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Time to cry over spilled milk: An investigation into
China's food safety system.

By

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of the requirements for
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ABSTRACT

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Advisor: Mark Dallas

China is plagued with food safety scandals ranging from contamination of dairy, to exploding watermelons in the countryside. This thesis explores the four main reasons that China has many food safety regulatory issues: the wide dispersion of farms in China, the fragmentation of the food safety regulatory system, weakness of local implementation, and the poor structure of commerce. Using the case studies of the dairy and pork industries this thesis examines these four proposed flaws and proposed solutions for improving food safety in China. Governmental flaws and mistakes are mostly responsible for these problems, but the current structure of government is too bureaucratic and corrupt to properly handle the problem. Therefore, improvement of food safety relies on private enterprises.

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INTRODUCTION

In 2008, a bizarre illness was spreading across China; infants across the country were found to have kidney stones. Parents and doctors alike were baffled at what could be causing these kidney stones, which led to life-threatening illnesses in 300,000 individuals, mostly children, and the deaths of at least 6 infants.¹ The cause of these health issues was discovered to be melamine, a nitrogen-rich chemical usually used for the manufacture of fertilizers, plastics, laminates, paints and adhesives. Toxic when consumed by humans, melamine can cause renal failure and dysfunction, a fact that was known years before this scandal.² In 2008 it was discovered that workers at Sanlu, one of the leading dairy companies in China, were adding melamine to milk in order to make it appear to have a higher protein content, rendering it more marketable and of higher monetary value. Melamine usage was highly concentrated in the production of baby formula. The apparently nutrient rich infant formula would seem to be highly beneficial to the health of babies and motivate parents to buy it, but the addition of melamine was potentially lethal.

News about Sanlu's melamine-tainted baby formula first reached the media in late August (although Sanlu officials had known about the contamination for many months) and it quickly spread through national and international media. Ironically, Sanlu was officially recognized only 8 months earlier for its quality and standards, including for its

¹ Xiu Changbai. (2010). Melamine in milk products in China: Examining the factors that led to the deliberate use of the contaminant. *Food Policy*, 35(5), 464.

² Pei Xiaofeng et al. (2011). The China melamine milk scandal and its implications for food safety regulation. *Food Policy*, 36(3), 415.

infant formula.³ The company was required to recall all of its dairy products and was forced into bankruptcy because of the revenue loss caused by this recall. In Chinese courts, two people were sentenced to death for adding melamine to the milk and then selling it to the manufacturers. Many of the company's leaders were fined and imprisoned; the company's general manager and chairwoman was sentenced to four life terms in prison.⁴ Adding to the atmosphere of fear throughout China was the discovery of melamine in almost all dairy products throughout the country. There was a worldwide recall of all Chinese products that contained dairy, even candies. Blame for these incidents was found everywhere and new legislation was drawn up to help improve food safety regulations. Nevertheless, despite the severe punishments and new legislation in the three years since this scandal, food safety violations have become commonplace in China's media and melamine has not disappeared from the dairy industry. Exploding watermelons, fake tofu preserved with formaldehyde, and clenbuterol-fed pigs dominate the daily headlines, and reports of melamine-tainted milk continue; it is as if nothing has changed.

The Chinese people were baffled by these events; how could their government have allowed this to happen? Exacerbating matters was the fact that this was not the first incident in the dairy industry. In 2003 it was discovered that many companies in the dairy industry were producing substandard or fake milk powder. This led to the deaths of 12 babies and severe cases of malnutrition in hundreds of babies, but there were no changes in government regulation. In response some people have turned to creating co-ops and

³ Chen Shumei. (2009). Shame or sham: Rethinking China's milk powder scandal from legal perspective. *Journal of Risk Research*, 12(6), 726.

⁴ Xiu Changbai. (2010). Melamine in milk products in China: Examining the factors that led to the deliberate use of the contaminant. *Food Policy*, 35(5), 464.

growing their own food, but many do not have that opportunity and are forced to continue to buy food of mysterious provenance. Trust of the dairy industry in China has not yet returned and today many middle and upper class parents of young children only buy imported baby formula or buy it in travels to Korea, Japan or Hong Kong;⁵ even post offices in Chinatowns in the United States are stocked with infant formula to send back to relatives in China. Western restaurant chains, such as KFC, that were thought to be safe, now have records of high contamination and some government ministries grow their own food for their employees. The Chinese people no longer know who to trust.

Additionally, the rise in food safety concerns occurred concurrently with the widespread change in food consumption patterns in China and an equally drastic change in food production. In the past 30 years, food consumption patterns have changed from eight parts grain, one part meat-poultry-fish, and one part vegetables-fruit to four parts grain, three parts meat-poultry-fish, and three parts vegetables-fruit.⁶ Consumption of grain, which once was the only staple of the Chinese diet, is now declining and a rising proportion of grains is going towards animal feed rather than human consumption. Similar to other developing countries with rising incomes, there is no longer a clear divide between a staple food, in this case rice, and luxury foods such as meat.

Changing consumption patterns have caused equally drastic changes in production patterns and alterations in production. Brand new industries, such as beef, have quickly entered the market on a massive scale and are now booming. Meat production, for example, rose from 11.1 million tons in 1978 to 74.43 million tons in

⁵ K.B. Richburg. (2011, August 11). China seeks to address food-safety crisis. *The Washington Post*. Retrieved from <http://lexisnexis.com>, 1.

⁶ Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 110.

2005.⁷ Much of this growth was supported by the government as it encouraged farmers to diversify and break away from only farming grain or pork.⁸ This growth has also been driven by the changing appetites and incomes of the Chinese people. As the middle class in China has grown, demand for “richer” foods has grown, and meat and dairy have become common items in the Chinese diet. Therefore more meat and dairy are being produced in order to meet the demands of consumption.

Because of the rising consumption of food and changes in production of food over the past twenty years, China has had to adjust from being a country concerned about food security, having enough food, to being a country that is more concerned with food safety, the quality of the food. Due to the high profile of food safety scandals since 2008, food safety has become an extremely important issue for the current Chinese government. During celebrations for the 90th anniversary of the Chinese Communist Party this July, a high level report was issued urging the government to make food safety a national security issue. Food safety is considered to be at the heart of social stability, which President Hu Jintao continuously stresses as one of China’s more important issues.⁹ Recently a campaign has begun to teach the Chinese people more about the importance of food safety, to care about food safety, and alert farmers to potentially hazardous farming

⁷ Peter Li. (2009). Exponential Growth, Animal Welfare, Environmental and Food Safety Impact: The Case of China’s Livestock Production. *Journal of Agricultural and Environmental Ethics*, 22, 221.

⁸ Although most farms were concentrated in grain production 30 years ago, since it was the main staple of the Chinese diet, pork production was also extremely common. Pork has always been the most consumed meat in China. Pork is included here because of the commonplace consumption of pork, even 30 years ago. The government encouraged the production of other meats, because of pork’s existing popularity.

⁹ (2011, July 9). Getting to grips with food safety. *South China Post*. Retrieved from <http://lexisnexis.com>.

practices.¹⁰ The government is even offering rewards to informants who provide information about tainted food and protection from the companies they are reporting.¹¹ This is part of a year long effort that aims to improve food safety in China through education and raising awareness about food safety.

These efforts are largely ad hoc, impractical and cannot offer a long-term solution to the problem at large. Growing your own food is only sustainable for a small portion of the population as is buying only imported infant formula. China's income is growing, but a large portion of the population is still extremely poor and therefore will not be able to purchase foods from trustworthy brands or feed their babies imported formula. Education about food safety on the other hand is important, but the consumer does not have much power, even when educated, to control food safety. Another solution offered by the Chinese government, has been harsher punishment for offenders as a way to deter farmers, middlemen and business-owners from producing unsafe food, but this is not a solution, only a demonstration of the government's lack of power.¹² Two people were put to death and one person was sentenced to life in prison after the melamine-milk scandal with Sanlu and food safety issues remain; harsher punishments in this case seem to be ineffective. Additionally the only way the people learn of food safety issues is through the media, which in some cases has been responsible for escalating the scandals and has led to results when the government has not. Therefore, these solutions are only

¹⁰ Lan Xinzhen. (2011, June 30). Improving food safety: The government takes a tougher stance on processors and producers violating food safety standards. *Beijing Review*. Retrieved from <http://www.bjreview.com/>.

¹¹ (2011, July 9). Getting to grips with food safety. *South China Post*. Retrieved from <http://lexisnexis.com>.

¹² Lan Xinzhen. (2011, June 30). Improving food safety: The government takes a tougher stance on processors and producers violating food safety standards. *Beijing Review*. Retrieved from <http://www.bjreview.com>.

viable in the short-term; the long-term solutions and the problem of regulating food safety remains.

MAJOR PROBLEMS AFFECTING FOOD SAFETY

Scholars and government officials blame these food safety issues on four main factors: the wide dispersion of farms in China, the poor structure of commerce, the fragmentation of the food safety regulatory system and weakness of local implementation. First, some scholars have pointed to the structure and wide dispersion of farms in China. Agriculture in China is based on the small family farm with the vast majority of Chinese farms having less than 10 workers. Small scale farming in China has dated as far back as the 1600s. More recently, the household responsibility system reinforces this small-scale structure by dividing land usage equally among residents of a town or village. Since land is scarce and is being divided between many people, the farms run by each family unit are very small, usually just more than one acre.¹³ Officials and some Chinese economists argue that the small farms hinder regulatory measures, because the sheer number and wide dispersion of small farms is hard to physically regulate. There is not enough manpower to monitor so many farms. Since the contamination of many foods, including milk in 2008, happened before it reached the processing plant, it further supports the idea that the large dispersion of farms is too great for effective regulation.¹⁴

¹³ Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 111.

¹⁴ Yu Xiaodong. (2001, June 1). Farmers, corporations, and the government: Who's to Blame? *News China*, 15.

They argue for horizontal integration, large-scale industrial farms based on the model of the American agribusiness system.¹⁵

A second problem that scholars say is to blame for the food safety scandals throughout China is the poor structure of commerce. The structure of commerce in China is highly unorganized; therefore scholars argue that the process from production to consumption should be streamlined in order to ensure regulation and safety.¹⁶ Sanlu was once the largest producer of dairy in all of China, but almost all of the milk came from small farmers and was not supplied by Sanlu itself.¹⁷ The commercial structure linking farm to store includes many middlemen, creating many places for error. For the production of dairy for example, the farmers take their cows from the farms to the local milk collecting stations where the cows are milked. From there the milk is sent by a middleman to a processing and manufacturing plant where the raw milk is processed and changed into many different forms of dairy. From the manufacturing plant it goes to the wholesalers, to the retailers, and finally to the consumers.¹⁸ During the melamine scandal, melamine was added at the stage after the milk stations by the middlemen. There were no checks before the milk from the middlemen went into processing, leaving room for many flaws. By contrast scandals in the pork industry occur mostly on the farm. When the pork reaches the processing plant, the only quality control at the plant checks the protein

¹⁵ Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 111.

¹⁶ Ibid., 111.

¹⁷ Yu Xiaodong. (2001, June 1). Farmers, corporations, and the government: Who's to Blame? *News China*, 15.

¹⁸ Xiu Changbai. (2010). Melamine in milk products in China: Examining the factors that led to the deliberate use of the contaminant. *Food Policy*, 35(5), 465.

content of the meat.¹⁹ There are few checks for additives or hazardous chemicals when the pork arrives at the processing plant, therefore many problems can go unnoticed. The commercial process from farm to consumer has too many steps, so there are also many places where the process can go wrong and unsafe food can slip through the cracks.

The broken commercial chain leads to the third problem that scholars highlight, central government regulation. Central government regulatory measures for food safety are highly fragmented and hence are considered to be ineffective. As many as thirteen different ministries and agencies are responsible for some element of food safety regulation. By contrast in the United States, a similarly large agricultural giant, only two agencies, the FDA and the USDA, are responsible for food safety regulation and implementation. The FDA controls all but two industries, meat and poultry, which are regulated by the USDA. This allows for laws and regulations to be uniform and easier to follow since there is only one regulation, not many regulations and regulatory agencies acting on the same item in different ways.²⁰ China's system of regulation, broken over so many different agencies and ministries allows for more mistakes, weaker regulations, and unclear and overlapping jurisdictions. When the power to declare certain foods fit to eat is given to multiple ministries, the consumer can be faced with an extremely confusing situation and retailers will not know which foods are safe to sell. For example, when cancer-causing chemicals were found to be in vermicelli, the General Administration of Quality Supervision, Inspection and Quarantine (GAQSIQ) declared 30 brands of vermicelli fit for consumption, but the Ministry of Health (MoH) only listed 7 brands fit

¹⁹ Sun Zhe. (2011, June 1). When medievalism meets the modern marketplace. *News China*, 20.

²⁰ (2011, Sep. 6). Food Safety is Still a Critical Issue in China. *China Daily*.

for consumption.²¹ The consumer was given the task of deciding which ministry was more trustworthy, and stores were not forced to remove certain brands since it was on one of the ministries' lists. Furthermore, the multiple regulatory agencies create a slow flow of information since many of the agencies are competitive and refuse to work together and the fragmented system allows blame to be passed around without officially blaming any one agency or individual.²²

Another element increasing the fragmentation of the regulatory system in China is the food safety laws that give each ministry its regulatory duties. China did not have a strict food safety law until after the melamine incident in 2008. Prior to the Food and Safety Law, passed in 2009, China's only law regulating food safety was the Food Hygiene Law of the People's Republic of China of 1995.²³ This law was related to food safety, but spread the regulatory power to many different agencies as described above. The first law targeted directly at issues of food safety was the Food and Safety Law, instituted as a result of the melamine food scandal in 2008. This law attempted to streamline the regulatory process, but its power is also spread over many ministries and agencies in the government. It created the State Council Food Safety Commission, a commission that focuses on food additives, edible farm products and food processing, but the power of this commission is again hindered by the fragmentation of the system. None of the ministries or agencies wants to relinquish control over their areas of focus or the added revenue of regulation, maintaining the system of fragmentation that exists today.

²¹ Tam Weikeung, and Yang Dali. (2005). Food Safety and the Development of Regulatory Institutions in China. *Asian Perspective*, 29(4), 15.

²² *Ibid.*, 13.

²³ Chen Shumei. (2009). Shame or sham: Rethinking China's milk powder scandal from legal perspective. *Journal of Risk Research*, 12(6), 732.

Regulatory agencies also need to implement a plan to educate farmers about safe farming practices. The changing levels of food consumption described above have caused a proportional change in production fostering a change in the methods of production. The methods that the farmers use are not always safe, but most farmers are uneducated and do not know what safe farming practices are. In order to be competitive, small-scale farmers have to adopt possibly unsafe measures to increase their output. In pig farming for example, farmers used to feed their pigs homemade slop made of grain, yams and other waste food around the house. Today, most pigs are fed corn and soy meal mixed with additives that supposedly speed growth.²⁴ In the past, farmers kept pigs for a year or more to reach a weight of around 80 kilograms. Now after only four or five months of growth, a pig can weigh as much as 100 kilograms.²⁵ Organic and locally grown feeding methods have disappeared and farmers have to use modern tactics to compete with other farmers. There has also been an increase in the use of drugs to keep animals alive, or stimulate and enhance their growth. Antibiotics are used to combat or prevent diseases, and stimulants such as clenbuterol are used to add meat to the body of a pig, enhancing the leanness of the meat, without a thought being given to how these drugs will affect the humans who consume the meat.²⁶ Many of these additives have been around for years, but no one has educated the farmers about the harm that the additives can cause. For example, many farmers receive their pig feed from a company and they are told that this feed will make the pigs leaner. After hearing this the farmers do not question why the feed makes pigs

²⁴ Sun Zhe. (2011, June 1). When medievalism meets the modern marketplace. *News China*, 17.

²⁵ Ibid.

²⁶ Peter Li. (2009). Exponential Growth, Animal Welfare, Environmental and Food Safety Impact: The Case of China's Livestock Production. *Journal of Agricultural and Environmental Ethics*, 22, 228.

leaner because the farmer receives more money when the pigs are leaner. In the case of milk, farmers admit that “protein powder” of unclear origin was added to milk for years before the scandal was discovered in 2008.²⁷ In the United States the USDA is responsible for educating farmers about safe farming practices, but in China the agencies seem to have ignored the problem. Regulatory agencies need to take responsibility not only for the food, but also for the farmers and educate them on safe farming practices.

Finally, scholars argue that food safety problems have proliferated because implementation of the existing laws is very weak. Implementation of regulations is weak not only because of the fragmentation of the regulatory system mentioned above but also because of the difficulty of implementing national rules and laws on a local level. The Chinese government is highly bureaucratic and is organized in many layers. It runs from central to provincial, to city, to prefecture, to county, to town or township and so on. It is difficult for leaders on the central and provincial levels to make the leaders on the town and township levels follow the rules set by the central government. The local government often has closer ties to the local community than to the central government, so it is less likely to listen to the central government if their actions benefit the local community. As stated earlier, farming in China is highly dispersed and the farms are small, usually just over an acre and employ 10 or fewer people. Therefore the central government must rely on the local government to enforce laws and regulations. Enforcing these regulations can be difficult because if the illegal practices gain more money for the town, the local official is less likely to enforce the regulation because it damages the local economy and

²⁷ Gordon Fairclough. (2008, September 3). Tainting of milk is open secret in China. *Wall Street Journal*. Retrieved from <http://lexisnexis.com>.

hurts the local official's evaluations by the Chinese Communist Party (CCP).

Furthermore revenue generation is often more important than food safety regulations which can limit local growth.²⁸ Corruption at the local level is also a large problem. Local officials often overlook violations when personal bribes are offered and, in order to create more revenue for the region, local regulatory agencies will frequently fine businesses instead of halting their practices when a violation is discovered.²⁹ Additionally, since manufacturer's products are usually sent from the rural areas where the products are produced to urban areas where the products are consumed, local officials are less likely to crack down on individuals or businesses that produce fake or substandard goods if it is not affecting the local people. The melamine scandal that set off a wide range of food safety inquiries began at the local level where melamine was added to the milk, long before it reached the processing center.³⁰ Therefore local level implementation and federal implementation need to improve in order for there to be progress.

FOUR SOLUTIONS

Scholars also propose four solutions that align directly with solving the four problems: transform Chinese agriculture, restructure agricultural commercial organization, streamline the regulatory bureaucracy, and improve local implementation. First, some scholars suggest that farms must be reformed so that safer practices are encouraged and so that regulation becomes easier. Most officials and many Chinese

²⁸ Tam Weikeung and Yang Dali. (2005). Food Safety and the Development of Regulatory Institutions in China. *Asian Perspective*, 29(4), 17.

²⁹ Ibid. 20.

³⁰ Yu Xiaodong. (2001, June 1). Farmers, corporations, and the government: Who's to Blame? *News China*, 15.

scholars argue that the only option that would improve farming methods in China is horizontal integration, taking all of the small farms and combining them based on the American agribusiness form. Farms in the United States are large and mechanized with few workers. The average size of a farm in America is 418 acres per farm, 400 times the average size of farms in China.³¹ Scholars argue that more urbanization and the removal of farmers from land to cities would allow for the creation of large-scale farms similar to American farms and complete the modernization of China.³² Officials and scholars argue for large scale farms not only for the continued modernization of China, but also because large-scale farms would be easier to regulate than small farms since there would be fewer and they would not be as dispersed. Processors could assume that all the raw materials coming from each farm would be of the same quality and would only need to test a sample of the goods in order to determine their quality. In theory creating a large scale agribusiness system would be much easier to regulate, but in practice it would not only be hard to transform the current agricultural system, but it would also potentially harm the farmers, whom they are ostensibly attempting to help. In India for example, privatization of land has resulted in not only many farmers losing their land, but also a large class of urban poor.³³ Furthermore there are only six countries in the entire world with an agricultural policy based on large-scale farming methods.³⁴ In China, where small-scale

³¹ USDA. (2007). Farm Numbers. *USDA Census of Agriculture*. Retrieved from www.agcensus.gov.

³² Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 111.

³³ Yu Xiaodong. (2011, June 1). Why privatized farmland is not the solution. *News China*, 23.

³⁴ Ibid.

farming has dominated for centuries, the creation of large-scale agribusiness would be extremely complex and potentially impossible to complete.

The second solution offered by scholars and officials is to restructure commerce from production to consumption, so that regulation is easier and consumers know where their food originates. One solution offered by the Ministry of Commerce is an electronic tracking system at grocery stores.³⁵ The system is currently still in testing stages, but is fully in effect in 10 cities in China. The system tracks meat and vegetables from farm to store and consumers can check where the food has come from by scanning the barcode at the store. This tracking system is one of the Chinese government's solutions to the food safety problem and they plan to have it instituted throughout the entire country by the end of the 12th five-year-plan.

Another possible method of restructuring commerce is to streamline vertical integration, the process from farm to store. Three main options have been offered; "dragon-head" enterprises such as Sanlu, specialty co-ops, or independently owned farms and processing enterprises.³⁶ A "dragon-head" enterprise is one large company that collects goods from small farms, and processes and markets them, which so far seems to be the norm in China. Cooperative organizations on the other hand are a coalition of farmers that control production, processing and marketing. This is different from the "dragon-head" enterprises because the farmers are all part owners of the cooperative and there are safeguards built into the cooperative that protect farmers against an adverse market environment. Cooperatives are more appealing to farmers, because they receive a

³⁵ (2011, July 30). China Extends Food tracking Project. *China Daily*. Retrieved from <http://lexisnexis.com>.

³⁶ Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 117.

larger portion of the profits, but it is uncertain if all the farmers will actually have a voice in each cooperative or whether it will act more like a “dragon-head” enterprise. The final option is the easiest to control, because in this option the processing centers have their own farms. The structure is similar to the “dragon-head” enterprise, but the enterprise owns and cares for its own farm. This method is being touted as the most secure method of farming because the enterprise has the most control over product quality and product safety. According to scholars, the most effective solution and future outcome will be a continuous mix of the three systems.³⁷

A third solution offered by scholars is that government regulations should be streamlined in order to make regulatory measures possible and avoid conflict between ministries. Currently the multiple regulatory agencies all act in similar, if not the same, fields. This creates confusion, multiple regulations for the same product, and a system where it is easy to escape blame. The Chinese government has attempted to make changes in regulatory agencies and streamline the process since 2008. The new Food and Safety Law in 2009 was the first attempt at stricter food safety measures. According to the new regulations, no food can be sold inspection-free and food manufacturers are responsible for all recalls of food items. All additives must be approved, and there are now harsher penalties on violations of the food safety law.³⁸ But as mentioned above, this has not done much to stop food safety scandals and violations. In order to effectively regulate food safety, the government must either create a new food safety agency and strip existing agencies of their regulatory powers, or agencies responsible for food safety

³⁷ Ibid. 128.

³⁸ Xiu Changbai. (2010). Melamine in milk products in China: Examining the factors that led to the deliberate use of the contaminant. *Food Policy*, 35(5), 468.

regulations must have more outlined and specific responsibilities. Currently the room for ambiguity within the law prevents effective regulation and many scholars think that China missed its chance for an effective regulatory system by passing the Food and Safety Law without clearly defined regulatory provisions.³⁹

The final possible solution to the food safety issues in China is to improve implementation at the local level by local officials. Currently the only solution for improving implementation of regulation is harsher punishments for violators of regulations. Punishments have increased from days in jail to years in jail and the strongest punishment is death.⁴⁰ In recent months thousands of producers and processors have been arrested and questioned regarding their role in the contamination of goods, but harsher punishments are not the solution. The Chinese media and authorities mark these changes as a sign of improvement in the implementation and praise the government for these changes, but it is actually a sign of weak implementation since if the government was implementing the laws effectively, there would be fewer violations. In order to improve local implementation, China will have to change the way it reviews the work of the local level officials. Reviews of local officials given the task of regulating food safety should be based on the number of farms, manufacturers, and processors that pass food safety inspections. Fining individuals or companies and therefore gaining more money for the region should not be rewarded unless the fine results in an actual change in the actions of that individual or company. Evaluations should also look to discourage bribery

³⁹ Tam Weikeung and Yang Dali. (2005). Food Safety and the Development of Regulatory Institutions in China. *Asian Perspective*, 29(4), 12.

⁴⁰ Lan Xinzhen. (2011, June 30). Improving food safety: The government takes a tougher stance on processors and producers violating food safety standards. *Beijing Review*. Retrieved from <http://www.bjreview.com/>.

and corruption, although it is a problem throughout the Chinese government. This level of local implementation is both one of the largest problems facing the improvement of food safety in China and possibly one of the hardest problems to solve.

CASE STUDIES

Through the examination of two industries, dairy and pork, the proposed causes and subsequent solutions will be examined. Dairy and pork make good case studies because of the importance of each industry in China and past food safety issues that have recently occurred. Dairy, although it has not always been a popular industry in China, is currently growing exponentially and is becoming extremely important in the Chinese diet. Consumption of dairy, like many other foods in China, is increasing rapidly, as the income of the Chinese increases and the Chinese diet continues to change.⁴¹ In the past, milk was only used to feed the young and the elderly since it is full of important nutrients that are necessary for the health of the young and old. But as incomes increase, more Chinese are consuming dairy. The increase in consumption of milk in developing countries is a worldwide phenomenon, but in China the production and consumption increased exponentially from 8 million tons in 2000 to 36 million tons 8 years later.⁴² It is a luxury they can now afford.

As described above, the dairy industry has also faced many safety scandals and was the impetus for change in the regulatory system. Melamine was not the first scandal in the dairy industry. As mentioned above, the incident in 2003 caused the deaths of 12

⁴¹ F. Fuller et al. (2006). Got milk? The rapid rise of China's dairy sector and its future prospects. *Food Policy*, 31, 203.

⁴² Pei Xiaofeng et al. (2011). The China melamine milk scandal and its implications for food safety regulation. *Food Policy*, 36(3), 413.

babies and severe cases of malnutrition in others, but there were no actions taken to prevent similar incidents in the future.⁴³ Before the melamine scandal in 2008 the leading dairy companies were not required to undergo testing although there was a history of unsafe products in that industry. At the end of December 2011 another safety issue in the Chinese dairy industry was uncovered. Mengniu, one of China's leading dairy industries, and Changfu Dairy Company in Fujian were found to have milk contaminated with carcinogenic toxins caused by moldy cattle feed. The milk came from a Mengniu subsidiary company in Meishan, Sichuan and from Changfu's dairies in Fujian.⁴⁴ This milk never made it to the market since it was caught in government spot testing before being sold by retailers, but it has shaken the already fragile trust that the Chinese people have in the Chinese dairy industry.⁴⁵ Mengniu claimed that this toxin was allowed into the milk by mistake and that normally the company tests for this toxin, but the testing equipment for this toxin is usually 4,000 to 6,000 yuan per unit and therefore many dairy companies do not actually test for this toxin.⁴⁶ This is not Mengniu first safety issue of the year; in November high levels of bacteria were found in Mengniu's ice cream products and in April 251 students fell ill after drinking Mengniu milk in their cafeteria.⁴⁷ These scandals have decreased sales for Chinese dairy companies and have increased sales for foreign dairy companies hurting a potentially important domestic industry. Dairy, because of its growing importance in China and because of the multiple scandals,

⁴³ Tam, Weikeung, and Yang, Dali. (2005). Food Safety and the Development of Regulatory Institutions in China. *Asian Perspective*, 29(4), 7.

⁴⁴ (2011 Dec. 28). Tainted milk in China caused by rotten feed. *The Nation*.

⁴⁵ Edward Wong. (2011, Dec. 26). Contaminated Milk is destroyed in China. *New York Times*.

⁴⁶ (2011, Dec. 27). Questions Remain Over Mengniu Milk Scandal, Experts Say. *Caixin*. Retrieved from <http://english.caixin.com/2011-12-27/100343210.html>.

⁴⁷ Ibid.

is a highly desired commodity with an unsafe history, making it not only an interesting case study, but also important for an inspection of China's food safety.

Pork, on the other hand, is a staple meat in Chinese cuisine and although the production of other meat products has grown, pork remains the most commonly consumed meat in all of China.⁴⁸ The Chinese prefer pork to other meats and in many dishes there is some form of pork. The Chinese character for meat is the character for pork, for it to be beef or chicken another character must be added. The pork industry has more recently been investigated for food safety issues. This past April it was discovered that a subsidiary of Shuanghui, the largest meat processor in China, was found to have clenbuterol-tainted pork.⁴⁹ Also known as "lean meat powder", clenbuterol is fed to pigs in order to decrease the fat content of the meat and therefore increase the value of the meat. Clenbuterol is a stimulant that is used illegally as a steroid and as a weight loss agent in many countries. Some countries also use clenbuterol in asthma medicine, but clenbuterol in all forms is illegal in the United States.⁵⁰ In China, clenbuterol is illegal in animal feed since once ingested by humans it can cause dizziness, heart palpitations and profuse sweating in humans; some studies even link long-term consumption to cancer.⁵¹ The clenbuterol was found in pig feed, which is usually given to farmers by manufacturers, who tell the farmers that the feed will make the pigs grow faster and make

⁴⁸ Peter Li. (2009). Exponential Growth, Animal Welfare, Environmental and Food Safety Impact: The Case of China's Livestock Production. *Journal of Agricultural and Environmental Ethics*, 22, 222.

⁴⁹ Yuan Yuan. (2011, March 31). Food, food, safe food: New scandal triggers debate on solutions to food safety in China. *Beijing Review*. Retrieved from <http://www.bjreview.com>.

⁵⁰ Drugs and Chemicals of Concern: Clenbuterol. *Drug Enforcement Administration: Office of Diversion Control*. Retrieved from <http://www.deadiversion.usdoj.gov>.

⁵¹ Sun Zhe. (2011, June 1). When medievalism meets the modern marketplace. *News China*, 18.

their meat leaner. Farmers earn more money the leaner their meat is, so they do not ask questions. Since this incident occurred more than three years after the melamine milk scandal, this case study is revealing as a way to analyze the changes since the scandal and why the methods of regulation are still ineffective.

By examining data specific to each case study, the flaws in the regulation of each industry will be examined. In order to determine whether the structure of farming in China impedes regulation of agriculture in China, the geographic dispersion and size of farms in each respective industry will be examined through raw census and agricultural data, and through reports on the ratio of small farms to large scale farms and the percentage of goods that come from each farm. By examining these data, the true structure of farming in each industry will be uncovered and the effect of farming structure on regulation will be examined. Then, using reports on the past, current and potential structures of commerce, including those on the existing major companies or dragon-head enterprises in each industry, a broader picture of commerce in China will be examined and possible flaws and solutions will be laid out. In order to examine whether fragmented regulation is responsible for the flaws of regulation in each industry, laws governing regulation of industry, ministries in charge of each industry, and the role of education of farmers in each industry will be studied. Finally, in order to investigate local levels of implementation, newspaper articles will be examined for stories of lack of local implementation or trials and subsequent sentencing of local officials during food safety scandals. This information will provide greater perspective on how local implementation works and how it can be improved.

Food safety is a problem plaguing China as they modernize and develop into a fully industrialized and developed country. Using these case studies this thesis will examine the proposed causes in the context of each industry and determine whether the causes are valid in each case. In this thesis I hope to uncover the root causes of food safety issues in China and what China can do to improve its food safety record and prevent more deadly food scandals from occurring. The first chapter will examine China's agricultural structure, and propose solutions to this side of food safety concerns. The second chapter will expose China's agricultural commercial structure and examine ways in which this structure can be improved. The third and final chapter will expose flaws in China's regulatory system, examine how it can become stronger, explain China's implementation flaws and discuss what can be done to fix these problems. After examining these four main issues the true problems will be identified and possible solutions will be proposed.

CHAPTER ONE: AGRICULTURAL STRUCTURE

INTRODUCTION

Many Chinese scholars and officials blame food safety issues on the structure of farming in China. Currently, the agricultural system in China is highly dispersed and based on small scale farms, which makes it hard to physically regulate. Most farms are run by families with less than ten workers and on less than one acre of land.⁵² This has been the method of farming in China for hundreds of years and has been reinforced by the more recent household responsibility system, which divides land usage among all the families in each village. Although the urban population recently surpassed the rural population for the first time in all of Chinese history reaching 51.27%, the rural population is still extremely large.⁵³ Therefore each plot of land farmed by each family is extremely small. This structure is hard to physically regulate so scholars argue for horizontal integration of farms, or restructuring farms to create large scale farms in order to improve regulation. Scholars argue this structure, based on the American large scale agribusiness model would be much easier to regulate and would improve overall food safety, but raw data shows otherwise.⁵⁴ Most agricultural processing companies do receive their raw materials from smaller farms, but commercial ties between small scale farmers and large processing companies create a larger commercially connected network that should be easier to regulate. Therefore the American large scale model would be redundant and cause more harm than good.

⁵² Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 111.

⁵³ National Bureau of Statistics of China. (2011). *China's total population and structural changes in 2011*. Retrieved from <http://www.stats.gov.cn/english/>.

⁵⁴ Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 113.

The model that Chinese scholars believe China needs to emulate, the American agribusiness model, is based on large scale farms owned by individuals and large companies that grow the majority of crops and raise the majority of livestock in the United States. Scholars argue that this method of farming would be easier to regulate because there would be fewer farms, therefore less manpower would be need to inspect the farms.⁵⁵ Furthermore the farms would be more industrialized and have more modern production. Therefore, food would theoretically be safer. Although the system might be easier to regulate, the creation of this system would be very difficult. Currently there are only six countries in the entire world with large scale agribusiness farming structure; the rest of the world still depends on small scale local farming.⁵⁶ In the United States most of these large scale farms are corporate farms, owned by the companies, not the farmers themselves and the size of each farm is monumental; the average size of farms in the United States is 418 acres, 400 times the size of Chinese farms.⁵⁷

The United States' agricultural system is vastly different from China's agricultural system, but it is not as uniform as many Chinese scholars and officials would like others to believe. Most agricultural sales in the United States do come from large scale agribusiness farms, but the majority of farms are categorized as small; farms with 100 or less heads of livestock are categorized as small in the United States, but would be large farms in China. In the dairy industry, almost 50% of farms are categorized as small with less than 50 heads of cattle. And farms with less than 100 heads of cattle make up

⁵⁵ Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 111.

⁵⁶ Yu Xiaodong. (2011, June 1). Why privatized farmland is not the solution. *News China*, 23.

⁵⁷ USDA. (2007). Farm Numbers. *USDA Census of Agriculture*. Retrieved from www.agcensus.gov.

about 70% of the farms.⁵⁸ These small farms are numerous, but 81% of sales come from 24% of the businesses that tend to be corporate owned.⁵⁹ In the pork industry there is a similar trend with 6% of the farms, corporate farms, accounting for 33% of the sales, and family run farms, although they account for 85% of the farms, only account for 44% of the sales.⁶⁰ The USDA and FDA have to regulate both the small farms as well as the large farms. The US model of corporate farming, therefore, could solve some of China's regulatory problems, but not even the United States has an entirely corporate farming based agriculture.

The United States' system, although theoretically useful, would not only be difficult to carry out, but could also hurt the farmers and damage the agricultural industry. As mentioned in the introduction, India attempted to change its agricultural system after the corporate farming model and the result was a large number of landless peasants who moved to the cities and created the vast slums surrounding most cities in India.⁶¹ If China decided to transform its agricultural system it would possibly end in a similar result. Creation of a large agribusiness system of agriculture would necessitate the removal of peasants that currently farm the land.⁶² China has already experienced the removal and transplantation of large numbers of rural people such as during the creation of the Three Gorges Dam. Millions of people were moved from their ancestral homes and forced to

⁵⁸ USDA. (2007). Dairy Cattle and Milk Production. *USDA Census of Agriculture*. Retrieved from www.agcensus.gov.

⁵⁹ USDA. (2007). Dairy Cattle and Milk Production. *USDA Census of Agriculture*. Retrieved from www.agcensus.gov.

⁶⁰ USDA. (2007). Hog and Pig Farming. *USDA Census of Agriculture*. Retrieved from www.agcensus.gov.

⁶¹ Yu Xiaodong. (2011, June 1). Why privatized farmland is not the solution. *News China*, 23.

⁶² Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 126.

move thousands of miles away. Repercussions from this project are still being dealt with today. Logistically, the transformation to this system would be very difficult. Given this information, creation of a Chinese system similar to that of the United States' would be very complicated.

The argument that agricultural reform will be able to improve food safety needs to be examined from an empirical standpoint in order to determine the effect agricultural reform would have on food safety. As outlined in the introduction, the geographic dispersion and size of farms will be examined through raw census and agricultural data, reports on the ratio of small farms to large scale farms, and the percentage of goods that come from each farm will be examined in order to discover the true agricultural structure in China. Two case studies, the dairy and pork industries, are best suited for this inspection because of recent problems in each industry. Furthermore the two industries are good for comparison due to their respective histories in China; dairy is a relatively new industry while the pork industry is ancient. By examining these data specific to dairy and pork, the true structure of farming in each industry will be uncovered, the effect of farming structure on regulation will be examined, and proposed solutions will be analyzed.

DAIRY

Dairy production in China is on the rise. According to the China Statistical Yearbook, from 1995 to 2009 production of milk increased from 6,728,000 tons to

37,326,000 tons.⁶³ China is also the world's third largest producer of fresh milk, a recent development, as China became one of the top ten producers of milk only ten years ago.⁶⁴ Dairy is a fairly new industry in China, that has benefited both from governmental and foreign support and has expanded greatly in the past decade, but China's consumption of milk per capita is much below that of Western countries.⁶⁵ This could be attributed to lactose intolerance, which is very common in China, a large poor rural population that cannot always afford milk, and the comparative inefficiency of China's dairy farms.⁶⁶ The dairy industry has grown exponentially as consumption and popularity of dairy increased and is still expanding as foreign companies enter the market. This booming industry has been plagued with breaches of safety regulations such as the melamine scandal of 2008 and the more recent issues with Mengniu in December of 2011. This has led to general mistrust of the entire industry and to larger food safety questions such as why does the dairy industry appear to have the most food safety issues in China. Therefore the dairy industry is important to analyze because of its increasing popularity and because of its poor safety record.

The dairy industry is a relatively new industry in China. Before the economic reform and opening up of China in 1978, farmers were told to farm few crops, but in the 1980s agricultural restrictions loosened and farms were decollectivized. The rural agricultural communes that had dominated Chinese agriculture did raise production from

⁶³ China Data Service. Statistical Yearbook: Agriculture. 1995-2009. *China Data Service*. Retrieved from <http://chinadataonline.org>.

⁶⁴ Food and Agricultural Organization of the United Nations. (2009). *Top Production - Cow Milk, Whole, Fresh*. Retrieved from <http://faostat.fao.org/site>.

⁶⁵ Food and Agricultural Organization of the United Nations. (2010). FAOSTAT. Retrieved from <http://faostat.fao.org>.

⁶⁶ Ibid.

1950 to 1980, but left little room for rapid economic growth. The goal of the new system was to encourage individual agricultural growth and gave all farmers their own land to work on. Farmers were encouraged to diversify their crops and livestock. During this time dairy farming was strongly encouraged in Northern China, which has resulted in fairly localized production.

The provinces that consistently produce the most milk are Hebei, Inner Mongolia and Heilongjiang.⁶⁷ These provinces, along with parts of Shandong and Xinjiang are what make up China's growing "dairy belt," responsible for most dairy production in China as can be seen in the map below.⁶⁸ In 2006, milk produced in Inner Mongolia, Heilongjiang, and Hebei accounted for half of the total milk output in all of China.⁶⁹ The geography of Northern China (Inner Mongolia, Heilongjiang and Northern Hebei) is characterized by large, cold and largely unpopulated grasslands, ideal conditions for grazing of cattle. The Chinese government has been encouraging the development of the dairy industry in this mostly agriculturally underdeveloped region as a way to utilize the land, increase dairy production, and increase rural incomes.⁷⁰

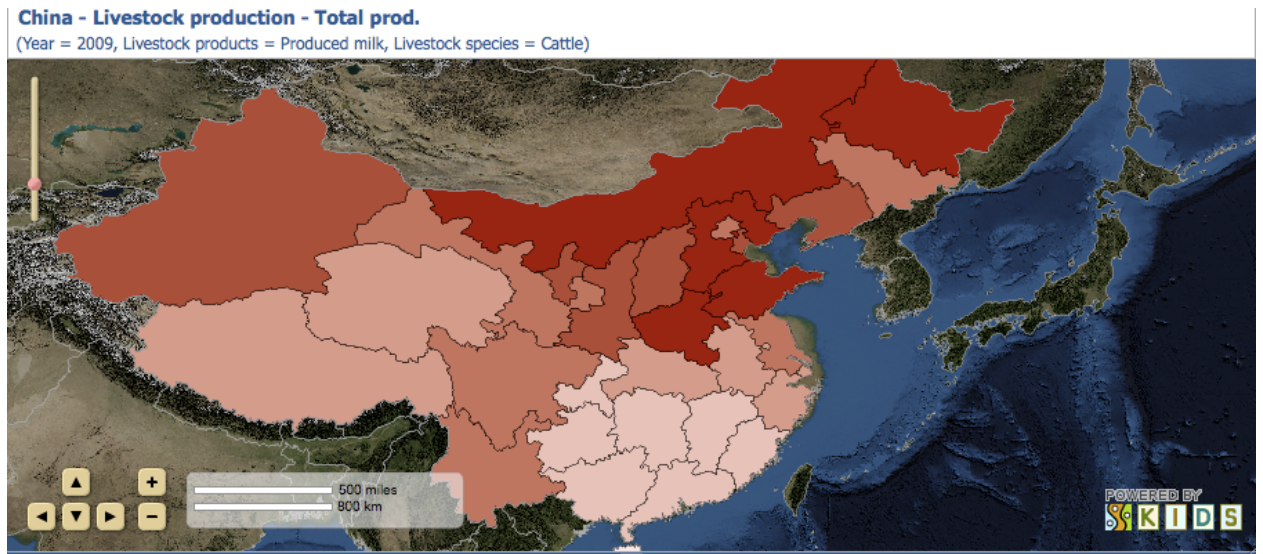
⁶⁷ China Data Service. Statistical Yearbook: Agriculture. 1995-2009. *China Data Service*. Retrieved from <http://chinadataonline.org>.

⁶⁸ Fuller, F. et al. (2006). Got milk? The rapid rise of China's dairy sector and its future prospects. *Food Policy*, 31, 211.

⁶⁹ Hu Dinghuan (2004). China: Dairy product quality as the new industry driver. *Agricultural Economic Research Institute*. 25.

⁷⁰ *Ibid.* 34.

Figure 1: Production of milk per region in China in 2009⁷¹



Governmental encouragement of the dairy industry in Northern China began in the 1980s.⁷² This area did not have a strong agricultural industry and the geography appeared to be well suited to dairy farming. Local governments provided aid and subsidies to dairy farmers in order to encourage an increase in production. The Inner Mongolia provincial government even listed dairy processing production as the top agricultural priority for the entire autonomous region. Furthermore, “the governments of Shijiazhuang City and Tangshan City in Hebei province perceived the dairy industry as a pillar for development in general.”⁷³ Methods such as reducing taxes, decreasing regulations, and increasing loans to dairy companies greatly encouraged the production of dairy in the region. These governmental encouragements have created the “dairy belt” in Northern China. Although Beijing and Shanghai are also centers of dairy production,

⁷¹ Food and Agricultural Organization of the United Nations. (2010). [Map of production of milk per region in China in 2009]. *China-Livestock production- Total Production*. Retrieved from <http://kids.fao.org/glipha/#>.

⁷² Hu Dinghuan (2004). China: Dairy product quality as the new industry driver. *Agricultural Economic Research Institute*. 34.

⁷³ *Ibid.* 26

most major dairy companies are centered in Northern China in Hohhot in Inner Mongolia, Harbin in Heilongjiang province, and Shijiazhuang and Tangshan in Hebei province. In 2005 these four cities produced nearly 40% of dairy in China with 70 different dairy enterprises.

Table 1: Liquid Milk and Dairy Products - Top Ten Cities by Sales Revenue⁷⁴

No.	Cities	Province	Market Share(%)	Number of Enterprises
1	Hohhot City	InnerMongolia	17.02	7
2	Shijiazhuang City	Hebei	9.97	13
3	Shanghai	Shanghai	7.20	16
4	Harbin City	Heilongjiang	5.53	16
5	Beijing	Beijing	3.76	19
6	Guangzhou City	Guangdong	2.71	10
7	Qiqihar City	Heilongjiang	2.62	17
8	Tangshan City	Hebei	2.37	17
9	Xi'an City	Shaanxi	2.26	9
10	Changsha City	Hunan	2.01	7

Hohhot, the capital of Inner Mongolia, is the main hub of dairy production in Northern China. Home to two of the largest dairy companies in China, Mengniu and Yili, Hohhot is the fast growing dairy capital of China. From 1992 to 2006 production of cow's milk in Hohhot alone increased from 35,447 tons to 2,277,884 tons.⁷⁵ New dairies are built constantly and surrounding the city are thousands of small dairy farms. The China Dairy Association Headquarters is in Hohhot and the International Dairy Expo is being held in Hohhot this year.⁷⁶ The dairy industry is even considered one of the main six industrial interests of the city due to the economic success of Mengnu and Yili.⁷⁷ Furthermore, Hohhot also has the largest concentration of dairy cows compared to any

⁷⁴ China Data Service. (2005). City Yearbook: Liquid Milk and Dairy Products. 2005. *China Data Service*. Retrieved from <http://chinadataonline.org>.

⁷⁵ China Data Service. (2006). Hohhot Economic Statistical Yearbook, 2006. *China Data Service*. Retrieved from <http://chinadataonline.org>.

⁷⁶ (2009). Hohhot Economic Development: Agriculture. *Hohhot Government Website*. Retrieved from <http://www.huhhot.gov.cn/en>.

⁷⁷ Ibid.

other city in China and Hohhot's leading dairy companies, Mengniu and Yili, account for almost a third of all milk production in China.⁷⁸

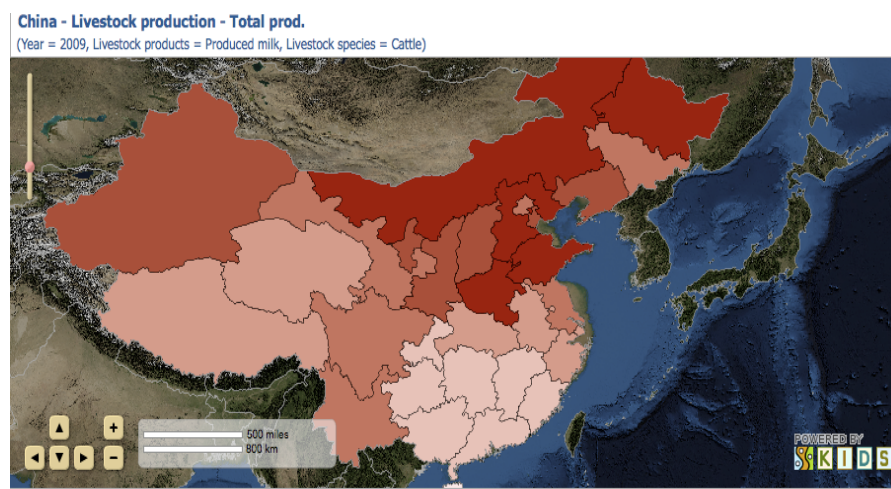
The concentrated production center of dairy, Hohhot, has its own concentrated centers of production. Dairy farming in this instance is not highly dispersed. Dairy production within the city of Hohhot is centered around 3 main areas in the city: Saihan city district, Horinger county, and Tumote Zuoqi Banner. Mengniu is based in Horinger county and Yili is based in Tumote Zuoqi Banner which accounts for their high level of production. Saihan city district has a higher level of dairy production because it is the most spacious district with the lowest population density leaving room for farming dairy cows. Mengniu and Yili, the two largest dairy companies in China get much of their milk from these districts, but also have milking stations throughout the country where local farmers go to milk the cows. From those stations, the milk is then sent to the large processing centers in Hohhot. The individual cows that are the source of Mengniu and Yili's milk are raised mostly in smaller scale farms, but the milk is all sent to a central location creating a hub and spoke structure of agriculture. This system creates a central processing center where most milk in the region goes to two or three enterprises and is then processed. Although the two companies use dairy from farms throughout the country, the commercial vertical integration creates a central, not dispersed, production center.

The farming structure in Hohhot is replicated throughout the areas of China with vast natural grassland where dairy farms depend on grazing. In the eastern section of China cows are primarily kept in backyard sheds and are fed more grain. Dairy farms

⁷⁸ Fuller, F. et al. (2006). Got milk? The rapid rise of China's dairy sector and its future prospects. *Food Policy*, 31, 211.

around cities, such as Bright Dairy, use more modern technology and are fairly large scale.⁷⁹ Although large scale dairies do exist, over 90% of all farms have less than 20 cows and are located in a small household, or “backyard farms.”⁸⁰ In 2009 there were 5,820 farms with over 200 cows that accounted for 0.24% of total farms.⁸¹ There are many more small farms than large farms, but the number of large farms has been growing as can be seen in the table below. In 2003 farms with 20 cows or less accounted for almost all farms in the country and for 72.6% of the total output. In 2009 the number of small farms had decreased significantly, but more importantly, the output of large farms increased and the output of small farms decreased to 57.4% of the total output.

Table 2: Size Distribution of China Dairy Farms in 2010⁸²



These statistics point to a change in the structure of dairy farming in China. Small farms are still the norm in dairy farming, but the number of large scale farms are growing and their output is growing even faster. The trend for larger farms is most popular in

⁷⁹ Dobson, W., Dong, F. and E. Jesse. (2011). *The Dairy Sector of China: A Country Study*. (Babcock Institution Discussion Paper). Babcock Institute for International Dairy Research and Development, Wisconsin. 13.

⁸⁰ Ibid. 13.

⁸¹ Ibid. 13.

⁸² Ibid. 13.

cities where the dairy companies have their own farms, but most dairy companies still get the raw milk from small scale local farmers. The dairy farms that utilized small scale farms also tend to control the economic and commercial supply chain and are vertically integrated. Vertical integration is becoming extremely popular and useful as it gives dairy processing companies more control throughout the dairy production process. However, local governments are also beginning to give incentives to large farms surrounding cities creating larger farms.

Given this information, scholars' arguments for agricultural reform are tenuous. Scholars argue that farming in China is too dispersed for proper regulation, but data in the dairy industry shows that this argument does not apply. The Chinese dairy industry is fairly concentrated in Northern China. The majority of dairy is produced and processed in Northern China as well. This regional concentration refutes the argument that widespread farms are the cause of food safety issues because dairy farms are highly concentrated in Northern China. Another factor listed by scholars is the size of each farm. Most dairy farms in China are very small with less than 20 cows, but these dairy farms are also commercially connected with large dairy companies. The milking stations in rural villages when there is "backyard" farming, are owned by these companies. Commercial vertical integration of each farm creates a larger commercially connected network, that acts like a large scale farm.

Therefore, since the small farms are connected to larger dairy processing companies, widespread horizontal integration of farms, or the creation of large scale farms, would be unnecessary. Dairy farms are effectively already large scale commercially. Very few dairy farmers sell directly to the market and nearly all dairy is

processed by these large processing companies. Dairy, as a regionally concentrated industry with vertical commercial integration does not fit the profile for agricultural reform that many scholars argue for. This can be attributed to the relative youth of the industry. The Chinese government has been able to plan the production of milk and has had a greater hand in its growth as an industry. This has allowed the dairy industry to be structured as it is today.

PORK

The production of pork on the other hand, is widespread and fairly consistent throughout the country. Pork is the most commonly produced agricultural good in China and has been a staple in the Chinese diet for many years. China is the largest producer of pork with Chinese production of pork accounting for 47% of the world's production of pork.⁸³ Pigs have been a domesticated farm animal in China as early as the Han Dynasty.⁸⁴ More recent studies have shown that domesticated pigs originated in China indicating that pig farming could have an even longer history, around 10,000 years.⁸⁵ Pigs are attractive as farm animals because they are fairly self-sufficient and require little tending. Pigs were even used until fairly recently as sewer systems through pig toilets and garbage disposals; they were responsible for eating human refuse and feces. The average farmer could raise pigs based on the scraps of their meals or their crops. The ease of pig

⁸³ Jimin Wang & Hongbo Xiao. (2007). Pork Production in China. *Institute of Developing Economies Japan External Trade Organization*. Retrieved from <http://d-arch.ide.go.jp>.

⁸⁴ Durham University. (2010, April 19). Chinese pigs 'direct descendants' of first domesticated breeds. *Science Daily*. Retrieved January 25, 2012, from <http://www.sciencedaily.com/releases/2010/04/100419150947.htm>

⁸⁵ Ibid.

farming combined with the long history of pig farming in China has led to production of pork in nearly every province with relatively equal outputs.

Over the past 14 years production of pork in China has also been consistent. There has been a gradual increase from 480,510,000 tons of pork to 645,386,000 tons of pork.⁸⁶ There were some fluctuations in those years, but there has been a general upward trend. This upward trend however is rather slow, compared to the production of milk, and is accommodating only the growth of the population and the changing Chinese diet. As mentioned in the introduction, as the income of the Chinese people rises, their consumption habits are changing leading to a diet based more on meat, milk and other fattier foods. This has caused a general increase in the production of pork, but because it is not a new industry like milk, the increase in production can only be attributed to increase in population and change in diets, not to growing popularity.

Although production of pork is rather uniform across the country, there are some areas of China where the production of pork is greater. Pork production is most frequent in South and Central China and the provinces with the highest levels of production are Sichuan, Henan, and Hunan province.⁸⁷ These provinces are all traditional agricultural bases in China; Sichuan has historically been known as the “Province of Abundance” because of its agricultural strength. Additionally Sichuan and Henan provinces are also the fourth and third most populous provinces, respectively. Therefore these three provinces have the highest production of pork in the country. Additionally, Shuanghui Group, the largest meat processing company in the nation, is headquartered in Luohe,

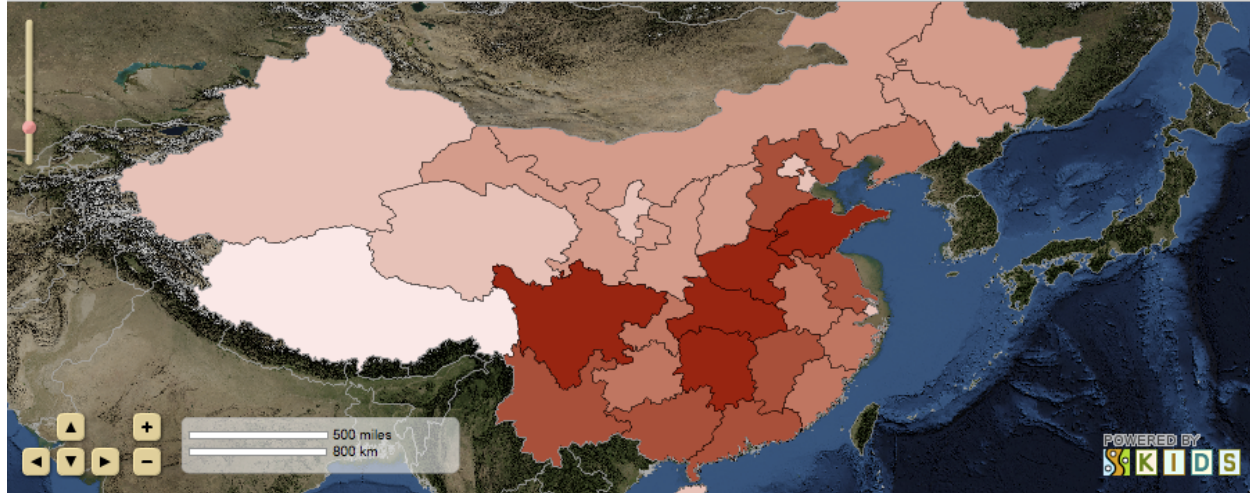
⁸⁶ China Data Service. (1995-2009). Statistical Yearbook: Agriculture, Livestock Output. 1995-2009. *China Data Service*. Retrieved from <http://chinadataonline.org>.

⁸⁷ Ibid.

Henan, which is famous for its ham production. Although these three provinces have the highest production of pork, you can still see in the map below that production of pork is fairly high in every province.

Figure 2: Number of pigs slaughtered per region in China in 2009⁸⁸

China - Livestock production - No. animals slaughtered
(Year = 2009, Livestock products = Produced meat, Livestock species = Pigs)

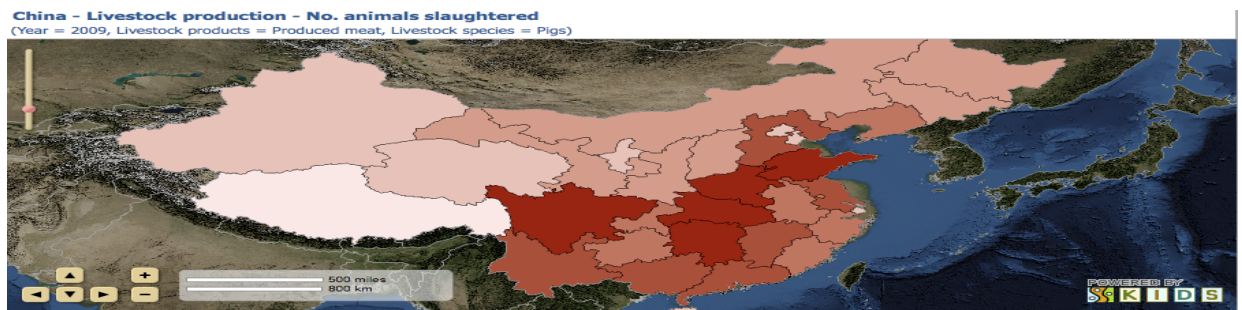


The uniformity of pork production in China can be attributed to the history of the industry as well as the prevalence of pork in Chinese cuisine. Compared to the hub and spoke structure of milk, the production of pork is much more widespread across the country. Pork is an old industry in China and therefore has been based on small scale family farms, farms with less than 50 heads of hogs, for most of China's history. However, recently more large scale farming and processing companies have started up in China. These farms are considered large if they have 50 or more heads of hogs. From 1995 to 1999 the share of large scale farms rose from 13.6% to 21.5% and after 2000, many backyard farming households withdrew from the industry due to the rising costs of

⁸⁸Food and Agricultural Organization of the United Nations. (2010). [Map of number of pigs slaughtered per region in China in 2009]. *China-Livestock production- No. Animals Slaughtered*. Retrieved from <http://kids.fao.org/glipha/#>.

pork farming and the low cost of pork.⁸⁹ Therefore a rising percentage of large scale farms has increased to fill the void. Large scale farms still only produce 40% of all pork in the country. Most of the small scale farms in China no longer sell their pigs independently instead they work with larger companies who supply the feed, medicine and technology and then eventually process the pigs.⁹⁰ Even the small scale farms are still connected to the large scale farms through integration of small scale with large businesses.

Table 3: Production by large-scale farmer (50 head or above per year sloughed)⁹¹



Large scale pork farms are on the rise because of the rising costs of pork production. Pig feed, medicine, and other costs are becoming too expensive for small scale farmers to afford. Large scale farms can lower their cost per pig because they have so many pigs. Many companies now control from the farm to the store; Shuanghui even has its own supermarket, Shineway, where it can sell all of its goods. These companies also utilize small farms. In the pork industry, like the dairy industry, small farms still outnumber and out-produce the large scale farms. These small farms are vertically integrated into the larger commercial system, combining large scale production with small farms.

⁸⁹ Jimin Wang & Hongbo Xiao. (2007). Pork Production in China. *Institute of Developing Economies Japan External Trade Organization*. Retrieved from <http://d-arch.ide.go.jp>.

⁹⁰ Ibid.

⁹¹ Ibid.

Although pig farming is widespread, the production of pork is vertically integrated, often by region commercially centralizing the industry. Like the dairy industry, this commercial vertical integration creates a system where horizontal integration is unnecessary. Fully industrialized large scale farms would not only be unnecessary for improving food safety, but would also harm the small farmers that dominate agriculture today. Pork is an older industry in China and therefore is much more scattered and widespread throughout the country, but its connections to larger processing companies creates a large horizontal structure.

CONCLUSION

The commercial vertical integration and growing numbers of large scale farms in the dairy and pork industries renders the proposed solution of agricultural horizontal integration inapplicable. Although the dairy and pork industries have different geographic and agricultural structures, the commercial and economic structures are very similar. The dairy industry does rely on more small farms than the pork industry, but both use a similar structure of vertical integration where the small farmers are connected commercially to larger processing companies. In dairy, small farmers rely on milking stations built and owned by companies such as Mengniu and Yili. That milk is later sent to these companies for processing. In the pork industry feed, medicine and technology are provided by the company that will eventually buy, slaughter, and process the pig.

This structure of commercial vertical integration acts very similar to horizontal integration and makes agricultural reform redundant. The current system already acts like large scale farming and agricultural reform would do more harm than good. Therefore it

appears that the structure of farming is not at fault. Dairy and pork both travel from small farms to the large processor. This large processor has the responsibility to inspect the goods and evaluate their safety. Therefore it is necessary to examine the commercial structure to see if there is a gap in the chain from farm to store that allows for food safety issues.

CHAPTER TWO: COMMERCIAL STRUCTURE

INTRODUCTION

A second potential flaw on the path to food safety in China is the commercial structure of agriculture; how the raw goods get from farm to store. The structure of commerce in China is highly fragmented; therefore scholars argue that the process from production to consumption should be streamlined in order to ensure regulation and safety.⁹² Currently, in most industries the path from farm to processing center involves many middlemen creating multiple areas for problems and mistakes. This is partially related to the agricultural structure described in chapter one; large processing companies have to rely on small farms for their raw goods. Therefore from small farm to large processing center there are many stages. All of the stages need to be regulated creating more work for the regulatory agencies. Regulating the farm, the middlemen and the large company can require too much manpower and be difficult to accomplish. This is a problem because in both the dairy and pork industries, most safety issues have occurred before the milk or pork entered the processing center due to the negligence or malevolence of the middlemen. In 2008 for example, during the melamine scandal, melamine was added by the middlemen at the milking stations in order to increase their profit. The middlemen in this circumstance were not well supervised and therefore had the opportunity to add additives to the milk without being noticed. Given this information commercial structure needs to be streamlined or adapted in order to improve regulation of agriculture and therefore improve food safety.

⁹² Philip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 111.

Currently there are three main forms of agricultural commercial structure in China. Large scale enterprises, or dragon-head enterprises, which are connected to the small scale farmers, or commerce; cooperative organizations that connect from farm to store; and independent large companies that own their own farms and livestock. Dragon-head enterprises are large scale businesses that are currently dominating Chinese agriculture. As described in chapter one, these large scale businesses are linked to small farms that provide the raw materials for processing. For example, a small farmer owns the pig, but feed, medicine, and technology all come from the main dragon-head processing company. The structure is preferred by central and local governments as can be seen through increased subsidies to large scale dragon-head enterprises.⁹³ The government probably supports this system because it best follows the pattern of modernizing agriculture in China. Large technologically advanced processing companies are seen to be the future of Chinese agriculture, so the government supports the growth of these businesses. It is also the most common and popular structure for both dairy and pork as large processing companies dominate both industries. Dairy companies such as Mengniu, Sanyuan, and Yili and pork processing companies such as Shuanghui and Zhengbang are all large scale and rely on small farmers for their goods. Although this structure is the most popular and is preferred by the government, it also has the history of the most safety issues and flaws. The melamine scandal of 2008, the clenbuterol scandal of April 2011 and the Mengniu safety issues of December 2011 were all partially caused by flaws in this commercial system.

⁹³ Ibid., 120.

The second commercial system is cooperative organizations. These organizations are owned by members not the enterprise. Therefore the cultivator benefits more in this system because in dragon-head enterprises most profits go to the enterprise leaving little for the producer. This system would bring together the entire chain of production: processing companies, marketing companies and farmers.⁹⁴ Currently there is no substantive government support of these organizations, but small cooperative organizations do exist. In the dairy industry, farmer are slowly becoming more popular. These cooperatives are very attractive to farmers because it gives the farmer more power and authority when negotiating prices for their goods. The goal of these organizations is more power and an increasing income for the farmers, which many cooperatives have been able to achieve.⁹⁵

Finally, there are many businesses that are similar in size to dragon-head enterprises, but instead of relying on small scale farmers for the raw goods, these companies have their own farms and control all areas of processing from farm to store. This system is more attractive to many companies because with complete control, the company can better ensure product quality. This system is slowly becoming more popular in the dairy industry as large companies buy large plots of land for their cattle. In the pork industry this system is even more popular. There are also many more governmental supports for large scale farms such as subsidies and tax breaks that encourage the construction of large farms.

⁹⁴ Ibid., 121.

⁹⁵ Jimin Wang & Hongbo Xiao. (2007). Pork Production in China. *Institute of Developing Economies Japan External Trade Organization*. 18.

Table 4: Numbers of Vertical Integration Entities by Organization Type, 2000-2005⁹⁶

	2000	2001	2002	2003	2005	2006
Slaughters above 50 heads (0000heads)	13550.08	14122.93	16598.2	18907.41	28257.6	31846.4
National slaughters (0000heads)	52673.3	54936.8	56684	59200.5	66098.6	68050.4
Share	25.72%	25.71%	29.28%	31.94%	42.75%	43.00 %

Source: Annual Statistics of the Chinese Livestock Industry

In each of these systems, food safety is an extremely important issue, but each of these systems alone does not appear to be enough. One solution is the use of technology to help track the progress from farm to store. These fragmented systems can make it hard to track where contaminated food comes from. The Ministry of Commerce as well as outside companies, such as IBM, are working to create systems that would make tracking of goods much easier. The Ministry of Commerce's program allows consumers to see where each individual item is from which makes tracking of problems easier and therefore increase accountability. IBM is creating food supply management technology, which would go to the processor and give companies more information on all of their goods. The goal of this technology is to streamline commercial structure and improve the safety of all food overall.

Companies have also been responding individually to the food safety crisis by adjusting their commercial structure. Dragon-head companies that relied entirely on small scale farmers are now creating a hybrid system. The companies own their own farm and livestock and also utilize the small farmers. Some companies are even using their influence to teach local farmers how to best use their land and livestock. These practices

⁹⁶ Phillip Huang. (2011). China's new-age farms and their vertical integration: Agribusiness or Co-ops? *Modern China*, 37(2), 122.

help improve food safety and work well with local farmers in order to best utilize resources. They also give the companies more control over the product quality and safety and increase accountability in the case of more food safety issues.

Of the three main structures described above, the dragon-head structure has the most flaws, but dominates the commercial structure of agriculture in China. This structure is the most popular because it utilizes the existing agricultural structure of China, but there are many other options available to large businesses. Since the history of food safety issues has been associated with this system, changes need to be made in this system to improve food safety and food safety regulation. Most structures have been constructed to work with the current agricultural structure in China, which is dominated by small farms, but enterprises need to find ways to work with the current structure safely and optimize safe food production. Both the dairy and pork industries are dominated by dragon-head enterprises and most of their safety issues have arisen from companies with this structure. Reports on past, current and potential commercial structures in the dairy and pork industries have revealed that there are viable alternatives to the dragon-structure system that can help improve and streamline commercial structure.

DAIRY

Commercial dairy production is divided into three main systems: dragon-head enterprises that rely on small farmers through milking stations, dairy husbandry areas or dairy zones supported by either government or large enterprises, and dairy farm household cooperatives. The majority of dairy is processed by the dragon-head enterprises. The top 5 dairy companies produce 39.26% of all dairy in China (see Table 5). These companies rely on small farmers for their dairy and build milking stations

throughout the area where local farmers go twice a day to milk their cows.⁹⁷ From there the milk is then sent to the companies. These milking stations are either corporately owned by the dragon-head enterprises or are cooperative owned, but frequently the people who work at the milking stations are merely middlemen.⁹⁸ Therefore the dragon-head companies do not have complete control over the stations not only because they are distanced from the processing centers, but also because they are not well supervised.

Table 5: Top 5 Dairy Processors⁹⁹

	2000		2002		2004		2005	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Total integrating organizations	66,688	100	94,432	100	113,953	100	135,725	100
Dragon-head enterprises	27,276	41	41,905	44	49,709	44	61,268	45
Brokerages	22,146		32,076		41,430		62,914	
Specialty co-ops	9,552	14	20,245	21	30,546	27	48,473	36
Specialty markets	7,674	12	9,163	10	10,565	9	11,543	9
Others	9,592		11,288		12,249			

Source: Zhongguo nongye chanyehua fazhan baogao, 2008: 309.

This was the source of the melamine scandal in 2008. Dairy farmers brought their cows into the milking stations to be milked, but because their milk was low in protein, the middlemen added melamine to make the protein content appear higher. Protein is measured at the milking station and when the raw milk reaches the plant. By adding melamine after the farmers had milked and the cows and sold their milk to the middleman, the middleman would pay less for the raw milk from the farmer and then would sell the raw milk with a “higher” protein content to the processing company for a

⁹⁷ Hu Dinghuan (2004). China: Dairy product quality as the new industry driver. *Agricultural Economic Research Institute*. 29.

⁹⁸ Ibid., 37.

⁹⁹ Dobson, W., Dong, F. and E. Jesse. (2011). *The Dairy Sector of China: A Country Study*. (Babcock Institution Discussion Paper). Babcock Institute for International Dairy Research and Development, Wisconsin. 18.

higher profit. This was done to increase the cost of the milk and therefore increase the middlemen's profit. Inadequate testing at the processing center allowed the milk to reach the production stage, but the problem originated from the milking stations (see Figure 3). In this instance the middleman was not connected to the main processing company and could add the melamine without fear of repercussions. The lack of connection between the middlemen and the main processing companies, common throughout most dragon-head enterprises, allowed this scandal to happen.

Figure 3: How Melamine was added in the milk supply chain¹⁰⁰

Name of Firm	Base Location	Sales in 2009 (billion yuan)	Proportion of National Dairy Sales in 2009
Mengniu Dairy Co., Ltd.	Inner Mongolia	25.71	15.84%
Yili Industrial Co., Ltd.	Inner Mongolia	24.32	14.99%
Bright Dairy & Food Co., Ltd.	Shanghai Municipality	7.94	4.89%
Wandashan Dairy Co., Ltd.	Heilongjiang Province	3.36	2.07%
Sanyuan Foods Co., Ltd.	Beijing Municipality	2.38	1.47%
Total		63.71	39.26%

Sources: Dobson, and China Dairy Yearbook [15, 8].

Although there is a history of serious flaws associated with this system, most large dairy companies in China still rely on this commercial structure in order to obtain their raw product. Both Yili and Mengniu, the top two dairy processors in the country, rely on the milking stations for their product. Mengniu has more than 3000 production bases and contracts with 3 million farmers.¹⁰¹ The companies are working with the existing agricultural structure in the way that seems best because it utilizes agricultural workers that dominate the industry, small farms. However, given the history of this

¹⁰⁰ Shumei Chen. (2009). Shame or sham: Rethinking China's milk powder scandal from legal perspective. *Journal of Risk Research*, 12(6), 731.

¹⁰¹ Mengniu Dairy Company. (2009). Introduction. Retrieved from <http://www.mengniu.com.cn>.

structure, companies will need to adapt and change this structure to provide more accountability for their product quality.

Another popular method used by large companies is dairy husbandry areas or dairy zones. These zones hold 200-300 cows and sometimes 500-1,000 cows.¹⁰² Each household manages its own cows, but barns and other structures as well as milking and disease control are controlled and taken care of by the zone. These zones are often supported with funds from the local governments and by large dairy processing enterprises. Yili, one of the top dairy companies in China has nearly 200 dairy zones in Inner Mongolia.¹⁰³ These zones are closer to the cooperative model, but are still monitored and organized by large scale dragon-head enterprises. They seem to have better standards for safety because the conditions for production are organized and controlled by the large companies without completely erasing the farmer's autonomy. Since this structure is organized and controlled by the company supervision of milking can be assumed to be better, and product quality can be ensured.

The final system is the dairy farm household cooperative. This system is relatively new as a law was only passed recently that allowed and encouraged the creation of farmers' cooperatives.¹⁰⁴ In this system farmers produce milk individually, but work together to sell to a larger enterprise as a whole. This gives farmers more power and authority to negotiate prices. Some local governments are encouraging the construction of these cooperatives. Theoretically the cooperatives would improve food safety because the farmers would get a fairer price for their goods and therefore care

¹⁰² Hu Dinghuan (2004). China: Dairy product quality as the new industry driver. *Agricultural Economic Research Institute*. 38.

¹⁰³ Ibid.

¹⁰⁴ Ibid., 39.

more about the quality of milk. It would also eliminate the middle man as farmers would be dealing directly with the processing companies, streamlining the process. This is a slow growing system in China, but one example is Taipingzhuang Dairy Association in Heilongjiang, which has more than 730 members and 4,200 heads of dairy cows.¹⁰⁵

These are the three main systems dominating dairy production in China, but as safety becomes a more important issue, some companies have begun to use a combination of these three systems. Mengniu for example has relied on milking stations for most of its history, but in reaction to the melamine scandal of 2008 has begun to start its own farms. Currently Mengniu owns 14 dairy farms with more than 10,000 cows each while also using small farms through milking stations.¹⁰⁶ The company-owned farms were bought and created as a reaction to the melamine safety scandal. By owning their own farms, Mengniu hopes to be able to better control dairy product quality. Yili also owns its own farms. According to the Yili website, “Yili is the only dairy product producer that possesses three major dairy farms in Tianshan of Xinjiang, Hulunbeier and Xilinguole of Inner Mongolia.”¹⁰⁷ Bright Dairy, a Chinese company based in Shanghai, also owns its own dairy farms. Bright is the third largest dairy processor in the country with 10 farms and 12,000 cows, but unlike Yili and Mengniu has never had a large safety scandal. This could be attributed to the fact that Bright Dairy owns and controls its own farms allowing for greater control of product quality and safety. This mixture of owning

¹⁰⁵ Ibid.

¹⁰⁶ W. Dobson, W., Dong, F. and E. Jesse. (2011). *The Dairy Sector of China: A Country Study*. (Babcock Institution Discussion Paper). Babcock Institute for International Dairy Research and Development, Wisconsin., F. Dong, & E. Jesse. (2011). *The Dairy Sector of China: A Country Study*. *Babcock Institute*. 21.

¹⁰⁷ Yili Dairy Company. (2009). About Yili Dairy. Retrieved from <http://www.yili.com>.

farms and using rural dairy farmers is becoming more popular as food safety becomes an important issue because it allows for more control and therefore can improve safety.

Foreign companies have seen these challenges to food safety, and have created different methods for dealing with China's agricultural system. Foreign investment in the dairy industry is also on the rise so this adjustment is very important (see Table 6).

Nestle, who has been investing in China for over two decades, has begun to invest even more money into the dairy industry after food safety issues with Chinese dairy farms.

These recent scandals could benefit Nestle since Chinese consumers are buying more foreign products, assuming that they are safer. Nestle is now investing \$396 million in its dairy enterprises in China and hopes to invest even more over the next three years.¹⁰⁸

Using its own hybrid system called the "Milk District" or factory and farmers system Nestle can better control product quality and safety. These systems are similar to milking stations, but each station is highly control and monitored by Nestle. Rural farmers bring their cows to each station and receive technical and medical assistance from Nestle.

Additionally, Nestle is placing importance on education of farmers and offers free training sessions so that farmers can be relied on to have safe milk.¹⁰⁹ By having more educated farmers who use more modernized methods Nestle hopes to produce the safest dairy possible.¹¹⁰

¹⁰⁸ Bloomberg News. (2012, January 12). Nestle boosts milk production in China after scandal hurts rival. *Bloomberg*.

¹⁰⁹ (2009). Nestlé Creates a Market for Chinese Milk Farmers. *Nestle Global*. Retrieved from <http://www.nestle.com/>,

¹¹⁰ Bloomberg News. (2012, January 12). Nestle boots milk production in China after scandal hurst rival. *Bloomberg*.

Table 6: Foreign dairy enterprises divided by region in 2009¹¹¹

District	Number of Enterprises (unit)	Gross Industrial Output Value1,000 yuan)	Percent of Total Gross Output	Percent of Total Enterprises
National Total	111	68,035,998	100	100
Beijing	5	2,879,962	4.23	4.5
Tianjin	4	167,154	0.25	3.6
Hebei	9	4,871,424	7.16	8.1
Shanxi	3	1,139,885	1.68	2.7
Inner Mongolia	11	14,518,344	21.34	9.9
Liaoning	5	2,493,293	3.66	4.5
Jilin	0	270,639	0.39	0
Heilongjiang	15	10,594,177	15.57	13.51
Shanghai	3	7,357,037	10.81	2.7
Jiangsu	0	335,714	0.49	0
Zhejiang	0	325,758	0.48	0
Anhui	0	2,030,584	2.98	0
Jiangxi	0	60,600	0.08	0
Shandong	13	4,302,549	6.32	11.71
Henan	0	108,074	0.15	0
Hubei	0	831,551	1.22	0
Hunan	4	2,153,759	3.16	3.6
Guangdong	12	7,523,125	11.05	10.81
Hainan	0	25,678	0.03	0
Sichuan	3	302,646	0.44	2.7
Guizhou	0	350,706	0.51	0
Shaanxi	9	5,086,756	7.48	8.1
Ningxia	0	115,423	0.17	0
Xinjiang	0	191,160	0.28	0

Another foreign owned dairy farm, Hua Xia, has completely ignored the most popular method of dairy production in China, milk stations, and owns its own farms. Furthermore it uses California dairy farm style, open air stalls with technologically advance milking houses, in order to ensure the health of the cows and the safety of the milk. It operates by the motto that happy cows make better milk and aims to provide the best environment for cows and farmers alike. Like Nestle, Hua Xia places large importance on education of its personnel and farms and has training courses for farming

¹¹¹ Compiled from China Data Services Statistical Yearbook

personnel.¹¹² These methods, along with high technological standards have allowed both Nestle and Hua Xia to operate without food safety issues that are felt by other Chinese dairy companies.

The dragon-head structure that dominates dairy production is not the best method of ensuring food safety in the dairy industry. The structure is fragmented and leaves room for errors to be made and go unnoticed. For dairy, a hybrid system using the above three described structures is the best choice for ensuring dairy safety. Processing companies need to improve supervision over all steps in the production process to prevent issues such as melamine contamination. A hybrid system would be best both for food safety and for the rural farmers that still dominate the agricultural structure in China.

PORK

Production of pork is organized in a similar manner to dairy production. Large processing companies dominate the industry and the independent small processing is shrinking. Compared to dairy production, meat production in China is much more industrialized and even better suited to large scale processing. Large processing industries include Shuanghui Group in Henan Province, Yurun Group in Jiangsu Province, Jinluo Group and Delisi Group in Shandong Province, Kunpeng Group in Beijing, Huazheng Group in Jilin Province, and Tieqi Group and Lishi Group in Sichuan Province.¹¹³ Most of these industrial groups use a similar system of vertical commercial integration, but the three main commercial integration structures described above dominate the industry:

¹¹² (2011). Hua Xia Story. *Hua Xia*. Retrieved from <http://www.huaxiadairyfarm.cn/about.asp>.

¹¹³ Jimin Wang & Hongbo Xiao. (2007). Pork Production in China. *Institute of Developing Economies Japan External Trade Organization.*, 17.

dragon-head farms, processing centers and cooperatives, and company owned farms. However, like the dairy industry more processing centers are reacting to food safety issues and are trying to improve their system of vertical integration.

The first and most popular commercial structure is the dragon-head model where thousands of small farmers are integrated into large-scale business. Companies provide seed, feed, medicine, technology, and marketing while farmers provide the raw product.¹¹⁴ Farmers and companies are “linked in order to conduct a version of industrialized large-scale production.”¹¹⁵ Farmers that are commercially connected to processing companies under this model are often treated poorly and are given unfair prices for their goods, but can also renege on their contracts and sell their goods to another processing center.¹¹⁶ Furthermore, the most recent pork scandal, the clenbuterol scandal, arose from a company that uses this system.

A subsidiary of Shuanghui Group was found to have been the source of this contaminated pork. Shuanghui Group is the largest meat-processing center in the entire country slaughtering 15 million heads and producing over 100 million tons of pork annually.¹¹⁷ With production centers in over 12 provinces, Shuanghui is both transnational and transregional and also exports internationally.¹¹⁸ During the clenbuterol scandal in April 2011, it was discovered that the contaminated pork came from clenbuterol tainted feed. In most cases feed is provided by the company so this implicates

¹¹⁴ Ibid., 18.

¹¹⁵ Ibid.

¹¹⁶ Ibid.

¹¹⁷ (2011). Group Profile: About us. *Shuanghui Group*. Retrieved from <http://en.shuanghui.com.cn>.

¹¹⁸ (2011). Group Profile: About us. *Shuanghui Group*. Retrieved from <http://en.shuanghui.com.cn>.

the company. In this instance the farmer is supposed to trust the company and therefore the food safety issues cannot be blamed on the farmer, but on the company. However it was only found in one of Shuanghui's subsidiary companies not in the main company itself and the source of the clenbuterol is not well known. The use of clenbuterol however is known to be common and widespread.

The second form of commercial vertical integration is the cooperative association plus the large scale enterprises system. This model was first implemented in Qingzhu village in an attempt to increase the living standards of the Chinese pork farmers.¹¹⁹ This is also a system of large scale production, but with this system, as described above, the farmers have more benefits. In its trial run at Qingzhu village the system enhanced the quality of the hogs, improved efficiency of the industry, and increased income of the farmers.¹²⁰ Because of the results, this system is viewed as an improvement on the dragon-head system of production. A large scale processing business still operates the processing side of the system, but because the farmers form an association together, they are able to have more benefits and pool their resources, which leads to a higher quality of pork. Delisi Company aims to achieve this model in order to optimize production and food quality. Another form of cooperative farming is not as popular, but incorporates the entire processing system. This system sets up a bridge between small-scale farmers and large scale markets. For many farmers the industry has become too large for them to handle individually, so they work together to form this commercial system. The largest

¹¹⁹ Jimin Wang & Hongbo Xiao. (2007). Pork Production in China. *Institute of Developing Economies Japan External Trade Organization*. 19.

¹²⁰ Ibid.

farmers' cooperative is in Taiyan city, Shanxi Province. It incorporates more than 32 hundred-scale farms.

The final mode of production is company owned farms. The companies create base farms, which they own and then have local rural farmers farm the land. These are large-scale farms, owned by companies that also control the processing system. Yurun Group uses this mode of production, but like the dairy industry, still utilizes small hog farmers.¹²¹ Zhongpin Inc on the other hand owns its own farm and controls the entire process from farm to store. Based in Henan Province, Zhongpin has processing and distribution centers all throughout the country (see Figure 4).

Figure 4: Zhongpin Distribution Map¹²²



Unlike dairy processing companies, which are specialized in only dairy, all of these companies are agricultural processing companies that process meats, fruits and

¹²¹ Ibid., 18.

¹²² (2006). About Zhongpin. *Zhongpin Inc.* Retrieved from <http://www.zpfood.com/about.asp>.

vegetables. Although most of the meat they process is pork, they also process other meats. For some companies this facilitates the creation of markets that sell goods processed by these companies. Zhongpin Inc for example has a total of 2,995 retail stores where it sells not only its pork products but all other meat products and fruits and vegetables as well.¹²³ Zhongpin is viewed as a more modern production system since it owns its own farms, processing center and retail stores. This system has allowed Zhongpin to pass many inspections and receive high product quality and safety ratings. Shuanghui's Shineway label is also a chain retail supermarket where Shuanghui Group sells its agricultural goods.

The main method of improving food safety in the pork industry is modernization of processing centers and technological advances for testing the pork and for tracking the pork. IBM is currently working with Shandong Commercial Group Co. to create a system that will track their products. This system is intended to ensure the safety of their products as they reach coastal regions of the country. Called "food supply management-technology" this system will go from farm, to slaughterhouses to supermarket shelves and will give the company the ability to trace where all of the food originated.¹²⁴ This will be important for accountability and for discovering where food safety issues stem from. The company also wants to increase consumer confidence as consumers have been bombarded with food safety issues over the past year.

Unlike the dairy industry, there is no clear structure that appears to be better for improving food safety. The dragon-head structure has experienced the most food safety

¹²³ Ibid.

¹²⁴ Bloomberg News. (2011, December 14). IBM to Build Food-Safety System for Pork in China's Shandong. *Bloomberg*. Retrieved from <http://www.bloomberg.com>.

issues, like in the dairy industry, but it also completely dominates the pork processing sector. Some companies do own their own farms, but technological advances, such as IBM's food safety system, seem to be the best method of improving accountability, product quality and overall food safety in the industry.

CONCLUSION

Vertical integration of commerce in the dairy and pork industries needs to be improved in order to improve food safety in China. Dairy's production chain is in the midst of reforming, but still has many holes where problems can arise. The pork industry on the other hand is fairly well established and is relying on larger, but still distanced farms and could benefit greatly from technological advances. It is in the interests of these processing companies to have the safest goods possible, because it increases consumer confidence, but the government and regulatory agencies are responsible for ensuring that these companies follow guidelines. If commercial structure of pork, dairy, and other agricultural products can be streamlined in order to form closer connections between every production stage, the structure will then be easier to regulate and food safety issues will more easily be avoided. Regulation and implementation of food safety laws and regulations on these commercial systems now needs to be examined in order to improve overall food safety in China.

CHAPTER 3: GOVERNMENT REGULATIONS

INTRODUCTION

The final obstacle on the path to improving food safety in China is regulation and implementation of food safety laws. Proper regulation and implementation of food safety is a large problem in China because all other elements of food safety rely on good and comprehensive regulation and implementation of those regulations. For example, it does not matter if an industry has a strong and easy to regulate agricultural structure if the regulatory agencies are not good at regulating. Similarly, commercial structure is unimportant if regulation and implementation of the industry are subpar. China's current system of regulation is too fragmented, which allows food safety problems to slip through the cracks unnoticed. Additionally, implementation at the local level needs to improve in order to ensure that the regulations are actually being followed. There are five main factors of this problem to discuss: regulatory laws, regulatory agencies, education by those agencies, regulatory standards, and local implementation of laws and standards. These five elements are extremely important when examining food safety because they are the source of most issues in regulation and implementation. Although each factor is extremely complex, these weaknesses could be improved by streamlining the regulatory system and changing the regulatory focus from reaction to food safety issues to prevention of food safety issues.

Streamlining regulation would fix China's fragmentation issue. Regulation could be streamlined by giving regulatory power to one or two agencies instead of the thirteen that are currently involved in food safety, or by creating an entirely new agency that is completely responsible for food safety. This would, however, be very difficult, because

high levels of bureaucracy and political gridlock would impede the process. Additionally, the regulatory agencies can improve local implementing by changing the focus from reaction to prevention in order to stop food safety problems before they happen. The laws only focus on punishments for violators, not on how to prevent violations from occurring. By examining the laws governing regulation, ministries in charge of regulation, the role of education in each industry, implementation of those regulations, and reports on local implementation, problems in the regulatory structure and implementation will be revealed and solutions will be examined.

LAWS REGULATING FOOD SAFETY IN CHINA

There are three main laws regulating food safety in China: the Product Quality Law of 1993, the Food Hygiene Law of 1995, and the Food and Safety Law of 2009. The Product Quality Law of 1993 applies to the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), giving it the power to issue permits to food processors and other food enterprises. The Food Hygiene Law of 1995 was the first law intended to focus directly on food safety, but the focus of this law was more on the cleanliness of food than the safety of the food.¹²⁵ According to the law, the safety of food is dependent on the cleanliness of the food preparation and processing centers not on what is inside the food or what bacteria may have contaminated the food. There is some mention of additives, but the chapter entitled “Safety of Food” is only about hygiene and

¹²⁵ (1995). *Food Hygiene Law of the People’s Republic of China*. (No. 59 Order). Beijing. 4.

cleanliness of food preparation.¹²⁶ This law originally gave regulatory power to multiple agencies, fragmenting the process.

The most recent law, the Food and Safety Law of 2009, was an attempt to streamline and enforce food safety regulation. It was passed in reaction to the melamine scandal of 2008 with hopes that it would prevent another similar scandal, but it did very little to improve the fragmentation of the regulatory system. This law changed the methods of regulation, the duties of each ministry, and created the State Council Food Safety Commission in order to improve the regulation of food safety in China.¹²⁷ However, currently the room for ambiguity within the law prevents effective regulation and many scholars think that China missed its chance for an effective regulatory system by passing the Food and Safety Law without clearly defined regulatory provisions.¹²⁸ The State Council Food Safety Commission, which that focuses on food additives, edible farm products, and food processing, theoretically would improve regulation and food safety, but the power of this commission is again hindered by the fragmentation of the system. Under this law, regulatory power is still spread between many ministries and none of the ministries want to relinquish control over their areas of focus or the added revenue of regulation, maintaining the system of fragmentation that exists today.¹²⁹

Although these measures did not do much to improve the fragmentation of the food safety system, the law did improve food safety regulations with several substantive measures. The law directly outlines food safety standards, including what can and needs

¹²⁶ *Ibid.*, 3-4.

¹²⁷ (2009). *The PRC Food Safety Law*.

¹²⁸ Tam Weikeung and Yang Dali. (2005). Food Safety and the Development of Regulatory Institutions in China. *Asian Perspective*, 29(4), 12.

¹²⁹ (2009). *The PRC Food Safety Law*.

to be regulated, inspection and testing of food, licensing of processing and distribution of food, and created harsher penalties for violations of the law.¹³⁰ There is a much larger focus on the quality and safety of the food including additives, pesticides, and other harmful contaminants that make food unsafe for consumption. The law requires stricter regulations on food safety and has a true focus on food safety compared to the Food Hygiene Law of 1995.¹³¹ In Article 6 of the Food Hygiene Law of 1995 it says, “Food shall be non-toxic, harmless, and meet the inherent nutrition requirements and present the corresponding organoleptic properties, such as color, smell, taste, etc.”¹³² In the same section of the Food Safety Law of 2009 it says, “The food safety standards shall specify: The limits to the content or concentration of pathogenic microorganisms, pesticide residues, veterinary medicine residue, heavy metals, contaminants, and other substances that may be hazardous to human health in food.”¹³³ The regulations placed by the Food Safety Law are much more specific and focused on food safety issues. All of these regulations are an improvement over the lax regulations and inspection guidelines in the past, and have the power to improve food safety.

MINISTRIES IN CHARGE OF REGULATION

Although the new food safety law improves regulations over food itself, the regulatory system is still highly fragmented and too many agencies have overlapping jurisdiction (see Table 7). Thirteen different ministries and agencies are responsible for

¹³⁰ Xiu Changbai. (2010). Melamine in milk products in China: Examining the factors that led to the deliberate use of the contaminant. *Food Policy*, 35(5), 468

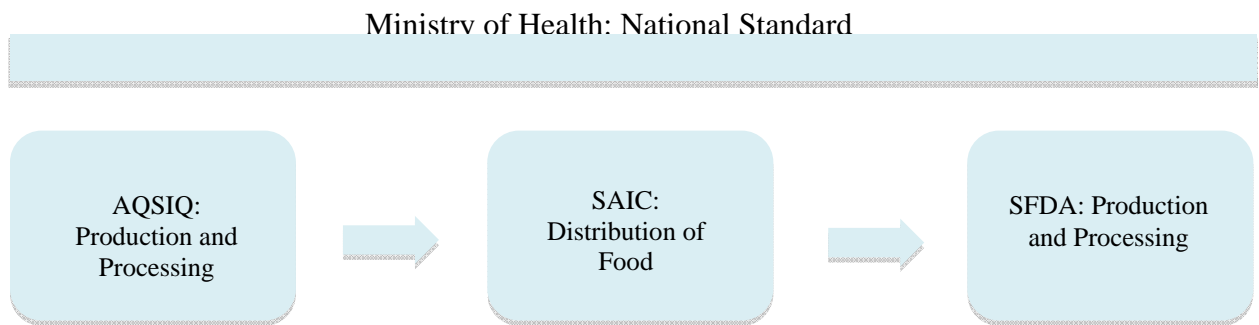
¹³¹ (2009). *The PRC Food Safety Law*.

¹³² (1995). *Food Hygiene Law of the People’s Republic of China, Article 6. 3.*

¹³³ (2009). *The PRC Food Safety Law, Article 16. 5.*

some element of food safety regulation. In contrast, in the United States only two agencies are responsible for food safety, the FDA and USDA. China's fragmented system, composed of so many different agencies and ministries, allows for more mistakes, weaker regulations, and unclear and overlapping jurisdictions. For example, when the power to declare certain foods fit to eat is given to multiple ministries, the consumer can be faced with an extremely confusing situation and retailers will not know which foods are safe to sell. When cancer-causing chemicals were found to be in vermicelli in 2005, the General Administration of Quality Supervision, Inspection and Quarantine (GAQSIQ) declared 30 brands of vermicelli fit for consumption, but the Ministry of Health (MoH) only listed 7 brands fit for consumption.¹³⁴ The consumer was given the task of deciding which ministry was more trustworthy, and stores were not forced to remove certain brands since they were on one of the ministries' lists.

Figure 5: Regulatory control over production chain



AQSIQ: General Administration of Quality Supervision, Inspection and Quarantine, SAIC: State Administration for Industry and Commerce, SFDA: State Food and Drug Association

Furthermore, a different regulatory agency has control over each part of the production chain. For example, the Ministry of Health will set the national standard for

¹³⁴ Tam Weikeung and Yang Dali. (2005). Food Safety and the Development of Regulatory Institutions in China. *Asian Perspective*, 29(4), 15.

milk, but the AQSIQ will set the regulations for the production and processing of milk. Once the product leaves the processing center, then the SAIC regulates the distribution of food. Finally, consumption in restaurants and cafeterias is controlled by the State Food and Drug Administration. Since each stage of the production chain is controlled by different agencies each stage has different regulations. Regulations could be stricter in one stage than the other leading to confusing regulations for companies to follow.

Table 7: Ministires in Charge of Regulation and their Responsibilities¹³⁵

Institution	Law	Responsibilities	Where in processing chain
Ministry of Health (MoH)	China's Food Hygiene Law 1995	In charge of Supervision and management of food hygiene. Authorities: issuing hygiene licenses; monitoring, inspecting and providing technical guidance for food hygiene; investigating and dealing with food poisoning or food contamination incidents, and imposing fines or revoking hygiene license.	
Ministry of Agriculture (MoA)	Food Safety Law 2009	Assess food safety risk, set national standards of food safety, release information relating to food safety, regulate food safety testing, investigate food safety incidents. (SFDA works under MoH)	Set national standard
Ministry of Commerce (MoC)	Food Safety Law 2009	Responsible for non-processed farm products Can enact and amend standards and rules regarding the procedures for food processing, packaging, storage, transportation, and sales	
General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ)	The Product Quality Law 1993	Issues production permits for food processors and producers, supervises licensed food enterprises for compliance with regulations concerning food manufacturing, packaging, and labeling, and is empowered to crack down on unlicensed food processing and production. Can issue fines, confiscate products, and ban food manufacturers from continuing production.	
	Food Safety Law 2009	Supervision of food production and food export/import	Production and processing

¹³⁵ (2005). Ministry of Health. *Gov.cn*. Retrieved from <http://english.gov.cn>. (2007). About AQSIQ: Mission. *AQSIQ*. Retrieved from <http://www.aqsiq.gov.cn>. (2009). About us. *SAIC*. Retrieved from <http://www.saic.gov.cn>. (2009). About SFDA. *SFDA*. Retrieved from <http://eng.sfda.gov.cn>.

State Administration for Industry and Commerce (SAIC)	The Product Quality Law 1993 Food Safety Law 2009	Issues business license and oversees food hygiene in urban and rural markets, empowered to fine and revoke business license of violators Supervise the domestic wholesale and retail food sectors	Food distribution
State Food and Drug Administration (SFDA)	Food Safety Law 2009	Authorized to exercise comprehensive supervision over safety of food, health products and cosmetics. Coordinates relevant bureaucracies, to draft laws, and administrative regulations concerning food safety. (Has very little actual power)	Consumption (Restaurant, Cafeteria, etc.)
State Council Food Safety Commission	Food Safety Law 2009	Co-ordinate and oversee new food supervision apparatus	

According 2009's Food Safety Law, the MoH is the main agency in charge of food safety and all the other agencies report to the MoH. However, many industries can form their own regulations over different parts of the production chain. The MoH sets the national standard, but then all other portions of regulation are divided among other agencies. The law also created a separate council for food safety, but the duties of this council are not clearly defined in the Food Safety Law or in the law's implementation measures. Solving fragmentation is extremely difficult because many of the agencies are competitive and refuse to work together. This competitiveness is caused by a large amount of political gridlock as different agencies do not want to lose jurisdiction and therefore revenue over areas of food safety. This causes agencies to do not share information, nor take the blame when there are large food safety issues. Blame is passed around without officially blaming any one agency or individual, and eventually falls on a scapegoat who did not play a large role in the issue.¹³⁶

Furthermore, all of these ministries want to maintain the current balance because regulation of food safety increases their revenue and power. For example, when the AQSIQ issues permits it receives an increase in revenue; production and processing

¹³⁶ Tam Weikeung and Yang Dali. (2005). Food Safety and the Development of Regulatory Institutions in China. *Asian Perspective*, 29(4), 13.

centers pay for each permit they receive. If regulatory power was consolidated, the AQSIQ could lose this area of control and lose revenue. This is the same situation for all ministries that have a role in food safety regulation. Additionally, because all of the ministries do not want to lose areas of control, there is internal political struggle that prevents changes to the current regulatory structure. All of the ministries want to maintain their political power, which prevents anything from getting done. This law attempted to fix previous problems, but, as seen in Table 7, the problems remain. Food safety problems will continue to occur until the problem is resolved.

EDUCATION

Another area where the regulatory system needs to improve is in education of farmers, processors, and retailers. Many food safety issues occur because of ignorance of farmers. As a result of a growth and change in production, production methods have changed drastically. The methods that farmers use are not always safe, but most are uneducated and do not know what safe farming practices are. For example, when farmers are given feed that is supposed to make their livestock grow faster and leaner, they do not question why. Additionally, there has been an increase in the use of drugs to keep animals alive, or stimulate and enhance their growth. Antibiotics are used to combat or prevent diseases, and stimulants such as clenbuterol are used to add meat to the body of a pig, enhancing the leanness of the meat, without thought being given to how these drugs

will affect the humans who consume the meat.¹³⁷ Farmers do these things in order to be competitive with other farmers; they do not know the repercussions.

Farmers need to be better educated in order to ensure the safety of their food. According to the Food Safety Law, “civil society and community groups are encouraged to conduct food safety educational activities on understanding food safety, laws, regulations, and standards, to advocate healthy diets and to raise consumer awareness of food safety and looking after their health.”¹³⁸ This however does not require that anyone educates the public about food safety and does not mandate a specific agency to be responsible for food safety.

In 2011 the government began a year-long campaign to promote food safety and raise awareness of food safety. It has become a top priority for the Chinese government and the media is now widely reporting these issues.¹³⁹ This is supported by the Food Safety Law, which states that “food safety information, laws, regulations and standards shall be publicized by the media.”¹⁴⁰ The Chinese government and media are taking on the role of educating the public, but one of the ministries should also be involved. In the United States, for example, the USDA is responsible for educating the public about issues ranging from what items have been recalled to how to properly handle and prepare raw meat.¹⁴¹ There is an entire section of the website devoted to teaching the consumer. China should follow this example and try to prevent food safety issues not only react to them.

¹³⁷ Peter Li. (2009). Exponential Growth, Animal Welfare, Environmental and Food Safety Impact: The Case of China’s Livestock Production. *Journal of Agricultural and Environmental Ethics*, 22, 228.

¹³⁸ (2009). *The PRC Food Safety Law, Article 7. 2.*

¹³⁹ Lin Liu. (2011, August). China seeks to address food safety crisis. *Washington Post*.

¹⁴⁰ (2009). *The PRC Food Safety Law, Article 7. 2.*

¹⁴¹ (2012) FoodSafety.gov. *USDA*. Retrieved from www.foodsafety.gov.

STANDARDS

The final issue in regulation of food safety is the lax regulations or near lack of regulation that was common in the early 2000s. In the melamine scandal of 2008, melamine went undetected for almost an entire year because large dairy companies were not regularly tested; large well-known companies were given exemption from testing.¹⁴² Melamine was deliberately added to the milk and the company knew of the contamination, but because large companies were exempt from regular testing, this information did not become public until after the deaths of many children. According to Article 18 of the Food Hygiene Law, enterprises were allowed to regulate themselves: “Enterprises engaged in food production, management and sale shall perfect their own food safety control system, assign full-time or part-time food safety control personnel, and strengthen laboratory testing work related to the foods they produce and sell.”¹⁴³ They were given inspection free status.¹⁴⁴ People were severely punished for their part in the scandal, but the damage was done. Lax regulations, or near lack of regulations, combined with a fragmented regulatory system, allowed this scandal to happen.

Although there have been reforms to regulations, the dairy industry still faces much controversy over specific standards. For example, bacterium content regulations are controversial because the limit for China’s dairy is much less stringent than the international limit. The limit in China is 2 million units per milliliter, while internationally it is 100,000 units per milliliter. It is an improvement on past standards of

¹⁴² Chen Shumei. (2009). Shame or sham: Rethinking China’s milk powder scandal from legal perspective. *Journal of Risk Research*, 12(6),

¹⁴³ (1995). *Food Hygiene Law of the People’s Republic of China, Article 18*. 7.

¹⁴⁴ Lee Spears. (2008, September 18). China Revokes ‘Inspection-Free’ Right Amid Milk Scare. *Bloomberg News*. 730.

4 million units per milliliter.¹⁴⁵ Additionally the AQSIQ lowered minimum protein level in dairy from 2.95% to 2.8% in order to decrease the incentives of adding melamine to milk, but officials have faced some complaints from that change.¹⁴⁶ The AQSIQ also imposes regulations that many companies do not have the funds to achieve. In early 2011, AQSIQ instituted new regulations for dairy requiring processing companies to test for 64 additives, including melamine. The equipment needed for these tests will cost companies at least 3 million yuan (US \$456,000).¹⁴⁷ By some estimates, only companies with annual revenues exceeding 80 million yuan will be able to afford this upgrade.¹⁴⁸ Because of the financial restrictions of many companies, many firms fail inspections. In early April 2011, AQSIQ reported that 643 firms passed inspection, while 426 failed and 107 were in suspension.¹⁴⁹

Standards set by the regulatory agencies are becoming stricter; however, many still complain that these standards are not enough. Calls for more stringent regulations, especially in the dairy industry, are frequent. Furthermore, many food safety issues occur because not all companies can afford to test their products to see if they meet the regulations. Companies need to implement their own inspection measures in order to prevent future food safety issues, but currently the local branches of regulatory agencies are not good at implementing laws and ensuring that companies follow the standards put in place by the central regulatory agencies.

¹⁴⁵ Wang Yong. (2011, Dec. 15). Dairy Standards Stir Uproar Over Safety. *Caixin Online*. Retrieved from english.caixin.com.

¹⁴⁶ Ibid.

¹⁴⁷ Dobson, W., Dong, F. and E. Jesse. (2011). *The Dairy Sector of China: A Country Study*. (Babcock Institution Discussion Paper). Babcock Institute for International Dairy Research and Development, Wisconsin. 19.

¹⁴⁸ Ibid.

¹⁴⁹ (2011, Sep. 6). Food Safety is Still a Critical Issue in China. *China Daily*.

IMPLEMENTATION

Implementation at the local level is the largest problem facing regulations, because the laws and standards that the central regulatory agencies pass are useless unless there is effective implementation of the regulations. According to an official, local “officials generally exhibit a lackluster response to food safety matters... they will only take it seriously if it’s linked to their positions or performance.”¹⁵⁰ Frequently, local governments and regulatory offices do not follow the regulations because it is profitable for them to ignore food safety problems. Revenue generation is often more important than food safety regulations, which can limit local growth.¹⁵¹ Local food safety offices have been set up around the country in recent years, but they dodge responsibility and blame other departments where there are food safety issues.¹⁵² However, licenses are enthusiastically issued by these departments because they bring in money.¹⁵³ The local offices are useless unless there is some guarantee that the officers will benefit from good performance. Currently the local offices are ineffective because they are more focused on their careers than on their performance. Local officials also often overlook violations when personal bribes are offered, and, in order to create more revenue for the region, local regulatory agencies will frequently fine businesses instead of halting their practices

¹⁵⁰ (2011, April 30). Hong Kong paper says “apologies not to fix “flawed Chinese food safety system. *BBC Monitoring Asia Pacific*.

¹⁵¹ *Ibid.*, 17.

¹⁵² *Ibid.*

¹⁵³ *Ibid.*

when a violation is discovered.¹⁵⁴ According to a dairy farmer from Shijiazhuang, “In this business, bribery keeps everyone silent.”¹⁵⁵

The government does not stress the importance of implementation and focuses instead on reacting to food safety issues. Therefore, harsh punishments such as the death penalty are being used in an attempt to prevent violations of food safety regulations. The regulatory agencies seem to think that the best method of improving implementation is to increase the levels of punishment, but preventative methods would avoid the problem altogether. China’s regulatory agencies need to focus on ways to prevent food safety scandals, not only how to respond to food safety scandals, in order to improve food safety.

Implementation in the dairy industry is a very serious problem, as the industry has been fraught with food safety scandals in the past. In 2008, in reaction to the melamine scandal, a total of 21 people were charged with crimes.¹⁵⁶ Two men were executed for their part in the scandal. Zhang Yujun, a cattle farmer, was executed for endangering public safety, and Geng Jinpin, a salesman, was executed for producing and selling toxic food.¹⁵⁷ Many people think that these two men were scapegoats and that most of the blame should have fallen on Tian Wenhua, Sanlu’s general manager, who received a life sentence.¹⁵⁸ Other Sanlu executives were sentenced to between 5 and 15 years in jail.¹⁵⁹

¹⁵⁴ Tam Weikeung and Yang Dali. (2005). Food Safety and the Development of Regulatory Institutions in China. *Asian Perspective*, 29(4), 20.

¹⁵⁵ Jim Yardley and David Barboza. (2008, Sept. 27). Despite Warnings, China’s Regulators Failed to Stop Tainted Milk. *New York Times*.

¹⁵⁶ (2009, Nov. 25). China executes pair over toxic milk powder scandal. *Belfast Telegraph*.

¹⁵⁷ Ibid.

¹⁵⁸ Tania Branigan. (2009, Nov. 25). International: China execute dairy farmer and salesman in tainted milk scandal. *The Guardian*.

Four officials in the city were fired: the vice mayor in charge of agricultural production, the Shijiazhuang Municipal Animal Husbandry and Fishery Bureau director, Shijiazhuang Municipal Food and Drug Administration director, Shijiazhuang Municipal Bureau of Quality and Technical Supervision director. The mayor of Shijiazhuang also resigned.¹⁶⁰ Chief of AQSIQ, Li Changjiang was the most senior official to resign and the Communist Party chief in Shijiazhuang was fired.¹⁶¹

Although many people were punished as a result of this scandal, others feel that the wrong people were punished. Zhang Yujun and Geng Jinpin were merely a cattle farmer and a salesman, respectively. Their actions were illegal and they deserved to be punished, but the actions of Sanlu's general manager, Tian Wenhua, were much worse. Tian knew milk was tainted in May, but did not inform officials in Shijiazhuang city until August. There are some reports that the company knew as early as December of 2007, but waited to cover it up until there were more complaints. After Sanlu told the city officials, the city officials waited a month, from August 2 to September 9, before telling the provincial officials because of the Olympics.¹⁶² It is reported that the officials were pushed to prevent this issue from becoming common knowledge until after the Olympics, which were important for international status and national harmony.

A year after the melamine scandal, melamine was found again in dairy products because tainted milk powder from 2008 had not been destroyed. This second scandal

¹⁵⁹ (2009, Nov. 25). China executes pair over toxic milk powder scandal. *Belfast Telegraph*.

¹⁶⁰ (September 18, 2008). "Death toll rises in China." *Xinhua*.

¹⁶¹ David Barboza. (2008, Sept. 23). China's Top Food Quality Official Resigns as Milk Scandal Widens. *New York Times*.

¹⁶² David Barboza. (2008, Sept. 23). China's Top Food Quality Official Resigns as Milk Scandal Widens. *New York Times*.

occurred because regulations were not enforced; companies were told to destroy the milk powder, but many did not.¹⁶³ The companies did not understand how to destroy the milk powder, but the government did not help them or enforce the rule. Instead, stockpiles of contaminated milk powder remained and were added to raw milk to increase the apparent protein content. Milk companies were supposed to be testing for melamine, but two years later it was still found in products because processing centers are not properly inspected and implementation of regulations is poor.

Later, in 2011, there was another milk safety scandal. Mengniu, one of the largest and most trusted dairy processing companies, was found to have dairy products contaminated with a liver-damaging carcinogen. Companies are required to test for this carcinogen, but because the testing equipment costs 4,000 to 6,000 yuan, many do not test for it. Companies need to improve inspection of their own products.¹⁶⁴ Again, the focus for this scandal was on punishing those who violated the laws after the fact. 14 people were sentenced for producing or selling tainted milk. Two people received life sentences, four received 10 to 15 years, and the others all received lighter sentences. In addition to jail time, fines ranged from 200,000 yuan to 400,000 yuan.¹⁶⁵

In the pork industry, the reaction to food safety violations has been the same and there are few reports on preventative actions taken by local or central regulatory agencies. For the Shuanghui clenbuterol scandal in April 2011, “at least six officials and employees at lower-level animal inspection stations have been fired or suspended, while

¹⁶³ (2010, Feb. 6). China sends inspectors to provinces as tainted milk products resurface. *BBC Monitoring Asia Pacific*.

¹⁶⁴ (2011, December 27). Questions remain over Mengniu milk scandal, experts say. *Caixin*.

¹⁶⁵ (2011, April 29). Court Sentences 14 for selling tainted milk powder in China. *BBC Worldwide Monitoring*.

22 others—pig farm managers, traders and slaughterhouse staff—have been detained.”¹⁶⁶ Five people were convicted of “endangering public security by using dangerous means,” for their role in feeding clenbuterol to pigs. Sentences ranged from 9 years to life with one person receiving the death penalty. These sentences were so extreme because all the defendants were aware of the contamination, but did nothing about it. By the end of the scandal, in total, 113 people in total were penalized for their role in the scandal, including 17 government officials.¹⁶⁷ The 17 government officials involved, which included animal health and food safety inspectors, got 3 to 9 years imprisonment.¹⁶⁸ One man received the death penalty for illegal clandestine production of clenbuterol.

Again, this reaction focused on the punishment of those involved, not ways to prevent people from committing this same offense in the future. Currently the Chinese government is focusing too much on reacting to food safety violations and not enough on how to prevent food safety scandals. Punishments for violations are clearly outlined in the new Food Safety Law that range from small fines to the death penalty. The government needs to work towards improving local implementation of these laws by working to decrease corruption and changing methods of evaluation to promote implementation of all food safety regulations. They also need to put a larger burden on the companies to self-regulate and change the way they review the work of the local officials. Reviews of local officials given the task of regulating food safety should be based on the number of farms, manufacturers, and processors that pass food safety

¹⁶⁶ (2011, April 30). Hong Kong paper says “apologies not to fix “flawed Chinese food safety system. *BBC Monitoring Asia Pacific*.

¹⁶⁷ (2011, November 26). China Penalizes 113 in tainted pork scandal. *Agence France-Presse*.

¹⁶⁸ *Ibid.*

inspections. For example, fining individuals or companies should not be rewarded unless the fine resulted in an actual change in the actions of that individual or company.

Evaluations should also look to discourage bribery and corruption, a problem throughout the entire Chinese government.

UNITED STATES REGULATION STRUCTURE

One model that China could look to in improving its regulatory system is the United States. This model would be suitable because the United States is similar in size to China and is also an agricultural giant. Furthermore, although the United States relies on large-scale farms, it has many more small-scale farms that it also needs to regulate. China could follow their model of regulation on its small and large-scale farms in order to improve the regulatory system. In the United States, all food safety regulations are controlled by two agencies, the FDA and the USDA. The FDA controls almost all agricultural products except meat and poultry products. This is due to an historical division of power, not different concerns for safety. The FDA originates from a branch of the USDA that was given control over all agricultural goods except for meat and poultry. This job eventually became too big to be under the USDA and now the FDA is its own Administration under the Department of Health and Human Services. Therefore food safety jurisdiction is divided. Having only two agencies responsible for regulation with clear division of jurisdiction allows for laws and regulations to be uniform and easier to follow since there are not many regulatory agencies acting on the same item in different ways.¹⁶⁹

¹⁶⁹ (2011, Sep. 6). Food Safety is Still a Critical Issue in China. *China Daily*.

The FDA has a special food safety office, The Center for Food Safety and Applied Nutrition, which issues regulations, recalls food products, and conducts inspections. The Federal Food, Drug and Cosmetic Act of 1938 established the legal framework within which FDA operates. The most recent food safety law was passed in January 2011, the Food Safety Modernization Act which is much more proactive and focuses on preventative control, not on reaction to food safety products. This law gives the FDA more power to recall food products, calls for more frequent inspections, and places more responsibility on farmers and food processors to prevent contamination. Additionally, the FDA sets national standards and works with state inspectors and bureaus in order to ensure the safety of food products in the United States.

The USDA also has its own food safety branch, the Food Safety and Inspection Service.¹⁷⁰ The FSIS is “responsible for ensuring that the nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged.”¹⁷¹ The FSIS educates consumers on food safety handling, even using a mobile application to teach consumers about proper preparation and handling of food. There are many laws regulating each specific industry, which the USDA regulates, clearly outlining regulations of food and the USDA’s power.¹⁷² Like the FDA, the USDA is prevention-oriented and performs frequent inspections in coordination with private and state inspection services to see if farms and processing companies are following regulations.

Although the United States’ regulatory system it is not perfect, it is much more streamlined than China’s system, with only two agencies involved in regulation and

¹⁷⁰ (2012, Feb. 14). *About FSIS*. Food Safety and Inspection Service. Retrieved from <http://www.fsis.usda.gov>.

¹⁷¹ *Ibid.*

¹⁷² *Ibid.*

safety control. China has adopted much of the technology used in the United States to monitor food safety, but it must take a step further and improve its regulatory and implementation systems as well. The USDA and FDA work hard to coordinate with local government branches and independent inspectors to inspect facilities and ensure food safety. If China were to look to the American model of food safety regulation for inspiration and guidance, it could avoid the current confusing regulations and create a cohesive system that has complete control over food safety, ensuring that the food on people's tables is safe to eat.

CONCLUSION

The fragmentation of the regulatory system in China is responsible for most food safety problems in China. If there were proper regulations, education, and a streamlined regulatory structure, then there would be many fewer food safety issues. China bases its agricultural goals on the structure of the United States, but it would do better to base its regulatory structure on the structure of the United States as well. Creating one agency that is responsible for food safety or giving the power to one or two existing agencies would make regulations more effective and would improve overall food safety in China. This is true across all industries and would optimize food safety. However, regulation alone is not enough if there is not proper implementation of food safety regulations and laws. Methods of implementation need to improve and regulatory agencies need to put a greater stress on preventing food safety issues instead of merely reacting to them. By streamlining the regulatory system and improving implementation of food safety, China will be able to avoid many food safety issues in the future.

CONCLUSION

Raising the standard of food safety in China is a complex and important issue. Without effective food safety regulation, China has experienced terrible tragedies that have resulted not only in illness, but also in death. The melamine scandal of 2008 was the

worst food safety issue that China has recently faced with six infant deaths and 300,000 ill infants. This event caused incredible backlash in China and people are still worried and complaining today about the quality of milk. More recent food safety scandals have not resulted in death, but illnesses have broken out throughout China as a result of food safety issues and the Chinese people do not trust that their food is safe. All of these issues make the improvement of food safety regulation very important for future Chinese health, society, and economy.

As described in the introduction, four main issues are proposed by scholars as possible causes of the current food safety issues in China; dispersed agricultural structure, broken commercial structure, fragmented regulatory system, and poor implementation. Of these four main issues, three issues strongly affect regulation: broken commercial structure, fragmented regulatory system, and poor implementation. These three issues are currently the largest obstacles facing food safety regulation in China because they impede the regulatory process. Commercial structure impedes the process because it leaves room for errors, the fragmented regulatory structure prevents effective regulation, and poor implementation allows errors to slip through the cracks unnoticed. In order to improve food safety and strengthen trust in the food industry China needs to streamline the commercial system, create a new regulatory agency or give regulatory power to only two or three ministries, and change how local officials implement policy.

Although restructuring agriculture in order to improve food safety is a highly popular idea among scholars in China, the highly dispersed structure that characterizes Chinese agriculture is not responsible for food safety issues in China. It does make

regulation of each individual farm difficult, but because all farms are commercially vertically integrated with larger processing companies, the small farms, when joined with the large farms, form a larger scale production structure. This is supported by reports of agriculture in both the dairy and pork industries. Most dairy farms in China are very small, but each farm is connected commercially to a larger processing company. Furthermore, dairy production is concentrated in northern China, not widely dispersed across the country like some scholars claim. Production of pork on the hand is widespread and also still based on smaller scale farms. However, like dairy, pork production is connected commercially to larger processing centers creating a larger scale production structure.

Although the dairy and pork industries have different geographic and agricultural structures, the commercial and economic structures are very similar and follow this commercially integrated structure. Both of these industries rely on the small farms that scholars criticize, but these farms rely on the large scale businesses. In the dairy industry, small farmers rely on milking stations built and owned by companies such as Mengniu and Yili. That milk is later sent to these companies for processing. In the pork industry feed, medicine and technology are provided by the company that will eventually buy, slaughter, and process the pig. This structure acts very similar to the proposed transformation of the agricultural system. Restructuring agricultural structure to follow the large scale American-style farm is unnecessary and would cause too much strife in the Chinese countryside. Also, because the farms are commercial integrated, it appears that the structure of farming is not at fault and commercial interests need to be more closely examined.

Given this information, vertical integration of commerce in the dairy and pork industries needs to be improved in order to improve food safety in China. Currently the production chain is very fragmented with too many steps and too much room for errors. In most industries the path from farm to processing center involves too many middlemen creating multiple areas for problems and mistakes. This is related to the widespread agricultural structure that characterizes China's agriculture. Because of this structure, large companies have to rely on small farms for their raw goods. This system creates a commercial structure with many stages creating more work for regulatory agencies and leaving a lot of room for mistakes and mishaps. Dairy's production chain is in the midst of reforming, but still has many holes where problems can arise. The pork industry on the other hand is fairly well established and is relying on larger, but still distanced farms, and could benefit greatly from technological advances. Both the melamine scandal of 2008 and the more recent clenbuterol scandal of 2011 occurred because of gaps in commercial regulation, testing and commercial structure; melamine would not have been added to the milk if the middleman collecting the milk had a stronger connection to the processing company.

Therefore, the commercial structure of pork, dairy and other agricultural products should be streamlined in order to form closer connections between every production stage. The structure will then be easier to regulate and food safety issues will more easily be avoided. Technological solutions have been offered both by the Chinese government and by companies such as IBM to help both the consumer and processor track where their meat and produce are coming from. The IBM project would help the Shandong Group track their pork products far down the production chain all the way to the farm where the

pig originated. This will not only increase consumer trust, but also make targeting the source of food safety issues much easier and therefore easier to deal with and fix. The goal is that increased accountability and control will lead to safer food products. It is in the interests of these processing companies to have the safest goods possible in order to increase profits and consumer confidence, but part of the burden of safety also lies on governmental regulatory agencies that are responsible for ensuring that these companies follow guidelines.

Problems in the regulatory system in China are extremely important because all other elements of food safety rely on proper regulation and implementation. The fragmentation of the system is responsible for most food safety problems in China. Currently there are 13 ministries in charge of food safety in China, that each control different portions of the food production and processing chain. This fragmentation allows for the same product to have different safety regulations at different stages; even entire items could be deemed safe by one ministry and not by another and therefore the safe/unsafe item would still be consumed. This system also leads to poor implementation of the regulations and laws because the system is very unclear. New laws have been passed that attempt to streamline regulations and improve implementation, but the problems still remain.

This fragmentation is hard to fix because of political gridlock in Chinese bureaucracy. None of the regulatory agencies want to give up control of their section of food safety because regulation of food safety means an increase in revenue and an increase in political power. If a new agency was created, many existing agencies would lose that power and revenue; therefore it is very hard to streamline regulation. The

multiple agencies combined with political gridlock also leads to poor communication between ministries and therefore more food safety issues can slip through the cracks unnoticed. The ideal solution to this problem would be to create a new agency or give regulatory power only to two or three existing agencies, but given the political gridlock, a more practical solution would be to slowly streamline regulation and attempt to increase communication between agencies.

The most feasible method of improving food safety regulation is to improve implementation of food safety regulations and laws. Currently implementation of food safety regulations is focused on punishments of violators. After the melamine scandal two men were put to death and one woman received life in prison, and punishments have continued to get harsher. There was an investigation on how melamine entered the system and melamine was outlawed as an additive, but methods of future implementation of these laws were not investigated. Many scholars claim that the punishments signal an improvement in implementation, but it really just marks a poor regulatory system because problems are not being caught before the products reach the shelves. Today, local food safety offices do not benefit from closing down factories if they violate food safety regulations so many food safety issues go ignored. Revenue only increases from issuance of licenses to produce; officials are not rewarded for proper implementation. Therefore officials do not properly regulate and most food safety regulations are ignored.

In order to improve regulation and implementation China needs to change how it evaluates regulatory officials to put a greater stress on preventing food safety scandals instead of reacting to them. Evaluation of Chinese officials needs to focus on proper implementation of laws and officials should be rewarded for good work, not just for

increasing revenue. Evaluations should also look to discourage bribery and corruption, although it is a problem throughout the Chinese government. The government also needs to encourage processing companies to increase self-inspections and enforce laws that require companies to test their own products. This will prevent food that is contaminated or toxic from leaving the processing center and it will never be consumed. Greater focus on prevention instead of on reaction will greatly improve food safety throughout all industries in China.

In order to improve food safety and prevent scandals that have plagued China in the past, China needs to work to streamline its commercial structure of agriculture, streamline its regulatory structure and improve implementation of food safety regulations and laws. Although scholars place importance on the structure of agriculture as well, for the dairy and pork industries the structure of agriculture cannot be adapted to benefit food safety. Agricultural reform would do more harm than good. In the commercial sector, companies need to work to better integrate production with processing in order to prevent gaps in the production chain. Creating a more cohesive system would allow for more control and accountability decreasing the risk of food safety issues. Regulatory agencies on the other hand need to improve and streamline regulatory structure and place greater emphasis on prevention of issues instead of reaction to food safety scandals. Finally implementation of regulations by local officials needs to be improved by changing methods of evaluating officials in order to encourage proper inspection and implementation.

Food safety is a critical and complex issue in China that needs to be closely examined. Most food safety issues occur because of governmental faults and mistakes

made by enterprises. For most industries improving food quality is imperative because lack of consumer confidence will result in decreased revenue. Therefore, although the government has many problems that need to be fixed in order to improve food safety, most food safety improvements will most likely be made by commercial interests. Governmental gridlock is too strong and complicated for significant regulatory changes and local corruption is too pervasive to improve. It is in the interest of commercial enterprises however to become self-regulating and engage in self-inspections because better quality food means more consumer confidence and then an increase in revenue. Therefore, although the largest flaws are governmental regulatory structure and implementation, the most practical method of improving food safety will need to be pursued by commercial enterprises.

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