

The Sustainability of Food Supply Chain in China: Review and Comment

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I. Overview

With 9.5% of world arable land and freshwater resource that is only 31% of world average, China has successfully fed 22% of world population. From 1978 until 2006, the Engel Coefficients of Chinese urban and rural residents have declined respectively from 57.5% and 67.7% to 35.8% and 43%, and the food of the Chinese has also turned from shortage to abundance. The above development shows that China has contributed greatly to world food security. However, the developmental process of food supply has the characteristics of “pollution first and then elimination”, which means the process is inevitably accompanied with relatively serious problems of pollution and food safety. At present, when the food industry has entered buyer’s market and the demand structure of consumers is upgrading, to enhance the sustainability of food supply chain becomes the major task of food supply chain management.

The concern on food supply chain is because many problems existing in food supply cannot be ascribed to certain firms or a certain link in food supply chain. At present, discussions on food supply chain in China are mostly for securing food safety and increasing the economic efficiency of food logistics. However, a sustainable food supply chain still has two other characteristics besides the above two, i.e., reasonable value increment during food process in finished food and reasonable distribution of profits among the different links in food supply chain, and also minimization of pollution caused by food supply.

With regard to the above four characteristics of a sustainable food supply chain, the status quo of food supply chain in China can be summarized in three aspects as following: (a) The food supply chain is unsustainable as a whole. There are hidden dangers of food safety, there is serious pollution in food industry, the food supply chain is not integrated and profits are not reasonably distributed along the chain; (b) China is making great efforts in food logistics, food industry, agricultural industrialization (i.e. vertical coordination), and governmental supervision on food safety, and the food supply chain is improving; (c) The improvement of food supply chain is imbalanced and step by step.

II. Problems

I) Problems in the various links of food supply chain

a) The link of primary production: The agricultural production process is lack of control, too much fertilizers, pesticides, and animal medicine are applied, resulting

in both environmental pollution and residue of detrimental materials in food. The farming size of individual farmers is too small and thus the size of agricultural producers is too large. The farmers are not organized and are in a disadvantaged position in marketing and sharing the added value in food supply chain.

b) The link of food processing: Although there are many large-scale modernized food companies in China, most food processing enterprises are small-scale food factories with ten or less employees or handwork workshops. Many food companies do not have necessary processing facilities or environment for food safety. Most food companies have established food sanitary standards and institutions, but many of them are short of strong consciousness of strict controlling food quality and food safety in the processing process. The worst situation is that, much food is produced illegally in unlicensed workshops without basic sanitary conditions. Various unimaginable deleterious foods escape governmental supervision and enter the market, bringing serious menace on market order and people's life safety.

c) The link of food marketing: At present, the retail channels of food in China are supermarkets, free markets of agricultural products, food shops and so on, whereas the first two channels are the most important. Safety supervision institutions have been established for the free markets of agricultural products, but the markets are short of enough measures, facilities and personnel for quality and safety check. Supermarkets have the highest credit in food safety, but hidden danger of food safety also exists, i.e. over-residue of deleterious and harmful materials in fresh products, deliberate change of the expiration date of perishable food, mix of fresh and outdated products, and so on. Such phenomena exist in both internationalized and domestic supermarkets, and the fundamental reasons are that the food retailers are lack of sufficient managerial institutions, facilities, and capabilities and execution capability. Especially when the supermarkets lease their counters of fresh food and on-the-spot cooked food to individual dealers, there arises the problem of ineffective supervision between the supermarkets and the dealers due to information asymmetry. Besides, large amounts of urban roadside stalls and rural markets of food and agricultural products are out of the scope of safety supervision. Some illegally processed unsafe food enters the market through these channels escaping governmental supervision.

d) The link of food logistics: This link contains two statuses, i.e. transport and storage. From agricultural production to food on the consumers' desks, there are several processes of transport, for example, from the fields to the processing factories, from the factories to distributional warehouses, and from the warehouses to wholesale market and then supermarkets and free markets. At present, 80% food is transported through roads, and the rest is through railway. In road conveyance, specialized food transportation vehicles are seriously insufficient, and most of the vehicles are common trucks. The volume of food warehouses is not big enough, the warehouses are not reasonably distributed, and the size of the warehouses is generally too small. Because of the imperfectness of the food logistics system, the loss rate of food during circulation is high, and the food is susceptible to secondary pollution during circulation. It is estimated that, in 2002, the food loss during transportation in China is no lower than 75 billion US dollars, so that 70% of the retail price of those perishable foodstuffs like seafood and dairy products is used to compensate the cargo damage during circulation.

II) Problems with various types of food

As far as the issue discussed is concerned, there exists less problem of food safety in the supply of bulk edible grains but more problem of food security, which is another specific issue that would not be discussed here. Here we would refer to the following three types of food.

a) Fresh and perishable vegetables and fruits: China has the tradition of vegetarian culture, vegetables and fruits have higher positions than animal products in dietary structure, and per capita consumption of vegetables and fruits is high. On the other hand, since China is land-scarce but population-abundant, the production of vegetables and fruits is comparatively advantaged, and they compose a big proportion of agricultural export in China. This type of food has both problems of food safety due to chemical residue during production and of cargo damage during transportation. For example, leek produced with virulent pesticides in Hebei Province once entered Beijing market; Carrefour in China has also been found to sell vegetables with over-residue of pesticides. In order to satisfy the strict safety and quality criteria set out by importing countries, China has built specialized supply chain for overseas markets, in which food safety is better safeguarded and the circulation efficiency is much higher. This is not only the case for fruits and vegetables, but also true for other exporting products. Even so, Chinese exporting food products are often checked to have over-residue of chemicals, without saying that in domestic market.

b) Animal and water products (meats, dairy products and fishery products): With the improvement of livelihood, the average consumption animal and water products goes up quickly, and their production expands quickly accordingly. Due to blind pursuit for output growth, large amounts of prohibited growth hormone, animal and fishery medicines are applied in production. The results are, fast increase of output on the one hand, and decline of food quality and over-residue of medicals and hormone in the products. In 2006, a food poisoning accident of “Lean Meat Regulation”(HCl Clenbutero) happened in Shanghai, whose source was even one batch of pork and pig viscera with legal check certificate. China is the world biggest aquaculture producers, whose aquatic products are 70% of world total. Aquaculture has caused serious water pollution and environmental deterioration, and the fishery products themselves have serious safety and quality problems.

c) Processing food products: The process of food processing has pollution both to the environment and to the food products themselves. The reason of pollution is mainly that, most of the food processing factories are too small to satisfy food safety conditions, so that the products are easily to be secondarily polluted during processing. Some producers use illegal additives to improve the appearance quality. For example, in 2004, *Longkou* (a very famous brand) vermicelli produced in Shandong Province were checked to have added carcinogen. Perished, outdated, and even detrimental materials might be used in food processing, trying to take the advantage that raw materials in processing food are difficult to check out.

III. Developmental process

a) The link of agricultural production: The Chinese government has for many years been promoting *agricultural industrialization* When the small farming size cannot be improved in the short run, China tries to promote the coordination between processing industry and the farmers to stabilize agricultural production and assure farmers' income. Environmental pollution and chemical residue in the production sector is been eased through *Contracting Farming* and technical guide and

requirements from the companies to the farmers. Meanwhile, the government is formulating policies to push agricultural cooperation and farmland flow and accumulation to promote the rise of agricultural scale and productivity.

b) The link of food logistics: The logistics infrastructure and logistics industry are growing fast in China. In 2004, the State Development and Reform Commission released policies to promote development of modern logistics industry, investment to logistics is encouraged, separation of logistic business from food processing and sale companies is encouraged to promote the development of an independent logistic industry, and it is consented to strengthen the fundamental work underpinning the development of logistic industry.

c) The links of food processing and marketing: With more market competition, more transparent information disclosure, and more influence of the demand-side on market situations, the food processing and marketing sectors both began to emphasize food supply chain management. Not only the industries strengthen management of food safety and quality on themselves, but the backward industries started to strengthen control on their upward industries, e.g. processing industry's control on agriculture, supermarkets' control on food industry and farmers, and so on. Hence they can achieve the goal of securing food safety and occupying the market through the whole industrial chain management. This tendency is starting from some large-scale supermarkets and food processing companies, which is shown when many food enterprises struggle to pass such quality certification as ISO9000, ISO14000, and HACCP.

d) The government: The Chinese government is trying to enhance the sustainability of food supply chain through law making, routine market supervision and policy support. Except that the Ministry of Health is responsible for supervision of food sanitation, the Ministry of Agriculture is responsible for administration of quality safety for agricultural products, and the Ministry of Commerce is responsible for safety management in food circulation. "Law of Quality Safety for Agricultural Products" was issued and implemented in 2006. "Administrative Methods on Food Safety in Circulation" was issued in 2006 and implemented in May 1st 2007. The Ministry of Agriculture has formulated specific measures to strengthen capacity building in agricultural food quality and safety supervision. According to the "Suggestions on the 11th Five-Year Developmental Planning of National Food Industry", China will issue "Food Safety Law", construct a credit system of food safety, strengthen the coordination between food industry and agriculture, build and strengthen national-wide specialized food logistic system, and encourage the development of food industry meanwhile.

IV. Discussion on some key issues

a) The priorities of the four goals of a sustainable food supply chain: Food safety should be put in the first position, followed by the pollution problem in agriculture and food industry. Proper allocation of added value along the supply chain and the economic efficiency of food supply chain are relative minor but not unimportant goals, the pursuit of which should contribute to, or at least not harm the first two goals.

b) The length of food supply chain: In Europe, now people tend to have shorter food supply chain, i.e. sending products from the farms directly to the families so as

to ensure the freshness and safety, and avoid uncertainty and information asymmetry. But in China, generally speaking, the degree of processing of agricultural products is still quite low, and the food supply chain is not long enough but still too short. In developing countries, the output value of processed food behind one dollar of agricultural output is 3 to 4 dollars, however that in China is only 0.8 dollar. So a possible conclusion is that, food supply chain in developed countries might already be too long, while in China it is still too short. Thus, it is China's necessary choice to encourage the development of food industry at the current stage.

c) Fair allocation of added value in food supply chain: An alternative problem is how to increase farmers' income. In developed countries, there are two ways to increase farmers' income, respectively governmental subsidies and better income from the market. In China, governmental subsidies are quite limited, and even negative in the past. In recent years, subsidies to farmers began to increase, but they are still insignificant. To increase farmers' income from the market needs to development agricultural cooperation and establish farmers' organization. In China, since farmers' organization still cannot be established at the current stage, the development of agricultural cooperation is congenitally disadvantaged. *Agricultural industrialization* is always seen as an important approach to increase farmers' income. When farmers coordinate with processing industry in this way, both can get average profit rate. However, since farmers' organization is not established, they are weak when negotiating with industries, and thus idea agricultural industrialization is difficult to succeed.

d) Governmental supervision on food safety and companies' opportunistic behavior with regard to food safety: The government is lack of public trust. The various governmental certifications on food safety or product quality does not tally with the truth, and "safe food" may not be safe. The enterprises are lack of social accountability and rely on opportunistic behavior to make profits. Due to loopholes of governmental supervision, hidden unsafe products often flow into the market by good luck. Other than specialized food safety supervision, the government also needs to construct socialized credit system, strengthen information disclosure, encourage third-party accreditation, and make corporate social accountability become endogenous stimulating behavior.

e) Economic development and sustainability of food supply chain: Comparatively, under the same conditions of market economy, we can say that the food supply chain in western countries is more sustainable than that in developing countries. With the progress of economic development and rise of people's consumption affordability, the influence of the demand side on food safety and quality would become stronger, and the market order would improve under the pressure from the consumers. In certain sense, it is the consumers themselves who chose what degree of food safety.

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