ADVANCEMENT OF AGRO-FOOD SAFETY SYSTEM IN KOREA

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Keywords

Abstract

The dramatic expansion of Korean agro-food industry and the increase of agro-food imports make Korean food consumers concerned with agro-food safety. In addition, the recent outbreaks of food-borne diseases, including mad cow disease (BSE) and the High Pathogenic Avian Influenza (HPAI), have exacerbated the jitters about agro-food safety control policy. In order to manage agro-food safety, the Korean government has implemented various agro-food safety management systems. However, the Korean agro-food safety system still has many problems, which are barriers to a safer agro-food environment in Korea. This paper analyzes the current situation of the agro-food safety system in Korea and the issues related with the risk analysis system, and reviews agro-food safety programs and outstanding issues. Then, a new agro-food safety system and polices are proposed as the results of this study.

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I. Introduction

With big changes in the lifestyles of the Korean people, the Korean agro-food industry has shown a dramatic growth. The Korean agro-food industry, including agro-food processing and food service industries, has been expanding at a very high speed. In 2004, the gross output of the Korean agro-food processing industry was about 42 billion dollars, while the value-added of the Korean agro-food processing industry was around 17 billion dollars. This gross output and the value-added of the Korean agro-food processing industry were 5.4% and 5.9% of the whole manufacturing industry in Korea, respectively. The gross output of the Korean agro-food processing industry dramatically increased to an output 3 times as large as the gross output of the Korean agro-food processing industry in 1990. The food service industry is also a fast growing sector. The market size and the number of enterprises of the food service industry doubled from 1990 to 2004.[1]

The growth of the Korean agro-food industry makes Korean consumers have growing concerns over agro-food safety, as they put more emphasis on agro-food diversity, quality, and health effects. The increase in the international agro-food trade volume makes agro-food safety issues more complicated. A recent survey shows that Korean consumers tend to choose safer agro-foods than cheaper ones, indicating that they are more sensitive to agro-food safety.[2]

However, the recent outbreaks of food-borne diseases, including mad cow disease (BSE) and the High Pathogenic Avian Influenza (HPAI), have exacerbated the jitters about agro-food safety control policy. With the advent of such threats, the Korean government has launched the Korea Food and Drug Administration (KFDA) in 1998 in order to achieve maximum consumer protection with the Ministry of Agriculture and Forestry (MAF), and Ministry of Maritime Affairs and Fisheries (MMAF). However, redundant laws, inefficient organizations, lack of consumer participation, and clumsy inter-organizational communications have posed a barrier for the agro-food related organizations

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[1] Korea National Statistical Office.

[2] Choi, Ji-Hyeon and Min-Jeong Kim.

to seamlessly function.

In order to solve these problems, it is necessary to have a clear understanding of the basic agro-food safety system. This paper takes a look at the current situations of the agro-food safety system in Korea and the issues related with the risk analysis system, which can be broken down into risk assessment, risk management, and risk communication. And, agro-food safety programs and outstanding issues have been reviewed. In conclusion, a new agro-food safety system and polices will be proposed.

II. Changes in Agro-Food Safety Circumstances and Consumer's Awareness

1. Increase of Agro-Food Hazard Factors

Korean agro-food consumers have led and experienced dramatical changes in the agro-food industry in Korea. As shown in Table 1, the consumption of processed foods and food-away-from-home (FAFH) have increased as national income increased. Since the 1980s, processed foods increased at a 3.3 percent rate while FAFH increased at a 10.9 percent rate. The share of processed foods on total food expenditure increased from 20 percent in 1982 to 43 percent in 2005.

Food imports also have increased rapidly from 3,152 million dollars in 1998 to 6,504 million dollars in 2004. There were remarkable increases in processed foods, which account for 29.7% of imported foods. In addition, Chinese agro foods recently emerged as one of major imported foods in Korea. The share of imported agro-foods from China on total agro-food imports increased from 50.5% in 2000 to 55.4% in 2004.

The consumer's awareness about agro-food safety gets heightened as consumers are exposed to new agro-food hazard factors due to the increase of processed foods, food-away-home, and imported foods.

Table 2 presents the new agro-food hazard factors which might be classified into 4 categories: chemical factors, biological factors, physical factors, and other factors. Chemical factors include agrochemicals, heavy metals,

TABLE 1. Fresh, Processed Foods and FAFH for Households
(constant price 2000=100)

Unit: won, %

| | Food Expenditure | | | | | |
| | Total(A) | Food Expenditure at Home | | | | FAFH |
		Fresh Food(B)	B/A	Processed Food(C)	C/A	
1982	238,985	191,634	80	47,351	20	20,623
1985	257,462	199,879	78	57,583	22	25,198
1990	299,455	209,964	70	89,491	30	80,600
1995	311,376	209,583	67	101,794	33	132,434
2000	270,569	173,216	64	97,353	36	175,990
2005	234,372	134,376	57	99,996	43	220,751
1982~2005 (%)	-0.1	-1.5	-1.4	3.3	3.4	10.9

Source: National Statistical Office, Annual Report on the Family Income and Expenditure Survey, 2006.

TABLE 2. Agro-Food Hazard Factors by Sources

Hazard factors	Sources	Food commodities contaminated
Chemical factors	Agrochemicals, antibiotic substances, heavy metals	All foods
Biological factors	Salmonella, pathogenic coliform bacillus, bacillus, BSE, anthrax	Meat, milk, and its processed foods
Physical factors	alien substances	Meat
Other factors	modified organisms (irradiated food, GM foods)	All foods
	Environmental hormones (dioxin)	All foods

and antibiotic substances, etc. Biological factors include the bacteria causing food-borne diseases and zoonoses such as BSE. Physical factors include alien substances, and other factors include modified organisms (GM foods and irradiated foods) and environmental hormones (dioxin, etc.).

The recent outbreaks of BSE and HPAI have exacerbated the jitters about agro-food safety control policy. In particular, Canada, the U.S., and Japan, which are well known to have constructed advanced agro-food management systems in the world, have experienced BSE in 2002 and 2003, and thus the agro-food safety issues have become primary national concerns in developed countries as well as developing countries.

Accidents related to agro-food hazards tend to be more serious due to the increase in group meals. In 2003, food poisoning from group meals accounted for 78 percent of total food poisoning accidents, and 52 percent of food poisoning were caused by school meals.

2. Consumer's Awareness toward Agro-Food Safety

The consumer survey showed that Korean agro-food consumers usually consider agro-food hazards as very serious problems. As shown in Table 3, Korean consumers replied that biological factors are the most threatening factors (88.0% of replies). This can be explained by the fact that Korean consumers have directly or indirectly experienced food-borne diseases due to bacteria or viruses annually. Chemical factors and other factors are considered as the second and third most serious factors in Korea, respectively. One thing interesting is that more than 60% of the replied realize the danger of other factors, including GM foods and environmental hormones, but only 17.1% of the replied consider these factors as very serious problems. That might come from the fact that Korean consumers have often been informed about the potential danger of GM foods and environmental hormones but they haven't seen the clear proof of their real hazards. Korean consumers considered physical factors as relatively less serious. The least number of respondents, or 52.6%, said that they consider physical factors to be threatening among the hazard factors.

The consumer survey also showed which agro foods are considered to be potentially dangerous by Korean consumers. As presented in Table 4,

TABLE 3.   Agro-Food Hazard Factors Mostly Concerned by Consumers

Unit: %

Hazard factors	Not concerned	Little Concerned	Neutral	Concerned	Very Concerned	Total
Chemical factors	0.6	3.8	14.0	43.2	38.4	100
Biological factors	0.1	2.7	9.2	42.1	45.9	100
Physical factors	2.1	12.4	33.0	42.0	10.6	100
Other factors	0.8	3.3	18.8	60.1	17.1	100

Source: Lee, Kyei-Im and Sounghun Kim, 2007, Developing A Risk/Benefit Model for Food Safety Regulation, KFDA.

82.3% of the respondents considered processed foods and meat as the main sources causing food hazard. That implies that the Korean government should focus on the agro-food safety management of these foods.

One thing remarkable is that vegetables is picked slightly more than seafood by the respondents. This means that Korean consumers regard the agro-food hazard factor in vegetables to be more serious than the agro-food hazard factor in seafood because they have eaten vegetables more often.

TABLE 4.   Agro Foods Mostly Concerned by Consumers

Unit: %

Foods	Consumers
Processed Foods	61.8
Meat	20.5
Vegetables	7.7
Seafood	5.7
Grains	2.7
Fruits	1.7

Source: Lee, Kyei-Im and Sounghun Kim, 2007, Developing A Risk/Benefit Model for Food Safety Regulation, KFDA.

III. Current Status of Agro-food Safety System and Relevant Issues

1. Current Status of Agro-Food Safety System

The current agro-food safety system can be reviewed in the context of the process of risk analysis, which comprises risk assessment, risk management, and risk communication.

1.1. Risk Assessment

Risk assessment is a scientific process of evaluating hazards and the probability of exposure to such hazards, and of estimating their impact on public health.[3] In Korea, there are a couple of risk assessment organizations: The National Veterinary Research Quarantine Service (NVRQS) and the Korea Food and Drug Administration (KFDA). The NVRQS, which is affiliated with the Ministry of Agriculture and Forestry (MAF), is responsible for assessing the risks of livestock products. When it comes to agricultural products, the KFDA affiliated with the Ministry of Health and Welfare (MOHW) is responsible. Specifically, the NVRQS conducts animal disease control, animal disease researches, and toxicological tests for livestock products, while the KFDA sets the standards for pesticide residues and conducts toxicological researches. In addition, the Rural Development Administration (RDA) carries outs tests and researches necessary for setting the pesticide residue standards.

1.2. Risk Management

Risk management is conducted utilizing the information gathered at the assessment stage and weighing policy options. It is composed of such activities as inspection, surveillance, and regulation.

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[3] Generally, risk assessment is conducted through 4 steps: hazard identification, exposure assessment, dose-response assessment, and risk assessment.

There are several government organizations that manage agro-food safety. First, the MOHW controls domestic unprocessed agricultural products at the storage step, unprocessed fishery products after distribution for sale to consumers, all processed foods, and imported products except for all the livestock products. If it is deemed necessary to protect the public health, the MOHW may determine and publicly announce standards on food, food additives, apparatus, labelling, and related issues.

Second, the MAF controls the safety of domestic unprocessed agricultural products usually until the material is stored or sold, and all livestock products, such as meat and dairy products. If it is deemed necessary to protect public health, the MAF may also determine and publicly announce the standards on foods, food additives, apparatus, labelling, and related issues.

Third, the Ministry of Maritime Affairs and Fisheries (MMAF) controls the safety of unprocessed fishery products before distribution for retail sale. In the case of imported products, the MMAF is authorized to quarantine imported unprocessed fishery products.
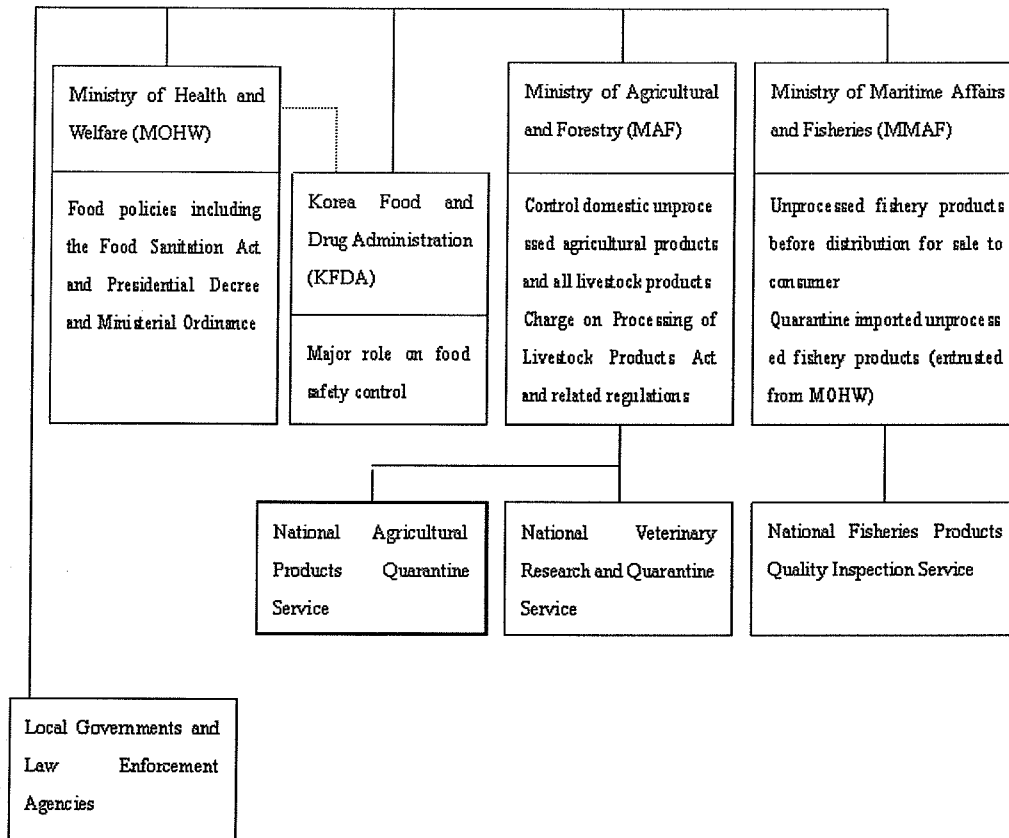
Fourth, the Ministry of Environment (MOE) takes care of drinking water. If it is deemed necessary to protect public health, the MOE may also determine and publicly announce the standards and related issues.

Lastly, the MAF conducts inspections on pesticide residues and guides farmers to properly utilize pesticides. The Rural Development Administration (RDA) conducts tests on the safety of pesticides and registers new pesticides. The MOHW and local governments are authorized to conduct inspections and impose administrative sanctions on proprietors.

There are 22 acts related to agro-food safety. The major food laws include the Food Sanitation Act (FSA), the Livestock Product Processing Act (LPPA), the Agricultural Products Quality Control Act (APQCA), the Fisheries Products Quality Act (FPQA), and the Drinking Waters Act. Processed foods are mostly controlled by the Food Sanitation Act and the Livestock Product Processing Act (LPPA).

FIGURE 1. Schematic Diagram for Agricultural Products and
Food Safety System in Korea

Ministry of Health and Welfare (MOHW)		Ministry of Agricultural and Forestry (MAF)	Ministry of Maritime Affairs and Fisheries (MMAF)
Food policies including the Food Sanitation Act and Presidential Decree and Ministerial Ordinance	Korea Food and Drug Administration (KFDA) Major role on food safety control	Control domestic unprocessed agricultural products and all livestock products Charge on Processing of Livestock Products Act and related regulations	Unprocessed fishery products before distribution for sale to consumer Quarantine imported unprocess ed fishery products (entrusted from MOHW)
	National Agricultural Products Quarantine Service	National Veterinary Research and Quarantine Service	National Fisheries Products Quality Inspection Service

Local Governments and Law Enforcement Agencies

1.3. Risk Communication

Risk communication refers to not only communicating the results of a risk analysis to the general public but also the ongoing communication among risk assessors, managers, scientists, regulators, and various stakeholders across the entire process. Figure 2 presents the shape of risk communication. Basically, proper risk communication leads to a more efficient agro-food safety management system, which offers safer agro foods to consumers.

Above all, risk assessors and managers must communicate each other in order to ensure that all affected parties will be fully included in the process and be informed of the knowledge generated by risk analyses.

FIGURE 2. Agro-Food Safety Management System
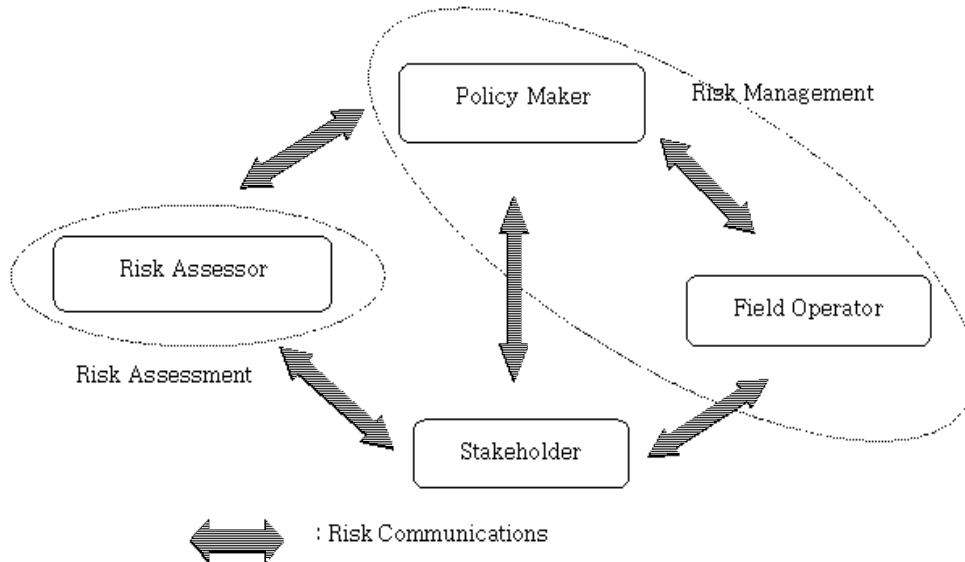
2. Agro-Food Safety Programs

2.1. HACCP (Hazard Analysis and Critical Control Points)

The Hazard Analysis and Critical Control Points (HACCP) is a production control system for the agro-food industry. It is a process used to determine the potential danger points during food production and to create a strict management and monitoring system which ensures safe agro-food products for consumers.[4] The HACCP is designed to prevent potential microbiological, chemical, and physical hazards in advance rather than to deal with them after they have actually occurred. The HACCP program is an effective approach to secure agro-food safety and to protect public health.

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[4] HACCP was developed by the U.S. National Aeronautics and Space Administration (NASA) in the 1960s.

The HACCP was first introduced to Korea in 1995 and implemented in 1997 under the Livestock Product Processing Act. Recently, HACCP is certified and managed by KFDA, MAF, and MMAF. In 2006, the number of enterprises with HACCP certification was around 600, and they are usually managed by MAF and KFDA. In particular, KFDA has a specific road map to ensure Korean food enterprises. The road map is managed by KFDA and will be under the control of HACCP until the end of 2012.

TABLE 5. Agro-Food Enterprises with HACCP in Korea

Unit: enterprises

Categories		# of enterprises	Total
KFDA	Agro-food processing	137	218
	Catering	52	
	Others	29	
MAF	Dairy processing	34	350
	Meat packing	203	
	Meat processing	70	
	Egg processing	2	
	Meat marketing	2	
	Feed	39	
MMAF	Marine products	47	47
Total			615

Source: KFDA, MAF, and MMAF

2.2. GAP(Good Agriculture Practices)

The Good Agricultural Practices (GAP) are a collection of principles applicable to on-farm production and post-production processes, with an aim to produce safe and healthy foods, while taking into account economical, social, and environmental sustainability. Though the term is not new, it has begun to draw the attention at the end of the 1990s.

The GAP is applicable to a wide range of farming systems at different

scales. Sustainable agricultural methods are used for such applications as integrated pest management, integrated fertilizer management, and conservation agriculture.

The concept of GAP has changed in recent years because of the rapidly changing landscape in agriculture, more vibrant world trade, food crisis (BSE, etc.), nitrate pollution of water, pesticide resistance, and soil erosion. Facing the challenges, the MAF and the RDA have developed projects to apply the GAP to Korea since 2003. The MAF enacted a law related to GAP in 2005, and expanded the infra such as the GAP manuals developing, education and training, and advertising. In 2006, 127 facilities producing agricultural products were certified and the number of facilities with GAP certification will be increased.

2.3. Traceability

Article 18 of the Regulation EC/178/2002 has defined traceability as the ability to trace foods, feed, and food-producing animals or substances which are intended to or expected to be incorporated into foods or feed across all stages of production, processing, and distribution. It also means the ability to trace one step back and one step forward in the food chains.

The identification of the origins of feed and food ingredients and food sources plays a key role in protecting consumers, particularly when products are found to be faulty. Traceability facilitates the immediate withdrawal of foods from the food chains when problems occur, and enables consumers to have targeted and accurate information regarding the concerned products. The European Union (EU) has showcased a proposal to implement the mandated traceability for genetically engineered crops and foods to help distinguish them from their conventional counterparts. The traceability system is a record keeping system. In practice, the traceability system is used primarily to keep the foods with different attributes separated from one another.

On the part of Korea, the MAF conducted a pilot project for traceability on cows and beef products since 2003 to start a traceability system on cows and other livestock. The MAF will develop a traceability scheme coincided with the GAP.

2.4. ISO22000

ISO22000, which is certified by private institutes, might be understood as a kind of combination of HACCP and ISO9001. Basically, ISO22000 is based on a management system controlling the quality of products, but it focuses on handling agro-food safety.

ISO22000 has a few strengths as the following: controlling agro-food safety "from farm to table," offering unified standards over the world without Technical Barriers to Trade (TBT), and handling agro-food safety in terms of flexible and efficient management system.

In 2006, around 15 Korean agro-food enterprises were certified, and the number of enterprises with the ISO22000 certification will be increased. However, ISO22000 shows a few problems. First of all, the fairness of certificating process. Since ISO22000 is certified by a few private institutes, including the Korea Accreditation Board (KAB), winning public trust on certification might be one of the main challenges facing certificating institutes. Next, ISO22000 is partly overlapped with other agro-food safety certification (GAP, HACCP, etc.), forcing food producers or processors with similar certifications to spend another budget for ISO22000 certification.

3. Issues on Agro-Food Safety System

3.1. Disintegrated Agro-Food Safety System

The current agro-food safety system is separately implemented by different authorities and laws for different food items in different marketing stages. As shown in Table 6, for example, fresh agricultural products are administrated by the MAF at the production level through APQCA. However, the products are controlled by MOHW and KFDA in marketing channels through the FSA.

This complicated agro-food safety management system has put a road block to timely amending and properly implementing the related laws. In order to solve this problem and to increase the efficiency of the agro-food safety management system, a unified and/or systematic government system for managing agro-food safety is required.

TABLE 6. Agro-Food Safety Management Authorities and Laws by Food Products

			Level of Management		
			Production	Import	Market
Agro products	Domestic Products	Fresh	MAF/NAPQ (AMA) (APQCA)	-	KFDA (FSA)
		Processed	KFDA (FSA)	-	KFDA (FSA)
	Import	Fresh	-	KFDA (FSA)	KFDA (FSA)
		Processed	-	KFDA (FSA)	KFDA (FSA)
Livestock products	Domestic Products	Fresh	MAF/NVRQ (LPPA) (FMA)	-	MAF/NVRQ (LPPA)
		Processed	MAF/NVRQ (LPPA)	-	MAF/NVRQ (LPPA)
	Import	Fresh	-	MAF/NVRQ (LPPA)	MAF/NVRQ (LPPA)
		Processed	-	MAF/NVRQ (LPPA)	MAF/NVRQ (LPPA)
Fisheries Products	Domestic Products	Fresh	MMAF/NFPQIS (FPQA)	-	KFDA (FSA)
		Processed	MAF/NVRQ (LPPA)	-	KFDA (FSA)
	Import	Fresh	-	KFDA (FSA)	KFDA (FSA)
		Processed	-	KFDA (FSA)	KFDA (FSA)

3.2. Vulnerability of Risk Assessment and Absence of Integrated Agro-Food Safety Information Network

Despite the rising outbreaks of new diseases, such as BSE and HPAI, and the finding of new toxic materials including environmental hormones, no consistent risk assessment is under way to study the new threats under a long-term vision. Even though KFDA, which is a major agro-food safety authority, invested a huge budget, KFDA failed to secure manpower and facilities enough to conduct a risk management.

Another problem is that there is no integrated agro-food safety information network. MAF, MOHW, and MMAF collect agro-food safety information and manage the information, without any explicit effort for sharing information about agro-food safety.

Insufficient risk assessment and the absence of integrated agro-food safety information network result in the barriers to making proper and efficient responses. Korea's central and local governments need to invest more budget and human-resources to solve these problems.

3.3. Insufficient Implementation of Farm-to-Table Approach

In order to secure agro-food safety throughout the agro-food chains, it is necessary to implement farm-to-table programs such as GAP, Traceability, or ISO22000. The Korean governments already started pilot projects for GAP and Traceability programs.

However, it will take times to establish the system because of the incomplete infra system and the low transparency of business activities. The Korean governments, in particular, should work harder to upgrade the infra system: the related manuals and standards, education and training system, and keeping farming records, etc.

3.4. Weakness of Agro-Food Safety Management for Imported Foods

Despite the increased demand for imported foods, the management system of agro-food safety authorities is not well established. First of all, previous information on hazard materials among imported agro-foods is not collected

enough to cope with the current agro-food safety issues. Second, adequate inspection standards for the hazard materials such as heavy metals are not well established yet. Third, the strategy to handle conflicts between Korea and an exporting country is not well developed.

The issues about agro-food safety management for imported foods required quick actions from the Korean government. One good example is the agro-food safety problem of imported beef during the FTA negotiations between Korea and the U.S.

3.5. *Lack of Producers' Agro-Food Safety Awareness*

Korean farmers still lack agro-food safety awareness. A farm survey reported that 21 % of farmers among respondents did not keep the agrochemicals application guideline. For livestock raising farms, a significant number of farms violated the livestock drug usage guideline.[5] Agro-food processors also show a low level of agro-food safety awareness, which is a more serious problem among small-scale agro-food processing and food service enterprises.

The Korean government should solve this problem with various ways to motivate agro-food producers and processors to do their best for safer food. One example can be steady and specific education programs for agro-food producers and processors.

IV. Development Strategy for Agro-Food Safety System

The current issues of the agro-food safety system of Korea can be summarized as follows: Inefficient agro-food safety management due to the disintegrated agro-food safety system, insufficient risk assessment and the absence of an integrated agro-food safety information network, insufficient implementation of the farm-to-table approach, weakness of agro-food safety management for imported foods, and the lack of agro-food producers/processors' agro-food safety awareness. To keep up with the changes in the global agro-food safety systems, the followings shall be pushed ahead by the Korean governments.

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[5] Choi, Ji-Hyeon and Min-Jeong Kim.

1. Establishing Farm-to-Table Policies

The roles of all market participants in a food chain have the primary responsibility for agro-food safety. Competent authorities should monitor and enforce this responsibility through the operation of a national surveillance and control system. The farm-to-table policies covering all sectors of a food chain should be implemented systematically and in a consistent manner. In that sense, traceability could be a basic but a strong alternative to establish farm-to-table policies because traceability will be established at all stages of production, processing, and distribution.

In order to facilitate the traceability, the government in Korea should develop guidelines, train farmers, and advertise what the traceability is before launching the system.

Another alternative might be ISO22000. Since ISO22000 covers all steps from farm to table, utilizing ISO22000 can make the management of agro-food safety over steps easy. In that case, however, the Korean government should prepare answers to solve the problems discussed in the previous chapter: winning public trust on certification and overlapped expenditure for certification.

TABLE 7. Farm-to-Table Policies by Management Stage

Production	Post harvest	Processing	Distribution	Consumption
GAP				
		HACCP, GMP		
			GHP	
				RECALL
TRACEABILITY				

2. Constructing Integrated and Precautionary Agro-Food Safety System

In the long run, agro-food safety policy must be based on integrated approach.

This means that the agro-food chain across all agro-food sectors should be monitored and controlled by a single agency in a consistent manner. This integrated agro-food safety system can be one of the best solutions to solve the current problems arising from the complicated and inefficient agro-food safety systems that are controlled by separate and independent government departments such as MAF, MOHW, and MMAF.

Even though there is a great effort to establish an integrated agro-food safety system in Korea, it will take a long time to complete the task. As the second best alternative, agro-food safety may be centered around agro-food commodities. It might improve the efficiency of the agro-food safety system.

The Korean food safety system should also be implemented as precautionary measures at the production and processing stages rather than as inspection at the distribution stage. In this case, GAP and HACCP are very effective programs to prevent hazard substances from entering into the market. For the imported foods, it is recommended to inspect agro foods before being exported at the port.

3. Strengthening the Function of Risk Assessment and Agro-Food Safety Information Network

As an initial and basic step for the agro-food safety management system, risk assessment is an essential work. However, the previous discussion in this paper pointed at the vulnerability of risk assessment. The strengthening of risk assessment would be reviewed as follows: establishment of an independent risk assessment organization, expansion of R&D investment for risk assessment, and separation of risk assessment from risk management. It is also needed to expand the standards for hazard substances on foods to cope with the new hazard environment.

In order to utilize the results of a risk assessment, the establishment of integrated agro-food safety information is required. Thus, the Korean government needs to figure out the way to establish an agro-food safety information system with the strengthened function of risk assessment.

4. Consumer-Oriented Agro-Food Safety

Many experts claim that the axis of agro-food policy has moved from the production stage to the consumption stage, since the supply of food exceeds the demand for food. Agro-food safety policy also should take into account this recent trend.

Food safety policy can improve credibility through the participation of consumers. It is necessary for consumer associations to monitor and keep under surveillance the agro-food safety system. It is also desirable to train consumers so that they can properly prepare and cook agro foods, and advertise agro-food safety policies to consumers. The government should be willing to provide scientific opinions and inspection reports to consumers.

The Korean government should also make food producers and processors realize that consumers have begun to possess powers to force them to supply safer foods. No safe food means no buying. This will be the clear trend in Korea. To promote this trend, the Korean government is required to find consistent and efficient ways to offer comprehensive information about food producers and processors supplying unsafe foods since today's Korean consumers get only pieces of information through TV, newspapers, and other mass media.

V. Conclusion

Since the public awareness of agro-food safety issues has been raised recently through BSE and HPAI, agro-food safety is regarded as the most significant consumer issue. In many countries, consumer-related departments are handling agro-food safety matters.

In Korea, the rapid economic growth since the 1980s has dramatically enhanced the living standards and eliminated most agro-food security problems. Now, Koreans are increasingly wary about the safety and the health value of foods.

By the nature of this issue, the Korean government is required to develop a strategy for the agro-food safety system. First of all, agro foods shall

be controlled across the entire stages ranging from production to consumption in a consistent manner. That is why the majority of European countries are building a comprehensive agro-food safety system.

Second, the Korean government should construct an integrated and precautionary agro-food safety system. The agro-food chain across all agro-food sectors, which are monitored and controlled by a single agency, will make agro-food safety management more efficient and effective. A precautionary agro-food safety system is also required to avoid "the doctor after death."

Third, the function of risk assessment and agro-food safety information network should be reinforced. In Korea, the level of risk assessment is low and the agro-food safety information network is not completed yet. The Korean government should figure out how to strengthen them in an efficient manner.

Finally, Korean agro-food safety policies should be consumer-oriented. Now, the consumers have the powers to force food producers and processors to supply safe foods, and this change is inevitable. In order to utilize this trend, the Korean government needs to prepare ways to promote and lead this trend for a safer agro-food environment.

In order to cope with the changing circumstances, the Korean government should establish a new agro-food safety paradigm. In Korea, the situation may be more difficult because the history of agro-food control is quite short compared with many other developed countries where the agro-food control scheme has been developed over a century. For that reason, it will be beneficial for Korea to benchmark developed countries, which have already encountered and overcome the same issues successfully, in modeling its own agro-food safety system.

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