

# HOW TO DEFINE LOGISTICS IN AGRICULTURE?

*Uroš Kramar, Darja Topolšek, Martin Lipičnik*  
*University of Maribor, Faculty of Logistics Celje, Slovenia*

*Logistics in agriculture is gaining more importance as it deals mainly with the smooth supply of food and other agricultural products from the producer to the final consumer. It is important to take account of the principles that apply in other subsystems of logistics, the right merchandise in the right place, intact, in the agreed amount on the agreed place at the lowest possible cost. Scope of agricultural supply chains and logistics are unlike the supply chain and logistics in the production currently under-researched. The aim of this research is to review the definitions in an agriculture logistics and to provide a comprehensive definition.*

**Key words: agriculture, logistics, definition**

## **Introduction**

In *The Art of War*, published in France in 1836, Baron Antoine Henri de Jomini (de Jomini, 2007) created the word “logistics” and defined it as “Logistics comprises the means and arrangements which work out the plans of strategy and tactics. Strategy decides where to act; logistics brings the troops to this point.” At the time, “strategy” was military strategy and “flows” concerned all goods, from food to weaponry that needed to be transported to, or close to, the battlefield. Today, logistics not only remains a major concern in any military operation, but has also emerged as a major tool in company management. Based on the development, in October 1998 the Council of Supply Chain Management (CSCMP) proclaimed the following definition, which asserts that logistics management was solely a part of SCM: Logistics is a part of the supply chain process which plans, implements and controls an efficient flow of goods and warehousing, services and relevant information from the point of origin to the point of consumption with the objective to meet consumer needs (CSCMP, 2013).

Zhang and Li (2012) defined agri-food supply chain as a network of business enterprises that are related to food, through which the food is “moving” from production to consumption, including the activities of pre-production and consumption. But where in this definition lies the logistics?

There are a number of changes in agri-food industry that initiate a re-orientation of food companies regarding their roles, activities and strategies. For example, demand and supply are no longer restricted to nations or regions but have become international processes. Furthermore, product assortments have expanded significantly and market requirements on product quality, traceability, delivery services and sustainability are still increasing.

The EU's common agricultural policy focuses on quality not quantity. It helps farmers not just to produce food, but also to protect the environment, improve animal

welfare and sustain viable rural communities. The main highlights of EU farm policy from 2013 are (European Union, 2013):

- Enabling farmers to: produce enough safe, high-quality food, contribute to a diversified rural economy and care for the environment and their animals to the highest standards.
- Supporting consumers to make informed choices about their food, through voluntary EU quality-labelling schemes. These labels – indicating geographic origin, use of traditional ingredients or methods (including organic) – also help make EU farm products competitive on world markets.
- Promoting innovation in farming and food processing to increase productivity and reduce environmental impacts,
- Encouraging fair trade relations with developing countries – by reducing EU farm export subsidies, which makes it easier for developing countries to sell what they produce.

To react to these changes and challenges, agricultural and food companies are continuously working on innovations by developing and implementing enhanced quality, logistics and information systems (IS). Most literatures on logistics outsourcing discuss the use of traditional logistics services such as transportation and warehousing. However, very little research is done and known about logistics implications for food supply chain networks. So in spite that the great importance of logistics in industry, business and other branches is generally acknowledged, this problem is not systematically investigated in agriculture (Vanecek and Kalab, 2003).

### **Definition of agricultural logistics**

The developed logistics industry and market system are the important guarantee of modern agriculture. The research on agricultural logistics is of great significance to speeding up the process of agriculture modernization and improving the competition ability of agriculture (Qi, Yang, Tang, 2008).

The main aim of this article is to find the most appropriate definition of agricultural logistics or to, based on deferent definition in scientific literature, define agricultural logistics based on the existing ones. Searching the existing definition of logistics in agriculture sector as made through browsers EMERALD Management Xtra (EMX); ScienceDirekt; Elsevier; SpringerLink and JSTOR (Journal Storage). We also searched with browsers IEEE Xplore, JSTOR (Journal Storage), and ProQuest Dissertations & Theses.

In the next section we prepared a table with different definitions from different authors.

*Table 1: Existing definitions of Agricultural Logistics*

<b>Authors</b>	<b>Definition</b>
<i>Li, Li, Chen, Li, Li, Qin, Zheng (2012)</i>	<i>Agricultural products logistics refers to moving material objects and related information from producer to consumer physically for meeting customer's needs and achieve the value of agricultural products.</i>
<i>Daoping, Feng, Lei (2012)</i>	<i>The logistics of food crops is a special type of logistics of agricultural products. The production, circulation and sales of food crops matters to state strategic reserve.</i>
<i>Liping (2009)</i>	<i>Agricultural products logistics is a branch of the logistics industry, refers to physical flows of physical entities and related information from producer to</i>

	<i>consumer that satisfy consumer demand, including agricultural production, acquisition, transportation, storage, loading and unloading, handling, packaging, distribution processing, distribution, and information activities.</i>
<i>Yao, Cui, Ying, Wei (2009)</i>	<i>Agriculture products logistics dynamic alliance provided a suitable mode for agriculture products logistics.</i>
<i>Zhang, Wang (2011)</i>	<i>Agricultural Products Logistics is one important part of economic behaviour, which is to create value and surplus value with the purpose of the act. Modern agricultural products logistics is to use modern science and technology to service in modern society.</i>
<i>Xu (2011)</i>	<i>Based on the understanding of modern logistics, modern agricultural logistics can be defined as: an integrated industrial activities of integrated operation and management relying on advanced computer networks and information technology, integrating the use of modern transport and storage facilities, through a large number of business information instructions, engaged in agricultural transportation, storage, processing, handling, packaging and distribution processing, distribution and information processing. The aim is to optimize the distribution channels of agricultural products, reduce operating costs of agriculture-related enterprises in full range, and provide faster and better service to consumers of agricultural products.</i>
<i>Li, Zhou, Wang (2012)</i>	<i>Taking agricultural products as the core, the agricultural products logistics refers to the organic combination of the entity flowing from producer to receiver and the involving technology, organization, management and other basic functions. It consists of a series of links, such as agricultural production, purchase, transport, storage, loading and unloading, handling, packaging, distribution, circulation processing, information activities, and etc. and realizing agricultural product appreciation and organization objectives in the process.</i>
<i>Wang (2012)</i>	<i>Agricultural products logistics is a branch of the logistics industry, refers to physical flows of physical entities and related information from producer to consumer that satisfy consumer demand, including agricultural production, acquisition, transportation, storage, loading and unloading, handling, packaging, distribution processing, distribution, and information activities. Development objectives of agricultural products logistics is to increase value-added of agricultural products, save distribution costs, improve circulation efficiency and reduce unnecessary losses, to some extent avoid market risks</i>
<i>Gan, Zhu, Zhang (2011)</i>	<i>It is defined agricultural product logistics is the economic activity from agricultural product producer to the consumers in order to satisfy customers' demands, including the links such as agricultural product production, purchasing, transportation, storage, loading and unloading, handling, package, processing, distribution and information processing.</i>
<i>Tan, (2012)</i>	<i>Logistics in agriculture are activities associated within the process itself, to improve the quality of agricultural products. The logistical process is improving and ensuring the quality of agricultural products, reducing logistics costs, an optimal allocation of resources, promote the welfare and protection of the environment, strives for the development of agricultural product logistics in the direction of green logistics.</i>
<i>Federico (2011)</i>	<i>Logistics plays a central role in modern agricultural production. The predominance of the logic of commodity trading, expressed by the standardization and international regulation of production, has been</i>

---

*promoting the deepening of the territorial division of labor, leading to regional agricultural specialization. The enlargement of the agricultural productive spatial circuits has integrated the flows on a global scale, calling for ever further--reaching logistics in the linking up of the stages spatially separate from production.*

---

Shufeng,  
Liya,  
(2010)

Wei

*Modern agriculture logistics should have 12 functional elements of procurement, supply, storage, transportation, loading and unloading, sorting, packaging, distribution, distribution processing, marketing, recycling, and information control; the task of modern agriculture logistics management should not only put foot on solving to lower the logistics cost, and lessen and avoid the logistics operating risks, but also research how to promote all of function elements to comprehensively play the integrated effects to create plentiful "3rd party profit" of logistics enterprises, and become the source of power of the village lowering agricultural production cost raising agricultural economic benefit promoting the peasants to raise the income and push forward modern agricultural economic development.*

---

The authors of the definitions that we have given in the table indicate that logistics in agriculture is an economic activity that caters to the optimal, continuous flow in the process, from the producer of an agricultural product to the final consumer. Logistics in agriculture is an effective and efficient system that ensures a smooth and successful process of production of agricultural products. The aim of logistics in agriculture is in increasing production of agricultural products to care for its continuous operation, optimize the cost of production, storage, transport and distribution, increase value-added agricultural products and satisfy consumer.

### **Conclusion**

Our search strategy started with reviewing theoretical bases of logistics. With extensive search on internet databases we found more scientific journals that were based on the topic of logistics in agriculture. Next step was exploring the concept of logistics in agriculture. From each journal we signed out different definitions of logistics in agriculture writing them down in orderly fashion. The result was a broad range of definitions and keywords which appeared in each definition.

After exploring the concept of logistics in agriculture we can assume, that the understanding and the meaning of logistics in agriculture is not so different than basic meaning of logistics. Like there is no unified definition of logistics we cannot speak of unified definition of logistics in agriculture.

Like Delfmann and others (2010) which have defined logistics as a scientific discipline we came out with this definition of the term:

Logistics in agriculture is a discipline which analyses and models division-of-labour economic systems as time-based and location-based flows of agricultural objects (above all goods and people) in agricultural networks, supplying recommendations for action on the design and implementation of these agricultural networks. Logistics in agriculture tries to configure, organize, control or regulate different agricultural networks and flows with the aim of paving the way for progress in the balanced achievement of economic, ecological and social objectives. The particular approach of logistics is that it interprets economic processes as flows of goods, information, people, assets and other objects in agricultural networks.

Logistics identifies, describes and analyses these networks and flows of objects from a multi perspectival viewpoint and creates a foundation for the organisation of these networks and flows geared towards economic, ecological and social goals.

## References

1. de Jomini, A. H. (Baron de Jomini)(2007). *"The Art of War"*, Arc Manor, Rockville, MD
2. CSCMP – Council of Supply Chain Management Professionals (2013). (online): <http://cscmp.org/about-us/supply-chain-management-definitions>
3. Zhang., M. &Li,P. (2012). *"RFID Application Strategy in Agri-Food Supply Chain Based on Safety and Benefit Analysis"* Physics Procedia, Vol..25, pp. 636-642
4. European Union (2013). Agriculture. (online): <http://europa.eu/pol/agr/>
5. Vanecek, D and Kalab, D. (2003). *"Logistics in agricultural production"*. AGRIC. ECON. – CZECH, 49, (9): 439–443
6. QI Yan-bin, YANG Jing-jing, TANG Yu-jiao (2008) »Agricultural Logistics: Situation, Problem and Countermeasure«) Journal of Sichuan Agricultural University. 2008-03
7. Daoping, W., Feng, L, Lei, C. (2012) *"Causality and Reasons of Agricultural Production and Agricultural Logistics Practitioners in China"* School of Economics and Management, University of Science and Technology, Beijing
8. Li, D., Li, D., Chen, Y., Li, L., Qin, X., Zheng, Y., (2012) *"A Bayesian Based Search and Classification System for Product Information of Agricultural Logistics Information Technology"*, China Agricultural University, Beijing.
9. Liping, W. (2009) *"Study on Agricultural Products Logistics Mode in Henan Province of China"* School of Economics and Management, Henan Polytechnic University, China
10. Zhang, X., Wang, C. (2011) *"Application of Analytic Network Process in Agricultural Products Logistics Performance Evaluation"* Department of Economy and Management, Tianjin University of Finance & Economics, Tianjin, China
11. Yao, X., Cui, Y., Ying, J., Wei, J. (2009). *"Dynamic Alliance of Agriculture Products Logistics Based on Swarm Intelligence"* College of Mechanical and Electrical Engineering, Hennan Agricultural University, Henan Province, China
12. Xu, S. (2011). *"Tactics on the Development of Modern Agricultural Logistics in Central China"*. Advanced Materials Research (Volumes 219 - 220)
13. Li, X-G., Zhou, H-J., Wang, T-S. (2012). *"Constructing Agricultural Products Logistics System to Ease Inflationary Pressure"*. School of economics and management. Hengshui University, Hebei
14. Wang L. (2012). »Study on Agricultural Products Logistics Mode in Henan Province of China«. (online): [http://link.springer.com.ezproxy.lib.ukm.si/chapter/10.1007/978-3-642-25349-2\\_84](http://link.springer.com.ezproxy.lib.ukm.si/chapter/10.1007/978-3-642-25349-2_84)

15. Gan, W., Zhu, Y., Zhang, T. (2011). »*On RFID Application in the Tracking and Tracing System of Agricultural Product Logistics*« (online):  
[http://link.springer.com.ezproxy.lib.ukm.si/chapter/10.1007/978-3-642-18336-2\\_49](http://link.springer.com.ezproxy.lib.ukm.si/chapter/10.1007/978-3-642-18336-2_49)
16. Dan T. (2012). »*Developing Agricultural Products Logistics in China from the Perspective of Green Supply Chain*«. (online):  
[http://www.google.si/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=16&ved=0CHgQFjAFOAo&url=http%3A%2F%2Fwww.ccsenet.org%2Fjournal%2Findex.php%2Fijbm%2Farticle%2Fdownload%2F19732%2F14062&ei=llWLUa2-FtO6hAexuoGABA&usg=AFQjCNGplc8yYovnc3mfaSJ2uvjUh\\_G3xA&sig2=Tz6p03RWimwdEUA8scfGNQ](http://www.google.si/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=16&ved=0CHgQFjAFOAo&url=http%3A%2F%2Fwww.ccsenet.org%2Fjournal%2Findex.php%2Fijbm%2Farticle%2Fdownload%2F19732%2F14062&ei=llWLUa2-FtO6hAexuoGABA&usg=AFQjCNGplc8yYovnc3mfaSJ2uvjUh_G3xA&sig2=Tz6p03RWimwdEUA8scfGNQ)
17. Federico S. (2011). »*The modern agricultural frontier and logistics: the importance of the soybean and grain storage system in Brazil*«. (online):  
<http://www.ige.unicamp.br/terrae/V8/PDF-N8/Samuel%20Frederico.pdf>
18. Delfmann, W., Dangelmaier, W., Günthner, Peter Klaus, Ludger Overmeyer, Werner Rothengatter, Jürgen Weber, Joachim Zentes. (2010). »*Position paper on a basic understanding of logistics as a scientific discipline*«. Working group of the Scientific Advisory Board of German Logistics Association (BVL) (online): <http://www.bvl.de/en/positionpaper>
19. Wang Shufeng, W., Liya, M., Wei, W. (2010). »*Modern agriculture logistics' function elements and its systematic operational management*«. Information Science and Engineering (ICISE), 2010 2nd International Conference on . Hangzhou, China. P. 2188 - 2192 (4-6.12.2010)