

## Adaptive governance for food security in China: A review

Jing Ping, Li quan, Kong chao

School of Public Administration, Southwest Jiaotong University, Chengdu 610031, P. R. China

\*Corresponding Author

Jing Ping

Email: [p.jing@foxmail.com](mailto:p.jing@foxmail.com)

**Abstract:** Food security concept originated in the mid-seventies of the twentieth century. This paper mainly discusses the food safety of society, family and individuals. Especially in China, with the increasing number of exposed food quality incidents in recent years, the awareness of people's food safety continues to increase. Although Chinese government did a lot in coping with food quality problems through laws, regulations, governmental standards, certification, inspections and enforcement, yet the food safety incidents are still frequent occurrence. This paper mainly studies the reasons of food safety from the management and technical perspective. Paper explores the way of food security solution from the perspective of governance theory in China.

**Keywords:** Food security; Market management; Government governance.

### INTRODUCTION

Many researches focus on food security and its determinants. Food Security concept originated in the mid-seventies of the twentieth century. It's more than two hundred definitions of the food security was introduced, evolved, developed, and diversified by the academic community and politics [1,2]. Among them, the Food and Agriculture Organization definite the food security is : "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life"(FAO). Overall, food Security include the macro and micro level, that is national or country, household and individual level [3].

On the macro level, food security is that a country is able to cover the food requirements of its population on a continuous and stable basis [4]. Nations often talk self-sufficiency ratios (the proportion of domestic consumption ) as a measure of food security. Since in the 1970s, the studies of "food security"was mostly concerned with the macrolevel ,namely national and global food supplies. However in the 1980s the food safety issues transferred to the household and individual levels . Many researches of household and individual food security have been introducedand most of them agreed that the key defining characteristics of household food security is the secure access at all time to sufficient food [5].

In recent years, China's food safety issues cannot be optimistic, with the increasing number of exposed food quality incidents , some of the mostwell-known are Fuxi event , alcoholic liquor excessive plasticizer, Shuanghui clenbuterol incident, waste oil resoldas

cooking oil and so on , significant pesticides residues in wine [6]. In 2007, Xinhua News Agency reported that over asix months period more than 60,000 fake food cases had been reported, more than 15,500 tons of substandard food was confiscated and 180 food manufacturers were caught making substandard foodor using inedible materials for food production[72]. Public awareness of food safety even to the extent of panic.

Although Chinese government did a lot in coping with food quality problems through laws, regulations, governmental standards, certification, inspections and enforcement, yet the food safety incidents are still frequent occurrence. This paper mainly studies the reasons of food safety from the institutional and technical and explore the way to solve the food Security from the perspective of governance theory.

### Food safety situation in China

In recent years, food safety incidents are often exposed, Food safety has increasingly become a major topic in the Chinese core all kinds of medias. The Internet search on food safety in the Chinese Core Newspaper Database showed a steady increase of 277 hits in 2000 to over 28,000 hits in 2011 (with only an anomaly in 2008, arguably due to the Olympics). In 2012, using the Chinese search engine Baidu gave a results on food safety almost 90 million, This indicates that food safety and food incidents have been widely discussed on the Chinese Internet and thus become the part of the public topic [6].

In addition to frequent food safety accidents, another important indicator of food security is to

incidence of foodborne disease, namely by direct dietary intake of pathogens causing human suffering from infectious or toxic disease. In China could easily lead to food-borne illness pathogens major pathogenic Escherichia coli, Staphylococcus aureus, Salmonella and other [7]. However, due to the imperfect correlation detection technology and networks, not to the incidence of foodborne illness for complete statistics. According to incomplete statistics, every year there are at least 300 million people of foodborne disease(<http://npc.people.com.cn>), foodborne illness has become our number one food safety issues. The following are the cases of food poisoning statistics (Table.1) and last ten years of major food safety incidents (Table.2) :

**Table-1: The number of poisoning from 2009 to 2013**

Year	Reported	The number of poisoning	Deaths
2013	152	5559	109
2012	174	6685	146
2011	189	8324	137
2010	220	7383	184
2009	271	11007	181

Source: People's Republic of China Ministry of Health  
"on the country's major food poisoning cases notified 2009-2013."

**Table- :2 Incident of food security**

Year	Incident	Overview of the melamine event
2014	Fuxi event	According to the Shanghai Radio and Television News official microblogging reported, McDonald's, KFC and other Western fast food supplier Häfele company traced to the use of low-quality meat and checked expired. The incident involved 22 downstream food distribution and fast-food chains.
2013	Wuxi lamb adulteration	Wuxi public security organs cracked King gang selling fake goods with fox, mink, and other inspection and quarantine of animals Lao Shurou posing lamb meat sales to the Soviet Union, Shanghai and other places farmers market. Then lamb adulteration traced spread to Shandong, Hunan, Shenzhen and other places
2012	Alcoholic liquor "plasticizer" excessive	21st Century Network issued a "deadly crisis: alcoholic liquor plasticizer exceeded 260%," the disclosure of alcoholic liquor "plasticizer exceeded." Long-term consumption of excessive food plasticizer, will damage the male reproductive capacity, to promote female sexual precocity and the immune system and digestive system damage and even poison the human genome.
2011	Shuanghui "lean" event	March 15, 2011, CCTV reported, "Weekly Quality Report" 3 · 15 program "" Bodybuilding pig "truth" reported that Jiyuan Shuanghui Food Co., the acquisition of "lean" pork was exposed.
2010	Table "waste oil"	Wuhan Polytechnic University professor recommends relevant government departments to intensify specification waste oil collection, sparked concerns about the safety of the food table again. The study said Chinese people eat two three million tons of waste oil per year. Long-term intake of cooking oil will affect human development, is apt to cause enteritis, but also produce liver, heart and kidney enlargement and fatty liver disease.
2008	Sanlu "milk" incident	Since May 2008 in the provinces and cities have been traced to the consumption of Sanlu baby milk powder caused kidney stones. After verified Sanlu infant formula contaminated with melamine, the body if long-term exposure can cause urinary tract bladder, kidney stones, and can induce bladder cancer. Government intervention in the investigation and held responsible, Sanlu bankruptcy.
2006	Use of prohibited drugs and chemicals (e.g. Malachitegreen) in fishery.	Shanghai on 30 chilled or fresh turbot sampling, the results show all 30 samples were found to nitrofurans metabolites was also detected in some samples of ciprofloxacin, chloramphenicol, erythromycin Yuyao disable other residues, residues of the drugs has exceeded the national standard limit requirements. If long-term high intake of human nitrofurans, will have the possibility of cancer.
2005	Sudan red dye event	In February, the British Food Standards Agency on food containing carcinogens can add food coloring Sudan issued a warning to consumers, and published a number of food brands may contain Sudan No.1. Immediately, the Chinese have started to implement Sudan I dragnet siege from the production, distribution, catering all sectors. In the country, including 88 food samples 30 companies were found to contain Sudan Red One.
2004	Counterfei milk formulae in China	Around 70 babies died of malnourishment. 100e200 babies in Anhui Province suffered from malnutrition.47 perpetrators were arrested and in total 45 types of substandard milk formulae were discovered in Fuyang markets.

#### Reasons of causing food safety incidents

Although thousands of people have been employed and engaged in food safety management around the world, with millions of dollars invested in food safety research and management and a myriad of inspections/audits and tests conducted by governmental agencies and non-governmental organizations (NGOs) at home and abroad, food safety still remains an issue of paramount importance and public health priority. Faced with the major food safety incidents after another, had let us reflect on the reasons behind. Next this paper mainly studies the reasons of food safety from the institutional and technical.

### Weak government management

In fact, legislation has long played a crucial role in food security [8] via its regulatory effects on practices in the food sector and its public educational functions. In addition, legislation can mainly function well as a way to handle the aftermath of an event [9] In order to increase attention to food safety issues in the past 20

years, international agencies, governments, non-government agencies, retailers, and producer associations have introduced a large number of food safety regulations, guidelines, standards and norms to regulate and guarantee food safety [10,11,12,13,14].

However, the development of food safety laws and regulations is very slowly in China and lack of strict uniform food safety standards. Until February 2009 the Chinese National People's Congress Standing Committee before the revision and development of new Food Safety Law. The new law Claims the formation of a national-level food safety commission to oversee the entire food monitoring system. It also defines harsher punishments, including significant fines and compensatory awards to victims, for businesses producing or selling substandard food products [15,16]. Table.3 shows the evolution of the history since the founding of China's Food Safety Law.

**Table-3: Relevant laws and regulations**

Year	laws and regulations
1982	"Food Sanitation Law"
1985	"Food Safety and Toxicology Evaluation Program (Trial)"
1994	"Food Safety and Toxicology Evaluation Program."
1995	"Food Sanitation Law" Revise
1996	"Further reforms to improve public health surveillance and law enforcement system notice"
2009	"People's Republic of China Food Safety Law"

Given the gap between the legislative, the Chinese government needs to take more measures to ensure food safety and restore public confidence [17].

Another problem is lax enforcement of food safety officials. There are few inspectors to follow the trail the vast number of small and large scale producers and Intensive local government protectionism of local producers may decrease the effectiveness of the inspection process [18]. Punishments for violations of Food Safety Laws at the local level are generally minor and are often not implemented, allowing producers to continue in business despite dangerous production practices [19]. Guan Shu-Fang from food safety system in punitive damages, to maintain food market order and safeguard the legitimate rights and interests of the public point of view believe that our present system of punitive damages "Food Safety Law" provisions, there are still too simple enough so that the cost of illegal punishment too low, leading to all kinds of major food safety cases in recent years emerging [20].

In coping with food safety issues, Chinese government relies heavily on state institutions, such as laws and regulations, governmental standards and certification, and inspections and enforcement [21]. The

following is primarily responsible for food safety regulation agencies in China [16].

From the food safety regulation agencies in China ,we can find that many government agencies are involved in enforcing food safety regulations, including the Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), the Ministry of Health (MOH), the Ministry of Agriculture (MOA), the Food and Drug Administration (FDA), the Administration for Industry and Commerce (AIC), and the Standardization Administration.

The Food Hygiene Law gives responsibility to the MOH for monitoring, inspecting and giving technical assistance for food hygiene as well as investigating food contamination and food poisoning incidents. The MOA is responsible for regulating quality and safety standards for farm products and the inputs used in their production [22]. The AQSIQ is responsible for control of importation and export of food products. We can find that as many as fourteen departments responsible for food safety supervision in China [23], these food management agencies and examination institutions face lack of qualified staff and unclear division of responsibilities [24,25].

National food regulatory model is an important control mechanism to achieve food safety compliance. "Strengthening national food control systems" is focused on government agencies and food control authority self-assessment and capacity building. The assessment is based on six elements food control management, food legislation, food inspection, official food control laboratories and food safety and quality information, education and communication [26,67].

European Food Safety Authority (EFSA) was the first integrated approach to control the food legislation in European Union. The white paper on food safety was published and approved in the year 2000. EFSA was established in 2002 as an independent European agency set up by EU budget that helps to improve food safety in EU and make sure high level of consumer protection. In the similar, in United Kingdom, Food Standards Agency is responsible for food safety and food hygiene. General food law primarily Food Standards Act 1999 gave powers to establish integrated Food Standards Agency.

The FSA was funded in the year 2001. The main objective of the Agency was to protect public health in relation to the food and its related activities. It is an independent government department managed by the board, rather than ministers with an independent outlook [67]. However until February 2009 the Chinese National People's Congress Standing Committee passed the new Food Safety Law, and set up a national-level food safety commission to oversee the entire food monitoring system in China. Lax enforcement of the law and lack of supervision has become an important cause of frequent food safety incidents in China.

### **Weak food-industry chain Asymmetry information**

Transparency of information is not enough. The transparency are to be found in earlier right movements, legislation and practices, particularly in the United States and other advanced industrialized democracies, in the 1960s and 1970s. It, loosely defined as the disclosure of information, has been developed and implemented in food systems in OECD countries to govern the quality and sustainability of agro-food, and to increase public accountability and consumer trust in food products, production and provisioning. Transparency thus relates the disclosure of information that was monopolized by food producers, which becomes now available for, among others, regulatory/inspection agencies, consumers and the wider public, there are four forms of food chain transparency: management transparency, regulatory

transparency, and public transparency and consumer transparency [27].

Transparency regimes as one of the most recent innovations in advanced market economies are public and private governance institutions for quality and sustainability in food products and production [71]. Because many food chain actors are not very responsive to any potential loss of reputation through disclosure and naming and shaming of unsafe and unsustainably produced food in China, so public transparency on food quality and sustainability dysfunctions. Qiang, Wen, Jing, and Yue [28] analyzed the content of 600 publicly available reports on food safety events from 43 websites, however very few of these had been advertised by public organizations such as environmental NGOs, consumer organizations, official medias, more qualified, systematic, and reliable reporting of food quality, sustainability and safety events by food chain actors remains restricted to and among professionals [29].

So, in China, what's the reason makes value chain transparency institutions from those in advanced market economies? It is the poor active involvement of the private sector. This is not so much a feature of Chinese enterprises, but arguably strongly caused by the lack of liability institutions and triviality of reputation capital [30]. Both are related to the near lack of consumer and public transparency and an ill-functioning rule of law. Enterprises do not yet witness harsh public and market penalties if food safety and quality is put in danger, neither through public reputation damage nor through liability systems. Brands play a different role in contemporary in China as they are less vulnerable for disloyal mass consumption [31], and firms easily change their name when they are 'negatively branded'.

In Special circumstances cases the state does put severe penalties for example, up to the death penalty, in the case of melamine in milk. But there is hardly any sanctioning power of the market and the public in China. This contributes to a suboptimal and overburdened state food safety management system. Although the 2009 Food Safety Law required the state to set up a unified food safety information release system [32], argue that the information provisioning system of the state on food safety ill-functions. Public food transparency, that is the systematic disclosure of information on food quality and sustainability towards the media and the wider public, is far from institutionalized and routinized in China.

### **The lack of corporate social responsibility (CSR)**

Food safety is a key issue for any society and economy as it requires the attention and awareness of the government and all stakeholders in the industry. In a

bibliometric analysis of 30 years of research and theory on CSR, De Bakker et al. [33] point out that the CSR have been discussed since the 1950s at least in the US. One of the most significant corporate trends of the last decade is the rapid growth in activities associated to corporate social responsibility (CSR). According to Business for Social Responsibility (BSR), CSR is defined as “achieving commercial success in ways that honor ethical values and respect people, communities, and the natural environment” [34]. McWilliams and Siegel [35] and McWilliams and Siegel [36] describe CSR as “actions that appear to further some social good, beyond the interest of the firm and that which is required by law.” Although definitions of CSR vary, the term generally refers to actions taken by firms beyond their legal duties, with respect to their employees, communities, and the environment.

Formally, Gerde and Wokutch [37], in their 25-year analysis of the proceedings published of social issues in management, distinguish four CSR-related phases: “gestation and innovation” in the 1960s, “development and expansion” in 1972–1979, “institutionalization” in 1980–1987, and “maturity” in 1988–1996. In the early period, the purpose of research on CSR is “to describe the situation and perhaps to develop theories of the dimensions of corporate social responsibility or the specific relationship between business and society and between the firm and its employees” [38].

Currently, there are four CSR evaluating systems widely used in the literature. [66] present an excellent review and identify multiple CSR sources into four categories.

- The Domini Social Index, which is a hybrid measure of perceptual and multiple dimensions of CSR and is developed by Kinder, Lydenberg, Domini (KLD). This index has created a series of widely acknowledged social responsibility criteria which gradually became an international standard [39]. The Domini social criterion includes eight big domains: community, corporate governance, diversity, employee relations, environment, human rights, product quality, and controversial business issues.
- The fortune reputation survey (a purely perceptual measure). Using questionnaires on eight attributes of firms’ reputation, the Fortune creates an overall corporate reputation index.
- The self reported measure, i.e. the Toxics Release Inventory (TRI). It consists of information on environmental discharges to the water, air, and landfills, and disposal of hazardous waste and is mandated by Emergency Planning and Community

Right-to-Know Act (EP-CRA-1986). Thus, this CSR measure is often used by the government and special interest groups.

- Corporate philanthropy. Some studies also use philanthropy as the CSR measure, [66] and Godfrey et al. [40].

Recently, a large number of companies worldwide have engaged in efforts to integrate CSR into all aspects of their businesses. Meanwhile, with the current financial scandals, investment losses, and reputational damage to listed companies, an increasing number of shareholders, analysts, regulators, employees, and news media outlets are focusing more on CSR-related issues. Although debates are still ongoing on whether a good CSR performance indeed contributes to a firm’s success [69, 70]. Although debates are still ongoing on whether a good CSR performance indeed contributes to a firm’s success the damage of a deficient response to CSR is indubitable. The cases of Toyota and BP are two recent examples.

In the 2010 Annual Corporate Social Responsibility Perceptions Survey released by Penn Schoen Berland, Land or Associates, and Burson Marsteller, more than 75% of consumers say that examining companies’ CSR strategies is important. This survey also shows that consumers prioritize social responsibility across business sectors, and 55% are more likely to purchase a product with added social benefit. Moreover, 70% of respondents are willing to pay a premium on products from a socially responsible company.

However, in China, the CSR evaluating systems are still in their nascent period. To our knowledge, there are only two CSR related indexes. One is China’s CSR Development Index, which was published since 2009 by the CSR Research Center of Chinese Academy of Social Sciences (CASSs). However, this index only covers China’s top 100 state-owned enterprises, top 100 private enterprises and top 100 foreign-invested enterprises. The index integrates companies’ responsible governance, economic performance, social contribution and environmental protection. The other one is CSR index for China’s listed companies, which was issued since 2008 by the SNAI. This SNAI index was formulated according to the standard of SA8000 (the first international certification on social responsibility) issued by Social Accountability International (SAI). Important reason for the lack of corporate social responsibility to be a variety of food safety incidents of fraud.

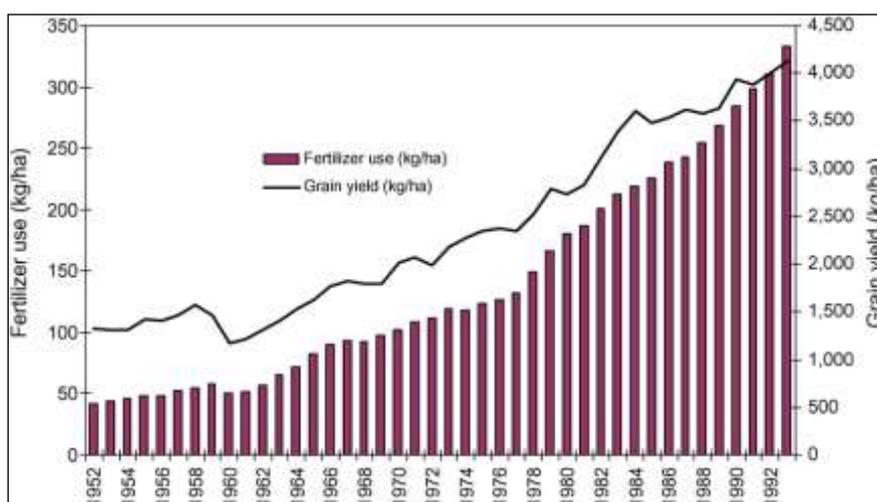
#### Food production and processing reasons

Product quality is the most important factor for a firm's success. The international food manufacturers and processors mostly had food safety management systems in place showing their commitment to legislation and customer requirement [41]. Feglo and Sakyi [42] supported the idea that in developing countries where money and time required improving existing environmental standards might demand longer waiting periods, these were mostly small and micro enterprises that lacked the capacity to implement and maintain acceptable international standards, absence of prerequisite measures and lack of documentation of available ones causes lack of standardization [43].

Many food quality and safety problems are due to the production of non-compliance, resulting in substandard product quality, thereby threatening human safety. In addition, improve food security will affect the production and operation costs, which would weaken the price competitiveness of products [44]. Antler [45] combined cost function model and happy computing model for American beef, pork and chicken

slaughtering costs associated with the output, quality control plants were estimated. The assumption that the market is under the premise of a competitive market structure, obtained product cost and product quality improvement is proportional to the stringent food safety and quality control and will result in higher production costs.

Meanwhile, food safety management requires a lot of manpower, equipment investment, increase product attrition rate, thereby increasing the cost of production. Therefore, the production operators, often through some of the production, processing technology, or failure to comply with certain statutory safety standards, reduce the quality and safety standards to increase productivity, improve business quality, reduce costs, and increase revenue. In the interests of the illegal use of technology driven, or failure to comply with statutory norms, making food quality and safety issues become a reality [46]. The following Figure 1 reflects another reason of the food safety in China from overuse of fertilizer.



**Fig-1: Grain yield and fertilizer consumption per hectare in China, 1952–1993.**

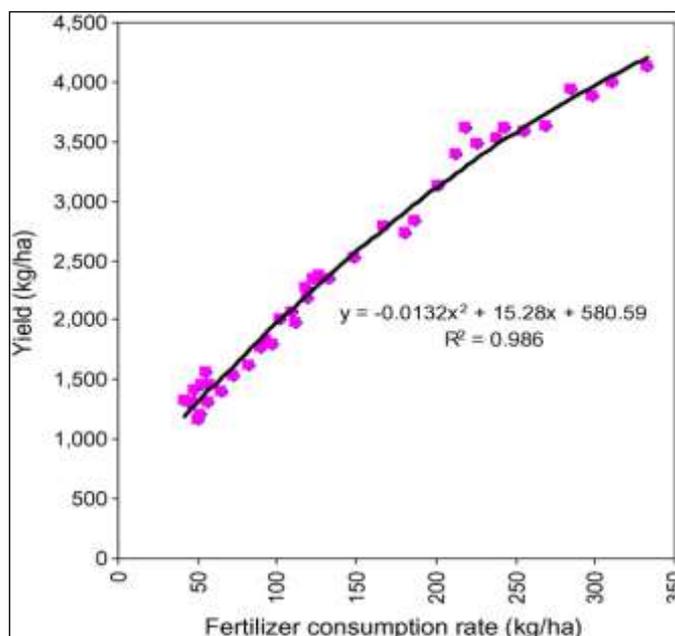
The world's fertilizer use per ha increased from about 60 kg in 1960 to 110 kg in 2002 [47]. In China, fertilizer use per ha increased from 10 kg in 1960 to about 330 kg in 2002, efforts to increase food production in China over the last 30 years have been accompanied by policies that encourage the use of chemical fertilizer. This increase in fertilizer application in China has been much higher than in many other developing and developed countries [48], contributing significantly to growth in grain production. Chemical fertilizer use increased rapidly with the rural economic reforms initiated in 1978, surpassing the use of organic fertilizer by 1982 [49]. Fertilizer use rates vary with geography in China. The average use rate is about 300 kg/ha in southeast provinces such as Guangdong, Fujian

and Jiangsu, and about 100 kg/ha in the northwestern provinces of Gansu, Guizhou and Qinghai [50].

Furthermore, fertilizer use by many farmers is inefficient and excessive [51]. The intense application of fertilizer contributes to the eutrophication of lakes and rivers, greenhouse gas emissions, and acidification of farmland. At the same time, heavy metals and chemicals from industrial activities often stay in soil and water for many decades, threatening food safety and human health well into the future. The Ministry of Environmental Protection has not released the results from its 2010 extensive study of soil pollution, but government sources indicate that about 8 percent of farmland is contaminated with industrial pollutants a potential contamination of approximately 12 million

tons of grain annually, which equals a direct annual economic loss of US\$3.26 billion [52]. Moreover, events such as the discovery by Chinese government officials [53] of cadmium - a carcinogenic heavy metal

used to produce batteries - in China's rice supply have the potential to shift consumer demand from domestic to foreign food markets and disrupt international markets by increasing global food prices.



**Fig-2: Relationship of grain yield and fertilizer use during 1952-1993.**

Along with the massive use of chemical fertilizers, pesticides are more and more used in the China. Following the threat of crop losses from pest infestations during the 1960s and 1970s the availability of pesticides was increased. By the late 1980s small holders in China applied pesticides regularly at rates higher than other rice producing countries in Asia [65]. Application rates in some counties in eastern China in the 1990s were twice those of irrigated rice systems in the Philippines, where serious impacts to farmer health and productivity have been linked to pesticide use [68].

Pesticide use for other crops also increased by several orders of magnitude. Field studies in China have shown that pesticides are over used; pest resistance has decreased the effectiveness of pesticides; and direct marginal contributions of pesticides to yields are low or negative, while associated negative externalities are high [54]. Evidence shows that less developed countries with high levels of foreign direct investments in the primary sector use more pesticides per hectare of cropland [56]. Together this poses a perplexing issue. With further liberalization of the Chinese economy, pesticide use will continue to increase. Government policies that promote pesticide use might be inappropriate, given the low incremental productivity and negative returns to pesticide use. China might reconsider its commitment to increase pesticide use in rice for greater food security. Investments in farmer education on biological pest control and improving

host-plant resistance might generate larger net benefits [55].

At the same time, the food supply chain has become longer and more complex with more participants and rising demand for higher value food, leading to more potential points of food contamination [57]. Large quantities of food are now transported in China over long distances to reach urban areas, increasing the potential for food cross-contamination and spoilage and expanding the distribution area of contaminated foods. Additionally, efforts to keep up with growing demand and increase profits amidst stiff competition have led some farmers, food processors, and traders to cut corners on food safety by using potentially hazardous inputs and production methods [58].

Over the last decade, the growing size and density of animal-based food production in China offers an increasingly fertile environment for the transmission and mutation of zoonotic diseases (defined as infectious diseases that are transmittable between animals and humans) that could endanger both food availability and human health [59]. China has experienced a number of notable outbreaks in animal-borne diseases, including swine (H1N1) and avian (H5N1) influenza. In 2013, a new strain of avian influenza (H7N9) emerged in mainland China that is often asymptomatic or mild in poultry, making it more difficult to undertake monitoring, prevention, and controlled quarantine

measures without disruptions to safe food production activities [60].

### Food security governance

At present, China is in a period of multiple food safety issues, food safety incidents occur frequently threaten not only people's health, causing serious damage to the economy and society, but also affected the country's image and standing in the international community. Therefore, food safety issues of governance become urgent economic and social development of the practical requirements. In the current context of economic and social development, China's food security governance has its own characteristics: dispersion of governance, hysteresis and intermittent. Although the country has introduced a number of positive response to the food safety, but the food security governance is still not optimistic. The main reason is the lack of effective government regulation, market regulation mechanisms unbalanced social forces participate in lack of motivation, lack of effectiveness of food safety emergency management, and other aspects of food safety loopholes in laws and regulations.

Visible, China's food safety problems in governance stems from several aspects, not only including the government regulation out of position, the weak of the market mechanism, but also the food industry associations, consumers, the media and other social self-organization fails. Food security governance is a complex social system process, relying solely on the government or the market can not fundamentally solve the problem, its role has certain limitations [61]. Therefore, building a diverse of food safety governance model, it has the theoretical and practical significance.

It is well known that as an important outcome of governance theory recently developed of public

administration, from the practical needs of the current economic and social change transformation. "Western political scientists and management scientists reason for making the concept of governance, governance instead advocate the use of the rule, it is because they both see the failure of the market in the allocation of social resources, and also saw the failure of the country." disciplinary research the traditional political science, administration, economics, etc. are mostly dependent on the simple dichotomy to explain and analyze real problem, it is not unable to adapt to the economic interests of social differentiation, multiple demands. The theory of governance advocate its multi-center cooperative governance, the concept of government "meta governance" role and network management system, either as a critique of the traditional dichotomy, or to some extent make up for lack of a binary perspective, be considered missing the "third term" choice. [62].

Currently, according to different criteria for the classification of food security governance model, it can be divided into different categories: food security governance in accordance with the nature of the subject, can be divided into governance and social governance; food from production to consumption in accordance with the scope and span of control, can be divided for full control and segmentation of governance; food security governance in accordance with the mechanism can be divided into policy mechanisms of governance, legal mechanisms of governance and risk management mechanisms; according to the number of food safety governance body, and can be divided into single subject of governance and management of multiple subjects, etc. The following table is a comparison of traditional food safety management and new food security governance [63].

**Table 4 Management factors**

	Traditional food safety management	The model of new food security governance
Management areas	Government and various departments to manage their own security division of the transaction	Integrated management of the government, highly coordinated various departments
Management body	Government is the only body	Government, marketing, production enterprises, the third sector cooperative governance
Management direction	Single management, from top to bottom	More to cross, network management
Management methods	Mandatory laws	Food safety policy, market policy, the combination of participatory policy
Management objectives	Ensure food safety	Promote the healthy and sustainable development of the food industry
Management capabilities	Administrative means to bureaucracy characterized	Economic means, administrative means, the means to participate in a comprehensive
Management combination	Type of food safety regulation is absolutely dominant policy	Type of food safety regulatory policy, market-based food safety policy, participatory organic combination of food safety policy

The traditional system of food safety policy is basically to solve a single problem of food hygiene and design, the tools mainly rely on policy of the government. But the governance theory advocated by the core value system point of view, they emphasize governance path opened up the idea of solving the problem of food security. First, under the theoretical perspective of governance, food safety begins with a "relatively closed system" to a "multiple open system" change, problem solving focus turned down by up shrink inward outward divergence, enhanced social basis and the practical effect of food security governance.

Second, in the theoretical perspective of governance, government agencies, the food industry, the third sector, the public and other types of body, become more central to food safety governance, each served in food security governance in different roles to play its functions, to achieve the goal of governance requires not only diversification of food safety management body and participatory measure of management, but also to ask for food safety management tools must have the appropriate changes [64].

Third, under the theoretical perspective of governance, food security governance form a dynamic network system, which relies on the orderly operation of a system under the authority of democratic consultation, rather than simply a government authority, both interconnected between multiple subjects and mutual restraint, either network relationships will be monitored from the other subjects.

In a word, the idea of introducing the theory of governance of food security, the multiple subjects respective powers and responsibilities as the research object, changing the traditional simply rely on "cover, blocking, penalty," the food safety management, also broke rely solely on a single government department management of the inertia of thinking, to effectively address the problem of food security provides a multiple angle, all-round perspective.

## CONCLUSIONS

China's major food safety incidents and problems of food frequently repeated, there are complex reasons behind the weak government management and food-industry chain. With the era of progress and technology development, food security will also face more severe and complex forms. Traditional food safety management methods cannot effectively solve the current severe food security problems. How effective implementation of food safety management, and earnestly safeguard the interests of the public life and health is a major issue in social management and livelihood projects currently facing.

From the core value of the governance theory advocated, it emphasizes the active mobilization of government, market and society, giving full play to the government "meta governance", self-discipline and social supervision form a further transform government functions and institutional reform strengthen corporate social responsibility and business ethics, promoting social collaboration participation and expression of spiritual discourse, standardized multiple subjects governance, pioneering a new way to solve the problem of food security, for truly orderly and safe operation in the field of food safety will be beneficial exploration and innovation.

## REFERENCES

1. Maxwell S, Smith M; Household food security: a conceptual review. In S. Maxwell and T. Frankenberger, eds. Household food security: concepts, indicators, and measurements: a technical review. New York, NY, USA and Rome, UNICEF and IFAD, 2013.
2. Giraldo DP, Betancur MJ, Arango S; Food Security in Development Countries: A Systemic Perspective. Proceeding in System Dynamics Conference. In Shri Dewi Applanaidu, & Nor'Azni Abu Bakar, & Amir Hussin Baharudin. An Econometric Analysis Of Food Security And Related Macroeconomic Variables In Malaysia: A Vector Autoregressive Approach (VAR). International Agribusiness Marketing Conference, 2013, 2008.
3. Shri Dewi Applanaidu, & Nor'Azni Abu Bakar, & Amir Hussin Baharudin. An Econometric Analysis Of Food Security And Related Macroeconomic Variables In Malaysia: A Vector Autoregressive Approach (VAR). International Agribusiness Marketing Conference 2013a, IAMC 2013, 22-23 October 2013, Kuala Lumpur, Selangor, Malaysia.
4. Aker JC, Lemtouni A; A Framework for Assessing Food Security in the Face of Globalization: The Case of Morocco. *Agroalimentaria*, 1999; 8: 13-26.
5. Shri Dewi Applanaidu, & Nor'Azni Abu Bakar, & Amir Hussin Baharudin. An Econometric Analysis Of Food Security And Related Macroeconomic Variables In Malaysia: A Vector Autoregressive Approach (VAR). International Agribusiness Marketing Conference 2013b, IAMC 2013, 22-23 October 2013, Kuala Lumpur, Selangor, Malaysia.
6. Yang G; Contesting food safety in the Chinese media: Between hegemony and counter-hegemony. *The China Quarterly*, 2013; 214: 337-355.
7. Potter, Hotchkiss (2001). *Food Science*: 471-487. Sina foodborne diseases have become the number one food safety issues [EB / OL]. <http://npc.people.com.cn,2006-09-08>.
8. Kastli P; Effects of food legislation on the hygienic

- production of milk and milk products. *Mitteilungsblatt Lebensmitteluntersuchung und Hygiene*, 1955; 46(6): 483-488.
9. Chan ZC, Lai WF; Revisiting the melamine contamination event in China: implications for ethics in food technology. *Trends in food science & technology*, 2009; 20(8): 366-373.
  10. Da Cruz AG, Cenci SA, Maia MCA; Quality assurance requirements in produce processing. *Trends in Food Science & Technology*, 2006; 17(8): 406-411.
  11. Henson S; The role of public and private standards in regulating international food markets. *Journal of International Agricultural Trade and Development*, 2007; 4(1): 52-66.
  12. Luning PA, Marcelis W, Spiegel MV; Quality assurance systems and food safety. In P. Luning, F. Devlieghere, & R. Verh ? e (Eds.), *Safety in the agri-food chain*. Wageningen: Wageningen Academic Publishers, 2006.
  13. Neeliah SA, Goburdhun D; National food control systems: a review [Article] *Food Reviews International*, 2007; 23(1): 35-51.
  14. Trienekens J, Zuurbier P; Quality and safety standards in the food industry, developments and challenges [Article] *International Journal of Production Economics*, 2008; 113(1): 107-122.
  15. Chinaview, 2009. More Chinese officials punished in tainted milk scandal. *Window of China*, Available from: [http://news.xinhuanet.com/english/2009-03/20/content\\_11043298.htm](http://news.xinhuanet.com/english/2009-03/20/content_11043298.htm).
  16. Broughton EI, Walker DG; Policies and practices for aquaculture food safety in China. *Food Policy*, 2010; 35(5): 471-478.
  17. Chan ZC, Lai WF; Revisiting the melamine contamination event in China: implications for ethics in food technology. *Trends in food science & technology*, 2009; 20(8): 366-373.
  18. Ellis LJ, Turner JL; Sowing the seeds: opportunities for US-China cooperation on food safety. In: *China Environment Forum*. Woodrow Wilson International Center for Scholars Washington, DC, 2008.
  19. Ming L; Study on establishing a perfect food safety system in China. *Management*, 2006; 11(1): 111-119.
  20. Guan Shu-Fang; *punitive damages system research* [M] Beijing: Chinese People's Public Security University Press, 2009.
  21. Mol AP; Governing China's food quality through transparency: A review. *Food Control*, 2014; 43: 49-56.
  22. Tam W, Yang D; Food safety and development of regulatory institutes in China. *Asian Perspectives*, 2005; 29(4): 5-36.
  23. Wu, Y., & Chen, Y. (2013). *Food safety in China*. *Journal of Epidemiology and Community Health*, 67(6), 478-479.
  24. Ni HG, Zeng H; Law enforcement is key to China's food safety. *Environmental Pollution*, 2009; 157: 1990-1992.
  25. Wu X, Ye Y, Hu D, Liu Z, Cao J; Food safety assurance system in Hong Kong. *Food Control*, 2014; 37: 141-145.
  26. FAO/WHO; *Assuring food safety and quality: Guidelines for strengthening the national food control systems*. FAO food and nutrition paper 76. Rome, Italy: Joint FAO/WHO Publication, 2003, Available from: <http://www.fao.org/docrep/006/y/8705e/y8705e00.HTM>.
  27. Zhang L, He GZ, Mol APJ, Lu Y; Public perceptions of environmental risk in China. *Journal of Risk Research*, 2013; 16(2): 195-209.
  28. Qiang L, Wen L, Jing W, Yue D; Application of content analysis in food safety reports on the Internet in China. *Food Control*, 2011; 22(2): 252-256.
  29. Xue J, Zhang W; Understanding China's food safety problem: an analysis of 2387 incidents of acute foodborne illness. *Food Control*, 2013; 30(1): 311-317.
  30. Liu H, Kerr WA, Hobbs JE; A review of Chinese food safety strategies implemented after several food safety incidents involving export of Chinese aquatic products. *British Food Journal*, 2012; 144(3): 372-386.
  31. Eckhardt G, Bengtsson A; A brief history of branding in China. *Journal of Marcomarketing*, 2010; 30(3): 210-221.
  32. Jia C, Jukes D; The national food safety control system of China a systematic review. *Food Control*, 2013; 32(1): 236-245.
  33. De Bakker FGA, Groenewegen P, Den Hond F; A bibliometric analysis of 30 years of research and theory on corporate social responsibility and corporate social performance. *Business & Society*, 2005; 44(3): 283-317.
  34. Dongmin Kong; Does corporate social responsibility matter in the food industry? Evidence from a nature experiment in China. *Food Policy*, 2012; 37(3): 323-334.
  35. McWilliams A, Siegel D; Corporate social responsibility and financial performance. Correlation or misspecification? *Strategic Management Journal*, 2000; 21: 603-609.
  36. McWilliams A, Siegel D; Corporate social responsibility: a theory of the firm perspective. *Academy of Management Review*, 2001; 26: 117-127.
  37. Gerde VW, Wokutch RE; Twenty-five years and going strong: a content analysis of the first 25 years of the social issues in management division

- proceedings. *Business & Society* 1998a; 37(4): 414-446.
38. Gerde VW, Wokutch RE; Twenty-five years and going strong: a content analysis of the first 25 years of the social issues in management division proceedings. *Business & Society*, 1998b; 37(4): 414-446.
  39. Becchetti L, Giacomo SD, Pinnacchio D; Corporate Social Responsibility and Corporate Performance: Evidence from A Panel of US Listed Companies. Working Paper, 2005; 40(5): 541-567.
  40. Godfrey PC, Merrill CG, Hansen JM; Corporate Philanthropy and Shareholder Value: An Event Study Test. Working Paper, 2009; 30(4): 425-445.
  41. Patricia Foriwaa Ababio, Pauline Lovatt; A review on food safety and food hygiene studies in Ghana. *Food Control*, 2015a; 47: 92-97.
  42. Feglo P, Sakyi K; Bacterial contamination of street vending food in Kumasi, Ghana. *Journal of Medical and Biomedical Sciences*, 2012; 1(1): 1-8.
  43. Patricia Foriwaa Ababio, Pauline Lovatt; A review on food safety and food hygiene studies in Ghana. *Food Control*, 2015b; 47: 92-97
  44. Henson S; Regulating the trade effects of national food safety standards: Discussion of some issues[A]. OECD Workshop on Emerging Trade Issues in Agriculture[M]. Paris: OECD Workshop, 1998; 25-27.
  45. Antle JM, Efficient; Food Safety Regulation in the Food Manufacturing Sector, *American Journal of Agricultural Economics*, 1996.
  46. Zhou deyi, Yang Haijuan; Food quality and safety management of information asymmetry and government regulatory mechanisms. [J] *Chinese rural economy*, 2002; 29: 35-52.
  47. FAO; Review of agricultural water use per country, 2007a, Available from: [http://www.fao.org/nr/water/aquastat/water\\_use/index.stm](http://www.fao.org/nr/water/aquastat/water_use/index.stm).
  48. Kahrl F, Li Y, Su Y, Tennigkeit T, Wilkes A, Xu J; Greenhouse gas emissions from nitrogen fertilizer use in China. *Environmental Science & Policy*, 2010; 13(8): 688-694.
  49. Liu X, Chen B; Efficiency and sustainability analysis of grain production in Jiangsu and Shaanxi Provinces of China. *Journal of Cleaner Production*, 2007; 15(4): 313-322.
  50. FAO; Review of agricultural water use per country, 2007b, Available from: [http://www.fao.org/nr/water/aquastat/water\\_use/index.stm](http://www.fao.org/nr/water/aquastat/water_use/index.stm).
  51. Ma W, Li J, Ma L, Wang F, Sisák I, Cushman G, Zhang F; Nitrogen flow and use efficiency in production and utilization of wheat, rice, and maize in China. *Agricultural Systems*, 2008; 99(1): 53-63.
  52. Anonymous. 2012. Pollutants, pesticides threaten farm land. *China Daily*, 2012-6-12. [2013-7-28]. [http://www.chinadaily.com.cn/business/2012-06/12/content\\_15496585.htm](http://www.chinadaily.com.cn/business/2012-06/12/content_15496585.htm)
  53. Buckley C; Rice tainted with cadmium is discovered in southern China. *New York Times*, 2013.
  54. Widawsky D, Rozelle S, Jin S, Huang J; Pesticide productivity, host-plant resistance and productivity in China. *Agricultural Economics*, 1998a; 19(1-2): 203-217.
  55. Widawsky D, Rozelle S, Jin S, Huang J; Pesticide productivity, host-plant resistance and productivity in China. *Agricultural Economics* 1998b; 19(1-2): 203-217.
  56. Jorgenson AK; Foreign direct investment and pesticide use intensity in less-developed countries: a quantitative investigation. *Society & Natural Resources*, 2007; 20(1): 73-83.
  57. IRGC (International Risk Governance Council). 2010. Emerging food safety risks: Melamine-tainted milk in China. In: *International Risk Governance Council Case Study*. Geneva.
  58. Pei X, Tandon A, Alldrick A, Giorgi L, Huang W, Yang R; The China melamine milk scandal and its implications for food safety regulation. *Food Policy*, 2011; 36(3): 412-420.
  59. IDS (Institute of Development Studies). 2013. Zoonoses from panic to planning. *Rapid Response Briefing 2*, January. Brighton, United Kingdom.
  60. Perry J; H7N9 avian flu infects humans for the first time. *British Medical Journal*, 2013; 346.
  61. Zhang Qi; China's food safety research multi-agent governance model - based on the perspective of governance theory [D], Shandong Normal University, 2014a.
  62. Zhang Qi; China's food safety research multi-agent governance model - based on the perspective of governance theory [D], Shandong Normal University, 2014b.
  63. Qing Li, Wang Song; Public governance theory: A New Perspective on food safety governance [J] *Changchun Institute of Technology*, 2008a; 2: 34-36.
  64. Qing Li, Wang Song; Public governance theory: A New Perspective on food safety governance [J] *Changchun Institute of Technology*, 2008b; 2: 34-36
  65. Widawsky D, Rozelle S, Jin S, Huang J; Pesticide productivity, host-plant resistance and productivity in China. *Agricultural Economics*, 1998c; 19(1-2): 203-217.
  66. Griffin JJ, Mahon JF; The corporate social performance and corporate financial performance debate: 25 years of incomparable research. *Business & Society*, 1997; 36(1): 5-31.
  67. Shukla S, Shankar R, Singh SP; Food safety regulatory model in India. *Food Control*, 2014; 37: 401-413.

68. Pingali PL, Hossain M, Gerpacio RV; Asian rice bowls: the returning crisis?. *Int. Rice Res. Inst*, 1997.
69. Posnikoff JF; Disinvestment from South Africa: They did well by doing good. *Contemporary Economic Policy*, 1997;15(1): 76.
70. Wright P, Ferris SP, Sarin A, Awasthi V; Impact of corporate insider, blockholder, and institutional equity ownership on firm risk taking. *Academy of Management Journal*, 1996; 39(2): 441-458.
71. Mol AP, Spaargaren G, Sonnenfeld DA; Ecological modernization theory: taking stock, moving forward. In *Routledge International Handbook of Social and Environmental Change* (pp. 15-30). Routledge. 2014.
72. Veeck A, Yu H, Burns AC; Consumer risks and new food systems in urban China. *Journal of Macromarketing*, 2010; 30(3):222-237.