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2014 Modularization of Korea's Development Experience:

Good Agricultural Practices (GAP) for Agricultural Food Safety Management

2014

Ministry of Agriculture, Food and Rural Affairs

SOOKMYUNG WOMEN'S UNIVERSITY

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Good Agricultural Practices (GAP) for Agricultural Food Safety Management

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Preface

The study of Korea's economic and social transformation offers a unique window of opportunity to better understand the factors that drive development. Within about one generation, Korea transformed itself from an aid-recipient basket-case to a donor country with fast-paced, sustained economic growth. What makes Korea's experience even more remarkable is that the fruits of Korea's rapid growth were relatively widely shared.

In 2004, the Korean Ministry of Strategy and Finance (MOSF) and the Korea Development Institute (KDI) launched the Knowledge Sharing Program (KSP) to assist partner countries in the developing world by sharing Korea's development experience. To provide a rigorous foundation for the knowledge exchange engagements, the KDI School has accumulated case studies through the KSP Modularization Program since 2010. During the first four years, the Modularization Program has amassed 119 case studies, carefully documenting noteworthy innovations in policy and implementation in a wide range of areas including economic policy, admistration·ICT, agricultural policy, health and medicine, industrial development, human resources, land development, and environment.Individually, the case studies convey practical knowhow and insights in an easily accessible format; collectively, they illustrate how Korea was able to kick-start and sustain economic growth for shared prosperity.

Building on the success during the past four years, we are pleased to present an additional installment of 19 new case studies completed through the 2014 Modularization Program. As an economy develops, new challenges arise. Technological innovations create a wealth of new opportunities and risks. Environmental degradation and climate change pose serious threats to the global economy, especially to the citizens of the countries most vulnerable to the impacts of climate change. The new case studies continue the tradition in the Modularization Program by illustrating how different agents in the Korean society including the government, the corporations, and the civil society organizations, worked together to find creative solutions to challenges to shared prosperity. The efforts delineated include overcoming barriers between government agencies; taking advantage of new opportunities opened up through ICT; government investment in infrastructure; creative collaboration between the government and civil society; and painstaking efforts to optimize

management of public programs and their operation. A notable innovation this year is the development of two "teaching cases", optimized for interactive classroom use: Localizing E-Government in Korea and Korea's Volume-based Waste Fee System.

I would like to express my gratitude to all those involved in the project this year. First and foremost, I would like to thank the Ministry of Strategy and Finance for the continued support for the Modularization Program. Heartfelt appreciation is due to the contributing researchers and their institutions for their dedication in research, to the former public officials and senior practitioners for their keen insight and wisdom they so graciously shared as advisors and reviewers, and also to the KSP Executive Committee for their expert oversight over the program. Last but not least, I am thankful to each and every member of the Development Research Team for the sincere efforts to bring the research to successful fruition, and to Professor Taejong Kim for his stewardship.

As always, the views and opinions expressed by the authors in the body of work presented here do not necessarily represent those of the KDI School of Public Policy and Management.

December 2014

Joon-Kyung Kim

President

KDI School of Public Policy and Management

Contents | LIST OF CHAPTERS

Chapter 3

Contents | LIST OF CHAPTERS

Chapter 6

Contents | LIST OF TABLES

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Chapter 5

Contents | LIST OF FIGURES

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Summary

This report sets out to share with developing countries the lessons and implications of Korea's experience with the Good Agricultural Practices (GAP) system since its introduction in 2003. This paper is an analysis of and researches the introduction, processes, and current status of the system .

The objective of the GAP system is to properly manage hazardous elements such as pesticides, heavy metals, persistent organic pollutants or hazardous organisms which have been found to linger in the agricultural environment and foods. In particular, agricultural farmland where crops grow and agricultural water at each step of production–from harvest (including storage, cleaning, drying, sorting, cutting, preparation, packaging of agricultural food etc) to distribution–are susceptible. GAP covers the life cycle of food production and ensures the safety of agricultural foods, as well as preserves the agricultural environment and ecological systems so that consumers can enjoy safe and sanitary agricultural foods. In other words, the producer and controller oversee the proper management of all hazardous elements in the production and handling procedures from farm to table. When safety issues arise, GAP quickly identifies the cause by tracing back the process.

Currently, the number of GAP certification authorities, certified farmers and authentication processes has shown an increasing trend. Through the introduction of the GAP system, consumers are able to purchase safe agricultural foods as safety checks and mechanisms are increasingly enforced. The Agriculture and Fisheries Trade Corp, Korean Medicine Herbal Association, and Korea Ginseng Corp. have joined together and implemented a case study project targeting 9 farmhouses in 2003 as part of the official application process for the GAP System by the Agricultural Cooperative. In 2006, Korea passed the revised Agricultural

Products Quality Control Act and sub provisions to set the foundation for compliance with GAP management criteria. Criteria include a subject item list and detailed implementation guidelines. In 2006~2007, the GAP certification and historical data management information system were set up. In September 2008, Korea expanded the subject lists of GAP certification/ history back tracking items to 105 items. In December 2009, the name "Good Agri-food Certification" was changed to the Good Agri-food Quality Management Certification. In December 2009, the subject items for GAP certification and archived information were increased from 105 items to all items grown for food in Korea. Since the official application project started, the strategies implemented to establish the GAP system can be grouped into four categories such as cultivating the organization, production expansion, distribution promotion, and sales expansion. The representative 8 kinds of activation plans include the cultivation of GAP applied producers, preparation of "Good Agri-food Management Criteria" by product group, the expansion of GAP facilities, the preparation of marking standards for GAP certified Agri-food processed food items and repacking, the growth of sales and demand for GAP certified Agri-foods, the reinforcement of GAP system education and promotion of the program. In addition, the GAP System has enjoyed support in the form of financial supportive measures for facility support and safety assessment costs. Various government agencies have a role in the GAP System. The Ministry of Agriculture, Food and Rural Affairs controls the rules and GAP system operation, while the Rural Development Administration is in charge of the system criteria setup and producer training. The National Agricultural Products Quality Management Services oversees the appointment of private certification institutions and their management. When the GAP system was first introduced to Korea, systematic measurements such as the preparation of GAP related acts, the development of GAP cultivation and management guidelines, the preparation of an educational system, and the establishment of sanitation infrastructure were implemented. However, problems such as the lack of understanding of GAP related systems–particular on the side of farmers–and the cost push in accordance with the assessment, as well as the lack of awareness of GAP related Agri-food on the consumer's side prevailed. In this regard, the Korean government integrated sophisticated certification procedures and enforced control of the risk factor, putting forth recommendations to make the GAP certification criteria more substantial. In addition, the government sought to expand the GAP certification of Agri-food by improving education of the GAP system, consulting on and reinforcing outside management, developing GAP distribution organizations, and marketing.

GAP is the safety management system for Agri-food for which the behavior code forms the golden rule. The operation of the system is basically subject to the voluntary and active

participation of the farmers as behavior subjects. In Korea, sanitary foods are mostly limited to imply finished goods that were processed and cooked. Thus, Agri-food was differentiated from other foods, and the level of understanding of hygiene among farmers was low from the aspect of the cultivation of Agri-food and production management. In the course of the pilot project during the early stages of introduction, the concerned authorities had tried to improve such awareness and, until now, were looking for convenient and reasonable ways to participate given the aged populations in rural communities.

Currently, the GAP system in Korea has been in operation under the auspices of three authorities–the Ministry of Agriculture, Food and Rural Affairs and the Rural Development Administration, and National Agricultural Products Quality Management Service. However, the energy behind the initiative was low, leading to the government's decision to disband the triumvirate overseeing organization and form the national GAP consultative body in 2014. This administrative unit expedited the revision of the GAP management system. In order to apply the GAP system to agricultural sites and achieve the goals of developing countries, it is important to first evaluate and inspect the size of the agricultural market and base within the concerned country. An important indicator for the development and application of the GAP system is the level of the agricultural market, potential of mass production, and level of production technology for high quality processes.

If possible, differentiating between farmers who seek to export goods overseas and individual farmers try to increase their income through the differentiation of products, would be an efficient first step toward introducing the GAP system. As the GAP system is directly related to the consumer market for Agri-food, the government must be actively involved in enhancing the awareness of the safety of foods among consumers. This lack of participation was initially an obstacle for Korea during the pilot project. The government should also continuously promote and advertise the GAP system, emphasizing the differentiation in safety that the system promises for Agri-food. When developing countries adopt the GAP system in the future, they will enhance their potential for success by taking into consideration their own unique agricultural market factors and by referring to the Korean case analyzed in this study.

Chapter 1

Evaluation of the Target and Performance of the GAP System for Agri-food Safety Management in Korea

Evaluation of the Target and Performance of the GAP System for Agri-food Safety Management in Korea

1. Evaluation of Performance against the Objectives at the Time

1.1. GAP was Introduced and Established

"Good Agricultural Practices (GAP)" represents the proper management of hazardous elements such as pesticides, heavy metals, persistent organic pollutants or hazardous organisms that can linger in the agricultural environment and agricultural foods–in particular agricultural farmland where crops grow and agricultural water throughout each step of production such as harvest (including storage, cleaning, drying, sorting, cutting, preparation, packaging of agricultural food) and distribution. (「agricultural product quality control act」 Article 2, section 4). The introduction of GAP was intended to provide consumers with safe agri-food by establishing an agri-food safety management system that covers all processes from production to sales. In other words, the producer and controller conduct proper management of all hazardous elements in the production and handling procedures from farm to table. GAP is to ensure the safety of agri-food and enhance the reliability of domestic consumers, as well as to strengthen the competitiveness of Korea's agri-food in the international market and protect the agricultural environment. Since GAP was introduced, certified products have increased from 105 items in 2009 to all products in 2010. GAP certified agri-foods continue to increase every year. In 2013, about 45,000 farmers received GAP certifications, and the overall cultivating areas are shown to have increased in general by as much as 58,000 ha compared to that of the previous year. Among the GAP certified crops, only 59 items (food 6, special purpose 2, medicinal purpose 14,

mushrooms 5, vegetables 23, fruit trees 9) received certifications, and 10 items such as rice, apple, pear, mushroom, paprika, tomato, and strawberry accounted for the majority of the products. Currently, GAP covers only 3% of the total transaction volume. But the government plans to expand the portion of GAP agri-food to 10% by 2015 (Jemin, 2011).

Table 1-1 | GAP Certifications by Year (2006~2013)

Year	Certified Products (items)	Certification Authorities (unit)	Management Facility (unit)	Certification Cases (case)	Number of Farmers (households)	Cultivated Area (ha)
2013	127	48	756	2,499	46,000	58,703
2012	110	51	718	1,969	40,215	55,215
2011	89	49	606	1,756	37,146	49,548
2010	86	45	565	1,459	34,421	46,701
2009	59	43	484	1,233	28,562	40,081
2008	59	38	417	1,053	25,158	37,129
2007	50	31	316	364	16,769	24,754
2006	45	21	190	220	3,659	1,373

Source: National Agricultural Products Quality Management Service, 2014.

At present, GAP is evaluated as a reasonable system for supplying final agri-food products that are ensured for safety by controlling various hazardous elements that may exist in the farming environment, cultivation process, during harvesting and the treatment processes that follow, as well as during the storage process. The government institutes criteria for regulating these elements. When compared to the early stages of the system's introduction, the number of certified farmers increased from 3,659 in 2006 to 46,000 in 2013, and certification cases increased by more than 10 times from 220 cases in 2006 to 2,499 cases in 2013. The Ministry of Agriculture, Food and Rural Affairs set out to set a consistent supply base for safe agri-food and expand the number of GAP certified farmers. Therefore, the gap between actual performance and the target is minimal. The obstacles to the establishment and growth of the GAP system are diminishing when taking into consideration the growing number of certified farmers, positive feedback from surveying consumer awareness and satisfaction, and global awareness of the importance of safe food. The results of a survey on the awareness of the certification system for agri-food in 2013 revealed that awareness of all 8 government agri-food certification systems increased compared to 2012. And among the government agri-food certification systems, with the exception of the processed food

certification systems, 42.8% were aware of the GAP system, increasing by 7.5% compared to that of the previous year (Ministry of Agriculture, Food and Rural Affairs, 2014).

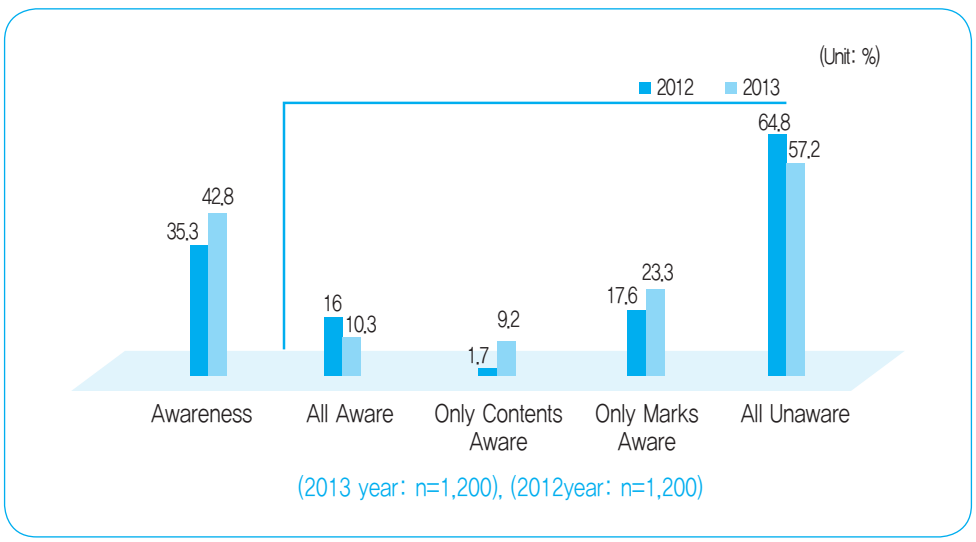
Table 1-2 | Awareness of Government Certification Systems for Agri-food (2012~2013)

(Unit: %)

Classification	Number of Cases	Total	Organic Processed Food	Eco-friendly Agri-food	Authentic Food Quality	Food Experts	Geographical Marking	GAP	HACCP	Processed Food KS
2013 (A)	1,200	56.3	77.5	89.5	26.8	21.3	35.4	42.8	69.9	86.8
2012 (B)	1,200	50.3	73.3	85.3	26.0	17.5	32.3	35.3	59.8	75.5
A - B		+6.0	+4.2	+4.2	+0.8	+3.8	+3.1	+7.5	+10.1	+11.3

Source: Korea Agency of Education, Promotion and Information Services in Ministry of Agriculture, Food and Rural Affairs, 2013.

Figure 1-1 | GAP Awareness



Source: Korea Agency of Education, Promotion and Information Services in Ministry of Agriculture, Food and Rural Affairs, 2013.

As seen in <Table 1-3>, out of the respondents who knew about the food certification system, their purchase rate of the relevant agri-food was shown as 78.5%. In the case of GAP, the purchase rate was 64.2%. This figure may not seem as high as the others, but the

delta from 2012 marked a sharp increase from 21.6% to 42.6% in 2013. From this it can be concluded that although the present state of awareness is not high, the rate of increase in consumer awareness of the system is high (Korea Agency of Education, Promotion and Information Services in Ministry of Agriculture, Food and Rural Affairs, 2013).

Table 1-3 | Purchase Rate of Government System Certified Agri-food (2012~2013)

(Unit: %)

Classification		Total	Organic Process Food	Eco-friendly Agri-food			Authentic Food Quality	Food Experts	Geographic Marking	GAP	HACCP	Processed Food KS
				Antibiotic Free	Pesticide Free	Organic						
2013 (A)	Cases	7,548	930	1,074	1,074	1,074	321	256	425	514	839	1,041
	Purchase Rate	78.5	74.2	74.1	83.7	84.6	57.0	46.1	60.2	64.2	91.2	93.9
2012 (B)	Case	-	880	1,024			312	210	388	423	718	906
	Purchase Rate	40.4	60.0	80.5			13.7	8.0	20.0	21.6	51.2	67.6
A-B		+38.1	+14.2	+6.4	+3.2	+4.1	+43.3	+38.1	+40.2	+42.6	+39.1	+26.3

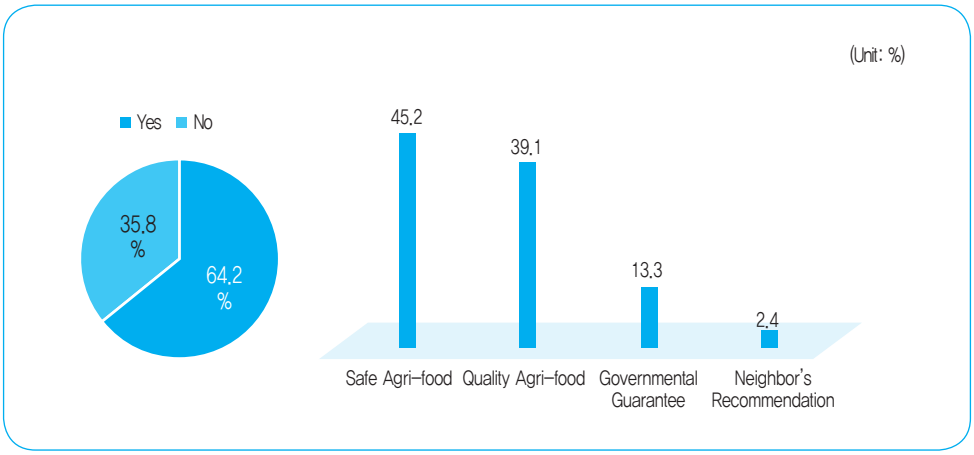
* The total purchase rate for 2012 was not analyzed and substituted with arithmetic means for each nation's certification system.

*A-B: Purchasing rate for 2013 - Purchasing rate for 2012.
(Changes in purchasing rate in 2013 compared to 2012).

Source: Korea Agency of Education, Promotion and Information Services in Ministry of Agriculture, Food and Rural Affairs, 2013.

In addition, referring to the GAP agri-food purchase rate itself in [Figure 1-2], positive responses to having purchased GAP agri-food marked 64.2%, of which the motivation for the purchase included "it was thought to be safe food (45.2%)", "the quality of agri-food is good (39.1%)", "I can trust the food because of the government's guarantee" (13.3%), and "it was recommended to me by neighbors (2.4%)" (Korea Agency of Education, Promotion and Information Services in Food, Agriculture and Fisheries, 2013).

Figure 1-2 | Purchase Rate and Motivation of GAP Agri-food



Source: Korea Agency of Education, Promotion and Information Services in Ministry of Agriculture, Food and Rural Affairs, 2013.

In the course of evaluating the GAP system, the number of GAP certified farmers, and certification cases have increased. In addition, there have been positive changes recorded in terms consumer awareness of the system and the purchase rate for GAP certified agri-food, leading to the conclusion that the GAP system is an excellent program. The GAP system will continue to become more established and grow largely due to the government's efforts and a detailed expansion plan (Korea Agency of Education, Promotion and Information Services in Food, Agriculture and Fisheries, 2013).

2. Contributions of GAP to the Domestic Economy and Social Development

2.1. Quantitative Performance

GAP certifications have gradually increased from 21 in 2006 to 51 in 2012, and GAP facilities have increased from 190 units in 2006 to 728 units in 2012. The number of registered traceabilities for agri-food marked 3,659 units in 2006, increasing to 40,215 units in 2012, establishing a strong GAP certification base. In addition, by mandating the registration of the traceability to the certification criteria, the safe agri-food management system covering production, distribution and sales was prepared to handle the expanded range of agri-food management from the production stage to the packing and sales stages.

By organizing the GAP system so as to set a foundation for activating more certifications, certification target items were extended to all items cultivated for food in the country. Training programs for the certification inspectors were expanded, and the certification business itself grew as well. The numbers of certification authorized appointments, certified farmers and certification cases are expected to increase with the growing potential of the GAP system and its growing contributions to the foundation and expansion of the current agri-food safety management system.

The Korean Rural Economics Institute surveyed the status of GAP agri-food certification awareness and recognition among farmers, which revealed that among those surveyed, 20.9% were GAP certified. A substantial number of farmers were optimistic about future GAP agri-food sales, and 63.5% of farmers expected the sales volume of GAP agri-food to increase. Only 9.4% forecasted a decrease (Ji Hyun Choi and others, 2012).

Table 1-4 | Future Sales of GAP Agri-food

(Unit: Person (%))

Classification	Proportion	Average Increase Rate
Forecasted Increase 5 years Later	282 (63.4)	33.5
Forecasted Decrease 5 years Later	42 (9.4)	32.0
Same as the Current Level	121 (27.2)	-
Total	445 (100.0)	-

Source: The Korean Rural Economics Institute, 2012.

The survey also found that among agri-food management facilities and distribution facilities at production sites, 92 companies (43.0%) out of the total 214 survey subjects of the APC (Agricultural Products Circulation) or distribution centers of agri-food and RPC (Rice Processing Complex) were facilities registered with GAP. In general, these facilities expected an increase in the handling volume of agri-food in the next 5 years. In particular, 73.9% of APC predicted an increase in the GAP agri-food treatment volume (Ji Hyun Choi and others, 2012).

Table 1-5 | Future GAP Handling Volume

(Unit: Person (%))

Classification	APC	RPC	Total
Forecasted Increase in 5 years	51 (73.9)	12 (57.1)	63 (70.0)
Forecasted Decrease in 5 years	-	3 (14.3)	3 (3.3)
Same as the Current Level	18 (27.3)	6 (28.6)	24 (26.7)
Total	69 (100.0)	21 (100.0)	90 (100)

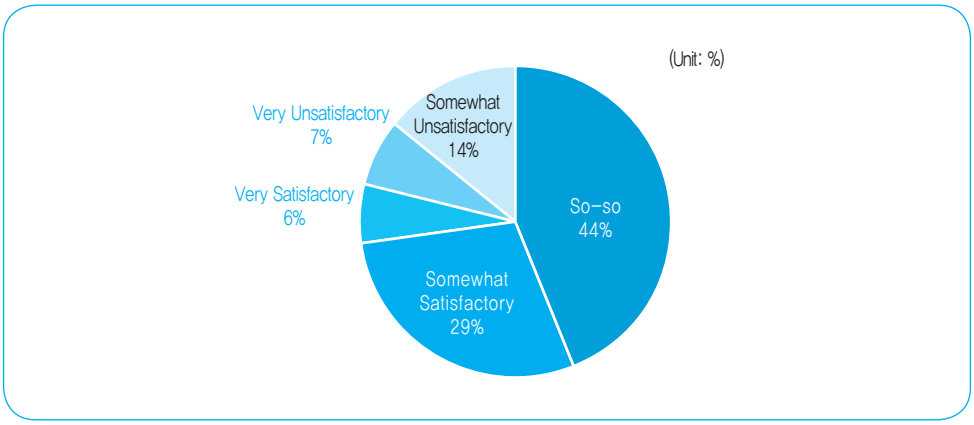
Source: The Korean Rural Economics Institute, 2012.

Also, due to the increase in the number of GAP certification authorities and registrations for agri-food traceability, the foundation of GAP certification was established, and all items cultivated for public consumption in the country were declared certification objective items. Training programs for the certification evaluators of the agri-food safety management system were set up, while the certification business was expanded (Ji Hyun Choi and others, 2012).

2.2. Qualitative Performance

According to the survey, the status and awareness of GAP agri-food certification conducted among famers by the Korean Rural Economics Institute as seen in [Figure 1-3] indicated that only 21% rated their participation in GAP as "unsatisfactory," 35% answered "satisfactory," and 44% were ambivalent. The survey concluded that the overall level of satisfaction with the GAP certified farmers system was not low (Ji Hyun Choi and others, 2012).

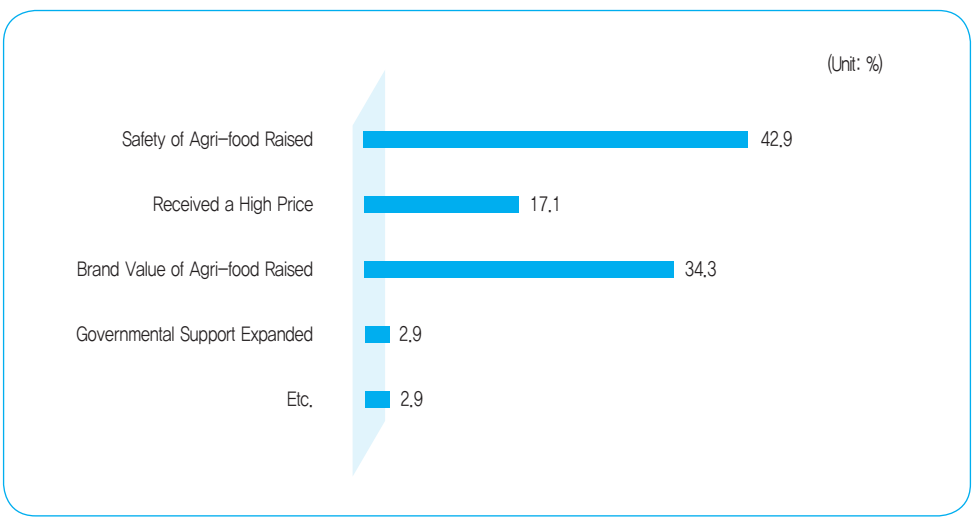
Figure 1-3 | GAP System Participation Satisfaction Levels



Source: The Korean Rural Economics Institute, 2012.

The primary reasons for satisfaction in the GAP system were mainly the resulting higher safety levels of agri-food (42.9%), as well as the higher brand value of agri-food (34.4%), as seen in [Figure 1-4]. External image and credibility factors, then, are key to the profitability of agri-food by enhancing its image and safety reliability through the proper management of the hazardous elements and the differentiation that such a systematic program promises when compared to other items (Ji Hyun Choi and others, 2012).

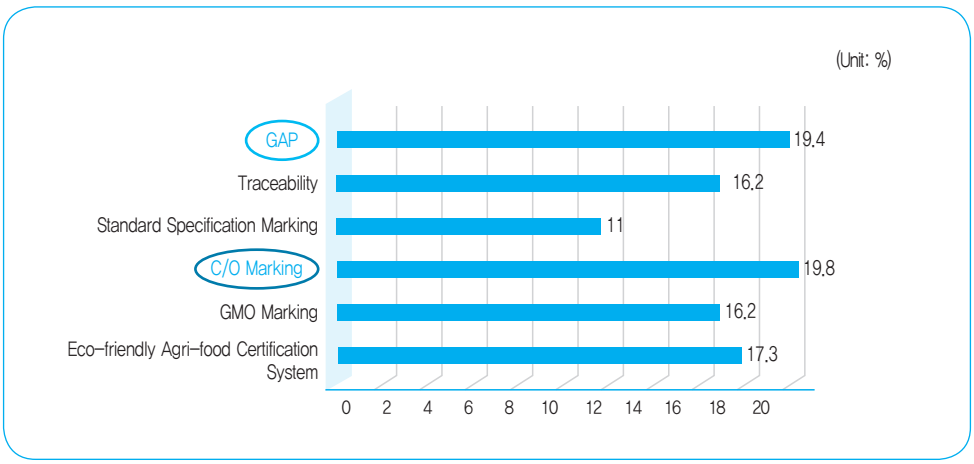
Figure 1-4 | Reasons for Satisfactory Participation in GAP



Source: The Korean Rural Economics Institute, 2012.

According to research on the awareness of agri-food safety policies conducted among average adults by the Consumers Union in Korea in [Figure 1-5] in 2007, C/O marking (19.8%) and GAP (19.4%) were indicated as the most needed improvements in the system and to motivate the purchasing of agri-food (Hyang Gi Lee, 2014).

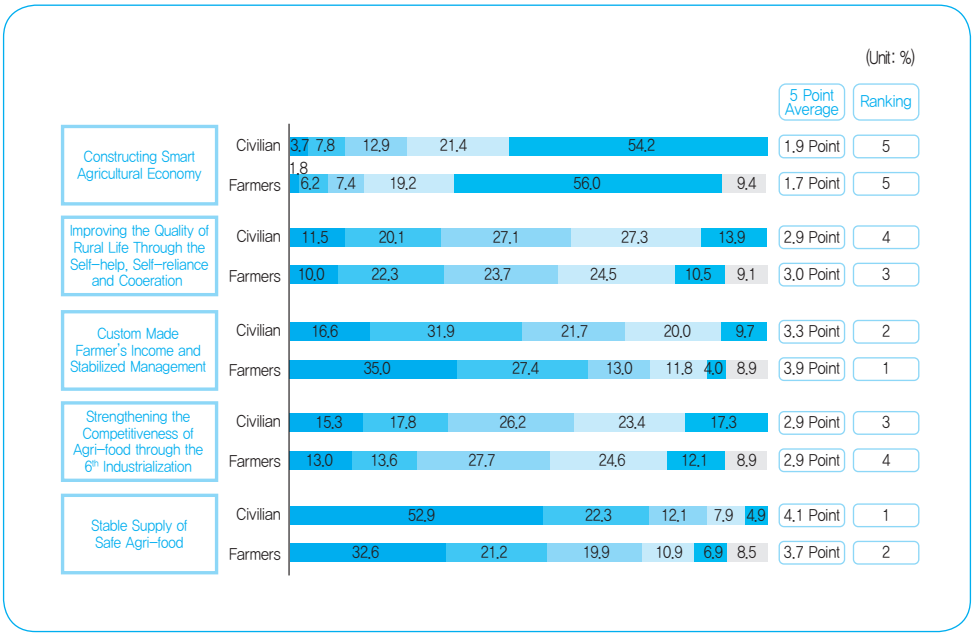
Figure 1-5 | Consumer Awareness of Agri-food Safety Management System



Source: Consumer's Union in Korea, 2014.

The survey report targeting rural and urban populations concerning the importance of the five major agricultural policy objectives published by the Ministry of Agriculture, Food and Rural Affairs in July 2013 as [Figure 1-6] revealed that all producers and consumers selected "stable supply of safe agri-food" as the top priority. These findings show that farmers producing agri-food would be able to secure buyers more easily, as well as gain credibility, by introducing the GAP system. Distributors and wholesalers and retailers who handle GAP agri-food could also benefit based on this feedback from consumers. Consumers benefit from being able to buy dependable agri-food–that is the right to safe and good agri-food in terms of sanitation. Moreover, the overall trustworthiness of domestic agri-food was enhanced (Dong Won Kim and Hey Jin Park, 2013).

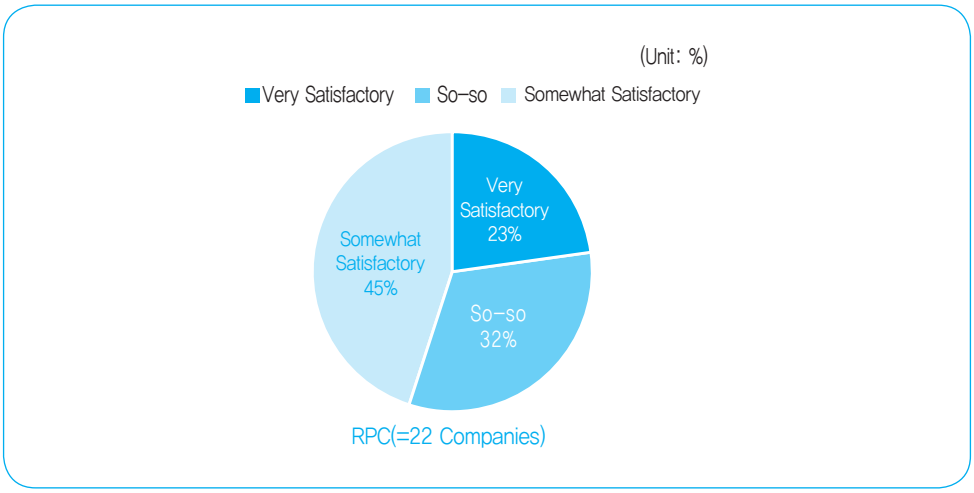
Figure 1-6 | 5 Major Policy Priority Rankings



Source: The Korean Rural Economics Institute, 2013.

A survey of the status and awareness of good agri-food management facility certification conducted by the Korean Rural Economics Institute targeting distribution facilities at the production sites as seen in [Figure 1-7] revealed that 68.2% of the respondents rated RPC as satisfactory GAP facility certified companies. This finding is significant because when the RPC is certified as a GAP facility, its branded rice is then differentiated from others in term of quality, facilitating its competitiveness in mass distribution markets. Given the fierce competition of the rice market, the introduction of GAP could be considered a best practice or business strategy for RPC (Ji Hyun Choi and others, 2012).

Figure 1-7 | Evaluating GAP Facility Certification



Source: The Korean Rural Economics Institute, 2012.

Reflecting consumer demand, the evaluation of the safety of agri-food and its contribution to brand value, the GAP system enjoys a positive image and credibility as a safety assurance mechanism. Such positive awareness could result in setting the foundation for entering the mass distribution market and generate profits for GAP certified agri-food.

2.3. Comprehensive Effects

The current social environment is such that consumers are increasingly demanding stronger safety assurances on domestic and overseas agri-food. To satisfy such demands, producers and distribution wholesalers and retailers of agri-food are focusing on the sanitation process of agri-food. In particular, attaining the trustworthiness of Korean exported agri-food and being recognized as a high-quality safe agri-food in other countries directly impacts the income of Korean farmers. As a result, by introducing the GAP system for the domestic consumption and export of agri-food, Korea proactively responded to international safety management standards for agri-food, securing consumer confidence in Korean agri-food and enhancing export competitiveness. For example, one of the first GAP certified items involved oriental medicinal herbs as the pilot project. Having received much feedback from many farmers, the project has led to increasing the number of certified farmers and production volume. GAP certified medicinal herbs already became differentiated from ordinary herbs and is being exported to the U.S. in an amount exceeding USD 1 million. As such, GAP certified agri-food is growing as a Korean brand with export competitiveness.

While there is room for growth in terms of price differentiation, the supply of agri-food has been expanded. A rise in the level of consumer awareness is expected, and 72.4% had planned to purchase GAP certified agri-food, contributing to the enhancement of the safety of agri-food (The Korean Rural Economics Institute, 2012).

The GAP system established a sanitary agri-food system for farmlands, which had lacked any concept and awareness of safe agri-food in the past. There is presently more recognition among famers of the safety of agri-food. In addition, the GAP system is operated by farmers who directly participate in and, furthermore, enable the building of healthy farmland and efficient and consistent agricultural development within the macro agricultural infrastructure.

3. Expected Effects of GAP System Introduction

3.1. Expected Technical Effects

3.1.1. Construction of Traceability System Using Radio Frequency Identification (RFID)

a. Agri-food Traceability System

GAP certified farmers provide consumers with basic information about producers, collective sites, types of facility materials, and the objectives of using the agri-food traceability system set up by the Rural Development Administration. In particular, the agency not only provides information on supply and logistics, but also detailed information about safety management measures, pesticides, the unit of fertilizers, etc., further enhancing the security and safety of agri-food. However, a shortage of manpower for the traceability system and aging demographics of farmers, as well as the absence of a benchmark traceability system make the construction of the traceability system difficult. For these reasons, and considering the application of Radio Frequency Identification (RFID) technology, a more efficient operation is being anticipated (Sang Yo Kim, 2006).

b. Definition and Configuration of RFID

RFID technology enables the detection and identification of certain products, transmitting the information wirelessly from a remote location. Once the identification information is inputted into the miniscule semiconductor and through the reader/antenna, the wireless frequency identification system reads the information written in a subject-specific TAG format. RFID contains a reader in the antenna that sends and receives the wireless data. The

data storage unit of the TAG includes the electronic circuit and an antenna. The circuit plays the role of storing data and transmitting the data through the antennas. The reader has the function of interpreting the electromagnetic data, and the main computer will receive and store such data (Jong Deuk Kim, 2004).

c. RFID Utilization

The Rural Development Administration provides consumers basic information about the producers, the collective sites, types of facility materials and usages. Such data could be installed in a RFID chip alongside other information such as country of origin, manufactured year/month/day, sales expiry date, distribution procedures, and delivery date–which reduces the workload for the producers who would otherwise have to attain this information on their own. This technology is especially convenient for the older farmers participating in the GAP certification process, as well as to transmit the broad production history to consumers (Jong Deuk Kim, 2004).

3.1.2. Application of Integrated Pest Control Methods (IPM) and Integrated Fertilizer Management (INM)

a. Status of and Need for Technologies

In the GAP business, seeds with strong resistance against pests are recommended for selection. One method for doing this is adopting the integrated pest management (IPM) system. Codex standards set out to minimize pest occurrences through appropriate sanitation facilities, followed by inspection and monitoring of delivered materials. To achieve this process, anti-insect nests should be installed at facilities considered particularly vulnerable to pest invasion (e.g., the sewing pipes or ventilation devices). When chemical and physical or biochemical drug treatments are needed, the application of the treatments are regulated so as to not impact the safety of the food.

In the long-term, the domestic GAP business should investigate methods for creating a low-cost agricultural environment that applies IPM for pesticide use guidelines or INM for fertilizer use guidelines–not only to promote efficient management of food pollution factors, but also to develop custom-made technologies suitable for the domestic agricultural environment (Sang Yo Kim, 2006).

Table 1-6 | Codex GAP Guidelines

Classification	Codex GAP Guideline
Production Base (soil, water quality, atmosphere)	• Soil, water quality standards of individual country
Sanitation Management and Pollution Control Facilities	• Toilet facilities, washing facilities • Compost storage facilities • Anti-pest facilities installation
Pesticide, Fertilizer, Sanitation Management During Cultivation	• Input standards for pesticide, fertilizer • IPM, INM, use of natural enemy • Sanitation management program for workers
Sanitation Management During Harvest Work	• Washing the working machines (delivery vehicle) • Use of chemical free materials • Prevention of pollution from livestock, etc.
Post-harvest Sanitation Management (packing, delivery, blending)	• Washing water: drinking water criteria • Facilities easy for washing, cleaning • Health checkup of workers • Low temperature storage facilities, refrigerator car
Hazardous Ingredient Inspection (remaining pesticide, heavy metals)	• Inspection by certified institutes
Production Management and Training for Traceability	• Regular training for participant farmers • Supply of producer, management guidebook

Source: Young Man Lee and others, 2005.

b. Application of IPM & INM Criteria

IPM is the technology that reduces pests or maintains levels that minimize economic costs by using various and complementary control technologies based on the knowledge of the crops, pests, and natural enemies. INM sets out to maintain levels of productivity while minimizing the environmental consequences of fertilizer use by assessing the total needs of fertilizer and ensuring application of the appropriate amount, as well as supplementing the effects with natural or other artificial devices. By virtue of the INM, use of agricultural chemicals or chemical fertilizers are minimized, and various outgrowths obtainable in the agri-food production processes are recycled by utilizing the agricultural by-products and reducing the amount of fertilizer input (Sang Yo Kim, 2006).

3.2. Social Expected Effect

3.2.1. Contribution to the Improvement of Domestic Agri-food Safety

GAP protects both producers and consumers. Consumer attention begins with whether or not the food is being properly handled at the sales point. Also, consumers want to know if the food has been distributed, treated, harvested, and grown in a sanitary and safe way through a reverse farm-to-table process, as well as the environment of the food farming site. Such a process is referred to as traceability. The GAP system makes the traceability of agri-food possible and allows the producers to be responsible for food safety at each step of the production process, as well as to obtain confidence about the products from consumers.

In the food industry, the most vulnerable area related to traceability is the post-harvest treatment process. Most agri-foods are either delivered by the distributors from the farmland to consumer locations at the same time as the harvest or collected at low temperature reservoirs or agri-food collective storages. As such, intermediate distributors or warehouse representatives–not farmers–are responsible for handling the food, leading easily to a low sense of responsibility for the products. Nor are they able to implement a consistent and systematic safety management system for the foods. The foods produced under the GAP system could be comprehensively managed at every stage–from soil and water management involved in the production to the natural and wildlife protection of the farmlands–giving producers a greater sense of responsibility for the planting methods of the crops, pesticides and fertilizer management, as well as the pre- and post-harvest treatments. Such a process would ensure a steady supply of good quality, healthy and safe food, increasing consumer confidence (Ministry of Agriculture, Food and Rural Affairs, 2003).

3.2.2. Enhanced Consumer Awareness of Agri-food Sanitation and Safety

As a result of the high level of safety of Korean agri-food, consumers have much confidence in domestic agri-food. Maintaining this confidence and reputation of safe Korean agri-food should be a priority.

Consumer interest in a safe dietary lifestyle has grown recently with improvements in economics and standards of living. The number of consumers desiring to purchase safe agri-food is also increasing. The GAP system responds to these needs for improved safety of agri-food while maintaining a clean agricultural environment so that future generations can be provided safe food. the system also promotes vigorous safety and hygiene control from production to selection, as well as cleaning to packaging. Safety can be confirmed

transparently from production to consumption with traceability systems implemented at all stages. Therefore, GAP can enhance consumer awareness on agri-food hygiene and food safety as a system to lessen consumers' anxiety (Byeong Seok Kim, 2012).

3.2.3. Protection of Agricultural Environment

The production activity at the ordinary food manufacturing factory is excluded in the discussion of the GAP system. The quality and management control systems are being applied at the food manufacturing factory by applying the total quality management (TQM) system used in the manufacturing sector. In particular, the HACCP (Hazard Analysis Critical Control Point) system is a food sanitation program being actively introduced throughout all of the food manufacturing sector. However, such a system is being focused on the production stages to set basic guidelines for food sanitation and quality control for the processor to ensure the safety and quality of products. This is a significant difference from the GAP system, which intends to produce healthy and safe agri-food by protecting the agricultural production environment.

The GAP system comprehensively and systematically manages not only the production factors such as soil, water, seeds, pesticides, and fertilizer, but also the welfare and health of workers participating in the safety management and production processes of cultivation, harvest, and post-harvest activities. Such a system enables agriculture to be permanently maintainable by protecting the agricultural environment (Ministry of Agriculture, Food and Rural Affairs, 2003).

3.3. Economic Expected Effects

3.3.1. Purchase Increase of GAP Certified Agri-food due to Consumer Preferences

Research concerning consumer preferences and the customer's willingness to pay when the GAP system is fully executed revealed that for every 1,000 Won in cost for ordinary products, the customer was willing to pay a premium for safe products, totaling 1,658 Won for fruits, 1,766 Won for greens and fruits, 1,568 Won for vegetables, and 1,961 Won for medicinal herbs. This means that the consumer is willing to pay more for safer foods compared to ordinary products. In fact, 61% of those surveyed indicated a willingness to pay a premium for food items with the implementation of the GAP system. The results of his research indicate that the GAP system is suitable for satisfying the purchase needs of modern consumers who are sensitive to the safety quality of food (Jae Hong Park and others, 2005).

Table 1-7 | Consumer Willingness to Pay under the GAP System

Variables	Definition	Costs (Won)/People (%)	
Amount Willing to Pay	Willingly Payable Amount for the Safe Product if Ordinary Product Costs 1,000	Fruits	1,658 Won
		Green and Fruits	1,766 Won
		Vegetables	1,568 Won
		Medicinal Herbs	1,961 Won
Consumer Preferences	Execution of the GAP System for Production and Distribution of Safe Agri-food	Preferred Not Preferred	242 (61.4%) 125 (38.6%)

Source: Jae Hong Park and others, 2005.

3.3.2. Associated with Rural Tourism

Although not yet fully executed, rural tourism could provide the possible link with local tourism resources between local specialty foods and implementation of the GAP System. The first such collaboration in Korea is that between green tourism and an oriental medicinal herb tour designed to foster GAP growth and good medicinal herbs in northern Kyungsang Province. This project was carried out for the purpose of utilizing an existing harmonious association between a rural village with good medicinal herb production resources and tourism attraction that would increase the income of farmers. As such, the construction of a GAP system associated with green tourism facilitates a consistent generation of income for farmers (Ministry of Agriculture, Food and Rural Affairs, 2003).

2014 Modularization of Korea's Development Experience
Good Agricultural Practices (GAP)
for Agricultural Food Safety Management

Chapter 2

Background and Need for GAP System for Agri-food Safety Management

1. Domestic Situation and External Environment of GAP System Early Stages
2. Main Reasons and Bases for GAP System Introduction
3. Overseas Cases of GAP System Introductions

Background and Need for GAP System for Agri-food Safety Management

1. Domestic Situation and External Environment of GAP System Early Stages

1.1. Status of Domestic Safety Management System for Agri-food

The Agri-food certification system is designed to improve the quality of domestic agri-food and add competitiveness to exports by gaining consumer trust and guaranteeing quality products to customers through careful management of food safety processes. The quality certification systems in Korea as well as the GAP system are particularly intended to meet global quality criteria, leading to an increase in export volume. In other words, Korea introduced numerous certification marking systems for the purpose of income growth for farmers through the improvement of international competitiveness and the increase of export, a safety guarantee on the supply of agri-food, and the provision of information.

In 1962, as the Industrial Standardization Act (formerly the Manufacturer's Standardization Act) was enacted based on the Agricultural Food Inspection Act, the KS certification system was introduced to the food industry. Since then, agri-food certification systems have increased, and there are now about 30 relevant certification systems in operation in accordance with relevant laws and regulations. The representative agri-food certification systems are the GAP system based on the agri-food quality management act, the "Eco-friendly Agri-food certification system" based on the eco-friendly agriculture cultivation act, and the Traceability system for agri-food. There is also the good dietary supplement manufacturing practices (GMP) and the HACCP, which is similar to the GAP system, classifying Livestock HACCP and Food HACCP.

Table 2-1 | Status of Statuary Certification Systems Related to Domestic Agri-Livestock Products

Name of Certification System	Object of Certification	Name of Relevant act	Certification Agent	Certification Authority	Introduction Time
Eco-friendly Agri-food Certification System	Primary Agri-livestock Products	Eco-friendly Agricultural Promotion Act	Agri-food Quality Controller	Agri-officer and Certified Professional Certification Authority	1993
GAP System	1st Produce of Agri-food	Agricultural and Fishery Quality Management Act	Agricultural and Marine Products Quality Management Service	Designated Professional Authority	2006
Traceability System for Agri-food	1st Produce of Agri-food	Agricultural and Fishery Quality Management Act	Agriculture, Forestry, Animal Husbandry and Food	Agri-food Quality Management Association	2006
Geographic Marking System	1st Produce of Agri-forestry-livestock Products and Their Processed Items	Agricultural and Fishery Quality Management Act	Agriculture, Forestry, Animal Husbandry and Food	Agri-food Quality Management Association	2002
Livestock HACCP	Farmland, Butchery and Processed Sites, Animal Food and Their Sales Places	Livestock Processing Treatment	Agriculture, Forestry, Animal Husbandry and Food	Livestock Standard Authority	1997
Food HACCP	Food Processed Workplace	Food Sanitation Act	Department of Health and Human Services	MFDS	1995

Source: National Agricultural Products Quality Management Service, 2014.

1.1.1. Eco-Friendly Agri-food Certification (1993)

Eco-friendly agri-food include agricultural and livestock foods that are produced by either omitting or minimizing chemical pesticides, fertilizer and antibiotics, while conserving the agricultural ecology and environment. The eco-friendly agri-food certification system was introduced based on the regulatory environment surrounding the development of the

agricultural products processing industry and quality control. The agri-food certification system was introduced in 1993 and is being carried out for organic and pesticide-free agri-food certification systems.

Since the recent revisions to relevant regulations, the system has been implemented based on the Agricultural Products Quality Control Act. In 1997, the report system for eco-friendly agri-food was introduced and, in accordance with the environment agriculture promotion act, management divided categories into organic, transitional organic, pesticide-free, and low pesticide. In 2001, the environment agriculture promotion act and agricultural products quality control act were incorporated into the eco-friendly agriculture promotion act and unified under the eco-friendly agri-food certification system. Since 2002, the eco-friendly agri-food certification has been expanded private companies as well as universities. The relevant authorities and organizations were appointed as private certification authorities for managing the expansion of the certification.

When comparing GAP and the eco-friendly agri-food certification system, both are similar in terms of their safety emphasis. However, it can be said that GAP is different from the eco-friendly agri-food certification system from the viewpoint that GAP accounts for the aftermath and traceability of agri-food after harvest. Also different from the eco-friendly agri-food certification system, GAP includes criteria involving geographic conditions and quality standards for agri-food. In 2016, low-pesticide agri-food is scheduled to be abolished in the eco-friendly agri-food certification system, and the Agricultural food distribution department in the Ministry of Agriculture and Forest recommends GAP as the alternative measure (Jemin, 2011).

Table 2-2 | Comparison of Low-Pesticide Certification and GAP

Classification	Relevant act	Use of Chemical Fertilizer	Use of Pesticides
Low Pesticide Certification	Eco-friendly Agriculture Promotion Act	Less than 1/2 of the Recommended Input Amount	Less than 1/2 of Input Cases, The Final Input day Applied by 2 Times
GAP Certification	Agri-food Quality Management Act	Adequacy of Chemical Fertilizer	Compliance of Criteria for the Safe Use of Pesticides

Source : Korean Farmer's and Fisheries' Paper, 2013.

1.1.2. Hazard Analysis Critical Control Points (HACCP, 1995)

The Hazard Analysis Critical Control Points (HACCP) system refers to the scientific sanitation management system designed to identify the hazardous factors of each step leading up to public consumption. Critical control points (CCP) are set up from the stage of raw materials through production, processing, storage, distribution, and cooking to ensure secure, concise and safe food processing. HACCP was recommended to be introduced to each country by CODEX for the improvement of food safety in 1993. In accordance with international developments such as joining the WTO and the encouragement to introduce HACCP by CODEX, the HACCP system was introduced and executed in Korea. The HACCP system is now regarded as a global, effective and efficient safety management system for agri-food, adopted and implemented by countries like the U.S., Japan and EU. The HACCP system in Korea is divided into two parts–the HACCP under the jurisdiction of the MFDS according to the Food Sanitation Act, and the HACCP under the jurisdiction of the Agricultural and Fisheries Products Quality Control Act (HACCP Korea, 2014).

1.1.3. Good Manufacturing Practice (GMP, 2004)

The GMP system certifies the excellence of facility and sanitation management, as well as quality control for the production of good dietary supplement food. To ensure quality such as the efficacy, safety, and stability of dietary supplement food, the quality control system of the products throughout the production processes including the structural facilities and ranging from the purchase of raw materials to manufacturing, packing, and delivery, should be established, operated and maintained. The Chief of MFDS appoints the manufacturer to comply with the manufacturing criteria and quality management criteria for good dietary supplement food as a GMP applicable company (Jemin, 2011).

1.1.4. Traceability Management for Agri-food (2006)

Korea revised and published the Agricultural and Fisheries Products Quality Control Act and officially adopted the traceability management system for agri-food in August 2005. Participation in the traceability management system is to be determined by the registration assessment after applying to the National Agricultural Products Quality Management Service.

Commonly applicable standards among the traceability management criteria include taking precautions so as not to mix up the traceability management items and other agri-foods to secure the possibility of traceability, and to manage information related to the traceability management products in the form of written or computerized records. Thus,

when asked by traceability authorities, the producer, distributor, and seller should provide such information. In addition, the post management system should be prepared to record information on materials like pesticides possibly impacting safety when uncovered during a traceability management process (In Seong Jo and Boo Cheon Baek, 2009).

1.1.5. Good Agricultural Practices (GAP, 2006)

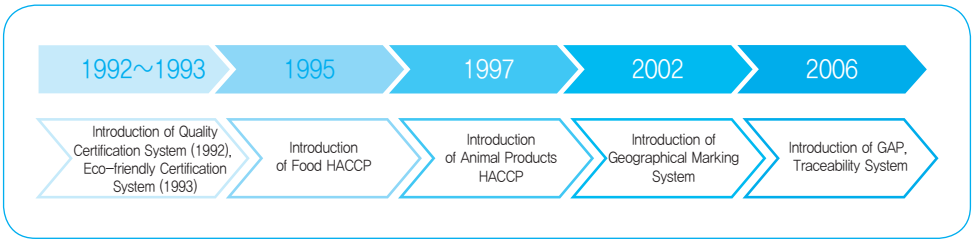
GAP is the management criteria used to manage the agricultural environment (soil, water quality, etc), residual pesticides, heavy metals and hazardous organisms from the harvest step of agri-food to the packing step. The traceability system ensures the safety of agri-food by blocking hazardous factors, minimizing the hazardous factors from the natural environment and by managing the hazardous elements during the harvest, processing, and storage stages in order to ensure safe agri-food for consumers. GAP has been enforced since 2006 on the statuary basis of the Agricultural Food Quality Control Act enacted in 2005 (The Rural Development Administration, 2012).

Table 2-3 | Detailed Criteria of GAP System

Classification	GAP Certification (Agricultural Products Quality Control Act)
Certification Mark	GAP MAFRA KOREA
Quality	Standardized Criteria
Breed	Breed (Whether GMO is marked)
Management Control	Production Career 3 Years
Water	Cultivation: Agricultural Water Washing Yater: Drinking water
Cultivation & Packing	Place of Gradient within 15 Degrees Place of No Worry about Pollution
Pesticide Fertilizer	Safe Use of Pesticide Criteria (IPM mandatory) Fertilizer: Adequacy (INM mandatory)
Safety Criteria	Food Sanitation Act Article 7, Criteria of Residual Pesticide Allowance for Agri-food
Others	Microorganism Management Criteria

Source: Soo Il Lee, 2007.

Figure 2-1 | Introduction of Certification System for Agri-food in Korea



1.2. Need for Safety Management of Agri-food

1.2.1. Increased Attention by Consumers to Food Safety

The number of consumers who want to buy safe agri-food continues to increase as the economy grows and living standards improve–which levels up the interest in safe agri-food. When reviewing consumer awareness of food safety, food safety anxiety has been found to increase while demand for safe agri-food has also increased. The reason for the safety concerns relates to the perception of the market economic system being more focused on mass production than safety. There are also concerns surrounding the use of hazardous materials such as pesticides and fertilizers in the production process–leading to anxiety among customers who do not understand the processes. In addition, critical damages on broader areas may occur once an accident takes place due to food. Transportation and communication, while making possible faster delivery and speedy transmission of information, also leads to information distortion or misinterpretation, giving rise to consumer distrust. Frequent occurrences of food safety accidents lead customers to prioritize "safety" such as shelf life, sanitation and safety, taste, and production sites. As the preference among consumers for safe food grows, the demands for competitive and high quality agri-food are increasing. Accordingly, the security of food safety from the production step of food material to the steps of processing, handling, distribution, storage and final consumption has become very important.

Worldwide, accidents related to food safety are increasing, making the issue of food safety more urgent. Korea witnessed foot-and-mouth disease in 2000, bad dumplings in 2003, malachite green detection from eels in 2004, lead detection from kimchi, and tar detection from hot pepper powder in 2006. In the U.S., *E. coli* O157 was detected in U.S. beef in 1997, *Listeria* in sausage in 1999, and *E. coli* O157:H7 in a spinach food poisoning accident in 2006. BSE was also detected in British beef in 1996, and Chinese crab in the

2000s, iron pigment detected in hot pepper powder, pesticides from Chinese mushrooms, and carcinogen substances in Chinese ginseng, among many other incidents worldwide (Ha Sang Do, 2009). Such food safety accidents demand the construction of a worry-free imported food environment by customers as their distrust and anxiety toward agri-food are increasing. Therefore, calls for a management system for agri-food have been raised in order to secure food safety from the production step of agri-food to the steps of harvest, post-harvest distribution, storage, processing, and sales.

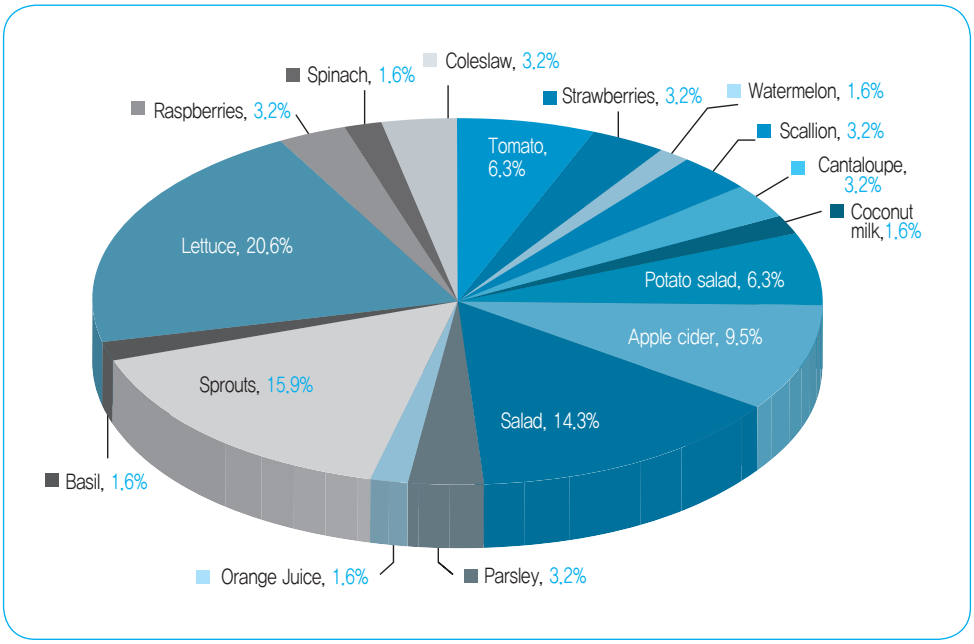
Table 2-4 | Food Safety Related Accidents in Major Countries

Area	Food Safety Accident
Korea	2000: Food-and-mouth disease 2003: Birds flue, bad dumping accident 2004: Eel malachite green detected 2004: BHC detected from ginseng exceeding criteria, Lead detected from kimchi 2005: Parasite eggs detected from kimchi 2006: Tar pigment detected from hot pepper powder
U.S.A.	1997: *E. coli* O157 detected from US beef 1999: *Listeria* detected from US sausage to be returned 2006: Poisoning food incident from Californian spinach. *E. coli* O157: H7 may be the reason
Europe	1996: BSE occurred in GB
China	2000: Chinese crab, iron powder detected from hot pepper powder 2001: Pesticide detected from Chinese mushroom, bird flu occurred 2002: Lead particles detected from imported Chinese crab and blowfish 2000s: Hazardous substances of carcinogen found in Chinese ginseng, seafood, hot pepper powder, etc.

1.2.2. Foodborne Illness Occurrences by Various Types of Agri-food (1990~2006)

The source of food poisoning occurrences by type of agri-food include *E. coli* O157:H7 in lettuce, Cyclospora, Hepatitis A, *Campylobacter jejuni*, *Shigella*, in salad by *E. coli* O157:H7, *E. coli*, *Salmonella*, Hepatitis A, and in tomato by *Salmonella*.

Figure 2-2 | Foodborne Illness Occurrences by Various Types of Agri-food (1990~2006)



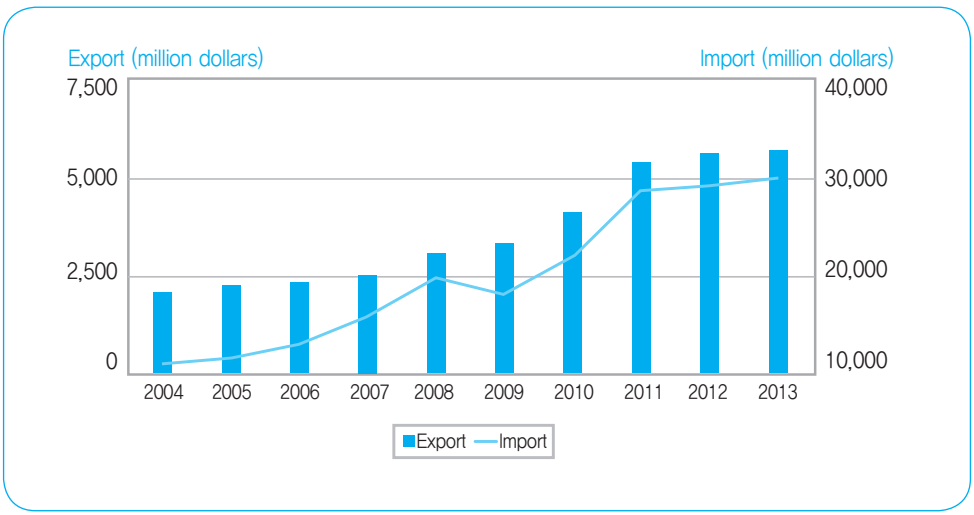
Source: Chung, Duk hwa, 2014.

1.2.3. Increased Food Transactions

When the World Trade Organization (WTO) was launched, a Free Trade Agreement (FTA) was signed, expanding the import and trade of agri-food and effectively enhancing the importance of agri-food safety management. Imported agri-food tends to increase in accordance with the launch of WTO/SPS (sanitation & quarantine), leading to an increase in risk factors for food poisoning due to the increase in agri-food and changes in consumer preferences. For these reasons, the range of safety accidents for agri-food has widened and, thus, stricter sanitation management for food is being demanded. In July 2003, CODEX set up the production criteria for fruits and vegetables, based on which it pushed to realize non-tariff barriers for international trade. That is, through the GAP system, the detection of risk factors for agri-food could be minimized, and an internationally reliable trading environment would be prepared (National Agricultural Products Quality Management Service, 2014). Other than this, along with the domestic market opening, the need to introduce and establish a quality control system increased in order to secure the competitiveness of imported agri-food and attain competitive superiority in the export market. Korean agri-food, therefore,

must compete on the basis of safety quality, accordingly requiring a management system for safe agri-food as Korean agri-food is not price competitive compared to other imported foods.

Figure 2-3 | Import/Export Trends in Agriculture and Seafood



Source : Nara indicator, 2014.

1.2.4. Increased Need for a Systematic Food Safety Management System

There are many potential hazards in agri-food from the cultivating step and through the steps of processing, distribution, and consumption. Such hazardous factors include contaminants or conditions that affect health or cause disease. If such hazardous factors are not controlled at each step, it may develop into a food safety incident. Accordingly, in order to manage such factors more efficiently, there is a need to introduce and apply a stricter food safety management system to prepare for and prevent food safety incidents.

2. Main Reasons and Bases for GAP System Introduction

GAP is the food safety management system aimed at supplying safe agri-food from harvest to sales, which was introduced to produce safe agri-food and boost consumer confidence and international competitiveness. Pesticide detection in agri-food, parasite eggs detected in kimchi, and food poisoning at schools increased public anxiety, reinforcing the need to supply safe agri-food and resulting in the urgent introduction of the GAP system.

Along with the domestic situation, the need to supply safe food was also raised overseas, and international organizations such as CODEX and FAO recommended implementation of the GAP criteria and agri-food for reinforced safety. In compliance with the food chain approach methods of food safety protection measures, which cover the steps of production to consumption, a systematic approach was taken by major countries such as the U.S., EU, and Japan by implementing the GAP system. Korea shortly followed (National Agricultural Products Quality Management Service, 2006).

2.1. International Organizations Introduce GAP

GAP is widely known as a safe agri-food guideline all over the world. The FAO regards GAP as the production technology concept for the improvement of agricultural productivity. For consistent maintenance of the environment, CODEX adopts the GAP concept as the means to preempt any related hazardous factors within the processes of production, harvest, delivery, and storage, and to introduce guidelines to secure safe food.

2.1.1. CODEX

CODEX is the consultation mechanism among countries which was jointly established by the UN, FAO and WHO in 1962. CODEX prepares and offers international standards for food safety and hygiene for the purpose of ensuring consumer health and fair international food trade. In 1997, as there were many cases of directly ingesting fresh food without a separate processing step like cooking, based on the general rules for food hygiene, CODEX conducted discussions to ensure safe production of fresh fruit, vegetables that required reinforced safety steps, and prepared production management criteria (hygiene code of practices concerning the production and handling of fresh fruits and vegetables). This code is the GAP guideline to supply sanitary and safe fruits and vegetables, which includes all things to be managed such as production and harvest, packing, storage, the environment of the delivery process, personal health at the workplace, use of safe agricultural tools, education, and traceability. The code also contains post-harvest sanitation guidelines of GHP (Good Hygiene Practices) and manufacturing guidelines for the processing step of GMP (National Agricultural Products Quality Management Service, 2014).

2.1.2. International Food and Agricultural Organization (FAO)

The FAO under the umbrella of the UN is focused on changing the global food production economy and food safety and quality issues. The FAO insists on adopting the food chain approach as opposed to the existing food safety policy which exempts the processes of

production and consumption. The food chain approach is the protective measure for food safety, which plays the role of protecting consumers from hazardous factors such as microorganisms and chemical substances by systematically managing and opening all processes from production to consumption. Such a food chain approach was determined in 2003, and GAP is now being applied for production, processing, storage, and soil control as the basic principle (National Agricultural Products Quality Management Service, 2014).

GAP was ratified in 2001 and proposed as a system for including all food safety-related guidelines, IPM, and farming techniques. This code configures 10 categories (soil, water, crop and fodder production, crop protection, livestock production, health and welfare of animals, harvest and storage, management of energy by-products, welfare health and safety, and wild animals and scenery) and sets up the scheme for detailed management skills by the farmland unit. The GAP recommendation proposed by FAO includes not only the concept focusing on the safety of agri-food, but also the security of agricultural sustainability such as the improvement of agri-food and enhancement of agri-productivity, agricultural skills for sustainable preservation of the environment, and social welfare of the farmers. In other words, GAP further distinguishes between healthy agricultural guidelines and reasonable agricultural guidelines. GAP ensures the safety of agri-food to prevent safety incidents. In addition, the FAO not only creates the international standards or codes but also intends to establish a system that governments and individuals can easily access by supporting the strategy development, production technology and professional skills suitable for the environment. Thus, it eased some of the strict GAP criteria, allowing farmers to apply GAP and make correct judgments.

2.2. Reasons for GAP Introduction

There is a prevalence of inaccurate information being delivered to the public because of the steady increase in food safety incidents. The media transmits stories of food incidents without the backing of scientific evidence or research, making food safety an even bigger concern. At the same time, the economic loss due to the reduced transaction volume contained high social costs. As the fundamental measure to resolve such problems, the need to construct a systematic food safety program increased, and the system was established by enacting or amending the relevant laws, unifying management, censorship, and supplementing the food safety system (Duk hwa Chung, 2012). In advanced countries, preventive activities for food safety are being taken at the national level, and efforts to publicly present and implement various measures, and analyzing and controlling the hazardous factors in food are being made, while the appropriate administrative bodies are

also being established. The Korean government adopted the GAP system with the slogan of "From Farm to Table" and tried to eliminate environmental hazardous factors and perform overall quality management through traceability.

3. Overseas Cases of GAP System Introductions

3.1. Overseas Trends

The EU proposed an Eastern Europe GAP system as a condition of agricultural performance to enter the EU and will provide support to farmers above the GAP level, which is being carried out through the ratification of the Common Agricultural Policy (CAP). American areas such as the U.S., Canada, Chile and Mexico have adopted the GAP system to ensure food safety and protect their people. GAP system criteria also guarantees the food safety of export countries for transactions. In the meantime, Asian countries like China and Malaysia tend to gradually promote the introduction of GAP in order to guarantee the required food safety of its export counterparts necessary for transactions, and actively support the improvement of the agri-food management system at the governmental levels (National Agricultural Products Quality Management Service, 2014).

3.2. GAP Introduction by Major Countries

3.2.1. EU (Global GAP)

a. Introduction Background

In the late 1990s, as food safety problems such as BSE, GMO agri-food production, and diseases caused by foodborne illness bacteria in fruit and vegetable became a global issue, the need for hazardous factor food management increased in the food industries. Once a food safety incident takes place, the concerned food industry will suffer from a sales decrease and the loss of consumer confidence. Accordingly, a standard to increase food safety was needed. In 1997, companies belonging to the EUREP (Euro-Retailer Produce Working Group) started adopting the EUREP GAP of the internal quality certification program. The private organization of EUREP GAP changed to the Global GAP (GGAP) in 2007. GGAP emphasizes the safety of agri-food production and the welfare of farmers, as well as other eco-friendly factors (Global GAP, 2014).

b. Operational Organization and System

The beginning of Global GAP was an organization configured with European agricultural retailers. As consumer demands to address the rising food safety incidents increased, retailers selling agri-food had to meet such demands. These retailers organized the private EUREP and, by adopting a system able to certify the technology for the hygiene and welfare of the producers, environmental protection, and health of intermediate handlers throughout all food processes–from harvest to cultivation, storage, and distribution–named the program GAP–which was changed from EUREP GAP to Global GAP (GGAP) in 2007 (Global GAP, 2014).

Europe established Food PLUS in 2001 and designated GAP certification criteria and integrated safe agri-food related regulations (export and import prohibited items, traceability, etc.). The agency was run by international organizations and EU members and non-members, and suggested to farmers who wanted GAP certification to follow the inspection standards. Global GAP is supported and legally owned by Food PLUS and plays the role of the secretariat. Global GAP has its headquarters in Germany, and its branches are responsible for GAP operations in EU countries, which are composed of the Council for the roles of the Coordinating Committee and the Technical Standards Committee, the Coordination Committee which determines policy, and the Technical Standards Committee for final approval of GAP standards. Global GAP is applicable for the agri-food logistic phase covering all of Europe. Furthermore, Asian and African regions are utilizing the system (Global GAP, 2014).

c. Purpose of Integrating Management Criteria by Global GAP

In Europe, Global GAP headquarters integrated certification management criteria and set the same criteria as other retailers to help farmers and distribution companies save on cost since 2013 (Global GAP, 2014).

d. Status of Promotion and Certification

Global GAP is now participated in by more than 110 countries as of June 2013, and the number of participants surpasses 131,000 people (Global GAP, 2014).

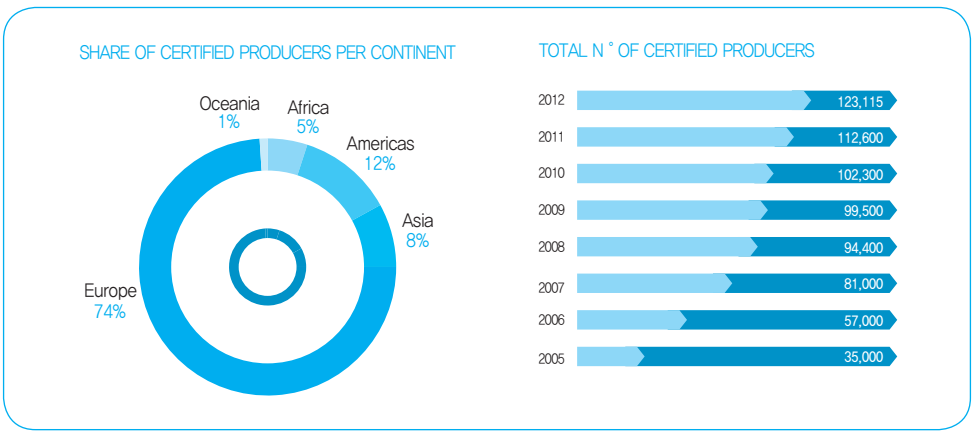
a) Status of Global Certification

Classifying the Global GAP certified countries by continent, Europe marks 74% as the largest, followed by America (12%), Asia (8%), Africa (5%), and Oceania (1%). Also, worldwide, the number of Global GAP certified farmers increased by about 3.5 times from 35,000 farmers in 2005 to 123,115 farmers in 2012 (Global GAP, 2013).

Figure 2-4 | Countries Participating in Global GAP (2012)

* Colored in gray.
Source: Global GAP, 2013.

Figure 2-5 | Global GAP Certification Acquisition Ratio by Continent and Number of Global GAP Certified Farmers Worldwide

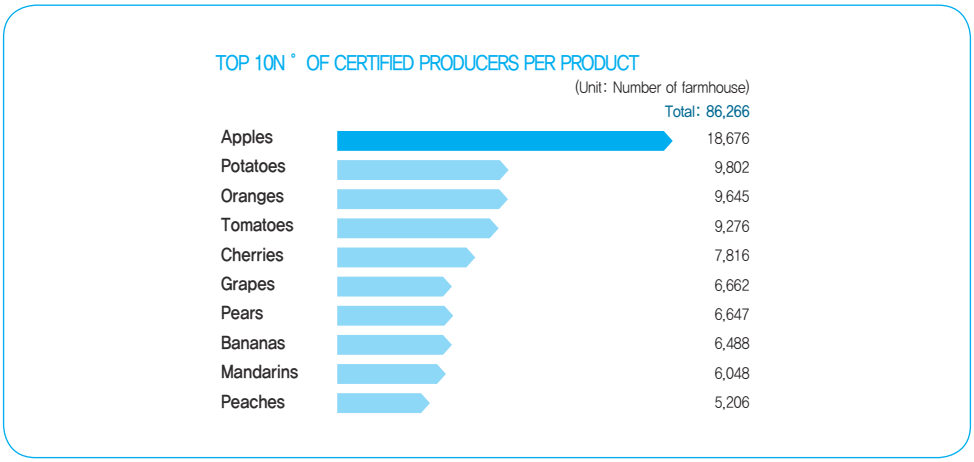


Source: Global GAP, 2013.

b) Certification status by Product

Certification target products are fruits and vegetables (September 2001), flowers and ornamental plants (July 2004), coffee and tea (2004), livestock (November, 2004). Seeing the status of a number of Global GAP certified farmers by product, the farmers for apple (16.6%), potato (8.7%), orange (8.6%), tomato (8.2%), and cherry (6.9%) acquired the certification (Global GAP, 2013).

Figure 2-6 | Number of Global GAP Certified Farmers by Products



Source: Global GAP, 2013.

3.2.2. U.S.A.

a. Introduction Background

Due to an increase in diseases stemming from fruits and vegetables, Americans have tended to pay more attention to agri-food safety. Such an influence made possible various reports on related matters and food safety issues in May 1997. The U.S. GAP was introduced as social issues regarding food safety were raised and the people sought to secure food safety for the people. The U.S. prescribed the Food Quality Protection Act in 1997, and the USDA (United States Department of Agriculture) and FDA (Food and Drug Administration) published jointly a guide to microbial food safety for fresh fruits and vegetables, starting to officially introduce GAP. The guidelines cover the agricultural skills needed to prevent pollution from hazardous factors when cultivating fruits and vegetables ingested in fresh conditions, which includes content about sanitation control of farmland and the hygiene of workers, agricultural water, organic by-products, and traceability. In other words, the guide emphasizes hygiene management in cultivating procedures under the GAP concept (Soo Il Lee, 2007).

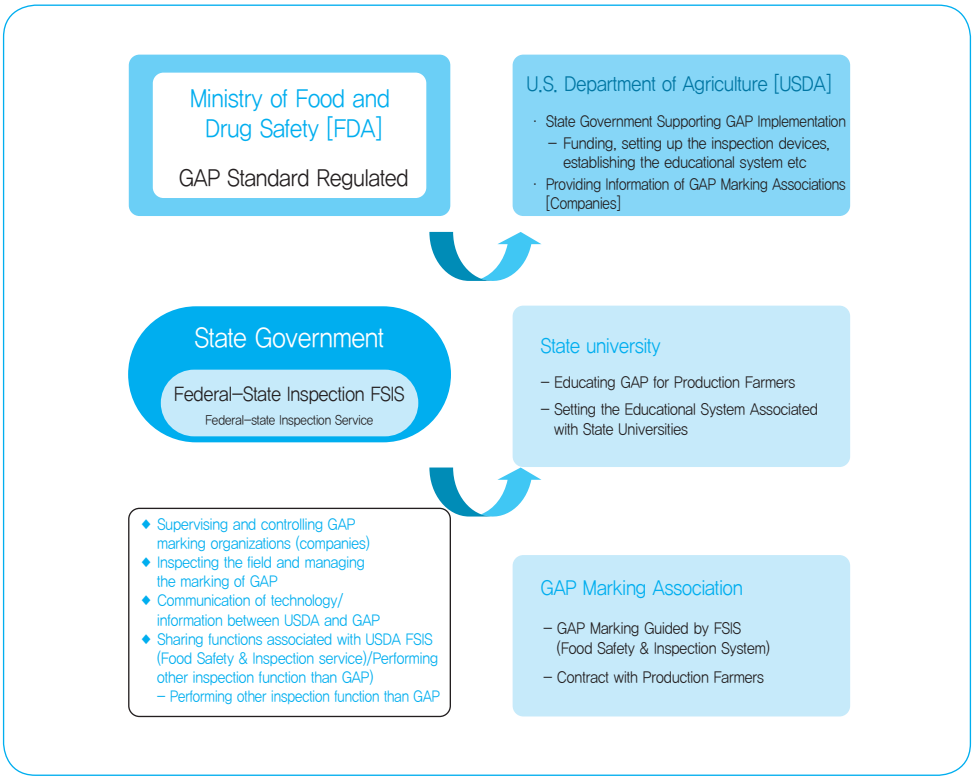
Figure 2-7 | U.S. GAP Certification Mark

Source: USDA, 2011.

b. Operational Organization and Scheme

In the U.S. GAP system, the FDA regulates GAP criteria and prepares the operational codes. The USDA is involved in the practical aspects such as funding, training system establishment for state governments, and inspection standard setup. State governments are in charge of delivering guidance and conducting management audits on the farmers and organizations who applied under the GAP system, skills when inspecting the workplace, and information communication with the USDA. In particular, GAP training for the production farmers were conducted by the state universities in conjunction with the FDA that linked educational systems with universities on global GAP training. However, each state has its own assessment of GAP performance. The USDA also operates the programs to certify the produced agri-food through reinforced microbiological safety and GAP-applied agricultural technology. The AMS of the USDA has a quality and ranking department for fresh agricultural food, while the Food Safety and Inspection Service (FSIS) is in charge of inspecting the workplace of farmers who apply for the certification (National Agricultural Products Quality Management Service, 2014).

Figure 2-8 | GAP Management Process in the U.S.A.



Source: National Agricultural Products Quality Management Service, 2014.

c. Promotion and Certification

The U.S. has regulated and enforced the Food Safety Modernization Act to strengthen the food safety system management process for public health and prevention of food safety incidents since 2011. In January 2013, the FDA put forth rules for science-based minimum standards to promote the safe cultivation, harvest, packing and storage of edible fruits or vegetables (draft) in January 2013; and it established scientific standards to prevent contamination due to microbiological hazardous factors in the form of a step-by-step process for the safe harvest, production, and storage of fruits or vegetables (National Agricultural Products Quality Management Service, 2014).

3.2.3. Japan (JGAP)

a. Background of Introduction

Japan GAP (JGAP) has been systemized since several retailers started managing the farmers and suppliers as a way to brand their goods in 2002. This trend led to the formulation of other criteria between retailers and suppliers, which resulted in the different criteria among these groups. However, after the JGAP association was established in 2006, Japan standardized Japanese farms as a way to improve its own agri-food in terms of quality and to secure some competitiveness over other imported agri-food. In 2007, JGAP ratified an agreement that would equate its own goods with the Global GAP. In 2009, the Japanese government officially started providing the guidelines to farm owners seeking to become GAP certified (National Agricultural Products Quality Management Service, 2013).

Figure 2-9 | GAP Certification Mark of Japan

Japan GAP Certified
Farm Marking

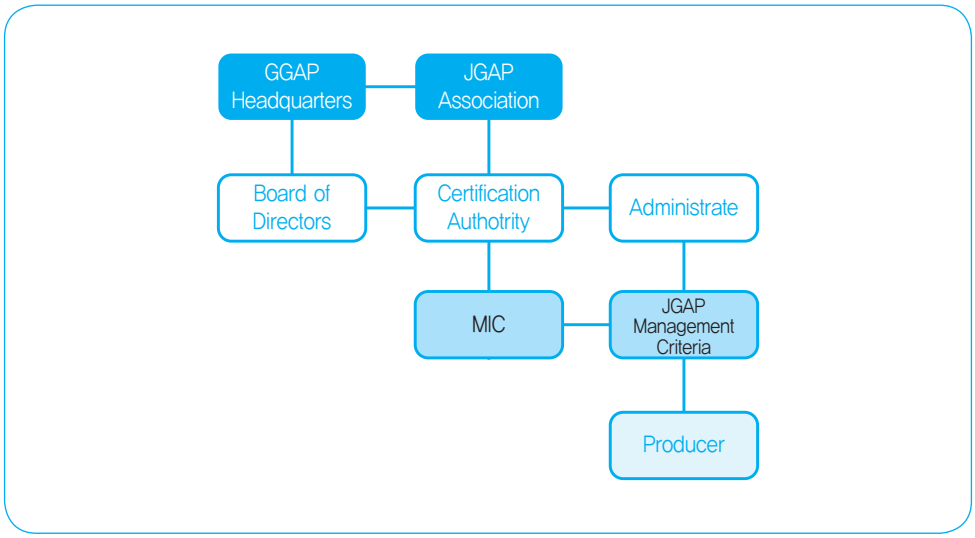
Japan GAP Certified
Farm's Agri-food Marking

Source : Japan GAP association, 2014.

b. Operational Organization

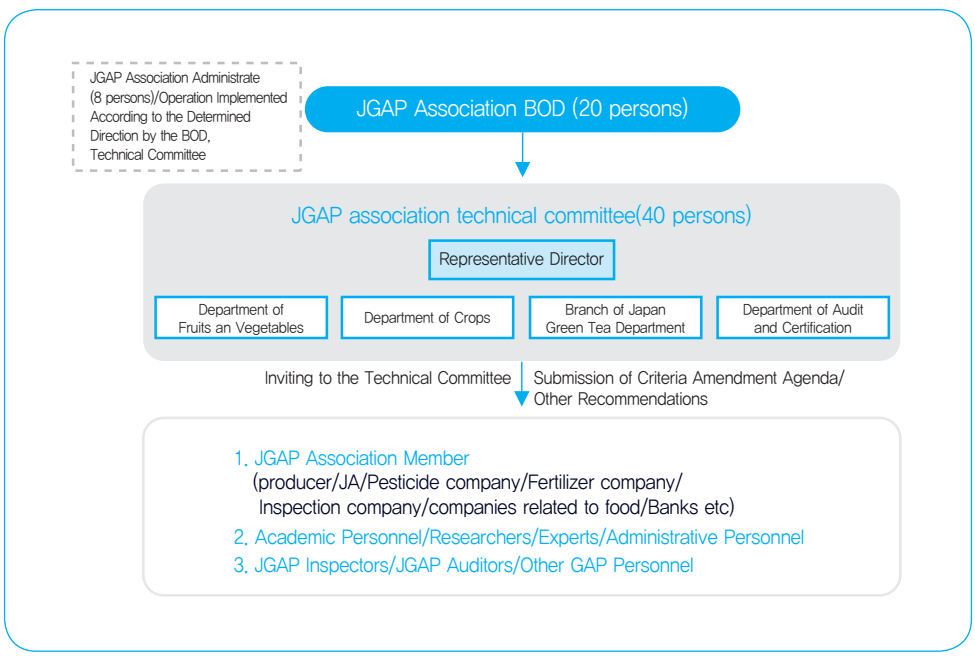
There are a total of five authorities for Japan's GAP certification. The Ministry of Agriculture, Forestry and Fisheries, distributors, Consumer Cooperatives, and the prefectures of Japan account for the certification. The Japan GAP association commissioned the MIC (Moody International Certification) to GAP-certify all Japanese agri-food. More than 120 different standard management practices such as pesticide and traceability are being examined and certified. The association performs operations such as accounting for GAP certification costs, certificate issuance and complementary standards, certified members management and certificate issuance to the certified farmers, and the management of examination results (National Agricultural Products Quality Management Service, 2013).

Figure 2-10 | Organization Chart of Japan GAP Association



Source: National Agricultural Products Quality Management Service, 2013.

Figure 2-11 | Description of Japan GAP Association Organization Chart



Source: National Agricultural Products Quality Management Service, 2013.

c. Purpose of JGAP Introduction

JGAP is the environment certification system for harvesting and producing safe agri-food free of chemical substances and bacteria–mainly to protect produce against substances. The system is being implemented in accordance with about 130 different management criteria. JGAP can be said to be the best management certification system in Japan and contains the most important criteria that enable the high level of trust in the production environment of Japan.

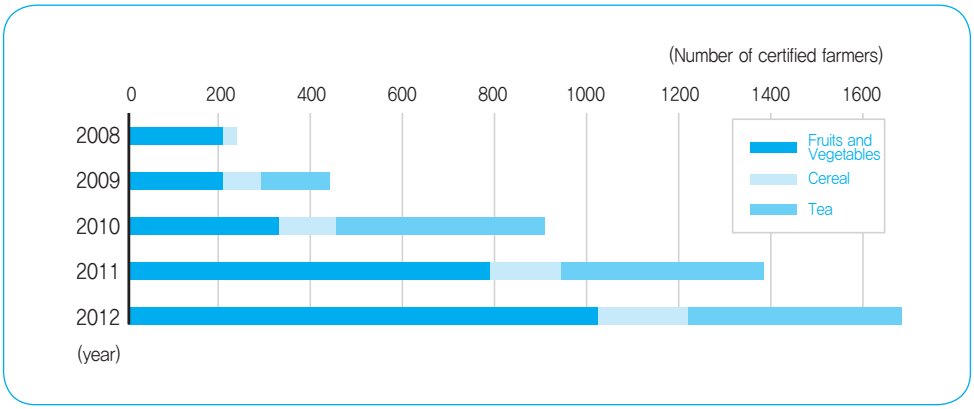
Japanese retailers follow JGAP and use it as an important indicator for transactions with suppliers. Also, through communication with the Global GAP of Europe, JGAP is continuously updated as a management skill (National Agricultural Products Quality Management Service, 2013).

d. Status of Promotion and Certification

In November 2002, Japan started investigating the reasons for food safety incidents by launching the traceability system. In August 2007, Japan GAP was confirmed by European and Global GAP standards. That is, by signing the agreement to apply the AMCL (Approved Modified CheckList) method, Japan GAP was able to issue certificates for its own exports of agri-food. Accordingly, the Japanese government had their farmers adopt the JGAP, which was tantamount to the Global GAP system, and expected an increase in exports. In March 2011, Japan identified a potential danger involving radioactive substances with the nuclear power station accident that occurred and revised the regulations accordingly.

The number of JGAP certified farmers (2012) reached 1690 units and is continuously increasing. JGAP was to be applied not only to the production steps of agri-food but also to the overall food supply system. The items targeted for certification inspection are 50 units of crops, fruits and vegetables, and all are subject to all of the processes, including water. The Japanese government and local government authorities created and published the certification management criteria manual, and efforts are underway to expand the system application (National Agricultural Products Quality Management Service, 2013).

Figure 2-12 | Number of JGAP Certified Farmers



Source: Japan GAP association, 2014.

3.2.4. Canada

Canada's GAP is a "Made-In-Canada" food safety program to provide food safety criteria for Canada and the certification system for supplying fresh agri-food. This program was set in a direction for preventing food safety risks based on HACCP and made to comply with already known procedures to minimize the hazardous factors in food safety.

The system is based on running scientific protective measures. Canada GAP educates suppliers of fresh agri-food on food safety guidelines, satisfies customer needs, and ensures that Canada GAP certified companies maintain their competitiveness in the international market (CanAgPlus, 2014).

Figure 2-13 | Canada GAP Program Certification Mark and Canada GAP Company Logo

Source: CanAgPlus, 2014.

a. Background of Introduction

In the latter part of the 1990s, Canada GAP created a food safety system that could be applied to farms in order to enhance the sense of food safety of fresh agri-food suppliers of the Canadian Horticultural Council (CHC) or producer associations for fresh fruits and vegetables (CanAgPlus, 2014).

b. Operational Organization and Scheme

Unlike other countries' GAP operational programs, Canada GAP is not run by the government but by a non-profit corporation. CanAgPlus was separated from CHC and has managed/audited/operated Canada GAP since 2012. CanAgPlus promotes the development of Canada GAP by managing and auditing the technical requirements of the Canadian government, as well as provides the support of federal government funding and technical support on specific product modules for federal and state government professionals. In 2013, the wholesale food safety and repacking programs of the CPMA (Canadian Produce Marketing Association) were integrated and operated (CanAgPlus, 2014).

c. Status of Promotion and Certification

Canada GAP was the first Canadian food safety program and internationally approved by the Global Food Safety Initiative (GFSI). In May 2010, the GFSI officially benchmarked Canada GAP and approved parts of Canada GAP certification options (Option B and C) to satisfy the requirements of international food safety. In other words, Canada GAP was recognized as having the same authority as Global GAP of Europe (CanAgPlus, 2014).

3.2.5. China

a. Background of Introduction

After joining the WTO, many food safety accidents and incidents were reported internationally in China, lowering the credibility of Chinese agri-food. Moreover, the major exporting countries of Chinese agri-food such as Europe and Japan reinforced the safety inspection for imported agri-food, which drove China to urgently improve the quality of their agri-food. Accordingly, in order to level up the hygiene and quality of agri-food, eliminate external distrust and increase exports, China introduced the GAP system. The Chinese government manages all steps of production and supply for agri-food ranging from farm to table, and leads the way in sanitation and safety (Dong Pil Lee, 2012).

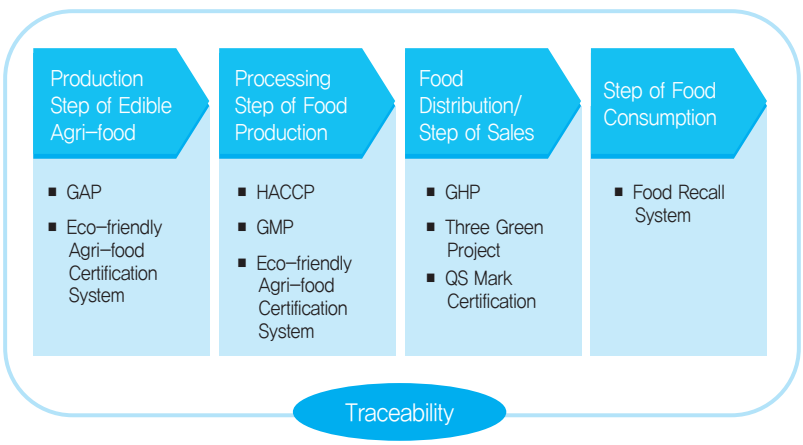
Figure 2-14 | China GAP Certification Marks

Source : The Korean Rural Economics Institute, 2012.

b. Operational Organization and Scheme

China GAP is made up of both government and private organizations. Four affiliated agencies (National Accreditation Regulatory Commission, CQC, OFDC, Good Agricultural Food Development Service Center) and 12 other private professional certification agencies perform GAP certification. The National Accreditation Regulatory Commission conducts the monitoring and supervising of professional certification agencies. GAP is in charge of several aspects of the overall food safety management system in China (National Agricultural Products Quality Management Service, 2014).

Figure 2-15 | Food Safety Operation System in China



Source: The Korean Rural Economics Institute, 2012.

c. Status of Promotion and Certification

In 2002, the National General Administration of Quality Supervision, Inspection and Quarantine Services in the Agriculture Department regulated agricultural pollution control measures. China GAP standards were set by the CNCA (Certification and Accreditation Administration of the People's Republic of China) under China's State Council, and the CQC is in charge of almost the entire GAP certification process. China GAP implements GAP for all agri-food and pays incentives to the concerned farmers (National Agricultural Products Quality Management Service, 2014).

Shandong Lai Yang Ruhwa Incorp was the first to obtain China GAP in June 2006. From this point on, China raised the level for agri-food quality safety and promoted an increase of exports overseas. China GAP was set up by benchmarking the management criteria of Global GAP, and currently applies and implements these criteria by dividing them into 1st and 2nd grades. As China has a large population and big land mass, the application of GAP standards has been low and severe in deviations. In February 2009, the "1st degree" of China GAP standards (classification standard unique to Chinese agriculture) was certified as being equivalent to Global GAP through an MOU signed by the Certification and Accreditation Administration of the People's Republic of China and Eurep GAP (now, Global GAP), MOU of technical cooperation between Food PLUS signed in May 2005, China GAP certification system, and Eurep GAP certification system standards comparison signed in June 2006. At present, though the GAP certification rate in China is low, education and promotion of the certification will lead to its expansion in the mid- to long-term (Dong Pil Lee, 2012).

3.2.6. Malaysia (SALM)

The Malaysia Ministry of Agriculture established the SALM (Good Farm Practice Scheme Malaysia) and attempted to produce an eco-friendly agricultural environment and safe agri-food of good quality. SALM is the integrated program of systems managed independently that supplies additional incentives to farmers complying with GAP in terms of crop management, post-harvest management, and recording systems. SALM was generated and based on the GAP draft of the FAO and "sanitation management criteria for fruits and vegetables" of the WHO/FAO, as well as the "Guideline for fruits and vegetables" contained in the Global GAP. If a problem is uncovered through implementation of the system, in accordance with SALM regulations (e.g., when residual pesticides and heavy metals are detected in harvested agri-foods), SALM will receive direction from a consultant (Department of Agriculture Malaysia, 2005).

Figure 2-16 | GAP Certification Mark of Malaysia

Source: Department of Agriculture Malaysia, 2005.

3.2.7. Thailand (Thai GAP)

Thailand is an agricultural country where more than 50% of the population works in agriculture. The nation ranked 7th among global top exporting countries in 2007. Thailand intended to adopt GAP to ensure the quality assurance of Thai fruits and vegetables as well as safety, and the Thailand Ministry of Agriculture and Cooperatives (MOAC) prepared Thai GAP standards based on the guidelines of the Cluster of Western GAP (Kasetsart University, Kampaengsaen Campus) and Global GAP. Thai GAP certified Agri-food contains the Q mark. The introduction of GAP in Thailand is still in its beginning stages. A lack of awareness of agri-food safety among farmers, short knowledge history of GAP, little understanding of GAP requirements, low motivation, and little understanding by the Thai government of the national role of GAP, as well as communication issues among the interested parties are some of the bottlenecks in the system's development (Thailand Ministry of Agriculture and Cooperatives, 2008).

Figure 2-17 | GAP Certification Mark of Thailand

Source: Thailand Ministry of Agriculture and Cooperatives, 2008.

GAP is not a compulsory regulation but simply a guideline for each state to operate according to its circumstances voluntarily and autonomously at the request of producers, packagers and delivery operators (Global Agriculture Policy Institute, 2007).

GAP in Japan is called JGAP, which is the most outstanding certification system in Japan. Its quality is continuously improving with the latest administrations through exchanges with Global GAP of Europe. With these efforts, Japanese GAP was acknowledged as an equal to Europe's Global GAP and increased exports. The number of JGAP certified farms is continuously increasing from approximately 200 in 2008 to a total of 1,690 in 2012. In Canada, unlike other countries, the GAP system is not operated by the government. Instead, CanAgPlus, a non-profit organization, has been supervising GAP since 2012. Canada GAP is an internationally recognized system and has an equal position to Global Gap of Europe.

GAP in China was introduced in order to secure the safety of exported agricultural products and smooth expansion of trade. The system was modeled after the administrative standards of Global GAP which are applied in two stages–class 1 and class 2. China has a large population and territory, making it difficult to promote extended application of GAP. However, class 1 was acknowledged as an equal to Global GAP (National Agricultural Products Quality Management Service, 2014).

GAP in Malaysia and Thailand was introduced in order to secure the safety and quality of fruits and vegetables. However, the level of farmers' awareness of agri-food safety still needs improvement. Their little understanding and knowledge of GAP principles is quite problematic.

2014 Modularization of Korea's Development Experience
Good Agricultural Practices (GAP)
for Agricultural Food Safety Management

Chapter 3

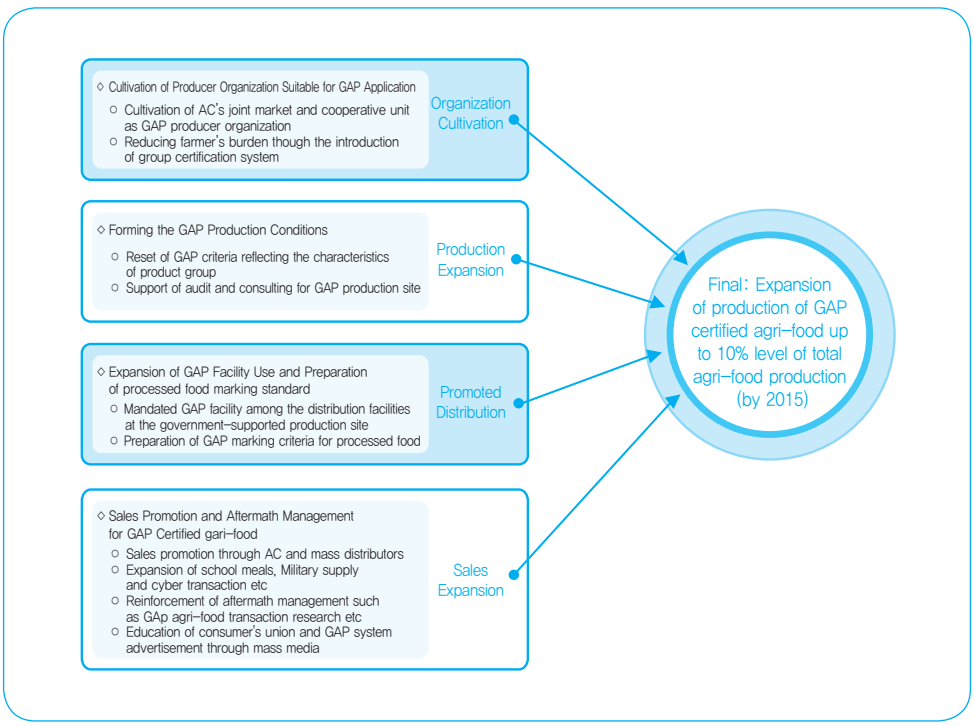
Promotional Strategies and System Analysis of GAP System for Agri-food Safety Management

1. Performed Strategies for Establishing the GAP System
2. Funding for GAP System Promotion

Promotional Strategies and System Analysis of GAP System for Agri-food Safety Management

1. Performed Strategies for Establishing the GAP System

Figure 3-1 | GAP Activation Policy



Source: Ministry of Agriculture, Food and Rural Affairs, 2011.

1.1. Cultivation of GAP Applied Producers

The primary organization implementing the GAP system for the production and delivery of agri-food is the Agricultural Cooperative, which has set a goal of growing by 3,000 GAP production organizations (3~5 item production per each unit) until 2015. To achieve this, the Agricultural Cooperative supports the distribution fund for the production site, as well as the training for the production related personnel.

The GAP group certification system (quality control act enforcement regulations were originally published by the quality control committee and put into effect in August 2012) is the certification system in a unit of a GAP production organization and implemented to reduce the burden of producers and farmers. When the producer unit wants to be inspected for GAP certification, the production unit will be in charge of the certification process, which will relieve each farmer's burden. This means the purpose of the group certification system is to manage GAP as the unit of the producer group and reduce the burden of each farmer, as well as to increase the number of GAP applied farmers.

1.2. Configuration of Smooth Production Conditions for GAP Certification Applied Farmers

1.2.1. Preparation of 'GAP' by Product Group

To set up the GAP certification standard, an agricultural extension agent classifies the GAP certification applied by a single standard (50 items) and divides the product groups by common standards and product group standards, classified into 6 groups, and subdivided into each product group. Common standards include the certification standard for items of traceability, soil management and water management. The product group was divided into such items as fruits, vegetables, medicinal herbs, and specialty crops, for which characteristics were considered when setting up the standard. The reformed GAP system has been in effect since August 2012 (The Rural Development Administration, 2012).

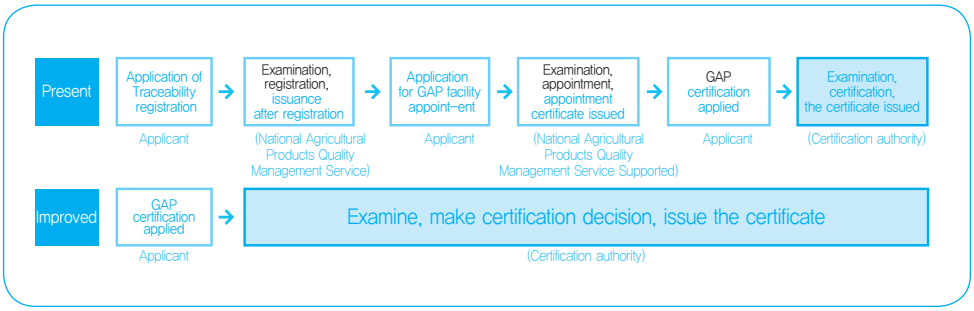
1.2.2. Expense, Administration, and Education Support

In 2012, the Ministry of Agriculture, Food and Rural Affairs set a goal of expanding GAP application to the 10% level (120,000 farmers, 170,000 ha) by 2015. To achieve this, the government will amend the Agricultural Products Quality Control Act to relieve the

burdens associated with GAP certification for farmers. The activation plan to set up the production conditions for GAP certification applied to farmers can be summarized into three aspects of expenses, administration, and education.

From the expense aspect, certification examination fees related to soil and water analysis are to be supported by the government, and half of the certification fee is paid for by the government. Local governments also contribute to the fund. Through a matching of funds with the local government, the supportive fund was expanded from 1.65 billion Won in 2012 to 2.5 billion Won in 2013. Furthermore, support for analysis expenses for heavy metals and residual pesticides was applied. From the administrative aspect, the validity of GAP certification was extended from the existing 1 year period to 2 years so as to relieve the burden of having to revise the certification every year (Agricultural Products Quality Control Act, 2012). In addition, GAP certification procedures (Max. 126 days → 42 days, shortened) were integrated, and mandatory submissive documents were reduced (12 → 3). In 2012, the requirement of the cadastral map for planned farmland was abolished, and by simplifying the administrative procedures regarding the duplicative required documents necessary for GAP certification examination on eco-friendly farmers through exemption and other methods, the government tried to increase participation in GAP certification. Moreover, by adding traceability to GAP criteria, a separate mandatory provision of a traceability system was abolished. When the hazardous factors for agri-food are being safely managed, the duty to pass through a GAP-appointed facility was exempted. After GAP certification, a certification checklist controlling the hazardous factors should be created and, based on this list, a hazardous factor management plan should be created as a convenience to farmers. Improving the displayed contents of GAP certification agri-food would also reduce the burden for farmers. From the educational aspect, since February 2012, the Agricultural Technology Center was appointed as the GAP certification authority to proceed with the consultation for individual farmers. The Center provided one-stop service to complete the processes up to the certification examination. GAP consulting related education was to be done through the cooperation of the AC by the personnel in the technology center.

Figure 3-2 | GAP Certification Procedures



Source: National Agricultural Products Quality Management Service, 2014.

1.3. GAP Facilities Improvement and Preparation of Marking Standards

1.3.1. GAP Facilities Expansion and Relief of Standards

To activate GAP, GAP facilities were expanded and, to supplement the distribution facilities and equipments, support was extended. Concerning the distribution facilities that the government supports such as the APC and RPC, they were mandated to meet the GAP facility criteria. Facility standards were relieved for small post-harvest management facilities that the certified farmer owned to be appointed a GAP facility (Quality Control Act Enforcement Regulations amended, effected in August 2012). Regarding GAP farmer owned facilities, mandatory provisions such as the transportation/movement of facilities were abolished as a GAP facility appointment requirement (Quality Control Act Enforcement Regulations). In addition, the requirements for facility management manpower were eased (for personnel working for agriculture, quality control jobs of more than 2 years could be approved as management personnel) and the conditions and requirements related to the transportation equipment, freezing and refrigeration facility were eliminated. Requirements for the workplace walls, ceilings, and doors were also eased. For example, it was no longer required to use water-resistant material, and easy cleaning conditions were mandatory.

1.3.2. Preparations for Labeling Standards for GAP Certified Agri-food and Repacking

Regarding the repacking marking standard while distributing GAP certified agri-food, the system has been revised to be able to mark GAP in the name of the GAP facility handler. In 2012, the basis for marking the processed products manufactured with GAP agri-food (Quality Control Act Enforcement Regulations amended, effected in August 2012) was prepared. It was agreed and promoted as a revision on marking standards within the Food and Sanitation Act. In addition, the labeling standard was revised and promoted to display one of the producer's names or handling facilities.

1.4. Expansion of Sales and Demand for GAP Certified Agri-food

1.4.1. Mass Market

GAP certified agri-food has been extended as a result of sales led by the AC. In 2012, the AC confederation supported the distribution fund. When evaluating the sales performance of AC distribution centers participating in the production and distribution of GAP certified agri-food, if sales are good by reflecting the sales volume of GAP certified agri-food, incentives are to be paid. An internet sales system was also constructed. Such a policy was applied for mass markets, and led by the advanced notification system for GAP certified agri-food sales to the mass markets, the promotion effect was raised. For example, 'DDEURANAE GAP agri-food' linked with the certification, production, and sales of GAP can be considered an example of promotion. Supply to the mass markets is possible by combining the GAP logistics system with the GAP distribution centers by facility. Lotte Mart set its GAP sales target at the 5% level in 2012 (Seong Goo Kim, 2012).

1.4.2. Group Catering

a. School Meals

GAP agri-food is a method to ensure safe eating, thereby minimizing incidents of food poisoning and safety issues related to the handling of food materials for group catering. As school meals are considered a suitable group catering program that demands the level of quality of a GAP certification system, the government formed an agri-food cooperation with Seoul city. The AC appointed and operated the pilot schools for GAP certified agri-food, and the Ministry of Agriculture, Forestry, Livestock jointly with Ministry of Education, Science and Technology held an agri-food safety management symposium for school meals as a way to promote the utilization of GAP agri-food to the personnel in charge of

school meals within the Department of Education. The GAP system and Agri-food safety management Symposium took place in 2010, targeting school nutritionists and nutrition teachers. In the future, the Ministry of Agriculture, Forestry, Animal Husbandry and Food declared that through discussions with other relevant departments, it would take active measures to change the system for GAP agri-food so as to become extensively used for group catering food supply.

b. Military Supply

In addition to school meals, military supplies were also recognized as justification for GAP distribution, leading to the argument that adopting GAP certification was necessary. In 2012, based on the standard operating procedure on product qualification criteria, it was decided that military supplies would take into primary consideration the use of GAP certified agri-food. The standard operating procedure was amended to grant more points for using GAP agri-food when in open competition among KS quality and HACCP appointed companies (Ministry of Agriculture, Food and Rural Affairs, 2011).

1.4.3. Reinforced Post Management

GAP agri-food also contains a mechanism for inspecting for microorganisms and pesticide residuals even after the initial certification process and during distribution.

1.5. Education and Promotion of GAP System

In Europe, GAP is accepted as the common safety management system for agri-food in production and distribution. However, the level of awareness and production volume in Korea are still low. Promotion of GAP certification is imminent. The Consumers' Union puts forth efficient education measures on appropriate subjects targeting consumers such as symposiums targeting parents and nutrition teachers, promotions for the officers in charge, continuous education for distributors, and brainstorming sessions with producers–all aimed at promoting the benefits of GAP agri-food. In addition, information related to the GAP system can be accessed more easily–through media advertisement, cyber curriculum establishment and education by internet.

The Consumer's Union of Korea conducted a total of 9 educational initiatives (involving 600 people) in 2007, and 8 initiatives (831 people) in 2008. Following the educational activities, the awareness of GAP among consumers was enhanced. Also, the Consumer's Union of Korea utilized both online and offline media to advertise GAP such as lectures and flash to create its own materials and distribute them to trainees, consumers, and the Ministry of Agriculture, Food and Rural Affairs.

Figure 3-3 | Consumer's Union of Korea, Educational Material Flash 'Agri-food Smart Consumption'

Source: Consumer's Union of Korea, 2014.

2. Funding for GAP System Promotion

2.1. Facilities Support

The government continues to encourage businesses to adopt and firmly institute GAP, particularly among distribution facilities of production sites. GAP facilities supplement existing businesses, helping to improve and maintain existing GAP facilities while encouraging the construction of new facilities. Also, funding support to farmers who apply for the GAP certification examination and for the travel expenses of the certification authorities began in 2008. About 1.4 billion Won was budgeted and processed as the operational fee to cover farmers' inspection fees and the work promotion cost for certification authorities (Ministry of Agriculture, Food and Rural Affairs, 2011).

Table 3-1 | Trends Related to Government GAP System Facilities

(Unit: million Won)

Classification	2005	2006	2007	2008	After 2009
Total	4,320	7,004	5,706	8,481	10,842
Support	2,920	3,824	3,840	4,743	7,576
Local Expenses	400	1,405	533	1,068	933
Self-charge	1,000	1,775	1,333	2,670	2,333
GAP Facilities Supplementation					
- Support	600	1,400	800	1,602	1,400
- Local expenses	100	1,405	533	1,068	933
- Self-charge	1,000	1,775	1,333	2,670	2,333

Source: Ministry of Agriculture, Food and Rural Affairs, 2011.

2.2. Support for Safety Inspection Fees

Support for safety inspection fees was introduced by the Ministry of Agriculture, Food and Rural Affairs in 2007 and served as an effort designed to further disseminate GAP system certification. In June 2010, it was decided that its commission should be transferred from the Agriculture, Forestry, Animal Husbandry and Food to the Food Agricultural Products Quality Management Service. In January 2012, the Agriculture, Forestry, Animal Husbandry and Food promoted the program of matching funds along with local governments as a GAP activation measure. At that time, a survey of local government opinions revealed that 9 cities and provinces hoped to participate in the business.

This business may extend the number of certified farmers to 10% of total farmers (120,000 units) by 2015, which is the policy target of the Ministry of Agriculture, Food and Rural Affairs. This would be made possible by reducing the burden of the GAP certification processes of participant farmers. Support targets farmers who implemented the safety inspection and paid for the expenses per the Agricultural and Marine Products Quality Control Act, Article 6. Inspection fees for soil, water quality for GAP certification and for pesticide residual and heavy metals charged by the Ministry of Agriculture, Food and Rural were remitted and paid, covered 70% through governmental expenditures and 30% through local governmental expenditures (National Agricultural Products Quality Management Service, 2013).

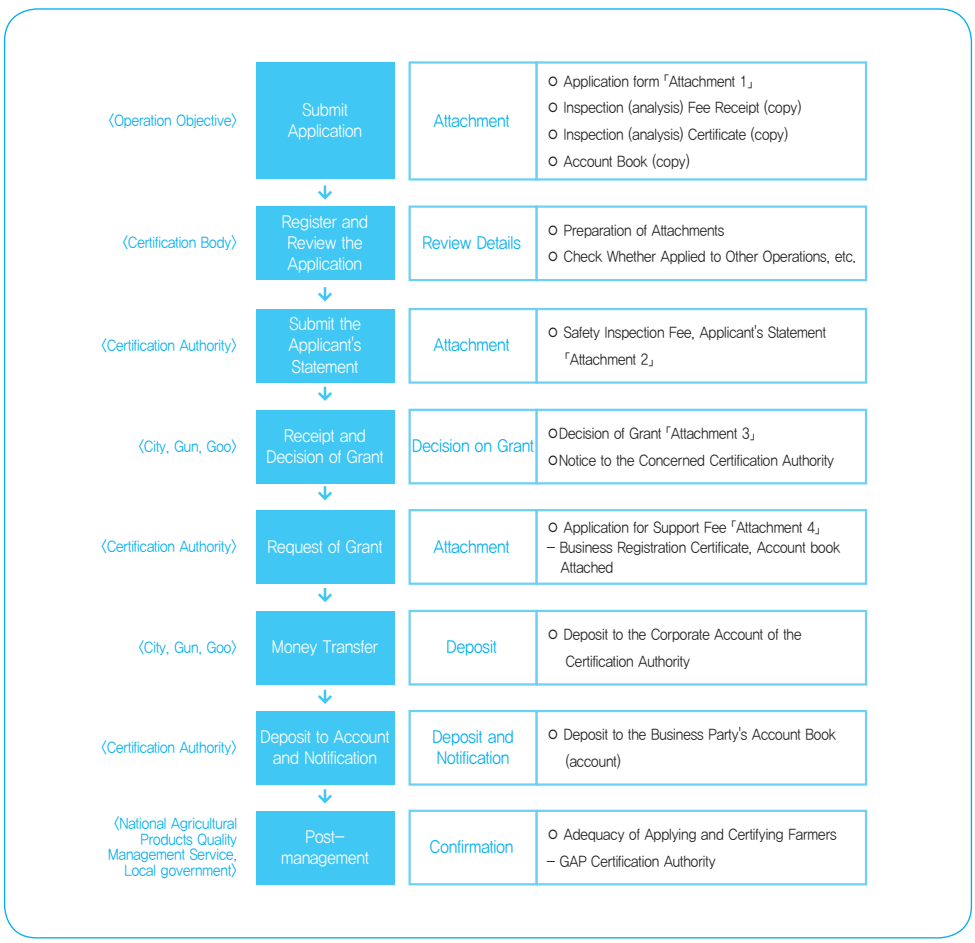
Table 3-2 | Budget Support Plan by Year

(Unit: million Won)

Classification	2007	2008	2009	2010	2011	2012	2013
Total	380	571	888	1,255	1,406	1,575	2,715
Governmental Expenses	380	571	888	1,255	1,406	1,575	1,900
Local Expenses	-	-	-	-	-	-	815

Source: National Agricultural Products Quality Management Service, 2014.

Figure 3-4 | Inspection Fee Support Program for GAP Certification and Enforcement Procedures



Source: National Agricultural Products Quality Management Service, 2013.

To summarize the GAP financing system, a matching fund between the national and local government in the ratio of 70% to 30% covers the analysis cost of land water. The Agricultural Technology Center was operated as a GAP certification and consulting institute. Submission documents for the GAP system were simplified for farmers (obligation to submit a land registration map of the relevant farmland to verify administrative information was abolished) to lessen the burden on farmers. Also, local distribution facilities were provided with GAP equipment to gradually expand GAP facilities. The APC and RPC, government funded distribution facilities, were also required to meet GAP facility standards. Local distribution facilities owned by GAP certified farmers and producer organizations that meet certain standards were acknowledged as GAP facilities in order to expand GAP facilities and to promote convenient use of facilities (Korea Rural Economic Institute, 2012). Based on these methods of support for facilities and certification examination expenses, the number of GAP certification increased greatly from 200 in 2006 to 2,499 in 2013. The number of farms also increased to 46,000 in 2013 from 3,659 in 2006 (National Agricultural Products Quality Management Service, 2014).

2014 Modularization of Korea's Development Experience
Good Agricultural Practices (GAP)
for Agricultural Food Safety Management

Chapter 4

Details and Promotion Status Surveys of GAP System

1. Main Contents of GAP System
2. Establishment of Organization for Instilling and Stabilizing the GAP System
3. Policies and Major Functional Changes of the Authority According to Time Flows and Domestic/Overseas GAP System Environments

Details and Promotion Status Surveys of GAP System

1. Main Contents of GAP System

GAP is the system to ensure safety by managing potential hazardous factors such as pesticides, heavy metals or hazardous organisms, which could remain in agri-food from the production to post-harvest packing stages, and supplying safe and sanitary agri-food to consumers. The system is intended to allow the government to standardize safety criteria for supplying safe agri-food regardless of the presence of hazardous factors in the final agri-food product. This is done by analyzing and removing in advance or reducing various hazardous factors which can be mixed in during the cultivation environment, cultivation processes, harvest stages, post-harvest treatments, and storage phase.

The introduction of the GAP system can also ensure the safety of agri-food by strengthening competitiveness through quality and differentiation. Specifically, the system enables Korea to comprehensively manage food and prevent incidents that become more prevalent during agri-food market opening periods (FTA) (Ministry of Agriculture, Food and Rural Affairs, 2013).

1.1. Promotion Status

Surveying the promotion progress of GAP certification, the Agricultural Cooperative, Agriculture and Fisheries Trade Corp., Korean Medicine Herbal Association, Korean Ginseng Corp, Jangwon Industrial Co., Ltd., and Pulmoowon participated with 42 products–including watermelon, strawberry, and ginseng–as part of a pilot project in 2006 (2003~2005) before the official start of the system. The pilot began with the participation of 9 farmers in 2003, and 1,000 farmers joined in 2005 (National Agricultural Products Quality Management Service, 2014).

An amendment of the "Agricultural Products Quality Control Act" and its sub provisions, as well as related regulations such as GAP management criteria, applicable products, and detailed implementation guides, were enacted (January 2006). In 2006~2007, the GAP/Traceability system was established. In September 2008, the number of target products for GAP certification and traceability were extended to 105 products (edible crops 10, specialty crops 4, medicinal crops 34, mushrooms 10, vegetables 30, and fruits 17). In December 2009, the title of GAP was changed to AGP, and in December 2009, GAP certification and traceability target products were extended from 105 products to all products cultivated in the country (National Agricultural Products Quality Management Institute, 2014).

Table 4-1 | GAP Appointments by Year

Year	Certified Products (product)	Certification Authority (unit)	Management Facilities (unit)	Certification Cases (case)	Number of Farmers (unit)	Harvest Areas (ha)
2013	127	48	756	2,499	46,000	58,703
2012	110	51	718	1,969	40,215	55,215
2011	89	49	606	1,756	37,146	49,548
2010	86	45	565	1,459	34,421	46,701
2009	59	43	484	1,233	28,562	40,081
2008	59	38	417	1,053	25,158	37,129
2007	50	31	316	364	16,769	24,754
2006	45	21	190	220	3,659	1,373

Source: National Agricultural Products Quality Management Service, 2014.

Table 4-2 | GAP Appointment by City/Province

City /Province	Number of Certification Cases	Number of Farmers (Farmhouse)	Cultivating Areas Rate (%)	Planned Production (ton)
Seoul	1	1	0.0	0
Busan	3	97	0.2	104
Incheon	5	39	0.1	129
Daegu	0	0	0.0	0
Gwangju	5	278	0.6	171
Daejeon	4	18	0.0	10
Ulsan	2	144	0.3	171
Sejong	14	123	0.3	105
Kyunggi	164	8,030	17.5	10,121
Gangwon	116	4,171	9.1	10,413
Choongbuk	269	3,656	7.9	3,557
Choongnam	809	4,915	10.7	6,142
Jeonbook	352	9,133	19.9	13,419
Jeonam	111	4,662	10.1	4,114
Kyungbuk	279	8,640	18.8	7,844
Kyungnam	177	1,169	2.5	1,138
Cheju	188	924	2.0	1,265
Total	2,499	46,000	100	58,703

Source: National Agricultural Products Quality Management Service, 2014.

1.2. Introduction of GAP Related Markings

The design of the GAP symbol is made up of the symbols for country and an official stamp. The stamp-like square frame symbolizes trust and guarantee. The coloring was generally green with an exceptionally applied red and blue highlight for better visibility on the package and an aesthetic shape. The name was simply and clearly expressed for consumers to understand easily (National Agricultural Products Quality Management Service, 2014).

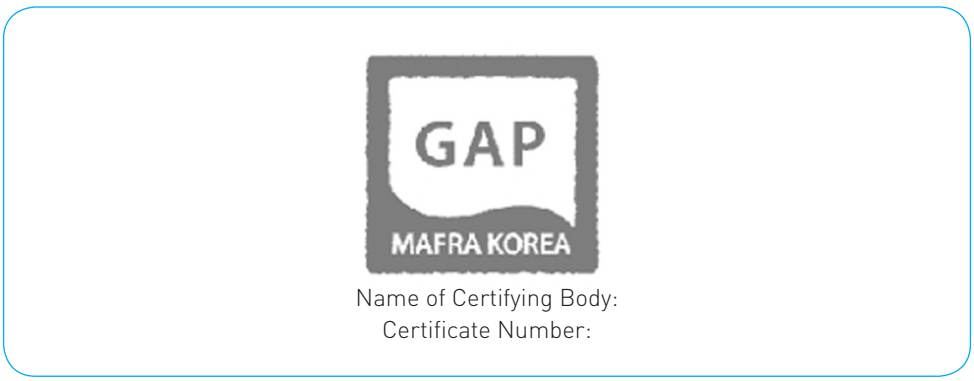
1.2.1. Marking Contents

a. Display

For domestic use of GAP certified agri-food, Hangeul is used. For export use, Hangeul and English are used (National Agricultural Products Quality Management Service, 2014).

b. Production sites (City, province, gun, gu), products (species), weight, pieces, grade, year of production, producer (producer group name) or good management facility name, and traceability number

Figure 4-1 | GAP Certification Mark



Source: National Agricultural Products Quality Management Service, 2014.

1.2.2. Method of Marking

The size of GAP markings can be enlarged or reduced depending upon the size of the packing material. It is to be displayed on the side of the packing material. However, from the structure of the packing material, if it is difficult to be placed on the side, its location can be changed. Labeling content should be printed for customers to be able to recognize easily. Or it may be attached as a sticker so as not to be separated from the packing material.

In cases of being sold without packing, in bulk, or in a form that makes it difficult to print or attach both the GAP marking or contents label, only the GAP marking can be displayed. For export use, the stamp may depend upon the requirements of the concerned country. Or the contents may be displayed in accordance with other regulations such as standardized specifications. Any geographical markings can be omitted.

1.2.3. Display Contents

The size of the display can fit into the packing material. However, the shape of the marking and display of the letters cannot be changed. The production site is where the products are produced and is to include the name of the city, province or city, gun, and gu–which are to be written in accordance with the regulations regarding the place of origin. The products (species) will be marked as per the Seeds Industrial Act, Article 2, No. 4, or Article 7 Section 2 No. 3. The weight and pieces are to be presented in net weight or by piece, and the degree will be used according to the standardized specification in the case of items where standardized specifications are applicable. When standardized specifications are not applicable, the format should follow general trading practices.

Also, only rice is to be marked with the year of production. And in the case of agri-food in transit to a good management facility, the good management facility's name is to be used, and the name of the representative, address, telephone number, and the location of the workplace should be displayed. The producer (producer group) will be displayed with the names of the producer or organization, address, telephone number, and traceability number, enabling the tracking of the product.

1.3. GAP Certification Content and Procedures

Determining the eligibility of an individual production farmer or producer group (Act, Article 6, Rule 10) is the job of the GAP certification agent appointed by the president of the agricultural products quality management institute. Farmers may apply for GAP certification when the item of interest is either an agri-food currently in the production stages in accordance with the certification criteria or an agri- and forestry-food being no more than 2/3 into its growth period. The certification is valid for 2 years, and depending upon the characteristics of the products, may have different validity periods (Section 07, Paragraph 1, Article 14 paragraph on Terms and Rules). For example, ginseng, certain medicinal crops, Matrimony, Angelica, Maekmoondong, Coix, Peony, Cnidium, Schizandra, Rehmannia gluinosa, Yam, Cornus, Shiho, In Sentico, White sewage, Alismataceae, Ma, Bellflower, Gamguk, Licorice, Gwakhyang, Sasam, Wooseul, Sambaekcho, Baekchool, and Raspberry have validity periods of 3 years. The certification target products are agri-products produced and managed for eating purposes.

Table 4-3 | GAP Certification Objective Products

Classification	Name of Products					
Food Products (12)	Rice	Bean	Rye	Unhulled barley	Two rowed barley	Wheat
	Corn	Sweet potato	Sweet bean	Potato	Rye	Oat
Specialty Products (4)	Sesame	Perilla	Peanut	Green tea		
Medicinal Products (29)	Matrimony	Angelica	Maekmoondong	Coix	Peony	Astragalus
	Ginseng	Cnidium	Schizandra	Rehmannia gluinosa	Yam	Golden
	Cornus	Shiho	Sentico	White sewage	Alismataceae	Hyanguja
	Ma	BEllflower	Gamguk	Licorice	Gwakhyang	Dokwhal
	Sasam	Wooseul	Sambaekcho	Baekchool	Rasberry	
Mushrooms (9)	Button mushroom	Oyster Mushroom	Top mushroom	Ganoderma lucidum	Poria cocos	Cordyceps
	Hericium erinaceus	Pegasus mushroom	King Oyster mushroom			
Vegetables (28)	Pepper	Cabbage	Watermelon	Green pepper	Strawberry	Garlic
	Cucumber	Radish	Melon	Green onion	Onion	Pumpkin
	Lettuce	Bell tomato	Ripe tomato	Spinach	Carrot	Eggplant
	Melon	Ginger	Cabbage	Buttercup	Paprika	Crisp lettuce
	Andy probe	Perilla leaf	Kale	Others		
Fruits (14)	Apple	Pear	Sweet persimmon	Astringent persimmon	Grape	Peach
	Plum	Jujube	Japanese apricot	Kiwifruit	Citron	Cherry
	Apricot	Citrus				

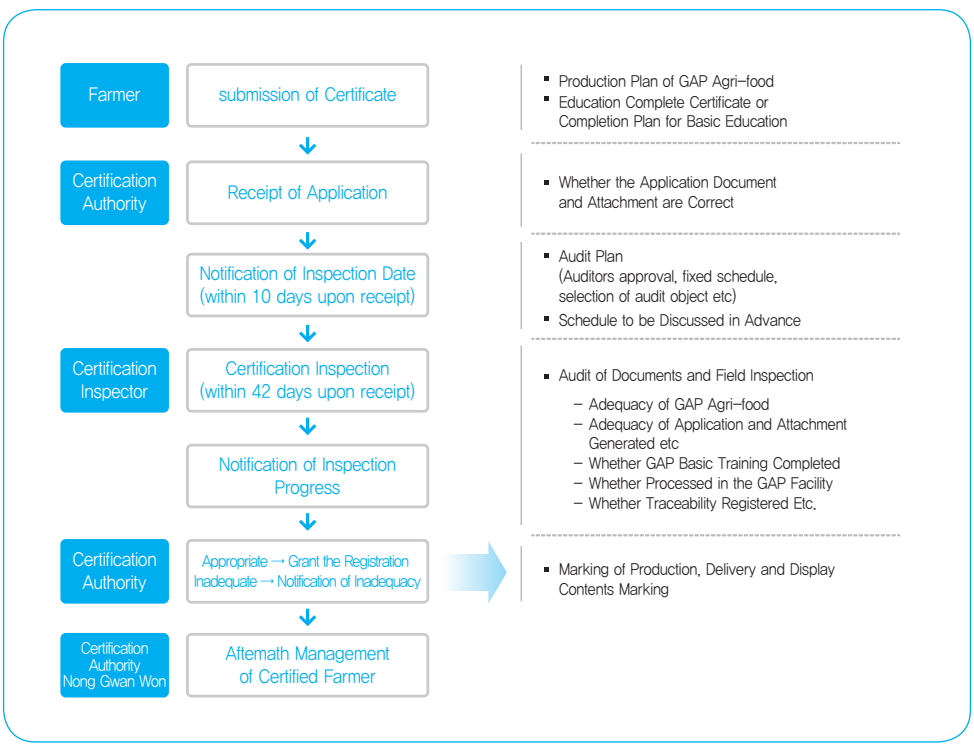
Source: National Agricultural Products Quality Management Service, 2014.

The certification standards are covering what are produced and managed in compliance with GAP criteria, what are managed after harvest in the GAP management facilities, and what are registered for traceability. However, from the product characteristic, those deemed unnecessary for management specifically at a GAP facility by the Ministry of Agriculture, Food and Rural Affairs will be excluded.

With regard to certification procedures, first a farmer submits the production plan with a plan to complete the educational portion of the certification or the actual completion

certificate to the certification authority. The authority then receives the application and examines the application documents to determine suitability of the attached materials. Following a thorough examination of the documents and field site, the certification examination organization will assess the adequacy of the GAP standards, application and attached documents, whether or not the basic GAP education was completed and the item was treated at a GAP management facility, registration of traceability, and other factors. The certification authority will then determine whether or not the criteria were adequately met in granting registration to the product, allowing for the production of certified products, delivery and display contents to be appropriately marked. The certification authority and National Agricultural Products Quality Management Service will perform the post-certification procedures.

Figure 4-2 | GAP Certification Procedure



Source: National Agricultural Products Quality Management Service, 2014.

1.4. GAP Facilities

GAP certified agri-food focuses on the hygiene and safety of agri-food, as well as promoting an agricultural environment and the sustainable development of agriculture; proper management of hazardous factors such as organic residual contamination, heavy metals or hazardous organisms that can remain in the packing and agricultural water during each step of the production and post-harvest management process (including storage, cleaning, dry, selection, cutting, blending, and packing); and distribution of agri-food. As agri-food is processed differently from other foods in the production and management stages, the government (National Agricultural Products Quality Management Service) is to assign specific management facilities to ensure that they meet post-harvest management facility standards and produce agri-food in a safe and secure environment.

In order to qualify as a GAP certification marked agri-food, the food should be processed in GAP facilities appointed by the government (National Agricultural Products Quality Management Service). The GAP management facility appointment implies specific standards have been met (organization and manpower, building, workplace, post-harvest management facility, storage facility, transportation/movement equipments, and hygiene management) (National Agricultural Products Quality Management Service, 2014).

1.4.1. GAP Facility Appointment Criteria

a. Organization and Manpower

Organization: The GAP facility shall be equipped with the capability to execute the GAP management business. If businesses other than GAP management is being carried out, such execution should not impact the GAP management business in an unfair manner.

Manpower: More than 1 personnel in charge of the GAP management business should be provided, and the concerned personnel in charge of the GAP management business should correspond to one of the following–and also be educated in the proper role and attitude as the personnel executing the GAP management business per the criteria set forth by the president of the National Agricultural Products Quality Management Service, regulations related to GAP management, GAP facility standards, management procedures of the GAP facility, and other requirements:

○ Person holding at least a Bachelor's degree as per the Higher Education Act, Article 2, Section 1

○ Person holding at least a specialized Bachelor's degree from a specialized university as per Article 2, Section 4, also possessing work experience in quality control for agri-food at an agriculture related company, researcher, agent or organization of at least 2 years

○ Person is licensed as an Agri-food quality controller, technician, engineer, or industrial technician, per the National Technology Qualification Act. However, a person holding an industrial technician license should have experience managing an agri-food quality control operation at an agriculture related company, researcher, organization and association of at least 2 years

○ Person with experience managing an agri-food quality control operation at an agriculture related company, researcher, organization and association of more than 3 years

○ Person with experience working in an agri-food quality control operation for more than 4 years. However, in the case of a production site distribution facility owned for post-harvest management of the agri-food internally produced by the farmer or producer group, the person should be have experience working for an agri-food quality control operation for more than 2 years (including working period for agriculture).

b. Facility

GAP facility shall be managed in accordance with GAP management standards as per Act Article 6, Section 1. Also, the GAP facility shall satisfy the following facility standards:

Table 4-4 | GAP Facility Appointment Standards

Facility Criteria (Rice comprehensive treatment warehouse in accordance with Act Article 11, Section 1)	
Facility	Location of the building for post-harvest treatment facility and complete products storage facility should be isolated so as not to be hazardously impacted by facilities holding livestock wastewater, chemical substances and other potential contaminants.
Dry/Storage Facility	A) Facilities of drying and storage should be built in the structure and have no crop remains or must be cleaned.
	B) Storage facility should be equipped with devices to lower the temperature of crops such as ventilation or cooling. Temperature measuring devices to check the temperature of crops should be in good working order.
	C) Storage facility should be structured so as not to be invaded by rats or other pests. Materials impacting the crops like pesticides should not be stored with the crops.
Processing Room	A) The processing room to process and pack the raw material crops should be isolated or sectioned off with dividing walls from the facilities where receipt, drying and storage take place, including the by-products room.
	B) The rice processing room should be isolated or divided with walls to separate brown rice, white rice, packing processes, completion processes, and packing material storage processes.
	C) The floor of the processing room should be constructed with solid material to sustain the loads and prevent harmful impact. Nor should there be holes or severely broken gaps or holes.
	D) The inner walls and ceilings of the processing room should be built with materials so as not to impact the crops. The structure should be cleanable and not accumulated with dust or other factors that are conducive for microorganisms to grow.
	E) Door of the processing room should be strong and closable. The door to frequent traffic or forklifts should be double-walled. The outer door should be solid and also closable. The inner door should be structured to open and close quickly so as to prevent dusty conditions.
	F) The window of the processing room should be closable. Anti-insect mesh should also be installed.
	G) Processing room should be installed with an outside air ventilation hole to collect dust. The outer air ventilation hole should be equipped with air filters to prevent dusts or foreign particles from entering.

Facility Criteria (Rice comprehensive treatment warehouse in accordance with Act Article 11, Section 1)	
Processing Room	H) Lighting in the processing room should be appropriate for working conditions, and protective devices such as covers should be installed.
	I) By-products generated in the processing room should be collected in the structure so as not to attract dust. They should be maintained and not released or stored with other by-products or competing products. Packing and other materials should be confined to a sectioned-off processing room.
	J) The vacuuming cleaning system should be equipped to upkeep the processing room in a sanitary manner.
Processing Facility	A) Parts coming in direct contact with the polished rice in the processing room such as the transferring facility, transferring pipe, and storage vessels should be smooth and corrosion-resistant like stainless steel with no holes or cracks.
	B) Processing facility should be equipped with pest and rodent deterrents.
	C) Each machine unit, transfer facility and storage vessel should be easy to find in the structure, and the remaining crops cleaned.
	D) Equipment to remove foreign materials and other pieces of different crops should be readily available.
Dust collection Facility & By-product Warehouse	A) To prevent cross-contamination from dust, dust collection facilities should be installed by sectioning it off from the processing room.
	B) The dust collecting facility should be sufficiently equipped to remove dust and powder created in the processing room. The dust collection facility should be maintained in a continuously operable condition.
	C) The rice hull room, rice polishing room and other by-products room should be in the structure where dust generated inside is not sent outside.
Water Treatment Facility	A) The quality of water to be used for washing and processing of crops should be above that of drinking water, regulated by the environment policy basic rule and underground water regulation. If recycled water is used, it should be purified water. When using underground water, the water-intake source should be far away–more than 20 meters from a toilet, waste treatment facility, livestock cage, or anywhere underground water may become polluted.
	B) Water to be used for crops should be assessed more than once a year and checked to see if it meets drinking water standards.

Facility Criteria (Rice comprehensive treatment warehouse in accordance with Act Article 11, Section 1)	
Water Treatment Facility	C) The water storage tank should have a closing cover and locking system so as to prevent contamination.
Hygiene Control	A) Toilet should be equipped with a water-washing system separate from the processing room to be maintained in a sanitary manner. A hand washing and hand dryer should also be available.
	B) Sanitary uniforms for processing room personnel should be supplied, and a changing room should be installed.
	C) Space dedicated to store a cleaning facility and tools should be prepared.
Other Facilities	A) Waste material treatment facility should be built far away from the processing room.
	B) If a waste water facility is needed, it should be equipped away from the workplace.
Management & Maintenance	To manage a GAP facility, a flow chart of facility and machinery equipment and maintenance chart should be prepared.

Source: National Agricultural Products Quality Management Service, 2014.

Facility Criteria (Agri-food free distribution center and post-management facility of post-harvest agri-food in accordance with Act Article 11, Sections 1, 2, 3)	
Building	Location of the building for post-harvest treatment facility and complete products storage facility should be isolated so as not to be hazardously impacted by the facilities of livestock wastewater, chemical substances and other contamination-occurring facilities.
Workplace	Workplace means the working room to manage the post-harvest agri-food, and the selection and storage facilities should be separated or divided (with dividing walls or curtains). However, due to the automation of working processes or characteristics of agri-food, when approved, separating or dividing may not be necessary.
	A) Floor and inner walls and ceiling of the workplace should be constructed in the following structure. (1) Floor should be of a solid material that is impact-resistant, and draining shall occur easily.
	(2) Draining path should be installed for easy draining and cleaning, as well as preventing any cross-contamination. It should also be installed so that waste water flows reversely or the sediment does not accumulate.

Facility Criteria (Agri-food free distribution center and post-management facility of post-harvest agri-food in accordance with Act Article 11, Sections 1, 2, 3)	
Workplace	(3) Inner walls should be installed as water-resistant, and certain structural elements should not be visible (H beams, etc.) which could be breeding grounds for microorganisms, etc.
	(4) Ceiling should be used with materials so as not to harm the agri-food, and installed infrastructure should not be seen (H beams, etc.) as dust or microorganisms are feared to accumulate. However, the salient H beam and piping absent of any dust or microorganisms, and utilization of corrosion-resistant treatments may constitute exceptions to this policy.
	(5) Door should be made of solid and water-resistant materials and easy to clean.
	A) Lighting or lightings should be maintained at appropriate conditions for a working environment.
	B) Work place should be equipped with a ventilation facility to remove odors, hazardous gas, smoke, steam, etc., as they arise.
	C) Doors and windows of the workplace should be closed up, and the windows should be installed with anti-insect mesh to prevent the invasion of hazardous insects.
	D) When dust or powder is generated in the working process, dust collecting equipment should be prepared.
	E) Piping in the workplace should be maintained and clean at all times.
Post-harvest Management Facility	A) Machinery and tools necessary for managing the post-harvest agri-food should be kept as per the characteristics of the agri-food.
	B) Out of the treatment facilities for agri-food, parts coming in direct contact with agri-food should be smooth and corrosion-resistant, and have no holes or cracks, and be washable and fumigated.
	C) Cooling and heating facilities should be installed with a thermometer or device to assess the temperature, and be maintained at the appropriate temperature.
	D) Treatment facility should be maintained and managed in a sanitary manner.

Facility Criteria (Agri-food free distribution center and post-management facility of post-harvest agri-food in accordance with Act Article 11, Sections 1, 2, 3)	
Water Treatment Facility	A) The quality of water to be used for washing and processing of crops should be above that of drinking water regulated by the environment policy basic rule and underground water regulation. If recycled water is used, it should be purified water. When using underground water, the water-intake source should be far away and more than 20 meters from a toilet, waste treatment facility, livestock cages, and other places where underground water may be polluted.
	B) Water to be used for crops should be assessed more than once a year and examined to meet the drinking water standard.
	C) The water storage tank should have a closing cover and locking system so as to prevent incoming contaminants.
Storage (ex. cold storage) Facility	Storage facility means a low-temperature storage facility for post-harvest raw material and quality management. However, if the objective agri-food is regarded as not necessary for the low -temperature storage, it may not need to be installed.
	A) Wall and the inner layer of the ceiling should be finished with water-resistant insulating panels, in principle.
	B) Windows or doors should installed with anti-insect mesh to prevent access by birds, rats and farm animals.
	C) Agri-food in need of cold storage (freezing and cooling) should be equipped with stackable panels for smooth flow of cool air to keep the appropriate temperature.
	D) Thermostats installed in the refrigerator (freezing and cooling) room should be in a location suitable for controlling temperatures so as to be able to monitor temperatures from outside.
Transportation /Movement Equipments	A) Moving vehicles should be managed in a way that the transporting agri-food is not to be contaminated from the outside, and the agri-food requiring refrigerated distribution should be contained in the refrigerator.
	B) Vessels to be used for transportation and movement should be easy to clean and fumigate and dry, when necessary.
	C) Tools for transportation, movement, and storage should be maintained in a clean and sanitary manner.

Facility Criteria (Agri-food free distribution center and post-management facility of post-harvest agri-food in accordance with Act Article 11, Sections 1, 2, 3)	
Hygiene Management	A) Toilets should be installed separately from the workplace in water washing types, and a hand washing facility and hand dryer should be equipped (excluding those places using disposable tissue).
	B) Toilets should be maintained in a sanitary manner.
	C) Appropriate cleaning facility and tools should be placed in the dedicated storage place.
Other Facilities	A) If a waste treatment facility is necessary, the facility should be constructed and managed far away from the workplace.
	B) Waste water treatment facility should be installed and operated far away from the workplace. However, in the case of simple washing, the waste water treatment facility may not be installed.
Maintenance	For efficient management of a GAP facility, the following materials should be prepared: - Work procedure chart with machinery facility locations - Workplace, machinery facilities, storage facility, inspection standards and management checklist for toilets

Source: National Agricultural Products Quality Management Service, 2014.

Facility Criteria (Self-holding facilities for post-harvest management of agri-food by the farmer or production organization itself)	
Building	Location of post-harvest management facility for agri-food and storage facilities for raw materials and complete products should be isolated so as not to be impacted by agri-food from facilities containing livestock waste water, chemical substances and other contaminants.
Workplace	Workplace means the working place for the selection of agri-food, post-harvest management and storage.
	A) Floor and inner walls and ceiling of the workplace should be constructed as follows: (1) Floor should be made of a solid material that is impact-resistant, and draining shall be made easy.
	(2) Draining path should be installed for easy draining and cleaning, and be free of cross-contamination. It should also be installed in a way that waste water flows reversely or the sediment doesn't accumulate.

Facility Criteria (Self-holding facilities for post-harvest management of agri-food by the farmer or production organization itself)	
Workplace	(3) Inner walls should be installed as water-resistant, and the infrastructure should not to be visible (H beams, etc.) as exposure poses a threat for the growth of microorganisms.
	(4) Door should be made of solid and water-resistant materials and easy to clean.
	(5) Lighting or lightings should be maintained as appropriate conditions for a working environment.
	B) Workplace should be managed in a sanitary manner.
Management Facility for Post-harvest	A) Facilities such as machinery and tools necessary for the post-harvest management should be supplied and managed.
	B) Treatment facilities should be maintained and managed in a clean and sanitary manner.
Water Treatment Facility	A) The quality of water to be used for washing and processing of crops should be above that of drinking water regulated by the environment policy basic rule and underground water regulation. If recycled water is used, it should be purified water. When using underground water, the water-intake source should be far away and more than 20 meters from the toilet, waste treatment facility, livestock cages, or other location where underground water may be polluted.
	B) Water to be used for crops should be assessed more than once a year and checked to meet the drinking water standard.
	C) The water storage tank should have a closing cover and locking system so as to prevent incoming contaminants.
Storage Facility	Storage facility means the facility to store the original products of post-harvest agri-food.
	A) Windows or doors should be installed with anti-insect mesh to prevent access by birds, rats and farm animals.
	B) Storage facility should be managed in a clean manner.
Transportation and Movement Facilities	A) Vessels to be used for transportation and movement should be easy to clean and fumigated and dried.
	B) Distribution facilities for transportation, movement, and storage should be managed in a clean and sanitary manner.
Hygiene management	A) When equipped with a toilet, the hand washing facility and hand dryer (excluding places using disposable tissue) should be built.
	B) Toilet should be managed in a clean and sanitary manner.
	C) Appropriate cleaning facility and tools should be prepared.

Facility Criteria (Self-holding facilities for post-harvest management of agri-food by the farmer or production organization itself)	
Other Facilities	A) If a waste treatment facility is necessary, the facility should be equipped and managed far away from the workplace.
	B) Waste water treatment facility should be equipped and managed far away from the workplace. However, for simple washing, it may not be necessary to install a waste water facility.
Maintenance	The following materials should be prepared for the efficient management of GAP facilities: - Management record sheet

Source: National Agricultural Products Quality Management Service, 2014.

c. Operational regulations for GAP facility

Operational regulations for a GAP facility shall include information on post-harvest management products, how to handle GAP certified agri-food, how to maintain the post-harvest management facility, management procedures for post-harvest GAP certified agri-food, compliance regulations for GAP management facility workers and internal management and supervisory matters, matters concerning educating workers on GAP facilities, and other matters deemed necessary by the president of the National Agricultural Products Quality Management Service for optimal performance of a GAP facility.

1.4.2. Examples of GAP Facility Appointment

a. DaeSan AC APC located in Daesan myun, Euichang Gu, Changwon city and Chilbuk Yirong Organic Valley located in Chilbuk myung, HamAn Gun

National Agricultural Products Quality Management Service, Kyungnam office, appointed DaeSan AC APC located in Daesan myun, Euichang Gu, Changwon city, and Chilbuk Yirong Organic Valley located in Chilbuk myun, HamAn Gun, as GAP facilities. These companies were appointed as GAP facilities for safe and sanitary management of post-harvest agri-food through the examination of the appointment requirements and facility standards regulated by the Agricultural and Fisheries Products Quality Control Act (National Agricultural Products Quality Management Service, 2012).

Figure 4-3 | Daesan Agricultural Cooperative's APC Packing Shed (Paprika)

Source: National Agricultural Products Quality Management Service, 2012.

Figure 4-4 | Chilbuk Yiryeong Organic Valley Packing Shed (Sweet Persimmon)

Source: National Agricultural Products Quality Management Service, 2012.

b. Okjong dried persimmon located in Okjong Myun, Hadong Gun

National Agricultural Products Quality Management Service, Kyungnam office, appointed the Okjong dried persimmon wood burning dryer facility as a GAP facility (National Agricultural Products Quality Management Service, 2012).

Figure 4-5 | Okjong Dried Persimmon Cooperative Unit Peeling and Drying Room

Source: National Agricultural Products Quality Management Service, 2012.

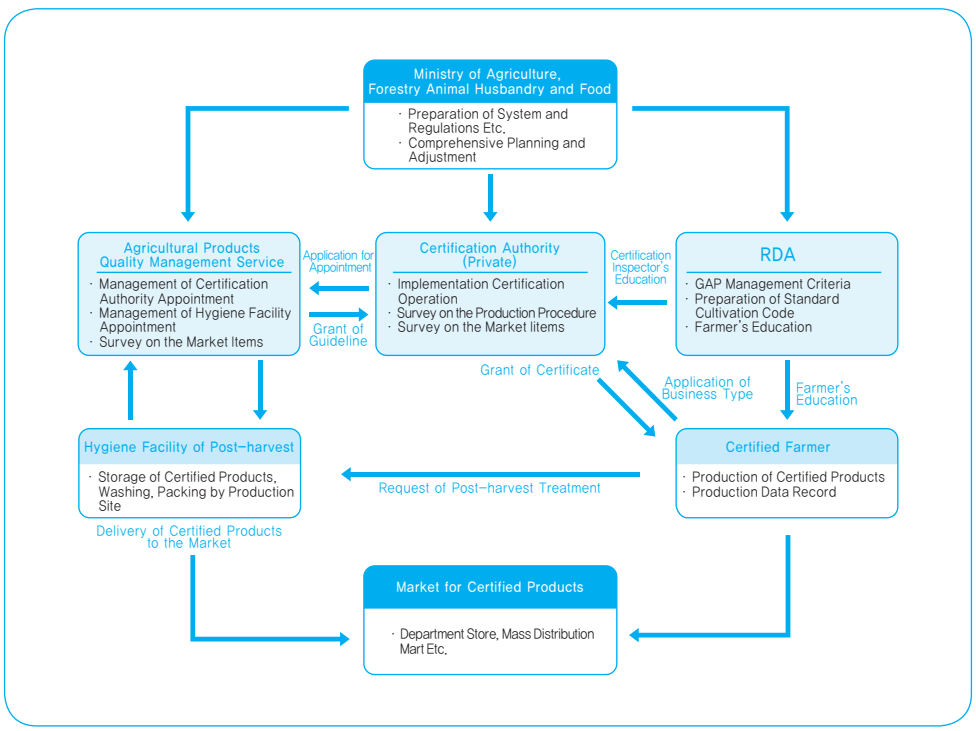
Figure 4-6 | Okjong Dried Persimmon Cooperative Unit Drying Room

Source: National Agricultural Products Quality Management Service, 2012.

2. Establishment of Organization for Instilling and Stabilizing the GAP System

When viewing the GAP certification related authorities and their business process system, the Ministry of Agriculture, Food and Rural Affairs is in charge of all of the regulations and overall system operation. The Rural Development Administration is responsible for GAP setup and education of producers, and the National Agricultural Products Quality Management Service oversees the appointment of private certification agents and post-management. Private agents are in charge of certifications for farmer applicants and aftermath management (Soung Hoon Kim and others, 2008).

Figure 4-7 | GAP Operational Processing System



Source: National Academy of Agricultural Science, 2013.

3. Policies and Major Functional Changes of the Authority According to Time Flows and Domestic/Overseas GAP System Environments

The Ministry of Agriculture, Food and Rural Affairs (Minister, Lee Dong Pil) published improvement measures to supplement the existing GAP system in order to actively promote the power of food safety and managed eateries (National assignment #77) of the Park Geun Hye government. Ever since the GAP system was introduced in 2006, its awareness or performance were still minimal despite various efforts to activate the system. In order to develop the GAP system as a criteria for enhancing hygiene and safety, as well as differentiation of Korean agri-food, more basic improvements are needed. A task force made up of the Agriculture, Forestry, Animal Husbandry and Food, Rural Development, Agricultural Products Quality Management Service, and relevant experts collected the field side of opinions and put forth improvement measures for the consumer-oriented GAP system. Currently, problems such as a lack of safety management, low participation of farmers, short demand for GAP certified agri-food, a lack of understanding among consumers and farmers about GAP, and weak marketing for GAP exist. Efforts are being made to address these weaknesses.

Integrating the current three steps of the complicated application procedure for GAP certification into one step, and reducing the 12 documents necessary for the application of GAP certification into 3 documents led to improved participation by farmers in the GAP system. Also, as traceability was included in the GAP system, the regulation to register on a separate management tracking system was abolished. This alleviated the pressure on farmers, and reorganization of unnecessary requirements raised the participation rate of farmers as well. As farmers feel it is difficult to receive GAP facility certification, many relevant matters for facility certification were abolished. But the matters related to managing post-harvest hazardous factors were still in effect, although they could now be verified and checked during certification. The regulations considered overly burdensome or ambiguous regarding GAP facility standards were organized to focus only on those contents deemed critical to the management facility criteria of hazardous factors, minimizing the farmer's burden (Ministry of Agriculture, Food and Rural Affairs, 2013).

2014 Modularization of Korea's Development Experience
Good Agricultural Practices (GAP)
for Agricultural Food Safety Management

Chapter 5

Analysis of Success (Failure) Factors after the Introduction of the GAP System for Agri-food Safety Management

1. Initial Lackluster Introduction of the GAP System
2. Success or Failure Elements since the Introduction of the GAP System
3. Comparing the Experiences of other Countries' Introduction of GAP System

Analysis of Success (Failure) Factors after the Introduction of the GAP System for Agri-food Safety Management

1. Initial Lackluster Introduction of the GAP System

1.1. Challenges to be Resolved

Currently, the GAP system is still in the process of being instilled as an agri-food safety control system. Even though the level of awareness among farmers and consumers improves, it is estimated that a relatively long period of time remains for the system to truly become established and make progress. Also, consumer awareness and knowledge of the system lag behind relative to the superiority of the system itself. There are other problems such as a lack of public relations efforts on the environmentally friendly certification, which is the root of insignificant increases in the earnings of GAP applied farms. Also, despite the easing of administrative standards to encourage farmers to participate, it still takes a relatively long period of time for farms to be trained and to execute the system due to the aging agricultural population. The high cost to be evaluated for GAP certification is another factor. Problems occurring on the operational side of the system are targets of much-needed policy improvements related to pre-existing agri-food laws and regulations. There is also a need to better cooperate with relevant organizations, and the equivocal and vague connection between the agri-food safety control system and agri-food certification must be addressed (Soung Hoon Kim and others, 2008).

1.2. Long Term Improvement Direction

In developed countries like the U.S. and Europe, the GAP system is approached as an agri-food safety management system of the production process. However, in Korea, the GAP system is considered a certification concept and associated with consumption enhancement. This perception is due to the fact that the GAP system was introduced to Korea in 2003 and immediately interpreted as a Good Agricultural Food Certification.

It is true that the GAP system ensures the safety of the production process of agri-food. However, the system itself is closely related to the behavior codes for the concerned subjects to be directed and practiced in the processes of production, handling, packing, and collecting of agri-food rather than the differentiated production certification such as pesticide-free and organic cultivation. It can be verified that in the EU, U.S., and Japan, the GAP system is not a consumption oriented certification system, but it is used as a tool for quality management contracts or quality assurance systems between the producer and distributor. Therefore, the GAP system in Korea also makes the establishment project of a food safety management system its final goal, and tries to enhance the awareness of agri-food safety among consumers and farmers as producers (Seong Hoon Kim and others, 2008).

1.3. Detailed Improvement Direction

To establish Korea's GAP system as something other than a simple 'agri-food certification' program, that is, a bona fide safety management system for agri-food, the Korean government must make practical improvements so that the private sector is motivated to actively and voluntarily participate. At present, it is a government-driven business riddled with many issues in the field that must be improved.

However, if the existing GAP related policies or businesses in the early stages of introduction are given up, and European or other developing countries' methods are adopted as they are, it is very possible that the settled GAP system in Korea so far would be fluctuating. In the European countries where GAP is already settled and effectively operated, this is the result of long-term efforts of private enterprises. And considering the level of GAP activation in newly adopted countries like Japan, where private companies have been slow to participate, it is believed that to raise the efficacy of the current GAP system in the short term and to practice the above-mentioned directions in the long term would be the most efficient option. As detailed improvement measures for this, the GAP

certification system should be improved, domestic trade expanded, exports of GAP agri-food increased, and education and advertisement of the GAP system promoted (Soung Hoon Kim and others, 2008).

1.3.1. Encouragement of GAP Certification System and Government Support

Focusing on the GAP audit operation by private certification authorities requires improvement of the model. Currently, the certification fee of 50,000 Won per certification case is at the level of 3,400 Won per farmer. This is so low that poor certification authorities face increased difficulties to operate. In the future, analyzing the detailed certification fee rate is necessary and urgent.

On the contrary, in the case of private analyzing agents excluding the poor private analyzing agents, the analyzing fee is more expensive than that charged by public authorities. The difference of fees between the agents is so big that it aggravates the farmer's burden, which must be resolved soon. This may be possible by encouraging cooperation with local public analyzing agents whose analyzing fees are relatively cheap, or by inducing lower fees by sharing the analyzing fee among the involved analyzing agents.

In the meantime, there are many cases in which deviation in various inspection fees for farmers is severe. Fundamental improvement measures should be prepared. The burden of farmers to pay various analyzing fees for an audit is so great that the Department of Agriculture, Forestry, Animal Husbandry and Food, municipalities, and AC supplement the inspection fees (Sang Yo Kim and others, 2006). The government promotes an increase in the participation rate of GAP certified farmers by subsidizing the examination fees for GAP certification applying farmers and operations to supplement the facilities (Ministry of Agriculture, Food and Rural Affairs, 2011).

Table 5-1 | Farmer Requirements to Diffuse the GAP System

Classification	Stabilization of GAP Agri-food Price	Support to Secure Stable Sales Route	Expansion of Technical Support Fund	Reinforced Advertisement	Others
Frequency (times)	18	40	12	17	3
Proportion (%)	20	44.4	13.3	18.9	3.3

Source: National Institute of Agricultural Science and Technology, 2013.

1.3.2. Domestic Transaction and Export Expansion of GAP Agri-food

Currently, the government mainly expects to instill the GAP system through the promotion of production sites and farmer participation in the GAP certification process. To do this, it is necessary to advertise to and educate farmers on the operation and related operations of the GAP system. In addition to the policy of making farmers more aware of the GAP system, the government must introduce a policy of inducing participation through the market system in order to expand GAP participation. In other words, as the proportion of GAP agri-food occupying the total transaction volume of agri-food is increasing, the distributors and producers are also increasing, which can be directly conducive to the successful settlement of the GAP system.

To expand the domestic trade volume of GAP agri-food, the expansion of trade between the farmers of the suppliers in the production field or the distributors of the consumers in the consumption field can be induced. First, in the case of farmers in the production field, to induce participation, it is proposed that the fee paid to farmers be increased as part of a plan to ensure more stable income and sales. For example, the price paid to farmers for GAP agri-food is so difficult to increase substantially that the policy inducing the participation through a price increase is judged to be ineffective for GAP participation. Accordingly, by expanding the demand volume for GAP agri-food and sales channels, it is necessary to promote an increase in the stable income of farmers.

Research has shown that 75% of companies in the production field request a more stable supply of GAP agri-food through stable contracts with mass distributors. Mass retailers also want a more constant supply of quality and safe food through the activation of GAP certified agri-food. This demand can be interpreted as a need for policy support that activates supply contracts for GAP agri-food between the production field and mass retailers. As a prerequisite for activating the contracted production of GAP agri-food by increasing the volume and organization structures of GAP producers and organizations in the production field, it is necessary to prepare a strong foundation of supply of GAP agri-food.

Also, it is possible to generate new demand through the introduction of markings on simple processed GAP agri-food. In the case of GAP agri-food that is simply processed in the production field, GAP certification was not used. But if allowed in limited circumstances, new demand for GAP agri-food could be generated. For example, in the case of green tea, GAP certification is limited to the green tea leaves. Thus, there needs to be an improvement in the processes related to markings on food processed with the same raw material (powders, etc.) or that which utilizes the materials.

In addition, actively encouraging the function of export promotion, which is one of the best benefits of GAP, requires additional demand for Korean GAP agri-food. At present, agri-food for exports feature requirements involving pesticide inspections in accordance with the import conditions of the export objective countries and not Korean GAP criteria. Korean GAP certification has not been recognized for being on par with that of importing countries like Japan. Thus, in certain areas, the overseas exporting objective country has directly visited the production field in Korea to perform its own GAP certification audit. To raise the level of Korean GAP criteria, negotiations with the objective country and the adjustment of domestic GAP criteria could take a long time. However, equating the criteria for Korean GAP 'for export' and 'for domestic use' as that of the export objective country when granting certification would then be possible.

1.3.3. Active Advertisement of the GAP System

When reviewing consumer awareness of GAP from the aspect of advertisement of the GAP system, it is found that the awareness of eco-friendly agri-food certification systems is high (85.2%), as well as the organic processed food certification system (78.1%) exceeding 70%. The awareness of GAP (18.1%) is relatively low. Out of the 3.8 billion Won of the GAP related budget in 2007, advertisement costs was about 0.4 billion Won. As the advertisement method for the low awareness of the GAP system, measures avoided one-shot advertisements such as an event and encouraged media like TV as being more effective to maximize business performance. It is recommended that private certification participants such as the AC and distributors be constantly promoted by setting up a separate regular exhibition corner. Also, in the domestic and overseas food fair, GAP certified agri-food is displayed to reinforce the sale and advertisement of GAP. An institutional unit collecting information about overseas fairs and notifying and supporting the concerned production organizations is also needed.

It is true that the ultimate direction of GAP is to be a set of practical codes to comply with by the relevant subjects in the processes of cultivation and harvesting of concerned agri-food. However, in the short term, the direction is to encourage the intention of farmers or companies in the production field to participate in GAP, as well as to increase consumer awareness and preference for GAP, calling for continued and various advertisements and marketing.

1.3.4. Cultivation of GAP Related Professional Personnel

A GAP certification auditor is in charge of checking if farmers are correctly complying with GAP regulations by travelling around the country. However, at present, the number of certification auditors is too small to cover the entire country. Likewise, for a smooth transition to GAP agriculture, the cultivation of relevant experts such as education and training lecturers on the operations subject to the farmers, certification auditor, and consultants are required. As it is now the beginning stage, the quantitative expansion of professional personnel is a priority, and the development of educational programs and supplementing certification audit codes are to be implemented. In the long term, measures to separately cultivate a third institute in relation to education and training could also be considered.

In addition, as the existing GAP has been implemented in a farmer-centric way, the involvement of and operation led by the government is necessary. Therefore, Korea started organizing the national GAP federation in 2014. So far, the central confederation has been configured, and by December, the government federations of metropolitan, city and provincial representatives were formed. In 2015, the federations of Eup and Myun units are scheduled to be organized. Due to this, active participation in the GAP operation by the government can be expected in the future. The network of GAP participating organizations will play a significant role in understanding the system, identifying GAP agri-food consumers, enhancing awareness, and increasing GAP agri-food consumption in the future.

1.3.5. Detailed Management of Private Certification Companies

Unlike the U.S. or Europe, Korea introduced the certification system led by the government and implemented the certification targeting production farmers to secure the safety and quality of agri-food. Recently, in the case of eco-friendly certification systems, a significant increase in consumer demand for safe agri-food has led to an increase in the number of certified farmers and certification cases. This has resulted in the commissioning of certification operations to appointed private certification agents. Compared to the beginning stages, it is true that the level of certification professionalism and capability have been raised. However, they still do not enjoy a nationwide organizational network except for the AC. Thus, they only play the role of region-centered certification agents. It is predicted that a small number of certification agents may have difficulty carrying out an inspection of the production process and post-operations. Integrating a smaller certification authority and appointing and cultivating the certification authority to control the entire country may be a counter-measurement to this problem.

Another problem is that it is difficult for certification authorities to maintain offices merely by performing the certification operation professionally as the certification fee is too low. Most of the certification authorities are carrying out the certification operation, sales and distribution of the certified agri-food, and the sales business of the raw materials for certified products simultaneously. In these cases, there is a concern that the certification operation may be neglected, which may be a factor in lowering consumer trust in private certification. Therefore, either by realizing the certification fee or other supportive measures for the certification authorities, it is necessary that the certification authorities play their own roles.

Moreover, it is the circumstances surrounding a poor certification industry that may cause problems for efficacy and impartiality of a certification audit. As the counter-measurement to eliminate this problem, strengthening the competitiveness of the certification market– by establishing a single private certification authority or strengthening the function of the certification federation–is necessary (World Agricultural Policy Research, 2007).

2. Success or Failure Elements since the Introduction of the GAP System

2.1. Overview and Status of Progress of the GAP System

Korea was determined to introduce the GAP in 2003. By amending the Agricultural Food Quality Control Act in 2006, GAP was officially implemented. The certification object is the primary production of agri-food, certification for which is the private certification authority commissioned by the National Agricultural Products Quality Management Service. The certification target items number 105 products in 2009 and were to be expanded to all products in 2010. GAP certified agri-food tend to increase every year. In 2013, about 45,000 farmers received GAP certifications, and the overall cultivating areas are shown to have increased in general by as much as 58,000 ha in comparison with that of the previous year. Concerning the GAP certified crops, only 59 items (food 6, special purpose 2, medicine purpose 14, mushrooms 5, vegetables 23, and fruit trees 9) received certifications, and 10 items such as rice, apple, pear, mushroom, paprika, tomato, and strawberries accounted for the majority of the products. Currently, GAP only occupies 3% of the total transaction volume. However, the government plans to expand the portion of GAP agri-food to 10% by 2015 (Jemin, 2011).

2.2. Analysis of Reasons for the Status Quo

2.2.1. Lack of Understanding among Participating Farmers and Market Shortage for GAP Certified Agri-food

As a result of investigating the selling price around GAP certification farmers, it was found that aside from variations depending on the shipping date, agricultural food was on average about 10 to 20% more expensive. The results of these surveys indicate that the prices were about the same level as the selling price of agricultural GAP agri-foods. As a result of investigating the farmers of all 30 farm families, 15 out of 30 (55.5%) desired GAP agricultural food priced at more than 30% higher in 2005. About 45 percent of those surveyed wanted GAP certification agricultural food priced at 25 percent or more than general agricultural food. These findings show that farmers only recognize the profitable opportunities associated with the GAP system. It is necessary that participants fully understand the GAP system from the perspective of safety management, in addition to the process of production and shipping that is also profitable for the farm itself.

In addition, a survey of the distribution channels of regional case studies was performed, concluding that almost all sales transactions went through the agricultural cooperative. The reason for this market bias is assumed that GAP business agricultural cooperatives recognize the value of GAP agricultural food. Although GAP certified agri-foods are sold in large retail stores, the amount was a negligible level. The reason that the sales route was not expanded was due to the fact that the general distributors were hesitant to deal with GAP agri-food because of the lack of consumer awareness about the GAP system and the difficulties in continuously supplying GAP agri-food (Sang Yo Kim, 2006).

2.2.2. Slowdown in the Administrative Process due to the Diverse Administrative Organizational Bodies

Professor Dukhwa Chung of Gyeonsang National University–chairman of the National GAP Federation–pointed out the HACCP hosted by MFDS is well recognized by consumers. Although many food manufacturers implement GAP for quality certification, on the contrary, GAP cannot expedite its operation compared to the farmer because of the size of the government administration. Because GAP is being coordinated by three administrative bodies such as the Ministry of Agriculture, Food and Rural Affairs (decision-making), Rural Development Administration (system designed), and National Agricultural

Products Quality Management Service (system application), it is difficult to coordinate their opinions. Administrative processing takes too much time, which requires the coordination of a more effective administration system for operational sharing of tasks.

2.2.3. Weak Certification Authority and Lack of Support System

Nationwide, 48 private certification authorities are now appointed. But authorities with certification cases exceeding 100 cases number only 2~3, and over 10 authorities have less than 10 cases of certifications. The reason for this is that certification is costly–including the particle analysis fee such as soil and pesticides–and other support has been minimal. Also, due to the cheap inspection fee, certification authorities are not resourced to run their operations. For example, the certification fee is 50,000 Won per each GAP certification application, which translates into 2,100 Won per farmer (Byung Woo Kim and Duk Gi Jang, 2009).

2.2.4. Difficulty in GAP Information System Management

Difficulties in producing information and computerizing production data and distribution information are emerging, and there is a tendency to oversee traceability steps like the history of in/out deliveries because of the burdensome paperwork at the sales stage. One way to alleviate this burden would be to send computerized input assistance to the farmers for a certain period of time. Measures to make managing this process easier include changing the computerized input program, or by introducing the RFID system of traceability for GAP certified agri-food to reduce input errors (Soung Hoon Kim and others, 2008).

2.2.5. Facility in Compliance with GAP Certification Criteria and Difficulty Installing Equipment

The post-management stage of GAP certified agri-food involves farmers improving and maintaining the facility in accordance with code #23 of the appointment criteria of GAP facilities, processed at the GAP facility and appointed according to the president of National Agricultural Product Quality Control. Many farmers find the requirement to construct a GAP facility for GAP certification difficult and burdensome. The government should reconsider whether or not it is actually necessary to require that GAP agri-food transit through the facility (Seong Hoon Kim and others, 2008).

2.2.6. Lack of Price Differentiation in the GAP System

In 2008, the government planned to raise the GAP implementation ratio to more than 10% based on the quantity of distribution by investing 208.4 billion Won to expand GAP by 2013. While the number of farmers rose from 16,796 farmers to 25,158 in May 2009, in terms of the distributors, price differentiation eroded almost entirely, and the transaction volume decreased. Accordingly, a policy to highlight the awareness and differentiation of GAP agri-food should be presented (Duk Gi Jang, 2009).

Mr. Yeom Gyung Seop of the Korean Medicine Herbal Association, which is considered the number two certification authority, said, "To activate GAP among the farmers, not only must there be support for the safety inspection fees, but also the introduction of a direct payment system to induce the participation of farmers." He pointed out that effective government support was needed. A direct payment system should be in the form of direct financial support from the government. For example, representative company Cheol won Odaesan rice production RPC is actively producing GAP rice with the support of more than 10 billion Won. Mr. Yeom emphasized that expanding the adopted direct payment system would help the primary food of rice to become completely GAP compliant. This would then have the impact of introducing GAP to all other agri-food.

2.2.7. Low Awareness of GAP System

Survey results show that the awareness of GAP is gradually increasing. Thanks to continuous advertisement via the mass media, awareness reached 65.1% in 2008 (compared to 32.7% in 2007); however, consumers answered only 9% of the questions correctly. The sales proportion of GAP certified agri-food was an average of 12.9%. The sales proportion of agri-food with the GAP certification marking for fruits was 4.5%, vegetables 2.6%, and crops 0.8%, bringing the average to only 2.0% (Soung Hoon Kim and others, 2008).

3. Comparing the Experiences of other Countries' Introduction of GAP System

3.1. Japan

3.1.1. Introduction of GAP in Japan

a. History of Foundation

The Agricultural Cooperative Cooperation Wagowon (Representative: Kiwoochi Hirokats) created the efficient JGAP. The production status of the region and atmospheric conditions were supported by the Agriculture and Fisheries Bureau in accordance with the fresh agri-food safety insurance project. The apple farmer, Katayama, was first to pass the EUREP (presently called Global GAP) criteria in Japan. The vegetable farmer, Kiwoochi Hirokats, was second to pass the criteria in Japan, recognizing the necessity of JGAP's introduction and establishing the GAP production organization–called the GAP Association–that year (Japan GAP association, 2014).

b. Background of Foundation

Japan GAP required traceability for the safe supply of food. And to implement the safety inspection for agri-food, just as Global GAP required a third party inspection and certification, many retailers started asking for the Japan GAP to become the conditions for trading of all agri-food. Since 2005, some retailers insisted on doing business with farmers who did not have a GAP certification. The AEON group–the largest distributor in Japan–and Consumer Cooperatives aggressively demanded GAP certification. Raising the level of Japanese agri-food to that of GAP certification standards, they could demand the strict standards on imported food from overseas. And as GAP certification was required to raise the quality of Japanese agri-food and challenge imported foods from overseas–in particular in the face of increased imports of GAP agri-food such as China GAP, Thai GAP, and Vietnam GAP–JGAP was considered to be at the foundation of the survival strategy of Japanese agri-food (Kyei-Im Lee and others, 2008).

3.1.2. Comparative Analysis of GAP between Korea and Japan

Table 5-2 | GAP Comparison between Korea and Japan

Classification		Korea	Japan
Purpose		Introduction of GAP level food to producer farmers, support for production of high quality safe agri-food export	Secured competitiveness in price against imported GAP certified products and protection of Japanese production sites, brands of producer farmers
Certification	Objective Products	All products cultivated for food in the country except livestock	Crops, fruits and vegetables, teas
	Certification Procedure	Application-document examination/receipt-Notice of audit plan-Inspection of soil and water-Field inspection-Pesticide inspection-Certification inspection-Grant of certificate-Aftermath management of certified products	Application-calculating invoice-audit contract-site inspection-examination of certification-grant of certificate-extension
	Owner Management Criteria	RDA	Japan GAP association
	Type of Application	Individual farmers, farmer's association	Individual farmer, group farmers
	Certification Mark	Marking on the package or sticker attachment	Not displayed, Not allowed to attach GAP mark as the condition of equity recognition
	Certificate Type	GAP certificate	JGAP, Global GAP
	Certificate Extension	When the validity of certification is requested	When the validity of certification is requested
	Certificate Issuance	2 years of validity in the name of certification authority	1 year of validity in the name of Japan GAP association

Classification		Korea	Japan
Farmers Related	Traceability registration	Registration at National Agricultural Products Quality Management Service	Production information publication, JAS certification
	Application fee	50,000 Won per application	Individual: 50,000Đ Group: (5,000¥*number of farmers) over 90%
	Water quality inspection	Farmer's account	Farmer's account
	Soil inspection	Farmer's account	Farmer's account
	Product inspection	Farmer's account	Farmer's account
Certification Authority	Characteristics	Producer association, distributor, college, etc.	The third party international certification authority
	Appointment	Government	Japan GAP association
	Appointment base	Agri-food Quality Control Act	Japan GAP association administrate standard
	Number of Appointees	49 units (2011)	1 unit (MIC)
	Number of auditors	5 persons at law (including 2 full-time)	Independent recruit without legal limitation
	Auditor's payment	Recruit, salaried	Hourly payment on the basis of contract
	Number of audits	Field inspection, 3 times including post-management	Once (completion within 4 hours per farmer/statuary provision)
	Supporter	Government	Japan GAP association
Our Agri-food Management Facility		Agri-food Quality Control Act	No specific appointment procedure, but based on the management criteria, inspected by the certification authority at the same time.
Penalties		Corrective command, marking stop, certification cancellation	Corrective command, administrative measure (penalty)
Certified Equity with EU		Prepared Korea GAP as being equal (2011)	Recognized of equity only limited to the farmland management criteria

Source: Ministry of Agriculture, Food and Rural Affairs, 2008.

The fact that there were different regulated management standards for 50 products such as fruits and vegetables in the Japan GAP system based on the Global GAP of Europe caused a lot of confusion for the farmers who wanted to adopt the GAP system. However, Korea regulated the GAP management standard as one system and operates the GAP system by the RDA.

Concerning the post-management of certification authorities, Japan conducts repeated certifications every year and has no specific post-management process. However, Korea performs certification twice a year. Also, Korea checks for whether or not the management facility is compliant with the specified facility criteria and manages the post-harvest crops. However, Japan specifies the general matters. In Japan, the audit is being conducted by external certification authorities under the GAP, and the GAP association issues the final certificates. It is judged that in such cases, there could be a reference to the restructuring of 35 private certification authorities in Korea. Also, Japan GAP is divided by domestic and export purposes. And for export GAP, it was recognized to be equal to the Global GAP. This actually contributed a lot to the export of agri-food. Accordingly, it is required in Korea that the GAP for export be managed by appointing a CB (certifying body) as the certification authority of the third country and, for exports, the requirement to be equal to the Global GAP should be eliminated. In sum, Japan GAP is being operated not as a consumer certification program like the Global GAP, but as a safety management system, which is different from the Korean GAP system that is to be operated as a certification program (Soung Hoon Kim and others, 2008).

3.2. Europe (EU)

3.2.1. GAP Introduction in Europe

Global GAP is the system developed in Europe, which is broadly being applied to the distribution step of agri-food in Europe, as well as Africa and Asian regions. Global GAP is the authority generating the standards to internationally certify fruits and vegetables. This authority sets out to attract consumer attention to food safety, animal welfare, environmental protection, and the welfare of agricultural workers. To achieve these objectives, several guidelines are offered. Global GAP built its certification system for agri-food using the official and viable minimum amounts of chemical substances such as pesticides and fertilizers recommended by the EU to certify an item as a safe agri-food. To do this, the system continues to develop standards, as well as optimal guidelines that are at the base of the standardized traceability system. This authority establishes the single certification

system to certify safe agri-food independently, and supports constant communication and consultation with consumers and major relevant personnel, including producers, exporters, and importers (Kyei Im Lee and others, 2008).

3.2.2. Comparative Analysis of Global GAP & Korea GAP

Table 5-3 | Comparison of Certification Requirements between Korea GAP and Global GAP of Europe

Classification		Korea GAP	Global GAP (EU)
Purpose		Secured safety of agri-food and preservation of agricultural environment	Promotion to minimize the input of agri-chemical and medicine and activation of farmer's assurance system
Certification	Object Products	Edible agri-food cultivated in the country	Fruits, vegetables, coffee, livestock, fisheries, etc. plus 232 items
	Management Criteria	50 items (Necessity 27, recommendation 24)	236 (necessity 74, semi-necessity125, recommendation 37)
	Owner	RDA	FoodPlus (GG headquarters administrate)
	Application Type	Individual farmers, farmer's association	Individual farmers, farmer's association
	Certification Mark	Marking on the package or sticker attachment	Mark attachment not allowed, certification number marking
Certification Authority	Appointment	Led by government (Agricultural Products Quality Management Service)	Commissioned authority (DAP, ZAS-ANZ)
	Appointment Base	Agricultural Products Quality Act	GG general code Ⅱ, ISO guide 65
	Number of Appointment	49 units including aT etc (2011)	170 units (2007)
	Auditors	5 persons at law (including 2 full-time)	Auditor 1, Inspector 1, Lecturer 1
	Number of Audit	Field inspection, 3 times including post-management	Divided into production process, post-examination
Management Facility		Agricultural Products Quality Act	No specified appointment procedure
Penalties		Corrective command, marking cancellation, certification cancellation	Warning, suspension 6 months, cancellation

Source: Ministry of Agriculture, Food and Rural Affairs, 2008.

Unlike the private-centered Global GAP, Korea GAP is regulated by the Rural Development Administration on the basis of Agricultural Products Quality Control Act. This private association's role in the GAP operation is similar to that of Japan, attesting to the progress of Korea GAP's operation. In terms of GAP certification management, Global GAP introduces all compliance in advance and grants certification through assessments, whereas Korea GAP grants the certification when the basic certification requirements are met, and manages it through the post-management process. Korea marks the certified products in accordance with the Agricultural Products Quality Control Act, whereas Global GAP does not mark the agri-food certification on the actual products, making it difficult for consumers to differentiate among the certified products from the uncertified products at the point of sales counters. As the Korean certification authority has no certification validity, and there is the concern that it may not be maintained properly because certifications are not cancelled, the EU receives a re-application every 5 years and performs a precise investigation for the certification requirements. Accordingly, in order to raise the credibility of Korea GAP certification, it must be reinforced by an external audit of producer groups and internal audit of companies, as well as an external audit for certification authorities. This thorough process will precisely investigate whether or not the selection and packing are conducted in accordance with the criteria.

The benchmarked scheme of Global GAP contain strong characteristics of agricultural practices, recognized management standards and certification methods. Global GAP sets a precedence for other countries' certification systems, management criteria, inspection contents, and certification procedures. Such are being developed in Korea based on Global GAP. Therefore, Korea GAP can be operated, introduced or utilized by countries that have no safety management production systems for agri-food or with mass distributors in possession of their own certification (Soung Hoon Kim and others, 2008).

3.3. U.S.

3.3.1. GAP Introduction in the U.S.

Food hazards are mainly divided by chemical hazards caused by pesticides and microbial hazards derived from bacteria causing food poisoning. Since the string of food poisoning deaths in 1997, the issue of food safety became a major social issue in the U.S., and the attention to food safety has changed from the traditional chemical hazards to microbial hazards. For these reasons, the GAP program began with the enacted Food Quality Protection Act, and the guide to minimize microbial food safety hazards for fresh fruits and vegetables was published in 1997.

The promotion of the GAP program sets out to reinforce food safety by removing the microbial dangers in advance, which may occur upon consumer ingestion of fruits or vegetables. The GAP program is only one of many other factors in quality assurance programs to enhance food safety. The system is supplemented by other risk factor minimizing strategies such as the HACCP, GMP (Kyei Im Lee and others, 2008).

3.3.2. Comparison with Korea

The FDA regulates GAP standards, and the USDA supports GAP practices such as the funding of the state government, setting up the inspection criteria, and building up the educational systems. The FDY is also in charge of providing GAP related information. Federal-state Inspection Service accounts for the guidance and management of GAP associations, GAP field inspections, marking management, communication of GAP technology, and information exchanges with the USDA. The state universities are in charge of GAP education and mainly carry out GAP education for producer farmers, the establishment of educational systems through cooperation with universities, and international GAP education jointly conducted with the FDA. In the private field, companies support the publication of the FSIS guide for mass distributors. They set up the internal management code for GAP on the basis of FDA management guidelines and manage the certification internally, and distributors supervise the production by contracting with the producer farmers and establishing and managing the internal inspection system by commissioning research centers. Cooperation between the private and government sides has been recognized as being especially well organized, which resulted from the voluntary and active participation of universities and corporations.

This American case study is a strong point from which to expand Korea's GAP system–transitioning from a primarily governmental-led policy and initiative to more private participation. In the meantime, GAP farmer education is mainly done by state universities. In this case, it is understood that education is not simply grouping education levels, but also about fully granting the agricultural utility function to experts in the universities. In Korea, there is really no direct GAP education. Rather, education is similar to an agricultural information 119 project participated in by universities for traceability and other training (Soung Hoon Kim and others, 2008).

2014 Modularization of Korea's Development Experience
Good Agricultural Practices (GAP)
for Agricultural Food Safety Management

Chapter 6

Implications of the Introduction of GAP System for the Safety Management of Agri-food

1. Lessons Drawn from Analyzing the Korea GAP System from the International Viewpoint
2. Applicability of the Korean GAP System to Other Developing Countries

Implications of the Introduction of GAP System for the Safety Management of Agri-food

1. Lessons Drawn from Analyzing the Korea GAP System from the International Viewpoint

The GAP system is a business internationally implemented by the FAO and CODEX committees for a safer human dietary world following a worldwide evaluation of the safety of agri-food. To keep pace with such international trends, Korea introduced GAP for medicinal herbs to satisfy consumer needs for safe agri-food and to enhance the competitiveness of domestic agri-food in September 2002. In June 2003, it was determined that GAP would be applied to all the agri-food. And in 2004, along with the pilot projects for fresh fruits, vegetables, and specialty crops, and for the purpose of official implementation in 2006, basic regulations were prepared. Currently, 3% of all distribution of agri-food are participating in the GAP system. But the government plans to expand the portion of GAP agri-food to 10% by 2015, and 30% by 2017 (Ministry of Agriculture, Food and Rural Affairs, 2013).

The GAP system of Korea was introduced in 2003 and led by the Institute of Korean Medicine Herbal Association. Pilot projects have been implemented, and the official GAP system application business began in 2006.

While the pilot projects proceeded, various inspection fees necessary for soil, water quality and other inspections required for certification conditions were supported at the government level. However, since 2006, when the pilot project was completed, such supportive measures were reduced for framers, who had to directly pay for the inspection fees and cost to build the facilities. Due to the low awareness of the GAP system and the burden of expenses, the practical participation in and performance of the system

also declined. Various GAP associations requested aggressive support for operations to the Department of Agriculture, Forestry and Food. By eliminating the economic burden of farmers, it was then possible to encourage GAP system certification and increase the number of certified farmers.

GAP is a system operated through voluntary participation by farmers. When starting the pilot project for the Korea GAP system, the most challenging factor was trying to raise awareness among the aging rural areas of the GAP system. The awareness of the eco-friendly certification which had a marketing strategy with healthy content like pesticide free cultivation was high, but the basic concept of the GAP system of cultivating safe agri-food through sanitary management from the cultivation to distribution stages was not well known to the farmhouses. The meaning of food hygiene among consumers was mostly limited to the concept that of being applied to processed or cooked products in the distribution markets. To the farmers, agri-food was classified differently from the overall category of food. And awareness of sanitation was low from the aspect of production management. Compared to the time of its introduction, with government support operations and advertisements, changes in the level of awareness among farmers were achieved. However, until now, it remains as one of the main reasons why the diffusion of GAP systems is still slow. Voluntary participation in the GAP system and encouraging this knowledge among farmers have great implications from the social aspect. Farmers are more likely to build healthy farmlands with reasonable concepts and develop the capability to lead sustainable agriculture. Despite these benefits, the actual budget of the GAP system only reached 1 percent of the eco-friendly agri-food system. It is time for the government to prioritize increasing the understanding of GAP and enhancing the public's sense of food hygiene–especially among farmers–by supplementing the administrative power and budget for the system, thereby creating the necessary conditions for increased participation in the GAP system.

Unlike the HACCP system implemented by the leading management of the MFDS, the GAP system is jointly managed by three governmental authorities such as the Agriculture, Forestry, Livestock and Rural Development Authority and Food, Agricultural Products Quality Management Service.

The Ministry of Agriculture, Forestry, and Livestock was in charge of the draft of the GAP system, while the KRD formulated the plan for implementation of the system. The Food, Agricultural Products Quality Management Service is responsible for the actual application of the system. Such a complex administrative configuration led to a slowdown of administrative processes from the practical viewpoint of the GAP system's introduction. It became more difficult to diffuse the system, also leading to a decrease in priority on

strengthening the system due to the diversification of administrative power. To overcome these obstacles, the government planned to set up a national GAP committee in 2014, which includes building the center, metropolitan area, city, province, Eup, and Myun of the administration units, through which the government would have direct control to operate GAP system.

Development of GAP systems has become a global trend as the focus on the safety of agri-food and environmental protection by consumers continues to increase. Korea also needs to expand GAP certification to all agri-food. Korea's neighbors including China and Japan are expanding the GAP system quickly by, for example, equating it to the level of Global GAP of Europe. Korea, however, has not been able to secure the cornerstone of international recognition yet. In addition, these other countries enjoy a higher level of recognition among consumers of the premium that the GAP system promises, and the awareness continues to grow. In Korea, however, as information on and awareness of the benefits connected to the GAP system and the safety of agri-food are still low, efforts are still required for promoting the system.

GAP is an important program for creating the necessary conditions for coping with the increasing competition and pressure of market opening from overseas. For this reason, and to protect Korea's domestic market, smooth application of the GAP system is critical to protecting the Korean market. Korea should participate in future international transactions within the GAP business more aggressively (Sang Moo Lee and others, 2007).

2. Applicability of the Korean GAP System to Other Developing Countries

In 2003, when the GAP pilot project was first implemented in Korea, the most critical obstacle was how to make farmers understand the important of sanitary management. The GAP system was applied as a measure to raise the safety of agri-food, as well as the important of safety. Experts predict this education of the safety concept to be the bigger barrier for developing countries–more so than it was even in Korea. In preparation for this challenge of connecting GAP certified products to the consumer market, the government should pro-actively become involved in enhancing the awareness of food safety among farmers and the people as consumers. Informing the public of how the GAP system is a worldwide global business and promoting the differentiation between ordinary agri-food and GAP certified agri-food are critical messages to convey.

Physically, to apply the GAP system to the field and obtain the desired level of effectiveness, the size and basis of the agricultural market should reach a certain level prior to the government's involvement and management or active participation of farmers. The overall indicator for evaluating whether or not the agricultural market has reached the necessary level of readiness is that it is equipped with the agricultural technical capability that enables the mass production of agricultural products. Also, whether or not the industry owns the technology to produce the agricultural products of high quality as well as the amount of production. Such conditions should be evenly satisfied to introduce the GAP system, which enables utilization of the system's natural purposes and acquires the expected outcome.

In a developing country, if the step-by-step introduction is attempted and targets all farmers in the country, it is necessary to consider that the introduction and application of the GAP system should be proactively managed by the government rather than guided by the certification-centered participants of the GAP system at the private level, as seen in the U.S. and Canada. Sufficient budgeting and allocation of administrative power for active operation are necessities for successful dispersion of the GAP system. However, if the size and technical level of the agricultural market do not reach the required level, a small-scaled introduction targeting farmers with exports or individual farmers seeking to increase their profits through product differentiation can be an effective foot in the door for the introduction of the GAP system, rather than a uniformed introduction to the entire farming industry in the country. In other words, targeting individual farmers who have already met certain criteria, a strategy for introducing the GAP system, providing practical education, and having an operational model should be examined for the purpose of introducing a GAP system.

In conclusion, when comprehensively reviewing the test cases of the early years of when Korea introduced the GAP system, it is found that there were systematic introduction options such as the preparation of GAP management regulations, the development of GAP cultivation and management guidelines, preparation of an educational system, and establishment of a hygiene base. However, improvements in issues concerning the real distribution markets such as the burden of costs derived from the low level of understanding of the GAP system and examination procedures among farmers, as well as consumer awareness of GAP related agri-food were insufficient. Korea was slow in realizing progress in corresponding institutional policies as well. In order to improve these statistics, the government integrated the complicated certification procedures and reinforced the management of hazardous factors to substantiate GAP certification standards. To improve the GAP education system

and reinforce the consulting role for post-management processes, the government also cultivated the GAP distribution organization, which also helped to advertise the program and expand the range of GAP certified agri-food (Soung Hoon Kim and others, 2008). Based on a review and analysis of the Korean cases, when developing countries introduce the GAP system, a thorough analysis its own agricultural market would lead to a more successful introduction.

As Korea begins to apply GAP certification to medicinal herbs as part of a GAP demonstration project, it became possible to establish a consumer satisfaction system for certified agricultural products. This helped to improve the competitiveness of producing farms and quality control. These implementation effects have led to the voluntary participation of farms in GAP certification, which began as a government led project. Now Korean medicinal herbs are successfully acknowledged as a quality brand, earning more than a million dollars in exports to the U.S. If developing countries could introduce GAP in accordance with market opening through the FTA, GAP certification could be a remarkable tool to guarantee the differentiation and quality of products in the international market.

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