Research and Application of Agricultural Green Logistics Development Evaluation Based on Comprehensive Evaluation Method

Xiaoyan Liu*, Miao Feng* and Chaosong Fu
School of Economics and Trade, Jilin Engineering Normal University, Changchun 130000, China
*Corresponding author e-mail: 1036909360@qq.com, 530667393@qq.com, 2023096073@qq.com

Abstract. With the increasing awareness of human protection of the environment and green consumption, the green logistics of agricultural products has developed rapidly. The green development of green logistics of agricultural products is of great significance in reducing environmental pollution and improving the living standards of residents. By analyzing the importance of green development of green logistics of agricultural products, based on research and actual research, selecting suitable factors for the green development of agricultural product logistics, and constructing comprehensive evaluation to evaluate the development status of green logistics of agricultural products, the development degree of green logistics of agricultural products in the stage The comprehensive evaluation method has reference value and practical significance.

1. Introduction
With the development of the economy and the improvement of the quality of life, as an important part of the logistics industry, agricultural product logistics is moving towards a green ecological road. While improving the performance of corporate social services, logistics companies will also pay attention to the impact of logistics on the ecological environment. Green logistics comes from environmental resource management. The concept of green production and consumption has been deeply rooted in the hearts of the people, providing a driving force for the development of agricultural products logistics, and through a series of research on green logistics of agricultural products. By analyzing the all-green management process of agricultural products under supply chain conditions, the evaluation model of comprehensive evaluation method. According to the influencing factors of agricultural products in the circulation process, the green system of agricultural product logistics is constructed [1].

2. Definition of green logistics development of agricultural products
Green logistics of agricultural products, that is, in the process of forward logistics and reverse logistics of agricultural products, taking the impact on the ecological environment as an important way, minimizing the impact on the ecological environment, using advanced management concepts to
manage the logistics process and achieve full and rational use of agricultural product logistics resources.

As an important part of modern logistics, green logistics of agricultural products includes the following contents: intensive resources for agricultural products. The integration and rational use of existing resources, improve the efficiency of resource utilization, reduce unnecessary waste, and achieve sustainable development. Green transportation of agricultural products. Reasonable layout and planning of the lines and nodes in the transportation process, reducing vehicle exhaust emissions and fuel consumption by reducing transportation lines and no-load rate, while requiring the use of clean energy and preventing oil leakage during transportation to pollute the environment. Green storage of agricultural products. Reasonably arrange the layout of agricultural product warehouses, aim at not jeopardizing the local environment, improve the utilization rate of warehouses, strengthen the pollution prevention capacity of the warehouse itself, and reduce the loss rate of storage. Green packaging of agricultural products. Try to use recyclable, non-toxic packaging materials to reduce damage to the environment and damage to the packaging, while improving packaging technology, reducing the space occupied by packaging, and improving space utilization. Reverse logistics of agricultural products. Recycling waste materials generated during the logistics process, turning waste into treasure, and improving resource utilization [2].

3. Construction of agricultural product green logistics system evaluation index system
The green logistics of agricultural products can be summarized as follows. Under the guidance of the green environmental protection concept, the green logistics technology is applied to all the links of fresh agricultural products from picking to reaching the hands of consumers. In this process, resource consumption is reduced as much as possible, and logistics operations are reduced. The negative impacts include the macro-level and micro-level factors in the whole process of agricultural products from producers to final consumers [3].

The selection principle of the evaluation index is comprehensive and complete, without unnecessary parts, accurately and scientifically reflects the development degree of green logistics of agricultural products, easy to obtain and easy to quantitative analysis. Through the research results of green logistics and summarizing the evaluation indicators of green logistics development of agricultural products based on actual research.

3.1. Agricultural products green logistics system market
(1) Market economy factors. Market demand is the engine to promote economic development, and economic benefits can directly represent the degree of green development of agricultural products, mainly by means of the total output value of green agricultural products logistics, the growth rate of total logistics output value, the scale of logistics equipment, the average output value of logistics enterprises, and the rate of agricultural product corrosion. The proportion of technology investment and the proportion of environmental protection investment reflect market effects and economic benefits [4].
(2) Agricultural product logistics operation factors. The logistics operation of agricultural products refers to the actual operation of agricultural product logistics, covering the production volume of agricultural products, the intensity of logistics and transportation, the proportion of agricultural products circulation, the utilization of equipment, and the intensity of the use of logistics standards.

(3) Green environmental factors. By studying the green development level of agricultural products, the resource loss of agricultural products logistics and transportation process is reduced, and the recoverable utilization rate of agricultural products is improved, thereby improving the development level of regional agricultural products green logistics. The use of pollution tracking, the promotion of green production and consumption concepts, energy loss rate, inviolability, environmental technology use, logistics expertise and other indicators to assess the green level of agricultural products logistics.

3.2. Principles for selecting evaluation indicators for green logistics of agricultural products

The selection of indicators should be comprehensive but not overlapping; the selection of indicators should be scientific, reasonable, and applicable to reflect the green development of green logistics logistics of agricultural products; indicators should be easy to obtain and quantifiable. This paper summarizes the evaluation indicators of green logistics of agricultural products green logistics by consulting a large number of literature results and actual research and analysis.

(1) Marketability of green agricultural products.

Demand is the driving force behind the promotion of production. The consumption of green agricultural products is the internal thrust to promote the green logistics development of agricultural products. By analyzing the market demand for green agricultural products, the price of green agricultural products, and the consumption of green agricultural products, we can learn the potential and shortcomings of the development of agricultural green logistics [5].

(2) The use of green logistics technology.

The important indicator of the green development of agricultural product logistics is whether to adopt cold chain technology from the picking of agricultural products to consumption, to achieve full green logistics to reduce the waste of resources and ensure the quality of agricultural products.

(3) Economic benefits of green logistics.

Economic indicators are figures that directly reflect the degree of green logistics development of agricultural products. The use of indicators such as the total value of green logistics of agricultural products and the ratio of green logistics costs of agricultural products to logistics costs can help assess the greenness of green logistics of agricultural products.

(4) The external environment of green logistics.

Agricultural products green logistics the development of green logistics requires the support of the external environment, assessing the environmental scale of the number of green logistics facilities and
equipment, the development and use of green logistics standards for agricultural products, and providing reference for the country and associations to promote the green development of agricultural green logistics logistics.

(5) Environmental protection of green logistics.

The purpose of this paper is to promote the green development of agricultural green logistics and reduce energy consumption and resource waste. Therefore, it is necessary to evaluate the energy consumption rate of transportation vehicles, the promotion rate of green development concepts, and the utilization rate of green and green logistics technologies [6].

3.3. External evaluation indicators for the development of green logistics of agricultural products

(1) Market demand

The logistics industry serves the links and fields of production, consumption and circulation. The output of agricultural products, the turnover of agricultural products traded in various markets and the total import and export of agricultural products can all reflect the demand situation and scale of agricultural product logistics from different angles.

(2) Infrastructure

The construction of infrastructure such as traffic roads largely determines the quality and speed of transportation. When evaluating agricultural product infrastructure, the main indicator is the total annual investment in transportation facilities, especially rural transportation facilities. In addition, the construction of the public information platform for agricultural products logistics is also a very important indicator.

(3) Logistics node

The layout, quantity and scale of agricultural product logistics nodes are important factors affecting the overall efficiency of agricultural products logistics. The agricultural product logistics nodes include agricultural product logistics bases, agricultural product logistics centers and agricultural product distribution centers. Whether the layout of agricultural product logistics nodes is reasonable, whether the quantity and scale are appropriate will directly affect the agricultural product logistics cost, the agricultural product logistics speed and the efficiency of agricultural product logistics.

(4) Institutional environment

The quality of the agricultural product logistics development system not only affects the operation of agricultural product logistics enterprises, but also directly determines the ability to attract foreign investment and investment in all aspects. The institutional environment for the development of agricultural product logistics includes the degree of logistics market order and the policy and legal environment. The order of agricultural product logistics market can be measured from three aspects: market entry and exit order, market transaction order and market competition order. The policy and legal environment mainly refers to the financing system, taxation policy, talent use system, food safety supervision regulations and so on.

(5) Logistics standard specification

The standardization of agricultural product logistics is a qualitative indicator. The standardization of agricultural product logistics mainly involves the standardization of logistics equipment, the standardization of data information, and the three aspects of logistics technology and terminology standardization. At present, the country has established a development plan and standard system that is suitable for the development and operation standards of agricultural products logistics. Therefore, improving the standardization of agricultural product logistics is an urgent task, which will greatly affect the development of China's agricultural product logistics in the future.

(6) Logistics education and training

The status of agricultural product logistics education and training is one of the important factors affecting the development of agricultural products logistics. The status of agricultural product logistics education and training mainly includes the research status of agricultural products logistics, the education level of agricultural products logistics practitioners, and the training of agricultural product logistics practitioners. Through the horizontal and vertical comparison of agricultural product logistics
education and training, we can measure the status, gaps and the focus and direction of talent training and education in China's agricultural product logistics.

3.4. Internal evaluation indicators for agricultural product green logistics development

(1) Transportation
The indicators for evaluating agricultural product logistics and transportation activities mainly include transportation cost level, on-time transportation rate, full load rate and transportation loss rate. Through the evaluation of these indicators, it can reflect the cost and efficiency level of China's agricultural product logistics and transportation, so as to propose specific measures for improvement in response to existing problems.

(2) Warehousing
The indicators for evaluating agricultural product logistics and storage activities mainly include warehouse utilization rate, inventory turnover rate, on-time delivery rate, cargo defect rate and storage cost. Warehouse utilization refers to the actual quantity of stock agricultural products as a percentage of warehouse inventory capacity; inventory turnover rate refers to the percentage of sales cost to the average occupation of agricultural products inventory; on-time delivery rate refers to the proportion of on-time delivery times to total delivery times. The cargo defect rate refers to the total loss of stored agricultural products as a percentage of the total value of the goods; the storage cost includes the total storage cost and the storage cost as a percentage of the total sales of agricultural products.

(3) Handling and handling
The indicators for evaluating the handling and handling activities of agricultural products mainly include the average number of loading and unloading operations per unit of goods, the average handling and handling cost per unit of goods, and the loss rate of handling and handling. In the whole process of agricultural product logistics, the frequency of loading and unloading occurs more frequently than other various logistics activities, and each time loading and unloading takes a lot of time and consumes a lot of labor. Loading and unloading is not only the key to determining the speed of agricultural product logistics, but also an important factor affecting the logistics cost of agricultural products.

(4) Distribution processing
In the process of agricultural products flowing from the production to the consumer sector, the main role of circulation processing is to promote sales, maintain product quality and improve logistics efficiency. The indicator for evaluating the circulation processing activities of agricultural products is the processing value-added ratio of agricultural products. The sales of agricultural products in China
are mainly primary products, and the proportion of various processed products is relatively small. Due to the low level of deep processing of agricultural products and the low added value, the low level of agricultural products in China is excessive, structural contradictions are prominent, and lack of competitiveness.

(5) Distribution
The degree of development of distribution is an important indicator to measure the degree of modernization of logistics development in a country or region, and is an important manifestation of the degree of modernization of a country or region. The indicators for evaluating agricultural product logistics and distribution activities mainly include the punctuality rate of delivery, the accuracy of delivery delivery, the distribution damage rate, and the distribution frequency.

Figure 3. Comprehensive evaluation index of green logistics development of agricultural products

4. Countermeasures for the development of green logistics of agricultural products

(1) Strengthen the construction of agricultural product logistics
Infrastructure and equipment. Accelerate the construction of railways and expressways, improve infrastructure such as airports, stations and terminals, continuously improve the transportation network, improve warehouse storage facilities, and ensure the refrigerating environment required for agricultural products during transportation. The government participates in the establishment of a green channel to improve the packaging, preservation, handling, handling and other technologies of agricultural products, and strengthen the standardization of agricultural product logistics.

(2) Improve the green logistics laws and regulations and organizational guarantee system
In order to improve the agricultural product logistics system and promote the healthy and rapid development of agricultural product logistics, the government must establish sound laws and regulations, and strengthen policy support and investment in the development of green logistics for agricultural products by strengthening macro-control and planning. Establish a green production base for agricultural products, cultivate an agricultural green logistics market, and quickly research and develop a more complete legal system. Formulate green production standards, quality standards, and sanitary standards for agricultural products, standardize the organizational behavior of logistics, strengthen the joint relationship between various agricultural products, and strictly implement high-quality comprehensive evaluation methods.

(3) Increase logistics channels and trading methods.
In order to reduce the cost of agricultural products logistics. In addition to the traditional way of trading, it advocates the emergence of new trading methods. For example, new trading methods such as futures, orders, and auctions. The means of circulation of agricultural products should also be improved, and the circulation of chain operations, online sales and distribution should be promoted. It
should be encouraged to set up professional logistics enterprises to enter the agricultural product circulation field to reduce the cost of agricultural product logistics. For agricultural products with a relatively short transportation distance, farmers can be directly sent to consumers, reducing logistics entities and reducing logistics costs.

5. Conclusion

By establishing an agricultural product green logistics evaluation index system and empirical analysis, it is concluded that the green logistics development of agricultural products green logistics needs to be improved and improved, and the green development of agricultural product logistics can be promoted from government support, consumption promotion, and enterprise attention. Process. The green development of agricultural product logistics is the focus of China's agricultural product green logistics development, and it is also the top priority of agricultural product logistics development. The external environment, internal process of agricultural product logistics development and the overall benefit of agricultural product logistics have constructed the agricultural product logistics evaluation index system, which laid the foundation for further planning and development of agricultural product logistics. In practical application, the acquisition of agricultural product logistics evaluation index data and the use of evaluation methods are difficult for agricultural product logistics evaluation, and can promote the true meaning of green logistics of agricultural products to be promoted and developed.

Acknowledgments

This work was financially funded by science research project of education department of Jilin province, Project number: JJKH20190778SK; Supported by Program for Innovative Research Team of Jilin Engineering Normal University.

References

[1] Pan Wenjun. Analysis of regional green logistics development evaluation system based on circular economy theory. Journal of Beijing Jiaotong University, Vol. 6 (2016) No. 12, p.126-131.

[2] Li Wei. Comparative study on foreign social logistics evaluation indicators. Logistics technology, Vol. 8 (2017) No. 21, p.213-215.

[3] Zhao Lijun. Research on Green Logistics Evaluation Based on Fuzzy Comprehensive Evaluation Method. Journal of Wuhan University of Technology, Vol. 9 (2016) No.10, p.285-291.

[4] Wang Changqiong. Preliminary Study on Evaluation Index System of Sustainable Development of Logistics Industry. Economic Management, Vol. 10 (2018) No. 15, p.311-315.

[5] Li Jian, Wang Chengliang. Analysis of the driving factors and strategies for the development of green logistics in enterprises. Journal of Weifang University, Vol. 11 (2015) No.12, p.415-419.

[6] Guo Bin. Research on the dynamic mechanism of enterprise green development from the perspective of green demand. Technology economics and management research, Vol. 3 (2017) No. 14, p.89-92.