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RESEARCH ARTICLE

STRATEGIES TO INCREASE FOOD SECURITY IN THE EUROPEAN UNION

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Abstract

Against the backdrop of increasing food insecurity, the development and adaptation of food-supply strategies aimed at ensuring sustainable societal development within the European Union are becoming increasingly important. In this context, the optimization of regional food-supply and logistics systems operating under relatively stable conditions, together with their coordination and adaptation in response to global crises, represents an effective, efficient, and scientifically grounded approach. A systematic analysis of the structure of imports of critical food products and agricultural raw materials can support the coordination of individual subsystems and facilitate timely responses to emerging risks and disruptions. The optimization of regional food-supply and logistics systems is closely linked to their functionality and resilience, which vary across European regions. Identifying vulnerabilities within EU food-supply chains is therefore a key direction for the timely detection of threats and risks and for the development of targeted strategies and action plans capable of addressing geopolitical and economic instability.

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Introduction:-

One of the key approaches to reducing the vulnerability of food systems is the development of domestic sources of food, particularly through support for small-scale farms and the strengthening of interregional cooperation. This approach facilitates the development of so-called short food-supply chains, characterized by a limited number of intermediaries between producers and consumers and shorter distances between production and consumption. As noted in the literature, the principal advantage of short supply chains is the reduction in the number of intermediaries connecting local food producers with consumers and the shortening of physical distribution distances. This configuration promotes greater transparency and traceability within the supply chain, thereby contributing to food safety and creating additional opportunities for local economic development by strengthening the position of small producers (Clapp, 2023).

The development of local production, including support for household agricultural production, can have a positive effect on food security. According to available statistics, the development of local production contributes to increasing the volume of food available on domestic markets, expanding food consumption, making more effective use of underutilized agricultural land, reducing unemployment, and improving living standards in EU Member

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States. Interregional cooperation, in turn, can mitigate regional disparities in food supply by establishing stable logistical links between regions of production and consumption. Consequently, stimulating local production and strengthening producer–consumer linkages can provide a foundation for diversifying sources of supply and reducing dependence on external and geographically distant suppliers (Koteva et al., 2023).

Alongside the development of local sources, an important strategy is the expansion of international partnerships and the reduction of dependence on imports from individual countries. The primary objective of food import substitution is to develop and scientifically substantiate a strategy for the dynamic development of agricultural production that increases the availability of food on domestic and international markets, reduces dependence on imported supplies and disruptions in external commodity markets, increases employment, and contributes to improved living standards (Strategic, 2024).

Achieving this objective requires not only an increase in domestic production but also the diversification of foreign-trade relations through the establishment of new trade agreements with a broader range of supplier countries. Such an approach can distribute the risks associated with geopolitical instability and economic shocks affecting particular regions of the world. New trade agreements should, in particular, seek to secure access to food categories that remain highly dependent on imports, including fruit, vegetables, and dairy products. At the same time, available data indicate that dependence on imports of meat and meat products, particularly poultry and pork, has already declined because of the expansion of domestic production (Popov, 2011).

This demonstrates that combining import-substitution policies with active diversification of external sources of supply can contribute to strengthening food security. The resulting model is a balanced system in which domestic production is complemented by reliable and diversified external supply channels, thereby reducing vulnerabilities within food-supply chains.

Methods:-

The study applies a dialectical approach to examine general and particular phenomena, their interrelationships, and the causes and consequences underlying contemporary food-system processes. A systemic approach is applied to the scope and depth of the research as one of the universal methodological approaches to scientific inquiry. Its application involves a dialectical analysis of food-system dynamics within society, treating the food system as an interconnected subsystem whose effective functioning contributes to sustainable societal development. The systemic approach examines the relationships among interconnected elements and considers their functional unity within the broader system.

An integrated approach is employed to examine the interrelationships among systems in the context of food-related problems. Complexity and systemicity are methodologically grounded in the principle of interconnectedness rather than identity. The systemic approach remains neutral with respect to ideological interpretations of food-related issues and can therefore be applied to food-system research without requiring substantive methodological modification. The integrated approach, reflecting the socially significant nature of the subject under investigation, considers food-related issues within their broader social reality rather than exclusively from a formal or technical perspective. The analytical approach focuses on the interrelationships between food-supply diversification and logistics optimization.

Results:-

Import substitution and critical segments of the agro-industrial complex:-

A primary objective of import substitution is to reduce dependence on external supplies in the most vulnerable segments of the agro-industrial complex. As noted in the scientific literature, accelerated import substitution is particularly necessary in those segments where external dependence presents the greatest risks. These critical areas include seed production, livestock breeding, and the manufacture of agricultural machinery and equipment, where the share of imported inputs remains high. Reducing dependence in these areas should therefore be regarded as an important priority for strengthening the sustainability of the food system (Todorov, 2025).

State policies aimed at import substitution are implemented through a combination of measures, including food embargoes, subsidies, preferential lending, and the development of scientific and technological capacity. According to existing research, improving import substitution and increasing the competitiveness of domestic products in foreign markets requires an appropriate food policy, effective customs and tariff regulation, and structural

restructuring of commodity-producing sectors. Such restructuring should include the development of breeding and selection programmes adapted to regional conditions and technological modernization based on resource-efficient and innovative technologies (MFA, 2024).

These instruments are intended to create favourable conditions for expanding domestic production and replacing imported products and inputs with domestic alternatives. Import substitution can contribute to strengthening food self-sufficiency and reducing vulnerability to external shocks. The principal objective of food import substitution is to develop and scientifically substantiate a strategy for the dynamic development of agricultural production that increases the volume of food available on domestic and foreign markets, reduces dependence on imported supplies and disruptions in international commodity markets, increases employment, and contributes to improving living standards (Dimitrov, 2025).

Thus, import substitution can contribute not only to food security but also to the sustainable development of the agro-industrial complex. Its implementation may reduce risks associated with geopolitical instability and economic shocks capable of disrupting global supply chains. The development of domestic production of critical inputs, such as seeds and breeding material, can reduce dependence on external suppliers and increase the resilience of national food systems. Over the longer term, this may contribute to strengthening food sovereignty, whereby a country is better positioned to provide its population with essential food products despite external disruptions (National, 2024).

Regional food supply, infrastructure, and logistics:-

A major challenge facing regional food-supply systems is the persistent imbalance between the development of trade infrastructure and logistics capacity. According to existing studies, the high resource intensity of food-distribution systems is attributable to several factors, particularly substantial logistics and transportation costs resulting from inadequate infrastructure, inefficient management, and the increasing globalization of food-supply chains. These costs place additional pressure on final food prices and consequently reduce the economic accessibility of food for consumers.

Addressing these imbalances requires targeted investment in the modernization of transportation hubs, storage facilities, and information systems for supply-chain management. The development of short supply chains represents a promising avenue for optimization because it reduces the number of intermediaries and the transportation distance between producers and consumers. Fewer links within the supply chain can increase flexibility and resilience while simultaneously supporting the development of local logistics infrastructure (Odegard et al., 2024).

However, fully realizing the potential of short supply chains requires overcoming information asymmetries, regulatory barriers, and infrastructure deficiencies at the local level. Comprehensive infrastructure development, together with the introduction of modern logistics models, is therefore essential for reducing the resource intensity of food distribution and improving the balance and resilience of regional food markets.

Food clusters and interregional cooperation:-

The formation of food clusters and the development of interregional cooperation represent effective mechanisms for strengthening the resilience of food-supply chains. Consortia and clusters can facilitate the implementation of programmes aimed at developing food-production capacity and promoting the dissemination of innovative technologies within the food sector (FAO, 2018).

Bringing together producers, processors, and logistics operators within clusters can reduce transaction costs and accelerate the adoption of effective practices. The cluster approach may also contribute to a more balanced distribution of added value among supply-chain participants, which is particularly important for rural areas.

Interregional cooperation and supply-chain diversification have a direct impact on the resilience of food systems. Scientific evidence indicates that diverse, sustainable, and well-connected food-supply chains increase resilience by providing multiple pathways for the production, supply, and distribution of quality food. Such network structures can mitigate regional disparities in food availability, which remain a systemic challenge for food security (Marsden et al., 2024). Consequently, targeted support for cluster initiatives and the development of interregional connections should constitute an important component of regional food policy.

Import dependence and technological vulnerability:-

An analysis of the structure of food and agricultural-raw-material imports reveals persistent dependence on external supplies for several strategically important categories. In particular, significant import dependence remains in seed

material, breeding animals, and high-technology agricultural machinery and equipment. Such dependence creates a strategic vulnerability because disruptions in international supplies may directly affect reproductive and productive processes within domestic agro-industrial systems. The significant share of technologically advanced imported goods also indicates technological dependence in several areas of agricultural production. The current structure of imports creates a situation in which, even when official self-sufficiency thresholds are achieved for particular food products, substantial dependence on foreign components and technologies may remain (Dimitrov, 2025).

For example, the expansion of greenhouse production of fruit and berries, which represents an important means of increasing domestic output, remains significantly dependent on equipment and technologies manufactured abroad. Consequently, import dependence is not exclusively quantitative but is also qualitative and technological in nature. This dimension requires particular attention when assessing the resilience and security of food systems. The implementation of import-substitution policies may contribute to achieving the threshold values established by the Food Security Strategy for a number of basic products, including grain, sugar, and vegetable oil. However, existing research emphasizes that import substitution does not necessarily result in complete self-sufficiency in basic food products produced from domestically sourced raw materials (Slavova, 2026).

This demonstrates that an increase in gross domestic production does not necessarily correspond to the complete elimination of dependence on imported raw materials, components, and technologies. Continued dependence is further compounded by technological gaps, particularly in sectors requiring sophisticated equipment and advanced agricultural technologies. These factors create long-term risks for the sustainability of food supplies and highlight the need for targeted policy support.

Transport and logistics costs and regional accessibility:-

One of the major factors contributing to the vulnerability of European food systems is the high proportion of transportation and logistics costs within the final price of food products. Studies indicate that approximately half of food costs may be associated with the circulation and distribution of products, including trade margins and logistics expenses. The high resource intensity of food distribution is attributable to a combination of factors, including inadequate infrastructure, inefficient management, and the extensive globalization of food-supply chains, which increases transportation volumes and, consequently, delivery costs (JRC, 2023).

Regional disparities in the availability of retail outlets and storage facilities create significant barriers to the physical accessibility of food, particularly in rural areas. Spatial analysis indicates substantially lower provision of stationary and non-stationary retail outlets in rural areas than in major cities. These areas also face infrastructure constraints, including insufficient logistics capacity, inadequate storage facilities, and limited transport accessibility (Biswas et al., 2024).

Such imbalances exacerbate food-security challenges by creating situations in which adequate national food production does not necessarily guarantee physical access to food for all population groups. The combination of low retail-network density and weak logistics infrastructure in rural areas means that residents may have to spend more time and financial resources obtaining food, while the range of available products may also be limited.

Overcoming these infrastructure gaps is therefore essential for ensuring equitable access to food irrespective of geographical location.

Short supply chains and external shocks:-

The development of short supply chains (SSCs) represents a promising instrument for reducing the vulnerabilities identified above and strengthening the resilience of food supplies. Short supply chains are networks of interconnected actors that cooperate in managing the flow of products and information while seeking to reduce the number of intermediaries and the physical distance between producers and consumers (Koteva, 2023).

The development of digital distribution centres can reduce final product prices by lowering transportation and intermediary costs while also increasing supply-chain flexibility and reducing exposure to disruptions. At the same time, such centres can contribute to the development of local logistics infrastructure and local food markets.

The conflict in Ukraine and the Middle East crisis of 2026 represented significant turning points in the structure of food imports. Measures designed to stimulate domestic production have simultaneously increased the need to identify new trading partners and alternative logistics routes, with implications for final product prices. Although many of the restrictions introduced have been indirect, they have required European countries to seek alternative sources of food supplies. This has contributed to increased procurement and transportation costs.

The disruption of established trade routes and infrastructure has generated cascading effects, including higher food prices and increased transportation costs (European Committee of the Regions, 2025). Thus, external pressures that stimulate import substitution may simultaneously create new price-related challenges for domestic markets.

Technological dependence and food-system resilience:-

External restrictions have accelerated processes of import substitution and adaptation within the food and agricultural sectors but have not eliminated their underlying systemic vulnerabilities. One of the principal challenges remains technological dependence. Import substitution is particularly difficult in relation to advanced agricultural machinery, expensive equipment, and specialized components that are difficult to manufacture domestically. This creates long-term dependence on external sources of production inputs.

In addition to technological dependence, limited economic accessibility of food remains a significant constraint on food-security sustainability. This challenge is further exacerbated by inflationary pressures, inadequate logistics infrastructure, and inefficiencies in production. The gap between the technological capabilities of domestic production and global standards reduces production efficiency, while underdeveloped domestic-market infrastructure limits the effective distribution and storage of food. Together, these factors constrain the resilience of food systems to external shocks.

Conclusion:-

The study demonstrates that global food-supply chains are exposed to a range of interconnected vulnerabilities, with geopolitical instability, climate change, and economic shocks representing major sources of risk. These factors can reinforce one another, resulting in disruptions to logistics flows, increased price volatility, and reduced availability of critical goods. Within the European context, these risks have become particularly pronounced, revealing structural dependence on imports for a number of strategically important food products and production inputs.

The analysis indicates that dependence on external supplies of seeds, feed additives, and agricultural machinery, combined with bottlenecks in logistics infrastructure, creates significant vulnerabilities within food systems. Sanctions and natural disasters can further intensify these vulnerabilities, transforming supply-chain dependence from an abstract structural concern into a tangible food-security risk. The findings therefore suggest that contemporary challenges require a reassessment of existing import structures and food-supply strategies.

A reasonable response to these risks is a gradual transition towards more resilient and autonomous regional food-supply systems. The principal instruments for such a transition include diversification of supply sources, which can reduce dependence on individual supplier countries, and targeted import substitution in critical segments of the agro-industrial complex.

The development of domestic agricultural production, including the production of feed additives and agricultural machinery, should constitute an important component of agricultural policy and should be supported by appropriate policy instruments. At the same time, strengthening food-system resilience requires more than simply increasing domestic production. Particular attention should be given to the digitalization of agriculture, which can contribute to the optimization of production processes, improvement of quality control, and more efficient logistics management. Combined with the adaptation of regional food systems to local conditions and the development of storage and processing infrastructure, digital technologies can contribute to reducing exposure to external disruptions. The implementation of these measures can provide a foundation for strengthening food-system resilience and food sovereignty while reducing the risks associated with global economic, geopolitical, and logistical shocks.

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