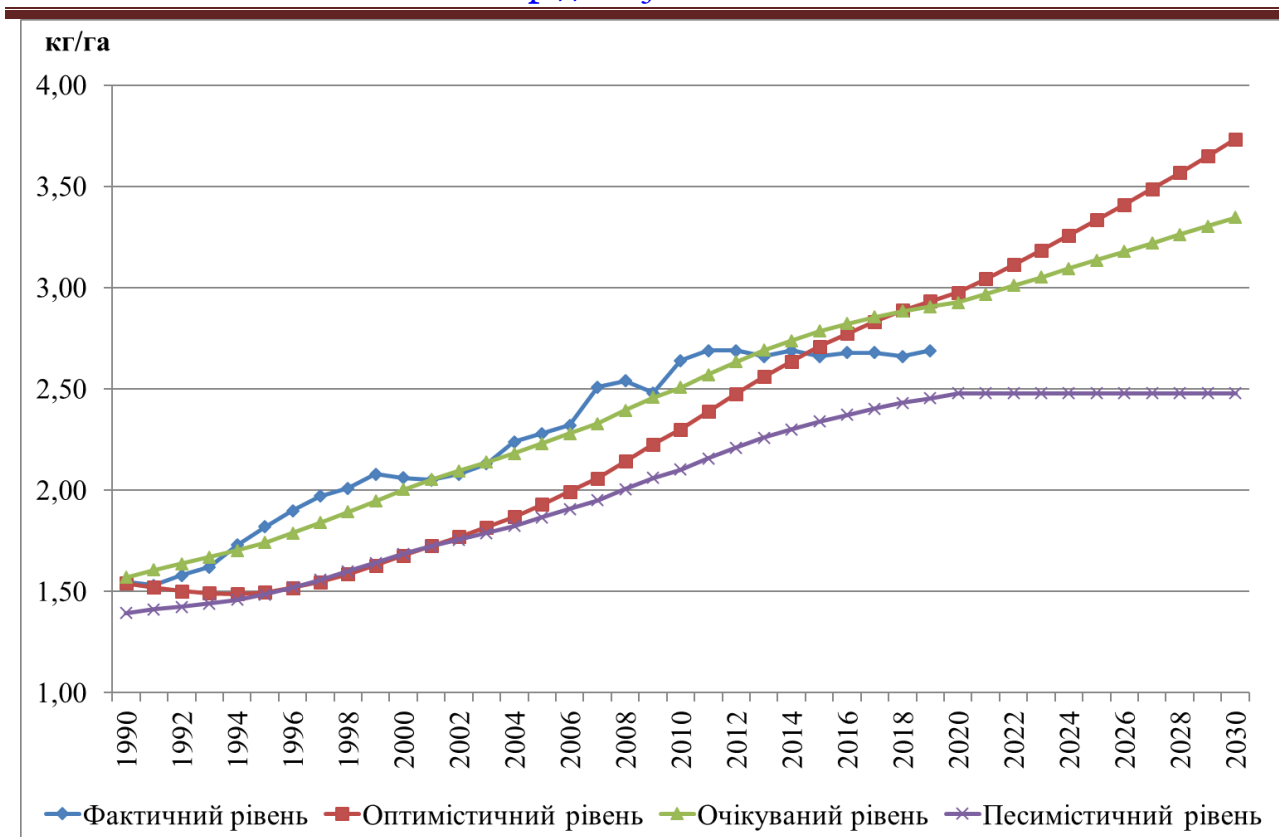
Рис. 6. Прогнозний обсяг використання пестицидів у світі з розрахунку на одиницю площі на період до 2030 р., кг/га

Джерело: розрахунки авторів.

Очікуваний рівень внесення пестицидів з розрахунку на 1 га посівної площі в Україні у 2025 р., як свідчать прогнозні розрахунки, становитиме 1,30 кг, за оптимістичного сценарію – 1,70 кг, за песимістичного – 1,41 кг. У 2030 р. в Україні очікуваний середній рівень внесення пестицидів з розрахунку на 1 га посівної площі становитиме 1,33 кг, за оптимістичного сценарію – 1,92 кг, за песимістичного – 1,41 кг. Слід зазначити, що показники надійності для цих прогнозів свідчать про невисокий ступінь їх імовірності через значні коливання фактичних даних. Сценарні прогнози за масивом даних (табл. 2) про інтенсивність використання пестицидів в Україні наведено на рис. 7.

Обговорюючи результати дослідження, слід зазначити, що вони мають важливу практичну цінність для виробників та експортерів при формуванні ринку хімічної продукції у світі. Визначені основні показники світового ринку пестицидів і структура їх використання є важливими компонентами у формуванні державної політики у сфері пестицидів й агрохімікатів і мають певну цінність для аграрних товаровиробників. Умови, в яких функціонує аграрний сектор, мають високий рівень мінливості й невизначеності, і ця обставина вимагає від виробників сільськогосподарської продукції пошуку шляхів отримання достовірної інформації про стан ринку цієї продукції, організаційно-функціональних зв'язків між суб'єктами господарювання ринку [41], а також про стан ринків матеріально-технічних ресурсів, пестицидів та агрохімікатів, що використовують аграрні підприємства. Так, C. Collins та інші

вчені стверджують, що стабільна політика є важливою для забезпечення безпечного економічного, екологічного та соціально прийнятного простору для подальших інновацій у виробництві та використанні хімічних речовин [42]. Щоб сприяти справді «сталому розвитку» у сфері захисту рослин, німецьке Федеральне агентство з навколишнього середовища рекомендує комплексний підхід до всіх відповідних сфер політики (захист рослин, навколишнє середовище, охорона природи та сільське господарство), заснованої на таких п'яти основних принципах: мінімізація використання; ідентифікація, кількісна оцінка та повідомлення про ризики; інтерналізація зовнішніх ефектів; компенсація неминучих наслідків; оптимізація управління ризиками [43].
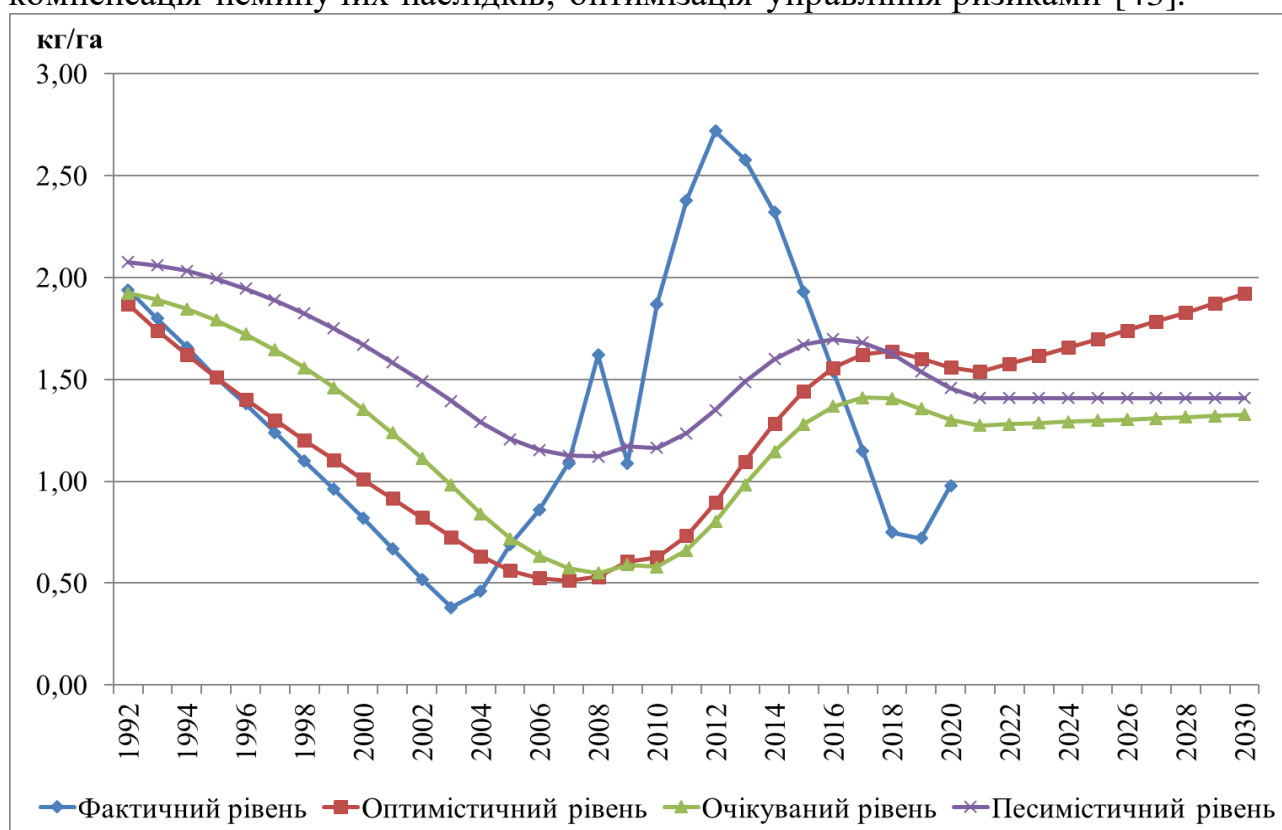
Рис. 7. Прогнозний обсяг використання пестицидів в Україні з розрахунку на одиницю площі на період до 2030 р., кг/га

Джерело: розрахунки авторів.

Суспільство потребує впровадження нової аграрної концепції щодо виробництва харчових продуктів, яка є безпечнішою для людини та довкілля [44]. На продовольчу безпеку й безпечність продуктів харчування впливає багато факторів, включаючи: вибір способу землекористування, зміну клімату, методи вирощування сільськогосподарських культур, нові технології боротьби зі шкідниками [45]. В окремих економічно розвинених країнах щороку зростає виробництво біопрепаратів – як альтернативних засобів у боротьбі зі шкідниками, хворобами та бур'янами. Обсяг використання біопрепаратів у світі з кожним роком збільшується. Так, дослідження авторів [46] свідчать, що біопрепарати є екологічно чистими речовинами й можуть використовуватися в окремих господарствах як один із методів захисту від шкідників з метою

зменшення застосування хімічних речовин. Найбільший ринок біопрепаратів сконцентровано в Північній Америці (44 %), Латинській та Південній Америці (10 %), а в Азії та Індії приблизно до 6 % [47]. Окремі дослідники [48] дійшли до висновку, що в майбутньому біопрепарати стануть одним із альтернативних засобів синтетичним хімічним препаратам через їх меншу вартість, безпеку й широке поширення та доступність. Втрата врожаю, яка спричинена шкідниками, є серйозною проблемою для сільськогосподарського виробництва. Зменшення витрат на боротьбу зі шкідниками та використання пестицидів може бути досягнуто шляхом запровадження або збільшення популяції природних ворогів [49].

Ефективність регулювання ринку пестицидів полягає в забороні або ліквідації пестицидів, які є найнебезпечнішими та мають найбільший потенціал шкоди для людей та навколишнього середовища [50]. Як бачимо, наслідки застосування хімічних засобів захисту рослин від шкідників і хвороб проявляються не тільки у виробничій та економічній сферах, а й у питаннях ідентифікації, кількісної оцінки, оптимізації управління ризиками, мікробної деградації і конверсії ксенобіотиків у навколишньому середовищі та ін. Таким чином, у перспективі слід заохочувати використання в сільськогосподарському виробництві біопрепаратів замість хімічних пестицидів.

Висновки. Ринок засобів захисту рослин є одним із найважливіших ресурсів у сільськогосподарському виробництві, оскільки пестициди разом із технологічними інноваціями відіграють важливу роль у стимулюванні обсягу світового виробництва аграрної продукції. Аналіз сучасних світових трендів розвитку ринку засобів захисту рослин показав, що він характеризується тенденціями до нарощування обсягів виробництва, експорту, імпорту й застосування пестицидів. Найвищі темпи зростання інтенсивності використання пестицидів з розрахунку на 1 га демонструють країни Америки й Океанії, а найнижчі – країни Африки. Найбільшими експортерами та імпортерами пестицидів є країни Європи. На відміну від загальносвітових тенденцій, для України характерні періоди істотного зниження використання пестицидів, зокрема протягом 1990-х і 2010-х років, що з позицій імплементації Європейського зеленого курсу можна вважати певною мірою позитивним.

На основі виявлених багаторічних тенденцій уперше розраховано прогнозний рівень використання пестицидів у світі та в Україні на період до 2030 р. за різними сценаріями (очікуваний, оптимістичний, песимістичний). Так, у 2030 р. очікуваний рівень загальносвітового використання пестицидів становитиме 5232,0 тис. т, за оптимістичного сценарію – 5917,2 тис. т, за песимістичного – 3802,8 тис. т. В Україні у 2030 р. прогнозний загальний обсяг використання пестицидів становитиме за очікуваного сценарію 41,9 тис. т, за оптимістичного сценарію – 61,9 тис. т, за песимістичного – 46,7 тис. т. Як у світі, так і в Україні, найбільш стійким є оптимістичний сценарій прогнозу. При цьому критерії надійності для прогнозних значень використання пестицидів підприємствами України свідчать про їх більш високу волатильність порівняно

із прогнозними показниками щодо світового рівня (очікуваний сценарій – 5,17 %; оптимістичний сценарій – 4,27 %; песимістичний сценарій – 4,62 %).

З метою вдосконалення державної політики у сфері пестицидів та агрохімікатів і для подолання проблем ринку засобів захисту рослин у сільському господарстві України, перш за все, необхідно:

– удосконалити законодавчу базу щодо поліпшення державного регулювання ринку у сфері поводження з пестицидами та агрохімікатами з наданням рівнозначних альтернатив щодо замінників у разі заборони використання окремих засобів захисту рослин на українському ринку;

– внести зміни до Закону України «Про захист рослин» щодо посилення відповідальності за використання фальсифікованих засобів захисту рослин – хімічних продуктів, що не відповідають встановленим світовим вимогам, які висувають до хімічних засобів захисту рослин від шкідників і хвороб;

– упровадити більш ефективний державний нагляд і контроль за додержанням чинного законодавства щодо використання в сільськогосподарському виробництві якісних пестицидів і гарантування безпеки їх застосування у відповідності до світових стандартів якості ISO 22000 та вимог нормативно-правових актів ЄС;

– посилити відповідальність усіх учасників ринку хімічних засобів захисту рослин за порушення чинного законодавства про охорону навколишнього природного середовища в умовах сталого розвитку;

– у сільськогосподарському виробництві необхідним є комплексне поєднання агрохімічного захисту з різноманітними біологічними та механічними методами боротьби, при цьому держава має стимулювати застосування біопрепаратів замість хімічних пестицидів.

На нашу думку, потребують подальшого розгортання наукової дискусії та подальших досліджень щодо проблем, які спрямовані на пошук методологічних і практичних підходів до формування та розвитку ринку засобів захисту рослин від шкідників і хвороб у контексті імплементації Європейського зеленого курсу; охорони ґрунтів та забруднення підземних вод, а також контролю за обігом пестицидів та їх використанням відповідно до вимог ЄС і країн-партнерів України в міжнародній торгівлі.

Подяка. Колектив авторів щиро дякує анонімним рецензентам за їхні конструктивні відгуки, поради та зауваження.

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РОЗВИТОК ЦИРКУЛЯРНОЇ АГРАРНОЇ ЕКОНОМІКИ: ПОТЕНЦІЙНІ ДЖЕРЕЛА ФІНАНСУВАННЯ ІННОВАЦІЙНИХ ПРОЄКТІВ

Мета. Метою цієї роботи є висвітлення результатів дослідження потенційних джерел фінансування циркулярної економіки в аграрному секторі й моделювання факторів, що впливають на формування фінансового забезпечення (власними ресурсами) для реалізації інноваційних циркулярних проєктів аграрних підприємств.

Методологія / методика / підхід. У дослідженні використано такі методи: бібліометричний (для визначення стану досліджуваної проблеми на основі баз Scopus і Web of Science); кореляційний аналіз (для виявлення та оцінювання тісноти взаємозв'язку між факторами, що впливають на формування фінансового забезпечення (власними ресурсами) для реалізації інноваційних проєктів аграрних підприємств); економетричне моделювання (для побудови математичної моделі залежності інвестиційного прибутку аграрних підприємств Харківської області від виробничих витрат на 1 га с.-г. угідь і їх площі); графічний (для побудови тривимірного графіка й наочного представлення виявлених залежностей); монографічний та абстрактно-логічний (для узагальнення результатів дослідження). Емпіричну частину дослідження виконано на прикладі даних 506 аграрних підприємств Харківської області за 2019 р.

Результати. Узагальнено європейські практики фінансування циркулярних проєктів. Представлено результати кореляційного аналізу впливу на формування фінансового забезпечення (власними ресурсами) для реалізації інноваційних проєктів аграрних підприємств таких факторів: мотивація персоналу, концентрація, інтенсивність використання земель, інтенсифікація, спеціалізація, диверсифікація, аутсорсинг. Установлено, що першоосновою одержання високих показників доходу, маржинального доходу, грошового потоку та інвестиційного прибутку є формування належного розміру виробничих витрат на гектар. Так, підвищення розміру виробничих витрат на 1 тис. грн/га с.-г. угідь сприяло збільшенню загальної суми інвестиційного прибутку на 0,3199 млн грн, збільшення площі с.-г. угідь на 1 га – зростанню цього прибутку на 0,0037 млн грн.

Оригінальність / наукова новизна. Уперше розроблено одно- та двофакторні лінійні економетричні моделі, що дозволило здійснити кількісну оцінку впливу інтенсифікації виробництва та концентрації земель на формування інвестиційного прибутку аграрних підприємств як головного потенційного джерела самофінансування інноваційних проєктів. Набули дальшого розвитку положення про формування фінансового забезпечення реалізації циркулярних проєктів в аграрному секторі.

Практична цінність / значущість. Основні результати дослідження можуть бути використані для (i) удосконалення політики фінансового забезпечення реалізації циркулярних

проєктів в аграрному секторі; (ii) оцінювання та прогнозування впливу факторів на інвестиційний прибуток аграрних підприємств як потенційне джерело самофінансування інноваційних циркулярних проєктів; (iii) управління виявленими факторами з позиції максимізації формування власного грошового потоку як потенційного джерела самофінансування інноваційних циркулярних проєктів.

Ключові слова: *циркулярна аграрна економіка, циркулярні проєкти, фінансове забезпечення, власні джерела фінансування, інвестиційний прибуток.*

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DEVELOPMENT OF CIRCULAR AGRICULTURAL ECONOMY: POTENTIAL SOURCES OF FINANCING INNOVATIVE PROJECTS

Purpose. *The purpose of this paper was to highlight the results of the study of potential sources of financing the circular economy in the agricultural sector and modeling the factors influencing the formation of financial support (with own resources) for the implementation of innovative circular projects of agricultural enterprises.*

Methodology / approach. *This study uses the following methods: bibliometric (to determine the state of the problem under study based on the Scopus and Web of Science databases); correlation analysis (to identify and assess the close relationship between the factors influencing the formation of financial support (with own resources) for the implementation of innovative projects of agricultural enterprises); econometric modeling (to build a mathematical model of the dependence of the investment profit of agricultural enterprises of the Kharkiv oblast on production costs per 1 ha of agricultural lands and their areas); graphical (for building three-dimensional graph and visual representation of the revealed dependencies); monographic and abstract-logical (for generalization of the research results). The empirical part of the study was performed on the example of data from 506 agricultural enterprises of Kharkiv oblast in 2019.*

Results. *European practices of financing circular projects are summarized. The results of a correlation analysis of the impact on the formation of financial support (with own resources) for the implementation of innovative projects of agrarian enterprises of the following factors are presented: staff motivation, concentration, intensity of land use, intensification, specialization, diversification, outsourcing. It is established that the fundamental basis for obtaining high indicators of income, marginal income, cash flow and investment profit is the formation of the appropriate amount of production costs per hectare. For example, an increase in the size of production costs by 1 thsd. UAH/ha of agricultural land contributed to an increase in the total amount of investment profit by 0.3199 mln UAH, an increase in the area of agricultural land per 1 ha – an increase in this profit by 0.0037 mln UAH.*

Originality / scientific novelty. *For the first time, one- and two-factor linear econometric models were developed, which made it possible to carry out quantitative assessment of the impact*

of the intensification of production and land concentration on the formation of the investment profit of agrarian enterprises as the main potential source of self-financing of innovative projects. The provision on the formation of financial support for the implementation of circular projects in the agricultural sector, was further developed.

Practical value / implications. *The main results of the study can be used for (i) improving the policy of financial support for the implementation of circular projects in the agricultural sector; (ii) assessment and forecasting of the impact of factors on the investment profit of agricultural enterprises as a potential source of self-financing of innovation circular projects; (iii) management of identified factors from the standpoint of maximizing the formation of own cash flow as a potential source of self-financing of innovation circular projects.*

Key words: *circular agricultural economy, circular projects, financial support, own sources of financing, investment profit.*

Постановка проблеми. З огляду на обмеженість світових ресурсів і прогнозоване збільшення чисельності населення, поточну лінійну економічну модель нині дедалі більше вчених і практиків вважають нежиттєздатною як з економічного, так і з екологічного погляду. Тому є об'єктивна необхідність переходу до бізнес-моделі циркулярної економіки, яка вимагає зміни економічної парадигми та радикальних змін у мисленні політиків, бізнесу, споживачів і фінансистів у напрямі мислення, що ґрунтується на життєвому циклі [1]. Перехід до циркулярної економіки потребує відповідних інвестицій. Більше того, забезпечення доступу до фінансування для інноваційних проєктів циркулярного бізнесу на різних етапах його становлення є однією з ключових умов успішної імплементації циркулярної економіки. Саме проєктний підхід є одним із найбільш дієвих інструментів упровадження циркулярної економіки й трансферу циркулярних інновацій через розроблення й реалізацію конкретних інноваційних проєктів [2, с. 87]. Циркулярні проєкти – проєкти, пов'язані із циркулярною економікою, зосереджені на переосмисленні та перепроєктуванні продуктів, процесів, ланцюжків створення вартості, бізнес-моделей і послуг для максимального скорочення та/або перероблення ресурсів, що використовують для виробництва товарів чи послуг, зберігаючи при цьому в найкращій мірі свою економічну цінність і мінімізуючи негативний вплив на довкілля [3, с. 5]. Фінансування можна залучити за допомогою різних типів проєктів, але в публічному просторі мало або зовсім немає інформації про те, де і як отримати фінансування для проєктів, пов'язаних із циркулярною економікою, і які загальні вигоди для підприємств від екологічної діяльності [4], що свідчить про актуальність і важливість цього дослідження.

Актуальність і значущість проблеми посилюється змінами клімату, необхідністю адаптації до них і зменшення негативного впливу на довкілля, та сталим економічним зростанням, до якого прагнуть як країни, так і підприємства. Для аграрного сектора впровадження циркулярної економіки є особливо актуальним, оскільки, з одного боку, саме в цій галузі задіяно у виробничому процесі значний осяг природних ресурсів, а з іншого боку, – саме тут є великі можливості для більш раціонального використання ресурсів,

побічної продукції та відходів для подальшого застосування в економіці, надання переваги відновлюваним матеріалам.

В умовах зростання попиту на продовольство, деградації довкілля й потреби в економії ресурсів, модель циркулярної економіки набуває актуальності для підтримки сільського господарства України. Це пов'язано, зокрема, з основними перевагами циркулярної бізнес-моделі на противагу традиційним, оскільки вона базується на розширеному розумінні цінності, яка містить три виміри сталості, поєднуючи економічні, соціальні й екологічні вигоди та взаємозв'язки, створюючи нове стале середовище. Однак концепція ще не повною мірою адаптована до потреб аграрного сектора економіки [5]. Тому є об'єктивна потреба в обґрунтуванні концепції та стратегії розвитку циркулярної аграрної економіки й механізмів забезпечення її імплементації, одним із яких є механізм фінансового забезпечення.

Аналіз останніх досліджень і публікацій. Слід погодитися з тим, що для розбудови циркулярної економіки, яка є нейтральною для клімату, започатковують відповідні політичні ініціативи, розробляють програмні дії; трансформація вже триває, проте концептуальні рішення необхідно розробляти й ухвалювати якнайшвидше [6]. Про істотну увагу та її зростання з боку науковців до циркулярної економіки у світі переконливо свідчить швидке підвищення рівня публікаційної активності (рис. 1).
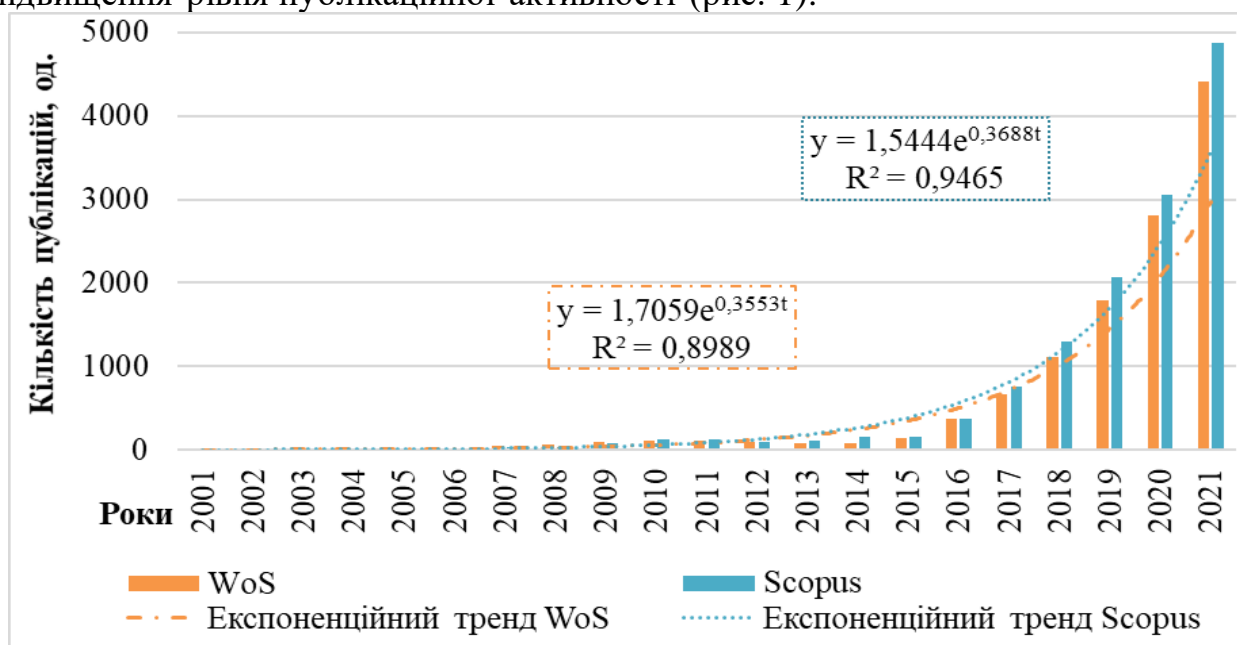
Рис. 1. Динаміка кількості проіндексованих у Scopus та Web of Science публікацій, які містять термін «circular economy» у назві, ключових словах й анотації

Джерело: побудували автори на основі даних баз Scopus та WoS.

Результати дослідження показали, що загалом за 2001–2021 рр. у Scopus та WoS проіндексовано відповідно 13393 і 12045 опублікованих документів, що містили фразу «circular economy» у назві, анотації та/або ключових словах. Загалом в останні роки кількість публікацій у світі щодо циркулярної

економіки збільшувалася дуже високими темпами, оскільки характер кривої та тренду вказують на експоненційний ріст публікаційної активності. Установлено, що італійські та китайські вчені мали найбільшу кількість статей про циркулярну економіку в аналізованих базах (рис. 2).

а)	б)
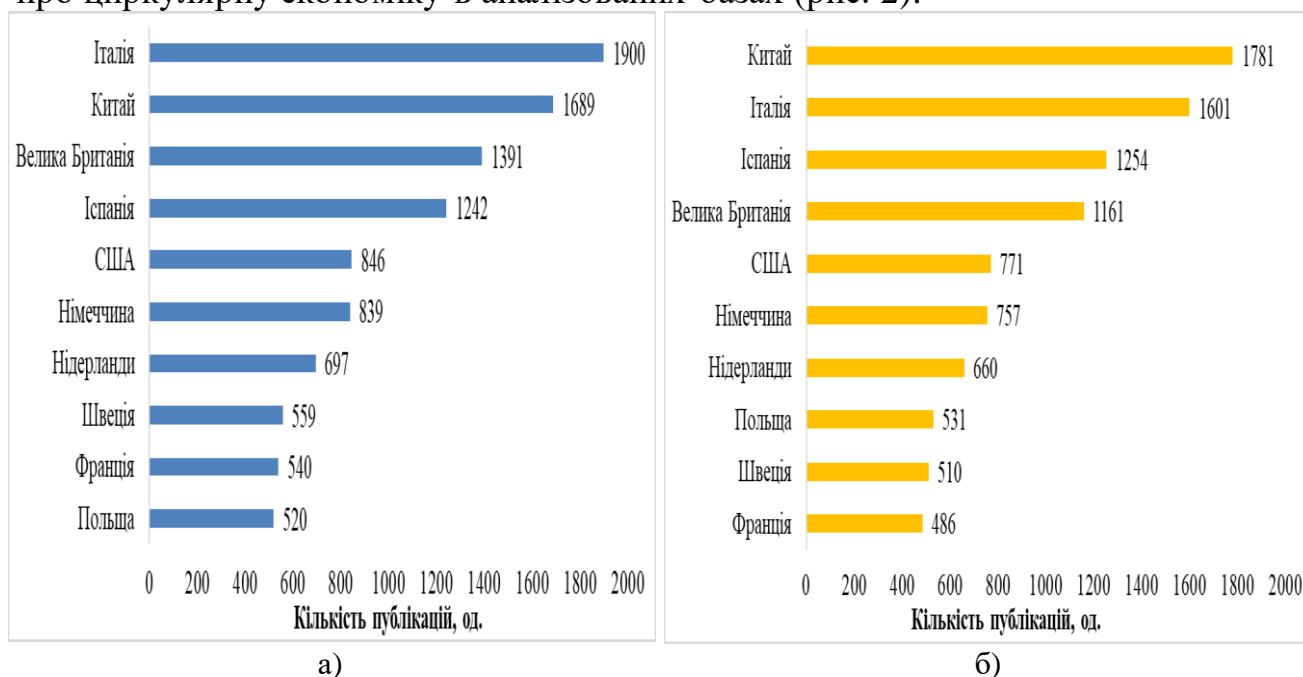
Рис. 2. ТОП-10 країн за кількістю проіндексованих у Scopus (а) та Web of Science (б) публікацій, які містять термін «circular economy» у назві, ключових словах й анотації, 2001–2021 рр.

Джерело: побудували автори на основі даних баз Scopus та WoS.

Так, згідно з базою Web of Science, світовими лідерами за кількістю публікацій є Китай (1781 робота або 14,8 % від загального обсягу), Італія (1601 робота або 13,3 %), Іспанія (1321 робота або 10,4 %), Велика Британія (1161 робота або 9,6 %) та США (771 робота або 6,4 %). Українські вчені за вказаною базою опублікували 46 робіт, що становить 0,38 % світового потоку публікацій, відповідно в загальному рейтингу Україна посідала 22-гу позицію.

Аналіз ТОП-10 організацій світу за кількістю проіндексованих у Web of Science публікацій, які містять у назві, анотації та/або ключових словах термін «circular economy», свідчить, що найбільшу кількість досліджень і відповідно публікацій профінансували Європейська комісія (856 робіт або 7,1 % від загального обсягу), Національний фонд природничих наук Китаю (469 робіт або 3,9 %), Фонд досліджень та інновацій Великобританії (348 робіт або 2,9 %). Отже, Європейська комісія є світовим лідером за фінансуванням досліджень із циркулярної економіки.

Не зважаючи на високу публікаційну активність, лише окремі аспекти розвитку циркулярної аграрної економіки у світі відображено в працях закордонних учених [7–13]. Дещо більше уваги приділено фінансовим аспектам імплементації циркулярної економіки. Так, аналіз останніх публікацій свідчить, що зарубіжні вчені досліджували такі питання: інвестиції для розробки бізнес-

моделей і проєктів у циркулярній економіці [4]; потрійна спіраль ринкових провалів фінансування циркулярної економіки у європейських малих і середніх підприємствах [14] і роль традиційного фінансування у впровадженні вказаними підприємствами циркулярної економіки [15]; фінансування дебіторської заборгованості в ланцюжку постачання енергозбереження та захисту довкілля в рамках зеленого розвитку [16]; фінансові ресурси для інвестицій у відновлювальне власне споживання в рамках циркулярної економіки [17]; політика зелених угод та її застосування до політики циркулярної економіки [18]; ідентифікація ризиків, що обмежують доступ до фінансових ресурсів, та обґрунтування нових механізмів співфінансування й альтернативних інструментів, таких як змішане фінансування або «циркулярне фінансування» [19]; вплив екологічних переконань керівників банків на запровадження циркулярної економіки [20]; роль цифрової валюти центрального банку (ЦВЦБ) у переході до циркулярної економіки [21].

Серед праць українських учених, присвячених розвитку циркулярної економіки в аграрному секторі, слід відзначити монографію С. І. Страпчук [22]. Певний внесок у вирішення проблеми розвитку циркулярної аграрної економіки та фінансового забезпечення реалізації інноваційних проєктів аграрних підприємств здійснено авторами [2; 23]. Одну із небагатьох публікацій вітчизняних дослідників присвячено визначенню специфіки фінансового забезпечення циркулярної економіки на різних етапах проєкту, який реалізують у контексті її пріоритетів, зокрема, проведено оцінку потенціалу грантів, краудфандингу, венчурного фінансування, імпакт-інвестицій для її розбудови [24]. Разом із цим, нам не відомі публікації, які були б присвячені обґрунтуванню потенційних джерел фінансування інноваційних циркулярних проєктів на рівні аграрних підприємств. На заповнення зазначеної прогалини й спрямована ця стаття, що особливий акцент робить на одному із ключових складників фінансового потенціалу для реалізації інноваційних циркулярних проєктів – власних джерелах фінансових ресурсів.

Мета статті. Метою цієї роботи є висвітлення результатів дослідження потенційних джерел фінансування циркулярної економіки в аграрному секторі й моделювання факторів, що впливають на формування фінансового забезпечення (власними ресурсами) для реалізації інноваційних циркулярних проєктів аграрних підприємств.

Виклад основного матеріалу дослідження. На першому етапі нами узагальнено європейські практики фінансування циркулярних проєктів. Більшість ініціатив, пов'язаних із упровадженням циркулярних бізнес-моделей, супроводжується значними капіталовкладеннями, у той час як малі й середні аграрні підприємства України продовжують функціонувати в умовах невизначеності [5], що істотно ускладнюється російською військовою агресією.

Досвід європейських країн вказує на те, що основними джерелами фінансування циркулярних бізнес-проєктів є самі компанії, банки, фонди та інвестори, венчурний і приватний акціонерний капітал, а також краудфандинг

(crowd funding). Серед програм фінансування інноваційних проєктів у Європі є чимало циркулярних проєктів, що забезпечують їм великі обсяги фінансування. Наприклад, одним із найбільших інвесторів у проєкти циркулярної економіки є Європейський інвестиційний банк (ЄІБ), що надає консультаційну допомогу, оцінюючи можливості фінансування конкретного циркулярного проєкту банком і підбору найкращих умов кредитування. Занадто малі для обробки як самостійні проєкти можуть бути підтримані через посередницькі кредити. До числа великих інвесторів належить Європейський фонд стратегічних інвестицій (ЕФСІ), який забезпечує вкладення в дослідження та інновації, а також підтримує малий і середній бізнес. У межах «InnovFin – EU Finance for Innovators» фінансують проєкти з високим рівнем ризику за умови наявності в циркулярному проєкті технологічних інновацій. Програми Європейського союзу (ЄС) доповнюються інвестуванням на національному рівні за допомогою різних інструментів, пропонованих національними, регіональними та/або місцевими агентствами розвитку (наприклад, Tekes у Фінляндії, Invitalia в Італії, Нідерландське агентство підприємництва, Innovate UK і т. ін.) [25].

У ЄС самофінансування циркулярної економіки є найефективнішим методом внутрішнього фінансування в малих і середніх підприємствах. Ураховуючи унікальний циркулярний ризик і перехідний характер циркулярної економіки, залучення зовнішнього фінансування вимагає альтернативних способів та інструментів, наприклад, краудфандингу. Альтернативне фінансування є найефективнішим методом зовнішнього фінансування, що свідчить про те, що фінансовий сектор пропонує інноваційні рішення щодо імплементації циркулярної економіки [14]. Одним із таких інноваційних рішень, що може зробити важливий внесок у перехід до циркулярної економіки, є поява цифрової валюти центрального банку.

Як зазначає P. K. Ozili, центральні банки можуть сприяти переходу до циркулярної економіки двома способами: по-перше, роблячи цифрову валюту центрального банку доступною для циркулярних підприємств та інших гравців у секторі циркулярної економіки; по-друге, досліджуючи, як конструктивні особливості ЦВЦБ можуть підтримувати цілі циркулярної економіки. Учений стверджує, що ЦВЦБ є кращим варіантом оплати для фінансових операцій із циркулярною економікою, може сприяти кращому доступу до фінансування, може запропонувати низьку вартість транзакцій для фінансових операцій із циркулярною економікою, її можна використовувати для надання стимулювального фінансування для підтримки циркулярного бізнесу під час криз [21]. З огляду на високі досягнення й істотні темпи цифрової трансформації України, а також беручи до уваги те, що Національний банк України у 2019 р. завершив розширений пілотний проєкт запуску електронної гривні (е-гривня) та продовжує вивчати перспективи застосування відповідного інструменту, вважаємо можливим і перспективним використання цього важеля для сприяння імплементації циркулярної економіки.

Використовуючи дані про понад 2000 європейських малих і середніх

підприємств учені виявили, що традиційне фінансування продовжує мати важливе значення для циркулярної економіки. Самофінансування є значним фактором, що сприяє запровадженню загальних практик циркулярної економіки, а також боргового фінансування, причому останнє має менше значення, ніж перше. Державні кошти також мають значення, вони справляють більший вплив, ніж самофінансування, але менший, ніж боргове фінансування. З іншого боку, наявність альтернативних форм фінансування не тільки не підтримує циркулярну економіку, але навіть витісняє її імплементацію, можливо, на користь діяльності з більшим лінійним ризиком [15].

Незважаючи на те, що наявність фінансових ресурсів визначено як один із визначальних факторів для інвестування в рішення щодо власного споживання відновлюваних джерел енергії для сприяння переходу ЄС до низьковуглецевої економіки, є певні труднощі в доступі до фінансування в деяких європейських регіонах. Разом із цим, власні фінансові ресурси залишаються основним джерелом фінансування. Так, наприклад, в Іспанії більше 50 % споживачів фінансували свої установки з відновлюваної енергетики за рахунок власних джерел. При цьому характерно, що споживачі аграрного сектора використовували переважно зовнішнє фінансування (кредитні установи, інструменти, надані роздрібною енергетичною компанією, лізинг); проте питома вага власних коштів (33 %) залишалася високою [17].

Учені також підкреслюють, що інструмент політики зелених угод виявився успішним у подоланні різноманітних бар'єрів і корисним для диверсифікації альтернативних механізмів фінансування циркулярної економіки в Нідерландах, тому його можна рекомендувати для застосування в інших країнах. Зелені угоди (від European Green Deal) дають можливість підприємствам, неурядовим організаціям, університетам, а також органам влади регіонального рівня підписати угоду з національним урядом, щоб усунути перешкоди для імплементації інноваційних проєктів, пов'язаних із циркулярною економікою [18].

В Україні є широкі можливості для трансформації домінуючої моделі лінійної економіки в екологічно й економічно ефективну циркулярну модель, проте наявні економічні механізми все ще орієнтують підприємства на застосування застарілої лінійної моделі. Тому найпершим кроком має стати заборона субсидування будь-якої діяльності, що шкодить довкіллю [6]. Для прискорення впровадження циркулярної економіки в Україні можуть бути корисні пропозиції латвійських учених, які розробили проєкт, спрямований на створення мотиваційного та сприятливого середовища для компаній (передусім малих і середніх підприємств), які переходять на рішення з циркулярною економікою, а також створення та поширення інформаційних матеріалів про бізнес-моделі циркулярної економіки та можливості їх фінансування. Це має бути надійна та легкодоступна платформа, яка надаватиме інформацію про те, де отримати фінансування для циркурярних проєктів і бізнес-моделей та як заохочувати бізнес-інвестиції в сталі рішення [4]. Подібний проєкт може бути

розроблений і реалізований в Україні, що особливо важливо в умовах післявоєнного відновлення економіки, базовими трендами якого мають бути індустрія 4.0, ефективний енергоменеджмент та еко-інновації [26].

Ми погоджуємося з тим, що кейсове використання циркулярних бізнес-моделей аграрних підприємств дозволяє всебічно обґрунтувати вирішення актуальної наукової проблеми щодо сталого розвитку на мікрорівні. Концепція циркулярної економіки характеризується низкою переваг для сталого розвитку аграрних підприємств, зокрема, пов'язаних із зменшенням викидів парникових газів і підвищенням економічної ефективності господарювання [22, с. 7]. Водночас економічні ризики, що притаманні кожному етапу впровадження принципів циркулярної економіки, часто не сприяють залученню традиційних джерел фінансування (власні кошти підприємств, банківські кредити, державне фінансування). Проєкти циркулярної економіки не завжди підходять під стандарти традиційних фінансових інститутів і фінансових відносин. Форма організації та специфіка циркулярних бізнес-проєктів, у тому числі створення й управління схемою утилізації, відносять їх до ризикових, що потребує різних схем залучення фінансування, зокрема: публічно-приватне партнерство, венчурний і приватний акціонерний капітал, крауд-фінансування [27, с. 158]. Тому, на думку вчених Інституту економіки промисловості НАН України для фінансування циркулярних бізнес-проєктів найбільше підходить краудінвестинг як одна із форм крауд-фінансування. Краудінвестинг може бути реалізований кількома способами: (1) шляхом укладання договорів, які передбачають внесення інвестицій в обмін на частку в прибутку особи, що реалізує проєкт (договір про розподіл прибутку); (2) через придбання частки в статутному капіталі юридичної особи – реципієнта інвестицій (шляхом збільшення статутного капіталу або реалізацію казначейських часток/акцій); (3) змішаний варіант, коли надання коштів здійснюють на основі договору, який передбачає обов'язок одержувача коштів передати частку у своєму статутному капіталі в майбутньому (наприклад, через опціон або договір конвертованої позики) [28, с. 163].

Оскільки, як зазначає С. І. Страпчук, на національному рівні рішення про використання циркулярних моделей переважно випливають із громадських ініціатив, постанов, спільних угод й інших нормативно-правових документів [5], то в цьому випадку до пріоритетних джерел фінансування інноваційних проєктів належать державні кошти, крауд-фінансування, гранти, кошти, що залучені в результаті публічно-приватного партнерства, та ін. Водночас на мікрорівні ініціаторами інноваційних циркулярних проєктів виступають переважно самі аграрні підприємства, тому основними джерелами фінансування є власні кошти (прибуток та амортизація), кредити, фінансовий лізинг, венчурний капітал та ін.

Наступний етап дослідження передбачав економетричне моделювання факторів, що впливають на формування фінансового забезпечення (власними ресурсами) для реалізації інноваційних циркулярних проєктів на прикладі

аграрних підприємств Харківської області. Для цього з урахуванням попередніх досліджень [2] відібрано (а) 17 показників, що характеризують такі організаційно-економічні фактори, як мотивація персоналу, концентрація, інтенсивність використання земель, інтенсифікація, спеціалізація, диверсифікація, аутсорсинг та (б) 11 результативних ознак, опис яких наведено в табл. 1. Під час цього етапу дослідження фінансового забезпечення реалізації інноваційних проєктів використано масив даних із статистичної звітності, яку складали 506 аграрних підприємств Харківської області у 2019 р.

Таблиця 1

Опис змінних для кореляційного аналізу й економетричного моделювання факторів, що впливають на формування фінансового забезпечення (власними ресурсами) для реалізації інноваційних циркулярних проєктів аграрних підприємств Харківської області, 2019 р.

Результат / фактор	Опис показників	Змінна
Результативна ознака	Прибуток, млн грн	y_1
	Прибуток на 1 га, тис. грн	y_2
	Амортизація, млн грн	y_3
	Амортизація на 1 га, тис. грн	y_4
	Інвестиційний прибуток, млн грн	y_5
	Інвестиційний прибуток на 1 га, тис. грн	y_6
	Маржинальний дохід, млн грн	y_7
	Маржинальний дохід на 1 га, тис. грн	y_8
	Грошовий потік, млн грн	y_9
	Грошовий потік на 1 га, тис. грн	y_{10}
	Дохід на 1 га, тис. грн	y_{11}
Фактори		
Мотивація персоналу	Середньомісячна оплата праці працівника, грн	x_1
	Питома вага витрат на оплату праці з відрахуваннями на соц. заходи в структурі виробничих витрат, %	x_2
Концентрація	Площа с.-г. угідь підприємства, га	x_3
	Площа ріллі підприємства, га	x_4
	Чисельність працівників, осіб	x_5
	Дохід від реалізації – усього, тис. грн	x_6
Інтенсивність використання земель	Рівень розораності, %	x_7
	Площа інтенсивних культур, га	x_8
	Питома вага інтенсивних культур у структурі ріллі, %	x_9
Інтенсифікація	Виробничі витрати на 1 га с.-г. угідь – усього, тис. грн	x_{10}
	Виробничі витрати в рослинництві на 1 га ріллі, тис. грн	x_{11}
	Витрати на мінеральні добрива на 1 га ріллі, тис. грн	x_{12}
Спеціалізація	Питома вага тваринництва у виробничих витратах, %	x_{13}
	Питома вага рослинництва в доході від реалізації, %	x_{14}
Диверсифікація	Площа нішевих культур, га	x_{15}
	Питома вага нішевих культур у структурі посівних площ, %	x_{16}
Аутсорсинг	Питома вага витрат на оплату послуг і робіт сторонніх організацій у структурі виробничих витрат, %	x_{17}

Джерело: сформували автори.

У результаті виконаного кореляційного аналізу (табл. 2) ідентифіковано систему кореляційних взаємозв'язків між основними відібраними факторами та результативними ознаками. Зокрема, з позицій можливості самофінансування інноваційних циркулярних проєктів одним із найцікавіших є зв'язок інвестиційного прибутку, грошового потоку та доходу із такими факторами, як концентрація, зокрема площа с.-г. угідь підприємства та інтенсифікація в оцінці за виробничими витратами на 1 га с.-г. угідь, який у переважній більшості випадків був статистично надійним, прямим, помірним і помітним. Характерно, що з показниками аутсорсингу та диверсифікації зв'язки результативних ознак були переважно оберненими слабкої та помірної тісноти.

Таблиця 2

Матриця лінійних коефіцієнтів парної кореляції між показниками фінансового забезпеченнями (власними ресурсами) для реалізації інноваційних циркулярних проєктів аграрних підприємств Харківської області та факторами, що на них впливають, 2019 р. (*n = 506*)

	x₁*	x₂	x₃	x₄	x₅*	x₆	x₇	x₈	x₉	x₁₀	x₁₁	x₁₂	x₁₃	x₁₄
x_1*	1,000	0,125	0,327	0,331	0,223	0,363	0,045	0,261	-0,173	-0,070	0,046	-0,099	-0,121	0,096
x_2	0,125	1,000	0,049	0,038	0,353	0,011	-0,161	-0,020	-0,229	-0,124	-0,256	-0,304	0,328	-0,299
x_3	0,327	0,049	1,000	0,996	0,587	0,881	-0,029	0,937	-0,065	0,112	0,063	-0,061	0,214	-0,213
x_4	0,331	0,038	0,996	1,000	0,550	0,879	0,026	0,944	-0,063	0,115	0,066	-0,059	0,197	-0,197
x_5*	0,223	0,353	0,587	0,550	1,000	0,653	-0,317	0,405	-0,205	0,332	0,056	-0,113	0,465	-0,470
x_6	0,363	0,011	0,881	0,879	0,653	1,000	0,007	0,835	-0,048	0,378	0,305	0,051	0,276	-0,285
x_7	0,045	-0,161	-0,029	0,026	-0,317	0,007	1,000	0,037	0,034	0,122	0,054	0,011	-0,170	0,127
x_8	0,261	-0,020	0,937	0,944	0,405	0,835	0,037	1,000	0,150	0,094	0,094	-0,031	0,085	-0,093
x_9	-0,173	-0,229	-0,065	-0,063	-0,205	-0,048	0,034	0,150	1,000	0,018	0,104	0,066	-0,188	0,182
x_{10}	-0,070	-0,124	0,112	0,115	0,332	0,378	0,122	0,094	0,018	1,000	0,791	0,438	0,355	-0,394
x_{11}	0,046	-0,256	0,063	0,066	0,056	0,305	0,054	0,094	0,104	0,791	1,000	0,614	-0,104	0,071
x_{12}	-0,099	-0,304	-0,061	-0,059	-0,113	0,051	0,011	-0,031	0,066	0,438	0,614	1,000	-0,140	0,115
x_{13}	-0,121	0,328	0,214	0,197	0,465	0,276	-0,170	0,085	-0,188	0,355	-0,104	-0,140	1,000	-0,935
x_{14}	0,096	-0,299	-0,213	-0,197	-0,470	-0,285	0,127	-0,093	0,182	-0,394	0,071	0,115	-0,935	1,000
x_{15}	0,197	0,234	0,596	0,582	0,761	0,610	-0,042	0,412	-0,236	0,229	-0,032	-0,106	0,602	-0,604
x_{16}	-0,038	0,259	0,149	0,142	0,337	0,170	-0,012	0,017	-0,358	0,202	-0,111	-0,143	0,564	-0,582
x_{17}	0,051	-0,200	0,010	0,004	0,033	-0,022	-0,046	0,014	0,153	-0,051	0,006	-0,098	-0,104	0,077
y_1	0,167	0,034	0,510	0,497	0,364	0,703	-0,048	0,503	0,003	0,195	0,122	-0,020	0,202	-0,223
y_2	0,019	-0,050	0,004	0,001	0,068	0,183	0,032	0,021	0,092	0,162	0,132	0,086	0,045	-0,097
y_3	0,317	0,034	0,645	0,645	0,477	0,675	0,039	0,610	-0,050	0,266	0,202	0,060	0,191	-0,197
y_4	0,020	-0,046	0,043	0,049	-0,014	0,127	0,118	0,046	0,011	0,339	0,319	0,176	0,034	-0,054
y_5	0,237	0,040	0,632	0,621	0,457	0,807	-0,029	0,616	-0,013	0,248	0,166	0,002	0,231	-0,250
y_6	0,025	-0,061	0,017	0,016	0,059	0,211	0,067	0,034	0,089	0,259	0,224	0,136	0,052	-0,107
y_7	0,354	-0,077	0,758	0,768	0,254	0,845	0,052	0,766	0,006	0,123	0,184	-0,008	0,004	-0,003
y_8	0,361	-0,224	0,072	0,081	-0,088	0,278	0,125	0,108	0,110	0,183	0,370	0,129	-0,176	0,156
y_9	0,199	-0,075	0,295	0,307	-0,053	0,475	0,038	0,370	0,051	-0,069	0,071	-0,012	-0,160	0,176
y_{10}	0,330	-0,115	0,028	0,032	-0,134	0,202	0,046	0,061	0,047	-0,113	0,127	0,052	-0,206	0,211
y_{11}	0,186	-0,179	0,113	0,118	0,223	0,449	0,132	0,118	0,045	0,782	0,754	0,406	0,174	-0,204

З урахуванням результатів кореляційного аналізу відібрано пріоритетні фактори для побудови одно- та двофакторних економетричних моделей з умовою відсутності мультиколінеарності й можливості управління цими

факторами з позиції максимізації формування власного грошового потоку як потенційного джерела самофінансування інноваційних проєктів. Так, згідно з побудованою двофакторною лінійною моделлю (рис. 3), підвищення розміру виробничих витрат на 1 тис. грн/га с.-г. угідь сприяло збільшенню загальної суми інвестиційного прибутку на 0,3199 млн грн, збільшення площі с.-г. угідь на 1 га – зростанню цього прибутку на 0,0037 млн грн.

Продовження табл. 2

	x_{15}	x_{16}	x_{17}	y_1	y_2	y_3	y_4	y_5	y_6	y_7	y_8	y_9	y_{10}	y_{11}
x_1*	*0,197*	-0,038	0,051	*0,167*	0,019	*0,317*	0,020	*0,237*	0,025	*0,354*	*0,361*	*0,199*	*0,330*	*0,186*
x_2	*0,234*	*0,259*	*-0,200*	0,034	-0,050	0,034	-0,046	0,040	-0,061	-0,077	*-0,224*	-0,075	*-0,115*	*-0,179*
x_3	*0,596*	*0,149*	0,010	*0,510*	0,004	*0,645*	0,043	*0,632*	0,017	*0,758*	0,072	*0,295*	0,028	*0,113*
x_4	*0,582*	*0,142*	0,004	*0,497*	0,001	*0,645*	0,049	*0,621*	0,016	*0,768*	0,081	*0,307*	0,032	*0,118*
x_5*	*0,761*	*0,337*	0,033	*0,364*	0,068	*0,477*	-0,014	*0,457*	0,059	*0,254*	-0,088	-0,053	*-0,134*	*0,223*
x_6	*0,610*	*0,170*	-0,022	*0,703*	*0,183*	*0,675*	*0,127*	*0,807*	*0,211*	*0,845*	*0,278*	*0,475*	*0,202*	*0,449*
x_7	-0,042	-0,012	-0,046	-0,048	0,032	0,039	*0,118*	-0,029	0,067	0,052	*0,125*	0,038	0,046	*0,132*
x_8	*0,412*	0,017	0,014	*0,503*	0,021	*0,610*	0,046	*0,616*	0,034	*0,766*	*0,108*	*0,370*	0,061	*0,118*
x_9	*-0,236*	*-0,358*	*0,153*	0,003	*0,092*	-0,050	0,011	-0,013	*0,089*	0,006	*0,110*	0,051	0,047	0,045
x_{10}	*0,229*	*0,202*	-0,051	*0,195*	*0,162*	*0,266*	*0,339*	*0,248*	*0,259*	*0,123*	*0,183*	-0,069	*-0,113*	*0,782*
x_{11}	-0,032	*-0,111*	0,006	*0,122*	*0,132*	*0,202*	*0,319*	*0,166*	*0,224*	*0,184*	*0,370*	0,071	*0,127*	*0,754*
x_{12}	*-0,106*	*-0,143*	-0,098	-0,020	0,086	0,060	*0,176*	0,002	*0,136*	-0,008	*0,129*	-0,012	0,052	*0,406*
x_{13}	*0,602*	*0,564*	*-0,104*	*0,202*	0,045	*0,191*	0,034	*0,231*	0,052	0,004	*-0,176*	*-0,160*	*-0,206*	*0,174*
x_{14}	*-0,604*	*-0,582*	0,077	*-0,223*	-0,097	*-0,197*	-0,054	*-0,250*	*-0,107*	-0,003	*0,156*	*0,176*	*0,211*	*-0,204*
x_{15}	1,000	*0,673*	-0,057	*0,417*	0,049	*0,424*	0,042	*0,486*	0,059	*0,357*	-0,066	0,028	*-0,103*	*0,131*
x_{16}	*0,673*	1,000	*-0,121*	*0,139*	0,019	*0,127*	0,046	*0,158*	0,033	-0,001	*-0,170*	*-0,114*	*-0,193*	0,052
x_{17}	-0,057	*-0,121*	1,000	-0,072	-0,062	*-0,109*	*-0,233*	-0,095	*-0,132*	0,078	*0,181*	-0,010	0,024	-0,028
y_1	*0,417*	*0,139*	-0,072	1,000	*0,569*	*0,339*	0,046	*0,958*	*0,546*	*0,686*	*0,302*	*0,665*	*0,327*	*0,372*
y_2	0,049	0,019	-0,062	*0,569*	1,000	0,024	0,048	*0,493*	*0,949*	*0,203*	*0,474*	*0,311*	*0,524*	*0,467*
y_3	*0,424*	*0,127*	*-0,109*	*0,339*	0,024	1,000	*0,582*	*0,595*	*0,206*	*0,516*	*0,153*	*0,112*	0,009	*0,233*
y_4	0,042	0,046	*-0,233*	0,046	0,048	*0,582*	1,000	*0,217*	*0,361*	*0,107*	*0,231*	-0,006	0,007	*0,294*
y_5	*0,486*	*0,158*	-0,095	*0,958*	*0,493*	*0,595*	*0,217*	1,000	*0,529*	*0,744*	*0,305*	*0,603*	*0,282*	*0,389*
y_6	0,059	0,033	*-0,132*	*0,546*	*0,949*	*0,206*	*0,361*	*0,529*	1,000	*0,223*	*0,515*	*0,289*	*0,491*	*0,529*
y_7	*0,357*	-0,001	0,078	*0,686*	*0,203*	*0,516*	*0,107*	*0,744*	*0,223*	1,000	*0,483*	*0,770*	*0,403*	*0,358*
y_8	-0,066	*-0,170*	*0,181*	*0,302*	*0,474*	*0,153*	*0,231*	*0,305*	*0,515*	*0,483*	1,000	*0,514*	*0,853*	*0,691*
y_9	0,028	*-0,114*	-0,010	*0,665*	*0,311*	*0,112*	-0,006	*0,603*	*0,289*	*0,770*	*0,514*	1,000	*0,610*	*0,324*
y_{10}	*-0,103*	*-0,193*	0,024	*0,327*	*0,524*	0,009	0,007	*0,282*	*0,491*	*0,403*	*0,853*	*0,610*	1,000	*0,531*
y_{11}	*0,131*	0,052	-0,028	*0,372*	*0,467*	*0,233*	*0,294*	*0,389*	*0,529*	*0,358*	*0,691*	*0,324*	*0,531*	1,000

Примітки. 1. *Кількість спостережень відмічених факторів становить 132.

2. Курсивом виділено статистично значущі показники за рівня надійності 95 %.

Джерело: авторські розрахунки.

Коефіцієнт множинної кореляції свідчить про помітну тісноту зв'язку, а коефіцієнт множинної детермінації вказує на те, що варіація розміру інвестиційного прибутку на 43,2 % пояснювалася варіацією включених до моделі двох факторів. Розроблена модель у цілому є статистично надійною, достовірною та адекватною, що підтверджують результати аналізу критеріїв Фішера та Стьюдента (табл. 3). Результати оцінювання параметрів цієї моделі (табл. 4) засвідчили статистичну значущість включених регресорів за рівня надійності 95 %. Додаткові дослідження щодо побудови нелінійних моделей

залежності величини інвестиційного прибутку від аналізованих факторів засвідчили статистичну ненадійність окремих їхніх параметрів, тому для практичних цілей варто використовувати лінійну модель.

$$Y_5 = -4{,}2547 + 0{,}0037x_3 + 0{,}3199x_{10}$$
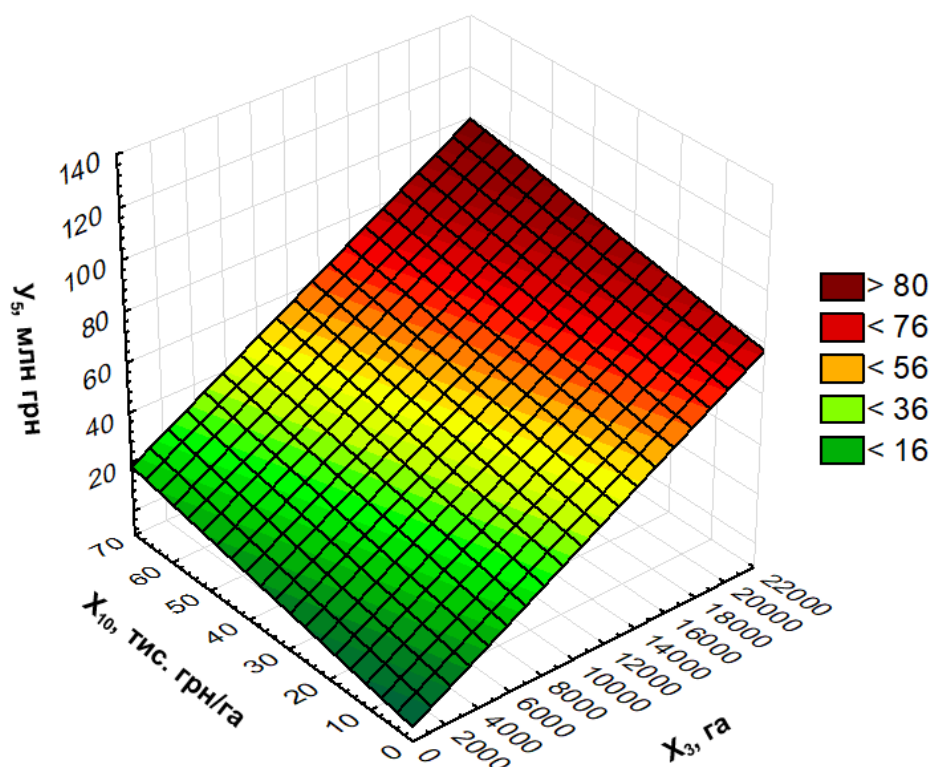
Рис. 3. Лінійна модель залежності інвестиційного прибутку (У₅, млн грн) від виробничих витрат на 1 га с.-г. угідь (x₁₀, тис. грн) і площі с.-г. угідь (x₃, га) аграрних підприємств Харківської області, 2019 р.
Джерело: побудували автори.

Таблиця 3

Параметри економетричної моделі залежності інвестиційного прибутку аграрних підприємств Харківської області від виробничих витрат на 1 га с.-г. угідь і їх площі, 2019 р. *(n = 506)*

Ознаки й статистична характеристика	Показники та їхнє значення
Множинна лінійна регресійна модель	$y = -4{,}2549 + 0{,}0037x_3 + 0{,}3199x_{10}$
Коефіцієнт множинної кореляції (R)	$R = 0{,}657$ (тіснота зв'язку помітна / середня)
Коефіцієнт множинної детермінації (R^2)	$R^2 = 0{,}432$ (статистично значущий, оскільки значущість $F < 0{,}05$)
F-критерій Фішера	$F_{факт} = 191{,}1$; $F_{табл} = 2{,}50$ – за 95 % рівня ймовірності; $F_{факт} > F_{табл}$
t-критерій Стьюдента	$t_{факт} = 25{,}9$; $t_{табл} = 1{,}96$ – за 95 % рівня ймовірності; $t_{факт} > t_{табл}$

Джерело: авторські розрахунки.

Синтезуючи результати кореляційного та регресійного аналізу, побудовано кореляційну плеяду формування питомих показників (на 1 га) фінансового забезпечення (власними ресурсами) як потенційного джерела фінансування для реалізації інноваційних циркулярних проєктів (рис. 4), яка наочно демонструє структурно-логічну модель формування інвестиційного прибутку й математично підтверджує відповідні зв'язки.

Таблиця 4

Результати оцінювання параметрів економетричної моделі залежності інвестиційного прибутку аграрних підприємств Харківської області від виробничих витрат на 1 га с.-г. угідь і їх площі, 2019 р.

Змінні	Регресори, коеф.	Стандартна помилка	t-статистика	P-значення	β-коефіцієнт
y	*-4,25489*	*1,146404*	*-3,71151*	*0,000229*	*-*
x_3	*0,00369*	*0,000204*	*18,10572*	*0,000000*	*0,612370*
x_{10}	*0,31991*	*0,06028*	*5,30706*	*0,000000*	*0,179495*

Примітка. Курсивом виділено статистично значущі показники за рівня надійності 95 %.
Джерело: авторські розрахунки.

Отже, можемо стверджувати, що між відібраними факторами та результативними ознаками присутні помітні та високі прямі кореляційні зв'язки, які можуть слугувати основою для економічного управління формуванням інвестиційного прибутку як потенційного джерела самофінансування аграрними підприємствами інноваційних циркулярних проєктів. Першоосновою одержання високих показників доходу, маржинального доходу, грошового потоку та інвестиційного прибутку є формування належного розміру виробничих витрат на гектар.
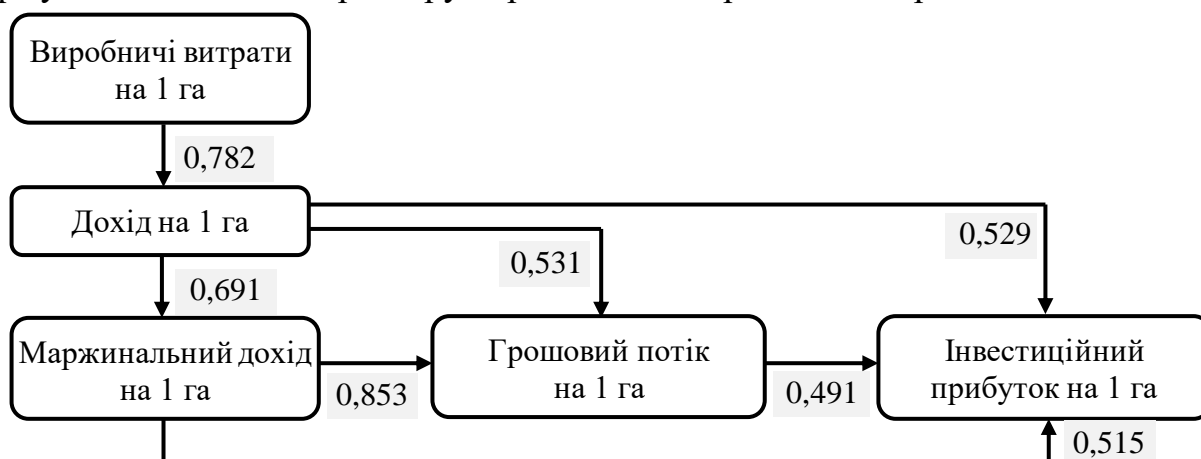
Рис. 4. Кореляційна плеяда формування питомих (на 1 га) показників фінансового забезпечення (власними ресурсами) для реалізації інноваційних циркулярних проєктів аграрних підприємств Харківської області, 2019 р.
Джерело: побудувала автори.

Підтвердженням запропонованої кореляційної плеяди та зробленого висновку є побудовані однофакторні статистично надійні моделі (рис. 5–7), що наочно демонструють характер виявлених залежностей.
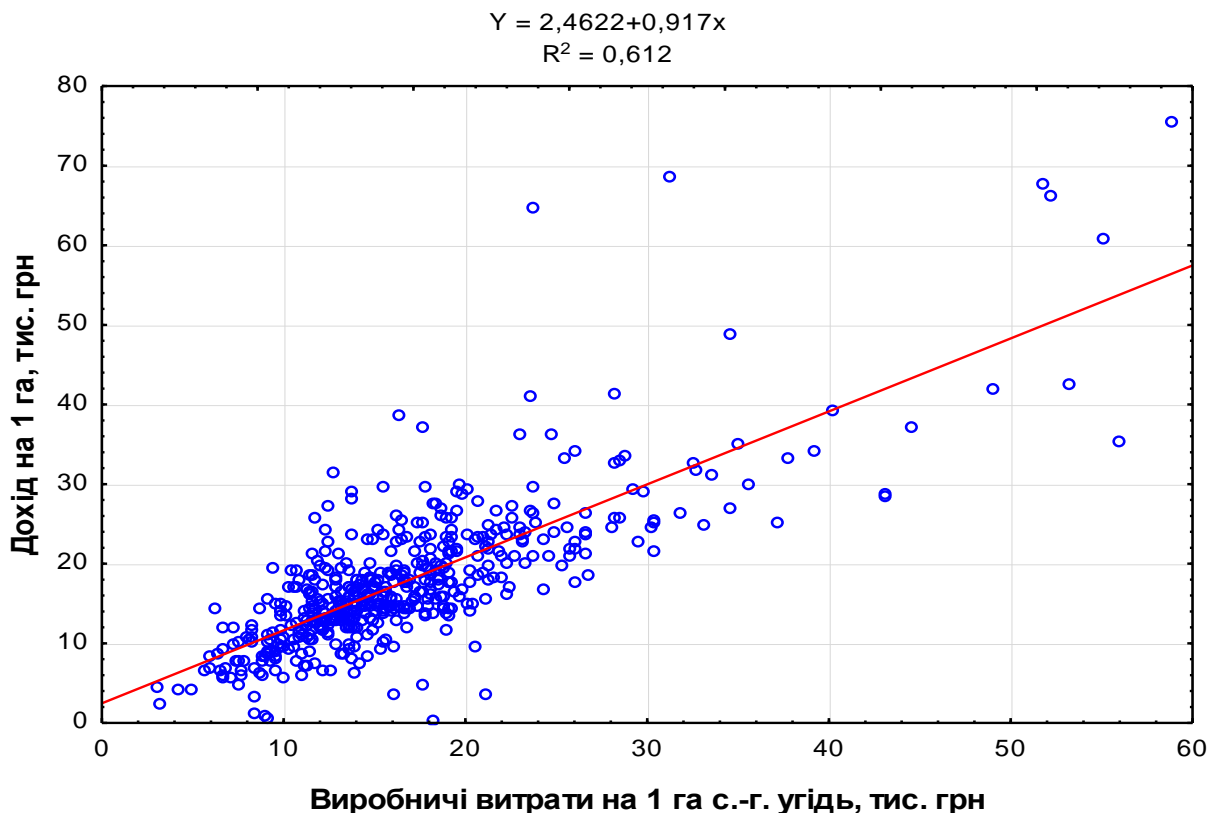
Рис. 5. Залежність доходу на 1 га від виробничих витрат на 1 га в аграрних підприємствах Харківської області, 2019 р.

Джерело: побудували автори.
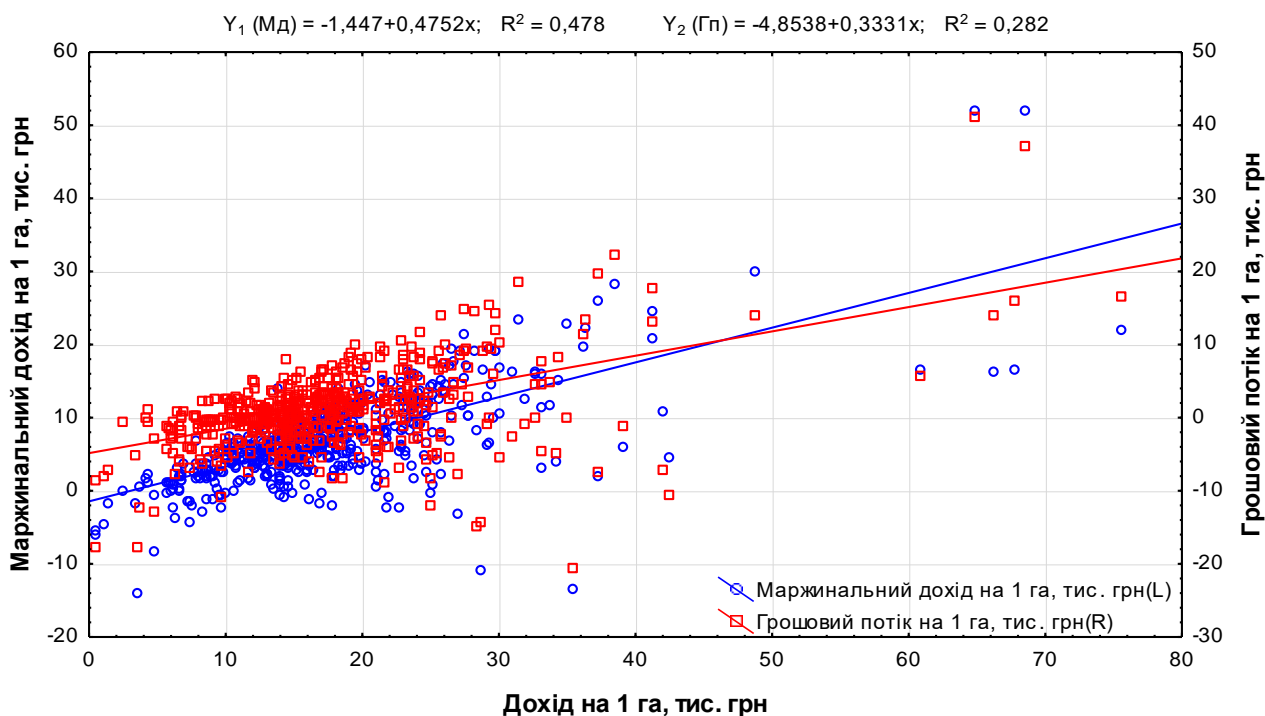
Рис. 6. Залежність маржинального доходу та грошового потоку на 1 га від доходу на 1 га в аграрних підприємствах Харківської області, 2019 р.

Джерело: побудували автори.

$$Y = -2,0188+0,4247x-0,0035x^2$$
$$R^2 = 0,315$$
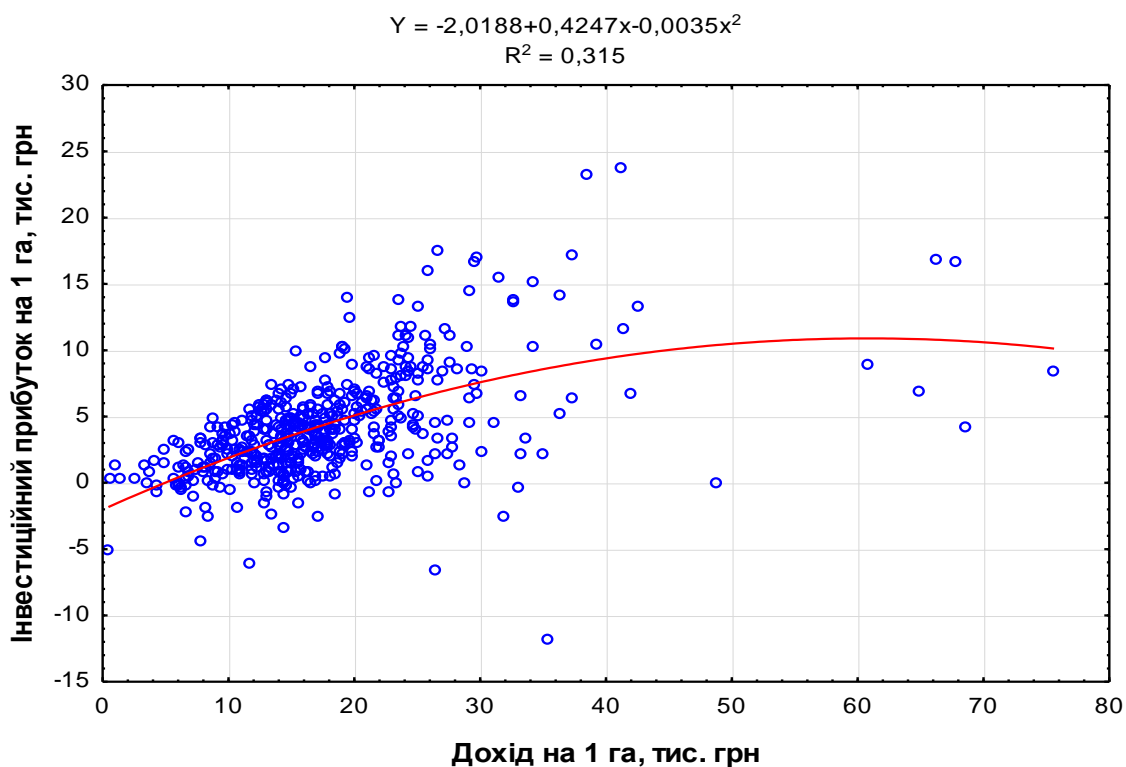
Рис. 7. Залежність інвестиційного прибутку на 1 га від доходу на 1 га в аграрних підприємствах Харківської області, 2019 р.

Джерело: побудували автори.

Установлено, що (і) збільшення виробничих витрат на 1 тис. грн/га сприяло підвищенню доходу на 0,917 тис. грн/га ($R^2 = 0,612$); (іі) своєю чергою, зі зростанням доходу на 1 тис. грн/га збільшувалися маржинальний дохід на 0,475 тис. грн/га ($R^2 = 0,478$) і грошовий потік на 0,333 тис. грн/га ($R^2 = 0,282$); (ііі) підвищення розміру доходу на 1 тис. грн/га сприяло зростанню суми інвестиційного прибутку на 0,229 тис. грн/га ($R^2 = 0,279$). В останньому випадку виявлену залежність дещо достовірніше описувала парабола другого порядку, згідно з якою підвищення доходу на 1 тис. грн/га сприяло зростанню інвестиційного прибутку на 0,425 тис. грн/га, однак темпи такого зростання уповільнювалися на 0,0035 тис. грн/га ($R^2 = 0,315$). Отже, розроблено комплекс моделей, які можуть бути використані для економічного управління.

Висновки. Узагальнення результатів теоретичного аналізу та європейських практик фінансування циркулярних проєктів показало, що до числа потенційних джерел фінансування циркулярної економіки в аграрному секторі належать: власні кошти підприємств (прибуток й амортизація), позичкові (кредити, фінансовий лізинг), залучені (гранти, спонсорські внески, краудфандинг, венчурний капітал, імпакт-інвестиції), бюджетні кошти (фінансова підтримка, часткова компенсація ставок за кредитами), кошти, що залучені в результаті публічно-приватного партнерства, прямі іноземні інвестиції, змішане («циркулярне») фінансування й інші джерела. З огляду на те, що основним джерелом фінансування циркулярної економіки у європейських малих і середніх підприємствах залишаються власні кошти, та беручи до уваги

українські реалії, вважаємо, що в середньостроковій перспективі саме власні кошти виступатимуть пріоритетним джерелом фінансування інноваційних циркулярних проєктів аграрних підприємств.

У результаті кореляційного аналізу ідентифіковано систему кореляційних взаємозв'язків між основними відібраними факторами (мотивація персоналу, концентрація, інтенсивність використання земель, інтенсифікація, спеціалізація, диверсифікація, аутсорсинг) та результативними показниками, що свідчать про рівень фінансового забезпечення (власними ресурсами) для реалізації інноваційних циркулярних проєктів аграрних підприємств. Розроблена кореляційна плеяда формування питомих (на 1 га) показників фінансового забезпечення (власними ресурсами) для реалізації інноваційних проєктів наочно демонструє структурно-логічну модель формування інвестиційного прибутку й математично підтверджує відповідні зв'язки.

Уперше розроблено одно- та двофакторні лінійні економетричні моделі, що дозволило здійснити кількісну оцінку впливу інтенсифікації виробництва та концентрації земель на формування інвестиційного прибутку аграрних підприємств як головного потенційного джерела самофінансування інноваційних проєктів. Так, згідно з двофакторною моделлю, підвищення розміру виробничих витрат на 1 тис. грн/га с.-г. угідь сприяло збільшенню загальної суми інвестиційного прибутку на 0,3199 млн грн, збільшення площі с.-г. угідь на 1 га – зростанню цього прибутку на 0,0037 млн грн. Установлено, що першоосновою одержання високих показників доходу, маржинального доходу, грошового потоку та інвестиційного прибутку є формування належного розміру виробничих витрат на гектар. Основні результати дослідження можуть бути використані для (i) удосконалення політики фінансового забезпечення реалізації циркулярних проєктів в аграрному секторі; (ii) оцінювання та прогнозування впливу факторів на інвестиційний прибуток аграрних підприємств як потенційне джерело самофінансування інноваційних циркулярних проєктів; (iii) управління виявленими факторами з позиції максимізації формування власного грошового потоку як потенційного джерела самофінансування інноваційних циркулярних проєктів. Перспективним напрямом досліджень є обґрунтування методики визначення ефективності інноваційних проєктів переробки органічних відходів в аграрній галузі.

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ЕМПІРИЧНИЙ АНАЛІЗ СОЦІАЛЬНО-ЕКОНОМІЧНИХ ДЕТЕРМІНАНТ РОЗВИТКУ СІЛЬСЬКИХ І СЕЛИЩНИХ ТЕРИТОРІАЛЬНИХ ГРОМАД

Мета. Метою статті є дослідження впливу соціально-економічних факторів на оцінку наявних проблем розвитку сільських і селищних територіальних громад та вибір напрямів їх вирішення з точки зору мешканців громад.

Методологія / методика / підхід. В основі дослідження лежить порівняльний аналіз результатів опитування мешканців Ямпільської територіальної громади Сумської області в березні-квітні 2021 р. (проведені в рамках розробки стратегії розвитку Ямпільської територіальної громади на 2022–2027 рр.) та аналогічні дослідження, які проводили в Зноб-Новгородській об'єднаної територіальної громади Сумської області у 2018 р. Для виявлення проблемних питань життєдіяльності громад та їх бачення подальшого свого розвитку виконано соціологічне дослідження. Методом збору первинної інформації визначено анкетування, для відбору респондентів застосували комбіновану вибірку, яка враховувала соціально-економічну та демографічну структуру населення. Загальна чисельність опитаних становить 649 осіб. Із них 544 особи опитано інтерв'юерами, а 105 осіб – за допомогою гугл анкет через інтернет.

Результати. Проведений порівняльний емпіричний аналіз впливу соціально-економічних і демографічних чинників щодо оцінки наявного становища, визначення пріоритетності проєктів розвитку, віри в можливість і готовності брати участь у реалізації проєктів соціально-економічного розвитку місцевих громад виявив певні тенденції – найбільш важливими для мешканців сільських територій є проблеми економічного характеру та функціонування інфраструктури. Саме це визначає вибір економічних проєктів розвитку як найбільш пріоритетних. Серед місцевих жителів домінують песимістичні очікування щодо можливостей реалізації завдань розвитку, але водночас спостерігається висока готовність брати активну участь у їх реалізації. В обох громадах головним ресурсом розвитку мешканці вважають природні ресурси та прогресивну владу, і тільки дуже незначна частина населення вірить у підприємливість й активність громадян. Водночас є і ряд розбіжностей стосовно впливу окремих чинників (освіта, соціальний статус, рівень доходів) на оцінку наявного стану та можливостей розвитку, що вимагає додаткових досліджень в цьому напрямі.

Оригінальність / наукова новизна. Проведене дослідження базується на порівнянні емпіричних даних, які зібрані та оброблені авторами особисто, та результатами аналогічного дослідження, проведеного в сусідній громаді три роки тому. Зокрема, отримало дальший розвиток ідентифікування ключових чинників, що визначають соціально-економічний розвиток територіальних громад. Дослідження виявило тенденцію зменшення значення економічних проєктів розвитку громад і збільшення соціально-культурних із зростанням рівня отриманих доходів. Також виявлено, що більш високий рівень освіти визначає і вищий рівень оптимізму щодо можливості реалізації завдань розвитку громад.

Практична цінність / значущість. *Отримані результати можуть бути використані органами місцевого самоврядування при розробці стратегії соціально-економічного розвитку територіальних громад, а також органами державного управління при визначенні напрямів реалізації регіональної політики.*

Ключові слова: *соціально-економічний розвиток, сільські громади, населення, соціальний статус, рівень доходів.*

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EMPIRICAL ANALYSIS OF SOCIO-ECONOMIC DETERMINANTS OF DEVELOPMENT OF RURAL TERRITORIAL COMMUNITIES

Purpose. *The purpose of the article is to study the influence of socio-economic factors on the assessment of existing problems in the development of rural territorial communities and the choice of directions for their solution from a community perspective.*

Methodology / approach. *The study is based on a comparative analysis of the results of a survey of residents of the Yampil territorial community of the Sumy Region in March-April 2021 (carried out as part of the justification of strategy for the development of the Yampil territorial community for 2022–2027) and similar studies conducted in the Znob-Novgorod territorial community of the Sumy region in 2018. A sociological study was conducted to identify problematic issues in the life of communities and their vision of their further development. Questioning was determined as the method of collecting primary information, and a combined sample was used to select respondents, which took into account the socio-economic and demographic structure of the population. The total number of respondents was 649 people. Of these, 544 were interviewed by interviewers and 105 by google questionnaires over the internet.*

Results. *The comparative empirical analysis of the influence of socio-economic and demographic factors in assessing the current situation, prioritizing development projects, faith in the possibility and willingness to take part in the implementation of socio-economic development projects of local communities showed the existence of certain trends – the most important for residents of rural areas are problems of an economic nature and the functioning of infrastructure This is what determines the choice of economic development projects as the highest priority. Among local residents, pessimistic expectations about the possibilities of implementing development tasks dominate, but at the same time, there is a high willingness to take an active part in their implementation. In both communities, residents consider natural resources and progressive government to be the main resource for development, and only a very small part of the population believes in the entrepreneurial spirit and activity of citizens. At the same time, there is a number of disagreements regarding the influence of individual factors (education, social status, income level) on the assessment of the current state and development opportunities, which requires additional research in this direction.*

Originality / scientific novelty. *The study is based on a comparison of empirical data collected and processed by the authors personally, and the results of a similar study conducted in a neighboring community three years ago. The definition of key factors determining the socio-economic development of territorial communities was further developed. The study revealed a trend*

towards a decrease in the importance of economic projects for the development of communities and the growth of socio-cultural projects with an increase in the level of received income. It was also found that a higher level of education determines a higher level of optimism about the possibility of implementing the tasks of community development.

Practical value / implications. *The obtained results can be used by local governments in developing a strategy for the socio-economic development of territorial communities, as well as by government bodies in determining the directions for the implementation of regional policy.*

Key words: *socio-economic development, rural communities, population, social status, income level.*

Постановка проблеми. За останні роки розвиток сільського господарства відбувається на фоні зростаючої агрохолдингізації галузі. Зосередження в користуванні великих аграрних компаній значних обсягів сільськогосподарських земель дозволило значно підвищити продуктивність праці на основі використання сучасних технологій, техніки, сортів сільськогосподарських культур і порід худоби. Підвищення урожайності основних товарних культур (зернові та олійні) забезпечило зростання валових зборів та обсягів експорту аграрної продукції (головним чином – зерна та насіння олійних культур). Це дозволило стати аграрному сектору провідним постачальником валюти.

Після прийняття у 2006 р. Закону України «Про холдингові компанії в Україні» [1] пріоритетним у практиці аграрного розвитку виявився латифундистський шлях, а не фермерський. За останні десять років частка доходів домогосподарств (включаючи фермерські господарства) у створеній валовій доданій вартості в сільському господарстві скоротилася з 55,9 % у 2010 р. до 42,6 % у 2019 р., при цьому в цілому в Україні зафіксовано протилежну тенденцію – частка домогосподарств у створенні валової доданої вартості зросла з 19,2 % до 23,3 % [2].

Досвід розвинених країн світу свідчить, що демократичне правове суспільство ґрунтується на середньому класі, основою якого є малий і середній бізнес (в аграрному секторі – фермери, місцеві підприємці, «білі комірці»). Сільська місцевість – не просто територія, де живе певна кількість населення, яке займається певним видом діяльності. Село є душею нації, саме тут зберігаються традиції, культура, ментальність. На найвищому рівні в ЄС відзначають, що «Сільські райони є тканиною нашого суспільства та серцевиною нашої економіки. Вони є основною частиною нашої ідентичності та нашого економічного потенціалу. Ми будемо берегти та зберігати наші сільські райони та інвестувати в їхнє майбутнє» [3].

Сільське господарство забезпечує продовольчу безпеку країни, визначає здебільшого в кінцевому підсумку рівень та якість споживання населенням основних товарів. Невипадково усі провідні країни світу витрачають значні кошти на підтримку фермерства. Аграрна політика ЄС, зокрема, спрямована на підтримку фермерства, а не великих корпорацій [4–6]. Одна з трьох всеохоплюючих цілей ЄС у галузі розвитку сільських районів передбачає їх

збалансований територіальний розвиток [7]. Протягом 2014–2020 рр. на підтримку розвитку сільських територій у рамках реалізації САП (Common Agricultural Policy) спрямовано більше 363 млрд євро [8], при цьому 15 % коштів спрямовані на соціально-економічний розвиток сільських територій [9]. Як зазначають європейські дослідники [10], якщо раніше сільське суспільство функціонувало в просторі сільського господарства, то тепер сільське господарство є складовою частиною сільського простору та суспільства.

На жаль, в Україні процеси інтенсифікації сільськогосподарського виробництва на основі впровадження інновацій супроводжуються негативними явищами соціально-економічного характеру в сільській місцевості: зростання сільського безробіття, занепад соціальної сфери, і, як наслідок, поглиблення демографічної кризи. Адміністративно-територіальна реформа та процеси децентралізації, які відбуваються в Україні в останні роки, ще більше актуалізували проблему забезпечення сталого розвитку територіальних громад (ТГ) у сільській місцевості. Передача багатьох владних повноважень на рівень місцевих громад, які раніше здійснювали органи влади вищих рівнів управління, зумовили докорінну зміну функцій місцевої влади, яка після реформи повинна не лише вирішувати поточні питання функціонування комунального господарства, а й визначати стратегічні напрями розвитку громади з урахуванням економічного, соціального, екологічного, демографічного та інших векторів розвитку. Без активної взаємодії з місцевими мешканцями, без визначення ключових з їхньої точки зору факторів розвитку громади неможливо сформувати дієву стратегію. У цих умовах зростає актуальність аналізу соціально-економічних чинників, які впливають на розвиток місцевих громад з точки зору її мешканців.

Аналіз останніх досліджень і публікацій. Реформування органів влади та переосмислення їх повноважень на регіональному та місцевому рівні вимагають нових підходів щодо розвитку аграрного сектора економіки та сільських територій. Вплив децентралізації на соціально-економічний розвиток українського села знайшов своє відображення в численних працях вітчизняних та закордонних науковців. Зокрема, Б. Пасхавер, Л. Молдаван, О. Шубравська, М. Стегней [11; 12] зосереджують увагу, перш за все, на розвитку аграрного виробництва як основи соціально-економічного розвитку сіл та покращення умов життя їх мешканців. Водночас можна погодитися із М. Маліком, В. Пулімом, Т. Гоголь, М. Тимошенком, що метою аграрної політики має стати «забезпечення комплексного, багатофункціонального розвитку сільських територій, за якого зростала б їх роль як просторової бази не лише сільськогосподарського виробництва, а й несільськогосподарських видів діяльності, а також сприятливого середовища проживання» [13, с. 2; 14; 15].

Надзвичайно важливою в цих умовах є всебічна підтримка розвитку підприємництва на селі як у сільському господарстві, так й інших сферах економіки: торгівлі, сервісу, переробці та ін. На цьому наголошують як українські науковці [16–18], так і зарубіжні [19–22]. За державою при цьому

закріплюються такі функції, як інформаційно-консультаційна підтримка та створення дієвого механізму партнерських відносин між владою, сільськими громадами й бізнесом [23].

Важливим чинником успішного розвитку сільських територій виступає усвідомлення єдності та компліментарності сільських й урбанізованих територій, що вимагає формування та реалізації нових механізмів їх взаємодій [24; 25]. За таких умов саме державні інвестиції в розвиток інфраструктури та комунального господарства мають вирішальне значення [26]. На важливості врахування просторового аспекту, який значною мірою зумовлює диференціацію перспектив розвитку громад, наголошує А. Колосов зі співавторами [27], оскільки ігнорування цього приводить до ситуації, коли одні ТГ (ТГ-реципієнти) приваблюють до себе мешканців з інших ТГ (ТГ-донорів) для роботи, закупівлі товарів і сплати послуг.

На підвищення ролі екологічної свідомості сільських мешканців в контексті боротьби із змінами клімату (боротьба із забрудненням, розвиток органічного землеробства, «зеленого» туризму) роблять акцент, перш за все, зарубіжні політики та науковці [28].

Проблема забезпечення всебічного розвитку сільських територій ускладнюється перманентною демографічною кризою, яка характерна не лише для України, а й для Європи та Північної Америки [29]. За таких обставин важливо знайти свої шляхи розвитку для кожної конкретної громади з акцентом на використання власних ресурсів, а на державні та регіональні органи влади покладається забезпечення необхідних інструментів і механізмів фінансування для розробки та реалізації ефективної стратегії сільської громади [25; 30–32]. Розробка та реалізація такої стратегії повинна враховувати особливості конкретної місцевої громади, широку участь мешканців, їхні цінності та пріоритети [33–36]. Це, своєю чергою, вимагає вивчення думки місцевих жителів щодо визначення кола наявних проблем і способів їх вирішення.

Мета статті – дослідження впливу соціально-економічних факторів на оцінку наявних проблем розвитку сільських і селищних територіальних громад та вибір напрямів їх вирішення з точки зору мешканців громад.

Методологія. В основі дослідження лежить порівняльний аналіз результатів опитування мешканців Ямпільської територіальної громади Сумської області в березні-квітні 2021 р. (проведено в рамках розробки стратегії розвитку Ямпільської ТГ на 2022–2027 рр.) та аналогічні дослідження, які проводили в Зноб-Новгородській об'єднаної територіальної громади (ОТГ) Сумської області у 2018 р. [33].

Загальна чисельність населення Ямпільської ТГ становить 7858 осіб [37]. Для виявлення проблемних питань життєдіяльності громад та їх бачення дальшого свого розвитку проведено соціологічне дослідження. Методом збору первинної інформації визначено анкетування, для відбору респондентів застосували комбіновану вибірку. Загальна чисельність опитаних становить 649 осіб. Із них 544 особи опитано інтерв'юерами, а 105 осіб – за допомогою

гугл анкет через інтернет.

У вибіркову сукупність увійшло 31,2 % чоловіків та 68,8 % жінок. Серед усіх опитаних 28,3 % проживають у смт. Ямпіль, а решта 71,7 % – у сільській місцевості, що в цілому відповідає загальній структурі населення в громаді. Вік респондентів представлено в межах трьох вікових груп: до 25 років (10,0 %), від 25 років до 60 років (68,9 %), старше 60 років (21,1 %), що відображає всі вікові категорії жителів ТГ.

Майже половина опитуваних є представниками бюджетної сфери, кожен п'ятий – пенсіонер, майже кожен дев'ятий працює за наймом, кожен восьмий не має роботи. Лише 2,3 % є економічно незалежними від держави.

Щодо рівня доходів, то 74,9 % респондентів має дохід менше 6 тис. грн, 20,6 % опитуваних має дохід у межах 6–10 тис. грн за місяць, 4,5 % мають рівень доходу більше ніж 10 тис. грн.

Стосовно рівня освіти, то 40,4 % опитаних мають вищу освіту; середню та середню професійну освіту мають відповідно 23,8 % та 31,5 %.

Виклад основного матеріалу дослідження. Територіально-адміністративна реформа України та процеси децентралізації державного управління зумовили перенесення значної частини владних повноважень на рівень місцевих громад. Не зважаючи на те, що разом із передачею на рівень територіальних громад багатьох функцій щодо управління та утримання об'єктів соціально-культурної сфери (школи, медичні заклади та ін.) надано значні фінансові ресурси (переважно у вигляді цільових субвенцій), проблема стійкості фінансово-економічного базису розвитку сільських територіальних громад не втрачає актуальності, особливо на фоні тенденції зменшення рівня державної підтримки та необхідності збільшення частки власних надходжень до місцевого бюджету, що, у свою чергу, вимагає активного пошуку шляхів стимулювання розвитку малого та середнього бізнесу. Активізація підприємницької діяльності на місцях має базуватися на чіткому розумінні впливу соціально-економічних і демографічних детермінант розвитку громад.

Опитування мешканців Зноб-Новгородської об'єднаної територіальної громади Сумської області показало, що для більшості громадян основним ресурсом розвитку громади є наявні природні ресурси (більше 48,0 %) і прогресивна та дієва місцева влада (16,6 %). І лише один із дев'яти опитаних вважає таким активність і підприємливість мешканців. При цьому люди середнього та старшого віку (45,0 %), на відміну від молоді (57,0 %), менше надають перевагу природним ресурсам. На владу менше розраховує молодь (12,2 %) та пенсіонери (5,9 %), натомість середнє покоління значно більше вважають владу головним ресурсом – 22,9 % [33].

Аналіз результатів аналогічного опитування, проведеного через три роки в сусідній Ямпільській територіальній громаді підтвердив цю тенденцію (рис. 1). Природні ресурси є ключовим ресурсом розвитку громади для двох третин мешканців. Водночас лише 6,6 % респондентів справедливо вважають, що головним ресурсом громади є активність і підприємливість її мешканців.

Рис. 1. Визначення респондентами ключового ресурсу для розвитку Ямпільської територіальної громади, %

Джерело: розраховано та побудовано авторами.

Тільки кожен десятий респондент робить ставку на місцевих підприємців та підприємства. При цьому найбільше цінують природні ресурси люди старшого віку (пенсіонери) – більше 80 %, особи із середньою з освітою – 74 % та найнижчим рівнем отриманих доходів – 68 % (табл. 1).

Таблиця 1

Соціально-економічні детермінанти оцінки головного ресурсу розвитку Ямпільської територіальної громади

Характеристики респондентів	Питома вага відповідей, % до опитаних									
	Корисні копалини на території громади	Вільні земельні ділянки у громади	Вигідне географічне положення	Приваблива природа	Вільні господарські приміщення	Цікаві туристичні об'єкти	Активність / підприємливість мешканців громади	Місцеві підприємства та підприємці	Прогресивна та дієва місцева влада	Особисті селянські господарства
1	2	3	4	5	6	7	8	9	10	11
Вік опитаних										
До 25 років	3,1	24,5	5,1	24,5	2,0	6,1	14,3	8,2	12,2	6,8
26–60	5,1	22,3	1,9	15,9	4,5	7,6	8,9	10,8	22,9	8,1
Понад 60 років	3,9	11,8	3,9	25,5	5,9	7,8	13,7	21,6	5,9	5,8
Рівень освіти										
Вища	3,1	15,3	8,7	31,0	12,2	10,8	5,6	10,5	7,3	9,4
Середня	5,3	17,6	6,9	44,3	6,9	4,6	10,7	7,6	4,6	7,6
Середня професійна	3,9	19,4	9,4	36,7	6,1	4,4	5,6	7,8	4,4	6,1
Не зазначена	6,1	15,2	9,1	39,4	7,6	7,6	7,6	10,6	4,5	1,5

<div align="right">Продовження табл. 1</div>

1	2	3	4	5	6	7	8	9	10	11
Сфера зайнятості										
Власний бізнес (підприємець)	5,9	23,5	5,9	17,6	23,5	5,9	23,5	11,8	11,8	5,9
Найманий працівник	2,8	15,3	8,3	34,7	11,1	8,3	4,2	8,3	8,3	6,9
Пенсіонер	6,1	20,0	13,0	42,6	5,2	5,2	4,3	6,1	3,5	6,1
Бюджетна сфера	2,3	16,4	6,4	36,5	9,0	8,0	6,7	11,0	5,4	8,7
Студент	8,8	14,7	14,7	35,3	14,7	5,9	20,6	14,7	8,8	0,0
Безробітний	2,3	20,5	10,2	35,2	10,2	10,2	6,8	3,4	8,0	9,1
Інші	12,8	5,1	5,1	25,6	2,6	5,1	0,0	12,8	0,0	5,1
Рівень отриманих доходів, грн/місяць										
До 6000 грн	4,8	17,7	8,8	36,6	8,1	7,1	4,6	7,6	6,2	7,1
6000–10000 грн	1,5	15,7	9,7	33,6	11,9	6,7	11,2	13,4	6,0	9,0
Понад 10000 грн	6,3	15,6	3,1	21,9	6,3	12,5	9,4	9,4	3,1	15,6
У середньому	4,1	16,9	8,6	36,0	9,0	7,5	6,8	9,2	5,7	7,4

Джерело: розраховано авторами.

Головними проблемами на селі залишаються економічні: високе безробіття, низький рівень доходів, неналежна якість доріг, нерозвиненість і зношеність об'єктів інфраструктури. Серед мешканців Зноб-Новгородської ОТГ таких виявилося майже 60 % [33], у Ямпільській – майже три чверті (рис. 2).

Соціальний статус опитаних значно вплинув на оцінку найголовнішого ресурсу розвитку громади – активності та підприємливості мешканців, а також місцевих підприємств і підприємців. Третина підприємців та студентів і лише 10–18 % інших категорій населення вважають бізнес і підприємливість ключовим ресурсом громади.

У цілому можна констатувати, що серед мешканців громади домінують думки щодо зовнішнього чинника вирішення їхніх проблем. Частково це пов'язано із демографічним чинником (переважання серед селян людей пенсійного та передпенсійного віку), а частково – спадщиною радянської економічної системи, яка привчила до думки, що всі проблеми повинна вирішити держава.

Водночас недостатню підприємливість мешканців громади вважають головною проблемою приблизно однакова кількість населення: 26,4 % у Зноб-Новгородській ОТГ та 28,3 % у Ямпільській ТГ. Вплив соціального статусу респондентів на оцінку наявних проблем Ямпільської територіальної громади є достатньо суттєвим (табл. 2).

Низький рівень доходів і відсутність промислових підприємств, а також відсутність можливостей для розвитку культури та спорту найбільше турбує підприємців, водночас саме підприємці менше за інших вважають основною проблемою несприятливі умови для розвитку підприємництва. Майже половина опитаних підприємців вважають серйозною проблемою наявність значної частки людей передпенсійного віку. Підприємців і студентів значно більше за інших турбує недостатня підприємливість мешканців громади. Аналогічні

результати були отримані й у Зноб-Новгородській ОТГ [33].

Рис. 2. Чинники, що найбільше заважають розвитку Ямпільської територіальної громади, % від опитаних

Джерело: розраховано та побудовано авторами.

Як не дивно, на перший погляд, але низька якість медичного обслуговування найбільше турбує молодь (студенти) – 52,9 % і найменше пенсіонерів – 33,0 %. Аналогічне опитування в Зноб-Новгородській ОТГ теж показало, що пенсіонери (після студентів) найменше вважають проблемою низьку якість медичного обслуговування [33]. Скоріше за все, це зумовлено тим, що люди старшого віку, які прожили в умовах радянської системи охорони здоров'я, менш вибагливі, ніж ті, хто виріс уже в умовах ринкової економіки.

Таблиця 2

Вплив соціального статусу на оцінку наявних проблем громади

Фактори	Питома вага відповідей, %						
	Вид діяльності						
	Власний бізнес (підпри-ємець)	Найманий працівник	Пенсі-онер	Бюд-жетна сфера	Студент	Безро-бітний	Інші
Безробіття	76,5	55,6	63,5	68,2	82,4	70,5	66,7
Низький рівень доходів населення	88,2	66,7	73,0	74,2	76,5	73,9	66,7
Відсутність інвестицій	64,7	54,2	45,2	67,2	67,6	53,4	46,2
Відсутність промислових підприємств	70,6	54,2	47,0	64,5	52,9	56,8	38,5
Низька якість (відсутність) дорожнього покриття між населеними пунктами сільської ради	52,9	56,9	37,4	48,8	47,1	58,0	48,7
Відсутність можливості для самореалізації, забезпечення змістовного дозвілля	41,2	47,2	32,2	40,5	41,2	52,3	41,0
Недостатня якість медичного обслуговування	35,3	43,1	33,0	42,8	52,9	31,8	51,3
Несприятливі умови для розвитку підприємництва	29,4	34,7	36,5	37,1	38,2	38,6	41,0
Значна частка населення старшого працездатного віку	47,1	31,9	33,0	36,8	38,2	43,2	33,3
Зношеність інженерних мереж (водопостачання, водовідведення)	23,5	37,5	19,1	46,2	29,4	35,2	33,3
Відсутність можливостей для розвитку культури та спорту	47,1	34,7	27,0	31,4	32,4	36,4	30,8
Поширення злочинності, алкоголізму, наркоманії	35,3	29,2	26,1	27,8	32,4	28,4	35,9
Недостатня підприємливість мешканців громади	41,2	22,2	28,7	26,4	41,2	29,5	20,5
Недостатня громадська ініціативність та активність мешканців	23,5	18,1	25,2	26,1	29,4	34,1	35,9
Екологічний стан, засміченість довкілля	29,4	23,6	15,7	25,4	20,6	20,5	35,9
Недостатня інформованість про громаду за її межами	29,4	25,0	24,3	25,8	11,8	25,0	30,8
Відсутність розвиненої мережі закладів побутового обслуговування	29,4	18,1	15,7	19,4	38,2	20,5	15,4
Недостатній рівень дошкільної освіти	11,8	18,1	16,5	10,4	32,4	22,7	23,1
Недостатній рівень загальної освіти	17,6	19,4	11,3	10,0	41,2	19,3	17,9
Відсутність розвиненої мережі торгівельних закладів	11,8	13,9	8,7	13,7	32,4	14,8	15,4

Джерело: розраховано авторами.

Одне з питань анкети стосувалося вибору пріоритетних проєктів соціально-економічного розвитку Ямпільської територіальної громади. Усі проєкти можна поділити умовно на три блоки: економічний (створення кооперативів і переробних підприємств, підтримка органічного виробництва, розширення мережі малого та середнього бізнесу); інфраструктурний (капітальний ремонт доріг, реконструкція вуличного освітлення та мереж водопостачання та водовідведення, будівництво тротуарів, утилізація сміття) та соціально-культурного спрямування (розвиток паркової зони та дитячих майданчиків, будівництво сучасного стадіону, відновлення історико-культурної спадщини, створення зони «зеленого туризму» та екопоселень). У цілому пріоритети мешканців проілюстровано на рис. 3.

Рис. 3. Визначення мешканцями Ямпільської ТГ пріоритетних проєктів для розвитку громади, %

Джерело: розраховано та побудовано авторами.

Аналіз результатів показує, що в пріоритеті мешканців є проєкти з інфраструктурного та економічного блоку, а проєкти соціально-культурного спрямування пріоритетними визнає лише третина опитаних.

Ці результати корелюють із оцінками мешканців Зноб-Новгородської ОТГ, де також проєкти економічного характеру домінували над соціально-культурними проєктами. При цьому саме підприємці найбільше стурбовані

економікою (77,8 % опитаних) та найменше соціально-культурною сферою (33,3 %). Досить чітко проявляється тенденція щодо зменшення значення економічних проєктів і збільшення соціально-культурних із підвищенням доходів респондентів [33]. У Ямпільській ТГ вплив соціального статусу на оцінку пріоритетності проєктів розвитку громади є доволі схожим (табл. 3).

Таблиця 3

Вплив соціального статусу на оцінку пріоритетності проєктів розвитку Ямпільської територіальної громади

Проєкти	Питома вага відповідей, %						
	Вид діяльності						
	Власний бізнес (підприє-мець)	Найманий працівник	Пенсі-онер	Бюд-жетна сфера	Сту-дент	Безро-бітний	Інші
Створення переробних підприємств	52,9	55,6	37,4	64,2	55,9	53,4	48,7
Створення молочного кооперативу	29,4	38,9	34,8	51,2	26,5	43,2	43,6
Створення кооперативу з вирощування високорентабельних культур	29,4	47,2	22,6	48,2	38,2	47,7	33,3
Створення багатофункціональ-ного комунального підприємства	52,9	47,2	33,9	52,5	32,4	48,9	43,6
Підтримка органічного виробництва	29,4	43,1	28,7	48,5	44,1	42,0	41,0
Розширення мережі малого та середнього бізнесу	58,8	47,2	38,3	48,5	70,6	53,4	48,7
У середньому економічні проєкти	*42,2*	*46,5*	*32,6*	*52,2*	*44,6*	*48,1*	*43,2*
Капітальний ремонт доріг	82,4	80,6	71,3	73,9	67,6	84,1	76,9
Реконструкція мереж водо-постачання та водовідведення	41,2	62,5	49,6	53,8	55,9	52,3	41,0
Реконструкція вуличного освітлення	41,2	47,2	55,7	44,1	41,2	52,3	41,0
Будівництво тротуарів	29,4	41,7	30,4	36,1	41,2	40,9	33,3
Створення сортувальної лінії на полігоні твердих побутових відходів (ТПВ)	35,3	38,9	18,3	45,2	29,4	37,5	33,3
У середньому інфраструктурні проєкти	*45,9*	*54,2*	*45,0*	*50,6*	*47,1*	*53,4*	*45,1*
Створення зони «зеленого туризму» та екопоселень	23,5	33,3	21,7	38,5	29,4	42,0	30,8
Розвиток паркової зони, дитячих майданчиків	35,3	47,2	30,4	31,1	20,6	36,4	28,2
Відновлення історико-культурної спадщини	35,3	33,3	24,3	31,8	23,5	37,5	33,3
Будівництво сучасного стадіону	23,5	36,1	11,3	17,1	20,6	20,5	23,1
У середньому соціально-культурні проєкти	*29,4*	*37,5*	*22,0*	*29,6*	*23,5*	*34,1*	*28,8*

Джерело: розраховано авторами.

Найбільш опікуються економічними проєктами бюджетники та безробітні, найменш – пенсіонери, що є цілком логічним. Студентів і підприємців з економічного блоку найбільше турбує розширення мережі малого та середнього бізнесу. Серед інфраструктурних проєктів поза конкуренцією є капітальний ремонт доріг серед усіх категорій респондентів. Найменше підтримують соціально-культурні проєкти пенсіонери (що можна пояснити віком опитаних) і студенти (скоріше за все, опитані респонденти із цієї категорії не бачать свого майбутнього в громаді).

Рівень доходів також впливає на оцінку пріоритетності проєктів розвитку громади (табл. 4).

Таблиця 4

Вплив соціального статусу на оцінку пріоритетності проєктів розвитку Ямпільської територіальної громади

Проєкти	Питома вага відповідей, %		
	Рівень доходів, грн/місяць		
	До 6000 грн	6000–10000 грн	Більше 10000 грн
Створення переробних підприємств	54,4	63,4	65,6
Створення молочного кооперативу	43,3	47,0	50,0
Створення кооперативу з вирощування високорентабельних культур	38,5	50,7	62,5
Створення багатофункціонального комунального підприємства	44,7	55,2	46,9
Підтримка органічного виробництва	39,4	51,5	50,0
Розширення мережі малого та середнього бізнесу	47,0	53,7	56,3
У середньому економічні проєкти	*44,5*	*53,6*	*55,2*
Капітальний ремонт доріг	76,3	75,4	65,6
Реконструкція мереж водопостачання та водовідведення	53,9	55,2	43,8
Реконструкція вуличного освітлення	51,4	34,3	46,9
Будівництво тротуарів	37,1	33,6	34,4
Створення сортувальної лінії на полігоні ТПВ	33,6	47,8	43,8
У середньому інфраструктурні проєкти	*50,5*	*49,3*	*46,9*
Створення зони «зеленого туризму» та екопоселень	31,3	33,6	50,0
Розвиток паркової зони, дитячих майданчиків	33,9	29,9	25,0
Відновлення історико-культурної спадщини	29,7	28,4	34,4
Будівництво сучасного стадіону	19,1	18,7	31,3
У середньому соціально-культурні проєкти	*28,5*	*27,6*	*35,2*

Джерело: розраховано авторами.

Із збільшенням доходів зростає часка респондентів, які надають пріоритети проєктам економічного та соціально-культурного спрямування, водночас пріоритетність інфраструктурних проєктів із зростанням доходів дещо знижується. У рамках окремих проєктів простежується доволі чітка тенденція щодо збільшення із підвищенням доходів значення розвитку кооперації та

підтримки малого й середнього бізнесу (що є достатньо зрозумілим і логічним) та зменшення пріоритетності розвитку паркової зони та дитячих майданчиків (що можна пояснити певною зміною характеру бажаного відпочинку та дозвілля).

Важливим чинником розвитку місцевих громад є віра мешканців в успіх реформ та готовність брати активну участь у їх реалізації.

Серед опитаних мешканців Зноб-Новгородської ОТГ лише 40,9 % вірили в можливість реалізації поставлених завдань розвитку громади. При цьому найбільшими оптимістами виявилися пенсіонери (51,0 %). Підвищення рівня освіченості та доходів населення показало зменшення рівня оптимізму [33]. У Ямпільській ТГ результати дещо відрізняються (табл. 5).

Таблиця 5

Відмінності оцінки можливості реалізації завдань розвитку Ямпільської громади

Характеристики респондентів	Позитивні оцінки, % до загальної кількості опитаних			Негативні оцінки, % до загальної кількості опитаних		
	«Так»	«Скоріше так»	Разом	«Ні»	«Скоріше ні»	Разом
Вік опитаних						
До 25 років	19,3	22,8	42,1	19,3	38,6	57,9
26–60	17,8	19,0	36,8	25,5	37,7	63,2
Понад 60 років	16,0	25,5	41,5	31,1	27,4	58,5
Рівень освіти						
Вища	18,8	22,1	40,9	20,7	38,4	59,1
Середня	15,5	16,4	31,9	32,8	35,3	68,1
Середня професійна	15,5	20,5	36,0	31,7	32,3	64,0
Не зазначена	19,6	19,6	39,2	23,5	37,3	60,8
Сфера зайнятості						
Власний бізнес (підприємець)	0,0	43,8	43,8	18,7	37,5	56,2
Найманий працівник	14,5	17,4	31,9	27,5	40,6	68,1
Пенсіонер	16,8	23,8	40,6	28,7	30,7	59,4
Бюджетна сфера	17,9	18,3	36,2	23,4	40,4	63,8
Студент	22,6	22,6	45,2	22,5	32,3	54,8
Безробітний	16,3	25,0	41,3	30,0	28,7	58,7
Інші	27,6	6,9	34,5	37,9	27,6	65,5
Рівень отриманих доходів, грн/місяць						
До 6000 грн	15,0	19,8	34,8	28,0	37,2	65,2
6000–10000 грн	17,3	24,4	41,7	18,9	39,4	58,3
Понад 10000 грн	20,7	20,7	41,4	34,5	24,1	58,6
У середньому	17,4	20,4	37,8	26,1	36,1	62,2

Джерело: розраховано авторами.

На відміну від Зноб-Новгородської ОТГ, зростання рівня освіти та доходів збільшує частку оптимістів. Підприємці та студенти є найбільшими оптимістами. Найбільш песимістично налаштовані наймані працівники та бюджетники. Вплив соціального статусу опитаних на рівень оптимізму/песимізму в обох громадах є практично ідентичним, що свідчить про

наявність певних загальних тенденцій. Якщо оптимізм студентів можна пояснити молодістю, то оптимізм (хай навіть й обережний) підприємців пов'язаний, на нашу думку, більше з вірою у власні сили.

Незважаючи на домінування в цілому песимістичних настроїв у громаді, позитивним моментом є готовність мешканців брати активну участь у реалізації завдань щодо розвитку громади (табл. 6).

Таблиця 6

Відмінності готовності брати активну участь у реалізації завдань розвитку Ямпільської громади

Характеристики респондентів	Позитивні оцінки, % до загальної кількості опитаних			Негативні оцінки, % до загальної кількості опитаних		
	«Так»	«Скоріше так»	Разом	«Ні»	«Скоріше ні»	Разом
Вік опитаних						
До 25 років	57,1	30,4	87,5	5,4	7,1	12,5
26–60	50,8	33,9	84,7	5,9	9,4	15,3
Понад 60 років	50,5	25,2	75,7	11,7	12,6	24,3
Рівень освіти						
Вища	52,6	33,6	86,2	5,2	8,6	13,8
Середня	50,0	31,2	81,2	9,8	9,0	18,8
Середня професійна	50,9	31,6	82,5	8,8	8,7	17,5
Не зазначена	45,8	27,1	72,9	8,5	18,6	27,1
Сфера зайнятості						
Власний бізнес (підприємець)	58,8	41,2	100,0	0,0	0,0	56,2
Найманий працівник	50,7	34,3	85,0	3,0	11,9	14,9
Пенсіонер	48,6	26,7	75,3	9,5	15,2	24,7
Бюджетна сфера	53,7	30,7	84,4	7,4	8,2	15,6
Студент	46,7	36,7	83,4	10,0	6,6	16,6
Безробітний	50,0	39,5	89,5	5,8	4,7	10,5
Інші	37,5	25,0	62,5	15,6	21,9	37,5
Рівень отриманих доходів, грн/місяць						
До 6000 грн	48,2	32,9	81,1	8,6	10,3	18,9
6000–10000 грн	57,1	33,3	90,4	3,2	6,4	9,6
Понад 10000 грн	53,6	32,2	85,8	7,1	7,1	14,2
У середньому	51,0	31,9	82,9	7,4	9,7	17,1

Джерело: розраховано авторами.

Отже, більше половини респондентів твердо готові брати активну участь, а 31,9 % налаштовані на це. Загальні настрої жителів Ямпільської громади цілком корелюють із результатами опитування в Зноб-Новгородській ОТГ [33]. Молодь в обох громадах готова брати найбільш активну участь. Мешканці з вищою освітою також в обох громадах є більш активними. Але стосовно соціального статусу є відмінності між громадами. Якщо в Ямпільській ТГ найбільш активними є підприємці та безробітні (опора на власні зусилля), то в Зноб-Новгородській ОТГ найбільш пасивними виявилися підприємці та студенти (можливо, це пов'язано із перспективами цієї категорії населення

щодо проживання в цій громаді).

Висновки. Виконане дослідження ґрунтується на порівнянні емпіричних даних, які зібрані та оброблені авторами особисто, та результатами аналогічного дослідження, проведеного в сусідній громаді три роки тому. Отримані висновки мають певну наукову новизну, оскільки підтверджені достатнім фактологічним матеріалом. Проведений авторами порівняльний емпіричний аналіз впливу соціально-економічних і демографічних чинників щодо оцінки наявного становища, визначення пріоритетності проєктів розвитку, віри в можливість і готовності брати участь у реалізації проєктів соціально-економічного розвитку місцевих громад виявив наявність певних тенденцій, зокрема: найбільш важливими для мешканців сільських територій є проблеми економічного характеру та функціонування інфраструктури (близько 50 % мешканців). Саме це визначає вибір економічних проєктів розвитку як найбільш пріоритетних. Серед місцевих жителів домінують песимістичні очікування щодо можливостей реалізації завдань розвитку (60 % опитаних), але водночас зафіксовано високу готовність брати активну участь у їх реалізації (майже 83 %). В обох громадах головним ресурсом розвитку мешканці вважають природні ресурси та прогресивну владу, і тільки дуже незначна частина населення вірить у підприємливість й активність громадян. Отримані результати можуть бути використані органами місцевого самоврядування при розробці стратегії соціально-економічного розвитку територіальних громад, а також органами державного управління при визначенні напрямів реалізації регіональної політики.

Водночас є ряд розбіжностей стосовно впливу окремих чинників (освіта, соціальний статус, рівень доходів) на оцінку наявного стану та можливостей розвитку, що вимагає додаткових досліджень у цьому напрямі.

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Citation:

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Pylypenko, V., Pylypenko, N., Khaminich, S., & Sokol, P. (2022). Empirical analysis of socio-economic determinants of development of rural territorial communities. *Agricultural and Resource Economics*, 8(2), 228–249. https://doi.org/10.51599/are.2022.08.02.12.

ЗАПРОШЕННЯ ДО ПУБЛІКАЦІЇ

Шановні колеги!

Редакційна колегія міжнародного наукового фахового рецензованого журналу **«Agricultural and Resource Economics»** запрошує Вас до публікації наукових робіт.

Редакційна колегія приймає до публікації статті, написані українською, англійською або польською мовою. Стаття має бути написана на актуальну тему, містити результати глибокого наукового дослідження й обґрунтування здобутих наукових результатів відповідно до мети й завдань статті, які не повинні бути вузькими (у сенсі охоплення зацікавленої аудиторії).

Рукописи статей рецензують провідні вчені та фахівці відповідних галузей.

Вимоги до структури та оформлення статей

УВАГА! Для правильного оформлення статті автори повинні скористатися запропонованим шаблоном.

Вимоги до оформлення та структури тексту:

1. Статті оформлюють на листах формату А4 (210 х 297 мм) з полями 2 см з усіх сторін; абзацний відступ – 1 см, інтервал тексту – одинарний. Обсяг статті від 10 до 30 сторінок (оптимально – 15–20 сторінок).

2. Шрифт Times New Roman, розмір 14.

3. Стаття повинна мати JEL Classification (1–3 коди, що розміщують через кому. Див. коди класифікатора за Journal of Economic Literature Classification System: https://www.aeaweb.org/jel/guide/jel.php), з лівого боку, літери великі, шрифт напівжирний.

4. Після відступу в 1 рядок вказують ім'я та прізвище автора (авторів) з вирівнюванням праворуч напівжирним курсивом.

5. Після відступу в 1 рядок вказують найменування установи, де працює (навчається) автор, із вирівнюванням праворуч звичайним курсивом. Якщо статтю написали кілька авторів, які працюють у різних установах, після прізвища автора та перед найменуванням установи, де працює (навчається) автор, роблять помітку у вигляді відповідної надрядкової цифри. Якщо статтю написано одноосібно, або ж автори працюють (навчаються) в одній установі, то тоді таку помітку не роблять.

6. У наступному рядку вказують назву країни з вирівнюванням праворуч звичайним курсивом (якщо автори з різних країн, то назву країни вказують після найменування установи).

7. Через відступ в 1 рядок вказують назву статті з вирівнюванням посередині сторінки великими жирними літерами, розмір шрифту 14.

8. Через відступ в 1 рядок наводять анотації двома мовами (українською та англійською – не менше 1800 друкованих знаків, ураховуючи пропуски). Анотація (реферат) має розкривати мету статті, головну її ідею та короткий огляд здобутих результатів дослідження. Шрифт анотації – курсив, розмір – 12. Для англомовних статей потрібна анотація лише цією мовою (анотацію українською подають окремо). Анотація має бути оформлена за такою структурою (як окремі абзаци): мета; методологія / методика / підхід; результати; оригінальність / наукова новизна; практична цінність / значущість. Перед кожною анотацією пункти 4, 5, 6, 7 цих вимог наводять мовою анотації.

9. Після кожної анотації без відступів наводять ключові слова до статті (5–7 позицій). Вимоги щодо шрифту, розміру та мови такі ж, як і до анотації.

10. Далі через відступ в 1 рядок наводять основний текст статті.

11. У статті повинні міститись **(із виділенням у тексті)** такі елементи:

- **постановка проблеми** в загальному вигляді та її зв'язок із важливими науковими чи практичними завданнями;

- **аналіз останніх досліджень і публікацій**, у яких започатковано розв'язання цієї проблеми і на які спирається автор, виділення не вирішених раніше частин загальної проблеми, котрим присвячується означена стаття;

- **мета статті** (постановка завдання);

- **виклад основного матеріалу дослідження** з повним обґрунтуванням отриманих наукових результатів;

- **висновки** із цього дослідження й перспективи дальших розвідок у цьому напрямі;

- **список використаних джерел** (оформлюють за вимогами ДСТУ 8302:2015 «Інформація та документація. Бібліографічне посилання. Загальні положення та правила складання»).

Англомовна стаття має бути структурована таким чином:
Introduction and review of literature.
The purpose of the article.
Results and discussions.
Conclusions.
References.

Вимоги до оформлення літературних джерел і посилань на них

Посилання на джерела слід позначати в тексті у квадратних дужках за порядковим номером цієї роботи в списку, наприклад, [3, с. 35; 8, с. 56–59], у яких перша цифра вказує порядковий номер джерела в списку літератури, а друга – відповідну сторінку в цьому джерелі; одне джерело (зі сторінкою) відокремлюють від іншого крапкою з комою. Розташування джерел у списку має бути в міру посилання в тексті. Список використаних джерел повинен включати не менше 20 позицій, у тому числі сучасні англомовні публікації, що індексуються в Scopus і/або Web of Science (не менше 50 % від загальної кількості). Згідно з новими правилами, які враховують вимоги міжнародних

систем цитування, автори неангломовних статей повинні наводити список використаних джерел у двох варіантах: один мовою оригіналу й окремим блоком той самий список джерел (References) у латинському алфавіті (APA Style), тобто перекладений англійською мовою, повторюючи в ньому в тій же послідовності всі джерела літератури, незалежно від того, чи є серед них іноземні. Приклад правильного оформлення **References** можна подивитися за посиланням https://are-journal.com/are/about/submissions#authorGuidelines. Наприкінці бібліографічного опису джерела слід обов'язково зазначати унікальний цифровий ідентифікатор DOI, якщо його присвоєно відповідній публікації.

В англомовних статтях посилання в тексті можна здійснювати в гарвардському стилі й наводять лише References.

Нагадуємо, *що не варто посилатися на підручники, посібники, конспекти лекцій, практикуми й іншу ненаукову та науково-популярну літературу. Посилання на власні наукові праці (самоцитування) допускаються лише в разі нагальної потреби, але не більше 10 % від загальної кількості джерел. Не бажано посилатися на матеріали конференцій. У списку джерел мають переважати статті з визнаних закордонних і вітчизняних журналів та монографії, які опубліковано протягом останніх семи років. Усі цитати мають закінчуватися посиланнями на джерела. Роботи авторів, на прізвища яких є посилання в статті, мають бути в списку використаних джерел.*

Вимоги до оформлення таблиць, рисунків і формул

Кількість табличного матеріалу й ілюстрацій повинна бути доречною. Цифровий матеріал подають у таблиці, що має порядковий номер з вирівнюванням праворуч (напр., *Таблиця 1*) і назву (друкують над таблицею посередині напівжирним шрифтом). Розміщення таблиць і рисунків в альбомному форматі не бажане.

Ілюстрації також потрібно нумерувати й вони повинні мати назви, які вказують під кожною ілюстрацією з вирівнюванням посередині напівжирним шрифтом (напр., **Рис. 2. Модель управління ефективністю виробництва**). Рисунки, виконані в MS Word, потрібно згрупувати; вони мають бути єдиним графічним об'єктом.

Шрифт тексту в таблицях і на рисунках Times New Roman, розмір 12 (у виключних випадках розмір шрифту може бути меншим).

Автор статті обов'язково має наводити джерело інформації після кожного рисунка й таблиці (напр., *Джерело:* розраховано на основі статистичного щорічника «Сільське господарство України») з абзацним відступом, розмір шрифту – 12.

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Просимо авторів також звернути увагу на такі вимоги

У статті не повинно бути переносу слів і макросів. Під час набору слід вимкнути автоматичний «м'який» перенос (заборонені «примусові» переноси – за допомогою дефісу); лапки необхідно набирати однакові по всій статті; не використовувати дефіс замість тире. Абзаци позначати тільки клавішею «Enter» (форматування здійснювати лише через параметри абзацу), не застосовувати пропуски або табуляцію (клавіша «Tab»). Текст має бути побудований у логічній послідовності, без повторень, із чіткими формулюваннями й відповідно до вимог стилістики наукового тексту, без граматичних і стилістичних помилок. Матеріал має бути ретельно вичитаний і відкорегований.

Назва файлу статті має відповідати прізвищу автора (напр.: **Іваненко_стаття** або **Ivanenko_article).** Статтю подають лише у форматі Microsoft Word.

Просимо уважно стежити за виконанням усіх вимог до оформлення статті й не ігнорувати вимоги щодо оформлення таблиць й ілюстрацій!

Перед надсиланням статті, будь ласка, перевірте її відповідність кожному пункту вимог.

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The editorial board of the international scientific peer-reviewed journal **"Agricultural and Resource Economics"** invites you for the publication of scientific papers.

The editorial board accepts for publication articles, written in English, Ukrainian or Polish.

The paper should be written on the current topic, with the results of profound scientific research and justification of obtained scientific results in accordance with the objectives and tasks of articles that should not be narrow (in terms of coverage of interested audience).

Manuscripts of articles are reviewed by leading scientists and experts from related branch.

The requirements for the structure and the design of articles

ATTENTION! For the correct design of article, the authors showed use proposed pattern.

Requirements for the design and structure of the text:

1. Articles should be on sheets of A4 (210 x 297 mm) with 2 cm margins on all sides; indentation – 1 cm, single-spaced. The articles should contain from 10 to 30 pages (optimally – 15–20 pages).

2. Font – Times New Roman, size – 14.

3. For each article – JEL Classification (Economic Literature Classification System: https://www.aeaweb.org/jel/guide/jel.php), on the left, the letters are large, bold font.

4. Author's name after indent – on the right italic, bold font.

5. After indent indicate below the name of the institution – the font is with normal italic on the right. If an article is written by several authors working in various institutions, after the author's name and before the name of the institution where he (she) works (studies), make a mark in the appropriate superscript numbers. If an article is written individually or author's work (study) in one institution, then do not make any mark.

6. In the next line indicate the name of country with normal italic on the right (if authors from different countries, indicating the name of the country after the name of the institution).

7. After indent in line indicate the title of the article aligned with the middle of the page with big bold letters, font size 14.

8. Next there should be the abstract, which is indented, italic and size 12 font

size. **For English-language articles the abstract should only be provided in English.** For Ukrainian and Polish Language articles abstracts should be provided in two languages: (1) Ukrainian or Polish – more than 1800 characters, considering spaces, (2) English – more than 1800 characters, considering spaces. An abstract should identify the purpose of the paper, information about the content of the core idea of paper and provide a brief overview of the results obtained in the research. Please format the abstract as separate paragraphs: (1) Purpose, (2) Methodology / approach, (3) Results, (4) Originality / scientific novelty and (5) Practical value / implications. Paragraphs 4, 5, 6 and 7 of these requirements should be provided in language of the abstract before each abstract.

9. After each annotation without indent write keywords to the article (5–7 positions). Requirements for the font size and language are the same as for the annotation.

10. Then through indent in 1 line write the main text.

11. Article should be structured as follows:

Introduction and review of literature.
The purpose of the article.
Results and discussions.
Conclusions.
References.

Requirements for references and links to them

Links for references should be marked in the text in square brackets for the serial number of the works in the list, for example, [3, p. 35; 8, pp. 56–59], in which the first digit indicates the serial number of sources in the bibliography, and the second – the appropriate page in the source; one source (with the page) is separated from the rest by a semicolon. Location of sources should be listed as references in the text. The article must contain at least 20 bibliographic sources. At least 50 % of the used sources should be from Web of Science and/or Scopus indexed journals.

Under the new rules, taking into account the requirements of international systems of quoting authors of non-English papers should give a list of used sources in two versions: one in the original language and as separate block of the same list of sources (References) in the Latin alphabet (APA Style), that is translated into English repeating in the same sequence all sources of literature, regardless of whether it is among them foreign. Example of proper design **"References"** can be found here: https://are-journal.com/are/about/submissions#authorGuidelines). At the end of bibliographic descriptions of source should necessarily to specify a Digital Object Identifier (DOI), when available.

In the English-language articles links for references in the text can be made in the APA Style and are only "References".

Remember, that you should not refer on textbooks, manuals, lectures, workshops and other unscientific literature. Links to own scientific work are allowed only in case of urgent need, but not more than 10 % of total sources. It is not

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Requirements for tables, figures and formulas

Number of Tables and illustrations should be appropriate. Digital material should be at the table that has a serial number aligned right (eg., *Table 1*) and name (printed above the table in the middle of bold text). Placement of tables and figures in album format is not desired.

Illustrations should also be numbered and they should have names that indicate under each illustration aligned with the middle of bold (eg., **Fig. 2. Model of management of production effectiveness**). The figures made in MS Word, you need to group; they should be the only graphical object.

Font of text in tables and figures – in Times New Roman, size 12 (in exceptional cases, the font size can be smaller).

The author should always show the source of information after each figure and table (eg., *Source:* calculated on the basis of statistical yearbook "Agriculture in Ukraine") with indent, font size – 12.

Formulas are performed using the integrated formula editor MS Equation, presented with italics, aligned with the middle and numbered on the right side.

We ask authors also draw attention to the following requirements

The article should not content hyphenation and macros. Turn off automatic dialing "soft" transfer (banned "forced" transfers – by using the dash); quotes to dial the same throughout the article; do not use a dash instead of a hyphen. Mark paragraphs only must key "Enter" (formatting to only the parameters paragraph) do not use spaces or tabs (button "Tab"). The text should be structured in a logical sequence, without repetition, with clear language and style in accordance with the requirements of scientific text without grammatical and stylistic errors. The material should be carefully proofread and corrected.

File name article must meet the author's name (eg.: **Ivanenko_article**). The article showed be in Microsoft Word format.

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