

Research on China's Food Safety “Multi-head Segmentation” Supervision Based on the Perspective of “Full Process”

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Abstract. Food, which is from raw materials to edible products, must go through the three stages of food production, processing and sales. The state must supervise every link, thus forming a chain of food safety supervision, the entire chain of food chains. Every aspect can be a hotbed of insecurity. In view of this, the incentives for food safety incidents under the supervision of multi-head segmentation are complex. Food safety risk factors are widely present in every small part of the food chain. The links are closely linked and interlocked. Therefore, it is necessary to disperse the food chain. All participants in different functions share responsibility for food safety.

Analyze the Characteristics of Related Subjects from the Perspective of Functional Decentralization

The food supply chain involves many links. As far as the single-category foods are concerned, they have to go through all the links from production to consumption in the entire food chain, and there are a large number of participants in each link and they have the quality. The safety of maintaining food play an irreplaceable special role. From the perspective of “whole process”, food safety supervision can be divided into three basic links: food raw materials, production and processing, and distribution and distribution. The characteristics of participating entities in each link are summarized as follows.

Characteristics of the Main Body of Food Raw Materials Production

In the process of planting and breeding primary agricultural products, the production and operation characteristics of all participating or related topics are the main characteristics of food raw material production. Hundreds of millions of small-scale farmers are the basic units of China's agricultural production. The scale of operation is small. When working with processing enterprises, wholesalers, supermarket chains, etc., it is difficult to provide effective guarantee mechanisms and specific measures for farmers' interests. Therefore, it is difficult to implement effective circumvention or preventive measures against the behaviors that endanger the quality and safety of agricultural products. In addition, most farmers lack professional knowledge training, lack of knowledge of safe production of agricultural products, and generally low production skills, which also leads to the quality and safety risks of agricultural products to a certain extent.

In recent years, with the vigorous development of modern agriculture, new forms of organization, such as agricultural cooperative organizations and production bases, are emerging in China. The emergence of these various forms of agricultural production organizations has brought new opportunities for the improvement of China's food safety management. The agricultural cooperative organization takes individual farmer production as the basic unit and encourages individual farmers to voluntarily join the agricultural economic cooperation organization. Agricultural cooperatives are an effective way to improve the organization and scale of agriculture. At the same time, they are also an internal supervision mechanism for farmers, which can more effectively play the role of internal supervision and improve the quality and safety of agricultural products. However, most of the cooperative organizations are new things, mainly initiated by large-scale farmers, village leaders,

and leading agricultural enterprises. Therefore, the improvement of operational mechanisms and institutional norms is a relatively weak link in the current construction of agricultural cooperatives. The production base is generally a component of agricultural production and processing enterprises. As the main body of agricultural production, it has shown a rapid increase in China in recent years. At present, through the cooperation of agricultural enterprises and leading enterprises to carry out the construction of innovation bases, large-scale promotion of high-tech new technologies will undoubtedly drive the professionalization, standardization and large-scale development of China's agricultural product bases. The organizational modernization and high-scale agricultural modernization base projects are usually developed at a faster rate, and the scale benefits can be easily highlighted. Compared with farmers and agricultural cooperatives, the agricultural production modernization production base has the technical advantages of agricultural production specialization, and the implementation of scientific production management has greatly improved production efficiency.

Main Characteristics of Food Production and Processing

The food production and processing sector involves a large number of processing entities across the country and presents a complex business model, which is the most lengthy and complicated part of the food supply chain. Whether it is a large-scale food production and processing enterprise, or a small family workshop, the participants in all food production and processing are inextricably linked with people's lives.

At present, the number of food enterprises in China is huge, but the number of large and medium-sized enterprises is small, and the number of small and micro enterprises and small workshops is quite large. Small and micro enterprises and small workshops do not have the advantages in scale and capital, limited resources, backward technology, poor equipment, and lagging management. It is difficult to ensure the quality and safety of their products. In addition, China's current food enterprises have presented a large number of "small, scattered, chaotic" problems such as low entry barriers, leading to vicious homogenization competition within the industry.

A large number of enterprises blindly pursue economic interests and reduce production costs through various unfair competition methods, which directly lead to the current and unreasonable current situation of food safety problems, so that the development of modern food production and processing enterprises in China is difficult.

The development of modern agricultural technology and technology has accelerated the pace of scale, intensification and modernization of food production and processing enterprises, providing a basis for the development of large and medium-sized food enterprises. In 2012, 33 food production and production enterprises had annual revenues of more than 10 billion Yuan; among all food production enterprises, 4,740 large and medium-sized food enterprises accounted for 14.% of the food industry; among the existing 28,952 small enterprises, The food industry accounted for 85.9%. Judging from the ranking of China's food enterprises in the country's 500 large enterprise groups in 2013, large and medium-sized food enterprises ranked in the top ranks of Chinese enterprises, of which COFCO's comprehensive ranking was 69th ¹. From this, it can be seen that the speed and level of the development of large and medium-sized food enterprises in China lag far behind those of other industries.

Analysis of the Characteristics of Circulation and Sales of Food

The circulation and sales process of food involves agricultural products, direct selling enterprises and farmers, supermarkets, wholesale or farmer markets, grocery stores, convenience stores, restaurants and many other subjects. The advantages of source channels, business environment and

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order, and orderly management level are gradually becoming the first choice for urban residents. In China's current large supermarket group, it has basically formed a complete and distinctive system and regulations, especially in food storage, testing technology, sales links and management practices.

According to China's urban and rural construction plan, China's establishment of food wholesale market and farmer's market (mainly selling daily necessities, vegetables, fruits, aquatic products and other products) is aimed at providing a trading place for the free trade of urban and rural markets and agricultural and sideline products, involving melons, fruit vegetables, grain and oil, raw meat, etc. The wholesale market is the most dynamic market in China's modern agricultural products market. It is a food distribution channel with functions such as sales of agricultural products, export of products or services, and adjustment of market prices. At present, there are a large number of wholesale markets in China to introduce information technology to assist in daily operation management. For example, the wholesale market of Shanghai Agricultural Products Center is a typical example of fully applying information technology for management. Some large-scale food enterprises with strong strength have opened direct sales stores, which have better hardware conditions and higher management level, which provide a strong guarantee for food safety, but such business formats need to be popularized and vigorously developed.

Overall, the large wholesale market has benefited from the government and its own financial and human support in food safety monitoring and risk control, making it an ideal distribution center for fresh food. However, in comparison, the farmer's market is at a disadvantage, mainly characterized by lack of resources, weak risk control, weak supervision of merchants, chaotic market order, lack of capital investment, neglect of quality safety control and other food safety problems.

Mechanism of Hazard under the Perspective of Functional Decentralization

A complete food supply chain includes six chain links: production, storage, processing, transportation, market circulation, and consumption. Food safety hazards exist in any part of the food chain, and are more risky than food safety for industrial products. Because food production cycle is long, and there are more participants in the food chain process, frequent changes in logistics, and centralized supervision, these problems increase the possibility of food safety risks. The edible agricultural product supply chain and the fresh food industry chain all involve the whole process management from farm to table. The fresh food supply chain has increased consumption control and other links, further extending the food industry chain. It should be noted that the main links of the food industry supply chain are not isolated, and they are related to many industries. In reality, all organizations and individuals, which are involved in the production or operation of the food supply chain, must implement different technical standards to strictly control the quality according to their links. Therefore, in order to effectively eliminate food safety hazards, product quality and safety are only implemented at the product terminals. Control is far from enough. In addition, the food industry supply chain standard system is not uniform, and decentralized link supervision has seriously hindered the improvement of management efficiency. In view of this, based on the overall governance, the concept and method of food safety supervision can be applied to all aspects to ensure the safety of the entire food supply chain.

From the perspective of the whole process, combined with the above analysis of the main characteristics of the main links of food production, processing, circulation, etc., we can find that the lack of capacity of any aspect of the supply chain body and the opportunism in the supply chain cooperation can cause quality and safety risks of the food supply chain. Information asymmetry is the main cause of the adverse selection of food safety. It will weaken the food supply chain's own guarantee function for food quality and safety, and thus increase the opportunistic behavior of supply chain entities and external cooperation. At the same time, the large number of supply chain nodes and the small size of the main body are the prominent features of China's food supply chain at this stage. Small-scale production and management entities are limited by shortage of funds. The technology and capabilities of food safety and control are generally weak. The defects

and hidden dangers in the trading environment have also made food safety management worse. Therefore, many enterprises lack quality and safety capabilities. The motivation for continuous investment has increased the difficulty factor for prevention and control of food quality and safety risks. The main reason for the food safety problem is that the small size, large quantity and decentralized distribution of the food supply chain increase the difficulty of supervision, and the production of food is complicated, which increases the probability of food quality and safety risks.

In the process of producing agricultural products, China involves a large number of scattered individual farmers. Agricultural production generally has serious dependence on chemical fertilizers, pesticides, agricultural film, etc., and non-point source pollution and municipal waste with livestock and poultry manure as the main pollution source. Pollution, industrial “three wastes” and environmental pollution problems brought about by the urbanization process all pose a threat to the production environment of safe agricultural products, thus affecting the quality and safety of agricultural products. The prevention and control of food safety risks is not solved by individual farmers. It requires a strong input from the state. In addition, due to the low level of skills of agricultural practitioners, excessive use of pesticides, veterinary drugs, and chemical fertilizers for one-sided pursuit of production has resulted in quality and safety problems in the production of agricultural products. For this reason, the source control and risk prevention of agricultural products quality and safety are bound to Row.

Ensuring the safety of food production, processing must require good production facilities and equipment, adequate capital investment and sound management as a guarantee. If enterprises or individuals are restricted by funds, personnel, technology, etc., they often lack the ability to invest in food safety. This lack of standardized production process management, one is to mix inferior raw materials into the enterprise, the second is that the food production and processing process is contaminated by microorganisms, and the third is improper storage and transportation measures, insufficient personnel, and outdated facilities, resulting in food spoilage. In addition, it can be attributed to the lack of safety common sense among employees, the low risk awareness, the low resistance to temptation, the improper use of employees or the addition of food additives. What is more, the addition of illicit drugs to foods is common. Food additives' excessive use of non-food substances increases the difficulty of market regulation, which in turn increases food quality and safety risks.

In the food circulation, along with the prosperity of cross-border and cross-regional food trade, the diversified needs of consumers can be met through food logistics. However, due to warehousing, transportation technology lags behind, safety awareness is weak, etc. The probability of physical pollution, in addition, due to the limitations of inspection technology and management level, the small-scale decentralization link will also increase the probability of food quality and safety risks.



Figure 1. Structural Characteristics of Food Safety Risks from a Full Process Perspective.

In addition, the quality and safety risks of food supply chain are common between and within the supply chain. At the same time, the external market environment is also an important incentive for food quality and safety risks. For this reason, the mechanism of food safety risks has the following

Fig. 1. According to the structural characteristics, the mechanism of food hazard generation can be explored. The internal mechanism of quality and safety risk can be understood from the three dimensions of operational capability, credit risk and information asymmetry risk of each subject in the supply chain, so as to clarify food safety supervision from the perspective of overall governance. The main points of construction lay the theoretical foundation.

The operational capability risk, caused by the lack of quality and safety guarantee capability of each main body in the supply chain, refers to the possibility and danger of the main body not having the ability to maintain and ensure food quality and safety, including technical ability, management level and cognitive level. The main body of the food supply chain will affect the quality of food. The ability of all subjects in the food supply chain to respond to quality and safety determines the level of food quality and safety risks. Therefore, the key to the quality and safety risks of the food supply chain is related to the quality and safety capability risks. The risk of food supply chain quality transaction trust is defined as the possibility and danger of the initiative to take actions that endanger food quality and safety in the cooperative activities in pursuit of illegal economic interests. The risk of trust lies in the middle position of the component structure of food safety risks, mainly due to the risk of tight supply chain structure and loose cooperation between entities. Information asymmetry is an important incentive for consumers to fall into the risk of food quality and safety, which in turn causes the adverse selection risk to be called the food supply chain quality and safety market risk. For the food supply chain, the market is its external environment. To this end, market risk lies in the position of the edge structure of the many constituent factors of the food chain food safety risk.

Based on the above findings, it can be seen that food primary production, food processing, distribution and sales have jointly promoted the formation of food quality and food supply chain quality and safety capability risks. The final quality assurance of food is the result of close collaboration among all the subjects in the food supply chain. Therefore, the mechanism of food safety hazards can reflect the multi-level requirements of food safety supervision. The full integration of all subject quality and safety risk control capabilities is to ensure the overall quality of food. The fundamental measures, the coupling of quality and safety of agricultural production, food processing, logistics and distribution and sales in the supply chain operation process constitute the risk of quality and safety of the supply chain.

Key Points of China's Food Safety "Multi-head Segmentation" Based on the "Full Process" Perspective

Based on the complexity and particularity of the food industry chain, product quality and safety management must be committed to the food production environment, processing environment, raw materials, storage and transportation to the terminal sales process implicit and explicit food safety risk management. In order to realize the basic supervision and pre-control functions such as food safety risk identification, evaluation and management, it is necessary to strengthen the technical means of food safety supervision, integrate supervision functions, and broaden the regulatory content. The technical work of food safety supervision technology is to identify and evaluate the biochemical risks and physical risks that may exist in the process of food safety production, processing, storage and transportation, and finally form an effective identification method for assessing and controlling risks. The integration of supervision functions refers to reorganizing the existing regulatory content in order to cope with the diversification of food production, processing, transportation, sales and the main body and links, in order to overcome the lack of supervision, weak supervision and regulatory conflicts. Regulatory issues, effectively safeguarding and improving the effectiveness of food safety supervision. Broadening the connotation of supervision means incorporating socialized supervision into the system of food safety supervision. It not only increases the ability of consumers to identify food safety risks, but also gives full play to the power of social ethics, integrity and social opinion to form a public opinion denial on the behavior of destroying food safety. ²¹

In addition, the emergence of food safety risks is caused by many factors such as the level of science and technology, the lack of systems, and poor food safety supervision. Strengthening food safety legal system construction, implementing market access system, regulating food label supervision, establishing sound food safety monitoring and information release mechanism, strengthening social integrity construction, and continuously improving consumer food safety awareness are widely adopted for food safety management methods in recent years worldwide. In view of the above perceptions, the shift from decentralized supervision to centralized supervision has become a prominent issue in the establishment of a sound regulatory system. The whole process of food safety supervision is a comprehensive and complex system engineering involving multiple subjects. It is also a socialized behavior with clear definition of division of labor and the need for multi-party cooperation. It includes government administration according to law and relevant enterprises, covers the responsibility and obligations of the management of the intermediary organization and the stakeholders. From the perspective of the whole process, the drawbacks of implementing decentralized safety management are mainly as follows: the variety of food raw materials and the complexity of its storage and processing technology make it impossible to achieve a clear degree of production and processing, so it is difficult to achieve regulatory duties. Make a clear definition; due to the variety of raw and auxiliary materials used in food production and processing, as well as the physiological characteristics of the food itself, it is difficult to timely and accurately identify and trace the source of food safety risks during the implementation of segmentation supervision, which hinders the implementation of the supervision effectiveness; the implementation of the sub-level supervision is very likely to cause the disjunction of the supervision functions between the various supervision links, the communication of information is blocked, the supervision departments push each other's responsibility, the quality can not be traced smoothly, the repeated detection frequently, the waste of resources is serious, the supervision cost is high and many more.

Summary

In order to strengthen food safety supervision, effectively avoid hidden regulatory issues, and strictly control food safety risks, it is imperative to establish and improve food traceability systems. However, due to the difficult situation of the government's seamless supervision, the imperfect legal system and the inconsistent standards, it has become a serious obstacle to China's implementation of the food traceability system. Judging from the construction of the existing food legal system in China, in the process of constructing the food traceability system, the system has begun to take shape under the leadership of key provinces and cities across the country, covering meat, fresh fruits and vegetables, and dairy products, and has achieved certain results, but because it is still in the initial stage of pilot promotion, the legal norm system is not perfect, especially in the important links such as production, processing, packaging, and market access systems, there are still different levels of legislative gaps. From the perspective of standardization construction, all administrative regulatory departments have actively built food traceability systems, but unfortunately, the current food traceability system lacks uniform standards. Most departments have their own policies. Hardware and software facilities and core technologies are in urgent need of reunification. The role of the food traceability system in food quality control is well utilized. Therefore, consumers with cognitive rationality are not willing to pay for consumption enthusiasm and willingness to pay. However, traceable foods can stimulate consumers' desire to purchase, and the market demand has broad prospects. Therefore, food enterprises have an internal driving force to actively promote the perfection of food traceability system. Due to regional differences, consumers in different regions have different perceptions of traceability systems, especially the disparity between regional economic levels leads to differences in people's perceptions of food quality and safety. Therefore, Consumers in different regions have different requirements for food trace ability system standards. As for food prices, it is undoubtedly a sensitive factor in the

implementation of food traceability system, which will increase the additional cost of each main supplier of supply chain nodes. Traced food prices are generally high, and there is a great resistance to the promotion of certified products.

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