

*Ensuring food safety and building consumer confidence through GAP and traceability*

## Technology development for Good Agricultural Practice (GAP) in Asia and Oceania

**GOOD AGRICULTURAL PRACTICES (GAP)** aim at meeting consumer needs and preference for products that are of high quality, safe, and produced in an environmentally and socially responsible way, all of which begin with on-farm production and handling processes. Traceability, on the other hand, is the system to identify the source of a product which serves as an important complement to GAP intended to minimize liability and prevent the occurrence of food safety problem.

The onset of the 21<sup>st</sup> century brought about a multitude of agricultural issues and concerns that all nations must face. These include the rapid exploitation of natural resources which is threatening the sustainability for higher agricultural productivity and incomes, free trade which has made small-scale farmers' livelihood vulnerable, and the increasing global interest on food safety and traceability not only among consumers who demand safe and reliable food, but also among producers and traders who recognize the critical need for ecologically sound agricultural practices.

The concept of GAP evolved in response to these new challenges. As defined by the Food and Agriculture Organization (FAO), GAP refers to principles applied to on-farm and post production processes, resulting in safe and healthy food and other agricultural products while taking into account the attainment of economic, social, and environmental sustainability.

### **GAP and food traceability forum**

This international seminar on GAP and food traceability was organized in view of the common goal among countries in the region to promote the adoption of innovative technologies and production schemes that will ensure the preservation of the agricultural environments, and at the same time guarantee food safety or the protection of food products from any form of hazard or contamination. The main objective of this seminar was to share and exchange knowledge and information on GAP, as applied in sustainable agricultural methods. These include technologies on economic and efficient production of sufficient, safe, and nutritious food, or what we refer to as food security, safety and quality; value-added marketable farm produce; sustaining and enhancing natural resources; and maintaining viable farm enterprises.

### **Key GAP issues and concerns**

In some countries, GAP particularly food traceability and other mechanisms to meet safety requirements in all stages of the production and handling processes have now become an uncompromising condition. Efforts toward GAP product standardization and certification by some developed countries have now been intensified, notably the European GAP (EUREPGAP) and the US-GAP. However, less developed countries particularly in the Asian region, need to develop their own GAP system suitable to their agricultural conditions, and considering the differences in the level of technological advancements among countries.

The key issues discussed during the seminar include: 1) basic concepts and requirements of GAP to assure food safety in all stages of on-farm and post production processes; 2) present status and perspectives on GAP and traceability in Asia and Oceania; 3) research and development for environmental impact assessment and risk management; 4) and information technologies to harness GAP and traceability.

### Basic GAP concepts and requirements

The GAP concept addresses two distinct issues: assuring food safety during on-farm and post production processes; and building consumer confidence and managing risk management through traceability mechanisms. The former involves various technological components to assure quality (to meet consumer satisfaction) and safety (physical, chemical and biological) of produce. Meanwhile, the latter involves traceability as a system of communicating and providing information to build consumer confidence.

EUREPGAP sets a framework defining essential elements (minimum standard available) for the development of best practices for the global production of horticultural products. US GAP, on the other hand, focuses on the prevention of microbial production contamination of fresh produce. There are differences in both systems, but food safety is obviously the core component. The term "GAP" is also considered conceptually difficult because of the diversity of codes, guidelines and definitions within the agricultural sector. This emphasizes the critical need for countries sharing geographical and

agricultural similarities (such as the Asian region) to develop a unique GAP system suitable to their conditions.

It became evident during the seminar that there is a need to address GAP concerns in different realities. This means that the GAP approach must meet the demands within a broad range of agro-ecological and socio-economic circumstances. Some key production environment and quality management components that could be included in developing GAP protocol in each country in order to address elements of safety, quality and sustainability include: soil and water management; Integrated Plant Nutrient Management; crop protection specifically Integrated Pest Management (IPM); agrochemical use; post-harvest management and storage; waste and harmful material management; workers' health, safety and welfare; and food traceability system.

### Status of GAP and traceability in Asia and Oceania

There is no unique system of GAP and traceability for all countries in Asia and Oceania due to differences in socio-economic and geographical conditions. Some countries are more advanced in terms of implementing GAP protocols (standardization and certification, and technological components particularly the trace back system using information technology), while some are still in the level of consolidating a mix of best practices in agricultural production aimed at sustainability and environmental conservation, as well as minimizing contamination and chemical hazards.

GAP logo providing producers with production information in Taiwan.



Photos courtesy of H.S. Lur, NTU, Taiwan ROC



Photo courtesy of C.H. Lee, RDA, Korea



GAP Trial in Korea

In more advanced Asian countries, GAP protocols and quality management systems are in place, as well as guidelines for the introduction of food traceability system. These include guidance for addressing concerns in the application of the GAP approach related to principles and specific guidelines for integrated production systems and commodity-based systems; modern market context such as trends in consumer demand, incentives, regulations and trade — considering that the GAP approach should not in any way create barriers to trade; and consistency with food security measures and priorities for limited resource and vulnerable groups.

Food traceability systems primarily to gain consumer confidence in agricultural produce, are also in place in some advanced countries of the region. Traceability refers to the system where foods and their information can be traced forward and back at each stage of the food chain, i.e. production, preparation/processing, distribution and sale. This means that all food business operators must record and manage information related to the product, such as from whom they buy and to whom they sell it; must have a tracing system that can pinpoint a particular product's movement or characteristics and be able to inform consumers about these attributes; and using the system, improve supply management and facilitate traceback for food safety and quality.

### Prospects of GAP in the region

In developing GAP protocol in each country, there is a need to adapt and/or modify international standards to attain the two basic concepts of eco-friendly agricultural production practices, and quality and safety of produce. It is likewise critical to advocate strong government support, political will and legislation in support of GAP, particularly in terms of standardization/certification, farmers' education and training, research and development on quality management systems, and financial resources to develop and maintain traceability systems (in view of the question as to who will bear the cost of the system).

Compliance by the farmers must also be considered, through intensified extension/promotional and educational activities. The GAP system must be accessible to both farmers and consumers.

Efforts to harmonize the system into a regional GAP are now ongoing, including education and training among farmers and consumers. Many crossover points among the diverse international/national GAP protocols and standards must, however, be taken into consideration to facilitate trading among countries.

More importantly, there is a need for international collaboration on GAP and traceability in the region. Based on essential/minimum requirements, and with food quality and safety as

the core components, there is a critical need for exporting and importing countries within the region which share geographical and agricultural similarities to forge international collaboration, harmonization and transborder policies to develop standards and mechanisms for GAP implementation. This harmonization must be transparent, and must be for the benefit of both farmers and consumers. This standard must not also add to the cost of production for the farmers.

Exchange and sharing of information among scientists, distributors, traders, retailers, consumers and farmers must be sustained and enhanced toward the attainment of economic, social, and environmental sustainability in agriculture, and in providing safe food supply and gaining consumer confidence in the agricultural produce.

Photos courtesy of T. Nanseki, NARC, Japan



**Farmers' training on navigation system for appropriate pesticide use in Japan.**

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## International Seminar on Technology Development for Good Agricultural Practice (GAP) in Asia and Oceania

Held at the Epochal Tsukuba (International Congress Center), Japan on October 25-26  
 Countries represented: 9 (New Zealand, Indonesia, Japan, Korea, Malaysia, Philippines, Taiwan ROC, Thailand, and Vietnam)

Papers presented: 20

Participants: 150

Cosponsors: National Agriculture and Bio-oriented Research Organization (NARO), National Agricultural Research Center (NARC), Japan

### List of papers

#### *Keynote paper*

1. GAP as a baseline, traceability as a pipeline to build consumers' confidence  
 - Tomoyoshi Matsuda, Chiba Univ., Japan

#### *Country reports*

2. Development of good agricultural practice programs in New Zealand's fruit industries  
 - Jim Walker, HortResearch, New Zealand
3. Introduction of GAP in Korea  
 - Cheol-Hi Lee, RDA, Korea
4. Quality management system: good agricultural practice (GAP) for on-farm production in Thailand  
 - Surmsuk Salakpetch, CHRC, Thailand
5. Country report on GAP  
 - Mohamed Mohd Salleh, MARDI, Malaysia
6. Philippine agriculture: retrospect and prospect in good agricultural practices amid globalization  
 - Patricio S. Faylon, PCARRD, Philippines
7. Progress of application of GAP and traceability in Taiwan  
 - Hsu-Sheng Lur, NTU, Taiwan
8. GAP status in Vietnam  
 - Ha Minh Trung, VACVINA, Vietnam
9. The propagation of EUREPGAP in Japan and development of JGAP (Japanese Good Agricultural Practice)  
 - Ryuichi Tagami, Agricultural Information Consulting Co. Ltd., Japan

10. A navigation system for appropriate pesticide use and food safety  
 - Teruaki Nanseki, NARC, Japan

#### *Resource papers*

11. An analysis of life cycle assessment applied to fruit production: a New Zealand perspective  
 - Jim Walker, HortResearch, New Zealand
12. Life cycle assessment of agricultural production systems: current issues and future perspectives  
 - Kiyotada Hayashi, NARC, Japan
13. Making evidence-based GAP for the reduction of mycotoxin contamination in cereals  
 - Takashi Nakajima, NARC for Kyushu Okinawa Region, Japan
14. Good soil care practice in the tropics: toward a new challenge  
 - Takeshi Watanabe, JIRCAS, Japan
15. AVRDC-the World Vegetable Center's present and future approaches to GAP  
 - M.C. Palada, AVRDC, Taiwan ROC
16. Traceability for agri-products in Korea  
 - Cheol-Hi Lee, RDA, Korea
17. Traceability system for agricultural products based on RFID and mobile technology  
 - Koji Sugahara, NARC, Japan
18. Interactive and seamless connection from farmers to consumers based on user-friendly mobile information technology will realize the GAP movement  
 - Kazunari Yokoyama, NARC for Hokkaido Region, Japan
19. Information technology for food safety and traceability: A case study of Thailand's chicken industry  
 - Pisuth Paboonrat, HAIL, Thailand
20. New challenges for GAP for ASEAN countries  
 - Chakam Saengruksawong, Dept of Agric., Ministry of Agric. and Coop., Thailand

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