

Fresh Agricultural Products Cold Chain Logistics Development Status and Countermeasures Research

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ABSTRACT

With the improvement of the living standard of consumers in China, people are more and more concerned about the demand and quality of fresh agricultural products, and the market scale of cold chain logistics of fresh agricultural products is growing explosively. However, China's cold chain logistics still exists such as insufficient cold chain logistics infrastructure, low level of information technology, high cost, low degree of standardization of fresh agricultural products production and other problems, resulting in China's fresh agricultural products cold chain logistics is facing serious challenges. This paper analyzes the development status quo of cold chain logistics and puts forward some solutions to provide some references for subsequent research.

KEYWORDS

Fresh agricultural products; Cold chain logistics; Informationization construction

1. INTRODUCTION

In recent years, cold chain logistics is booming as an emerging industry. While the demand for cold chain market increases, governments have continuously introduced policy measures to boost the development of cold chain logistics industry. From an international perspective, the global cold chain logistics market size is expected to soar from \$160 billion in 2018 all the way to as high as \$585.1 billion in 2026, with a compound annual growth rate of nearly 10% during the period. According to the research report of Cold Link, The Insight Partners and other foreign organizations, compared with North America, Western Europe and other mature regions, the Asia-Pacific region will provide the strongest driving force for the continuous expansion of the global market scale in the next 5~10 years, of which, China is the most important contributor to the growth of this region, relying on the rapid rise of cold chain demand and related infrastructure development to grow into a significant emerging market. China is the most important contributor to the growth of this region, relying on the rapid rise of cold chain demand and related infrastructure development to grow into a pivotal emerging market, and rapidly striding from a production-oriented economy to a consumption-oriented economy. However, there is still a big gap between China's logistics enterprises and developed countries in terms of technology and equipment, environmental protection concepts and business models. Agricultural products, as the main distribution object of cold chain logistics, are getting more and more attention. Since agricultural products are not easy to be preserved, easy to be spoiled, have strong geographical and seasonal characteristics, and are not easy to be transported over long distances, which makes the traditional ambient logistics unable to meet its transportation requirements, cold chain logistics is getting more and more attention from people.

2. DEFINITION OF CONCEPTS RELATED TO COLD CHAIN LOGISTICS OF FRESH AGRICULTURAL PRODUCTS

2.1. Definition of the Concept of Fresh Agricultural Products

Fresh agricultural products refer to those products which are directly sown by farms or farmers, responsible for taking care of them until maturity, without doing a series of processing and handling, and cannot be stored for a long time under normal environment, usually including fruits and vegetables, beef and mutton, and aquatic products such as fish and shrimp. Most of the producers of fresh agricultural products in China are farmers or agricultural cooperatives widely distributed throughout the country, and most of the consumers are concentrated in the towns, agricultural products from the hands of farmers to the hands of consumers in the process of transportation, need to go through transportation, warehousing, wholesale, retail and so on, the transportation process is long, the environment changes are also large, which makes fresh agricultural products are easy to rot and deteriorate, therefore, for fresh Therefore, the transportation and preservation conditions for fresh agricultural products. Transportation efficiency has high requirements.

2.2. Definition of the Concept of Cold Chain Logistics

The concept of cold chain logistics is defined in the 2021 edition of the Glossary of Logistics Terms as "a logistics technology and organizational system that keeps the items in the temperature environment required to maintain their quality from production to consumption according to the characteristics of the items." Cold chain logistics and distribution of fresh agricultural products refers to the logistics activity of delivering fresh agricultural products such as fruits, vegetables, meat, eggs, milk and other fresh agricultural products to the designated place in a suitable low-temperature environment after a series of links such as selection, packaging, distribution and so on in accordance with the user's demand. However, in practice, the cold chain logistics of fresh agricultural products will encounter many problems, especially in the distribution link, the cold chain logistics will waste a lot of distribution time due to the lack of information processing ability, which will cause economic losses and even food accidents. In the process of cold chain logistics of fresh agricultural products, how to carry out reasonable transportation route planning, real-time temperature control, and rapid distribution in the last kilometer are the main problems to be solved in cold chain logistics.

3. CHINA'S FRESH AGRICULTURAL PRODUCTS COLD CHAIN LOGISTICS DEVELOPMENT STATUS ANALYSIS

3.1. Few Supporting Facilities and Low Level of Informationization in Cold Chain Logistics

The front-end and back-end facilities of China's cold chain logistics are relatively imperfect, which makes most of the fresh commodities not get standardized heat preservation, humidity preservation and cold storage in the transportation process, which increases the loss of circulation and also increases the price and quality instability factors from the farmers to the consumers. First, the refrigerated trucks and other supporting facilities to keep a small amount. Refrigerated trucks are the most important means of transportation for cold chain logistics, and the data of the Cold Chain Committee of China Federation of Materials show that in 2019, China's refrigerated trucks retained about 214,700 units, an increase of 34,700 units compared with 2018, which only reached the level of the United States, Japan and other advanced countries in 2013, and not only the absolute amount is insufficient, but also the technological level is on the low side. Second, the rate of refrigerated transportation is low. At present, China's primary agricultural products cold chain transportation rate

relative to developed countries has been on the low side, developed countries have reached the level of 80%-90%, while China's fruits and vegetables, meat, aquatic products refrigerated transportation rate of only 15%, 57%, 69% respectively. Third, the "broken chain" occurs from time to time. In our country, the cold chain breaks the chain of agricultural products caused by spoilage is 1 to 2 times the rate of developed countries. According to estimates, China's annual cold chain "broken chain" caused by about 12 million tons of fruit, 130 million tons of vegetables waste, economic losses of more than 100 billion yuan, increasing the risk of food security. Fourthly, informationization support is weak. At present, the degree of informatization of cold chain logistics is relatively low, from the origin to the consumer can not be timely access to the matching chain information, resulting in production and demand are not equal. According to incomplete statistics, as of the end of 2020, only Beijing, Tianjin, Shanghai, Zhejiang, Fujian, Guangdong and other more than ten provinces and cities can implement cold chain food traceability, so it seems that there is still a lot of room for improvement in the future of informationization to support the development of cold chain logistics.

3.2. Low Market Concentration, "Small and Scattered, Lack of Specialists and Lack of Capital"

Compared with the United States, Japan and other developed countries, China's cold chain logistics industry started late, cold chain enterprises are generally "small and scattered, lack of specialists and lack of capital", and the market concentration of cold chain industry is not high. First, China's cold chain market concentration is only 114% of that of the U.S. According to the data of "China's Top 100 Cold Chain Logistics Enterprises", the combined revenue of the cold chain business of the top 100 cold chain logistics enterprises in 2019 amounted to 54.976 billion yuan, an increase of 38.05% year-on-year, accounting for about 16.21% of the total industry market size, an increase of 2.42% compared with 2018, while the top U.S. cold chain logistics enterprises are more than 20% of the total industry market size. 2.42%, while the top five enterprises in the United States accounted for 63% of the market share, which shows that the concentration of China's cold chain market is still not high. Secondly, there are fewer large enterprises in the cold chain enterprises, mostly small and medium-sized enterprises, and the market competitiveness is weak. According to the data of business registration, the number of small and medium-sized enterprises in China's existing cold chain enterprises accounts for 99.28% (Figure 8), and the cold chain logistics industry is still characterized by scattered, small and miscellaneous. Thirdly, there is a huge gap between the supply and demand of cold chain professionals, and there is a lack of innovation and research and development. At present, there are only 10 colleges and universities that offer "cold chain logistics technology and management specialty", and big data analysis shows that in 2019-2020, the supply-demand ratio between the number of cold chain graduates of the above 10 colleges and the recruitment of cold chain positions in the top ten cold chain logistics enterprises is 1:4. According to the survey of Cold Chain Committee of CIFT, 68.97% of enterprises reflected that it was difficult to recruit suitable cold chain logistics talents, and there was a serious lack of professionals with full chain design capability, and the innovation vitality of cold chain related fields showed a trend of falling back.

3.3. Low Degree of Standardization of Agricultural Production

Since fresh agricultural products are produced by farmers from scattered households, this makes the production process of agricultural products is not standardized, and most of the classification of agricultural products is based on human senses, which has a large error, and the lack of standardization of products leads to its inability to form close cooperation with downstream enterprises. In addition, there is no uniform packaging for fresh agricultural products, which brings a certain degree of difficulty to the cold chain transportation and storage of agricultural products

4. OPTIMIZATION SUGGESTIONS FOR THE DEVELOPMENT OF COLD CHAIN LOGISTICS OF FRESH AGRICULTURAL PRODUCT

4.1. Strengthen Infrastructure Construction, Coordinate and Optimize Layout

It is to promote the construction of cold chain logistics into the new infrastructure concept. Fully support the science and innovation-oriented enterprises based on the cold chain infrastructure field, guide the governments at all levels to incline in policies, funds, land, talents, etc., and strongly support the industry enterprises to increase the application of the Internet of vehicles, big data, artificial intelligence, 5G and other technologies, so as to let the cold chain logistics be fully integrated into the construction of the smart city and the revitalization of the countryside. Secondly, accelerate the basic construction of key cold chain logistics. Vigorously promote the new construction and upgrading of key cold chain equipment and facilities, and give enterprises special financial subsidies to support, such as allocating funds to purchase refrigerated vehicles and refrigerated equipment, and build modern cold storage. In particular, accelerating the construction of cold chain logistics infrastructure in rural areas is conducive to solving the problem of "the first kilometer", reducing product loss and guaranteeing fresh quality. Third, focus on strengthening the construction of processing and distribution centers. Taking processing and distribution centers as the core, extending to the upstream of the frozen and refrigerated supply chain, the downstream nodes such as stores, supermarket chains, convenience stores, etc. communicate more smoothly with the upstream of the supply chain, so as to make the procurement of commodities and supply more guaranteed, and effectively prevent the supply chain from breaking the chain.

4.2. Strengthening Cold Chain Logistics Informationization and Upgrading The Level of Informationization

The digitalization and informationization transformation of the cold chain logistics industry is a project with large investment scale, long cost recovery cycle and high comprehensive return in the future. Fresh agricultural products, especially aquatic products, from salvage to the hands of consumers, the whole process requires cold chain logistics throughout, and the digitalization of the cold chain logistics industry can improve the efficiency and visualization of the whole logistics link. The Internet of Things has been developing rapidly in China in recent years, and the Internet of Things technology can be applied to the cold chain logistics of fresh agricultural products, and the use of Internet of Things technology can integrate the cold chain logistics resources, improve the transportation speed of fresh agricultural products, and reduce the loss rate of the products. At the same time, network technology is utilized to carry out real-time monitoring, detection and cargo tracking of the temperature and humidity of cold chain distribution vehicles to improve distribution efficiency. Advocating a digital-based joint distribution model for fresh agricultural products optimizes the distribution routes of cold chain logistics, thus reducing the cost of cold chain logistics. By improving the distribution efficiency and reducing the distribution cost of fresh agricultural products, we can promote the supply-side reform of agriculture.

4.3. Strengthening Innovation Drive and Stimulating Market Vitality

First, establish a cold chain "industry-academia-research" promotion center. Strengthen the support of science and technology, set up an industry-academia-research promotion center led by the government, supported by scientific research institutes and demanded by enterprises, and focus on the application and transformation of cutting-edge scientific and technological achievements in the field of cold chain. Secondly, innovation and research and development of cold chain logistics technology and equipment. Strengthen the innovation and R&D of cold chain logistics technology and equipment such as cooling and freezing, cold storage and information management. Concentrate on the research and development of new techniques and technologies for cold chain logistics of

agricultural products, new type of energy-efficient and large-capacity cooling and freezing machinery, mobile cooling devices, large-scale refrigerated transportation equipment, special insulated compartments for refrigerated transportation vehicles, and quality and safety tracing devices, and so on. Thirdly, strengthen the innovation of cold chain logistics development mode. Encourage cold chain logistics enterprises to establish strategic cooperative relationship, promote the common construction, common use and sharing of cold chain logistics resources, facilities, equipment, talents and other resources, so as to be more scientific in cold chain logistics "task allocation", minimize the operating costs, and activate the vitality of cold chain enterprises in the market.

4.4. Introducing Professional Cold Chain Logistics High-End Talents and Improving Enterprise Management Level

The competition among fresh produce cold chain logistics enterprises is still the competition of professional talents in the final analysis. At this stage, there are fewer professionals in cold chain logistics in China, therefore, the cultivation and introduction of talents are particularly important, which can be started from the following aspects: Firstly, from the national level, we can encourage more colleges and universities to set up the cold chain logistics related majors, especially for the higher vocational colleges and universities and vocational colleges and universities, and advocate the cultivation of more skillful cold chain logistics talents; Secondly, school-enterprise cooperation, cold chain logistics enterprises and colleges and universities cooperate to study talent training programs and strengthen the cultivation of students' professional ability; thirdly, improve the welfare benefits of employees in the cold chain logistics industry, provide attractive career upward channels for employees, so that employees can realize their self-worth in the cold chain logistics industry and enhance their confidence in the cold chain logistics industry.

5. CONCLUSION

To summarize, the development of cold chain logistics of fresh agricultural products not only affects the experience of consumers in purchasing agricultural products, but also has very important significance to the development of agricultural economy and farmers' income. In recent years, China's fresh agricultural products cold chain logistics development momentum is rapid, has a great market prospect, but at the same time there are many problems, this paper for the development of fresh agricultural products cold chain logistics status quo puts forward some suggestions for improvement, for the follow-up cold chain logistics research to provide some reference.

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