

## Research Article

### Research on Logistics Mode of Fresh Agricultural Products in China

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**Abstract:** This study has a research on logistics mode of fresh agricultural products in china. Logistics costs are an important part of the price of fresh agricultural products. By researching the characteristics of fresh agricultural products, this study get the main reasons for the high price of fresh agricultural products in China, there are the high logistics cost, large loss and poor preservation in logistics process. Then some measures are proposed to reduce fresh agricultural products logistics costs in China. The measures are the advanced direct sales model, advanced cold chain technology and advanced networks of cold chain logistics and building fast fresh agricultural products information platform.

**Keywords:** Fresh agricultural products, logistics costs, mode

#### INTRODUCTION

Economic development has been accompanied by a widespread of supermarkets across South America replacing traditional food retail outlets and dramatically transforming existing food supply chains. This has enhanced the need for reliable logistics and cold supply chains, implying increased transport of general and containerized cargo. Supermarkets now control 50-60% of the food retail sector in South America; an increase from 10 to 20% in only 10 years.

Consumer expenditure on food products ranges between 20.2 and 29.5% of total consumer expenditure in South America<sup>3</sup> (2007), Food products were the biggest category even before the recent surge of commodity prices. The expenditure on food products was equal to 14.3% of the average GDP per capita in 2007. In the period 2002-2007, average expenditure on food products more than doubled (↑104.2%), while costs for housing only increased 93.1% (Francis and Yao, 2008).

Nevertheless, in many South American countries reductions in food prices have been modest in comparison to the decline of commodity prices in export markets, despite the various policy measures from governments aiming to limit the impact of high international prices on domestic markets. FAO (2008) states that average national cereal prices remain above their levels of a year earlier. Thus, sticky food prices continue to affect access to food of vulnerable populations in both urban and rural areas (FAO, 2008).

China is a large agricultural country. In order to reduce the price of fresh agricultural products, Chinese government has opened green channel for agricultural

products since 1998. So transporting the fresh agricultural products like fresh vegetables, live livestock, fresh seafood and raw eggs can enjoy preferential policies and circulate free (Gordon and Ricardo, 2009). In recent years the Ministry of Transport, the National Development and Reform Commission, Ministry of Finance have further improved the relevant policies of the green channel and expanded free access fees of vehicles for transportation of fresh agricultural products. It can be seen that transportation has been attached great importance to reduce the price of fresh agricultural products by the Chinese government (Chiung-Lin and Lyons, 2011).

In general, from the fields to the consumers' tables, the circulation of agricultural products generally goes through four main links: the acquisition of origin, intermediate transport, sales to wholesale markets and terminal retails. Agricultural products are purchased by agents, who are responsible for cargo handling, loading and transporting to wholesale markets. Then wholesalers around sell to supermarkets, farmers markets and so on, eventually consumers can get. In the national vegetable trading centers, there is not only acquisition, but also a lot of origin wholesales. Wholesale sales are also divided into firstly wholesale, secondary wholesale and so on in big cities such as Beijing, Shanghai, Chongqing (Rachael *et al.*, 2011; Zhu *et al.*, 2011). Agricultural products will generate the corresponding costs and expenses after each circulation. These expenses include: agricultural agents need to obtain a reasonable return, transportation cost, the loss of rotten fruit and vegetables and the operating expenses of wholesale markets (Yang *et al.*, 2010). Therefore, the corresponding costs of each circulation

are through the layers increases to gradually transfer to the downstream end consumers and ultimately form the "stacking effect", to pull up the terminal sales price of the agricultural products (Yin and Zhao, 2011). According to Commerce Department statistics, the price of every link of the circulation of agricultural products increases at least 5 to 10%, but in fact every link of the circulation of agricultural products increases about 20% or more. It directly leads to the phenomenon of growing vegetables cannot make money but buying vegetables cannot save money and causes the fresh agricultural products large loss as well as high logistics expense. Although the Chinese government has taken on related policies like free access fees of vehicles for transportation of fresh agricultural products, but Chinese current domestic logistics expense of fresh agricultural products still accounts for about 70%, which is much higher than the international average standard of 50%. Therefore, the logistics expense of fresh agricultural products also has reducing space (Chen and Dan, 2008).

This study has a research on logistics mode of fresh agricultural products in china. Logistics costs are an important part of the price of fresh agricultural products. By researching the characteristics of fresh agricultural products, this study get the main reasons for the high price of fresh agricultural products in China, there are the high logistics cost, large loss and poor preservation in logistics process. Then some measures are proposed to reduce fresh agricultural products logistics costs in China. The measures are the advanced direct sales model, advanced cold chain technology and advanced networks of cold chain logistics and building fast fresh agricultural products information platform.

### **THE CHARACTERISTICS OF THE CIRCULATION OF FRESH AGRICULTURAL PRODUCTS**

With increasing urbanization and the rapid development of modern transportation in China, fresh agricultural products in the production areas cannot be completely self-production and sales, so the vast majority of agricultural products must be transported to other areas for sale. The characteristics of fresh agricultural products in China are mainly reflected in the following aspects:

- **High logistics costs:** Agricultural products logistics cost includes the sum of human, material and financial resources of warehousing, transportation, packaging, processing, information processing and other logistics links in the forward or reverse circulation process. According to statistics, the domestic logistics expense of fresh agricultural products accounts for about 70% of their cost, for example, the cost of circulation of

vegetables is 2-3 times as the world average. The high cost of the circulation of agricultural products is mainly that many circulation links of the agricultural products from the fields to the tables lead to an increase in the cost of agricultural products. Agricultural products each after a circulation will generate the corresponding cost and expense and it causes the high cost of agricultural products circulation. The high logistics cost of fresh products in China is the main factor to push up high price of agricultural products.

- **Poor preservation:** China is a large production and consumption of agricultural products country. Currently fruit and meat production accounts for about 30% of the global output, eggs and aquatic products 40% and vegetables 60%. However, the proportion of cold chain circulation of fresh agricultural products in China is much lower than the level of developed countries and most of the fresh products are still circulated at room temperature. Despite the large amount of the production of fresh agricultural products, but due to the imperfect development of cold chain logistics and other fields, it results in few exports of vegetables and fruit, which account for only 1-2% of total output and 80% are primary products and low value-added. Poor capacity of preservation, storage and transportation due to agricultural products cannot be timely adjusted in a wide range of supply and demand, so the problems of "Selling Stalls "and "Black City "haveal ways occurred and large quantities of agricultural products loss on the way. According to incomplete statistics, there are about 37 thousand tons of fruit and vegetables rotting in transit every year in China, which is obviously increased its circulation expense.
- **Large loss:** Due to the fresh agricultural products are perishable and short shelf-life time, the loss of circulation of fresh agricultural products is rotting in the logistics process. The study of National Agricultural Preservation Engineering Research Center shows that, according to the data of National Development and Reform Commission, there are 300 million tons of vegetables production and over 60 million tons of fruit production every year in China. Due to the cold chain transport of agricultural products is lack of protection, the loss rate of vegetables is as high as 15-20% and the loss rate of potatoes is 15-25%, the rate of corn up to 8-12% and the rate of fruit is 10-15%. China's annual production of fruit and vegetables ultimate loss rate is 25 to 30% and only the loss of fruit and vegetables is more than 100 billion Yuan, but The United States is only 1 to 2%, which can be seen that the loss rate of China's fruit and vegetables is very large. If loss rate is able to reach the level of

Europe and the United States, circulation expense of Chinese agricultural products will be significantly reduced. These losses will be transferred to the consumers and ultimately are paid by the consumers.

### THE RELATIONSHIP BETWEEN THE PRICE AND THE LOGISTICS COSTS OF FRESH AGRICULTUREAL PRODUCTS

Transport costs of food imports have to be borne by the consumer. Thus, it seems logical that households with low incomes are quite vulnerable to increases in food prices due to external effects, as the 2008 peak in commodities and oil prices. However, these households also suffer significantly more from inefficiencies of transport chains that lead to an increase in transport costs, especially if these are accompanied by the latter mentioned developments.

**Actual path analysis of the fresh product price and logistics cost effect:** The sales price of fresh agricultural products should include origin price, logistics expense and sales cost. Agricultural logistics costs are in the form of shipping costs, storage costs, distribution processing costs, handling costs and transportation costs, packaging costs and distribution costs. The path of fresh products price and logistics cost effect are shown in Fig. 1. The above analysis shows that the high logistics cost, poor preservation and large loss in the process of transportation of fresh agricultural products in China result in high logistics expense of agricultural products, pushing up the price of agricultural products. According to Commerce Department data shows that from April 25<sup>th</sup> to May 1<sup>st</sup>, 2011, the average wholesale prices of the major cities of 18 kinds of vegetables reduced 4.2% compared to the previous week and the fifth consecutive weekly fall, the cumulative decline of over 20%. However, when the farmers faced with a very low purchase price and a large number of unmarketable vegetables that nobody cared, the prices of vegetables that consumers buy in the supermarkets or farmers markets have not come down significantly. Therefore, currently the main reason is not because of the farm price and sales cost, but the cost of transportation of agricultural products.

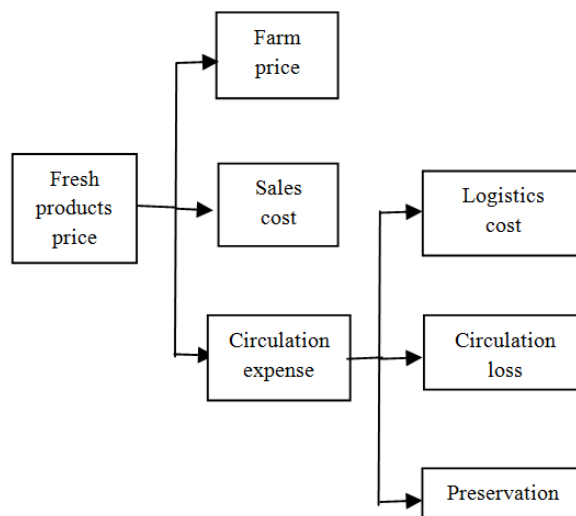


Fig. 1: The structure of fresh products price

### Comparison fresh agricultural product logistics mode:

**Traditional fresh agricultural products circulation mode:** Logistics of fresh agricultural products logistics in most parts of China is still based on the traditional model-based logistics and mainly is wholesale markets and farmers markets combined mode, as shown in Fig. 2. Logistics chain for this mode is longer, too much circulation links leading to the increase in the expense and loss, resulting in increasing in logistics cost of agricultural products.

**New fresh agricultural products circulation mode:** New fresh agricultural products circulation mode is to establish distribution centers in picking areas and to transport fresh agricultural products directly to the supermarkets or farmers markets, as shown in Fig. 3. This mode reduces the circulation links, thus reducing the loss and the cost of agricultural products. Currently, Chongqing Yonghui Supermarket adopts this farmer-supermarket direct supply mode. Yonghui Supermarket docking to the farmers by local enterprises, village cadres or cooperatives, the vegetables directly from the ground to the supermarket, to ensure the speed and quality of fresh products in the supermarket procurement. The proportion of directly picking is up to

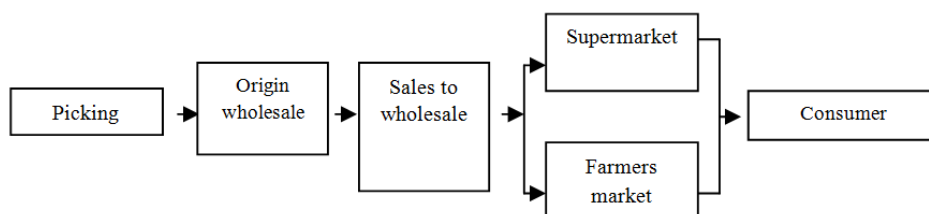


Fig. 2: Traditional fresh agricultural products circulation mode

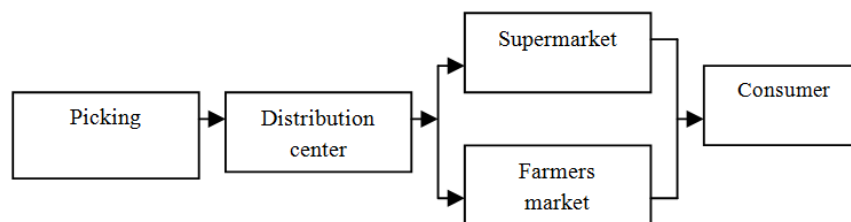


Fig. 3: New fresh agricultural products circulation mode

76%, far higher than the industry average. Yonghui Supermarket establishes a fresh logistics distribution center in picking areas, the farmers directly delivering the goods to the distribution center, distribution center unified then sending to Yonghui stores. The distribution frequency of the distribution team can reach three times a day. Due to delivery higher frequencies, a single product once sent several stores, it can reduce logistics cost. After researching the prices of many fresh agricultural products like vegetables, fruit, meat and poultry in Yonghui, the New Century and Chongbai three supermarkets in the area of the main city of Chongqing, the prices of Chongqing Shang she Group are 50% higher than Yonghui and some reach 70 and 80%.

#### MEASURES TO REDUCE FRESH AGRICULTURAL PRODUCTS LOGISTICS COST

**Advanced direct sales model:** Fresh agricultural products are mainly direct sales in the United States, Canada and Australia. The system of direct sales is well-developed of North American mode and the sales of agricultural products are mainly in direct sales. In U.S.A, the proportion of fruit and vegetables origins with large supermarkets and chain distribution network of direct sales accounts for about 80%, while through the wholesale markets sales accounts for only about 20%. Due to the development of these national retail chain operating network and supermarkets, the size and power of the retailers are growing. The circulation formation emerges which claims stable supply, timely delivery and the direct origin. Most of the circulation of agricultural products is traded from origin sales directly to retailers. Developed highway network and modern transport fresh facilities provide an important technical support for direct origin in New York. Therefore, according to the characteristics of fresh agricultural products, China can gradually change the traditional circulation mode to the new circulation mode, then it can reduce the logistics cost.

**Advanced cold chain technology:** According to the data shows that, of the fresh agricultural products, there are about 50% of vegetables and fruit, 100% of fish, meat and milk and 25% of block products and root

products, so they all need to be refrigerated. Therefore, frozen and refrigerated storage technology takes an important role in extending the preservation and shelf life of agricultural products, reducing the logistics cost of fresh agricultural products and expanding the sales range of agricultural products. Currently, Chinese agricultural products mainly are room temperature logistics, so it results that loss rate of vegetables and fruit is more than 10%. Proportion of developed countries such as Japan, Europe and the United States agricultural products into the circulation of cold chain system is more than 90%, but meat accounts for only 15%, vegetables account for 5% and aquatic accounts for 23% into the cold chain system in China. Even the use of cold chain transport, the thermostat transport often has interruptions, which will bring corresponding loss. If using frozen and refrigerated transport, it can make fresh agricultural products always in low temperature environment specified in the production, storage, transportation and sale of various links and improve product freshness to ensure the quality of the products effectively.

**Advanced networks of cold chain logistics:** The storage location, temperature, humidity, transport, primary processing and packaging and so on of agricultural products after harvest will be direct impact on the final quality and sales. The world's developed countries all attach an importance to the storage, preservation and processing of agricultural products in agricultural development. In order to minimize the loss of agricultural products after harvest, the Western developed countries draw up strict standards and operating specifications in sorting, preservation, storage, transportation and other links. As well, advanced technology equipments and management experience provide a solid guarantee to improve supervision and precision control, so relevant experience is worth learning for China. Since the development of agricultural cold chain logistics in Canada so many years, it has built a comprehensive cold chain logistics system of common development of the waterways, railways, highways and civil aviation. The various modes of transports achieve better convergence and cooperation and it forms the cold chain logistics network which matches with the Canadian economy development. Therefore, in order to

reduce the loss of fresh agricultural products and improve freshness, our government should increase investment of the cold chain transport, establish perfect cold chain logistics system and support cold chain transport through relevant policies.

**Fast fresh agricultural products information**

**platform:** From the 1970s to the mid-1980s, the development of computer technology and application software's provide auxiliary management tools for enterprises. The popularity of computer applications makes advanced logistics management technology as MRP (Material Requirements Planning), MRPII, DRP (Distribution Requirements Planning) DRPII, Kanban (the Kanban system) and Just-in-time (real-time) come into being and improve constantly. They have been applied in the production scheduling, inventory control, order processing and a series of activities and promote logistics activities the integration process. Agricultural cold chain logistics supply chain management system through electronic virtual IT track a variety of goods and use dynamic to monitor the cold chain vehicles.

No matter farmer-supermarket direct supply or trade and agricultural cooperation, a strong logistics system is essential, which requires the support of information technology. Development of logistics information technology of agricultural products promotes agricultural products logistics to be information, digital and intelligent. To build a comprehensive agricultural products logistics information platform will enable farmers to benefit from consumers or regulators. Information technology is the key to reduce logistics cost and improve logistics efficiency and more quickly achieve market conduction as well as effective solutions to maintain a stable agricultural economy. The e-commerce platform can plan the best logistics and transportation routes and save a lot of time to reduce the loss probability of agricultural products rotting in transit. Therefore, in order to reduce the loss of fresh agricultural products, the Chinese government should establish and improve the information system of agricultural products, to reduce the expense of circulation by reducing the loss of fresh agricultural products.

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