

Development Strategy Analysis of Cold Chain Logistics of Fresh Agricultural Products under the Background of Low-carbon Economy

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Abstract. In the context of global warming, the "low-carbon economy" based on low energy consumption and low pollution has become a global issue. Cold chain logistics has entered a period of rapid development driven by fresh consumption demand, and low-carbon logistics has become one of the important measures for the whole industry to adapt to the development of low-carbon economy. This paper analyzes the connotation and characteristics of cold chain logistics of fresh agricultural products, and analyzes the characteristics of transport links. The present situation of cold chain logistics of fresh agricultural products is summarized, the current working mode and main problems of cold chain logistics of agricultural products in China are clarified, and the main countermeasures for the development of cold chain logistics of fresh agricultural products are put forward.

1 Introduction

Low carbon economy is a new form of economic development. In the context of the development of low-carbon economy, all sectors in China should strive to achieve the development goals of energy conservation and emission reduction [1]. Logistics is to solve the space problem, the cold chain is to solve the time problem. Under the guidance of the target strategy of "peak carbon dioxide emission and carbon neutrality", the cold chain logistics industry is accelerating its transformation to the green and low-carbon direction [2]. Social residents have raised their requirements for the quality and freshness of agricultural products [3]. Cold chain logistics enterprises should put forward normative and feasible cold chain logistics mode of agricultural products according to the changes of current market economy and the basic concept of cold chain logistics.

2 Definition and characteristics of cold chain logistics of fresh agricultural products

2.1 Definition of fresh produce

Fresh agricultural products mostly refers to aquaculture, planting goods, do not do any processing or only simple processing, and then flow into the market. But most agricultural products have a time limit [4]. In order to ensure food safety, it is necessary to refrigerate and refrigerate the products during transportation, and finally

provide them for people to eat. Fresh agricultural products mainly include fresh vegetables, aquatic products, fruits, poultry and egg products, meat products and dairy products.

The essence of fresh agricultural products lies in "fresh", but more is easy to deteriorate perishable products. In order to improve the freshness and quality of fresh agricultural products, the temperature conditions need to be strictly controlled in the circulation links such as storage, transportation and marketing. Therefore, the market of fresh agricultural products to quality management and commodity preservation technology requirements are very strict.

2.2 Definition of cold chain logistics of fresh agricultural products

In order to ensure the quality of meat, aquatic products, fruits and vegetables and other fresh agricultural products at the source, it is necessary to ensure that the whole process of fresh agricultural products from production, circulation processing, packaging, transportation, storage and sales are in the natural circulation environment of low temperature logistics system [5]. Cold chain logistics is the main way of new service based on general logistics, and has typical characteristics of modern service industry.

2.3 The characteristics of cold chain logistics of fresh agricultural products

Fresh agricultural products are rich in essential trace elements needed for our life and water, which is known as the source of life [6]. There are more bioactive microbial

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communities in it than other products, so the occurrence of mildew and collective decay is the most significant characteristic of fresh agricultural products. Cold chain logistics is highly uncertain, in the entire circulation process of raw material production, sorting, circulation processing, warehousing, handling, distribution and sales. In the process of logistics operation, it is often caused by small collision or friction, which will bring irreparable harm to fresh agricultural products. This causes rapid qualitative changes in crops. Furthermore, in the whole process of cold chain logistics, it is necessary to set the most suitable environmental temperature characteristics according to the characteristics of different products, such as spoilage degree, to ensure the stability and value of food.

3 Analysis characteristics of transportation links of agricultural products cold chain logistics

Generally speaking, the agricultural products that need to be transported by the cold chain logistics system mainly include meat, vegetables, fruits and other fresh products [7]. During transportation, we should not only ensure the freshness of these fresh products, but also avoid problems such as decay and deterioration, which requires them to be in the same temperature environment all the time. At the same time, the cold chain logistics of agricultural products also involves procurement, processing, storage, sales and other links. Each link has an important impact on the quality of fresh agricultural products. Only with effective cooperation of each link can value-added be realized during transportation. Compared with ordinary logistics, the cold chain logistics characteristics of fresh agricultural products have the following three aspects.

3.1 The characteristics of accurate temperature control and high timeliness

Due to the special characteristics, the different fresh agricultural products are more sensitive to the storage of humidity, light, temperature and other environmental conditions [8]. Therefore, in each link of cold chain logistics, in order to ensure the quality of fresh agricultural products and slow down the decline of product freshness, the best storage environment of different fresh agricultural

products is also very different. The cold chain logistics products are highly perishable and the cold chain logistics links have strong timeliness. The requirements of fresh agricultural products on the delivery time are relatively strict. In order to ensure quality and economic benefits, the fresh agricultural products must be delivered to customers on time.

3.2 The characteristics of large capital investment and frequent daily maintenance

Fresh agricultural products generally have fresh activity, short shelf life, more difficult to store, and easy to mildew in the process of transportation [9]. Therefore, the requirements for the temperature and humidity of the transport vehicle are generally higher, and the professional fruit and vegetable refrigerated vehicles must be used during the transport, in order to reduce the deterioration rate and damage rate of fresh agricultural products. The investment cost of establishing professional cold storage with temperature monitoring and cold storage vehicles that can absorb water and prevent corrosion is very high, which is generally three to five times that of ordinary cold storage and cold storage vehicles.

3.3 The characteristics of professional equipment and high safety protection

The core requirement of cold chain logistics of fresh agricultural products is to maintain a certain temperature. In order to ensure the quality of fresh agricultural products, it is necessary to maintain a certain temperature in the whole process of transportation of fresh agricultural products [10]. During transportation, special equipment and special means can be used to ensure the quality and freshness of fresh agricultural products.

4 Current situation analysis of cold chain logistics of fresh agricultural products

According to the public data in relevant reports, the market scale of China's cold chain logistics exceeded 450 billion yuan in 2021 and will reach 897 billion yuan in 2025, as shown in Figure 1.

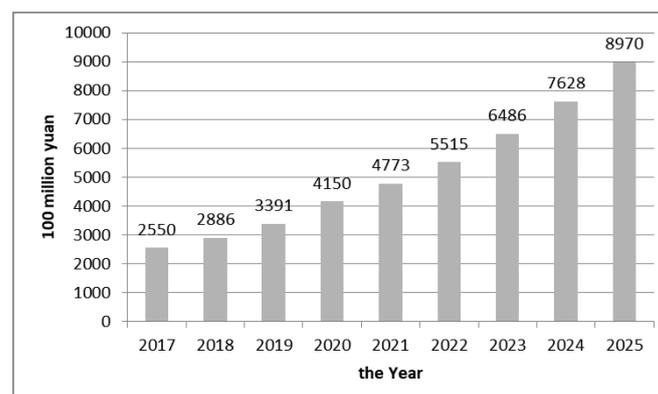


Figure 1. Market scale and forecast of cold chain logistics industry in China

4.1 Unmanned delivery has become the new normal during the pandemic

Logistics orders for fresh agricultural products doubled. In rural areas and remote mountainous areas where transportation is not convenient, the scene of cold chain logistics distribution of fresh agricultural products is also more complex. At present, both traditional delivery companies and e-commerce delivery companies are constantly exploring the application of drones. Unmanned logistics distribution has shown its own unique superiority. The mode of unmanned logistics distribution can not only solve the problem in special time, but also greatly reduce the distribution cost under general conditions, improve the logistics efficiency, and alleviate the problem of labor shortage.

4.2 The market space is huge, but development and upgrading are hindered

Fresh agricultural products have the characteristics of easy deterioration, fresh activity and storage difficulties, which leads to its transportation mode is different from that of other general products. It is necessary to purchase and use cold storage, refrigerated truck and other cold chain logistics supporting infrastructure. Strict and refined supervision and control should be applied to the whole process, with the aim of maintaining good quality of fresh produce. The logistics scale of fresh agricultural products has far exceeded the trillion yuan mark. There are many kinds of cold chain logistics, and because the level of cold chain logistics is still low compared with other conventional logistics, it has huge development potential and upgrading space.

4.3 Linkage of transportation means provides a new engine for logistics upgrading

The demand of freight transportation is very high related to the cold chain logistics of fresh agricultural products in our country, and the transport of goods needs the transport means as the carrier. Our country uses the railway to transport fresh agricultural products at first, which can meet the transportation demand of large-scale, directional product. With the more and more prosperous development of fresh agricultural products market, highway transportation has gradually become the main mode of transportation of fresh agricultural products because of its flexible characteristics. With the booming development of high-speed rail and the aviation industry, China has formed a trinity of integrated transport modes of "sea, land and air". The rise of cold chain logistics indicates that the network system of cold chain logistics is more and more perfect in China, and provides a basis for constructing more stereo cold chain logistics system.

4.4 E-commerce contributes to the country-of-origin delivery model

The emergence of e-commerce has greatly shortened the

distance between the circulation of fresh agricultural products from the origin to consumers. The origin express mode follows the trend of e-commerce, and its characteristics are very prominent. It is favored by consumers because of its strong timeliness guarantee and its ability to maintain freshness. However, there are also some disadvantages. The increase of logistics cost and the difficulty of logistics management restrict the development of the origin express mode.

5 The problems in cold chain logistics of fresh agricultural products

5.1 Supply and demand relations of fresh agricultural products are impacted

The supply of fresh produce plays a crucial role in the stability of agricultural markets. Consumer demand for fresh agricultural products is increasing, but product supply is not enough to meet consumer demand.

5.2 The development level of cold chain logistics is low, and the supporting infrastructure urgently needs to be improved

The construction speed of logistics infrastructure and supporting facilities is far behind the growth rate of the social demand for frozen food, and the supply of cold chain logistics cannot meet the social demand. Most of the employees have not experienced the professional training of cold chain logistics system, so their business skills are out of practice and the industry management talents are scarce. The production base and processing base of fresh agricultural products are scattered, and the supply of cold storage capacity is seriously insufficient.

5.3 Cold chain logistics system of fresh agricultural products has not yet been formed

Cold chain logistics is closely related to the development of logistics industry. The cold chain logistics of fresh products in China still has problems of dispersion, chaos and small scale. The scale of enterprises in the industry is quite different, and there are management problems to a certain extent. Cold chain logistics pre-cooling technology can not fully play the function of cold chain transportation logistics means in the whole process of temperature environment, manufacturing, flow processing, transportation and temperature control, and logistics technology means have not reached the level of popularization.

5.4 The supply chain connectivity of cold chain logistics of fresh agricultural products is insufficient

China's rural transportation distribution infrastructure is constantly improving, has been the focus of attention to the "last kilometer" of the short board has been constantly improved. However, the problem of "first kilometer" is

still not improved, which is still an obvious shortcoming. For the distribution link of cold chain logistics of fresh agricultural products, compared with the "last kilometer" distribution problem, the "first kilometer" has become more and more critical.

6 Conclusion

6.1 Attach importance to upgrading the supply chain of fresh agricultural products

With the improvement of People's Daily living standards, people's ideas have also changed a lot. Their focus on food is no longer limited to the price of products, but more on the quality of products and services. The application of blockchain technology enables the visualization of the whole process of fresh agricultural products from picking, packaging, transportation and so on, making consumers more comfortable to eat.

6.2 Build a more mature cold chain network system

The complexity of cold chain logistics is reflected in the urban and regional network, cold storage system, home-to-home network, data network and feeder system. The operation of this four-level network system affects cold chain logistics. If the four-tier network can operate efficiently and orderly at every link, it can be transported from the place of origin to the consumer at the fastest speed. The four-level network still has the shortcoming of unobstructed operation, and it is necessary to build a more mature cold chain logistics network system of fresh agricultural products.

6.3 Actively guide the innovation and development of cold chain logistics enterprises

Centering on key cold chain logistics enterprises, it will radiate to other small and medium-sized cold chain logistics, which will maximize the promotion of logistics facilities for fresh agricultural products to resist falling and shock. It promotes the improvement of frozen preservation and food packaging technology, and reduces the loss rate of fresh agricultural products as much as possible.

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