https://doi.org/10.31891/2307-5740-2026-352-3
UDC 338.43:[338.1+339.9]
JEL classification: F52; Q18

IVANOV Roman
Oles Honchar Dnipro National University
https://orcid.org/0000-0003-2086-5004
e-mail: romanivanov1926@gmail.com
HURTOVYI Yurii
Oles Honchar Dnipro National University
https://orcid.org/0009-0005-4047-140X
e-mail: hurtovyi_yu@365.dnu.edu.ua

ECONOMIC SECURITY OF THE COUNTRY AND AGRICULTURE: STRUCTURAL INTERRELATIONS AND EVOLUTION OF SCIENTIFIC DISCOURSE AMID INSTABILITY

Based on a bibliometric analysis of two datasets, the article identifies the structural role of agriculture within the economic security system and traces the evolution of scientific discourse amid global instability. It is established that agriculture forms a structurally separate cluster, while its deepened integration into security research is identified as the newest scientific horizon. The identification of China's growing role as a global geopolitical player within the research landscape substantiates the need for foreign trade diversification to minimize dependence on prevailing partners. Recognizing agricultural productivity and sustainability as dominant trends highlights the need to improve Ukraine's economic and food security systems through the integration of sustainable development principles.

Keywords: economic security; agriculture; cluster; global food security; research priority; sustainable development; productivity; exogenous shocks.

ІВАНОВ Роман, ГУРТОВИЙ Юрій
Дніпровський національний університет імені Олеся Гончара

ЕКОНОМІЧНА БЕЗПЕКА КРАЇНИ ТА СІЛЬСЬКЕ ГОСПОДАРСТВО: СТРУКТУРНІ ВЗАЄМОЗВ'ЯЗКИ ТА ЕВОЛЮЦІЯ НАУКОВОГО ДИСКУРСУ В УМОВАХ НЕСТАБІЛЬНОСТІ

Стаття присвячена визначенню структурної ролі сільського господарства в системі економічної безпеки країни, деталізації природи цих взаємозв'язків, а також відстеженню еволюції наукового дискурсу в умовах глобальної нестабільності. Для цього здійснюється бібліометричний аналіз двох масивів публікацій (базового – за запитом «економічна безпека», та специфікованого – з додаванням фільтра «сільське господарство»), проіндексованих у Google Scholar (2019–2025 рр.).

Встановлено, що навіть без застосування галузевих фільтрів категорії «сільське господарство» та «продовольча безпека» формують структурно відокремлений кластер, тобто, аграрний сектор визначається як фундамент продовольчої незалежності та інтегральний компонент економічної безпеки країни. Візуалізація накладання ідентифікувала інтеграцію аграрної проблематики в концептуальний базис безпекових досліджень як новітній науковий горизонт. Виявлено трансформацію дослідницьких пріоритетів: від абстрактно-теоретичних засад до прикладних механізмів реагування на екзогенні шоки. Зафіксовано хронологічний контраст у локалізації терміну «Китай»: від ранніх оцінок рівня його продовольчої забезпеченості до сучасної інтерпретації як глобального гравця, спрямованого на зовнішньоекономічну експансію. Це обґрунтовує необхідність диверсифікації зовнішньої торгівлі для мінімізації ризиків політико-економічного тиску з боку домінуючих партнерів. Специфікований аналіз дозволив конкретизувати зміст виявлених взаємозв'язків, показавши, що за новітністю сільського господарства стоять питання його продуктивності та сталого розвитку галузі. Це актуалізує потребу вдосконалення систем економічної та продовольчої безпеки України шляхом інтеграції принципів сталого розвитку.

Ключові слова: економічна безпека; сільське господарство; кластер; глобальна продовольча безпека; дослідницький пріоритет; сталий розвиток; продуктивність; екзогенні шоки.

Стаття надійшла до редакції / Received 17.02.2026
Прийнята до друку / Accepted 11.03.2026
Опубліковано / Published 31.03.2026

INTRODUCTION

Amid global turbulence accompanied by increasing geo-economic tension, the escalation of military conflicts, and rapid technological transformations, ensuring the country's economic security is becoming a strategic priority. This concept ceases to be a purely theoretical construct, transforming into an effective instrument for adapting national economies to external threats. Awareness of the high degree of vulnerability to exogenous shocks creates a societal demand for stability, which, in turn, intensifies the scientific discourse regarding the search for new paradigms to strengthen economic resilience.

At the same time, for countries with an agrarian or industrial-agrarian economy, particularly Ukraine, the architecture of economic security is inextricably linked to the efficient functioning of the agricultural sector. Agriculture not only determines the macroeconomic dynamics and stability of foreign exchange earnings but also

influences the positions of these states within the global food security system. In particular, G. Nasser Salifu defines the agricultural sector as an "engine of growth" and a foundation for structural transformations in transition economies, generating 60–65% of GDP and providing over 60% of employment [20]. Conversely, A. Allee et al. emphasize the critical vulnerability of such countries, where low productivity and climate shocks directly threaten food security by reducing household incomes [1].

The critical dependence of the global economy on this sector became evident during the period from 2019 to 2025, when the world faced an unprecedented convergence of crisis phenomena. As noted by A. Poruchnyk et al., the global economy has entered a phase of simultaneous exacerbation of environmental, institutional, demographic, and informational crises, which no longer evolve in isolation but mutually interpenetrate. The authors argue that such overlapping creates powerful synergistic effects that destroy the integrity of the socio-economic space, effectively rendering further linear positive development of the global system impossible [28]. The COVID-19 pandemic became a systemic challenge, exposing the structural imbalance of global food systems and the vulnerability of supply chains.

An even more powerful destabilizing factor proved to be the full-scale Russian invasion of Ukraine in 2022, which radically changed the landscape of global food security, causing price volatility, imbalances in external markets, and the destruction of the production and logistics infrastructure of one of the world's leading agricultural exporters. In this context, M. Nehrey and R. Finger state that the blocking of export routes not only triggered a surge in global prices and a food crisis in the Middle East and North Africa but also created immediate risks for Ukraine's internal economic stability [21]. Scientists emphasize that the war jeopardized the achievement of the Sustainable Development Goals, forcing the government to urgently reorient its strategy toward meeting the immediate needs of state survival. It is precisely this interdependence of security and sectoral challenges that necessitates a rethinking of the interrelations between a country's economic security and agriculture, the stable development of which serves as a prerequisite for macroeconomic stabilization.

LITERATURE REVIEW

To identify patterns and trace the evolution of research focuses amid global upheavals, recourse to the academic search engine Google Scholar is justified. Due to its scale and document diversity, it serves as a representative source of information. The value of this resource is underscored by F. Pereira and R. Mugnaini, who note that Google Scholar's ability to aggregate publication data, track citations, and generate metrics has caused significant interest within the scientific community regarding the conduct of bibliometric reviews [26]. This interest is largely driven by its compatibility with the free software Publish or Perish, which provides researchers with a toolkit for the efficient processing of datasets related to specific topics.

Comparing the analytical potential of Web of Science, Scopus, and Google Scholar, M. Chertow et al. confirm the advantages of the latter in providing broader coverage of relevant works. It is achieved through a unique algorithm that indexes the full texts of documents, rather than merely their metadata, which is critical for identifying deep contextual connections [4]. Thus, bibliometric analysis using the Publish or Perish analytical toolkit facilitates the systematization of the empirical base for the study: initially, a baseline dataset formed by the query "economic security of the country", and subsequently, a specialized dataset obtained by combining the concepts "economic security of the country" and "agriculture". This approach allows not only for assessing the representativeness of the agricultural component within the global discourse on economic security but also for identifying specific thematic clusters forming at the intersection of these two research areas.

Simultaneously, to go beyond quantitative bibliometric characteristics and gain a qualitative insight into the structure of the subject area, the application of VOSviewer software is appropriate. Network visualization facilitates the identification of clusters of key terms that form the main thematic directions, while the application of the overlay visualization methodology allows for the analysis of the temporal dynamics of these vectors [32]. Projecting the scale of the average publication year onto the network map enables the differentiation between established topics and novel research fronts that have emerged in response to contemporary challenges. It establishes a basis for evaluating the evolution of scientific interests, tracing shifting emphases in scholarly works, and identifying promising directions for future research.

Previous bibliometric studies confirm the multidimensionality of the concept of economic security, focusing on its diverse determinants and interrelations. In particular, L. Mikhnevych et al. examined it in light of the state's international image, identifying, based on mapping results, three key clusters encompassing issues of politics, sustainable development, and national branding [17]. In contrast, V. Novikov conducted a comprehensive retrospective analysis of national security issues covering 1930–2021, demonstrating that the social component dominates the hierarchy of scientific interest, followed by the information and economic components [23].

A substantial body of literature is dedicated to analysing specific components and influencing factors of the security environment. I. Didenko and K. Volik focused on the "migration–economy–security" triad, identifying clusters regarding the impact of climate change and socio-economic transformations on migration processes [6]. S. Chorna observed an upward trend in financial security research, which peaked in 2021 [5]. In parallel, Y. Jiang and X. Liu addressed theoretical gaps in energy security research (2005–2022) [12], while L. Skaf et al. conducted a systematic review of scientific literature on food security [29].

In summary, reviewed literature primarily focuses on distinct functional components – social, financial, energy, or food security. However, the previously identified thematic clusters and outlined vectors for future research require conceptual reconsideration, as they have likely lost relevance due to rapid transformations of the research object under the pressure of pandemic and military challenges. Furthermore, the coverage of the evolution of the interrelations between economic security and agriculture appears fragmented, highlighting the need to supplement the scientific discourse with up-to-date analytical groundwork.

Consequently, the study aim is to identify the position of agriculture within the system of country's economic security and, through the sectoral specification of the bibliometric dataset, to detail the nature of these interrelations, as well as to trace the evolution of the research focus within the scientific discourse amid global instability (2019–2025).

DATA AND METHODOLOGY

The methodological architecture of the research is grounded in a comparative bibliometric analysis of two datasets. To ensure representativeness and account for the impact of exogenous shocks (the COVID-19 pandemic and the full-scale war in Ukraine), the search time horizon was standardized to the 2019–2025 period. It allows for focusing on recent scholarly contributions and capturing the transformation of the research focus amid global instability.

The Google Scholar platform served as the information base, while the Publish or Perish software acted as the data aggregation tool. For each of the two analysis iterations, the sample size was limited to 300 publications, ranked according to the algorithm prioritizing the most relevant works. The specification of query parameters for each stage is as follows:

1. Baseline analysis – the term "economic security of the country" was defined as the key search criterion.
2. Specialized analysis – the search algorithm was modified by adding a sectoral filter, forming the combined query "economic security of the country", "agriculture".

The bibliometric indicators of the first (baseline) sample are characterized by high scientific weight. The total citation count stands at 112,216, which is a significant figure for a dataset of 300 publications. The average number of citations per paper (374.05) confirms that the analysis encompasses fundamental and high impact works rather than incidental publications. The h-index of the sample ($h = 216$) indicates that 216 works have been cited at least 216 times each. Moreover, 99.67% of the papers have at least one citation, and the proportion of studies with 20 or more citations stands at 89.33%, pointing to the exceptional relevance and authority of the selected sources (Table 1).

Table 1

Comparison of bibliometric indicators of the datasets (Google Scholar, 2019–2025)

Metrics	Description	Baseline dataset	Specialized dataset
		"Economic security of the country"	"Economic security of the country", "agriculture"
Papers	Sample size (number of publications)	300	300
Citations	Total citations	112,216	61,892
Cites/year	Average annual citations	18,702.67	10,315.33
Cites/paper	Average citations per paper	374.05	206.31
Cites/author	Authors per paper (collaboration level)	2.96	3.18
h-index	h papers cited $\geq h$ times	216	160
g-index	g papers received cumulatively $\geq g^2$ citations	300	246
hI, norm	Normalized h-index (accounting for co-authors and time)	125	89
hI, annual	Annual normalized h-index	20.83	14.83
Papers with annual citation count $\geq$ 1, 2, 5, 10, 20	Number of papers with at least 1, 2, 5, 10, and 20 citations respectively	299, 298, 279, 273, 268	300, 298, 275, 247, 224

Source: compiled by the authors using Publish or Perish; metrics description based on [10].

The term selection procedure for visualizing the baseline dataset was carried out based on text data (titles and abstracts) using the binary counting method, which records the presence of a term in a document regardless of its repetition frequency. As a result of filtering the initial set (1,770 terms) using a frequency threshold of 10 occurrences, 29 key concepts were selected for subsequent mapping. During the verification stage, a decision was made to manually exclude the technical categories "evidence", "review", and "study". Such exclusion is methodologically justified, as these words are common attributes of scientific literature that characterize the research format rather than its substantive content.

Regarding the indicators of the second (specialized) sample, the total citation count stands at 61,892. Such a decrease (compared to 112,216 in the first case) is a logical consequence of the narrowing of the research field due to the addition of the term "agriculture". Nevertheless, the sample remains highly relevant: every article received at least one citation, while 74.67% of studies are cited more than 20 times. The h-index value of 160 (constituting 74% of the baseline sample's indicator) testifies to the significant contribution of the agricultural component to forming the theoretical basis of the country's economic security. A crucial indicator is the increase in the average number of

authors per paper to 3.18 (against 2.96 in the baseline sample). It may indicate a strengthening of scientific collaboration, as research at the intersection of economic security and agriculture requires an interdisciplinary approach.

The analysis of term co-occurrence in the second sample was conducted in VOSviewer using a similar algorithm. Based on its results, 1,720 terms were identified, among which 32 items meeting the minimum occurrence threshold (10) were selected for visualization. At the data cleaning stage, structural elements of publications ("article", "research", "review") were also excluded, allowing the visualization to focus exclusively on substantive descriptors.

RESULTS AND DISCUSSION

Economic Security of the Country: Thematic Clustering and Evolution of Scientific Discourse

Based on the processing of the dataset of 26 verified terms, four clusters were identified, which serve as the basis for further content analysis. The analysis of the network visualization enables the interpretation of interrelations between key terms and the substantiation of their significance in the context of the country's economic security. The chief position in the network is occupied by the green cluster ("country", "economic security", "national security", "region", "security", "China"), which forms the conceptual core of the analysis (Fig. 1). The high link strength between the terms "country" and "economic security" testifies to the determining role of the state as a key actor, and economic security is interpreted primarily as its capacity to protect the national economic system. The spatial proximity of the nodes "economic security" and "security", actually overlapping, points to their semantic identity in scientific perception. In this context, S. Veshapidze et al. argue that economic security is conceptually corresponding to general security, which, due to the mutual reinforcement effect, facilitates the achievement of other security levels (regional and international) [33]. Developing this thesis, D. Mara et al. position economic security as a fundamental component of national security, emphasizing their critical interdependence in modern conditions [15].

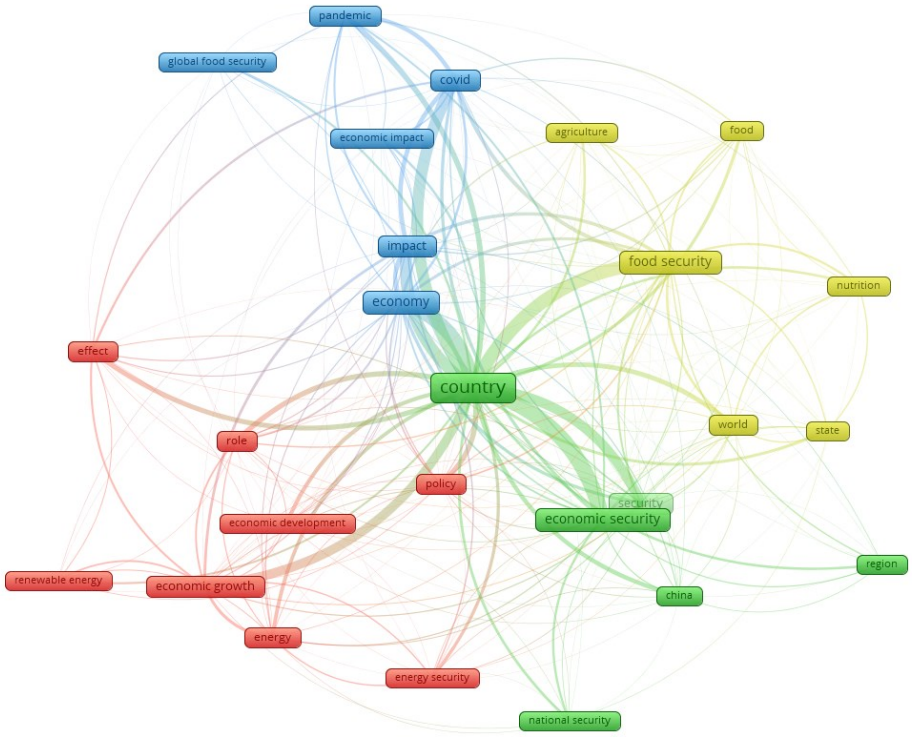

Fig. 1. Map of term co-occurrence in research on the economic security of the country (2019–2025)
Source: constructed by the authors using VOSviewer.

The integration of the term "China" into the central cluster deserves special attention, marking the geopolitical dimension of economic security. An illustration of threats is the study by B. Michalski, who points to the asymmetric dependence of the Visegrad Group countries on Chinese imports in mechanical engineering, which makes regional supply chains vulnerable [16]. At the same time, D. Morris, in the context of the Belt and Road Initiative, highlights key economic benefits: deepening interdependence, infrastructure development, and access to new export markets, which stimulate GDP growth. However, the author notes that although Chinese hegemony is not an inevitable scenario if a country uses its own finances, critical vulnerability arises in the case of total export orientation toward the Chinese market [18]. It underscores the dual nature of its impact, generating both new opportunities and security challenges depending on the cooperation model.

The red cluster consolidates the scientific discourse around the fundamental determinants of economic development. The correlation between the terms "economic development" and "economic growth" within the cluster

structure confirms that economic security is viewed not only as a state of protection but also as a dynamic prerequisite for achieving national development objectives. In this vein, Y. Tsenkov, examining the methodology for measuring economic security, emphasizes that its assessment models often include macroeconomic indicators such as GDP, inflation, and the unemployment rate [31]. A substantial component of this cluster is the energy block, represented by the terms "energy", "energy security", and "renewable energy". Their presence marks energy security as a critical imperative of economic development, emphasizing the transition to a "green" economy. Empirical confirmation of this relationship is provided by R. Nepal et al., who substantiated the existence of a long-term relationship between renewable energy, energy security, and economic growth in the member countries of the Association of Southeast Asian Nations [22]. The institutional dimension of economic security within the cluster is revealed through the high frequency of the terms "role", "policy", and "impact". It indicates a focus by scholars on the regulatory function of the state, the assessment of the effectiveness of management decisions, and their impact on the security environment. In particular, M. Audi and A. Ali demonstrate that government policy performs a key stabilizing function in mitigating economic shocks in both developed and developing economies [2].

The blue cluster reflects the reaction of scholars to the global upheavals of 2019–2025, consolidating issues of economic resilience under crisis conditions around the central terms "COVID" and "pandemic". The analysis of links demonstrates the deep integration of these concepts with categories of economic impact. In this context, N. Pitigala argues that global public health challenges triggered an unprecedented global crisis, which became a catalyst for threats to the economic security of developing countries [27]. Projecting global issues onto the national level, O. Bobrovska et al. emphasize that under pandemic conditions, the institutional capacity of authorities and the effectiveness of state strategies acquired critical importance for Ukraine, acting as a protection against the destabilization of economic development [3]. A principal structural element of the cluster is the term "global food security", the appearance of which in this group testifies to the awareness of the vulnerability of global supply chains and the highlighting of food crisis risks during the pandemic. At the same time, it is notable that the issue of the full-scale Russian invasion, despite its destructive impact on Ukraine's economic security and global agricultural markets, did not form a separate node in this crisis cluster. This circumstance is likely explained by the specifics of constructing the bibliometric sample: research on war consequences, being relatively new, has not yet accumulated the critical mass of citations necessary for inclusion among the most relevant and cited works. Furthermore, a comprehensive assessment of damages of such magnitude requires a significant time for the collection of verified statistical data.

The yellow cluster, composed of the key terms "agriculture", "food", "food security", "nutrition", "state", and "world", conceptualizes the fundamental role of the agricultural sector in the country's economic security. Their presence within a single cluster confirms that agriculture is defined as a strategic basis for ensuring food security. This structural interrelation is empirically substantiated by K. Pawlak and M. Kołodziejczak, who demonstrate that food security risks are most acute in countries with a high share of the agricultural sector in GDP against the backdrop of unfavourable production conditions and infrastructure degradation [25]. At the same time, the integration of the terms "state" and "world" into the cluster indicates that agriculture and food security are analysed both through the prism of state policy and in a global context.

The analysis of the architecture of interrelations between key terms reveals that research on the country's economic security is interdisciplinary. The most representative in this context is the correlation of the term "agriculture" with elements of bordering clusters, particularly its strong link with "economic security" (green cluster) and "policy" (red cluster). This configuration indicates that the agricultural sector is interpreted by scholars not as an isolated industry but as an integral element of state strategy aimed at guaranteeing the country's economic security.

A generalized description of the thematic priorities for each cluster is presented in Table 2.

Table 2

Clusters of key terms in research on the economic security of the country

Cluster	Key terms	Thematic focus / Interpretation
Cluster 1 (red)	economic development, economic growth, effect, energy, energy security, policy, renewable energy, role	Macroeconomic and institutional determinants of economic growth: economic security is viewed as a dynamic condition for development, ensured through state policy mechanisms. Special emphasis is placed on the synergy of energy security and renewable energy sources as drivers of sustainable economic growth
Cluster 2 (green)	China, country, economic security, national security, region, security	State-centric approach to security: interpretation of economic security as an integral component of national security and sovereignty, examined at the level of individual countries and regions. Research on China's geo-economic expansion and its impact on the transformation of supply chains and regional security balances
Cluster 3 (blue)	COVID, economic impact, economy, global food security, impact, pandemic	Focus on crisis management and assessment of the devastating impact of exogenous shocks (particularly the COVID-19 pandemic) on national economies. Studies analyse the transformation of global food security and evaluate the effectiveness of regulation and adaptation mechanisms of economic systems to conditions of global uncertainty
Cluster 4 (yellow)	agriculture, food, food security, nutrition, state, world	Definition of agriculture as the foundation of the state's food independence. Research integrates both the global context and the national dimension into a unified security assurance system

Source: created by the authors.

While network visualization facilitated the identification of the structure of interrelations, the application of overlay visualization enables the reconstruction of the temporal dynamics of the scientific discourse (Fig. 2). The use of a data standardization method (transforming absolute year values into a normalized scale within the [–1; 1] interval) allowed for visualizing the evolutionary vector of research through a colour gradient. In this coordinate system, the purple spectrum identifies established topics from the initial stage of the analysis (2019), whereas yellow marks contemporary research directions (2025) in the sphere of the country's economic security.

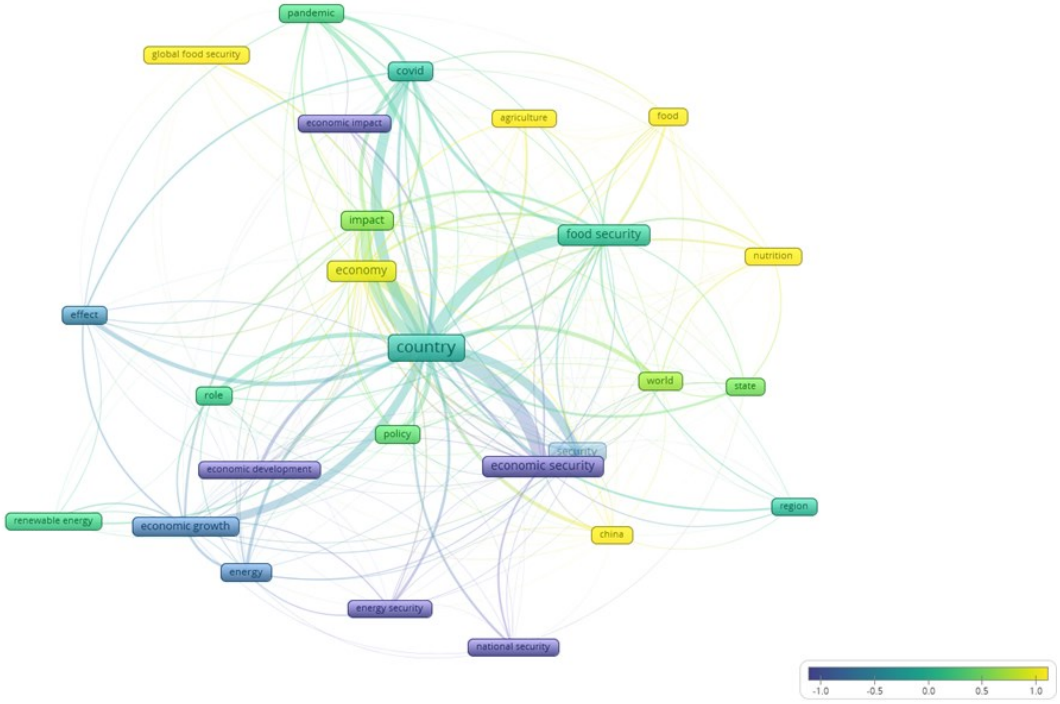

Fig. 2. Map of the evolution of key terms in research on the economic security of the country (2019–2025)
Source: constructed by the authors using VOSviewer.

The analysis of the overlay visualization demonstrates an evolution of the thematic focus of research on the country's economic security from 2019 to 2025. While initially, scientific interest focused on conceptualizing fundamental categories as a basis for economic development, afterward, abstract theoretical constructs gave way to the practical measurement of specific growth drivers, particularly the energy factor. The middle of the analysed period is marked by the adaptation of the scientific agenda to exogenous shocks caused by global upheavals (COVID-19). A logical continuation of this trend was the institutional response to the crisis, as the pandemic served as a catalyst for rethinking the role of the state, with the research priority shifting to the search for effective state policy instruments to neutralize systemic threats in the post-crisis period (Table 3).

Table 3

Evolution of key terms in research on the economic security of the country (2019–2025) by colour spectrum

Colour spectrum	Key terms	Interpretation of research thematic focus
Purple	economic security, national security, energy security, economic development, economic impact	Focus on issues of ensuring energy autonomy and interconnections between security levels and economic development rates. This corresponds to the period of pre-crisis stability, when the priority was not anti-crisis response, but building the potential of national economies
Blue – Green	energy, economic growth, effect, country, COVID, region, food security, role, renewable energy, policy, pandemic, state, impact, world	Transition from abstract categories to the study of applied aspects and crisis response. Energy (specifically renewable) is viewed as a key driver of sustainable growth and resilience. The research focus shifts to analysing the impact of exogenous shocks (the COVID-19 pandemic) on national economies, emphasizing food security vulnerability and the necessity of state adaptation policies to neutralize systemic threats
Yellow	global food security, economy, agriculture, food, nutrition, China	Integration of agricultural issues into the core of economic security, as global food security and nutrition quality become dominant themes of economic discourse under conditions of global crises. The presence of the term "China" underscores the dependence of the global economy on the strategies of key players

Source: created by the authors.

The newest research horizon, marked by the yellow colour, demonstrates a concentration of scientific interest around the agricultural sphere, global food security, nutrition issues, and the geo-economic role of China, indicating a reorientation of the discourse toward ensuring vital needs. The high frequency of terms within the food spectrum in the most recent publications (2024–2025) is evidently a mediated reaction of the scientific community to the global

consequences of the full-scale invasion of Ukraine, which transformed food security from a local sectoral task into a key pillar of international stability.

Thus, the results of the overlay visualization capture the integration of agrarian issues into the conceptual core of the country's economic security, where agriculture is defined not as a peripheral industry, but as a guarantor of the national economy's resilience.

Economic Security of the Country and Agriculture: Identification of Conceptual Interrelations and Research Trends

According to the bibliometric network map, the red cluster is a central component of the subject sample under investigation, within which "country" and "food security" hold paramount significance. The presence of terms associated with development and security underlines that the agricultural sector is regarded as a key element of the country's economic development, directly influencing its economic security. While "role" emphasizes the active functional significance of agriculture, "sustainability" expands the context by integrating the necessity of long-term development into the economic security model, considering environmental and social dimensions. It correlates with the findings of P. Pandey and M. Pandey, who argue that agriculture has a direct and indirect connection with all Sustainable Development Goals, while the technological modernization of the industry enables the achievement of synergy between productivity optimization, biodiversity conservation, and soil health improvement, which is a critical condition for ensuring food security [24].

The yellow cluster holds substantial analytical value. The scale of the "agriculture" node reflects the high frequency of its citation, which attests to the central role of this category in the scientific discourse. It encompasses not only the food function but also a complex of challenges regarding productivity, efficiency, and the rational utilization of resources (Fig. 3). In this context, K. Fuglie et al., investigating the dynamics of agricultural productivity, prove its determining significance for poverty reduction and enhancing welfare. The authors demonstrate that agricultural technologies ensure the adaptability of food systems to structural transformations, particularly changes in consumer preferences [7]. At the same time, A. González-Esteban and E. Botella-Rodríguez highlight the global problem of the inter-sectoral productivity gap between agriculture and other sectors. The scholars note the lack of positive dynamics in bridging this imbalance in both developed and developing countries, predicting the persistence of this structural asymmetry in the future [8].

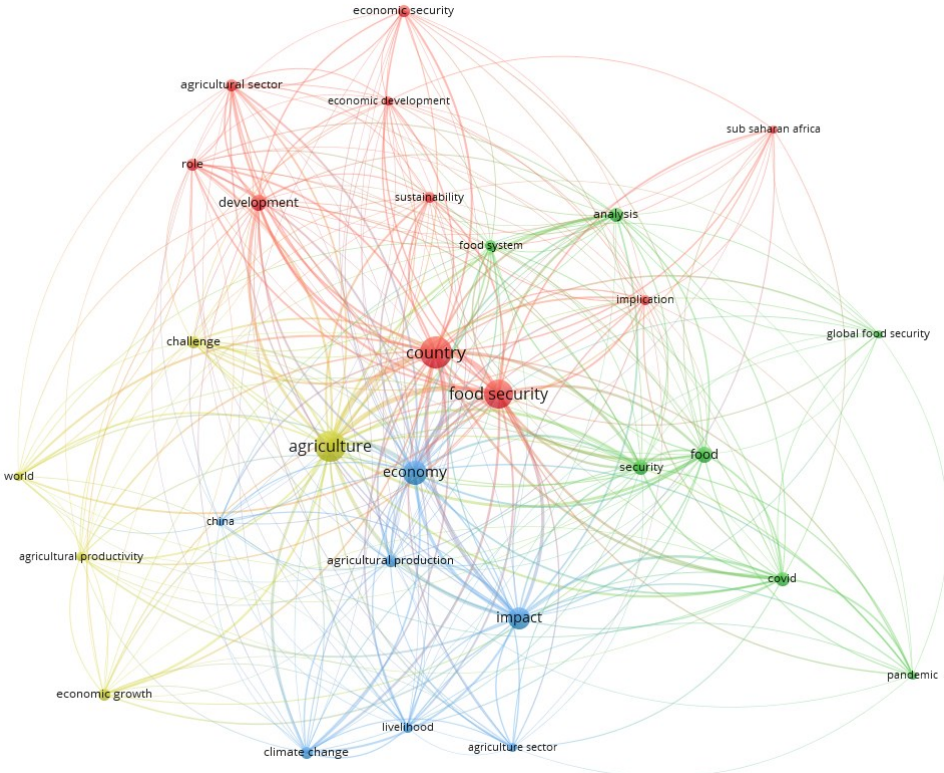

Fig. 3. Map of term co-occurrence in research on the economic security of the country and agriculture (2019–2025)
Source: constructed by the authors using VOSviewer.

The inclusion of the term "economic growth" in the cluster structure emphasizes scientific interest in the contribution of agricultural productivity to macroeconomic dynamics, which is confirmed by the study of A. Güzel and C. Akin. Based on data from 53 middle-income countries (1991–2017), they established that agricultural productivity is the key driver of economic growth in these nations [9].

The thematic focus of the blue cluster encompasses the impact of external factors on the agricultural sector. The visual dominance of the "impact" node testifies to the priority of analysing causal relationships between exogenous factors and the dynamics of the economy, agricultural production, and the population's livelihood system. In this vein, R. Ivanov et al., based on extended production function models, empirically confirmed the sensitivity of the agricultural sector to exogenous shocks, establishing that the pandemic reduced output value in the EU by 6%, while the war in Ukraine caused a catastrophic decline in production (by 24.72% with a 0.5-unit increase in destruction intensity) [11]. A. Jussibaliyeva et al., analysing the role of Kazakhstan's agriculture based on regression modelling, confirm that investments in the sector, its productivity level, and livestock development act as pivotal drivers of economic growth, expressed as GDP per capita [13]. Simultaneously, S. Muhammad Shihab and F. Rahim, investigating the determinants of agricultural output value in Iraq, identified soil degradation, investment deficit, and climate change as critical barriers to the country's food and economic security. The authors emphasize that mitigating these risks requires reorienting investment flows toward infrastructure development and technological modernization [19]. The climatic aspect mentioned by the previous authors is cross-cutting for this cluster. The integration of the term "climate change" confirms that current models of the agricultural sector's development account for not only financial-economic but also natural-climatic transformations as determining influence factors.

The green cluster represents a critically meaningful research direction, focusing on assessing the impact of the COVID-19 pandemic on global food security and the resilience of food systems. This thematic focus demonstrates the high adaptability of scientific thought to extreme international challenges. In this context, D. Thapa Magar et al., investigating the mechanisms of the post-pandemic recovery of Nepal's agricultural sector, verify the determining function of the state. Authors insist on the development of long-term strategies based on the modernization of institutional mechanisms, infrastructure development, and the implementation of innovations to guarantee the resilience of production processes, supply chains, and agribusiness [30].

A generalized characterization of the thematic content of the four clusters (formed from 29 terms), reflecting related issues, is presented in Table 4.

Table 4

Clusters of key terms in research on the economic security of the country and agriculture

Cluster	Key terms	Thematic focus / Interpretation
Cluster 1 (red)	agricultural sector, country, development, economic development, economic security, food security, implication, role, Sub-Saharan Africa, sustainability	Substantiation of agriculture's function in guaranteeing the country's economic and food security. The focus is directed at analysing the correlation between the agricultural sector's development and macroeconomic stability, as well as integrating sustainability principles into long-term planning. The term "Sub-Saharan Africa" reflects the regional orientation of research toward countries where security provision critically depends on the efficiency of agrarian systems
Cluster 2 (green)	analysis, COVID, food, food system, global food security, pandemic, security	Research on the vulnerability and resilience of food systems under conditions of extreme global upheavals. The dominance of the terms "COVID" and "pandemic" determines the priority of analysing the consequences of epidemiological crises for global food security and searching for adaptation mechanisms to them
Cluster 3 (blue)	agricultural production, agriculture sector, China, climate change, economy, impact, livelihood	Analysis of causal relationships between natural-climatic changes and the dynamics of agricultural production results. Focus on socio-economic effects: how these factors determine the state of the economy and the level of household welfare. The singling out of China testifies to the significant weight of this country in the scientific discourse, world agricultural production, and the economy
Cluster 4 (yellow)	agricultural productivity, agriculture, challenge, economic growth, world	The cluster encompasses issues related to global challenges facing the agricultural sector, focusing on such aspects as increasing agricultural productivity and its impact on economic growth on a global scale

Source: created by the authors.

To identify the transformation of research priorities regarding the interrelation of economic security and agriculture, overlay visualization in VOSviewer was applied. It enables the reconstruction of the chronology of the development of scientific thought, ensuring a clear differentiation between the established theoretical basis and contemporary research fronts (Fig. 4). The purple cluster identifies a fundamental layer of research that formed the conceptual basis of the subject matter, focusing on general aspects of agricultural production and ensuring livelihood systems.

Of particular analytical interest is the revealed chronological contrast regarding the localization of the term "China" (Table 5). While in the broad context of economic security, it was classified as an emerging trend (yellow spectrum), the integration of the "agriculture" component shifts it to the purple cluster. Such a divergence allows for a clear differentiation in the evolution of scientific interest: the priority of early research was the estimation of China's internal food autonomy, whereas the contemporary discourse interprets it as a global player projecting its influence through large-scale geo-economic expansion.

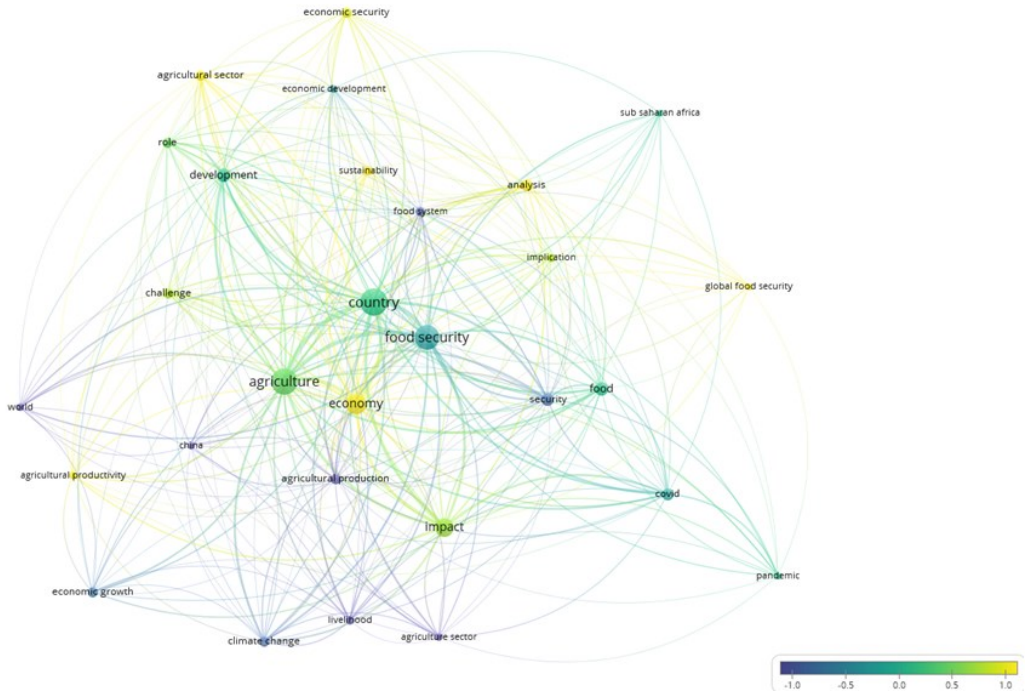

Fig. 4. Map of the evolution of key terms in research on the economic security of the country and agriculture (2019–2025)
Source: constructed by the authors using VOSviewer.

Table 5

Evolution of key terms in research on the economic security of the country and agriculture (2019–2025) by colour spectrum

Colour spectrum	Key terms	Interpretation of research thematic focus
Purple	agriculture sector, livelihood, agricultural production, China, world	Study of basic aspects of the agrarian sector's functioning in the architecture of the world economy. Focus on the production potential of the industry as a guarantor of livelihood and food self-sufficiency at the national level
Blue – Green	economic growth, climate change, agriculture, impact, food security, food, food system, security, country, COVID, pandemic, challenge, implication, role, development, economic development, Sub-Saharan Africa	Analysis of the cumulative impact of exogenous shocks on the trajectory of economic growth and food security. The singling out of Sub-Saharan Africa marks the regional projection of global vulnerability, where the combination of epidemiological and climatic threats acquires a critical scale for national development
Yellow	analysis, economy, sustainability, agricultural sector, agricultural productivity, economic security, global food security	Substantiation of agricultural productivity in synergy with sustainable development principles as the foundation of the modern architecture of global food and economic security of the country

Source: created by the authors.

The second group includes terms of the blue-green spectrum, which identify the transitional stage of research evolution: a conceptual shift occurred from basic topics to the analysis of dynamic threats. This cluster accumulates a wide range of issues related to economic growth, food security, and emergency response. The integration of the terms "COVID-19" and "pandemic" reflects the rapid reaction of the scientific community to global challenges, while the presence of the concepts "climate change" and "Sub-Saharan Africa" in this time interval highlights the synergistic effect of crises. The pandemic served as a catalyst that exposed the critical vulnerability of countries in this region to supply chain disruptions against the backdrop of exacerbating climate risks. Thus, the research focus of this period concentrated on assessing the cumulative impact of exogenous shocks (both epidemiological and climatic) on the resilience of agricultural systems.

The group of terms assigned to the yellow cluster is the most current and promising. The emphasis on productivity indicates that production efficiency is becoming crucial for ensuring food and economic security. The specification of the content of this trend acquires particular importance. While in the previous analysis (without the sectoral filter) "agriculture" figured as a generalized emerging direction, the analysis of the specified dataset allowed for decomposing this interest: the contemporary discourse focuses on the qualitative characteristics of the industry – its productivity and sustainability. N. Kumari et al. confirm that precisely due to high resource efficiency, reduced use of synthetic fertilizers and pesticides, and soil quality improvement against the backdrop of climate change, agricultural production volumes and ecosystem resilience will increase, enabling the satisfaction of the growing demand for food while preserving the environment [14].

In turn, the relevance of the concept "global food security" attests to its integration into the core of security research, and the surge of interest in this issue should be interpreted as a mediated reaction of the scientific community to the destabilization of global markets caused by the consequences of the Russian invasion of Ukraine.

CONCLUSION

Agriculture is viewed by the scientific community not as a peripheral industry, but as the foundation of food independence and an integral component of the country's economic security architecture. The results of the basic analysis showed that even without the application of a sectoral filter, the categories "agriculture" and "food security" formed a structurally separate cluster. At the same time, overlay visualization identifies the integration of agricultural issues into the conceptual core of security research as the newest research horizon. In turn, the reconstruction of the temporal dynamics of the scientific discourse attests to the evolution of priorities from abstract-theoretical concepts to applied aspects of countering threats. Exogenous shocks (primarily the COVID-19 pandemic) acted as a catalyst for the transformation, shifting the focus of scientific search toward the institutional response to the crisis and rethinking the role of the state in neutralizing systemic risks.

The integration of the term "China" into the central cluster points to the dual nature of its impact on the global security dimension: as a strategic partner and as a systemic challenge due to dependency risks. At the same time, a chronological contrast regarding the localization of this term was revealed. While in the broad context, it was classified as an emerging trend, the addition of the "agriculture" component shifts it to the cluster of early research. Such a differentiation of the evolution of interest (from assessing China's food autonomy in the early stages to its contemporary interpretation as a global player with geo-economic ambitions) actualizes the need for diversifying export-import operations to minimize threats to the country's foreign economic security from the dominance of a single partner capable of using economic dependence as an instrument of political pressure.

While agriculture appears as a generalized emerging direction in research on the country's economic security, the specified analysis reveals that issues of productivity and sustainability lie behind this priority. It empirically substantiates the necessity of implementing sustainable development principles (harmonizing economic, environmental, and social goals) into the system of ensuring Ukraine's economic and food security, which outlines a promising vector for further scientific research.

References

1. Allee, A., Lynd, L. R., & Vaze, V. (2021). Cross-national analysis of food security drivers: Comparing results based on the Food Insecurity Experience Scale and Global Food Security Index. *Food Security*, *13*(5), 1245–1261. https://doi.org/10.1007/s12571-021-01156-w
2. Audi, M., & Ali, A. (2023). Public policy and economic misery nexus: A comparative analysis of developed and developing world. *International Journal of Economics and Financial Issues*, *13*(3), 56–73. https://doi.org/10.32479/ijefi.13720
3. Bobrovska, O., Lysachok, A., Kravchenko, T., Akimova, L., & Akimov, O. (2021). The current state of investment security in Ukraine in the context of COVID-19 and its impact on the financial and economic situation of the state. *Financial and Credit Activity Problems of Theory and Practice*, *1*(36), 233–242. https://doi.org/10.18371/fcaptp.v1i36.227770
4. Chertow, M. R., Kanaoka, K. S., & Park, J. (2021). Tracking the diffusion of industrial symbiosis scholarship using bibliometrics: Comparing across Web of Science, Scopus, and Google Scholar. *Journal of Industrial Ecology*, *25*(4), 913–931. https://doi.org/10.1111/jiec.13099
5. Chorna, S. (2023). Analysis of financial security research vectors: Bibliometric analysis and visualization. *World of Finance*, *2*(75), 125–139. https://doi.org/10.35774/sf2023.02.125
6. Didenko, I., & Volik, K. (2021). Bibliometric analysis of publications on migration, economy and security of the country. *Visnyk of Sumy State University*, *2021*(3), 80–86. https://doi.org/10.21272/1817-9215.2021.3-9
7. Fuglie, K., Gautam, M., Goyal, A., & Maloney, W. F. (2019). *Harvesting prosperity: Technology and productivity growth in agriculture*. The World Bank. https://doi.org/10.1596/978-1-4648-1393-1
8. González-Esteban, Á. L., & Botella-Rodríguez, E. (2022). The agricultural productivity gap: A global vision. *Economic History of Developing Regions*, *37*(3), 257–287. https://doi.org/10.1080/20780389.2022.2067747
9. Güzel, A. E., & Akin, C. S. (2021). The role of agricultural productivity in economic growth in middle-income countries: An empirical investigation. *Economic Journal of Emerging Markets*, *13*(1), 13–26. https://doi.org/10.20885/ejem.vol13.iss1.art2
10. Harzing, A. W. (n.d.). *Citation metrics*. Harzing.com. https://harzing.com/resources/publish-or-perish/manual/using/query-results/metrics
11. Ivanov, R., Hurtovyi, Y., Maksyshko, N., Katan, V., & Osypchuk, M. (2025). Modelling the impact of state support types on agricultural production, considering exogenous shock and cyclical factors. *Agricultural and Resource Economics: International Scientific E-Journal*, *11*(3), 5–45. https://doi.org/10.51599/are.2025.11.03.01
12. Jiang, Y., & Liu, X. (2023). A bibliometric analysis and disruptive innovation evaluation for the field of energy security. *Sustainability*, *15*(2), 969. https://doi.org/10.3390/su15020969
13. Jussibaliyeva, A. K., Soltanbayeva, A. B., & Tleuberdiyeva, S. S. (2022). The agricultural factors influencing the economic development of Kazakhstan. *Economics: The Strategy and Practice*, *17*(4), 145–157. https://doi.org/10.51176/1997-9967-2022-4-145-157
14. Kumari, N., Pandey, A. K., Singh, A. K., & Singh, A. (2024). Sustainable agriculture: Balancing productivity and environmental stewardship for future generations. *Journal of Scientific Research and Reports*, *30*(8), 629–639. https://doi.org/10.9734/jsrr/2024/v30i82284
15. Mara, D., Nate, S., Stavytskyy, A., & Kharlamova, G. (2022). The place of energy security in the national security framework: An assessment approach. *Energies*, *15*(2), 658. https://doi.org/10.3390/en15020658
16. Michalski, B. (2024). The long shadow of the Great Wall. Trade dependencies of V4's countries on China. *Rocznik Instytutu Europy Środkowo-Wschodniej*, *22*(1), 67–85. https://doi.org/10.36874/riesw.2024.1.4
17. Mikhnevych, L., Marchenko, V., Hristov, P., & Kuzior, A. (2020). Conceptual relationships between country image and economic security. *Marketing and Management of Innovations*, *1*, 285–293. https://doi.org/10.21272/mmi.2020.1-24
18. Morris, D. (2024). Risks on the Belt and Road in Eurasia: Local perspectives and options. *Global Society*, *38*(4), 421–443. https://doi.org/10.1080/13600826.2024.2344501

19. Muhammad Shihab, S. A.-D., & Rahim, F. I. (2024). An econometric study of the factors affecting the value of agricultural output in Iraq for the period 2000-2022. *IOP Conference Series: Earth and Environmental Science*, *1371*(10), 102014. https://doi.org/10.1088/1755-1315/1371/10/102014
20. Nasser Salifu, G. A. (2025). Synergies and trade-offs of sustainable agricultural practices for improved food security in a developing country: a systematic review. *Cogent Food & Agriculture*, *11*(1). https://doi.org/10.1080/23311932.2025.2518218
21. Nehrey, M., & Finger, R. (2024). Assessing the initial impact of the Russian invasion on Ukrainian agriculture: Challenges, policy responses, and future prospects. *Heliyon*, *10*(21), e39208. https://doi.org/10.1016/j.heliyon.2024.e39208
22. Nepal, R., Musibau, H., & Taghizadeh-Hesary, F. (2020). Does renewable energy promote energy security and economic growth in the Association of Southeast Asian Nations? In H. Phoumin, F. Taghizadeh-Hesary, & F. Kimura (Eds.), *Energy sustainability and development in ASEAN and East Asia* (pp. 81–105). Routledge. https://doi.org/10.4324/9781003026075-6
23. Novikov, V. (2021). Bibliometric analysis of economic, social and information security research. *SocioEconomic Challenges*, *5*(2), 120–128. https://doi.org/10.21272/sec.5(2).120-128.2021
24. Pandey, P. C., & Pandey, M. (2023). Highlighting the role of agriculture and geospatial technology in food security and sustainable development goals. *Sustainable Development*, *31*(5), 3175–3195. https://doi.org/10.1002/sd.2600
25. Pawlak, K., & Kołodziejczak, M. (2020). The role of agriculture in ensuring food security in developing countries: Considerations in the context of the problem of sustainable food production. *Sustainability*, *12*(13), 5488. https://doi.org/10.3390/su12135488
26. Pereira, F. A., & Mugnaini, R. (2023). Mapping the use of Google Scholar in evaluative bibliometric or scientometric studies: A bibliometric review. *Quantitative Science Studies*, *4*(1), 233–245. https://doi.org/10.1162/qss_a_00231
27. Pitigala, N. (2020). COVID-19 crisis: The impact of trade and economic contagion on developing countries. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3709524
28. Poruchnyk, A., Kolot, A., Mielcarek, P., Stoliarchuk, Y., & Ilnytskyy, D. (2021). Global economic crisis of 2020 and a new paradigm of countercyclical management. *Problems and Perspectives in Management*, *19*(1), 397–415. https://doi.org/10.21511/ppm.19(1).2021.34
29. Skaf, L., Buonocore, E., Dumontet, S., Capone, R., & Franzese, P. P. (2020). Applying network analysis to explore the global scientific literature on food security. *Ecological Informatics*, *56*, 101062. https://doi.org/10.1016/j.ecoinf.2020.101062
30. Thapa Magar, D. B., Pun, S., Pandit, R., & Rola-Rubzen, M. F. (2021). Pathways for building resilience to COVID-19 pandemic and revitalizing the Nepalese agriculture sector. *Agricultural Systems*, *187*, 103022. https://doi.org/10.1016/j.agsy.2020.103022
31. Tsenkov, Y. (2020). Model for economic security assessment. *European Journal of Marketing and Economics*, *3*(1), 6–11. https://doi.org/10.26417/ejme.v3i1.p6-11
32. Van Eck, N. J., & Waltman, L. (2019). *VOSviewer manual*. Universiteit Leiden. https://www.vosviewer.com/documentation/Manual_VOSviewer_1.6.11.pdf
33. Veshapidze, S., Chiabrishvili, K., Zubiashvili, T., & Zoidze, G. (2021). On the relationship between education and economic security. *Ecoforum*, *10*(3). https://doi.org/10.5281/zenodo.5806515