1

Shared Responsibility of Food Safety

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1.1 Introduction

Part of the content of this chapter was adopted from the chapter I wrote for the book, Food Safety in China: Past, Present and Future [1]. Food safety has been a hot topic in the world in recent years. The horse meat case in the European Union (EU), the cantaloupe case in the United States of America (US) and the melamine case in China all received global attention. Although it has been the focus of attention for consumers in certain regions of the world for some time, it was not a major topic of concern for the government, food industry, media and the general public in China and the rest of the world till 2008. The turning point of global attention to food safety can be traced back to China’s melamine event. More than 50,000 infants and children were hospitalized and there were six confirmed deaths due to the illegal addition of melamine to milk and infant formula [2]. The event was in the global news for a long time. The New York Times had a special series of reports tracing the origin of the event. The Chinese government reacted quickly and published the first “China Food Safety Law” in 2009 [3]. Many people started to ask the question: who are the people responsible for food safety?

No doubt, food safety is not the responsibility of one person, one group of people, nor of an industry or a government agency. It is the shared responsibility of many people and organizations, in fact everyone.

The term, “shared responsibility” for food safety was first coined by the World Health Organization (WHO) [4]. WHO defined shared responsibility as the “collaboration between all sectors, including government, consumer organizations and food processors to achieve a safer and wholesome food supply.” The definition was inadequate to cover the whole spectrum of food safety.

The European Commission published a white paper on food safety in 2000, which led to the formation of the European Food Safety Authority (EFSA) in 2002. In the white paper, it states that “feed manufacturers, farmers, and food operators have the primary responsibility for food safety. Competent authorities monitor and enforce this responsibility through the operation of national surveillance and control systems. Consumers must also recognize that they are responsible for the proper storage, handling and
cooking of foods.” By this definition, only industry, government and consumers share responsibility for food safety.

Jen [5] presented a paper at the first International Forum on Food Safety in Beijing that defined food safety as a shared responsibility by all who are dealing with foods. The food industry and government agencies have a major responsibility for food safety. Academia and media have their special responsibilities. Every consumer and everyone who eats food has to share responsibility for food safety. The five pillars of food safety (Figure 1.1) are dependent on each other and form the basis for achieving maximum food safety in any organization, country, region and the world.

The agricultural and food processing industries, being the producers of food products for consumption, have to bear the major responsibility for food safety. In developed countries, the industry knows the responsibility well. They have little, if any, intentional adulteration of food causing food safety problems. Nevertheless, accidents take place from time to time. China, being in the transition period in becoming a developed country, is faced with many intentional food adulteration and food fraud problems. China’s food industry has not developed a spirit of goodwill towards society and many enterprises are still driven by a “quick profit above all else” attitude. However, some large food companies are taking food safety seriously, but it takes a while for the food safety culture to spread to all company employees. Also, China’s agricultural production and processing industries are still dominated by small enterprises with few employees. A merger and consolidation process into medium and large corporations will take place in the future.

Government, as the watchdog of the agricultural and food processing industries, also has a major responsibility for food safety. Government has to issue food safety laws, regulations and guidelines for the industry to follow, and to perform inspections to ensure the laws, regulations and guidelines are followed to minimize food safety incidents. In addition, government agencies need to provide funds for food safety research and education, and be transparent with the public on food safety outbreaks. Establishing laws are only the first step. Implementation of the laws, regulations and guidelines is a long-term process. The Chinese central government has done a great job in establishing
laws and regulations, but is a long way to go to spread that to every corner of the vast counties, down to the town and village levels.

Academia is responsible for training food safety workers, performing food safety research and providing the correct scientific information about food safety to society, including government agencies and industry. China’s education system for food safety is just in the early stages and has a long way to go to catch advanced countries of the world.

The media should report food safety events in a truthful manner and not try to cause public panic by sensationalizing minor food safety accidents. The media also shares responsibility for educating consumers on food safety knowledge, and informing the public of any new food safety laws and regulations. It should also try to report new scientific technology in layman’s terms for the public to understand. China’s media has experienced rapid growth in this field.

Consumers should acquire adequate food safety knowledge and practice food safety in handling foods at home. They should also report any unsanitary conditions in public eating places to the authorities. Most importantly, consumers should not spread food safety information on the Internet that is not based on scientific fact. Leighton and Sperber [6] recently published an article stating that “good consumer practices are necessary to further improve global food safety.” They declared that “food safety is the responsibility of all along the farm to table continuum.”

1.2 History

China’s population is anticipated to peak at 1.4 billion in 2025 [7]. Traditionally, China has been concerned with food security rather than food safety. Lester Brown published his classic text *Who will feed China?* in 1995 [8]. China has only 7–9% of the world’s arable land, but 20% of the world’s population, as estimated by the United Nations (UN) Food and Agriculture Organization (FAO) [9]. With the successful development of hybrid rice and other cereals, and high agricultural inputs, China gained self-sufficiency in food security in the 1990s, and began to shift their nutritional diet to animal products [10], mimicking that of developed countries in Western Europe and North America.

To sustain agricultural production, the Chinese government has invested billions to support research on transgenic varieties of rice, wheat, maize, cotton, soybean, pigs, cows and sheep. However, commercialization of the genetically engineered products has not taken place, mainly due to consumer misunderstanding of the technology. Water is the other major concern in China’s agricultural production. China’s water and sanitation infrastructure is at a much earlier stage of development [11], and thus the risks to the food supply are much greater. Meanwhile, chemical pollution is a major threat to both agricultural land and freshwater supplies [12]. With increased input, China’s use of pesticides and veterinary drugs have increased to such a level that China is now the largest producer and exporter of pesticides in the world [13]. Lastly, the excessive use of food additives and food fraud are increasingly becoming major concerns for food safety in China.

To the credit of the Chinese government, they have made tremendous efforts to reform food safety standards, laws and regulations in recent years. With a country as vast as China, the changes are slow to reach every part of the country. The UN Resident Coordinator in China [14] has suggested that the regulatory control of food safety is a
shared responsibility among national, provincial and local government authorities. A clear chain of command and responsibilities, a set of common and consistent standards, and a well-coordinated central steering committee would strengthen China’s implementation of existing food safety laws and regulations.

1.3 The Food Chain and Food Safety Laws

Food is simple, but food safety is complex. The food chain is a long process from farm to table. An interesting example can be drawn from the consumer dollar (Figure 1.2) published by the Economic Research Service (ERS) of the United States Department of Agriculture (USDA).

The 2014 ERS food dollar [15] shows the percentage distribution of one US consumer dollar to all industry and business when dealing with food expenditure from farm to table. It shows that the food service segment takes the largest share of the consumer spending dollar, which means this segment has the major share of the food safety responsibilities. The food processing industry, wholesalers and retail trades are next. Farmers and agribusiness only receive 10.4 cents of the consumer dollar. When government spends funds to monitor and inspect industries for the sake of food safety, it may be wise to have this consumer food dollar distribution in mind.

Besides the United Kingdom (UK), the US probably has the longest history in the world when it comes to official food safety laws and regulations. US food safety law started with the Food and Drug Act, passed by US Congress on June 30, 1906. It prohibits interstate commerce in misbranded and adulterated food, drink and drugs. The Meat Inspection Act was passed on the same day. The USDA had been given the responsibility and authority to enforce both Acts [16]. In 1938, Congress passed the Federal Food, Drug and Cosmetic Act, which amongst others, authorized standards of identity, quality and fill-of-container for foods, and authorized the USDA to be responsible for food processing factory inspections [17].

![Figure 1.2 The food dollar.](image)
In 1940, the Food and Drug Administration (FDA) was formed and the office was transferred from the USDA to the Department of Federal Security (now the Department of Health and Human Services (HHS)). The move split the responsibility for food safety from a single agency to multiple agencies. The move was politically motivated at the time, but it forever changed the food safety governing system in the US.

To date, the USDA Food Safety Inspection Service (FSIS) and the FDA still share the major responsibility for food safety laws and regulations. FSIS is responsible for the safety of meat, poultry and egg products, and the FDA is responsible for all other foods.

There are major differences on how FSIS and the FDA carry out their responsibilities over the years. FSIS places a USDA inspector at each and every animal slaughter and poultry processing plant throughout the US. Without the approval of the USDA inspector, no product can be shipped out of the plants, thus assuring a high level of food safety. FSIS also has mandatory recall authority. If they find a particular shipment of meat or poultry products was contaminated and may harm public health, they can order the total recall of products produced from that plant for a specific period of time.

The FDA, on the other hand, has few inspectors and works with the food industry in a very friendly way. Unless notified by reports, FDA inspection of the food processing industry is infrequent. It works with the food industry more in an advisory role. They depend greatly on a self-policing system by the food processing industry to maintain food as safe as possible. It was not until 1988 that the FDA officially became an agency of the HHS.

Other US federal agencies also have minor roles in food safety. The USDA Animal and Plant Health Inspection Service (APHIS) takes care of health issues regarding import and export of live plants and animals. The US Environmental Protection Agency (EPA) regulates the pesticide residues that are allowed to be used in agricultural production.

In 1990, US Congress passed the Nutritional Labeling and Education Act [18], which gave consumers essential nutrition information on food labels. The FDA is responsible for approving labels on food products. It is very strict on what is put on the label. All information must be based on strong scientific facts and have real and not perceived health impacts to consumers.

In 2011, US Congress passed the FDA Food Safety and Modernization Act (FSMA) [19]. The FSMA provided the FDA with more enforcement authority relating to food safety standards, such as recall and inspection authorities that the FDA never had before. It also gave the FDA tools to hold imported foods to the same standards as US domestic foods. It directed the FDA to build an integrated national food safety system in partnership with the food industry and with state and local authorities. The goal of the new law is to change the old “inspection of end products” method to a new “preventive actions at every step of the food chain” operation.

China has a relatively short history in food safety laws. The first law related to food safety can be traced to 1982 when the National People’s Congress passed a temporary trial law on “food and health”. In 1996, the trial law became official law. The public health agencies of various levels of government were given responsibility to oversee and monitor food safety and hygiene. Gradually, other agencies started to get into the picture, issuing certificates for various steps along the food chain from the farm to the table [20].
In December 2006, the Chinese Agricultural Product Safety Law was announced and implemented. After four years, Han and Yuan [21] examined the law’s impact on the wholesale vegetable market in China. They found that the law did improve the quality of wholesale vegetables. However, the inspection methods and number of inspectors were generally inadequate to further improve the quality and safety of vegetables sold at wholesale markets around the country.

In December 2007, the National People’s Congress started to look into the establishment of a new food safety law. After four revisions, it was announced on February 28, 2009 by the Eleventh Congress that the first “Chinese Food Safety Law” has been established, to be implemented on June 1 of the same year [3]. After the announcement, Li [20] provided an analysis of the pros and cons of the law. He noted that from public health to food safety was a major concept change in the law. The pros were led by the use of risk assessment analysis to guide the management of food safety, the establishment of food safety standards and the setup of the unsafe food products recall system. The cons were the multiple agencies, each with responsibility for part of the farm-to-table food chain, the different standards for domestic and export foods and the lack of clear guidelines for the punishment of food safety law violators.

Li [20] noted that in recent years, several foreign countries have regrouped all agencies that monitor food safety activities into one single agency. Canada has set up the Canada Food Inspection Agency (CFIA) to monitor the health, safety and quality of Canada’s agricultural, fish and food products, and to oversee the arrival of imported plants, animals and food products. The UK has created the Food Standards Agency (FSA), an independent government department responsible for food safety and hygiene across the UK. It works with the business community to produce safe food and with local authorities to enforce the food safety regulations. Time will tell if these new agencies work well in their respective countries.

To try to solve the multiple agency monitoring and inspection of food safety issues for the whole food chain, the Chinese central government established a new ministry-level agency, the Chinese Food and Drug Administration (CFDA) in 2013 [22]. It moved almost all of the authorities dealing with food safety from other agencies into this new ministry, except import/export inspection and agricultural production, which were still handled by the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) and the Ministry of Agriculture (MOA).

1.4 Current Status

Although laws and regulations can be passed quickly, their implementation is not as easily done and may take years, depending on the cooperation of the responsible agencies, the food industry, available inspection methods and qualified personnel. Another barrier to implementation is that some government food safety laws and regulations change and update often, making it almost impossible for the food industry to keep up.

The US FSMA was passed in 2012 [19], but the implementation has not been smooth. By the end of 2015, the FDA has not yet fully implemented the FSMA, partly due to the lack of funds budgeted by US Congress, partly due to the details of working with local health agencies and food companies. Nevertheless, the FDA is now nearing completion
of the task of working out all the details with individual domestic food processing companies to set up a food safety plan and record-keeping process. The FDA will look into implementing consistency of standards between imported food products and domestic food products. Countries like China, who export a lot of food products to the US will notice the difference in the coming months.

Although China has made great progress in implementing their Food Safety Law, published in February 2009, and the CFDA has set up administration offices at the province and city levels, the laws may not have reached to the town and village levels. As with any commercial commodity, food companies may seek to maximize profits and seek quick returns by using substituted ingredients for certain products, which supersedes their social responsibility. This has led to many food fraud events in China.

Some of the events did not harm the public health and were legal issues, rather than food safety issues. According to China’s Supreme People’s Court, 320 people were convicted of food safety crimes in 2011. The actual number might be higher than that, but such prosecutions show that law enforcement in China does place a high priority on food safety-related crimes [10].

In 2013, the new CFDA [22], which serves as a central authority, replaced the functions of many other regulatory bodies. This major overhaul signifies China’s determination to build a high-level, unified system to handle food safety issues. However, with over 450,000 food production and processing companies (more than 350,000 are small enterprises with less than 10 employees), China’s regulatory approaches are complicated and more difficult to implement than in most countries of the world. Government must take the initiative to assist and teach these small food processors about food standards and issue certificates to them after inspection of their operations.

On December 25, 2014, revision of the 2009 Chinese Food Safety Law was proposed and sent to the National People’s Congress for review. On April 24, 2015, the revised Chinese Food Safety Law was passed to be implemented on October 1, 2015 [23]. The revised law is comprehensive and matches laws in the Western world. How long and how well the law can be implemented will be the key to future food safety in China.

The food industry (including production, processing, marketing, retail and food service industries) has the primary responsibility to provide safe food products for consumption.

China’s agricultural production and food processing industries are unique in that they are dominated by small- and medium-sized farms and companies. Tracing back to the melamine issue, a New York Times reporter [24] visited Chinese villages and found that most Chinese farmers had two or three cows in their backyard. A milk collector, often on a bicycle, picked up the milk from the individual farmers and took it to the village collection station. No sanitation or refrigeration was used. By the time the refrigerated milk truck arrived at the village station and collected the milk, the microbial counts had reached a high level. The truck drivers often put a bottle of hydrogen peroxide into the milk to suppress the microbial count so as they can pass the food processing inspection. When asked why China allowed the individual farmers to keep the cows, the answer was that two or three cows may represent nearly half the income of the farmers. Therefore, changing the collection system would create a big social problem beyond food safety. The same situation applies to small food processing companies with less than 10 employees. Their profit margins are so low that they cannot spend money on safeguarding their products. The economical reality is such that the small farms are
beginning to form cooperative operations, and small food processing companies are going through mergers to increase their size to gain economy of scale.

China’s production industry needs to watch the excessive use of pesticides and antibiotics. The food processing industry needs to practice the now well-established, worldwide recognized Hazard Analysis and Critical Control Points (HACCP) system and its prerequisite programs [25]. Distribution and marketing industries must be careful to have proper temperature controls and sanitation conditions. The food service industry must work with local public health agencies to take on the huge responsibility of sanitation and serve safe foods to their consumers. In addition to the HACCP system, Leighton and Sperber [7] emphasized Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), Good Distribution Practices (GDP) and the new Good Consumer Practices (GCP).

Nevertheless, it may be quite a few years before China’s production and food processing industries become similar to that of developed countries like the US or the UK. In many ways, China really does not need to mimic the system in developed countries. China should find methods to deal with food safety that is suitable for its own system. This will depend on innovations from Chinese scientists and business managers and just copying the same system as foreign countries.

On the other hand, large farms and food processing companies in China, which represent approximately 20% of the total production at the moment, have embraced food safety practices. They have new equipment and all the sanitation practices needed to produce safe foods. Dr. Chen Jemin, president of the Chinese Agriculture Industry Chamber of Commerce (CAICC) has been very vocal in promoting food safety. He often reminds audiences that safe foods are the result of production not inspection [26].

Lam et al. [10] suggested that assurance of food safety and rebuilding of public trust will need food industries in China to recognize that they are ultimately responsible and be held accountable for food safety problems. The Chinese food industries must adopt social responsibility as an overarching principle, putting food safety ahead of maximization of profits.

On the academic side, Chinese researchers in the food safety arena have enjoyed several years of rich funding sources from central and provincial government agencies and some food companies. Research results are submitted for publication in international journals. For example, Food Control, a high impact international journal devoted to the publication of food safety issues has seen submissions from China jump in recent years. Only six papers were submitted in 2006, but in 2010, 187 papers were submitted, leading to 575 papers being submitted in 2014 [27]. Unfortunately, most of the submitted papers from China were related to detection or determination of pesticides and harmful chemicals in ingredients and food products, aimed at use for inspection purposes. Furthermore, many papers used highly-priced equipment that is not practical for use in the real world. Some of the microbiology-related papers also tended toward working on the biochemical mechanism of the pathogens and lacked practical applications. The Chinese researchers really should work with industry personnel to find out the needs of industry and produce research results applicable to the commercial situation.

The Chinese universities have established many degree programs for food safety or food quality. There are no standard course requirements, rendering most of the graduates without the needed skills to work in the food safety field. There are few available
food safety training courses for industry and government workers in food safety, except that offered by the Bor S. Luh Food Safety Research Center of Shanghai Jiao Tong University [28].

Chinese media has responded nicely to the needs of food safety reporting. The annual meetings between media reporters and scientists, arranged by Chinese Institute of Food Science and Technology since 2011 have paid big dividends. Every January, the major media reporters and 12 scientists get together to discuss the 12 major food safety events in the media from the past year [29]. The scientists each provide detailed analysis of one of the reported events and its relationship to food safety. They often point out that many reports are due to the lack of food safety knowledge by the general public and the media reporters. The reporters can ask very pointed questions to the scientists and get answers that they can understand. The reporters also establish contacts with scientists as resource people for future food safety reporting.

Recently, a book was published by Chinese reporters on how to properly report food safety issues [30]. Many of the major news media in China now have reporters who are responsible for reporting food safety-related news.

There is very little reporting on consumer behavior related to food safety in China. A 2009 report [31] by the Ministry of Health showed that more than half of the food poisoning problems reported in China were at home. They are not related to the production, processing or marketing part of the food consumption chain. Gong et al. [32] reported the handling of meat products at home in 15 Chinese cities. The results showed that most Chinese had no idea about safe handling of meats at home. Ignoring temperature and placing meats at room temperature for prolonged periods of time was the major problem. The authors suggested that consumer education is urgently needed to reduce food safety issues at home.

It can be said that present-day consumers in China are very confused, mainly due to widespread Internet messages. These messages often contain information without scientific background and the authors cannot be traced. To date, there is not a single authoritative website on food safety in China that consumers can trust.

1.5 The Future

Lam et al. [10] suggested that the Chinese government must strengthen the surveillance system and improve enforcement of food safety laws, increasing public awareness and improving transparency via media reporting, encouraging engagement of the public in discussion about and improvement of food safety. They felt that the future of food safety in China must emphasize responsibility, accountability and traceability. They suggested that a tracking system, so that the weak links in the protection of food safety can be identified, a regulatory system with a clear chain of command and division of labor among different regulatory bodies, adoption of common safety standards for all regulatory bodies and advancement of technologies to enable rapid and accurate measurement of food safety indicators, all have to be established.

Leighton and Sperber [6] proposed a new labeling system to aid consumers in identifying safe and high quality foods, copied from the EU system for electronic products. However, it may not work in foods. The original USDA meat grading system of prime, choice and standard has pretty much gone by the wayside.
The US CDC reports yearly on outbreak surveillance, and in 2014 there were 864 food safety incidents [33]. There were 13,246 illnesses, 712 hospitalizations, 21 deaths and 21 food recalls. Meat and fish products were the most common causes of food safety issues. Restaurants were the most commonly reported location, with 485 outbreaks. So, food safety problems occur everywhere in the world.

For China to continue to strengthen food safety concerns and gain back consumer trust, the government and industry must adopt transparency in their law and regulation process and food company operations. Transparency is the only way to gain trust from each other and to regain the trust of the consumers. In addition to transparency, science must be used as the basis for all information and communications.

One of the reasons that the US FSIS and FDA are very successful in their handling of the food safety laws and regulations is that they have very strong scientific research as their basis in their decision-making process. FSIS has the Agricultural Research Service (ARS), the world’s largest agricultural and food research resource to consult with at all times. The FDA has many research staff at its headquarters in Maryland and at their various regional laboratories. The many federal agencies work together cooperatively and support each other. The website of food safety published by the USDA, FDA and CDC is a perfect example of the cooperation and coordination among these agencies [34].

One of the shortcomings of the CFDA is the lack of such scientific support. Without it, it is much harder for industry and consumers to believe in the guidelines issued and implemented by the CFDA.

Jen [35] felt that academia sets trends, meets challenges and recommends solutions to global food safety matters. The trend is to provide scientific facts about food safety to lead the government and industry down the right path. The challenges to academia are how to educate everyone about what is known and unknown about food safety, as well as providing sound recommendations based on scientific facts. One of the urgent needs of China is an authoritative voice from academia that can provide science-based information whenever a food safety event takes place. With several Chinese academicians in the food safety field, one possibility is for them to set up an information center for food safety.

There is also an urgent need for a standard curriculum of food safety to be set up by the Chinese Ministry of Education. Trained food safety graduates must be able to work in industrial environments and serve as qualified personnel at government agencies, including inspection services. Without qualified and properly trained personnel, it is not possible to improve overall food safety management in China. Thus, education and training programs must be greatly enhanced in China.

The Chinese media are on the right track in reporting food safety events. What is needed is a continued education system for new reporters who have no food safety background. Perhaps training courses specifically designed for reporters can be set up at creditable institutes for that purpose. Continued development of links between food safety media reporters and food safety expert scientists needs to be established. The media could consider working with academic scientists to develop a trustworthy website on food safety practices and information for consumers. Canada’s CFIA has a great website called Fightback [36], which is used by many citizens of Canada to learn about food safety practices and news.

Chinese consumers are the weakest link of the five pillars of food safety in China. To bring the consumers along, the other four pillars of food safety have to have consumers
in mind at all times as they plan and carry out their programs. On the other hand, consumers have to try to gain accurate sound scientific knowledge in food safety. The consumer should practice the food safety principles of cook, chill, separation and storage [37] at home to minimize food safety problems in the daily consumption of foods.

Besides transparency, education is a key factor. Transparency leads to trust. Education leads to cooperation. When all group members are well-educated in food safety principles and practices, total cooperation will follow, which will benefit everyone. When everyone works together, that is the road towards a food safety culture in China and the world.

References