

## THE ESSENCE AND IMPORTANCE OF LOGISTICS FOR AGRO-INDUSTRIAL PRODUCTION

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**Abstract.** In contemporary agro-industrial production, logistics plays a central role in ensuring the efficiency and stability of agricultural enterprises, particularly those operating in the grain sector. The current global environment, characterized by climate change, market volatility, geopolitical tensions, and the ongoing war in Ukraine, has intensified the need for effective coordination of resource flows within the agro-industrial value chain. Logistics is no longer limited to transportation or storage processes. It functions as an integrated management mechanism that synchronizes the movement of material, informational, financial, and human resources from the stage of agricultural input supply to the final delivery of products to domestic or international markets. The strategic significance of logistics is especially evident when enterprises must adapt to disrupted infrastructure, fluctuating export routes, and increased transportation costs. Therefore, understanding the essence and importance of logistics is essential for optimizing operational processes, maintaining product quality, and enhancing the competitiveness and resilience of agricultural producers.

The aim of this study is to examine the conceptual foundations, strategic relevance, and practical functions of logistics in agro-industrial production, as well as to identify the features that distinguish logistics in the agricultural sector from other branches of the economy.

The research methodology relies on systematic, functional, and comparative analysis. The study synthesizes approaches presented in classical and contemporary logistics scholarship. Works by Ballou, Christopher, Mentzer, Bowersox and Closs,

Ghiani, and Ukrainian researchers such as Anishchenko, Kvasha, Moroz, Pavlenko, and Zolotarenko provide the theoretical basis. Institutional materials from FAO, OECD, and the European Commission supplement the empirical understanding of logistics challenges and development trends. The study also incorporates international cases related to seasonal logistics loads, spatial fragmentation of cultivation areas, climatic risks, infrastructural constraints, and geopolitical disruptions to agricultural supply chains.

The research identifies four dominant interpretations of logistics within agro-industrial production: logistics as a system of flow management, as an integrated managerial function, as a tool for enhancing efficiency, and as a factor influencing food security. Grain-oriented enterprises benefit from logistics that coordinates procurement of inputs, field operations, storage and processing, distribution, and export delivery. Modern logistics types relevant to the grain sector include production logistics, transportation logistics, warehouse logistics, distribution logistics, and information logistics. Their effective integration minimizes post-harvest losses, reduces transportation and storage costs, ensures compliance with delivery timelines, and preserves product quality. Key sector-specific features include seasonality, geographic dispersion of agricultural fields, sensitivity to climatic conditions, infrastructural limitations, and exposure to external market and geopolitical risks. These features require flexible, adaptive, and risk-oriented logistics strategies.

Logistics in agro-industrial production is a strategic function that defines the stability, efficiency, and competitive strength of agricultural

enterprises. Its importance grows under conditions of infrastructural disruption and global uncertainty. A comprehensive logistics system supports not only economic sustainability but also contributes to national food security.

Further research should focus on developing digital logistics platforms for grain traceability, evaluating energy-efficient logistics solutions, and designing adaptive routing models for unstable geopolitical environments.

**Keywords:** agro-industrial production; logistics; grain sector; supply chain management; production logistics; transportation logistics; warehouse logistics; distribution; information logistics; food security; operational efficiency; resource flow management.

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