

Improvement in logistics of fresh agricultural products

Jiashi Liu¹, Xinsheng Ke¹

¹School of Economics and Management in Beijing Jiaotong University, Beijing, China, 100044

11120694@bjtu.edu.cn

Abstract: There are many problems in logistics of Fresh Agricultural Products. In order to ensure the safety of fresh agricultural products and to decrease the price gap of field price and consumption price, it is important to reduce fresh agricultural products loss during logistics and cut down logistic cost. The essay first introduces the concept of Fresh Agricultural Products and the development status of Fresh Agricultural Products logistics. Then, the cause of problem is discussed. Finally, the solutions to the problems are put forward.

Keywords: Fresh Agricultural Products, Food Safety, Cold Chain Logistics

1. An Overview of the Agricultural Products

1.1. The Definition of Fresh Agricultural Products

Fresh agricultural products are the fresh vegetables, fruits, aquatic products, poultry and meat products, which is closely related to our living.

1.2. The Scope of Fresh Agricultural Products

Fresh agricultural products include fresh vegetables, fresh fruits, fresh seafood, live animals and poultry and fresh meat, fresh eggs, fresh milk.

1.3. Characteristics of Fresh Agricultural Products

Fresh agricultural products are fresh, perishable. The provisions of the logistics time limit to the perishable nature of fresh agricultural products, which make the selling fresh agricultural products logistics difficult, high cost, much higher than the average of agricultural products. It also needs special logistics and facilities. Characteristics of fresh agricultural products: seasonal, regional, cyclical, risky. Production sale characteristics: high demand, low unit value; price volatility, market risk; short on-shelf time.

2. The Development Status of the Fresh Agricultural Products Logistics

Fresh agricultural products can be conveyed through various channels from the origin to the city. Urban distribution is a process from a wholesale market to the point of sale terminals to protect the supply of fresh agricultural products. With the growing traffic demand and deteriorating traffic conditions, the policy of city traffic is increasingly strengthened; urban distribution of fresh agricultural products has been greatly restricted(Chen & Dan,2009). The contradiction between the growing demand of fresh agricultural products and fresh agricultural products distribution system is lagging behind has become one of the main problems of the supply of fresh agricultural products.

The price of agricultural products around the production place is not high, while the prices of vegetables sold in the city remains high. Prices of agricultural products in urban and rural areas vary widely.

According to media reports, in our country the rot deterioration lost of fruits, vegetables and other food in transit is valued at approximately \$ 700 million a year, resulting in a huge economic waste.

3. Logistics Problems of the Fresh Agricultural Products

3.1. Prices of Agricultural Products is High, but the Farmers' Income is Limited

In recent years, fresh agricultural products industry faces increasing challenges. In the first half of 2011, in many places in our country on the one hand "low vegetable prices hurt farmers"; on the other hand, urban residents reflect the phenomenon of high vegetable price. This includes goods vehicles hard in getting into the city, the astronomical road toll and road freight fines, supermarket slotting allowances, the logistics of double taxation problems.etc.

3.2. Food Security Issues

The loopholes in the supervision of the relevant government departments and unscrupulous businesses earn dirty money, domestic food safety problems emergence frequently. Food industry affects the people's health. Food safety problem have attracted the public's attention. The quality problem of fresh agricultural products is significant. Problems of injection pig meat products, vegetables, pesticide residues are worrying.

4. Cause of the Problem

4.1. There are Redundancy Processes in the Supply Chain

The communication of agricultural products is too long and wholesalers at all levels have to get their own profit. The buyers suppress the purchase price of agricultural products in rural areas, so the farmers' income increases difficult. Logistics costs are high, so the high price of urban fresh agricultural products is brought up.

4.2. Cold Chain Logistics is Underdeveloped

Processing, preservation, refrigeration, packaging bases are far from the fresh agricultural products and production base, fresh agricultural products are in high breakage rate. Special transport vehicles, refrigerated trucks, sealed railroad car are in short.

Fresh agricultural products are still at normal temperature logistics or natural logistics. Thus the high water constitution of fresh agricultural products, preservation of it will greatly limit the transport radius and trading hours.

4.3. Logistics Information Technology Usage is still in Low Degree

Fresh agricultural products logistics requires a robust, fast, sensitive and reliable logistics management information network and market supply and demand information. Farmers access to agricultural production and sales information to rely on traditional methods. Many logistics service enterprises have not applied IT to deal with the logistics information. These have caused the blindness in the communication of fresh agricultural products.

4.4. Logistics Infrastructure are Lagging Behind

Compared to the large number of fresh agricultural products production and sale, fresh agricultural products logistics infrastructure equipment is at a low level. First, rural road grade is very low and in bad road condition, very few highways and high-grade highways. This has caused the lead time too long and the logistics freight higher, increasing waste and operational risks in the transportation of fresh agricultural products. Second, fresh agricultural products logistics is still in a "scattered" stage. About 60 percent of the city's logistics cost of agricultural products is from the fresh agricultural products communication. The fresh agricultural products logistics lack of the dedicated refrigeration equipment and warehouses, transport vehicles are still the open-top cars or bulk transport, resulting in serious loss of fresh agricultural products.

5. Solutions

5.1. Use the Third-party Logistics

Actively introduce modern logistics enterprises to participate in the flow of

fresh agricultural products. Effectively change the concept of single transport operators, completely change the business model. To improve the communication of agricultural products, improve operational efficiency, reduce costs, increase farmers' income, professional third-party logistics companies should be introduced to do the transportation and distribution, to reduce costs and improve operational efficiency (Logan, 2000).

Introduction of local logistics companies, third-party companies in the production base near the base of the processing, preservation, refrigeration, packaging of fresh agricultural products. Shandong Province Anqiu County, near the production base in ginger, has a large wash ginger plant, ginger processing plant, ginger shipped from the production base after handling wash the ginger plant, after the ginger processing, processing into ginger powder and other 20 kinds of products exported to foreign countries to earn foreign exchange. The advantage of this model are: minimum to reduce the destruction of its natural and human factors; processing, preservation, refrigeration, packaging base built in the near production base can solve the employment problems of the local surplus labor and increase the value-added products.

5.2. Build Fresh Food Safety Traceability System

Frequent food safety problems are very serious. Great importance is attached to agricultural products safety. In order to realize information asymmetry, it is important to establish and improve fresh food safety traceability system.

Food traceability system includes information on all aspects of the food supply chain, such as identification, collection, transmission, associated management and information integration in order to achieve traceability throughout the supply chain(Li et al.,2010;Auyong et al.,2011). Food safety traceability system includes tracking and tracing two aspects. Tracking is to follow the path capacity of a particular unit or group of products running from the supply chain upstream to downstream. For fruits and vegetables and other agricultural products, it means the ability to track vegetables, fruits from the farm to the POS retail. Tracing is from downstream to upstream of the supply chain to identify a particular unit or group of products, sources of capacity, the ability to back the origin, purpose and location of an entity through the records identified. For fruits and vegetables and other agricultural products, it is the ability to trace the vegetables, fruits from the POS retail to farm.

The elasticity of demand for quality fresh agricultural products is bigger than 1, while the elasticity of demand for poor quality fresh agricultural products is smaller than 1, so there will be the phenomenon that low-quality products are eliminated. But due to profit purpose sellers deliberately confuse the two.

Abnormal trade phenomenon appeared on the market similar to the "bad money drives out good money", and ultimately the market has become the typical lemon market. In the supply of fresh agricultural products, low-quality agricultural products drive high-quality agricultural products out of the market. Therefore it is necessary to establish the agricultural products quality tracking system, making the quality of agricultural products can be easily signaled and achieved a separating equilibrium to ensure the identification of high-quality agricultural products to be recognized, so as to promote the production and consumption of high-quality agricultural products.

5.3. Use Network Marketing

5.3.1. Network Marketing of Agricultural Products Overview

E-commerce platform can be used to connect the vegetable producers and consumers. Communication system which is in the ‘farmers - e-commerce platform - Consumer ’form is more efficient than the past form of ‘farmers - large wholesale market - traders - consumers’. Implementation of network marketing can get better transportation and distribution level, reduce costs and improve efficiency(Munson & Rosenblatt,2001).

In the online supermarket, vegetable farmers will produce directly to the consumers. When the vegetables are sold, third-party companies charge a fixed commission in accordance with the agreement.

Eliminating the need for wholesale markets, seller. The fresh agricultural products sell vegetables directly from vegetable bases to consumers, reducing the cost in the middle of the communication, which allows consumers in time to have information about the prices of organic agricultural products. As is shown in Fig. 1 and Fig. 2.

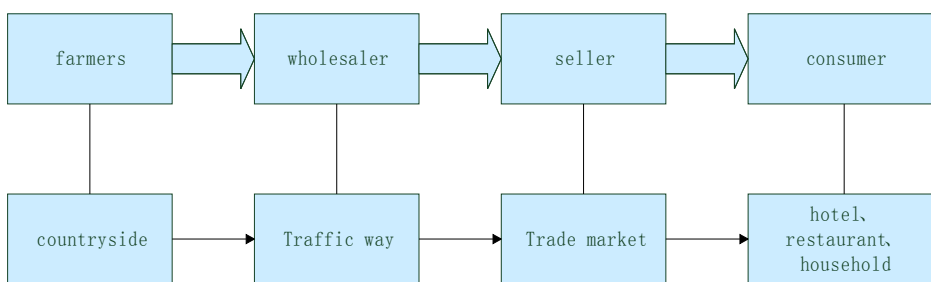


Fig. 1: The traditional mode of supply

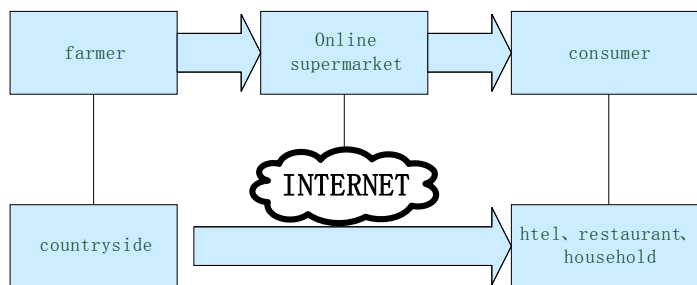


Fig. 2: Web-based marketing mode of supply

Take Agricultural Science and Technology Co., Ltd. of Qingdao as an example. It helps Qingdao people to realize buying green and organic agricultural products online. Fresh organic agricultural products could be bought on online supermarket (www.52266.com). The goods cover the green organic fruits and vegetables, fish, eggs, whole grains, and characteristics of dry goods food. Qingdao citizens in the future will be able to stay at home, enjoy the green organic agricultural products .Consumers can use any one online payment bank card for online payments. Consumers can also purchase a living off stored value card payment if you can't use online banking. Through Internet attentive service and directly delivery can be brought to their homes.

Advanced online sales platform can provide consumers with a comprehensive green organic food distribution and nutritional health care services. Therefore, actively build a heath food environment by online shopping basket for the country.

5.3.2. Data Mining

1) To guide trading

According to the price fluctuations of agricultural products, statistics, a large number of events is repeated in line with normal distribution, so we can identify the distribution of fresh agricultural products, to guide the production and trade of agricultural products.

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

- μ : reference price,

- $\mu-\sigma$: it is the minimum protective prices, the minimum purchase price,

- 6σ : transaction principle.

The probability of fall into the interval area of $[\mu-3\sigma, \mu+3\sigma]$ is 99.99966%.It means that to do one million transactions, in which only 3.4 times out of this range. Therefore, trading price out of in the 6σ range is unreasonable, the price should be in the $[\mu-3\sigma, \mu+3\sigma]$ interval.

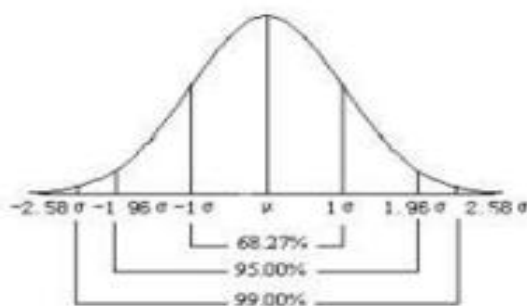


Fig. 3: Obey the (μ, σ) parameter normal distribution

2) Rating system to ensure quality

Trading of agricultural products on line allows consumers to report complaints. Consumer can do credit rating and quality rating. This can give the seller the punishment of cheating and not keeping one's word, so as to help businesses improve product quality.

5.4. Improve the Road Transportation System

Prices of fresh agricultural products gradually increase from the place of origin or large wholesale centers to the outside, showing the palm-shaped ring equal price lines. Along the road prices rise much slower, railway along the price line rose slower than along the highway and waterway.

Agricultural products to obtain the lowest price point in the center, the more away from the center of logistics costs the higher prices of agricultural products. As is shown in Fig. 4. The palm-shaped extension of the supply of agricultural products is due to the transit line can achieve a direct impact on prices of agricultural products, more convenient transport, lower the logistics cost. As shown in Fig. 5.

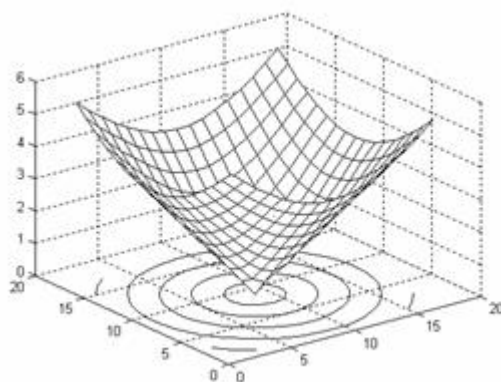


Fig. 4: The price level of the distribution of three-dimensional map

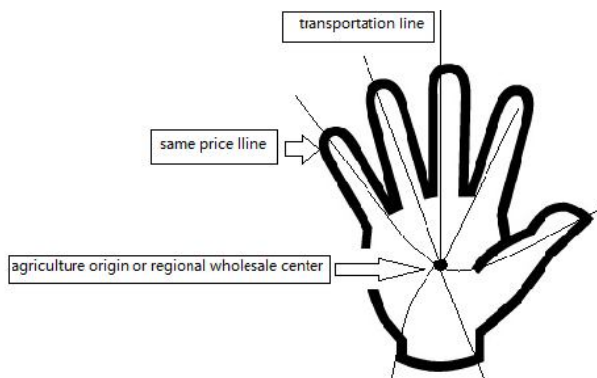


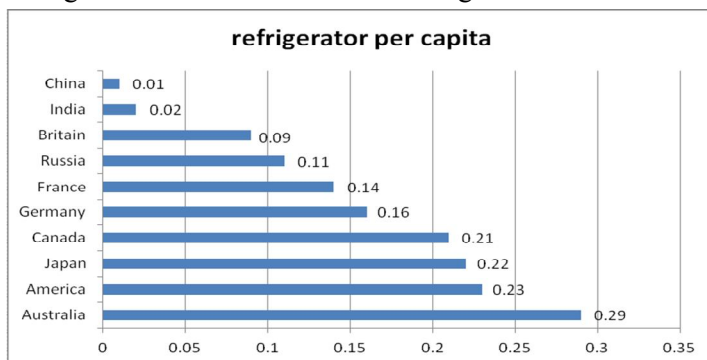
Fig. 5: The price level of the palm-shaped floor map

5.5. Apply Cold Chain Logistics

Fresh agricultural products is characterized by "new" and "fresh" high water content of fresh agricultural products, short shelf life, perishable cold chain refrigeration temperature monitoring. It should be conveyed in good condition so as to prolong the quality guarantee period to guarantee its excellent quality and food security. The cold chain is able to control the temperature of perishable products, to ensure the safety of its use, to ensure that consumers still have good quality products at the time of purchase.

Every aspect of the cold chain needs to participate in the control. Each link in the chain goes wrong may make the cold strand breaks. It may be on the platform in a warehouse or in transit, or in a stored procedure, or in retail supermarkets. If a link is broken, then it will affect the final consumption quality.

It is needed to add to investment. China's serious shortage of cold storage facilities and needs to purchase a refrigerated transport equipment, creates a sufficient number of cold storage to ensure the rapid development of China's cold chain logistics and the good communication status of fresh agricultural products. Refrigerator amount is shown in the Fig. 6.



Source: International Association of cold storage, the China Statistical Yearbook, Jones Lang LaSalle

Fig. 6: Comparison of world refrigerator per capita

Introduction of one-stop cold chain logistics services in order to minimize losses in fruits and vegetables during transport. Cold chain logistics cost of agricultural products is huge. The social investment will add 200 billion yuan in the next five years. In 2015, China will initially build agricultural products cold chain logistics network service system so that the communication rate on fruits and vegetables, meat, aquatic products, cold chain can reach respectively 20%, 30%, 36%, the communication spoilage loss ratio will be cut down to 15%, 8%, 10%. At present, our fruits and vegetables, meat, aquatic products enter the proportion of cold-chain systems that only 5%, 15%, 23%. In Europe, the United States and Japan and other developed countries, the agricultural products to enter the cold chain in communication in more than 95%. So there still have a long way to go, we need a big progress, so as to catch up.

6. Conclusions

The supply of fresh agricultural products has its own specialty. Good logistics system relies on the professional logistics equipment and the use of information technology to reduce supply chain links and improve logistics efficiency. Improving the quality of fresh agricultural products communication system can make contribution to the increasement of farmers' income and reduction of the food price in the city. Reduce of social waste of resources and promote long-term development of fresh agricultural products industry.

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