

# Analysis of Key Joints of Agricultural and Sideline Products Logistics under the Guidance of Food Quality and Safety

Xiaofen Wang

School of Electronic Commerce  
Wuhan Technology and Business University  
Wuhan, China  
10791660@qq.com

Xiaodan Ma

School of Electronic Commerce  
Wuhan Technology and Business University  
Wuhan, China  
61331603@qq.com

**Abstract**—The quality and safety of food was influenced by the agricultural and sideline product logistics process. This paper aims to analyze the key joints of agricultural and sideline products logistics to find the reasons that affect the quality and safety of food. Through studying the whole process from supply to consumption of agricultural and sideline products. This paper find supply chain links, logistics operations and logistics informatization all affect the quality and safety of food. In the end, the article puts forward countermeasures from the aspects of standardizing logistics process, completing cold chain logistics system, improving informationization degree and improving logistics system.

**Keywords**—quality and safety; agricultural and sideline product; logistics; key joint

## I. INTRODUCTION

As healthy industry is receiving more and more people's attention, food quality and safety issues are increasingly brought into focus. As an important branch of food sources, agricultural and sideline products are important aspects of people's survival and development. In recent years, incidents about quality and safety of agricultural and sideline foods have emerged, which seriously threaten our safety and health. Agricultural and sideline products logistics is an important joint that is likely to cause food safety problems. The problems of food expiration and damage caused by the transportation and storage of agricultural and sideline products are very common. Therefore, it is of great practical significance to conduct research on food quality and safety issues in agricultural and sideline products logistics. It is also a matter of urgency to understand and analyze the key points of agricultural and sideline products logistics under the guidance of food quality and safety.

## II. KEY JOINTS OF AGRICULTURAL AND SIDELINE PRODUCTS LOGISTICS UNDER THE GUIDANCE OF FOOD QUALITY

### A. Supply Chain

From beginning to the end, the agricultural and sideline product supply chain including raw material procurement, agricultural and sideline product manufacturing, distribution and logistics and terminal retailing. In the agricultural and sideline product supply chain, any problems will eventually lead to food quality and safety issues. The current situation in China is that the chain of the food supply chain tends to break, and all the four joints are facing food quality and safety problems or hidden dangers.

As shown in Fig. 1, in considering the information islands phenomenon in the supply, production, and sales of agricultural and sideline products, as well as the premise of lack of food safety supervision, the supply chain contains the following joints. Firstly, the upstream primary agricultural product suppliers supply raw materials of unqualified agricultural and sideline products. Then the downstream food manufacturers dispersed in different regions will produce harmful or even toxic semi-finished and finished products, which are then classified, categorized, packaged and repackaged through national or global mature distribution and retail joints. Finally, these products are available to the majority of consumption. The four joints, primary agricultural production, food processing and manufacturing, food distribution and logistics and the sales, are all facing conducive and superimposed food quality and safety risks<sup>[1]</sup>

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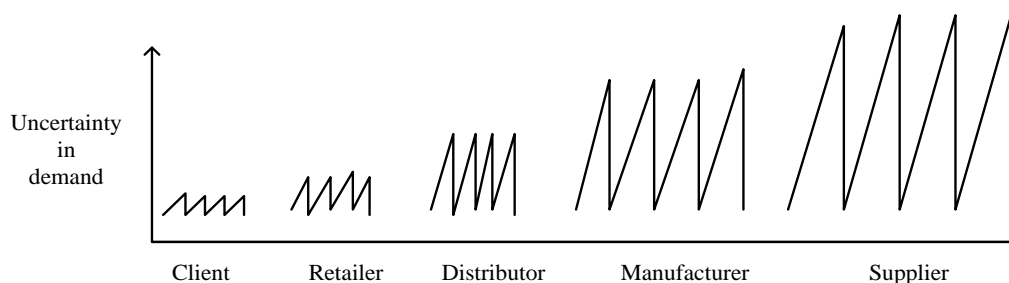


Fig. 1. The Principle of Supply Chain Demand Variation Amplification

### B. Logistics Operation

The distribution channels of agricultural and sideline products often long channels and wide channels which has many levels and members, and any problems in the logistic

process, namely procurement, manufacturing, packaging, transportation and storage will lead to the quality and safety problem of agricultural and sideline products.

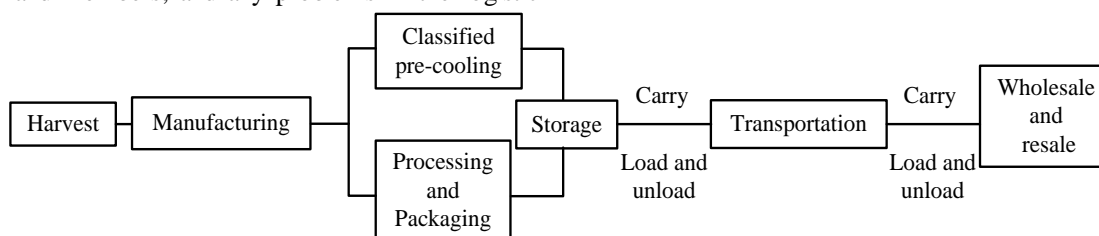


Fig. 2. Logistics Operation Joints of Agricultural and Sideline Products

1) *In the joint of procurement of raw materials:* Since the current agricultural and sideline products in China mainly come from the decentralized production and management forms of the farmers, by who the quality of products provided is uneven, so the agricultural and sideline products manufacturers face many problems when purchasing raw materials. Such as the classification of inspection and quarantine standards and the classification and storage of different quality of primary agricultural products. In addition, the current level of inspection and quarantine technology for agricultural and sideline products are relative low, and the quality and safety monitoring of the procurement process is not complete. Therefore, there are many food quality and safety issues in the procurement of raw materials.

2) *In the joint of manufacturing:* In order to extend the shelf life of foods and improve the aesthetic appearance of foods, some food companies have used excessive amounts of food additives, food preservatives and artificial colors in food production and processing, which has also intensified food quality and safety risk factor.

3) *In the joint of packaging:* The packaging of agricultural and sideline products are crude and the use of packaging materials is lack of standardization. Many of the materials used in packaging are plastic, some of the toxic and harmful substances in which will migrate out under certain environmental media and in high temperature environment, causing secondary pollution and bringing food quality and safety problems.

4) *In the joint of transportation:* Due to the special nature of agricultural and sideline products, the shelf life of some products are relatively short. Some merchants may add excessive preservatives in order to maintain the freshness of

agricultural and sideline products, which directly affect quality and safety of these products.

5) *In the joint of storage:* The sanitation, temperature, ventilation, pests and other factors of the warehouse will also affect the quality and safety of agricultural and sideline products.

6) *In the joint of loading and unloading:* Due to improper operation of logistics, the packaging of agricultural and sideline products may be damaged, causing bacterial intrusion and other problems, and even the quality and safety incidents of agricultural and sideline products.

7) *In the joint of distribution:* The distribution of some agricultural and sideline products requires timeliness, but many logistics enterprises could not meet the time requirement when distributing agricultural and sideline products, which leads to potential safety hazards in the quality of agricultural and sideline products.

### C. Cold chain logistics

Raw and fresh foods in agricultural and sideline products are prone to spoilage and be deteriorated, which requires high storage and transportation conditions. Consumers' high requirements for the quality and safety of ingredients make the cold chain logistics capacity the key to the development of agricultural and sideline food. The cold chain logistics system of developed countries is relatively perfect, but there are still many security risks in China.

First, the cold chain logistics infrastructure is inadequately equipped. In the domestic distribution market, refrigerated vehicles account for a small proportion of freight vehicles; key logistics nodes such as large agricultural product wholesale

markets and regional agricultural product distribution centers lack facilities for freezing and refrigerating. At the same time, there is a shortage of freezer and correspondingly carried vehicles in the export market. In addition, compared with other major countries, the stock of China's cold storage is quite low, which is unable to serve the large consumer group.

Secondly, the cold chain logistics transportation mode is not developed enough. Raw food require high level of aging and insulation measures, including the technical research and development for distribution packages, to make sure use safer and better delivery bags for insulation and pre-cooling. For example, existing incubators, thermostats, and other devices can effectively ensure that foods are kept fresh from the cold chain warehouse to consumer. The transportation of cold chain logistics in China is mainly automobiles and trains, and air transportation takes small proportion, besides, the refrigeration technology is not advanced enough. Therefore, there are hidden dangers of agricultural and sideline products in this process.

#### *D. Logistics Informatization*

The degree of informatization of agricultural and sideline products in China is generally low, mainly because the agricultural and sideline products logistics enterprises pay less attention to informatization, and their traceability is limited when the quality and safety problem of agricultural and sideline products occur. China's agricultural and sideline products logistics enterprises are relatively lacking in the establishment of complete agricultural and sideline products files, process monitoring systems, and warehouse automation systems. Therefore, the degree of information management of agricultural and sideline products is also relatively low. In addition, when problems occur in agricultural and sideline products, it is difficult to accurately locate problems through information management, which adverse to solve the quality and safety incidents of agricultural and sideline products. Therefore, only by vigorously developing the whole process of information management of food logistics, can the quality and safety risks in agricultural and sideline products logistics be minimized<sup>[2]</sup>.

### III. COUNTERMEASURES AGAINST FOOD SAFETY PROBLEMS IN AGRICULTURAL AND SIDELINE PRODUCTS LOGISTICS

#### *A. Reshape the Supply Chain*

Taking the advantage of the experience of quality and safety management of agricultural and sideline products supply chains in developed countries and regions such as the United States and the European Union to build a food supply chain information sharing platform. Food supply chain quality management involves not only logistics management, but also information flow management. In order to ensure the quality and safety of agricultural and sideline products, agricultural and sideline product supply chain enterprises should be centered on the core enterprises and jointly construct an effective information platform system. It is necessary to comprehensively use advanced bar code technology, radio frequency identification technology (RFID) and Internet information technology to establish a quality and safety information platform for agricultural and sideline products

supply chain. It enables the integration of quality and safety information in the entire agricultural and sideline product supply chain, and upstream and downstream enterprises in the supply chain can realize information sharing and traceability.

#### *B. Standardize Logistics Operation of Agricultural and Sideline Products*

Firstly, agricultural and sideline products logistics enterprises should establish a sound quality and safety management system to regulate the behavior of all relevant staff, and prevent the occurrence of agricultural and sideline products safety problems. Secondly, establish a systematic agricultural and sideline product logistics operation norm. From the packaging, transportation, loading and unloading to distribution and other key joints, we must carry out strict regulations and form a process management. Prevent the occurrence of operational risks. Thirdly, the relevant staff will be trained to improve their professional quality and reduce the negative impact of their behavior on the quality and safety of agricultural and sideline products.

#### *C. Establish a Complete Cold Chain Logistics System*

On the one hand, increase the investment in infrastructure and supporting facilities for cold chain logistics. Based on the existing infrastructure, relevant facilities should be continuously updated, and investment in necessary facilities such as cold storage should be increased, to fully guarantee the safety foundation and supporting facilities of raw and fresh foods, gradually minimize the gap of the development of cold chain with developed countries, and ensure the safety of fresh food. On the other hand, the coordinated development of variety modes of transportation could meet different needs. According to the timeliness of different agricultural and sideline products, a variety of transportation modes such as roads, railways and airplanes could be chose to ensure the quality and safety of agricultural and sideline products while reducing transportation costs.

#### *D. Improve the Degree of Informatization*

Agricultural and sideline products logistics enterprises should establish an information management system for the entire process. Firstly, establish an electronic file for agricultural and sideline products to in case problems occur. Secondly, establish a sound process monitoring system to strictly supervise the transportation process of agricultural and sideline products to prevent the occurrence of damage or pollution. Thirdly, improve the automation of the intermediate links of agricultural and sideline products logistics process. Taking the advantage of more efficient and advanced logistics information technology, such as GPS, WMS, etc. to improve logistics efficiency, reduce human operational risks, and better ensure the quality and safety of agricultural and sideline products<sup>[3]</sup>.

#### *E. Improve the System of Agricultural and Sideline Products Logistics*

First, supplement the laws and regulations related to agricultural and sideline products logistics. Improve the relevant regulations on agricultural and sideline products logistics, and ensure that the quality and safety of food in agricultural and sideline products logistics can be relied upon

regulations. At the same time, supplement the content of food safety in the regulation of the relevant regulations of the logistics industry. With the complement of different laws, a comprehensive legal management could be achieved. Besides, more laws and regulations should be introduced to meet the needs of the rapid development of agricultural and sideline products logistics. Specifying regulations on agricultural and sideline products logistics from transportation and storage to loading and unloading processing, and improving the regulatory laws and regulations on food logistics safety to punish illegal activities in a time, which is also facilitate the establishment of agricultural and sideline products logistics safety evaluation system.

#### IV. CONCLUSION

The logistics joints of agricultural and sideline products is of great importance and decisive significance for food quality and safety. Therefore, we should adhere to the two ways to improve the level of agricultural and sideline products logistics services. On the one hand, we should regulate the behavior of logistics companies from the level of laws and regulations, and enhance the safety consciousness of consumers. On the other hand, logistics companies should find reasons and solutions

from their own perspectives, and upgrade and optimize from the aspects of enterprise logistics operations, informatization level and facilities and equipment investments, so as to ensure the safety of agricultural and sideline products.

#### REFERENCES

- [1] Feng Junli. Research on Quality and Safety Management Mode of China's Food Supply Chain [J].World Agriculture.2015(9):227-232.In Chinese
- [2] Wang Jiyin. Food Safety Problems and Countermeasures in Food Logistics. Journal of Food Safety and Quality [J].2018(9):2019-5021.In Chinese
- [3] Liu Fan. Research on the Development Countermeasures of Food Logistics from the Perspective of Food Safety [J].Hebei Qiye,2017,(12):89-90.In Chinese
- [4] Yu Haifeng. The Status Quo and Problems of Fresh Food Logistics and Consumption in China's Supermarkets, Food and Nutrition In China 200 (2) .In Chinese
- [5] Swisslog(Shanghai) Trading Co., Ltd.. Seamless Production and Distribution of Americold's Low Temperature Distribution Center [J]. Logistics & Material Handling,2018,(6):100-102.In Chinese
- [6] Wang Jining,. Domestic and Foreign Review about the Information Transparency of Food Safety during Logistics Process [J]. China Condiment,2017,42(6):159-164.In Chinese