

# The Analysis based on the Logistics Cost Controlling of the Fresh Agricultural Products

Taking Shijiazhuang Qiaoxi vegetable wholesale market as an example

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**Abstract**—This paper takes Shijiazhuang Qiaoxi vegetable wholesale market as an example, using several typical agricultural products of fresh agricultural products in fruits and vegetables as the research object. Through the method of questionnaire investigation and field survey, we investigated the main circulation patterns in Shijiazhuang Qiaoxi vegetable wholesale market. We get the logistics cost data from the origin of fruits and vegetables wholesale market to consumers each circulation link, and access to the data collation and analysis, find that the fresh agricultural products transportation cost is the highest proportion of, nearly 40 of the total cost of logistics and satsuma logistics cost is the highest. Finally, through the analysis on the main factors influencing the logistics cost of fresh agricultural products, We propose to improve the fresh agricultural products logistics cost control level of countermeasures.

**Keywords**- fresh agricultural products;circulation pattern; cost control; cost structure

## I. INTRODUCTION

As the saying goes, "dish cheap is hurt farming, food you hurt people". The price of agricultural products is always the focus of the society. In recent years, fresh agricultural products, example for fruits, meat and vegetable, prices continued to rise. Agricultural products logistics cost is too high is one of the main reasons for the high price of agricultural products. To effectively control the logistics cost of agricultural products is an important way to keep the prices of agricultural products market stability.

Research on logistics cost of fresh agricultural products, mostly concentrated in the descriptive analysis on the phenomenon or a simple economical analysis. Crowell discussed for the first time the cost of and influence factors of distribution of agricultural products<sup>[1]</sup>. Steven pointed out that supply chain cost occurred mainly in the logistics, the cost reduction as an important index of

examination and the operation efficiency of the supply chain<sup>[2]</sup>. Through the empirical research, Xiaoping Hu and Zhichao Yin thought the circulation costs were a key element of determining the competitiveness of agricultural products<sup>[3]</sup>.

The fresh agricultural product specific varieties as the subject of study only in recent years has specific, in-depth. Zhihong Yang, taking the Shen Yang city as an example, the wholesale market of vegetables from the origin to the retail terminal (supermarket) the main circulation of all costs incurred are analyzed, summarized the factor of restricting the development of circulation channels of agricultural product supermarket<sup>[4]</sup>. Xiaowei Wen in a variety of vegetable variety combination as an example carried out an empirical study on Guangzhou vegetable market, focused on the analysis of the cost of circulation of agricultural products supply chain and the matching of related interests<sup>[5]</sup>. Yimiao Yang and Qinggong Xiao, with the grape as the research object, through in-depth interviews on the subject of circulation links under different circulation channels, investigated the grape cost, efficiency and profit distribution under the flow of different circulation channel<sup>[6]</sup>.

At present, The combination of fruits and vegetables in the fresh agricultural products for the study has been conducted empirical research on logistics cost control. This paper takes Shijiazhuang Qiaoxi vegetable wholesale market as an example, using several kinds of typical agricultural products of fresh agricultural products in fruits and vegetables as the research object. The main influence factors of the logistics cost of fresh agricultural products are analyzed. And the paper put forward the suggestion to improve the fresh agricultural products logistics cost control level of countermeasures.

## II. THE LOGISTICS COST OF FRESH AGRICULTURAL PRODUCTS AND COMPONENTS

To study the fresh agricultural products logistics cost control, first of all the logistics cost of fresh agricultural products and its composition should be defined. In the national standard GB/T20523-2006 "calculation of logistics cost", logistics cost is the monetary expression of materialized labor and living labor cost logistics activities. The article thinks that the logistics cost of fresh agricultural products refers to the agricultural product transfer including cost still or reverse circulation process of materialized labor and living labor monetary sum in space. Fresh agricultural products in the logistics activities, included transportation, storage, combined packing, loading and unloading, handling, distribution, distribution processing, logistics information links by the expenditure of human, financial, and material resources.

The composition of the logistics cost, many scholars have studied. America logistics science professor RonaldH. Ballou will be the logistics cost in detail, mainly including transportation cost, inventory cost, order processing cost, management cost<sup>[8]</sup>. In the national standard GB/T20523 -2006 " enterprise logistics cost calculation", the logistics cost is decomposed into transportation costs, warehousing costs, packaging costs, handling costs, circulation and processing cost, logistics information, logistics management costs logistics and inventory related liquidity occupation cost, inventory risk cost and inventory cost of insurance<sup>[7]</sup>. Jing Peng thinks the logistics cost mainly has some cost as follows: inventory costs, transportation costs, logistics costs and hidden costs<sup>[9]</sup>. Huixin Guo believes that the agricultural products cold chain logistics cost from the structure can be divided into: the transportation cost, storage cost, punishment cost and management cost<sup>[10]</sup>.

On the basis of the study, combined with the investigation of Shijiazhuang Qiaoxi vegetable wholesale market, according to the function, the logistics cost of fresh agricultural products is divided into: transport costs, packaging costs, handling costs, storage costs, distribution costs, loss cost, logistics information costs and management costs several parts. And this paper is analysis of the logistics cost and its control from operations logistics perspective.

## III. CIRCULATION PATTERN OF FRESH AGRICULTURAL PRODUCT

Shijiazhuang Qiaoxi vegetable wholesale market of agricultural products marketing is the national wholesale market, the market of radiation throughout the country 29 provinces, city, and autonomous region. The market supply of 80 agricultural capital and surrounding areas. The annual trading volume reached 6.02 billion yuan, more than 4 million passengers daily traffic. With the market as the research object to study the fresh agricultural products logistics cost is a representative. fruits and vegetables of Shijiazhuang Qiaoxi vegetable wholesale market from Shandong, Guangdong, Henan and

Shijiazhuang city and other places the line. The current market fruits and vegetables of main circulation pattern is as shown in Fig .1.

In the whole process flow, fruits and vegetables are into origin wholesale market by farmers, agricultural brokers or marketing major, and then transported to the wholesale market, then go to the supermarket or the market by fruit and vegetable vendors, finally reach the hands of consumers.

In the circulation mode, logistics cost occurred mainly in the four aspects.

### A. *The fruit and vegetable wholesale market suppliers from origin purchasing fruits and vegetables*

There are two main types of suppliers to acquire the way. one is to contact your manufacturer. Expenses are packing, loading fees and telephone charges, and these charges are belonging to the logistics cost information. Feature of this approach is to save the cost but a waste of time. Two is that the principal agent for the supplier buys vegetables. expenses are mainly market information fee which belongs to the logistics market information fee information cost, packing and loading the fare. Its characteristic is much more cost and time saving.

### B. *From the origin to sell fruits and vegetables*

Fruit and vegetable vendors have mainly two kinds of transportation modes. One is that the suppliers have their own vehicles, hire drivers and according to a certain way to pay salary. This way's expense is by fruit and vegetable vendors themselves burden. The features of this method is lower freight but increasing the vehicle maintenance costs. The second way is to entrust the third party logistics supplier company to complete the transportation, suppliers charge one-time payment of all charges to the third party logistics supplier company which bear the costs incurred in each link transport vehicle.

### C. *Fruits and vegetables into the wholesale market*

This part of the costs are mainly the slotting fee which is included in management costs, storage fees, and industrial and commercial administrative fees which is included in management costs.

### D. *Fruits and vegetables in supermarket or market*

In the city of Shijiazhuang, supermarkets, bazaars or market vendors purchase fruit and vegetable at wholesale market. They generally have their own vehicles, the costs incurred are mainly fuel costs and vehicle depreciation which are included in distribution cost.

Of course, fruit and vegetable will appear consumption in each link, but through the improvement of logistics activities, which can reduce the loss rate.

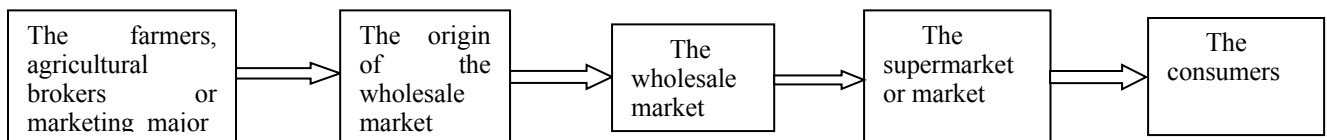


Figure 1. fruit and vegetable circulation pattern

#### IV. THE LOGISTICS COST OF FRESH AGRICULTURAL PRODUCTS

In order to obtain the fresh agricultural products logistics cost data, we choose several typical agricultural products sold in Shijiazhuang Qiaoxi vegetable wholesale market. They are apple, orange, satsuma, tomato, cabbage and wax gourd. These suppliers were conducted a questionnaire survey and interviews. The data were collected and analyzed. The analysis result is shown in table 1.

Drawn from the table 1, the transportation cost accounts for the proportion to be highest, nearly 40%,

followed by the packaging cost, loss cost and distribution cost. And logistics information cost, management fees and handling cost are low, are about 3%. The total cost of logistics ranking is: satsuma, orange, tomato, apple, wax gourd, Chinese cabbage. The main cause of this sort are as follows. Between Shijiazhuang and Guangdong where is the origin of satsuma and orange distance is far, so the transportation cost is large. Henan and Xingtang where are the origin of Chinese cabbage, are closest to Shijiazhuang, so the transportation cost is low. Satsuma, orange and tomato are easy to damage by pressing, the higher cost of packaging. For apple, satsuma and orange, Storage cost is higher.

TABLE 1 STATISTICS OF THE WHOLESALE MARKET FOR AGRICULTURAL PRODUCTS LOGISTICS COST

UNIT: YUAN / KG

Project	logistics information costs	Transport costs	packaging costs	handling costs	storage costs	management costs	loss cost	distribution costs	The total Cost of logistics
Apple	0.015	0.210	0.206	0.068	0.100	0.063	0.240	0.120	1.022
Satsuma	0.017	0.660	0.440	0.052	0.133	0.057	0.360	0.120	1.839
Orange	0.012	0.660	0.420	0.047	0.142	0.047	0.160	0.120	1.608
Tomatoes	0.120	0.433	0.421	0.033	0.033	0.023	0.180	0.120	1.303
Chinese Cabbage	0.014	0.107	0.030	0.020	0.028	0.023	0.010	0.120	0.352
Wax gourd	0.015	0.383	0.030	0.032	0.020	0.007	0.005	0.120	0.612
The mean	0.022	0.409	0.258	0.042	0.076	0.037	0.159	0.120	1.123
The mean / The total cost	1.97%	36.42%	22.97%	3.74%	6.77%	3.27%	14.18%	10.69%	100%

Data sources: Calculation of survey data

Note: from Shijiazhuang to all farmers markets or supermarkets, there is no relation between agricultural product distribution and agricultural products. And the distribution routes are basically the same, so distribution costs are the same.

#### V. THE MAIN FACTORS INFLUENCING THE LOGISTICS COST OF FRESH AGRICULTURAL PRODUCTS

According to estimates, China's logistics costs account for the total cost of 30% ~ 45%, fresh agricultural products or even as high as 60%, while the developed countries logistics cost is about 10%. There are many factors leading to the fresh agricultural products logistics costs so high. In order to promote the logistics cost of fresh agricultural products significantly reduced, and keep the stability of market price of fresh agricultural products,

we will only overcome and solve these factors through effective cost control.

##### A. The lag of the farm product logistics equipment and technology.

First of all, agricultural products logistics equipment technology based is insufficient. The majority of fresh agricultural products rely on ordinary convertible car, train wagon, and other transportation. Warehousing and storage is at room temperature. Preservative measures is only in fruit and vegetable intermediate with ice, surrounded by outside with quilts and other simple measures. The high

preservation technology is lack, such as refrigerated logistics facilities equipment, agricultural products dedicated warehouse. Secondly, the professional logistics allocation is insufficient. Fresh agricultural products mainly rely on the human way of handling, loading and unloading, the efficiency is low, the high cost of loading and unloading, the lack of logistics handling equipment. Thirdly, the logistics of agricultural products standardization degree is low. The fresh agricultural products in circulation processing, packaging and other link is mainly manual operation. The operation time is longer, and the fresh agricultural products logistics standardization degree is low. These will lead to high cost.

#### *B. Agricultural products logistics more transfer links*

At present, the logistics of the main agricultural products of Shijiazhuang Qiaoxi vegetable wholesale market is generally small, and social organization, scale degree is low, single distribution channels. The vast majority of fresh agricultural products must pass through the origin and the wholesale market in two major transportation and changed hands several times to reach consumers. The many times transit and long-distance transport has greatly increased the fresh agricultural products logistics transportation cost and loss cost. For example, Shijiazhuang Qiaoxi vegetable wholesale market tomatoes mostly from Guangdong, and the estate of Shijiazhuang tomato is not in the local sales, which were acquired to vegetable wholesale market sales or other area of Guangdong. After hundreds of transportation and multiple transfer produced tomatoes extruded loss and logistics cost huge expenditures, eventually lead to tomatoes sold at a high price.

#### *C. Agricultural logistics operation mode is not perfect*

Though the research, we find that the agricultural product logistics mode of operation is the most self conducting logistics or self logistics and second party logistics mode. The logistics system of agricultural products has not been perfect. The majority of logistics enterprises only provide a single logistics services, such as transportation, circulation processing, empty car distribution, city distribution. Logistics operation mode is not perfect, and the logistics of agricultural products supply chain cannot be integrated, significantly increased the cost of logistics of agricultural products.

#### *D. Management of agricultural products wholesale market is not reasonable*

Shijiazhuang Qiaoxi vegetable wholesale market is huge in quantity, the number of daily trading, so the market management will inevitably be inadequate. First, the market structure is not reasonable. The market has three major areas, dry cargo area, fruit area and vegetable area. Dry cargo area is located in the south of market, prominent location and easy to find. Fruit and vegetable area boundaries is unknown, more confusion, not easy to find. Irrational market layout extend the fruit and vegetable sales time, increased fruit and vegetable

consumption. Secondly, the market system is not reasonable; fruit and vegetable entry fee is higher, mini vans entry fee is 90 yuan, 20 ton truck entry fee is 160 yuan, 30 ton truck entry fee is 180 yuan. For the fruit, one percent of the price is charged. To charge for the fruit and vegetable cost 3.27. Excessive charges restricts the development of the market, but also increases the agricultural product logistics cost.

#### *E. Agricultural product logistics information is not unimpeded*

At present, the logistics of agricultural products is still in the process by traditional ways to collect information and use the information level, not enough to use the information function. The degree of importance for information is insufficient, and information of agricultural products logistics is not smooth, and even the flow of information asymmetry. Agricultural product logistics information is not smooth and asymmetry. It makes the docking between the fruit and vegetable producers and the fruit and vegetable buyers of slow. Roundabout transport, repeated transportation, no-load transport phenomena often occur. This affected the timeliness of fruits and vegetables, increased fruit and vegetable consumption and created unnecessary information expenditure.

### VI. SUGGESTIONS FOR IMPROVING THE FRESH AGRICULTURAL PRODUCTS LOGISTICS COST CONTROL LEVEL

#### *A. Agricultural product logistics information is not unimpeded To increase the construction of agricultural products logistics facilities*

Agricultural products logistics cost control is not only to reduce logistics cost of agricultural products, but the optimization of agricultural expenditure of the logistics cost, improving the logistics cost of agricultural products. First of all, the government should increase the rural road construction investment, improve the rural road conditions to do the same village, reduce the transportation time and circulation loss. Secondly, agricultural enterprises should increase the fresh agricultural products facilities (temperature chilling facilities, agricultural products professional warehouse, transportation vehicles and tools supporting) construction investment, promote the development of fresh agricultural product logistics cold chain system. Thirdly, agricultural enterprises should increase investment on research and development of packaging technology, processing technology of fresh agricultural products logistics in the logistics standard, improve the level of agricultural products, reduce the logistics cost of agricultural products.

#### *B. Improving the logistics mode of agricultural products*

Shijiazhuang Qiaoxi vegetable wholesale market is a multi middleman dominated circulation pattern. In this mode of circulation, circulation is more, scale is small, and degree of social organization is low. It is suggested to establish the specialized cooperative economic organizations of farmers in the area, to solve the problem of farmers and docking fragmented retail terminal. It can

effectively improve farmers organization degree and the degree of specialization of production. In addition, through the promotion of "production base + business", "processing enterprises + business", "agriculture super docking" model of agricultural product logistics development model, to solve the problem of reducing the circulation link.

#### C. *The formation of agricultural products of third party logistics operation mode*

Agricultural enterprises can set up the distribution center of agricultural products and agricultural products logistics park as the operation model of third party logistics to improve the efficiency of logistics activities. Distribution center Shijiazhuang Qiaoxi vegetable wholesale market only plays the role of city distribution. Large distribution center should be established to expand its functions, including participation in the production, packaging, processing, transportation, warehousing, distribution and other functions. Agricultural enterprises also can build agricultural products logistics park in the vicinity of Shijiazhuang. Through the establishment of business relations with farmers, wholesalers and distributors, agricultural products logistics park can provide logistics processing, packaging, storage, transportation, distribution and other logistics activities to improve and enhance the fresh agricultural products logistics level. This can gradually realize the fresh agricultural products logistics integration, intensive and scale.

#### D. *Improving the efficiency of management of agricultural products wholesale market*

The market efficient management can promote the fresh agricultural products quickly into the market, reduce the loss in the process. First of all, Shijiazhuang Qiaoxi vegetable wholesale market should be the overall layout and scientific planning and reasonable. The fresh agricultural products especially perishable, loss of fruit and vegetable location arrange in a convenient location to improve the logistics efficiency of fresh agricultural products and enhance the time efficiency of fresh agricultural products. Secondly, Shijiazhuang Qiaoxi vegetable wholesale market should also be reasonable development of agricultural products wholesale market system, be appropriate to reduce the wholesale market

entry fees, booth fees and management fees proportion, to reduce logistics cost of agricultural products.

#### E. *The construction of logistics public information platform for agricultural products*

Making full use of modern information technology, to construct public logistics information platform for agricultural products. It can realize the sharing between farmers and enterprises, the logistics of agricultural products between enterprises, between enterprises and consumers of agricultural products logistics information. Through information sharing, the dispersion and regional agricultural products are concentrated in a platform. Agricultural products supply and demand sides can quickly obtain the agricultural product market information, improve the timeliness of agricultural products. Through information sharing, agricultural enterprises can master the logistics of agricultural products in transit status, reduce the circulation of agricultural products, improve the efficiency of agricultural products logistics, and reduce logistics cost of agricultural products.

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