

# Manual on Good Agricultural Practices (GAP)



ASIAN PRODUCTIVITY ORGANIZATION



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Manual on Good Agricultural Practices (GAP)  
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First edition published in Japan

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ISBN 978-92-833-2463-8 (paperback)  
ISBN 978-92-833-2464-5 (PDF)

500. 1. 2016

Designed by Urban Connections  
Printed by Hirakawa Kogyosha Co., Ltd. Japan



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# Foreword

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With international trade in food booming, consumers are increasingly concerned about food safety, how food is produced, and how it is handled within the supply chain. New pressures from consumers, retailers, and legislation have placed additional demands on farmers and producers. They are increasingly required to use production methods that reduce the impact of agricultural practices on the environment, to reduce their use of agrochemicals, and to make efficient use of natural resources (land and water), all while safeguarding the welfare of workers and conserving farm ecology. Good Agricultural Practices (GAP) represent a solution for producers seeking to address consumer concerns in domestic and foreign markets.

The GAP concept addresses two distinct issues: ensuring the safety of food and other agricultural products during on-farm and post-production processes, and enhancing environmental sustainability for permanently productive farm operations. It also contributes to socioeconomic sustainability. The development and adoption of GAP has become increasingly important in light of increasing regional and international trade in food and other agricultural products, as well as the growing consciousness of consumers of the quality, safety, and hygiene of the products they buy.

Agricultural producers, particularly small farmers in Asia and the Pacific, need to have their farms certified as GAP compliant to be recognized and accepted by the retailers of the high-end markets. Several countries have developed their own GAP standards and certification systems. However, the lack of harmonization between national GAP schemes among countries, multiple audit requirements by different retailers, and the scarcity of affordable certification systems have often led to increased confusion and higher certification costs for farmers and exporters.

An understanding of the approaches, principles, and standards of GAP and benchmarking of local GAP schemes against globally recognized guidelines like the GLOBALG.A.P. standard and the regional GAP standards like ASEAN GAP are essential so that stakeholders in various Asian Productivity Organization (APO) member countries and elsewhere can properly orient and guide small farmers in meeting established GAP standards.

The APO has been promoting Green Productivity (GP) in the industry, services, and agriculture sectors for the past two decades. Within the agriculture sector, the APO supports member countries in developing more sustainable agriculture. One of the APO's key activities for agriculture is the promotion of GAP. This manual is a compilation of selected works written by several resource persons who contributed to the APO's e-learning courses, workshops, and self-learning e-courses on GAP offered during 2010-2014. I hope that this publication will be useful to GAP practitioners, producers, agricultural extension workers, and professionals and help to promote sustainable agricultural development practices.

Mari Amano  
Secretary-General  
Tokyo, January 2016





# Acknowledgements

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The APO is grateful to the following persons and organizations for their efforts and contributions:

- The GLOBALG.A.P. Secretariat for their generosity in drawing information from their vast store of normative documents on GLOBALG.A.P. under their e-Learning Projects and for the contributions of Kerstin Uhlig, Manager Stakeholder Liaison, GLOBALG.A.P. Secretariat as a resource person under the spirit of international cooperation.
- Yasuaki Takeda, Managing Director of JGAP for his kind offer to spend time to help put together this GAP Manual.
- Norma Othman, Director of Horticulture, Department of Agriculture of Malaysia for sharing her knowledge on the development of GAP in Malaysia and ASEAN.
- Professor Dr. Christopher S. Walsh for sharing his knowledge and understanding of GAP application in the horticulture sector in this Manual.
- Kit Chan, Managing Director of K-Farm Sdn Bhd for sharing his vast experience in commercial GAP application, as well as his knowledge and experience from his field mission work as International Expert in the United Nations Industrial Development Organization's UNIDO Trade Related Technical Assistance (TRTA II) Programme in Pakistan.

The resource persons involved in the training courses are active GAP practitioners who are currently involved in developing and promoting GAP standards through their institutions around the world. The APO has benefited from the vast experience and knowledge that the resource persons have shared in the APO training courses and workshops over many years.

There are numerous valuable articles, case studies, discussion papers, and documents that have been referred to throughout this GAP manual compilation. Written by a wide range of experts and practitioners from all over the globe, these resources enable an understanding of the concept of GAP from an international perspective that is applicable to nearly all farmers throughout the world. The APO greatly appreciates these contributions to this Manual.

This Manual references a large number of control points from the GLOBALG.A.P. normative document of the Control Points and Compliance Criteria (CPCC). The GLOBALG.A.P. CPCC is by far the most comprehensive document on GAP compliance practices. The APO is very grateful to the GLOBALG.A.P. Secretariat for their permission to allow the authors of this Manual to draw upon the resources of the GLOBALG.A.P. normative documents.

The Food and Agriculture Organization of the United Nations (FAO) has been a major force in the global promotion of GAP. A vast amount of studies and work have been generated by the agency and these documents have greatly inspired the authors of this GAP Manual. This GAP Manual also contains a large number of references to the work of the FAO to provide readers with a better understanding of the concepts of GAP.

The APO also acknowledges and greatly appreciates the work of all the other contributors, including private companies, international agencies, and individual experts. The Manual on Good Agricultural Practices would not have been possible without their important support.

# MODULE 1: INTRODUCTION TO GAP AND THE GAP MANUAL

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## 1.1 PROMOTING GAP

Many farmers and agricultural practitioners all over the world have difficulty understanding the GAP standards that have been set by national authorities, international agencies, or retailers. Their first impression of GAP standards or GAP schemes is simply of prohibitions on many of their farm activities. In addition, numerous farmers who use traditional farming methods feel that GAP is an affront to their practices.

**Traditional farmers say:**

We have always produced food this way. What is wrong with our methods?

**Farmers using conventional practices say:**

We are achieving high yields in our food production. What is wrong with our approach?



The majority of farmers in Asia cannot read or write, not only in English but also in their own languages. Many farmers learn their cultivation skills purely through exposure to field situations or from their elders. The success of each crop yield is often credited to hard work or divine blessings.

However, with the adaption of science into agricultural practices, crop cultivation has become a scientific process in which every aspect of plant growth can be scientifically explained. Scientifically enhanced crop cultivation practices far outstrip traditional cultivation practices in terms of productivity, and are vital to feed the increasing world population. Modern scientific food production practices have now become the conventional approach to cultivation.

The majority of farmers now use modern chemicals in every aspect of their daily practice, including crop production, crop protection, plant growth, post-harvest treatment, and storage life in order to improve their yield productivity and quality and to protect their crops from pests and diseases. However, poor practices in the use of these chemicals can result in the creation of toxic waste and crop products can become contaminated with toxic residue. This also disturbs the ecological balance of flora and fauna in the farm and the surrounding environment. The negative consequences of poor practices come full circle to affect food production, the livelihoods of farmers, and consumers.

Table 1. The Rise of Supermarkets

<p><b>Supermarkets</b></p> <ul style="list-style-type: none"> <li>• <i>An expanding global urban phenomenon in the area of shopping for food</i></li> <li>• <i>Target the masses, particularly middle class consumers in urban areas</i></li> <li>• <i>Offer attractive prices and value</i></li> <li>• <i>Very large international retail chains</i></li> <li>• <i>One of their growth strategies is capturing market share</i></li> <li>• <i>Have low profit margins so lowering costs is a priority</i></li> <li>• <i>Source products from all over the world</i></li> </ul>	<p><b>Walmart (2014)</b> [1]</p> <p>Revenue: USD\$476.3B Total Retail Units: 11,000 Employees: 2.2 million</p> <p><b>Tesco (2013)</b> [2]</p> <p>Revenue: £72.4B Total Stores: 6,500+ Employees: 500,000+</p>
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GAP aims to bring balance into the food production equation. It helps all stakeholders of the food production chain to understand the importance of food safety, the necessity of a sustainable food production system, and the fact that we must not produce waste. GAP does not prescribe techniques to increase crop productivity. It does, however, help farmers to effectively produce profitable and sustainable crops, creating benefits that directly affect them.

## 1.2 USING GAP AS A MANAGEMENT TOOL

Readers of this GAP Manual are largely expected to be people who are involved in the agricultural sector, such as production, distribution, marketing of agricultural products, academia, and trainers, as well as officers at private and government organizations. All of these individuals are expected to have been trained in agricultural science and production.

An abbreviation for good agricultural practice, the acronym GAP is used to designate good practices in daily agricultural activities. Farmers become experts in agricultural activity through their hands-on experience working in the fields and agricultural technicians have been trained in the academic and scientific side of the agricultural sector. Because of their knowledge and experience, some farmers and agricultural technicians who read this document may object to the examination and questioning of their farming activities.

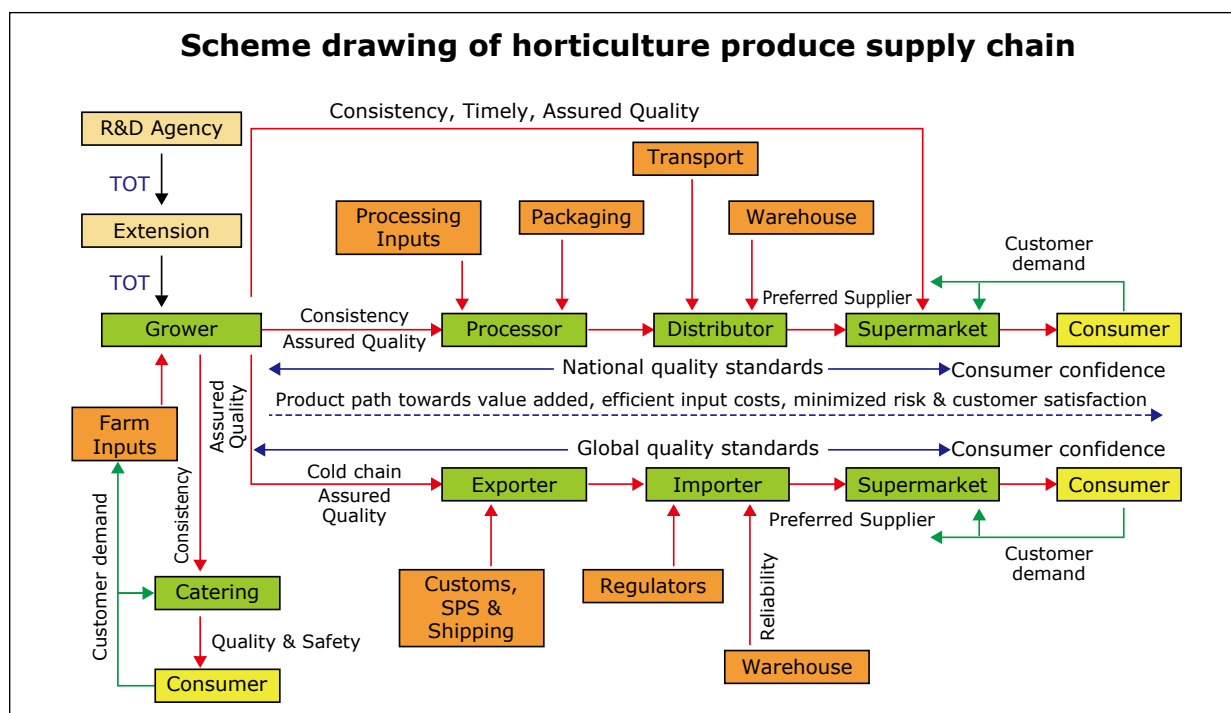


Figure 1. Every stakeholder of the produce supply chain has an equal and important role in assuring quality and food safety

This misconception of GAP has hindered the introduction and adoption of GAP practices. There is a belief that GAP standards are restrictive and obstruct farmers and their agriculture processes. However, the fundamental guiding principal of GAP is the achievement of a safe and sustainable food production system for growers and consumers. This safe production system is necessary to ensure the right of consumers to hygienic, nutritious, and affordable food. In addition, it is also essential for food production to safeguard the health, hygiene, and welfare of growers and farm workers. They must not be exposed to hazards and dangers during input applications.

Farmers are most concerned about growing successful crops that allow them to sell quality products at a favorable price. However, the power of the market rests heavily in favor of consumers. Consumers now demand and expect that GAP standards are applied for market access for many food crops. Crops from farms that are not compliant with GAP standards have to be traded in lower market destinations, which also means they are sold at lower prices.

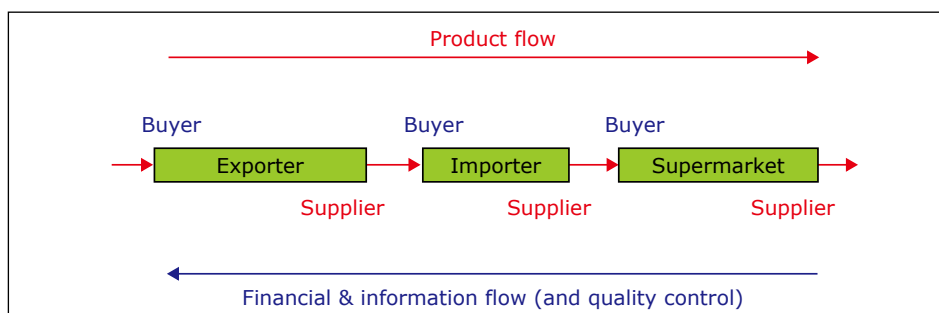


Figure 2. Every stakeholder in the chain is a buyer and a seller

Under such conditions, farmers, particularly small and rural farmers in Asia, have a desperate need to understand the workings of GAP. They must learn how to capture the opportunities and avoid the pitfalls of being trapped in a food market system where their crop products are side-lined in the food supply chain (FSC). It is hoped that this GAP Manual will assist these farmers in the management of their farms, giving them a proper understanding of GAP management practices in order to overcome these difficulties.



Farmers are most concerned about growing successful crops that can be sold for high prices.

### **1.3 CONSUMER DEMAND AS A DRIVER OF GAP PROMOTION**

GAP is a new conceptual approach to agriculture production. Because of this, GAP concepts and their application have proven to be puzzling for traditional horticulture practitioners. One aspect of this is the fact that farmers will now have to place more focus on the documentation of farm production activities than ever before.

Farmers are traditionally independent and produce for their local community within their area's natural environment. Under such conditions, they need only to think of producing the crop and selling it at the farm gate. However, with the advent of modern Horticultural Supply Chain Management (HSCM), farmers must now juggle consumer demands, supermarketization, post-harvest handling and treatment, and logistics management. As stakeholders in the supply chain, farmers now have the dual responsibility to be both responsible buyers and sellers. Farmers now realize that any of their actions on their farms will have an impact on the industry.

The use of Plant Protection Products (PPP), including pesticides, now seems to be obligatory in modern horticulture production. However, many consumers doubt whether farmers understand the correct application techniques for using PPP. Because

the market depends on consumer demand, consumer decisions now have a large effect in dictating to farmers what to grow, when to grow, and how to grow.

In the past, consumers ate to survive and the amount of food available on the market was never sufficient. Growers were assured that they could sell all their produce at any time. This was a time of supply push when markets were located fairly close to production centers. Imported food was expensive, difficult to procure, and distinctly poorer in quality. With the progress of

transportation, cold chain systems, and post-harvest handling technology, harvested food crops can now travel faster, better, and cheaper from the furthest corners of the world into the rich markets of Europe, the United States, and Japan.



Consumers now have a myriad of food choices.

Today, consumers are no longer solely focused on sating their hunger and have a great variety of food choices. Consumers in rich and developed markets, with their very large purchasing power, have a great variety of food choices available at any time of the year. Food production is now a demand pull function. Consumers now set the quality requirements on how food products are retailed. Rather than price, the deciding factor for consumers is whether poor farmers in developing countries can deliver produce into these markets with the best prices that have these quality requirements.

Under this modern system, consumers have a right to safe food. The new aspect of this conceptual approach to agriculture is the moral and legal obligation for every farmer to produce hygienic food that is assured to be safe and clean. Consumer demands in the market system mean that farmers must now produce crops in compliance with GAP standards.

#### **1.4 CONSTRAINTS OF SMALL AND RURAL FARMERS IN IMPLEMENTING GAP**

Many small and rural farmers in the developing countries of Asia lack the management skills and production practices that would aid them in adopting and developing GAP processes. These farmers also have poor financial resources and cannot afford the costs of compliance with GAP requirements. Individual development authorities in these countries have already undertaken many programs to address these deficiencies. However, these constraints continue to haunt small and rural farmers.

The current view is that because small and rural farmers from these developing countries often have not participated directly in the market system, this explains their lack of interest in implementing GAP in their practices. It is also believed that

the existence of numerous multi-tiered marketing intermediaries have decreased the motivation of small and rural farmers to adopt GAP systems of production.

However, as supermarket expansion in Asia continues with more direct sourcing from farms, there are greater opportunities for small and rural farmers to directly participate in the mainstream market system. Supermarkets have also argued that the reduction of marketing intermediaries will reduce distribution costs and that the savings could be returned to farmers. This direct sourcing approach benefits the farmers with higher returns on farm gate prices, and linking them to the market will encourage them to adopt GAP programs.

Table 2. Sustaining Small Farm Businesses

<b>Sustaining Small Farm Businesses</b>	
<b>Constraints of Small Farms</b>	<b>Necessary Interventions</b>
Production capacity/ scale	Minimization of waste related to labor, energy, water, and input resources; cluster programs (with the participation of small farms)
Production management	Codes of practice, achievement of higher productivity, quality, yield, minimization of waste, crop management, crop protection
Logistics management	Provision of an enabling environment (infrastructure, ease of doing business), technical assistance
Changing dynamics of the market	Information on markets and networking, work with supermarkets, harmonization of standards
Market linkage (market access)	Identification of markets, building of linkages, management of supply and demand, reduction in the number of market intermediaries
Building competitiveness	Certification of GAP schemes, development support services (packaging), information management
Making a profit	Value creation and value addition, niche marketing, processing

## **1.5 THE APO GAP MANUAL**

Global food cultivation represents the world's greatest consumption of land and water resources and contributes to a considerable ecological imbalance. As the world population continues to increase, the pace of food production to meet increased needs has put enormous stresses on natural resources and impacted the environment. It is no surprise that authorities and conservation groups are now paying increased attention to how food is grown, with fears of non-sustainable food production and potential food insecurity situations. Sustainable food production is also an essential issue for farmers because their livelihoods depend on reliable cultivation productivity.



In response to global calls for sustainable production and consumption, farmers must serve as champions of environmental concerns.

Although they are experts in their crops through direct experience in the fields, many farmers become lost when attempting to comply with the myriad of certification processes. In order for farmers to take the first steps necessary for GAP production approaches, it is necessary that they have a correct understanding of GAP principles, know how to implement them, and are convinced of the benefits of the GAP program. This GAP Manual published by the APO is written with practical, easily understandable explanations of the compliance requirements of the many GAP schemes currently available. It explains many of the requirements for farm compliance in the certification process in terms that are used by farmers.

The APO is well aware of the global concerns on economic and environmental issues. The development of this GAP Manual is one step in approaching these issues. The APO hopes that the GAP Manual will provide a basic understanding of the concepts of GAP. For those readers who are already well versed in the modern horticultural production transformation, the GAP Manual will serve as a useful reference document on development initiatives for GAP schemes and implementation.

For more information on the development of food safety standards and guidelines in a selection of developed countries, please read articles 1, 2, 3, and 4 of the reading list in this module.

The GAP Manual is primarily written with information that has been condensed from the following APO projects:

- E-Learning Course on GAP and GLOBALG.A.P. for Greater Market Access for Agrifood Products, 2010 [3].
- E-Learning Course on the GLOBALG.A.P. Standard for Greater Market Access, 2013 [4].
- Workshop on Good Agricultural Practice (GAP) for Increasing Farm Productivity and Enhancing Environmental Sustainability, Manila, 2014 [5].

These three courses present and examine the Malaysian GAP Scheme (MyGAP; previously known as SALM), Japan GAP (JGAP), GLOBALG.A.P., and the GAP practices in the United States. Reference materials from the e-learning courses and from the workshop are included in this Manual.

### **1.5.1 National GAP Schemes of APO Member Countries**

The 20 member countries of the APO have been involved to varying degrees in initiatives to develop their national GAP schemes. A number of the member countries already established their national GAP schemes some 10 years ago, including Japan (JGAP), Thailand (ThaiGAP), and Malaysia (MyGAP). There are also several new additions, including Indonesia (IndoGAP), Taiwan (TGAP), India (IndiaGAP), Vietnam (VietGAP), and the Philippines (PhilGAP).

The rest of the APO member countries are still in the planning and drafting stages in formulating their GAP schemes. This GAP Manual will serve as a useful source of information for the working groups composing national GAP schemes.

The majority of the national GAP schemes mentioned above cater to the domestic market, and export specifications are limited to regional trade. Japan and Thailand are in the process of benchmarking their respective GAP schemes of JGAP and ThaiGAP with GLOBALG.A.P in order to receive international certification. For more information on JGAP, please see Appendix 1. 'An Overview of JGAP,' presented by Mr. Yasuaki Takeda at the APO Workshop on Good Agricultural Practices (GAP) for Enhancing Food Security and Environment Conservation in Manila, Philippines on 11-15 August 2014.

### **1.5.2 ASEAN GAP**

The Association of Southeast Asian Nations (ASEAN) has developed ASEAN GAP, a quality assurance system for ASEAN fruits and vegetables. ASEAN GAP is a voluntary standard of GAP that is used to control hazards during the production, harvesting, and post-harvesting of fresh fruits and vegetables in the ASEAN region.

The 10 ASEAN member countries have also made efforts for their GAP development to varying degrees. Some of the countries already have government certification systems while others are at the early stage of implementing awareness programs for farmers. Member countries with national GAP schemes should benchmark against ASEAN GAP while those without national GAP schemes should adopt ASEAN GAP.

The objective of ASEAN GAP is to harmonize GAP schemes within the ASEAN region to facilitate both regional and international trade, to assure the safety and quality of fruits and vegetables for consumers, and to enhance the sustainability of the environment in the ASEAN region in order to protect the health, safety, and welfare of workers. ASEAN GAP should be promoted so that it can gain equivalency with other international GAP standards and achieve recognition by the World Trade Organization as an international trading standard.

ASEAN GAP covers four modules of compliance criteria: food safety; environmental management; workers' health, safety, and welfare; and produce quality. Member countries that are well advanced in their national GAP development should meet all of these four modules. ASEAN countries that have not yet developed their own national GAP schemes can adopt and utilize ASEAN GAP in order to improve their standards and eventually create a common standard with the rest of the ASEAN GAP frontrunners.

## **1.6 UTILIZING THE APO GAP MANUAL**

This Manual explains GAP's relevance for farm management with the following approach:

- Identification of the impacts of non-compliance for farms, products, and consumers.
- Explanations of the rationales for each compliance requirement so farmers can see the benefits that can be derived from the implementation of GAP practices.
- Provision of examples of procedures, checklists, and templates that readers can use for their daily farm management work.
- Provision of references on the subject of GAP that will enable readers to further expand their understanding of the subject.

Readers with knowledge of GAP practices will recognize that this Manual includes the major Control Points and Compliance Criteria that are found in many national GAP schemes. With an understanding of how to fulfill these criteria, these readers should be confident enough to attempt the certification process of the national GAP schemes in their own countries, or even the process for GLOBALG.A.P. certification.

Experienced farm extension officers can use this GAP Manual when they introduce and implement GAP with the small and rural farmers they work with. Farmers reading the Manual can utilize the farm management tools outlined here and independently implement GAP practices in their farms. They can even apply for GLOBALG.A.P. certification on their own.

The Manual includes a module on quality management systems (QMS). A QMS is a collection of business processes (e.g., organizational structure, policies, procedures, and processes) that assist producers in achieving the quality objectives they have promised to clients. A QMS is essential if the producer works within a cluster group of farmers. This is because producers need to have a system for controlling group members in order to focus on the common objectives of the cluster group.

This Manual is highly recommended for the leaders of cluster groups or contract farmer groups who are responsible for the GAP practices and conduct of their group members. The Manual is intended to aid practitioners as they independently introduce GAP and help them in their approach to GAP certification.

This Manual is divided into five GAP modules: Farm Management; Food Safety; Environmental Conservation; Workers' Health, Safety, and Welfare; and Quality Management Systems. A number of tools are introduced in this Manual that practitioners can utilize in their GAP management and implementation. These tools include examples of record-keeping templates, procedure formats, risk assessments, and checklist samples. In addition, internet links and addresses for valuable documents are provided and readers are encouraged to utilize these references to broaden their perspectives on GAP. Specific slides of PowerPoint presentations are also provided. Readers can also utilize these materials to teach others about GAP practices.

This Manual does not seek to replace any documents written on the subject of GAP or any existing GAP schemes. It is a supplement to the existing GAP schemes that are practiced by farmers and practitioners throughout the world. The guidelines for many GAP standards often utilize a highly technical style with complex terminology.

To heighten understanding among farmers, this Manual provides clear descriptions of the criteria of GAP standards and how to achieve compliance in daily farm practice.

Self-assessment quizzes are included at the end of each module, which highlight the important points and issues of the topics discussed. Readers will gain a better understanding on each topic by taking the quizzes. The quizzes encourage readers to examine how their activities can affect global issues and to contemplate how they can personally take specific actions in overcoming these issues. It is advised that readers complete each quiz before moving on to the next module.

The final examination should be taken after thorough study of each module. It will also serve as a benchmark for whether readers have truly understood the material and if they are ready to teach the subject of GAP to other farmers and practitioners who may not have the necessary language or technical skills to read and understand this manual.

The Manual is available both as an e-publication on the APO website and as a printed publication. This ensures convenient and affordable access for a wide audience interested in GAP practices. The APO also intends for the participants of the e-learning program to continue to connect with the wider network of individuals devoted to the environment.

## **1.7 PRESENTATIONS OF RESOURCE PERSONS IN THE APO GAP PROJECTS**

In response to growing calls from APO member countries for safe food production and environmental conservation, the APO is promoting Green Productivity (GP) as a strategy for socioeconomic development. In this regard, the APO has undertaken several GAP projects since 2008. There have been many successful advances in the APO member countries, which are introduced in section 1.5.1 of this module.

The APO has invited a number of resource persons to conduct both face-to-face and e-learning courses to introduce and promote GAP in member countries. The following are some of the PowerPoint presentations that have been given in the workshops and training courses. The readers of this Manual are encouraged to carefully look through these presentations. The information presented is derived from the field experiences of these resource persons, and has a wider and practical context that builds upon the modules. These presentations form an integral part of the GAP Manual.

### 1.7.1 Global Perspectives on the Implementation of GAP in Asia

Please refer to [Appendix 2](#) and [Appendix 3](#).

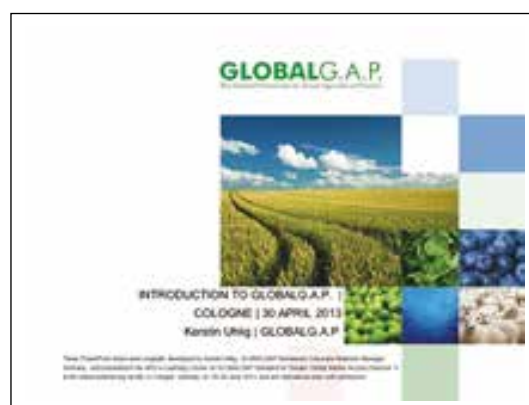
These two PowerPoint presentations explore issues related to Asian farmers who are anticipating the introduction and implementation of GAP, particularly small and rural farmers. The objective of these presentations is to present the big picture so that readers can position their implementation of GAP practices in the wider context of Asia.



### 1.7.2 Introduction to GLOBALG.A.P. and the GLOBALG.A.P. Certification Process

Please refer to [Appendix 4](#) and [Appendix 5](#).

Many GAP practitioners believe that GLOBALG.A.P. compliance criteria are out of reach for most Asian farmers. However, this is a misconception. GLOBALG.A.P. has set the minimum standards for the GAP certification process, and is in fact similar to the agriculture practice programs implemented by the farm extension officers of many of the agriculture agencies in Asian countries. It is often the highly technical language that makes it difficult for many farmers to understand the GLOBALG.A.P. Control Points and Compliance Criteria. For this reason, Kerstin Uhlig's excellent PowerPoint presentation is highly enlightening for readers.



### 1.7.3 Introduction to Japan GAP (JGAP)

Please refer to [Appendix 1](#) and [Appendix 6](#).

Japanese consumers have some of the most demanding criteria in the world for food hygiene, food safety, and packaging. Japanese consumers are mindful of the delicate environment of their island country and are sensitive about preserving its natural beauty.

Because of the concentrated and comparatively younger populations in Japan's urban metropolises, there are precarious food security issues, limited land to grow food, and very high labor and living costs. Due to this, Japan's agricultural and food production is based on state-of-the-art technology and highly sophisticated infrastructure. Concerns

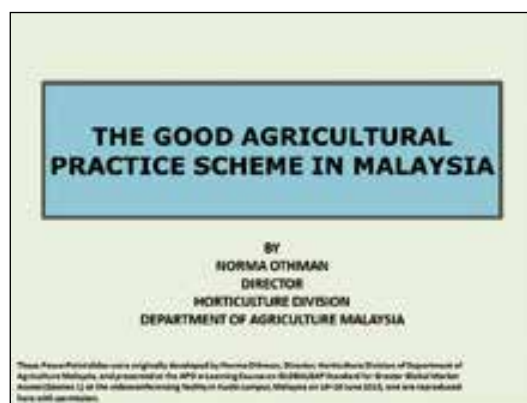


about food safety and environmental sustainability are given utmost consideration. In this presentation, readers discover the significance of GAP practices for Japan, and learn how to apply this example to their own situations.

#### **1.7.4 Introduction to Malaysia GAP (MyGAP; formerly known as SALM)**

Please refer to [Appendix 7](#).

Malaysia was one of the first countries in Asia to embrace GAP implementation. With the objective of rebranding their GAP scheme, in 2013 Malaysian authorities changed its name from 'SALM' to 'MyGAP.' The country is heavily invested in the production of oil palm. Malaysian authorities are most concerned about the sustainability of this industry because it comprises a very high percentage of the nation's export income.



MyGAP is a very comprehensive GAP scheme that covers all of the critical criteria of food safety and environmental concerns. Agrifood producers in Malaysia include both small growers and very large plantations. It is notable how an emerging economy like Malaysia has initiated its GAP movement and successfully promoted it to farmers in the country. Readers from other APO member countries can emulate the model of MyGAP.

#### **1.7.5 Introduction to ASEAN GAP**

Please refer to [Appendix 8](#).

ASEAN GAP is a voluntary standard for GAP to control hazards during the production, harvest, and postharvest of fresh fruits and vegetables in the ASEAN region. ASEAN GAP was developed to enhance the harmonization of national GAP schemes among ASEAN member states. There must be comparable standards when ASEAN countries begin to trade actively under the ASEAN Economic Community. Members of ASEAN who possess their own GAP schemes should benchmark their schemes with ASEAN GAP. Those countries that have yet to develop their own GAP schemes can adopt the ASEAN GAP standards.



## **READING LIST**

(Resources on GAP guidelines, codes of practice, and manuals)

1. 'Guidelines for On-Farm Food Safety for Fresh Produce' 2001.  
Department of Agriculture, Fisheries and Forestry, Government of Australia (AFFA).  
"Working Group on Safety and Quality Systems."  
ISBN 0 642 53942 1
2. 'Code of Practice for Fertilizer Use' – 1st Edition, August 1998.  
Fert Research © New Zealand Fertilizer Manufacturers' Research Association.  
ISBN 0-473-05526-0
3. 'Assuring Food Safety and Quality: Guidelines for Strengthening National Food Control Systems'. PDF Version  
Food and Agriculture Organization of the United Nations.  
FAO Corporate Document Repository.  
ISSN 0254-4725  
FAO Food and Nutrition, Paper 76.  
<http://www.fao.org/docrep/006/Y8705E/Y8705E00.HTM>
4. 'Good Agricultural Practices: A Self-Audit for Growers and Handlers' by Suslow Trevor. University of California Davis – Food – Safety – Audit. PDF Version  
<http://onfarmfoodsafety.org/wp-content/uploads/ucdavis-food-safety-audit.pdf>

## MODULE 2: THE DEVELOPMENT OF GAP IN THE HORTICULTURAL PRODUCTION SYSTEM

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GAP includes farm codes of conduct, manuals, guidelines, standards, and regulations that have been developed by growers associations, food processors, retailers, governments, and NGOs. The aim of these codes of conduct is to assure that the food produced is at the quality level demanded by consumers and safe for human consumption. The guidelines are based on science, and should conform to local and national standards. GAP also addresses environmental sustainability issues, as well as the economic and social sustainability of the stakeholders. GAP standards are adopted by practitioners on a voluntary basis.



### *Assurance of Safe Food Production*

The modern food trade system gives consumers greater influence in determining what food is grown, when it is grown, and how it is grown. Consumers demand that the produce delivered to them meets recognized quality and safety standards. Food that is safe for consumption is defined in terms of food hygiene, cleanliness in production and preparation, and an absence of physical, biological, and chemical contamination. However, due to increasingly complex modern food chain systems coupled with the development of experienced food producers and processors working alongside less developed food producers, many consumers now have doubts about the safety and hygiene of their food. This public concern is driven not just by food regulation authorities, but also by the business entities that are held responsible for food safety by consumers.

### *Sustainable Agricultural Production*

GAP allows chemical inputs in farms. However, the applications of these chemicals must ensure handling and residual safety, that the farm ecology is not irreversibly damaged, and that the negative impacts of farm practices are minimized and do not affect the environment outside the farm. These farm management practices promote ecological sustainability and enable farms to produce efficiently in a sustainable manner that leads to profitable returns.

Sustainable agriculture is a farming system that provides safe, nutritious, and affordable food to meet the needs of the world population in a way that conserves the environment and natural resources. It seeks to optimize skills and technologies to achieve long-term productivity and profitability for stakeholders of the agriculture



enterprise in order to ensure that future generations can also experience the same prosperity that we enjoy today.

Additional specific ecological concerns include soil productivity (erosion, depletion of top soil, desertification), water conservation (depletion, groundwater usage, contamination), pest and disease resistance to chemical pesticides, the greenhouse effect, and climate change.

### *Impacts on Human Health and Social and Economic Concerns*

In the majority of the developing countries in the Asia-Pacific region, farm laborers are illiterate and among the lowest paid members of the work force. Because of this, they are not likely to recognize chemical hazards or understand the seriousness of food contamination risks. Dissemination of knowledge, training, and the provision of remunerative incentives and sustainable wages for laborers are imperative to ensure the effectiveness of good farm practices.

Modern consumers are influenced by their moral convictions when they make their purchases. Their agenda now includes socioeconomic concerns on the production of their food purchases, including the price of food at the farm gate, the incomes of small and rural farmers, and the health and welfare of the farmers and their children. These concerns are now critical criteria in the food production process.



Walmart Supercentre



A Supermarket at Every Corner of the City

## **2.1 BACKGROUND AND DEVELOPMENT OF GAP**

### **2.1.1 The Earth Summit, 1992**

As the world's economic development rapidly progressed during the late 20th century, swelling population growth resulted in the inevitable demand for more manufactured goods and for more food to be grown. Because of this, world leaders, politicians, scientists, and planners have begun to pay increased attention to sustainable growth.

Will there be sufficient land and water to support food production that meets the needs of the global population? Can we prevent the impacts of industrial effluents from reaching a critical point of no return on the environment? How much harm could we do to the environment before the nations of the world took a stand? These were the questions that brought prominent leaders and planners together for the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil on 3-14 June 1992. The Conference has become widely known as the Earth Summit in Rio de Janeiro. The Conference was unprecedented in terms of size and the scope of the concerns it addressed. Hundreds of thousands of people from all economic and social backgrounds were drawn toward the Rio process. They pressed the policy makers of their countries for the transformation of attitudes and behavior toward the environment.

For more information on the proceedings of the Earth Summit in Rio de Janeiro, please read article 1 in the Reading List of this module.

One of the significant outcomes of the Conference was that it led to the adoption of Agenda 21 (the Global Agenda for the 21st Century). Agenda 21 is a wide-ranging blueprint for actions to achieve worldwide sustainable development. In particular; Chapter 14 of Agenda 21 calls for the promotion of Sustainable Agriculture and Rural Development (SARD).

SARD is described in Chapter 14 of Agenda 21 as follows:

The priority must be on maintaining and improving the capacity of the higher potential agricultural lands to support an expanding population. However, conserving and rehabilitating the natural resources on lower potential lands in order to maintain sustainable man/land ratios is also necessary. The main tools of SARD are policy and agrarian reform, participation, income diversification, land conservation and improved management of inputs. The success of SARD will depend largely on the support and participation of rural people, national Governments, the private sector and international cooperation, including technical and scientific cooperation.

For further information on SARD from Chapter 14 of Agenda 21, please refer to article 2 in the Reading List of this module.

### **2.1.2 FAO GAP**

The Food and Agriculture Organization of the United Nations (FAO) takes leading actions to create a more concrete implementation mechanism in the development for SARD. It began its initiative FAO Good Agricultural Practices (FAO GAP) in 2001. FAO GAP has made the first impacts on international governments to increase awareness of sustainable agriculture development.

The FAO describes GAP as follows:

The concept of Good Agricultural Practices is the application of available knowledge to the utilization of the natural resource base in a sustainable way for the production of safe, healthy food and non-food agricultural products, in a humane manner, while achieving economic viability and social stability. The underlying theme is one of knowing, understanding, planning, measuring, recording, and managing to achieve identified social, environmental and production goals... which requires a sound and comprehensive management strategy and the capability for responsive tactical adjustments as circumstances change. Success depends upon developing the skill and knowledge bases, on continuous recording and analysis of performance, and the use of expert advice as required.

The guidelines of FAO GAP address 11 categories of farm resource concerns and activities:

1. Soil
2. Water
3. Crop Production
4. Crop Protection
5. Animal Production
6. Animal Health
7. Animal Welfare
8. Harvest and On-farm Processing and Storage
9. Energy and Waste Management
10. Human Welfare Health and Safety
11. Wildlife and Landscape



Display of fruits and vegetables at a wholesale market in Brussels

The FAO GAP guidelines for these farm resource management and operations are geared toward the production of safe food, responsible and correct utilization of natural resources, heightened care in the treatment of products and animals, enhanced protections for worker health, and attention for the preservation of farm ecology.

### **2.1.3 Development of Private Sector GAP Standards**

By the year 2000, the impact of the Earth Summit had begun to become clear. Results were not only seen in the policies of many government programs and regulations, but also in the private sector corporations that were induced to take independent actions for sustainable food production processes. These actions of the large food production corporations may be seen as a response to consumers' sensitivities about food safety and environmental sustainability. The Unilever Sustainable Agricultural Initiative is an example of one corporation's project in this area.

Unilever is one of the largest consumer goods companies in the world. It is the world's largest user of agricultural raw materials and a major buyer of agricultural goods for processing for the world markets. The company is one of the largest producers of tomato-based sauces, pasta, and frozen peas and spinach.

Unilever established its Sustainable Agricultural Initiative to ensure continued access for the company to key agricultural raw materials and to develop a market mechanism that allows customers to influence the sourcing of raw materials through their buying habits. The initiative produced the agricultural best practice guidelines that have been incorporated into Unilever's contracts with their growers, defining soil preparation, fertilization regimes, harvesting, and other activities specific to each crop. This initiative thus plays an active role in influencing GAP for farmers.

For further information on the development of GAP by private companies, FAO, and other international agencies, please read the following articles in the Reading List of this module.

- Article 3 FAO GAP Principles
- Article 4 EISA (European Initiative for Sustainable Development in Agriculture), Common Codex for Integrated Farming
- Article 5 UNILEVER, Growing for the Future
- Article 6 EurepGAP Protocol 2000
- Article 7 FAO, COAG Development of a Framework for GAP
- Article 8 FAO, Report of Expert Consultation on GAP Approach
- Article 9 FAO, Summary Analysis of Codes Guidelines & Standards of GAP
- Article 10 FAO, Incentives in Adoption of GAP
- Article 11 FAO, Report of FAO Internal Workshop on GAP
- Article 12 FAO, GAP Working Concept

#### **2.1.4 EurepGAP**

In the U.K. at the end of the 20th century, many large retailers and supermarkets faced difficulties with poor quality fresh produce and fierce competition in the retail industry. As the last post of the supply chain, supermarkets were found liable for contamination incidents even if they were not the direct source of the problem. Every case of food contamination exposed in the news media cost millions of pounds in revenue for the supermarkets as customers moved away to their competitors. There were also legal suits brought against supermarkets by customers over contamination incidents.

Many supermarket chains had already put into place quality standards for their suppliers in recognition of the fact that their competitive edge was based not only on price but on quality. In order to meet these standards, fresh produce suppliers had to deal with the difficult task of meeting differing quality standards when they traded with multiple retail supermarkets.

With so many private sector food safety standards set up by supermarkets and commercial associations, the supplier stakeholders of the trade began to urgently request the establishment of a foundation for achieving harmonized good farm practices, food handling controls, and sanitary controls. The aim was to bring consistency to the different retailers' standards. Such a harmonized system needed to be flexible, easily adaptable by farmers and processors, totally transparent, and linked with other standards across the industry to generate a dynamic process of control.

Such a system was established by a group of leading European food retailers through the creation in 1997 of EurepGAP (Euro-Retailer Produce Working Group) for fruit and vegetable standards. The working group addressed standards for fruits and vegetables with the support of producer organizations outside the EU. EurepGAP was a wholly private sector initiative in the drive toward GAP.

The EurepGAP scheme succeeded well and became the world's most widely implemented farm certification scheme for GAP. Although certification for the EurepGAP scheme was voluntary, many European supermarket retailers demanded evidence of EurepGAP certification as a prerequisite for doing business with growers and suppliers. EurepGAP certification thus became an access barrier to supermarket retail for farmers and producers.

#### **2.1.5. GLOBALG.A.P.**

EurepGAP changed its name to GLOBALG.A.P. in 2007. The decision was made in order to reflect its expanding international role in establishing GAP as a standard for multiple retailers and their suppliers. The benchmarking scheme of GLOBALG.A.P. allows individual countries to benchmark their national GAP schemes with GLOBALG.A.P. and receive recognition for achieving the equivalent quality standards of GLOBALG.A.P. [6] GLOBALG.A.P. has since extended the voluntary standards certification of production processes from fruits and vegetables to include other crops, livestock, and aquaculture.

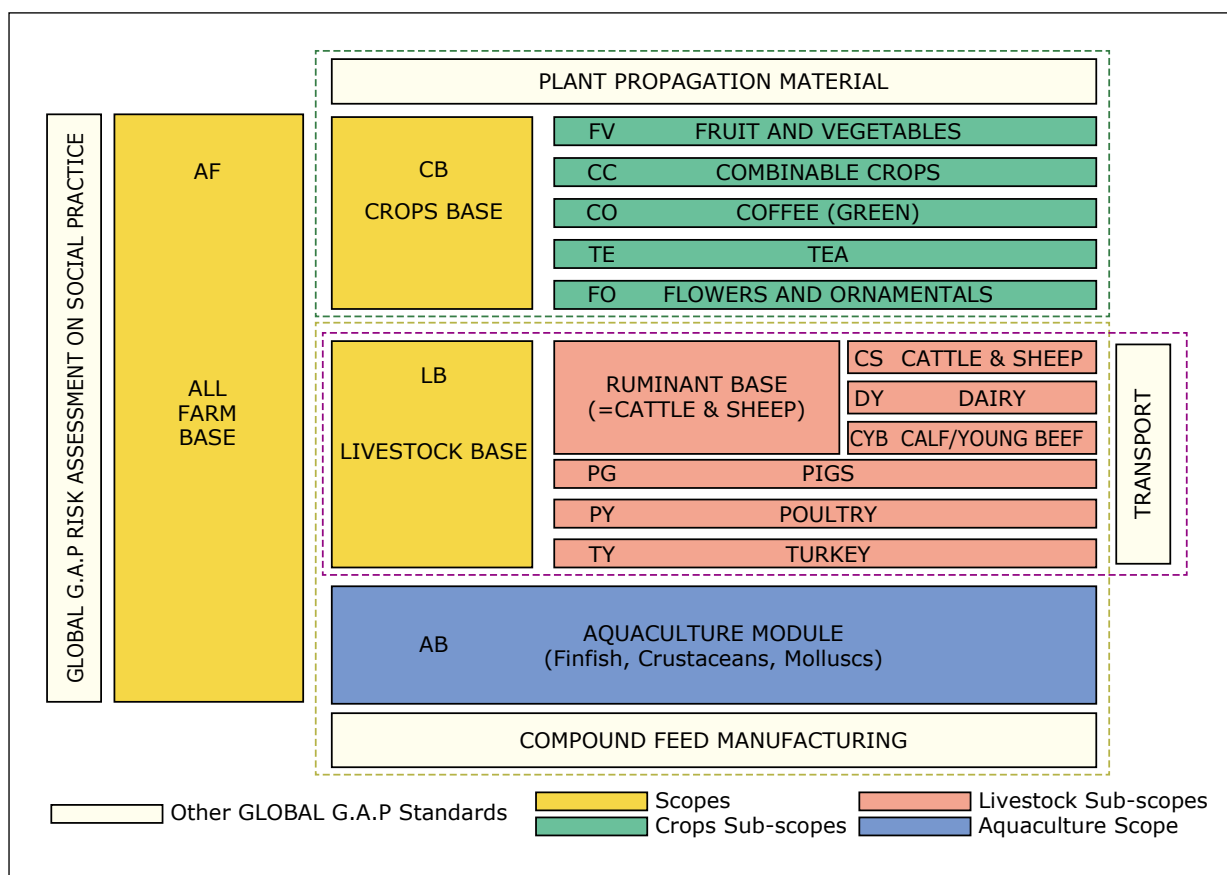


Figure 1. Structure of the GLOBALG.A.P. IFA Standards

The GLOBALG.A.P. standard is primarily designed to assure consumers about how food is produced on farms by reducing the use of chemical inputs, minimizing detrimental environmental impacts of farming operations, and ensuring a responsible approach to worker's health and safety as well as animal welfare. The GLOBALG.A.P. standard is based on a monitoring system of risk assessment.

## 2.1.6 National GAP Schemes

The development work on GAP spearheaded by FAO and GLOBALG.A.P. has spurred on many countries as they adopt GAP concepts for their own national GAP programs. Some of the early examples of these countries include Canada, New Zealand, Malaysia, France, Uruguay, Brazil, the U.K., and the U.S. In each of these countries, the national GAP programs that cover production safety standards or guidelines for fruits, vegetables, field crops, and livestock were established and supported by their respective ministries and research institutions, as well as private sector companies and civil society organizations.

### The GAP Phenomenon

Awareness of GAP standards and practices now constitute a global movement and those countries or private sector food crop producers that are not part of this phenomenon will lag behind, especially if cross-border trade is involved in their business.



It is possible to produce fruits of this quality without the excessive use of pesticides



There is no guarantee that large amounts of pesticides will prevent this.

## 2.2 THE CHANGING LANDSCAPE OF CONSUMERS AND PRODUCERS IN FOOD PRODUCTION IN THE ASIAN CONTEXT

No economy in the world today can escape the globalization effect on consumer trends and the global food trade, short of physically restricting its consumers' communication with the outside world. The global connectivity enabled by the internet and mobile telephones has given consumers the basic tools to make more decisions about their lifestyles.

Food supply chains and supermarkets incorporate cross-border destinations and sources of production come from all corners of the world. In addition, supermarket chains are opening up stores all throughout the world. The survival of food supply businesses in international trade rests on the suppliers' competitiveness and the strength of the international supermarket chains.

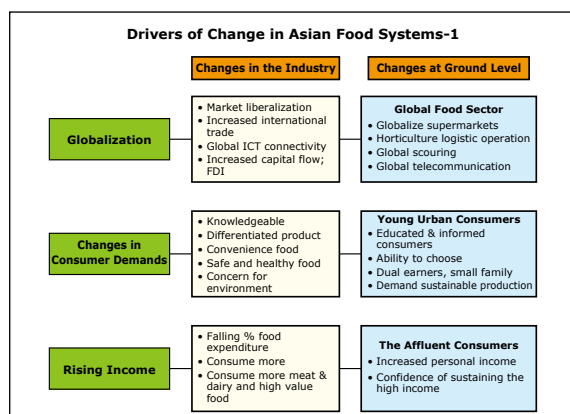


Figure 2. Drivers of Change in Asian Food Systems – 1.



In many economies, particularly in the more developed ones, consumption of food by consumers is not motivated solely by hunger. The ultimate destination of food depends on what customers want and the price they are willing to pay for it. Consumers have different demands for food items at varying times, qualities, standards, and types. Very large supermarkets chains have had enormous success in entering the markets of the U.S., Europe, and Japan and are now moving into Asia. They will continue to expand and influence the food consumption system. There are many potential paths for the future of food consumption in Asia because of these developments.

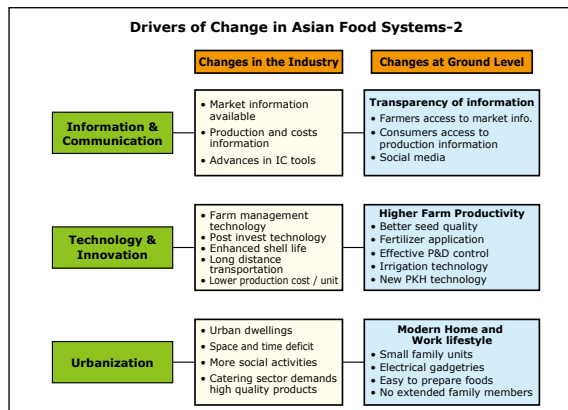


Figure 3. Drivers of Change in Asian Food Systems – 2.

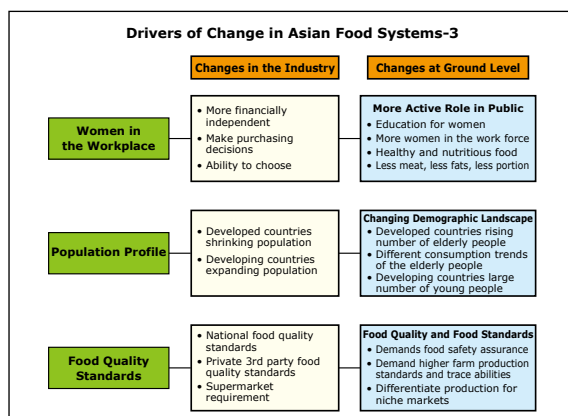


Figure 4. Drivers of Change in Asian Food Systems – 3.

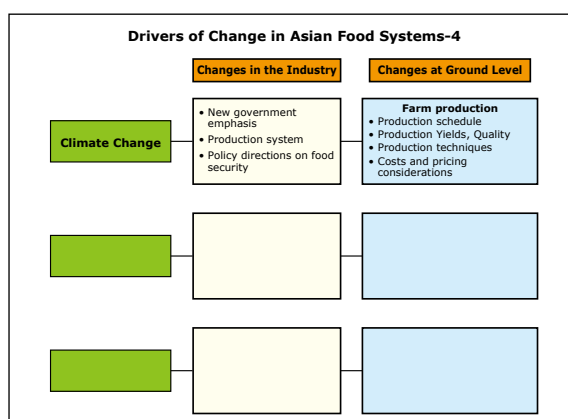


Figure 5. Drivers of Change in Asian Food Systems – 4.



### **2.2.1 Supermarkets**

Some 25 years ago, supermarkets in Asia were high-end retailers that catered to higher income customers, selling mostly imported goods at relatively expensive prices. Today, there is a global phenomenon of the masses shopping in supermarkets. Supermarkets with floor spaces that measure 5,000-10,000 square meters are a common sight in many cities in Asia. These supermarkets are now targeting the consumer masses and middle income customers in urban areas. Supermarket complexes provide convenient and comfortable shopping environments, and tend to either be located near urban train stations or to have ample parking facilities. Food prices in supermarkets now offer attractive value and promotional offers, and traditional small fruit and vegetable stores and wet markets find it hard to compete with them. There is now a sharp decline in the number of such traditional retail outlets, wholesale markets, and wet markets in the cities in many of the emerging countries in Asia.

Supermarkets are now very large retail chain stores. Their growth strategy lies in capturing market share through their expanding turnovers in sales. This means winning over customers from smaller retail stores, as well as their other supermarket competitors. Supermarkets have a very great purchasing advantage over the local food retailers and open markets. They buy at low prices in large volumes and work on low profit margins.

These supermarkets source their produce from all over the world, working with the supply windows of each origin country at different times of the year. Supermarkets can now offer all types of produce throughout the year, even if they are out of season in that particular area. These aggressive marketing strategies have made supermarkets into very powerful conglomerates, and they continue to expand through buy-outs of smaller local retail chain stores in Asian countries.



Supermarkets offer fruits and vegetables of excellent quality all year round.

### **2.2.2 Changing Consumer Trends**

Supermarkets have had a major impact on consumers. However, these changes would not have happened if the fundamental economic and social landscape in Asia had not also undergone a transformation. Asia has a combined population of about 4.3 billion people. This outsized population has created a consumption demand cycle that is making the continent a fast emerging economic power.

In the modern economy, there are new drivers that are influencing consumers in making their food purchases. The drivers of change in the Asian food system have been affected by the following factors:

#### *i. Globalization*

- Trade liberalization and globalization is opening up international trade. Retailers can now source their produce from multiple suppliers from the far corners of the world.
- Global ICT connectivity has allowed greater and more efficient capital flow into developing and emerging economies, raising the potential for income and economic growth in these countries.

#### *ii. Changes in Consumer Demands*

- Consumers today are more knowledgeable in discerning the different products available on the retail shelves.
- The changing lifestyles of consumers mean they are looking for convenient, safe, and healthy foods. They are conscious of how their consumption and food production affect the environment.

#### *iii. Rising Incomes of Consumers*

- The rising incomes of consumers in developed and emerging economies are reducing the percentage of their income for food consumption, thereby giving these consumers greater purchasing power in their food selections.
- There is now a trend of educated young urban families with both adults acting as dual earners, meaning that both husbands and wives work. The trend includes smaller families that need more convenient access to food.

#### *iv. Information and Communication*

- Advances in ICT tools give consumers access to market and production information. Consumers are now better informed on how their food is produced. This has given them a bigger role in influencing farm decision making processes.
- Farmers can access market information to help them decide what to grow, when to grow, and how to grow. This helps farmers make decisions on costs and pricing for their products.

#### *v. Technology Innovation*

- Developments in production technology and innovation have given farmers increased access to farm management technology, postharvest handling technology, logistics management, better seed quality, fertilizer application, better crop protection, and

irrigation. This helps produce better yields and quality crops.

- All of these technology innovations will aid farmers in lowering their production costs and give them better control of crop production.

#### *vi. Urbanization*

- The world is undergoing the largest wave of urban growth in history. In 2008, for the first time in history, more than half of the world's population lives in towns and cities. This means that a greater proportion of the population is consuming food but is not involved in its production. Food production locations and resources associated with food production are being pushed further out into inaccessible and rural areas.
- Urban lifestyles are characterized by a deficit of space and time. Homes are in high rise buildings with smaller kitchens, and house smaller families with fewer extended family members. Kitchens are equipped with appliances that enable easy preparation of food. Convenience in preparing food is a necessity.
- The food catering services of restaurants and fast food retailers are growing at a fast pace. These services demand higher quality supplies of products.

#### *vii. Women in the Workplace*

- A greater percentage of women are educated in urban areas. They work and earn their own living. They are financially independent and are able to freely make their own purchasing decisions.
- These women demand healthier foods with higher nutritional content. They do their purchasing in retail stores and supermarkets and tend to buy less meat and high-fat products, and in smaller portions. Food producers must redesign their packaging to appeal to this growing category of consumers.

#### *viii. Population Profile*

- The population profile in Asia is split between countries that have very young populations (Vietnam, the Philippines, Pakistan, Myanmar, India, etc.) and those with aging populations (Japan, the Republic of Korea, etc.). The food products and habits favored by these two groups of consumers are very different. Young people tend to seek fast food and processed foods, while the older population tends to buy healthy and fresh food.

#### *ix. Food Quality Standards and Supermarketization*

- Shopping for food in supermarkets in urban cities is now an established practice that will not change. Supermarkets have hugely influenced how food is produced and how it is sold. Shopping malls are also very popular. Many urban families spend an entire day in shopping malls each week, not to make purchases but because they enjoy spending time there.
- Supermarkets claim to represent the interests and demands of consumers. A large market share of the supermarket retail industry is held by a few very large corporations. These supermarket retailers have exerted great power over the stakeholders of the food supply chain. Supermarkets operate with low costs and low margins with sophisticated warehousing and distribution systems. They buy directly from large producers to streamline the production supply chain.

- Food safety standards are major criteria in the supply of food items to supermarkets. Supermarkets demand food safety standard certification and the traceability of these supply items to their farm origins. These standards can either be processed-based (e.g. hazard analysis or critical control points (HACCP)) or farm-based (GLOBALG.A.P.) or their equivalent. The farmers that supply the supermarkets have little choice but to comply with the requirements of the supermarkets.
- Many countries in Asia have developed their own national food safety standards, such as Q Mark in Thailand, MyGAP in Malaysia, and IndoGAP in Indonesia. ASEAN GAP is a harmonized GAP scheme for ASEAN member states. Countries that do not have their own national GAP standards can benchmark with ASEAN GAP and implement their food safety standards.

### **2.2.3 Impacts of the Food Production Supply Chain in Asia Due to Changing Consumer Behavior**

#### *Preferred Suppliers*

Competition in the supply chain area traditionally revolves around the pricing mechanism. Very often, the supplier who offers the cheaper price gets the business. However, in a market where value addition is pursued by consumers, price is not the only factor. Supermarkets have their 'preferred suppliers,' which acquire their enhanced status not only through competitive prices, but mostly due to the strong business/market linkages they have built with supermarkets by ensuring their deliveries are on time, have the correct quantities, and meet the quality standards that were agreed upon.



Importer warehouse

#### *Global Competition*

The supply of agrifood products to supermarkets is no longer a local business of farmers selling in local stores. The demands of consumers, as expressed by the purchasing behavior of supermarkets, have spurred global competitiveness between suppliers, competition between producer countries, and competition between supply chains.

On the other hand, there is also competition among supermarket chains to secure supplies from producers with the best quality agrifood products at the best prices.

One example of increased global competition can be traced to new seed varieties and technology. Certain crops were once limited to countries with hospitable climates. However, new seed varieties and seed production technology have enabled the same or similar crops to be grown in many countries. These seeds are sold internationally by the larger and more established seed companies. Producers will lose their competitive

edge if they have the false belief that they have a seed or crop variety that nobody else has. For example, many types of melon crops were once limited to countries with tropical climates. However, seed companies have now developed seeds that produce melons that can be grown in countries where it was previously impossible. This has led to increased competition for the original producers in the tropical countries.

### *Strategic Development of Market Linkages*

Developing the business of delivering agrifood products from the farms to the supermarkets in a foreign country is more than just a matter of locating individual exporters who are capable of the task. The collectors and exporters must connect with competent growers who can harvest, process, and deliver their products safely to the exporters' business, where they are repacked and shipped. The products need voyage monitoring, and there are many forms of documentation and trade regulations to comply with. Logistics management must be efficient and effective at all times. This includes the availability of transportation vehicles, multimodal connections, departure schedules, and a functioning cold chain system.

On arrival at the market, buyers must know how best to display and promote the fruits and vegetables in the best places for the best prices. It is important that customers who buy the fruits and vegetables for the first time like them and come back to make further purchases. This entire process is the definition of a successful shipment.

The strategy for developing linkages is built on an understanding of what clients (supermarkets and consumers) want and how to satisfy those needs. Consumers want consistently high quality products with sufficient variety and affordable prices. Supermarkets want to meet all the needs of their customers, and outdo the competition. This means that they want to have the products before anyone else, or stock them when their competitors do not. If the same product is available to everyone, supermarkets want their products to have added value compared to the products of their competitors.

### **Supermarkets and Suppliers**

One measure of the strength of a supermarket is how well it is served and supported by its suppliers. Supermarkets value long-term relationships with their suppliers given the costly repercussions of an interruption to their supplies. Efficiency, consistency, and reliability are important requirements of supermarket value chains. In situations where supermarket and supplier relationships exist, both partners can collaborate in expanding the scale and scope of the business for the supplier.

### *Compliance with Food Safety and Quality Measures*

In addition to valuing the development of market linkages with suppliers, supermarkets tend to only agree to business deals with suppliers if they comply with food safety and quality measures requirements.

These compliance requirements for safety standards include the following:

- Certification for HACCP, ISO 22000 (from the International Organization for Standardization), GLOBALG.A.P., the British Retail Consortium (BRC), International Food Standards (IFS), Global Food Safety Initiative (GFSI), etc., depending on the nature of the client's operations in the agrifood chain
- Compliance with sanitary and phytosanitary (SPS) and quarantine requirements
- Compliance with the maximum residue levels (MRLs) of pesticide residue in the agrifood products

In addition to the above, there is a growing trend of supermarket buyers that require certification of corporate social responsibility from their producers and suppliers.

## **2.2.4 Changes in the Systems of Food Safety Control**

In the past, food safety concerns were associated only with food processors. This was based on the belief that because processed foods were pasteurized, any contamination could only arise from poor processing handling or additives put into the processed product. The processor was the last entity of the process handling chain and took the blame for any contamination. Food safety regulators focused on enforcement mechanisms for processors to remove unsafe food from the market.



Fruits & Vegetables Stall in Rotterdam

However, exporters are now being instructed to prevent contamination at every critical control point of the food supply chain of the production stage. There are already a large number of well-established and effective food safety standards and practices available for adoption by all stakeholders of the production chain. Integrated pest management (IPM) and integrated crop management (ICM) cater to farmers on farms. HACCP is an integrated approach that facilitates improved consumer protection at the food processing stage. There are also the regulatory standards promoted by the national and regional governments (SPS regulations), and intergovernmental bodies (Codex Alimentarius) that provide coordination for food standards at the international trade level. The objectives of these regulations are to protect the health of consumers, define produce quality, and ensure fair practices in the food trade. The regulatory standards are mandatory and are enforced by governments to determine and refine policies and programs under their national food control systems.



With the liberalization of international trade, the volume of products entering ports has multiplied many folds. It is no longer possible for customs officers and quarantine officers to completely monitor and control for all the import requirements for product quality. A large number of personnel and resources are needed to enforce the rules. Enforcement is most often performed after products have reached their destination.

The numbers of consignment shipments that dock in the major ports in the EU, for example, run into tens of thousands of twenty-foot equivalent units each day. Delays in inspections of fresh produce hold up shipments and affect the quality. Taking shipment samples for laboratory tests also takes time, and the products could have already been sold by the time the test results become available.

It is clear that a different approach to the matter of food safety assurance and control is needed. Penalties for infringement may take the form of a fine. However, levying fines does not guarantee compliance with good practices and shippers may pay the fines without changing their behavior. In addition, more stringent rules and controls hinder trade.

As part of the new approach, inspection does not only occur at the distribution end of the chain. Exporters are now warned to prevent contamination at the beginning of every critical control point of the food handling chain. This approach will now include the handling processes at the farm and will apply even before the produce has been harvested.

In the past, the responsibility for monitoring and controlling food safety fell solely on regulators. However, supermarkets today adopt a food chain framework that facilitates a consumer-driven approach. In some supermarkets, the names of suppliers (including the entities of the sourcing country) are publicly posted in the store so that customers are aware of where they are buying from. The supermarkets also adopt a '3-strikes ban' on suppliers if they fail to comply with safety requirements.

## **2.3 CONCEPTS AND GUIDING PRINCIPLES OF GAP**

### **2.3.1 Sustainable Agriculture**

We have come a long way since the first Earth Summit in Rio de Janeiro, where so much progress was made in establishing an environmental consciousness in many governmental policies and private sector initiatives. Today, the stakeholders of the agrifood supply chain include protection of the environment as an integral part of their planning programs, comparable to any other aspects of their plans. They recognize that agriculture activities are a significant factor in environmental degradation. The consumption of the severely limited natural resources of good soil, fresh water, and cultivable land must be carefully mapped out to avoid wasteful usage. The need for an ever-increasing rate of food production requires that we continually till these precious soils. This is the reason that sustainable agriculture is vital.

### **Sustainable Agriculture**

Sustainable agriculture is a farming system that meets the need for safe, nutritious, and affordable food for the world population in a way that progressively conserves the environment and natural resources. It involves seeking to optimize skills and technologies to achieve long term productivity and profitability for stakeholders of the agricultural industry in order to ensure that future generations can also experience the same prosperity that we enjoy today.

From the definition above, three major concerns have emerged for farmers currently working on small plots of land who strive for the survival of their crops:

i. Ecological Concerns

- Soil productivity (erosion, depletion of top soil)
- Water (depletion, groundwater usage, contamination)
- Pest and disease resistance to pesticides
- The greenhouse effect and climate change

ii. Economic and Social Concerns

- The price of food
- Incomes of the small and rural farmers

iii. Impacts on Human Health

- Food safety and hygiene
- The health and welfare of farm workers

How can sustainable agriculture benefit farmers when conditions for farming in so many developing countries are in such a desperate state? The truth is that if these farmers do nothing, their lives will never get better. In today's market environment, these farmers may still have a small window that will allow them to participate in the mainstream of agrifood production. Although it is of course true that these farmers require assistance, whether it is technical or financial, what they need most are opportunities in the market. Fortunately, consumers today are greatly interested in supporting farmers who utilize sustainable approaches.

In the past, the focus of development economics centered on small and rural farmers, who tend to be poor and comparatively less productive. Recently, however, there are many economists who argue that less attention should be paid to small and rural farmers and that resources should be diverted to the larger and more productive producers.

It is vital that we continue to help small and rural farmers. We cannot afford to neglect these farmers due to their sheer numbers, as this would lead to extensive social, economic, and political consequences that would affect the global community. One new approach that can be taken for these farmers is the cluster group system for farms under GAP, which elevates their organizational structure and enhances their production



sustainability. This approach has far-reaching effects on the employment and social development opportunities for these communities, which exceed the benefits provided by large-scale, mechanized farms. In addition, small and rural farmers possess certain advantages over larger producers, such as the ability to be more attentive to their crop production and to produce crops specifically for niche markets.

### **2.3.2 The GAP Approach and Concepts**

Food regulatory authorities, retailers, and consumers all have active roles in advocating food safety and sustainable food production. Traditionally, it was the regulatory authorities who played the most active role by enforcing punitive measures for offenders for non-compliance. However, in the contemporary world where consumers are more informed and able to make their demands more vocal, they have now become more influential in dictating greater food safety and sustainable production initiatives. The role of monitoring and controlling standards and quality have now largely been replaced by assurances that reflect consumer demands and requirements from retailers.

GAP is a fitting model to help farmers address this change in the modern food production and distribution system. It is based on assurances, hazard analysis, and risk assessment. GAP approaches the issues of safe and sustainable food production from the following three levels:

#### **1. Starting with a Risk Assessment Approach**

Identifying hazards is a starting point for knowing where the dangers and risks lie for food safety and environmental damage. It is important to perform due diligence in order to know and understand the problems beforehand.

#### **2. Preventive Measures**

The removal of hazards (biological, physical, or chemical contaminants) from the Control Points (food operations procedures), and the prohibition of bad practices that potentially harm the environment (or farm ecology) will reduce or prevent accidents.

#### **3. Continuous Monitoring of the Production Process**

Continuous monitoring of the production process is essential because food contamination can occur under almost any circumstances. Similarly, the potential impacts of bad farm practices on farm ecology must be recognized and continuously measured to prevent the occurrence of irreversible damage. As an aspect of sustainable production, this monitoring will ensure that producers can dependably reap lasting economic returns for their work.

The adoption of GAP into farm activities puts into practice two central concepts of agriculture that tend to be denied by farmers, particularly small and rural farmers. Farm extension agents should teach these two ideas to farmers in their introductions to the adoption of GAP.

## **1. Agriculture is a Science**

Farmers must work to understand the risks involved for the biological functions and chemical consequences of production systems. In doing so, farmers will learn about plant life cycles and thus be able to make decisions on their next course of action or take logical responses to any interference in crop cycles.

## **2. Agriculture is a Business**

Farmers must acknowledge that in business, there are risks involved, as well as competition. Farmers must be aware of the events going on outside their farms that could have an impact on the marketing of their crops. Farmer must undertake some form of linkage into the market.

### **2.3.3 GAP and Risk Assessment**

A large part of providing food safety assurance comes down to removing hazards from the food production chain. Farmers must recognize the hazards, understand how the hazards can cause problems, and take all possible actions to prevent any accidents from happening. However, it is not possible to remove all the risks. GAP prescribes that farmers undertake a risk assessment for all the Control Points in the food production process. In recognizing problems, farmers are set on the right path toward providing assurance that customers can trust.

Risk assessments are careful examinations of the areas in the production chain that can cause harm to the food products or to the workers. They are undertaken so that farmers can weigh whether they have taken enough precautions or should do more to prevent harm. Consumers and workers have a right to be protected from harm caused by a failure in the production system to take reasonable control measures.

For further information on risk assessments, please read article 13 found on the homepage of Health and Safety Executive in the Reading List of this module.

The example below is one of the ways of undertaking a risk assessment. It is outlined with five steps.

#### **Five Steps for a Risk Assessment**

##### **1. Identify the hazards**

Identify the activities in daily farm work that can cause harm to workers. Take a walk around the farm to observe which areas could pose a health hazard to workers or the crop. Get the assistance of the workers to do this because they are most familiar with the hazards involved in the work they perform every day. Follow the daily farm activities of the workers and observe any potential dangers or health hazards.

##### **2. Decide who might be harmed and how**

For each hazard, clearly identify the specific type of harm that could hurt the workers or the crop. Define the nature of the harm and the degree of harm.

3. Evaluate the risks and decide on precautions

After gaining an understanding of the hazards, make a decision on what to do about the problem. Getting rid of the hazard is sometimes not possible. Therefore, try another approach to minimize the possibility of its occurrence.

The actions below can help in taking the next step:

- Find alternative products/methods that are not hazardous
- Find a way to prevent access to the hazard
- Implement procedures to enable safe work operations
- Have workers wear protective gear
- Practice good hygiene and cleanliness

Develop these practices together with workers and explain each action to them.

4. Record the findings and implement them

Document the findings, the actions taken, and the reactions of the workers. Also make sure to record the effects after the implementation of these actions.

A good plan of action includes both temporary solutions and a long term solution. Regularly monitor the implementation of actions to make sure they are realized. Use a checklist to record that the actions are performed correctly.

5. Review the assessment and update if necessary

Re-examine the assessment regularly on a scheduled date. Check if there are improvements (or no improvements). Decide if new or different actions need to be taken. Determine if any new hazards have surfaced.

The above five steps to assess risks on the farm have been adapted from ANNEX AF.1 Guideline Risk Assessment – General from Control Points and Compliance Criteria: All Farm Base by GLOBALG.A.P..

## **2.4 GAP COMPLIANCE AND CONFORMITY**

Many farmers have the misconception that GAP is an unfamiliar phenomenon and that they have no need for it in traditional farming. However, this might be true only if farming is performed at the subsistence level and to serve the local market. But if the products are to be exported to an international market that is competitive, and where consumer demands must be taken into consideration, GAP must be incorporated into the production system and supply chain.

International consumers demand that produce in the market must comply with new standards of food safety and food quality. There is pressure on suppliers and thus producers as well to improve production efficiency. Suppliers and producers must learn to manage market information, adopt ICT tools, and adopt competitive business strategies. They must also comply with good farm practices in farm management, pesticide applications, irrigation, and harvesting. Without doing these things, suppliers

and producers will not be able to access the supermarkets and compete in the international market.

GAP standards were initiated by the food industry stakeholders; producer associations, NGOs, and regulatory agencies to develop a code of practice on horticultural products at the farm level that assures safe food and sustainable production processes. The compliance of farmers with this code of practice is demonstrated by a certification process that they must undertake and pass.

When farmers receive GAP certification, it shows that they understand the correct processes of production (growing, harvesting, packaging, etc.). GAP certification proves that they have taken all necessary precautions to assure that their products are safe for consumption and that their production activities have made a minimal impact on the environment.

### **2.4.1 The Certification Process**

GAP certification is a verification method that proves that farmers understand the principles of GAP, and are willing and able to abide with the rigors of good farm practices.

There are three levels of certification processes:

#### **First-party Certification**

- Suppliers design and comply with their own food safety program standards
- Suppliers hire an independent certification body to audit their operations and quality

#### **Second-party Certification**

- Suppliers are required to comply with food safety schemes from buyers
- Standards are designed by the buyers or have been adopted
- Standards compliance and supplier operations are audited by the buyers or by independent certification bodies or auditors

#### **Third-party Certification**

- Buyers adopt an independent food safety scheme for themselves and the suppliers
- The buyers or suppliers hire an independent certification body to audit the suppliers

At the moment, all GAP certification is voluntary. This means that producers are not compelled to comply with GAP standards. GAP standards are not a form of regulation. Certification simply proves that GAP standards have been followed.

### **2.4.2 The Benefits for Farmers from GAP Certification**

- Enhanced food safety through the improvement of coordination with suppliers
- Reduction of risks and liabilities in production, leading to fewer recalls and withdrawals of products during distribution
- Improved cost management and good practices for IPM
- Improved productivity through the introduction of efficient operations management
- Competitive advantages related to costs, the market, credibility, and price
- Market access and recognition by buyers
- Improvement of farm ecology through good management of input resources

## **2.5 GLOBALG.A.P. CERTIFICATION AND THE HARMONIZED GLOBALG.A.P. SYSTEM**

GLOBALG.A.P. was designed with the objective of harmonizing GAP standards throughout the world. Suppliers experienced many difficulties when individual supermarket chains implemented their own GAP standards. At the same time, when countries implemented their national GAP standards, there was the issue of whether the supermarkets would recognize these standards.

GLOBALG.A.P. has set the minimum standards that farm production systems must implement to ensure consumers' requirements for safe and sustainable production. They also cover the legal requirements and regulations of the E.U. These standards have been agreed upon by all the members of the GLOBALG.A.P. organizations, including the suppliers, supermarkets, and associations and institutions of the agricultural industry. At the same time, GLOBALG.A.P. recognizes that there are other standards that may be higher than GLOBALG.A.P. that are utilized by global suppliers.

GLOBALG.A.P. is a private sector entity. Today, 50% of GLOBALG.A.P. memberships are made up of suppliers, 14% are retailers, and 36% are from associations and private institutions. The number of GLOBALG.A.P. certified farms has exceeded 100,000.

Participation in the certification scheme is voluntary. The call for voluntary compliance with food safety and quality requirements is an efficient mode of control. When a produce supplier complies with a voluntary food safety scheme, the producer willingly strives to achieve the standards required by the buyer. If the standards are of a relatively high level, the product are accordingly highly regarded. Business relations built in this supply chain are strong and long term. Under such healthy circumstances, there is very little incentive for anyone in the chain to want to damage the relationship by ending compliance.

There are tens of thousands of producers that would be happy to have the chance to trade in the most lucrative markets in Europe. Equally, the supermarkets and importers do not want to lose good producers and are most accommodating when it comes to pricing and terms of trade, as long as these are at market-competitive levels.

The on-farm safety control mechanism in the GLOBALG.A.P. system is very effective as it incorporates HACCP principles for hygiene practices and field controls of IPM and ICM for chemical inputs. All of these are good practices. Although they are not new to basic horticultural sciences, in practice many farmers have numerous reasons not to follow them. When the pressure of “modern” farming evolved to concentrate on getting very high aesthetic qualities to tempt customers, many farmers came to believe that they could achieve this by using more input chemicals. Thus, their products often end up with excessive residue levels of input chemicals.

Chemical companies have also supported GLOBALG.A.P. standards on the use of agrochemicals on farms. The chemical companies fear the emergence of pest resistance against their agrochemicals as a result of continuous incorrect usage and application. The promotion of GAP on farms will lead to better controls for the safe and effective usage of agrochemicals.

### **2.5.1 GLOBALG.A.P. Standards**

The standards in GLOBALG.A.P. are outlined as Control Points and Compliance Criteria (CPCC). These standards are designed by the standards committees, which are made up of industry experts from the entire global chain. The General Regulations establish clear criteria for successful implementation, verification, and regulation of standards.

The fundamental goals of GLOBALG.A.P. are to reduce the risk of food safety lapses in agricultural production and to objectively verify best practices with established reference points, ensuring that a systemic and consistent standard is applied globally. GLOBALG.A.P. achieves this with its protocol and compliance criteria.

GLOBALG.A.P. standards require producers or growers to establish complete control and monitoring systems on farm production. The focus is on comprehensive food safety and traceability criteria, and includes requirements on worker safety, health and welfare, and conservation of the environment.

GLOBALG.A.P. does not issue its own certificates. Growers and groups of producers can apply to any of the list of certification bodies (CB) approved by GLOBALG.A.P. and finalize an agreement for farm inspections and audits. When the certification procedure has been accomplished, the CB issues a certificate with its own name and logo that declares that the farm has successfully complied with the criteria of GLOBALG.A.P. standards for the specific product.

The GLOBALG.A.P. trademark cannot appear on the product’s packaging nor at the point of sale. Producers may only use the GLOBALG.A.P. trademark on pallets that contain certified GLOBALG.A.P. products, and the pallets must not appear at the point of sale. GLOBALG.A.P. certified producers may use the trademark for business-to-business communication and for traceability, segregation, or identification purposes on-site at the production location.

Documents on GLOBALG.A.P. certification can be found below:

- [7] GLOBALG.A.P. General Regulations - Part 1 General Rules
- [8] GLOBALG.A.P. General Regulations - Part 2 Rules for Option 2 and Option 1 Multi Sites with QMS
- [9] GLOBALG.A.P. General Regulations - Part 3 Certification Body and Accreditation Rules
- [10] GLOBALG.A.P. Integrated Farm Assurance – Introduction
- [11] GLOBALG.A.P. Integrated Farm Assurance – CPCC for All Farm Base/Crops Base/Fruits & Vegetables
- [12] GLOBALG.A.P. Glossary

### **2.5.2 GLOBALG.A.P. Certification**

GLOBALG.A.P. adopts a 3rd Party Certification process, utilizing independent certification bodies to verify compliance through an audit procedure.

Compliance consists of three levels of control points that the farm applicant has to undertake in order to obtain GLOBALG.A.P. recognition:

- i. Major Must: compulsory (100%) compliance with all the Major Must Control Points
- ii. Minor Must: 95% compliance with all the Minor Must Control Points
- iii. Recommendations – no minimum percentage of compliance is set

All control points in the CPCC Checklist must be audited, including the recommendations.

Farmers can achieve GLOBALG.A.P. certification under one of the two options described below:

Option 1: Individual farm certification in GLOBALG.A.P. or a benchmarked scheme. For this option, individual producers may own several production locations or management units but the units cannot function as separate legal entities.

Option 2: Group certification for a producer group in GLOBALG.A.P. or a benchmarked scheme. Once certified, the certificate holder will serve as the legal entity of the group. The group is held fully responsible for all its group members' actions in farm production. The group must have a QMS implemented for all the group members and must also comply with the QMS Rules of the General Regulations Part II.

### **2.5.3 Opportunities and Constraints of GLOBALG.A.P.**

In order to gain GLOBALG.A.P. certification, grower or producer groups must first set up an administrative system to account for all farm operations, including keeping records of plant stock, input purchases, maintenance of equipment, applications of agrochemicals, identification of farm legal entities, and so forth. Such systems may be possible for large-scale growers but are not financially feasible for small growers.

Obtaining GLOBALG.A.P. certification does not guarantee preferential prices from buyers. However, certified producers gain a passport for access to the largest food markets in Europe, the U.S., and Japan.

Achieving certification costs money. However, if growers undertake the GAP practices required in the system, they reap the benefits of improved farm management efficiency, quality, and environmental sustainability.

## **READING LIST**

1. 'The Earth Summit'  
United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3–14 June 1992.  
<http://www.un.org/geninfo/bp/enviro.html>
2. 'AGENDA 21'  
UN Sustainable Agriculture and Rural Development, Chapter 14 of Agenda 21.  
United Nations Conference on Environment and Development, 1992.  
<https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>
3. 'FAO GAP Principles'  
[www.fao.org](http://www.fao.org)  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
[http://www.fao.org/prods/GAP/home/principles\\_en.htm](http://www.fao.org/prods/GAP/home/principles_en.htm)  
[http://www.fao.org/prods/GAP/resources/keydocuments\\_en.htm](http://www.fao.org/prods/GAP/resources/keydocuments_en.htm)
4. 'A Common Codex for Integrated Farming'  
EISA (European Initiative for Sustainable Development in Agriculture)  
<http://ec.europa.eu/environment/archives/ppps/pdf/ilubrochure.pdf>
5. 'Growing for the Future'  
Unilever and Sustainable Agriculture  
UNILEVER  
[https://www.unilever.com/Images/1999-sustainable-agriculture-brochure----growing-for-the-future-\\_tcm244-409695\\_1\\_en.pdf](https://www.unilever.com/Images/1999-sustainable-agriculture-brochure----growing-for-the-future-_tcm244-409695_1_en.pdf)
6. Control Points and Compliance Criteria, Fruits and Vegetables, Version 2.1 – October 2004  
EurepGAP  
[http://www2.globalgap.org/documents/webdocs/EUREPGAP\\_CPCC\\_FP\\_V2-1\\_Oct04\\_update\\_01July05.pdf](http://www2.globalgap.org/documents/webdocs/EUREPGAP_CPCC_FP_V2-1_Oct04_update_01July05.pdf)
7. FAO 'Development of a Framework for Good Agricultural Practices'  
FAO Corporate Document Repository  
Committee on Agriculture, 17th Session, Rome, 31 March – 4 April 2003  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
<http://www.fao.org/docrep/meeting/006/y8704e.htm>



8. 'Report of the FAO Expert Consultation on a Good Agricultural Practice Approach'  
Written by Constance Neely with Boyd Haight, John Dixon and Anne-Sophie Poisot  
FAO Agriculture Department  
FAO GAP Working Paper Series 1, Rome, Italy, 10–12 November 2003  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
<http://www.fao.org/prods/GAP/Docs/PDF/1-reportExpertConsultationEXTERNAL.pdf>
9. 'Summary analysis of Codes, guidelines, and standards related to Good Agricultural Practices'  
Background paper for the FAO Expert Consultation on a Good Agricultural Practice Approach  
Written by Anne-Sophie Poisot FAO Agriculture Department  
FAO Working Paper Series 2, Rome, Italy, 10-12 November 2003  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
<http://www.fao.org/prods/GAP/DOCS/PDF/2-SummaryAnalysisRelevantCodesEXTERNAL.pdf>
10. 'Incentives for the Adoption of Good Agricultural Practices'  
Background paper for the FAO Expert Consultation on a Good Agricultural Practice Approach  
Written by Jill Hobbs Associate Professor, Department of Agricultural Economics, University of Saskatchewan, Canada  
FAO GAP Working Paper Series 3, Rome, Italy, 10-12 November 2003  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
<http://www.fao.org/prods/GAP/Docs/PDF/3-IncentiveAdoptionGoodAgrEXTERNAL.pdf>
11. 'Report of the FAO Internal Workshop on Good Agricultural Practices'  
Written by Anne-Sophie Poisot with Siobhán Casey FAO Agriculture Department  
FAO GAP Working Paper Series 4, Rome, Italy, 27–29 October 2004  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
<http://www.fao.org/prods/GAP/DOCS/PDF/4-workshopOct04EXTERNAL.pdf>
12. 'Good Agricultural Practices – a Working Concept'  
Background paper for the FAO Internal Workshop on Good Agricultural Practices  
Written by Anne-Sophie Poisot with Andrew Speedy and Eric Kueneman, FAO Agriculture Department  
FAO GAP Working Paper Series 5, Rome, Italy 27–29 October 2004  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
<http://www.fao.org/prods/GAP/DOCS/PDF/5-GAPworkingConceptPaperEXTERNAL.pdf>
13. 'Controlling the risks in the workplace', (How to assess risks in the workplace)  
HSE, Health and Safety Executive, Risk Assessment  
[www.hse.gov.uk](http://www.hse.gov.uk)  
<http://www.hse.gov.uk/risk/controlling-risks.htm>

## **SELF-ASSESSMENT QUIZ 1: QUESTIONS FOR MODULES 1 AND 2**

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1. How can GAP practices best help small and rural farmers?
  - a. GAP practices will guarantee a higher farm gate price for produce.
  - b. GAP practices will guarantee a higher retail price for produce.
  - c. GAP practices provide sustainable cultivation approaches to farmers.
  - d. GAP practices provide modern cultivation technology to farmers.
2. What do farmers achieve through sustainable cultivation?
  - a. Farmers learn to preserve the environment in order to continually produce crops of high quality.
  - b. Farmers learn to use more effective pesticides to produce crops of a higher quality.
  - c. Farmers learn to use more effective fertilizers to increase crop productivity.
  - d. Farmers learn to make the most of soil fertility for each crop cycle.
3. Which of the following stakeholders can drive GAP cultivation most effectively in the supply chain?
  - a. Government regulatory agencies
  - b. International regulatory agencies
  - c. Consumers
  - d. Input and service providers
4. Which of the following is the basic guiding principle in food crop production?
  - a. Achieving high yield productivity
  - b. Achieving high prices for the crop
  - c. Achieving the best aesthetic quality for the crop
  - d. Achieving food crops that are safe for consumption
5. Who is responsible for safe food production?
  - a. Farmers
  - b. Pesticide Companies
  - c. Retailers/Supermarkets
  - d. All of the above
6. JGAP is seeking to benchmark with GLOBALG.A.P. standards. What does this mean?
  - a. JGAP will lose its identity in the Japanese market.
  - b. JGAP will lose its identity in the international market.
  - c. JGAP will gain its identity in the international market.
  - d. JGAP does not benefit from the benchmarking exercise.

7. ASEAN GAP harmonizes the national GAP schemes of the ASEAN member states. How does this benefit the member states?
  - a. All ASEAN farmers work according to the common high standard of ASEAN GAP.
  - b. All ASEAN farmers sell their produce at a higher price to each other.
  - c. All ASEAN farmers sell their produce at a higher price to buyers outside ASEAN.
  - d. There are no benefits from the harmonization process.
8. Which of the following concepts does not characterize the principles of GAP?
  - a. Food safety
  - b. Sustainable cultivation
  - c. Risk assessment on food safety
  - d. Development of forest reserve lands for commercial cultivation
9. Which one of the following is NOT a driver in the changing landscape of consumers and producers today?
  - a. Urbanization
  - b. More regulatory controls in the market
  - c. Rising incomes of consumers in emerging economies
  - d. Supermarkets have become international conglomerates
10. Which of the following statements describes the GAP protocol correctly?
  - a. GAP represents a best practice model of QMS for on-farm activities.
  - b. GAP represents a best practice model for an export market only.
  - c. GAP represents the fickle demands of consumers because they can pay for it.
  - d. GAP represents a sinister approach by supermarkets to control food crop producers.

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<Answers>

1. c   2. a   3. c   4. d   5. d   6. c   7. a   8. d   9. b   10. a

## MODULE 3: FARM MANAGEMENT

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Farm management encompasses more than just planting and harvesting crops. In order for farms to be financially sustainable, it is also essential to consider the business aspects of carrying out the activities of producing and delivering high quality crops and marketing them at the best price in the best market location.

Farm management also incorporates the legal responsibilities of farmers, including the assurance of food safety, compliance with local registration requirements, and following regulations on land use, the handling of toxic chemicals, and disposal of waste material. The degree of stringency of these regulations varies by country. These responsibilities are the minimum standards for a well-managed farm, especially if the farm holds a certification for GAP.

In addition to their work in the fields, farmers must work to document their activities. Documenting daily activities and keeping records is an effective way to prove that all the necessary good agronomic practices have been utilized in the fields and that the ecology of the farm has been protected. Recordkeeping can also be used by third parties to acknowledge the work of farmers if the situation calls for it. Keeping records also helps remind farmers of the work they have done. Such references can prove to be useful at a later time, or can be referred to by other workers on the farm.

### **Recordkeeping and Accounting**

The rationale for keeping records of work performed on the farm is the same as that for accounting. Accountants must keep detailed records to prove that what they say is true, and farmers should do the same.

GAP control points provide assurance in the documentation of farm activities. They show that the crop has been handled in the best manner, reveal that all known hazards in the production chain have been removed, and that all risks of contamination to the product and damage to the farm environment have been minimized.

Routine farm activities should also be documented in writing. The information is described as a procedure, and clearly outlines what is done, how it is done, and what actions to take if the procedure is not performed correctly. Procedures are very useful to relay instructions to farm workers, teach new workers, or to make a statement on how things are done on the farm.

The FAO of the United Nations provides farm management resources on its website based on its extensive studies on the topic. For further information on farm management, please read the following articles in the reading list of this module.

- Article 1      Agriculture and Farm Systems
- Article 2      Farm Management and Farm Type
- Article 3      Elements of Farm-Household Systems

A farm's management system serves as an indicator of the level of responsibility that farmers are willing to take on for the safety of their farms and for their workers. There are many safety risks associated with farm work, but the establishment of a good farm management system will enable farmers to be more than capable of effectively dealing with any problems that do occur. This is why GAP practitioners have placed much weight on compliance with these procedures for farm management that address risks and hazards associated with farm work.

### **3.1 FARM SITE HISTORY AND MANAGEMENT**

#### **3.1.1 Suitable Land for Cultivation**

Analysis of farm site history will determine whether farms are physically suitable to carry out the production of a proposed crop. There are many conditions that render sites unsuitable for agricultural activities. For example, a potential farm site would not be suitable to grow food crops if metal ore mining was previously carried out at the site. This is because heavy metals from the previous mining activities might have entered the root system, and could potentially contaminate the food crop. In addition, heavy metals can also appear naturally in some soil conditions, which would also render the soil unsuitable for growing crops. Please refer to [Appendix 9](#).

As a second example, prior industrial usage of potential farmland can lead to the presence of chemical residue in the soil, which is detrimental to crops and could pose safety concerns. If the site was once used to grow crops that developed soil pests or diseases, growing similar crops on the same site could further spread the pest or disease. The presence of a landfill at a potential site could indicate unacceptable waste content in the subsoil that would contaminate crops or endanger workers employed at the site.

#### **3.1.2 Farm Site Management and Risk Assessment**

Farm site management must comply with all legal requirements and regulations in order for cultivation to be undertaken at the site. The authorities responsible for these areas issue legal documents on compliance to farmers. The compliance criteria for site history and site management comprise the following items:

- The farm site must have legal permission from the relevant authorities to cultivate food crops in the area.
- A soil and water analysis must be conducted for material and biological content and the result must be analyzed to evaluate if the soil and water are safe for crop cultivation.
- For existing farms, a detailed record must be created describing the prior land use of the site.

- In developing a new site for farm use, a detailed record of the land use activity of the site must be created and, if necessary, the farm use must be approved by the relevant national land authorities.
- A farm site plan must be developed that details the planted or unplanted areas, buildings to be constructed, farm boundaries, and the types of land use immediately outside the farm boundaries. The plan must identify the specific uses for each of the plots and the crops that are produced from them.
- A risk assessment must be developed for the land use of the farm site. It must indicate the heavy metal content in the soil, soil fertility and suitability for cultivation, pests and diseases present in the soil, and the impact of the farm activities on the surrounding areas.
- Farm management must also take into account the natural characteristics of the farm site. If the farm site is located on a hill or slope, there is a risk of soil erosion from the hill if the soil is disturbed by cultivation activities. Farm that are located near rivers may be subject to flooding or erosion. If the farm site is located near a protected forest/a reserved forest or very close to the water source of a river or reservoir, there is a risk of encroachment and contamination to these environmentally sensitive areas.

#### **Implementing GAP Standards with Smallholder Farmers**

Horticulture is a science and a business, but many farmers experience difficulty accessing vital information on areas such as production technology and marketing. Farmers must also access knowledge and information to understand the full implications of regulations and standards. Farm extension workers must help bridge this connection with farmers to help them effectively implement GAP standards.

### **3.1.3 Monitoring Farm Site Management**

Farmers must closely monitor any changes on the farm site that might affect the risk factors that were outlined in the risk assessment. The areas that are commonly monitored regularly include contamination in water sources and records of samples taken for detecting contamination in products. A laboratory analysis of water sources must be performed annually, as well as a laboratory analysis of the crop product for each new season.

A mechanism must be developed for recalling crop products if contamination from pests, diseases, or toxic chemical is found in the products. The mechanism must encompass the harvesting stage, the delivery system, and the retailer. Please see Item 3.5 for additional information. In addition, the proper disposal procedures for these contaminated products must be identified and performed.

### **Guidance in Approaching Farm Site Management and the Risk Assessment**

- Identify all potential problems that could arise due to the land use of the site
- Identify the potential impacts of farm cultivation activities on the surrounding environment
- Identify the potential frequency and severity of the problems and impacts
- Identify the potential severity of the problems and impacts if they arise
- Identify actions to take to minimize the frequency and severity of the potential problems and impacts

Please refer to [Appendix 9](#).

## **3.2 Farm Technicians and Internal Farm Inspections**

Many farms have been cultivated for generations by farmers without any agricultural, technical, or scientific training and credentials from conventional learning institutions. Despite this, these farms are still very successful in growing food crops in their fields each season. The credentials these farmers have achieved come from their many years of farming experience in the fields. This cannot be challenged.



Farm extension work

However, in modern conventional cultivation, farmers cannot be illiterate and forgo education in these areas, especially when they are responsible for handling farm chemicals and biological inputs. This requires that farmers have basic reading capabilities in order to read the instructions and understand how the chemical inputs work. They must also learn to properly operate machines and equipment in the post-harvest handling treatment. The risks and potential consequences of accidents are much higher if farmers cannot read and understand the instructions.

### **A Reminder**

Pesticides are plant protection products.  
They are not weapons of pest destruction.

If a farmer has not received training in the above areas, a hired agriculture technician should be utilized. The technician must understand scientific terminology and technical instructions related to the daily farm activities and also be able to provide accurate instructions to the other farm workers.

For the certification process, an internal farm inspection is performed. This is a

preparatory exercise for the GAP certification internal audit that is undertaken by farmers or farm technicians to check that all the farm activities are in compliance with the GAP certification criteria. The GAP standards checklist should be utilized to rectify any areas of noncompliance.

To qualify for the role of farm technician and to undertake the internal farm inspection, farmers or hired farm technicians must achieve the minimum formal qualifications listed below:

- Post-high school diploma certificate in crop, livestock, or aquaculture, or
- Agriculture high school qualification with experience in the relevant crop, livestock, or aquaculture farming

For the GLOBALG.A.P. certification process, the following technical skills and training qualifications are required to conduct an internal farm inspection:

- Two occasions of witnessing inspections accompanying an audit of food safety (GLOBALG.A.P. or any other relevant standards), or
- Two shadow farm audits by the certification bodies, or
- Training in HACCP principles, Codex Alimentarius, ISO 22000, food hygiene, plant protection, fertilizers, and IPM

These qualification requirements give an indication of the degree of competence required of farmers and farm technicians when pursuing GLOBALG.A.P. certification.

For national GAP certification, there are often farm extension officers from the country's agriculture department or agency who can provide technical training expertise. Alternatively, farmers would be obligated to attend compulsory group technical training courses prior to certification.

### **3.3 RECORD KEEPING, MONITORING, AND FARM MANAGEMENT TOOLS**

#### **3.3.1 Record Keeping**

Many farmers worry about keeping records because they feel they might be held accountable for doing something wrong. However, accountability is the precise reason records should be kept. Rather than focusing on potential incorrect actions, farmers should realize that records are an effective way to prove that they have performed their tasks correctly.

Farmers benefit from keeping records in the following ways:

- Records remind farmers what they have done, when it was done, and why. Farmers often need this information on various occasions, such as the occurrence of an accident or if there is an imminent attack of pests and disease on the crop.



- Records help farmers check that they have used the plant protection product correctly and remind them when they need to submit their applications again. Sometimes, the same farm operations are conducted by different people. With written records, everyone understands what to do next.

Recordkeeping need not be a laborious job if the information is recorded quickly on a regular basis. The information can be written down in a diary or a small record booklet. If computers are used, then an Excel file will work very well. Loose sheets of paper should be bound together because writing on scraps of papers would make farmers seem unprofessional. Records can be written in the local language so that farmers and their farm workers understand them.



### Example of Recordkeeping for Pesticides

The following is provided as an example of recordkeeping for pesticides. Most of the necessary information can be found on the label of the pesticide packaging. Farmers must be trained to understand pesticide package labels and should follow the written instructions.

The following information should be recorded:

- Date of application
- Identified field/plot/block
- Trade name of the pesticide
- Name of the active ingredient of the pesticide
- Concentration of the active ingredient
- Dilution rate
- Reason the application was undertaken or why the pesticide was selected
- Pre-harvest Interval (PHI)
- Restricted Entry Interval (REI)
- The person responsible for the application

Please refer to [Appendix 10](#).

### **A Short Note on Pesticide Labels**

Pesticides are generally chemical or biological agents that are manufactured to deter, incapacitate, or kill pests. The targeted pests include insects, small mammals, birds, plant pathogens, or microbes. Most modern pesticides are thoroughly studied and crafted to affect the target pest in a very specific manner without disturbing the general habitat conditions of the farm.

Farmers would be wise to follow pesticide label instructions. Pesticide labels prescribe the optimum conditions for the pesticide to do its work on the pest. Therefore, the dilution rate of the pesticide, method of spray, timing of application, frequency of application, and the application equipment used are all important, and it is necessary to follow the instructions in order to gain maximum efficacy against the pest.

It is incorrect to think that a more concentrated dosage or more frequent applications will kill the pests 'better' or faster. Pests can become immune to pesticides after prolonged or improper applications, and this can render the pesticide ineffective.

Pesticides are expensive products and judicious use will help farmers prevent unnecessary spending and inadvertent damage to the crop. Farmers will only gain a false sense of assurance by applying a pesticide for its own sake. They may feel personal satisfaction after using the pesticide, but the pest will still be present to damage the crop.

### **3.3.2 Farm Monitoring**

Other recordkeeping of farm activities includes documenting information on environmental conditions during the crop growth stages. These records can serve as useful advance warning information that give indications of the quality expectation for the crop. For tree crops, this information can also provide indications for optimum harvest dates.

Records can be kept for the following environment conditions:

- Changes in day and night temperature
- Rainy days or atmospheric humidity
- Sunlight intensity
- Soil moisture

Each area of this monitored data can also provide information for farmers to predict and anticipate changes that could affect the quality of the crop. This information helps farmers take preemptive actions to prevent any negative impact on the crop.

- Weather changes that bring the onset of pest or disease infestation.
- Weather conditions that affect the growth development rate of the crop.

- Weather conditions that affect the harvesting date of the crop. These weather conditions provide indications of when not to harvest the crop.
- Information used to determine the most appropriate time to irrigate, spray pesticides, apply fertilizers, etc.

### **3.3.3 Record Keeping as a Farm Management Tool**

Farmers work best if they have the proper farming tools to do the work in the fields and on the trees. Similarly, in farm management, farmers need management tools to help monitor the changing growth stages of the crop or the anticipated rise in pests and diseases in the field. Being able to access information on changes will assist farmers in taking correct and timely actions to overcome emerging problems or make the right decisions on next steps in the crop production process. Daily farm activities records and farm monitoring records are useful management tools for farmers.

Farmers can also develop work plans in the form of charts that they can easily refer to or checklists of farm activities that will ensure that they do not miss doing any of the important work.

Checking media networks, such as the radio or television shows that broadcast news on the weather forecast or changes in the climate/environment conditions, will also give farmers an advance warning system to manage their farms better.

## **3.4 TRACEABILITY SYSTEM**

### **3.4.1 Traceability System to Verify Product Identification**

The traceability system of the food supply chain enables the verification of the origin of food products, from the location of the growers and the farm through all the stages of production, processing, distribution in the supply chain, and up to the final consumers.

The traceability system has two components:

- Tracing, which is a backtracking of the supply chain. Tracing identifies the product's origins, including the grower, the farm, and even the plant or tree. It involves the verification of all the food inputs that have been added into the final product.
- Tracking, which involves monitoring the product and its transformation with added inputs and treatments. It traces the product's journey through the supply chain to the final consumer, measuring data that includes transit time and conditions.

#### **Product Identification**

A major objective for product identification is to ensure that certified GAP products do not get mixed up with uncertified products. The certified products should be clearly marked and distinctively segregated.

### **3.4.2 Managing the Traceability System**

The purpose of the traceability system is to determine where the product has been in the event of contamination. This allows the detection of the source and nature of the contamination (through tracing), and enables rapid and precise responses to withdraw or recall the contaminated product (through tracking) to prevent the consumption of the product or to minimize the damage.

Identification of the product can be based on:

- Individual pieces of the product
- The primary packaging
- The secondary packaging
- The palletized crate
- Delivery vehicle
- Shipping documents
- Farm packing documents

### **3.4.3 Identification Codes**

Identification codes can be simple numbers, letters, bar codes, or the more sophisticated 3-D scanner codes for tracing purposes.

For tracking purposes, transport vehicles (e.g., ocean liners) can send information out from the vehicle to the shipper through recorded messages, internet messages, or radio frequency identification gadgets planted inside the packaging that are adjusted to send out data on a regular basis.

The identification and traceability code would contain the following information. All of this information is needed to trace the source of contamination in order to prevent further contamination occurrences or to track the product to prevent it from reaching consumers.

- Consigner name, contact, and address
- Location of the processing plant, farm plot, and the farm address
- Name and contact of the grower
- Date of harvest
- Transportation (trucking and shipping) registration
- Reference numbers of the shipping documents
- Consignee name, address, and contact
- Additional information that must be made available when requested includes records of farm activities used for the product, records of post-harvest handling and treatment, and delivery flowcharts.



GAP traceability prior to planting



Bar code

### 3.5 RECALL AND WITHDRAWAL PROCEDURES

The identification and traceability system facilitates the rapid and effective recall and withdrawal of contaminated products from the production line and from the marketplace in the event of an accident. This minimizes the exposure of workers and customers to the contaminated product.

The recall and withdrawal procedure is a vital requisite of the GAP standard. The producer, shipper, and consignee must all be aware of this procedure and are required to understand the steps for rapid and effective recalls and withdrawals.

#### 3.5.1 Product Recall Procedure

The product recall procedure is composed of the following steps:

- Specify the contaminations that necessitate the recall (e.g., pesticide residue above acceptable levels, the discovery of a hazardous foreign body in the product, microbiological contamination, or any additional specifications required by the buyer).
- When told to undertake the recall, the producer or shipper must take immediate actions to execute the recall through the marketing channel. The shipment information of consignment number, supplier, PO Number, quantity inload, current locations of all product items, etc. must be made available.
- If the product is on site, then it should be marked with a red 'Hold QC' label stating 'Do Not Use.' If the product is to be recalled from the depot, the buyer must be provided with the depot and the quantities involved, and should be kept informed at all times of additional developments. After the recall is completed, a full investigation into the incident must be undertaken and the recall sheet must be filled out.
- The recall procedure should be trial-tested at the very least on an annual basis, or upon the request of the marketing agent. The product for the trial recall should be picked randomly by the CEO or technical manager. For the trial test, the following

documents must be obtained and attached as photocopies to the completed Product Recall Procedure Record:

- Inloading records
- Customer orders
- Despatch checks
- Any relevant e-mails
- Photographs (if available)

Any non-conformities that present an imminent and serious risk to the safety of food necessitating a recall should be reported to the auditing body. The product recall should be completed within 24 hours as speed is of the essence for the recall mechanism.

To verify the traceability system, a mock withdrawal should be carried out by the technical manager once annually. The Mock Product Withdrawal Record should be updated for details like raw materials, packing details, product quality, and dispatch details

### **3.6 DEALING WITH COMPLAINTS**

The ability of producers to effectively deal with complaints demonstrates that they manage a transparent system at their establishments. It will add further confidence and assurance for the consumers in the way the product has been produced and delivered. Please refer to [Appendix 11](#) and [Appendix 12](#).

There should be a written procedure for dealing with customer complaints. An example of a written procedure is shown below:

#### **Procedure for Customer Complaints (Example)**

1. In the first instance, complaints may be made in person, over the telephone, or in writing as determined by the customer.
2. Anonymous complaints shall not be accepted.
3. Staff members shall notify a Department Manager that a complaint has been made.
4. The details of the complaint and the actions taken shall be recorded in the Complaints Record.
5. All actions shall be taken seriously. The actions taken should be dealt with at the lowest operational level within the organization with the aim of resolving the complaint promptly.
6. Person(s) affected (or mentioned) by the complaint shall be fully informed of all the facts and given the opportunity to put forward their case.
7. The staff member who receives the initial contact shall attempt to resolve the issue in the first instance. If this does not resolve the issue for the customer, the process will proceed to the Department Manager and then the Customer Manager.
8. The staff member shall advise the person who complained of the complaints process, provide a written copy of the procedure with an attached flow diagram,

- and advise that he/she can speak to the Department Manager.
9. The customer must provide written notification of the complaint addressed to the Department Manager.
  10. An attempt should be made to resolve the issue within 14 days.
  11. If the issue is still not resolved to the customer's satisfaction, the customer can raise the issue with the Customer Manager. In some procedures, the complaint to the Department Manager may be omitted, and the complaint should go directly to the customer manager.
  12. The Customer Manager shall further investigate and prepare a response to the complainant and a report for the CEO of the company within 28 days of receipt of the complaint.
  13. The customer shall be informed of the final outcome of the complaint. The customer shall be asked for feedback on the complaints procedure and outcome.
  14. The final resolved conclusion of the complaint shall be recorded and documented.

### **READING LIST**

1. 'Agricultural and Rural Systems – Concepts and Definitions'  
FAO Farm management for Asia: a systems approach  
By Douglas J. McConnell and John L. Dillon  
FAO Farm Systems Management Series - 13  
FAO Agriculture and Consumer Protection Department  
ISSN: 1020-2080  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
<http://www.fao.org/3/a-w7365e/w7365e04.htm>  
<http://www.fao.org/docrep/w7365e/w7365e00.htm#Contents>
2. 'Farm Management and Farm Types'  
FAO Farm management for Asia: a systems approach  
By Douglas J. McConnell and John L. Dillon  
FAO Farm Systems Management Series - 13  
FAO Agriculture and Consumer Protection Department  
ISSN: 1020-2080  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
<http://www.fao.org/docrep/w7365e/w7365e05.htm>  
<http://www.fao.org/docrep/w7365e/w7365e00.htm#Contents>
3. 'Elements of Farm-Household Systems: Boundaries, Household and Resources'  
FAO Farm management for Asia: a systems approach  
By Douglas J. McConnell and John L. Dillon  
FAO Farm Systems Management Series - 13  
FAO Agriculture and Consumer Protection Department  
ISSN: 1020-2080  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS  
<http://www.fao.org/3/a-w7365e/w7365e06.htm>  
<http://www.fao.org/docrep/w7365e/w7365e00.htm#Contents>

## **MODULE 4: FOOD SAFETY**

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Consumers have the basic right to access food that is safe for consumption and farmers have the fundamental responsibility to produce food crops that meet this requirement. This is not a negotiable stance. These responsibilities and rights are enshrined in national and international food safety regulations, laws, guidelines, and codes of practice that are written specifically in the interest of limiting food contamination incidents and assuring the production of safe, hygienic food in an accountable manner.

In order to meet its objective of fulfilling the above responsibilities, GAP embraces the approach of Hazard Analysis and Critical Control Points (HACCP). There are numerous areas in the food production chain where food contamination can occur, starting from the growth stages on the farm. Under the HACCP system, a Critical Control Point (CCP) is where control can be applied to avert contamination through the prevention or elimination of food safety hazards, or to reduce the hazards to an acceptable level. GAP embraces the approaches of HACCP in the determination of CCPs and the compliance criteria of the GAP standards.

### **4.1 INTERNATIONAL FOOD SAFETY STANDARDS**

National food laws protect domestic consumers, and their level of tolerance differs according to the country. When food is traded across borders, export regulations and import restrictions based on international rules and agreements come into play. Food safety remains paramount, but the definition of safe food can be subjective. In addition, safety standards are sometimes used to restrict trade movements on imports as an excuse to protect domestic producers. The rules on how governments can apply food safety and animal and plant health measures are set in the World Trade Organization's (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement). While the SPS measures are backed by scientific facts and methodologies, there are constant debates over whether the measures have been implemented for safety protection or protectionism.

#### **4.1.1 The WTO SPS Agreement**

The WTO is the champion of the promotion of global trade and operates a system of trade rules. It is a forum for member governments to negotiate trade agreements and where trade disputes are settled. The WTO is the only international organization that deals with the rules of trade between nations. The WTO agreements are negotiated and signed by the majority of the world's trading nations and are ratified in their parliaments. The goal is to help producers of goods and services, exporters, and importers conduct their business [13].

The WTO enables member governments to sort out trade disputes they face with each other. For example, the WTO platform has helped resolve trade issues such as when certain countries have requested the lowering of the trade barriers of other countries. Another role of the WTO is to support selected trade barriers, particularly when those



trade barriers involve the protection of consumers and the prevention of the spread of disease.

The WTO SPS Agreement aims are as follows:

1. The protection of animal and plant life and health within a territory from risks arising from the entry, establishment, or spread of pests, disease, disease-carrying organisms, or disease-causing organisms.
2. The protection of human life and health within a territory from risks arising from diseases carried by animals, plants, or products thereof, or from the entry, establishment, or spread of pests.
3. The protection of human and animal life and health within a territory from risks arising from additives, contaminants, toxins, or disease-causing organisms in foods, beverages, or feedstuff.
4. The prevention or reduction of the risks of other damage within a territory from the entry, establishment, or spread of pests.

Countries that are signatories to this WTO SPS Agreement must abide by the rules that have been agreed upon through their negotiations. Trade relations often involve conflicting interests, and some countries break the rules. The most harmonious way to settle these differences is through a neutral procedure based on an agreed-upon legal foundation. This is the purpose of the dispute settlement process written into the WTO Agreement.

GAP standards endorse the SPS measures in GAP implementation. National and international trade rules and agreements on food safety must be complied with as a priority.

Fresh produce exporters may experience confusion over the WTO SPS measures for business export operations. If found to contain any prohibited pests or plant diseases, shipments that have landed at the consignee must be quarantined or destroyed by quarantine officers of the receiving countries, resulting in large losses for the shipper.

In tackling the SPS measures, there are many references, standards, codes of practice, and guidelines that exporting countries and producers can access to gain information and technical assistance to understand and overcome restrictions and avoid being hindered by the SPS measures at the port of entry. These are tools that producers can utilize to overcome the formidable trade barriers to access markets.

#### **4.1.2 The International Plant Protection Convention (IPPC)**

One such source of assistance is the International Plant Protection Convention (IPPC). The IPPC is an international plant health agreement, established in 1952, that aims to protect the world's cultivated and natural plant resources from the spread and introduction of plant pests and diseases while minimizing interference to the international movement of goods and people. The IPPC develops legally binding treaties on plant

health that are administered by the FAO but implemented through the cooperation of member governments.

For more information on the functions of the IPPC, please read the following articles found in the reading list of this module.

Article 1	IPPC, Overview Brochure
Article 2	IPPC, Strategic Framework
Article 3	IPPC, Capacity Development Strategy
Article 4	IPPC, Market Access Guide
Article 5	IPPC, Dispute Settlement

### **4.1.3 International Standards for Phytosanitary Measures (ISPM)**

International Standards for Phytosanitary Measures (ISPM) are a series of standards prepared by the Secretariat of the IPPC, and include standards, guidelines, and recommendations recognized as the basis for phytosanitary measures applied by members of the WTO under the Agreement on the Application of SPS Measures. The ISPM are part of the FAO global program of policy and technical assistance in plant quarantine. This program makes available to FAO members and other interested parties these phytosanitary standards, guidelines, and recommendations to achieve international harmonization of phytosanitary measures, with the aim to facilitate trade and avoid the use of unjustifiable food safety measures as barriers to trade.

The ISPM are adopted by contracting parties to the IPPC through the Commission on Phytosanitary Measures. Non-contracting parties to the IPPC are encouraged to observe these standards. The ISPM are subject to periodic review and amendments every five years from their date of endorsement [14].

### **4.1.4 The Codex Alimentarius Commission (CAC)**

The Codex Alimentarius Commission (CAC) was established by FAO and the WHO in 1963, and has developed a series of harmonized international food standards, guidelines, and codes of practice (Codex Standards) to protect the health of consumers and ensure fair practices in the international and domestic food trade. These standards are recognized internationally, particularly by the member states of the United Nations. Producers, exporters, and importers can refer to these standards for their arbitration over product quality standards and trade issues. The CAC also promotes coordination of all food standards work undertaken by international governments and non-government organizations. Countries that do not have relevant national standards in the specific product state may use the Codex standards for reference. Codex Alimentarius (Latin for “food code”) has become the global reference point for consumers, food producers, processors, national food control agencies, and the international food trade.

Farmers and producers are often confused about GAP implementation and the many international regulations and food quality standards. However, GAP standards do not contradict the Codex Standards. GAP standards are on-farm practices that are geared toward achieving the same quality and safety levels as these international product safety standards, such as the Codex Standards [15].

#### **4.1.5 The Health and Consumers Protection Directorate General of the European Commission (DG SANCO)**

The Health and Consumers Protection Directorate General of the European Commission (DG SANCO) operates under the legislation of the European Commission in upholding the EU treaties for the member states on food laws. DG SANCO is responsible for the implementation of EU laws on the safety of food and other products, on consumers' rights, and on the protection of people's health. All the member states of the EU have a consensus agreement on the rules implemented by DG SANCO, making it one of the most influential food safety monitoring agencies in the world [16] [17] [18].

The goals of DG SANCO are to make Europe a healthier, safer place where consumers can be confident that their interests are protected. DG SANCO's approach is centered on a zero-risk society for food safety in reducing and managing risks for consumers.

DG SANCO achieves these goals through the monitoring of the implementation of the relevant laws of national, regional, and local governments. This regulatory authority ensures that the traders, manufacturers, and food producers follow the rules correctly. DG SANCO also listens to concerns on EU policies on trade, competitiveness, and the environment, among others. Actions are taken through a mixture of regulation enforcement and support projects with the member states to build on their capacity to implement regulations more effectively. These very powerful and over-reaching policies give DG SANCO a very effective hand in food safety control and management of the intra-EU and inter-EU food trade business.

Food imported into the EU must comply with food safety regulations prior to the other standards enforced by any other parties. The compliance criteria and tolerance of DG SANCO override that of other standards when the products enter the shores of the EU.

#### **4.1.6 GAP Standards Vis-à-vis International Food Safety Standards**

As they work through the awareness promotion programs provided by GAP implementers, many GAP practitioners have experienced confusion over what they see as contradictions between GAP standards and existing international standards. These GAP practitioners wonder why they need GAP standards when many other standards exist, and how GAP standards co-exist with these international standards.

International supermarket chains source their fresh food products from all over the world. Local suppliers may only support seasonal supplies, but when the supermarket chains have an all-year-round supply policy, the importation of fresh food becomes the

business norm. The food safety standards from supplier countries vary greatly.

In theory, global supermarkets must have similar standards of food safety whether they operate in their home country or outside of it. In practice, these supermarkets often follow local standards. For example, Japanese supermarkets have a certain set of standards in Japan. But when these supermarkets operate in Malaysia, they sometimes have to follow Malaysian standards as it is not possible for some Japanese practices to be implemented.

At the same time, farmers from different countries have different levels of practices for food safety handling and hygiene. The regulatory enforcement approach to ensure safe food production practices on the farms is expensive and practically impossible. There is another downside of this approach, in that it becomes a static dogma for a food production system where the demands of consumers and demands for choice are not entertained. Such an approach would point another notch down for international trade.

GAP fits perfectly into this vacuum for the monitoring and controlling of farmers and producers in abiding by and achieving food quality and food product safety standards at the marketplace. GAP standards are on-farm standards for cultivation, production, and handling processes. The belief is that if farmers have consciously made good and correct decisions on the production in reducing all the hazards, then the risk of contamination of the food products is minimized.

GAP certification programs that exist now are mostly voluntary. The certification programs are also business-to-business oriented. This approach has encouraged more trade facilitations where buyers can now link with farmers and producers in much shorter marketing chains. In making the certification voluntary, the competitiveness of the producers and the buyers is greatly enhanced, encouraging farmers to make concerted efforts to comply with safe food production techniques. GAP is thus seen to be complementary to the existing national and international food safety standards and the farmers who comply with GAP practices emerge as the bigger beneficiaries because they can access markets that were once unattainable.

## **4.2 FOOD SAFETY HAZARDS**

Food contamination can occur at any point of the production process. The points where there is a more likely chance for contamination to occur are control points. This is where more attention (monitoring) should be paid and actions should be taken to control the contaminants from coming into contact with the food product. The less hazards in the process chain, the lower the risk of food contamination in the production.

### **Food Safety and Hazards**

Although we cannot guarantee food safety, we can assure food safety. If it were possible to remove all hazards, we would have zero risk. However we can only remove all known hazards, which will assure that there are minimal risks.

#### **4.2.1 Types of Hazards**

Hazards come in the form of:

- Biological organisms. Biological hazards are living organisms found in food that make the food unsafe for consumption. They may be bacterial, parasitical, or viral. Most biological hazards can be destroyed by heat or cooking, but there may still be toxic material remaining that would still render the food unsafe to eat.
- Chemical hazards. Chemical hazards can occur naturally in food or can be natural constituents of the food. Examples include aflatoxins, mycotoxins, and shellfish toxins. Chemical hazards can also have been incorporated into food through the production process (e.g. chemical pesticide residue), the environment, or food processing processes.
- Physical bodies, particularly small, sharp, and pointed objects such as glass, metal, or plastic. Physical bodies can be incorporated into food products due to careless or poor control during food processing and can harm the body, particularly if ingested.

The economic implications of food contamination in the food production business are as follows:

- The closure of food premises/loss of production/product recalls
- Loss of reputation of the business
- Penalties from regulatory and legal issues (increased legal costs/fines/civil action/lawsuits)
- High costs of internal investigation
- Expenditure on decontaminating, cleaning, and replacing equipment
- Cost of the waste of contaminated food products

If we can eliminate all of these known hazards in the process chain, we can almost reduce the risk of contamination to zero. This is the principle adopted in the HACCP system of food safety control.

#### **4.2.2 Hazard Analysis and the Critical Control Point System (HACCP)**

The Hazard Analysis and Critical Control Point System (HACCP) is a management system for addressing food safety through a preventive approach to monitor and control biological, chemical, and physical hazards in food processing chains, encompassing the raw material production, procurement, handling, manufacturing, distribution, and consumption of the finished product. HACCP anticipates accidents and takes on a proactive food safety program to stop them from occurring. The mechanism

of the HACCP system aims at identifying and controlling hazards in order to prevent risks of contamination from happening. It can be implemented for any specific process line in the industry.

For more information on HACCP, please read article 6, 'DG SANCO, Guidance Document on the Implementation of Procedures based on the HACCP Principles,' found in the reading list in this module.

The HACCP system operates on seven steps of accomplishment based on the following principles:

- i. Hazard identification and preventive measures  
Clearly identify the nature of the hazard, determine how best to control the hazard, undertake a risk assessment to determine the risk level, set up measures to prevent or eliminate an identified hazard or reduce it to acceptable levels, and make an informed decision of the process.
- ii. Identify CCP  
A CCP is a point, operational step, or stage in the food production process chain where accidents can happen, and at which point control is applied to prevent hazards. This is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.
- iii. Set critical limits  
Critical limits are criteria that separate acceptable levels from unacceptable levels. They also reflect the minimum level of control of the hazard. The critical limits are obtained from scientific literature, experimental data, mathematical modeling, and expert advice.
- iv. Establish a CCP Monitoring System  
Monitoring is measuring or observing at the CCP to ensure that the process is operating within the critical limits. Measurement data are gathered from visual observations, temperature readings, the time taken, pH, moisture level, relative humidity, acidity readings, or water activity index.
- v. Establish corrective action procedures  
Corrective action procedures are set written procedures that must be followed when a deviation in the critical limits has occurred.
- vi. Establish verification of the HACCP Plan  
Verification involves the application of methods, procedures, and testing that is carried out to determine that the operations are in compliance with the HACCP plan. Often, an audit is carried out. The audit is a systematic and independent examination of the process to determine whether activities and the information generated by those activities comply with documented procedures, and whether the procedures have been implemented effectively and are appropriate for the achievement of the defined objectives.
- vii. Establish documentation and records  
The documents and records to be kept include the activities recordings, checklists, forms, and flow charts. The documents and records contain any corrective actions, employee training records, product specifications, and hazard analyses. This

information needs to be filed and made available when requested by the auditor or relevant authorities.

The elimination of risks in food production is possible with the removal of all known hazards from the production chain. The HACCP is a preventive system of careful management of the production system that utilizes the analysis and removal of hazards in the production chain. This approach moves away from the traditional approaches of managing food safety via the focus on product testing at the consumption stage and reactions to the problems.

GAP practices embrace the approach of HACCP in managing risks through the identification of hazards, removing the hazards, and taking actions to prevent them from happening again. Module 3: Farm Management describes developing the risk assessments, traceability systems, recall and withdrawal procedures, and dealing with the complaint procedures. These are the tools that are used in managing the risks in GAP practices.

### **4.3 GAP PRACTICES FOR FARMERS' AND WORKERS' HEALTH AND SAFETY**

In modern conventional cultivation of fresh fruits and vegetables, the application of chemical inputs such as pesticides and fertilizers has caused major food safety concerns. The application of these inputs in crop cultivation is needed to protect plants and crops from damage from pests and diseases, and to increase their growth and productivity. The companies that have developed these products have undertaken very intense research and development on their efficacy and safety aspects before they are put out in the market for commercial application. The inputs are deemed to be safe for use on plants and crops [13] [14].

#### **4.3.1 Misuse of Plant Protection Products (PPP)**

It is more often the misuse and incorrect application methods that have brought out the dangers of chemical inputs onto final food products for consumption. To start with, farmers who cannot read and write do not understand how to handle pesticides. Pesticides are poison. They are manufactured to kill pests or at least deter them from damaging plants and crops.

It is argued that the quantum of chemical pesticides residue left in food crops is consumed by people on a daily basis. The elderly and young children are most vulnerable to these exposures. Thus it is reasonable that certain parties have related the use of pesticides with food safety concerns.

The prime offenders for the dangerous use of pesticides are individuals who do not understand the functions of pesticides and how to safely and effectively apply them. The most common bad practices stem from the following:

- Farmers' inability (or refusal) to read label instructions.
- Misunderstanding by farmers of the biological and chemical functions of pesticide classifications and how they work. They think that higher amounts of chemicals, more frequent use, and higher toxicity of the pesticides will destroy pests and eradicate diseases in a better and faster manner.
- There are unscrupulous chemical product salesmen (and chemical retailers) who would readily want to sell a product to unknowing farmers just to make a profit.

All of these bad practices frequently end up with high levels of pesticide residue (that may still be potent) left on the plant or in the crop. This can make vulnerable consumers exposed to the toxicity of the pesticides.

The exposure to the toxicity of pesticides lies not just in the final crop, but also with the persons making the applications in the fields, especially if the field workers are not correctly protected from physical contact with the pesticides during spraying or application. Accidents will happen if the pesticides are misplaced, mislabeled, unrecognized, or exposed to children or farmers who unknowingly make contact with their bodies or ingest them by accident.

#### **4.3.2 Best Practices of PPP Applications**

GAP recommends best practices for PPP field application and the handling of pesticides. The following have been used in preparing for field applications:

- IPM practices have been introduced and were undertaken prior to using chemical pesticides to control pests and disease.
- A competent technical advisor is responsible for recommending the correct pesticides used for the specific pest problem in plants and crops.
- Technical advice is given on the selection of PPP and the application recommendations.
- The pesticides applied are registered as PPP in the National Pesticides Registration List.
- Record keeping with reference to the application on the farm, information on the pesticide label, conditions of the plant/crop growth, and justification for the choice of pesticide [19] [20].

#### **4.3.3 Pre-Harvest Interval (PHI)**

Pre-harvest Interval (PHI) is the period between the physical spray of the pesticide on the plant and the harvest date of the crop. This interval is sufficient to make the sprayed pesticide lose its toxic potency from the natural chemical breakdown in its exposure to the environment in the farm. The PHI varies for different PPP, depending on its speed of chemical breakdown and the weather conditions of the farm. The PHI has been calculated from the concentration of the compound, the dilution rate, and the breakdown rate of the compound, and is stated on the pesticide package label. Compliance with PHI recommendations is one way to prevent the maximum residue limit (MRL) in the crop product from going over the national (or international) MRL tolerance for the pesticide type and the crop variety.



It is arguable if this approach is a foolproof method to secure MRL readings. There are many other reasons that may contradict this practice. However, given the many bad practices that are happening on numerous farms around the world, this small early step is a start for a good PPP application approach and continual improvement, which is another pillar of the principles of GAP.

#### **4.3.4 Disposal of the Surplus PPP Mixture**

The disposal of the surplus application mixture left in the mixing tank upon completion of the spray activity needs to be carried out in ways that do not compromise the safety of the crop, the people, and the environment of the farm.

#### **4.3.5 Disposal of Empty PPP Containers**

The disposal of empty pesticide containers must be done in ways so that they cannot be re-used in any way to contain food products. Empty pesticide containers cannot be left in the open in the fields. They have to be disposed of in ways such that they do not remain a hazard for the crop production or to people who may unknowingly be in contact with them. Please refer to [Appendix 15](#).

There is a danger of children playing with the empty containers, or even adults who may not be familiar with the conditions of the empty containers who may use them to hold potable water. These highly probable risks must be prevented.

The 3-Rinse Method of cleaning empty pesticide containers is considered an effective way to render them safe for temporary storage prior to disposal.

#### **4.3.6 Recall and Withdrawal Mechanism**

It is possible to deduce the CCPs where most hazards can come into contact with food products in the process chain and take action to prevent and control this from happening. However, there can still be hazards that are not known and still find their way into the production process. The risk assessments and the hazards analysis control mechanisms are very effective tools to minimize such contamination from happening.

However, in the event contamination does occur, and if the contamination is identified through the traceability system, a withdrawal or recall mechanism must be launched. A procedure is drawn to describe how the withdrawal or recall is carried out.

Reference is made to the procedure document for the recall and withdrawal mechanism of Item 3.5.

#### **4.3.7 PPP Exposure to Consumers**

PPP exposure can produce adverse human health effects on two levels: acute (short term) effects and chronic (long term) effects.

The severity of adverse health effects of the exposure, among other factors, depends on the dosage of the pesticides, the duration of exposure, and the victim's age and vulnerability to the pesticides. Acute effects of pesticide poisoning can occur through accidental (or intentional) contamination from a high and toxic dosage. Chronic effects from exposure to pesticides can be caused by the unwitting continual daily intake of food containing very low dosages of pesticide residue. While the human body is capable of nullifying the effects of daily low dosages of the toxin ingested in the body, scientists and health officers are more concerned about the general health and safety aspects of such exposures. Pesticide residue that is found in food crops is monitored on the health and safety tolerance level of MRL that measures the quantity of the chemical remaining in the food crop sample through the analysis method using gas chromatography mass spectrometry (GC-MS) or liquid chromatography mass spectrometry (LC-MS) machines.

The mass spectrometry machines can only detect the chemicals if they know what chemicals to look for. Commercially, there are thousands of pesticides that are in current use. Under GAP, producers need to inform their buyers of the full list of pesticide chemicals that they have applied in the production season.

Producers also have to use sufficient samples of the crop for regular pesticide residue analysis to determine if the crop is safe for harvest and shipment delivery. The crop must meet the permissible MRL of the importing country and that of the buyer.

Many countries have a permitted MRL register of the pesticide residue set for each crop product. If a country does not have a MRL, they may utilize the Codex Alimentarius MRL list.

#### **4.3.8 PPP Exposure to Farmers and Farm Workers**

Farmers and farm workers are exposed to the hazards of PPP contamination because they handle the chemicals very often. These workers must be protected from the dangers of PPP exposure and poisoning. Primarily, farm workers should be trained to understand how PPP works and how to safely and correctly handle the chemicals. Dermal exposure is the most common form of contamination when farm workers undertake work with chemical sprays on the plants.

Workers must be protected with the proper protective equipment:

- Rubber gloves when mixing chemicals in spray tanks.
- Stirring rods to mix the liquids in the tank.
- An effective gas mask (face mask) to be worn during spraying. Face masks made of porous cloth material are not suitable for this purpose.
- Plastic covering over work clothes to prevent spray landing on the body (raincoat or apron).
- Rubber boots.
- Goggles for eye protection.

It is a major compliance criterion that pesticide application protective gear must be present on the farm at all times. The equipment must be kept clean and functional, and there must be documentation that shows that farm workers have been trained to use the protective gear correctly.

#### 4.3.9 Personal Hygiene and Toilet Hygiene

Personal hygiene and toilet hygiene care must be fully followed before workers handle food products.

- Workers who have communicable illness must stay away from work.
- Open wounds must be fully dressed.
- There must be proper toilets and wash basins available in or near the packhouse but at a safe distance to prevent exposure to food.
- Access to clean water and soap must be available at all times.
- Illustrations and posters must be available and should be pinned to the walls in a visible manner so that workers are constantly reminded to maintain cleanliness at all times.

Poor personal and toilet hygiene are the main source of food contamination. The situation is more severe with farms that have no access to potable water or electricity. Dirty toilets or toilets located near packing sheds where harvested crops are sorted pose imminent dangers. Flies or rodents that tend to be found in these places are the most likely sources for contamination.

There is no compromise on the compliance for good personal hygiene and good toilet hygiene. It is not acceptable to argue that because the harvested crops are meant only for local markets, lower standards are allowable because local people are used to those kinds of living conditions.

This is a clear example that shows that the foundations of GAP are valid for all consumers of the export market as well as of the domestic market.

#### 4.3.10 First Aid

Accident and emergency procedures provide basic guidelines on what to do in the event of accidents. Accident and emergency procedures are steps that tell people what



Provide workers access to washing facilities

to do next, where to seek assistance, and how to undertake basic first aid treatment. Large posters with clear illustrations may be used if farm workers cannot read.

First aid training must be given to all workers to enable them to undertake accident and emergency treatment. This should include the following:

- Training materials written in a common language
- Illustrations (if possible) to depict the instructions
- A map of the farm (the exit gate, location of the nearest health center, etc.)
- List of contact persons (on the farm) who can provide emergency assistance
- List of telephone numbers of police, the fire brigade, hospitals, clinics, and means of transport
- Locations of the nearest telephones
- Locations of fire extinguishers
- Emergency cut-off of electricity, gas, water, etc.

Through this information, first aid and medical assistance can be called rapidly and effectively. Basic first aid treatment can be administered on the spot to victims. It is imperative that a first aid box is placed prominently in the packhouse. The first aid box must be fully equipped with all the necessary items.

#### **4.4 GAP SAFETY ASPECTS OF FARM SITES AND SOIL MANAGEMENT**

The soil is the basic resource in crop cultivation. In setting up a new farm, it is necessary to know the soil nutrient content and to find out what activity previously took place at the site. It is also necessary to know the soil nutrient fertility or if the soil is suitable for the crop before the crop is planted. The site may contain toxic elements like arsenic that could find its way through the root system into the crop yield. The site could have had activities like mining and the residual mined soil could contain heavy metals that are detrimental to consumers. A laboratory soil analysis would determine all the chemical elements of the soil in the site.

In some previously war torn countries, land mines and live explosives can still be found in the agricultural sites. Sites with previously cultivated crops may leave pests in the soil that need to be treated before a new crop is to be planted. Nematodes and soil fungus need to be treated before new crop planting.

There may be various techniques to improve and maintain soil structure. Techniques in preventing soil erosion and soil nutrient leaching through soil liming or mulching are examples of good farm practices.

Tilling of the soil after every harvest of the crop is a common practice all over the world. Farmers do this for many reasons, such as preparing the soil for replanting, getting rid of weeds, getting rid of soil pests, etc. However, tilling the soil very frequently will break the soil structure. The fine soil will harden easily or get blown away, making the soil poorer quality. Practices in keeping suitable soil structure and

maintaining soil health, like adding organic material into soil, mulching of soil surfaces under tree canopy, or keeping low vegetation in the inter-row of tree lines are some of the good cultivation practices. Maintaining good soil fertility does not mean simply adding chemical fertilizers into the soil.

Planting wind break trees on the borders of farm plots will prevent strong winds over the growing crops. They will also act as a buffer for any wind drifts that may carry unwanted chemical sprays from the neighboring fields.

Building low bunds across the slopes of fields will break the surge of running surface water during a heavy rain. This will prevent erosion of top soils and also slow down the seepage of chemical fertilizers downstream.

The examples of these good cultivation practices are not only beneficial for the cultivated crops but also provide added protections for the health and safety of the crops and soil of the farm and the environment. These good practices can reduce further additions of chemical inputs into the soil and crops, and help farmers to produce a strong and healthy crop.

## **4.5 PLANT PROTECTION PRODUCTS (PPP)**

Plant protection products (PPP) include insecticides, fungicides, and herbicides. GAP provides safe handling and application instructions on the use of PPP, which are necessary to provide assurance that workers are sufficiently protected from excess exposure to the PPP and that the surrounding areas of the farm are not affected by the application. The GAP approach to applying PPP on food crops also provides assurance to consumers that all the hazards pertaining to the use of PPP are monitored closely and that the risks of toxic poisoning, accidents, and toxic contamination of food products and workers are minimized. Please refer to [Appendix 16](#).

### **4.5.1 Handling Insecticides**

Insects are natural visitors to the farm. They feed and reproduce under climate conditions that prove suitable for their purposes. Some insects feed and reproduce more vigorously during the dry season while others prefer the wetter conditions. They may feed on plant parts or they may feed on other insects. The feeding habits of each insect type are specific. Some feed only on young leaves, older leaves, or on flowers. The feeding habits of these insects sometimes destroy plants and crops. Beneficial insects include predators that feed on other insects that feed on plants. The predators attack either the adults or feed on the eggs and larva during the reproduction stages, thus leaving the plants and the crop unscathed.

Plant protection products are chemical compounds that have damaging effects or dispelling effects on insects and larvae. These chemical compounds may be naturally occurring, plant essence, or be synthetically produced. Some of these chemical compounds aim to kill the insects and some work as a deterrent of the insects. The

goal of the application of pesticides is to protect the crop, and not primarily to kill the pest. This principle is borrowed from the HACCP system of identifying and removing hazards, which in this case is the insect pest.

**Details of recordkeeping on PPP applications:**

- Date of spray application
- Crop name/variety
- Application location
- PPP trade name and active ingredient
- PPP quantity applied
- Justification for the PPP application
- PHI
- Technical authorization for the PPP application
- Applicator machine utilized
- Operator's name

#### **4.5.2 Insecticides Modes of Action (MOA)**

PPP acts as a poison to insects. Synthetic PPP has targeted toxic effects (modes of action) on insects [21–22]. These targets include the nervous systems of the insects, their growth and development, their metabolism and energy production, and their circulatory systems.

Some types of PPP can kill insects instantly, e.g., the chemicals that target the nervous system of the insects. Chemicals that affect the growth and development of insect life cycles only reflect the effect of the PPP after one cycle of the insect's life.

Farmers who fail to understand the MOA of PPP might think that the chemicals that they are using are not effective and undertake more drastic actions to eradicate the insect pest, such as an additional round of spray or switching to a more toxic chemical. The result of such incorrect decisions will affect the safety issues on the harvested crop and also damage the delicate balance of the insect ecology (inadvertently killing of the beneficial insects), causing the next crop season to see a repeat of the same problem. It is frightening that such scenarios are not just isolated incidents but are being practiced by so many farmers so often. This is where a competent technical extension officer is best placed to advise and train farmers in the use of PPP and where farmers can benefit greatly from such information.

Insects that are exposed to the same PPP continuously for long periods of time will develop resistance to the chemical, rendering them ineffective. However, farmers unknowingly continue to use the same chemical.

### 4.5.3 Handling Fungicides

Plant pathogens acting on plants, fiber, and organic materials are nature's way of recycling and regenerating new plant growth, without which nature would not be what we have known it to be. The pathogens that break down other plant or organic materials include fungi, oomycetes, bacteria, viruses, phytoplasma, nematodes, or parasitic plants. This is when plant pathogens start to also act on the crops that farmers grow for food, causing diseases and damage that we consider as a problem.

The plant pathogens have a life cycle of their own. There are times when these organisms are low lying or dormant, and times when they flourish and grow rapidly. These are all the result of physiological factors due to the environmental conditions that affect their life cycles.

Generally, plant diseases occur when the pathogen finds its way into the plant through the opening that the pathogen has created. There could also be a secondary infection when the opening was initially created by some other factors (physical damage or an opening by an insect).

Fungicides are chemicals that kill or inhibit the growth of fungi and fungal-like organisms or inhibit the fungal disease developing in the plant. Contact fungicide remains on the surface of the plants where it is applied but does not go deeper into the tissues of the plant. These fungicides do not have after-infection activity. Thus, repeated applications need to be applied to protect new growth of plant parts and/or to replace the fungicides that are washed away by rain or irrigation, or have become less effective due to deterioration by environmental factors. Such fungicides perform a protective function for the plant. They provide a protective barrier for the plant before the pathogens arrives or before the pathogen begins to develop on the plant.

Systemic fungicides are absorbed into the plant tissues and may offer after-infection activity. Very few fungicides are truly systemic in that they move freely through the plant. Upwardly systemic fungicides move only upwards in the plant through the xylem tissues, while locally systemic fungicides move into the treated plant parts and move to some degree within the treated area of the plants. During early infection activities occurring in the plant, the fungicide can penetrate the plant and stop the pathogen in the plant tissues.

Anti-sporulant activity of fungicides has the ability to prevent spores from being produced. In such cases, the disease would continue to develop but the spores are not produced or released. Thus, the amount of inoculum available (meaning the spread of the disease) to infect surrounding plants is reduced.

### 4.5.4 Fungicides Modes of Action

Fungicides inhibit the metabolic functions of the fungi through different MOA that are classified under four areas [23]:

- i. Inhibitors of electron transport chain  
Effective fungicides: sulphur, strobilurins
- ii. Inhibitors of enzymes  
Effective fungicides: copper, dithiocarbamate, organophosphonate, substituted aromatics
- iii. Inhibitors of nucleic acid metabolism and protein synthesis  
Effective fungicides: benzimidazole, phenylamide, dicarboximide
- iv. Inhibitors of sterol synthesis  
Effective fungicides: imidazole, triazole,

In understanding the MOA of fungicides, farmers should better understand how to use fungicides to control fungal targets. They should also know how to apply fungicides so that resistance is not developed to the chemical and ensure more effective applications.

Recommendations of good practices in fungicide application also include the strategies of fungicide resistance management. They are as follows:

- Avoid repeated and exclusive use of one fungicide only.
- Apply as a mixture with one or more fungicides of different types, as a component in a rotation, or as an alternate with a different fungicide treatment.
- Restrict the number of treatments applied per season and apply only when necessary.
- Follow the recommended dose and application instructions of the manufacturer as written on the packaging label.
- Avoid using broad spectrum fungicides.
- Practice Integrated Disease Management: Use resistant crop varieties, biological control agents, good farm hygiene practices of crop rotation, remove diseased plant parts, etc.
- Apply protective spray early in the epidemic phase.

#### **4.5.5 Safety and Restrictions of PPP Use**

The label on the pesticide package provides most of the necessary safety instructions for the applicator. Farmers handling the pesticide spray should have all the protective clothing (gas mask, gloves, boots, plastic apron) in accordance with legal requirements. The protective clothing should be clean and in working order. Only authorized persons from the farm organization should be allowed to undertake the pesticide spray operation. The authorized persons should have been trained by a competent trainer in the knowledge of pesticides and the correct handling of the pesticide spray.



### Steps in Developing the MRL Management Program [24]

1. List all approved chemicals that are permissible for use in the producer country.
2. Confirm the list with the client/importer approved list.
3. Confirm the suitability/effectiveness for crops and pests.
4. List the pest and disease infections on a calendar/production progress.
5. Prepare a spray plan.
  - Chemical persistency
  - MOA of chemicals
  - Use contact or systemic compounds
  - Ensure no repeat usage
6. Modify the spray program based on MOA and persistence management
7. Prepare an alternative spray program for:
  - PHI
  - Changes in weather conditions
  - Chemical resistance
  - Residue accumulation
8. Refine the spray program for other considerations.
  - Non-chemical alternatives
  - Cultural practices

**Restricted Entry Interval (REI)** is the permissible period between the spray application and when the entries of persons are allowed into the spray area of the farm. The REI is indicated on the packaging label. REI are established to reduce pesticide exposure to farm workers or visitors and are based on the toxicity of the pesticide.

The **Pre-harvest Interval (PHI)** is the minimum time that must pass between the last pesticide application on the plants and when the crop can be harvested. Some pesticides have restrictions of PHI based on growth stages instead of a specific number of days. Crops harvested within the PHI period have a higher risk of excessive pesticide residue on the crop. This is because there is insufficient time for the natural breakdown of the chemical in the exposure to the environment. The PHI is indicated on the packaging label.

While PPP are manufactured to target pests and diseases, consumers are not convinced of their safety for humans, especially when the residual content of these PPP can be found in fresh food that is consumed daily. The following are the handling safety guidelines which farmers must heed when applying PPP on the crops:

- Farmers must be trained and advised by a competent person on the selection and spray handling of the PPP.
- The decision to use PPP should be made only as a final option after an integrated pest management (IPM) approach has taken place.

- Do not use PPP that are banned from use by regulatory authorities.
- Use only PPP that are registered by the regulatory authorities.
- Select PPP that are specific (most effective) to the insect pest and are most suitable to the crops, and as recommended on the PPP label.
- Follow the application instructions of the label found on the PPP packaging (dosage in dilution, time of spray, quantum of spray solution on plants, etc.).
- Keep detailed records of the PPP spray applications.

#### **4.5.6 Storing PPP**

PPP kept on the farm must be protected from unauthorized persons (children or persons not knowledgeable of PPP) for their own protection and to prevent them from unknowingly exposing the PPP to the food crop on the farm. The PPP must be stored in a place that has the following provisions:

- The PPP store must be secured with lock and key. The key should be accessible only to authorized personnel.
- The walls and door of the store must be fire resistant.
- The store must have sufficient ventilation and light inside.
- The PPP store is meant for keeping PPP only and no other containers, materials, or food products should be kept in the same area.
- The store should be equipped with measuring and mixing tools for the use of PPP.
- Absorbent material (sand, saw dust) should be available to soak up any spillage inside the store. The store should have a built-up bund around it to prevent any spillage leaking outside the store structure.
- PPP packaging and labels must be in their original form.

#### **4.5.7 Empty PPP Containers**

Empty PPP containers must not be placed openly where unauthorized persons can access them. The containers must not be reused to store any other kinds of products or materials.

All empty PPP containers must first be punctured before final disposal. Puncture plastic bottles or plastic bags and remove the caps of the glass bottles to discourage re-use. Cut off paper boxes. Empty bottles must first be cleaned with water under the 3-rinse method.

#### **4.5.8 Obsolete PPP**

PPP that have passed their expiration date are called obsolete PPP, and must not be used. These products must be returned back to the pesticide retail shop or disposed of through an authorized or approved channel. Obsolete PPP should be removed as soon as possible.

#### **4.5.9 PPP Residue Analysis**

Most developed markets and producer countries have a list of PPP MRL of the approved and registered pesticide products. Countries that may not have such a list should refer to MRL information of the Codex Alimentarius or the list available from the importing country.

For exported products, farmers must undertake actions to meet the MRL of the destination country of the specific crop for the PPP that have been applied to the crop. The MRL should follow the local list for crops for the domestic market, or the Codex Alimentarius list if there is no country information

A risk assessment should be developed to evaluate the PPP use and the potential risk of exceeding the MRL. The risk assessment should ensure the following:

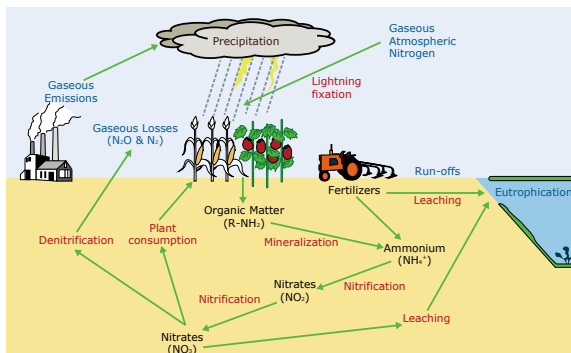
- Ensure the correct selection of the pesticide product to apply. The pesticide should target the pest and be suitable for the crop.
- Ensure that protective gear is available and worn correctly.
- Ensure that farmers strictly follow packaging label application instructions.
- Ensure PHI has been observed.
- Ensure a record of the spray applications has been made.

Samples of the crop harvested for shipment are required to undergo laboratory PPP analysis for chemical residue. An accredited laboratory must be used to undertake such chemical analysis.

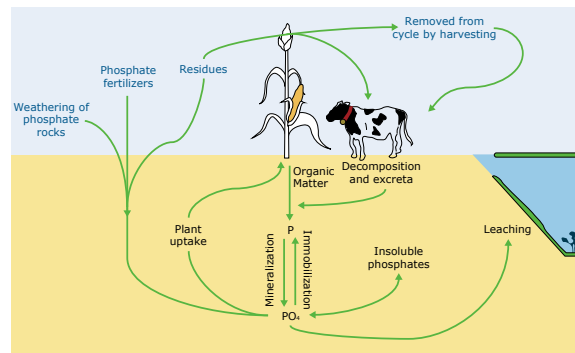
An action plan should be in place in the event that chemical analysis readings exceed the permitted MRL of the PPP product. This action plan should be a procedure for recall or withdrawal of the crop product from the supply chain mechanism. Please refer to item 3.5

### **4.6 FERTILIZER APPLICATION**

Plants survive through the nutrition that they receive from the air and soil. When undisturbed, the natural plant nutrient cycle is capable of being sustaining for long periods. However, when food crops are grown, the constant extraction of plant nutrients from the soil will mean they need to be replenished with fertilizers. Fertilizers are organic or inorganic materials, or synthetic or non-synthetic compounds that are added to the soil to replenish or supply one or more basic plant nutrients to support healthy and vigorous crop production.



Phosphorus Cycle



Nitrogen Cycle

#### 4.6.1 Fertilizer Hazards

Although fertilizers provide vital nutrients to plants, direct exposure to them will cause health hazards in humans. Synthetic fertilizer can be toxic to humans in its raw form. Organic fertilizers, especially unprocessed human and animal sewage, contain pathogens that are highly harmful to humans. The risk to human health in using and handling human and animal sewage is extremely high. The handling of human or animal sewage as fertilizer must be done very carefully.

Under GAP guidelines, the use of human sewage as an organic fertilizer is not allowed and fertilizers (including organic, inorganic synthetic, or non-synthetic) must not come in direct or indirect contact with fresh fruit and vegetable products.

The ratio of synthetic fertilizer taken up by plants to the amount of fertilizer applied into the ground is generally believed to be about 30%. This also depends on the soil porosity, structure, and contours of the farmed land, the root system of the plants, and the manner in which the fertilizers have been applied. The excess of such fertilizers will more often find its way downstream and eventually seep into the waterways, and may end up in nearby potable water supplies.

The quantum of fertilizer that needs to be applied into the ground should be determined by a laboratory soil analysis to find out what is lacking in the soil and how much is required by the planted crop for each crop cycle. A fertilizer application program can be developed for crop cultivation. A competent agriculture technician is required to make such prescriptions.

#### Fertilizer Storage Guidelines

- Fertilizers must be kept separately from plant protection products
- Fertilizers must be kept in a covered shelter in a clean and dry area
- Fertilizers must be prevented from contaminating water courses
- Fertilizers must never be kept together with harvested food products
- A storage inventory must be kept to indicate up-to-date stocks and records of use

### 4.6.2 Applying Fertilizer

Farmers applying fertilizers in the field are exposed to contaminations in their handling of synthetic fertilizers and non-composted animal waste fertilizers. Farmers are required to wear rubber hand gloves when applying fertilizers manually. Synthetic fertilizers kept in the storeroom emit gases that may be toxic to humans. For example, urea kept in bags in the storage area may release ammonia gas when the temperature rises. The ammonia gas rises in the air in the storeroom and forms ammonia vapor, which is a very corrosive agent. Farm workers entering the storeroom can be exposed to the ammonia vapor through breathing, swallowing, or skin contact. The vapor reacts with water to produce ammonium hydroxide. This chemical is very corrosive and damages cells in the body on contact.

Organic fertilizer storage and application guidelines:

- Human sewage must not be used as fertilizer.
- Undertake a risk assessment on organic fertilizers that reflects their source, method of composting, heavy metal content, timing of application, placement, and the period between placement and harvest. Indicate an action plan for how to minimize the risk of contamination.
- Determine the nutrient contribution of the organic fertilizer application.

## 4.7 IRRIGATION AND FERTIGATION

Fresh water on land is a scarce resource that needs to be conserved and utilized in a sustainable manner. Rivers do not only provide water for human consumption and agriculture use. They also have a myriad of roles, including supporting fish cultures and alluvium soils for the plains and delta regions where the livelihoods of those in large communities depend on the sustained flows.



Flood irrigation systems are a wasteful use of water and are detrimental to the root systems of crops

The extraction of water from the natural water system for use in agriculture must not contribute to water scarcity in the system. The method of irrigation and water usage must be justified for the quantum of crops produced. The idea is to prevent excess usage and to avoid wastage of water.

Actions that can be taken to assure responsible irrigation usage include the following:

- Changing irrigation methods and discouragement of flood irrigation methods
- Responsible selection of crops to be grown
- Responsible selection of crop cultivation methods

Water for irrigation usage must be clean, and untreated sewage water must not be used for irrigation or fertigation. Treated sewage water must comply with the WHO's Guidelines for the Safe Use of Wastewater Excreta in Agriculture and Aquaculture 1989.

A laboratory analysis for microbial and chemical content of the irrigation water must be carried out. Based on the laboratory analysis, a risk assessment for the potential contamination of microbial, chemical, and physical pollution should be made for the irrigation and fertigation water that considers the following:

- The suitability of the water for irrigation.
- Identification of the water source. The irrigation water must come from a sustainable source.
- The risk of contamination of the irrigation water due to seepage of industrial waste or sewage water.
- The risk of contact of the irrigation water with the crops to be harvested, and the risk of consuming irrigation water in the crop. This should be judged based on the time of irrigation, the time of harvest, and the type of crops grown.

Concerns about irrigation water quality and contamination center primarily on safe food production and worries for the health of the plant. Fast growing food crops and crops under fertigation tend to be more susceptible to accumulate/retain contaminants (chemical and micro-organism) than tree crops. Nevertheless, the use of contaminated water for irrigation causes damage in all situations and responsible irrigation assures that irreversible conditions of contamination to the plants and the crop do not develop.

## **READING LIST**

1. 'IPPC Overview Brochure'  
(Celebrating 60 years of protecting plant resources from pests)  
International Plant Protection Convention (IPPC)  
[www.ippc.int](http://www.ippc.int)  
[https://www.ippc.int/static/media/files/publications/en/2013/05/08/1367939850\\_03IPPC\\_GenericFlyer\\_e\\_W.pdf](https://www.ippc.int/static/media/files/publications/en/2013/05/08/1367939850_03IPPC_GenericFlyer_e_W.pdf)
2. 'IPPC Strategic Framework 2012-2019'

(Celebrating 60 years of protecting plant resources from pests)

International Plant Protection Convention (IPPC)

[www.ippc.int](http://www.ippc.int)

[https://www.ippc.int/static/media/files/publications/en/2013/06/03/1344410402\\_ippc\\_strategicframework\\_e\\_w\\_201305101054en.pdf](https://www.ippc.int/static/media/files/publications/en/2013/06/03/1344410402_ippc_strategicframework_e_w_201305101054en.pdf)

3. 'IPPC National Phytosanitary Capacity Development Strategy'

International Plant Protection Convention (IPPC)

[www.ippc.int](http://www.ippc.int)

[https://www.ippc.int/static/media/files/publications/en/2013/06/04/1359386736\\_02ippc\\_capacitydevelopment\\_e\\_201305101035en.pdf](https://www.ippc.int/static/media/files/publications/en/2013/06/04/1359386736_02ippc_capacitydevelopment_e_201305101035en.pdf)

4. 'IPPC Market Access - a guide to phytosanitary issues for national plant protection organizations'

Presentation: IPPC Secretariat SPS Committee meeting Geneva, Switzerland

October 2013

IPPC Secretariat IPP: [www.ippc.int](http://www.ippc.int)

Phytosanitary Resources: [www.phytosanitary.info](http://www.phytosanitary.info)

Helpdesk: <http://irss.ippc.int/helpdesk/> Email: [ippc@fao.org](mailto:ippc@fao.org)

International Plant Protection Convention (IPPC)

[https://www.wto.org/english/tratop\\_e/sps\\_e/wkshop\\_oct13\\_e/presentation\\_5\\_ana\\_peralta\\_ippc.pdf](https://www.wto.org/english/tratop_e/sps_e/wkshop_oct13_e/presentation_5_ana_peralta_ippc.pdf)

5. 'A brief guide to dispute settlement under the IPPC'

International Plant Protection Convention (IPPC)

[www.ippc.int](http://www.ippc.int)

[https://www.ippc.int/static/media/files/publications/en/2013/07/19/01ippc\\_disputesettlement\\_flyer\\_e\\_w.pdf](https://www.ippc.int/static/media/files/publications/en/2013/07/19/01ippc_disputesettlement_flyer_e_w.pdf)

6. 'GUIDANCE DOCUMENT: Implementation of procedures based on the HACCP principles, and facilitation of the implementation of the HACCP principles in certain food businesses'

Document published: Brussels, 16 November 2005 by The European Commission

Health and Consumers Protection Directorate General

[http://ec.europa.eu/food/food/biosafety/hygienelegislation/docs/guidance\\_doc\\_haccp\\_en.pdf](http://ec.europa.eu/food/food/biosafety/hygienelegislation/docs/guidance_doc_haccp_en.pdf)

## **SELF-ASSESSMENT QUIZ 2: QUESTIONS FOR MODULES 3 AND 4**

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1. In terms of risk assessment, why is it vital to know and understand the land use of the site prior to establishing a new farm?
  - a. Farmers can plan the marketing strategy for the new farm.
  - b. Farmers can assess the risk of soil pathogens or chemical contamination in the soil.
  - c. Farmers can assess the risk of climate change affecting the new farm.
  - d. Farmers can assess the risk of making mistakes that are similar to those of the previous owner.
2. Which of the following is the reason that recordkeeping for farm activities is a vital necessity in GAP management?
  - a. The records indicate that the farmer has done the work in the correct way.
  - b. The records indicate that the workers have not been sleeping on the job.
  - c. The records indicate that the necessary farm inputs are utilized all the time.
  - d. The records indicate that the workers have understood their instructions.
3. In the event of contamination of the crop, how does the traceability system help farmers rectify the problem?
  - a. It tracks and confirms if farmers are liable for the mistakes.
  - b. It tracks and identifies customers.
  - c. It tracks and identifies the source and cause of contamination and makes recalls possible.
  - d. It tracks and identifies noncompliance.
4. Why is dealing with complaints an important part of GAP management?
  - a. It keeps the customers happy knowing that the GAP producer is responsible.
  - b. It promotes the brand name of the company and the certification.
  - c. It trains the staff of the company to be courteous.
  - d. It acknowledges if a problem exists, rectifies the issue, and prevents it from happening again.
5. Which of the following is NOT correct guidance for farm site management and risk assessment?
  - a. Identify all potential problems arising due to the land use of the site.
  - b. Identify the impacts of cultivation activities of the farm on the surrounding environment.
  - c. Identify actions to minimize the intensity of the problems and impacts when they arise.
  - d. Identify actions to understate the problem and to not rock the boat so that the problem will eventually be forgotten.



6. Which of the following is NOT an aim of the WTO SPS Agreement?
  - a. The protection of the economy of a territory from the adverse impacts of international trade in the open market system through the establishment of regulatory control of food safety.
  - b. The protection of animal and plant life and health from risks arising from the entry, infestation, or spread of pests, disease, disease-carrying organisms, or disease-causing organisms.
  - c. The protection of human life and health from risks arising from diseases carried by animals, plants, or products thereof, and from the entry, infestation, and spread of pests.
  - d. The protection of the lives and health of humans and animals from risks arising from additives, contaminants, toxins, and disease-causing organisms in food, beverages, and animal feed.
7. Which of the following food production concepts is NOT relevant to GAP implementation?
  - a. Hazard Analysis and Critical Control Points (HACCP)
  - b. Organic Food Production
  - c. Integrated pest management (IPM)
  - d. Integrated crop management (ICM)
8. Which of the following statements on the implementation of GAP in safe food production is correct?
  - a. GAP does not allow the use of chemical pesticides in pest and disease control in the fields.
  - b. GAP recommends the use of raw sewage as fertilization material because it is considered organic fertilizer.
  - c. GAP recommends best practices for PPP field applications and the handling of the pesticides.
  - d. GAP recommends the use of GMO crop products over the use of PPP on conventional crop products.
9. In the management of pest control, which of the following statements is correct?
  - a. Insect pests are common visitors to the farm.
  - b. Insect pests in the farms must be permanently destroyed to prevent damage to crops.
  - c. Pesticides are the first line of defense in the management of insect pests.
  - d. Frequent applications of pesticides will provide more effective control of insect pests.

10. Which of the following statements is true about pesticide application?
- a. Use only one pesticide regularly to minimize the accumulation of residue in the crop.
  - b. Use a more toxic pesticide product but at a lower dilution rate for better pest control.
  - c. Use less toxic pesticide products but at a higher dilution rate for better pest control.
  - d. Use only the selected pesticide products recommended and follow the instructions written on the label.

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<Answers>

1. b   2. a   3. c   4. d   5. d   6. a   7. b   8. c   9. a   10. d

# MODULE 5: ENVIRONMENTAL CONSERVATION

## 5.1 IMPACT OF FARMING ON THE ENVIRONMENT

The modern farming system has made great strides in its efforts to increase food crop production, including the use of high quality seeds, new cultivation technologies, the utilization of effective chemical fertilizers to accelerate plant growth and produce better yields, and the reduction of crop damage caused by pests and diseases. These efforts have been necessary to feed the world's rapidly increasing population. But there is a price to pay for these improvements: the major impact on the environment.

Competition over scarce natural resources, including land and water, has been a longstanding issue throughout human history. In modern times, there is also conflict over whether these resources should be left alone to protect the environment. The increasing world population and growing urbanization are pushing agriculture lands into areas with fragile ecosystems. Synthetic inputs of plant production and plant protection products including herbicides and fertilizers release chemical residue into the soil, water, and air that is toxic for human, animal, and plant health. The practice of soil tillage causes the compacting of soils and loss of top soil. Planting on hills increases the risk of land erosion that can further damage land contours and natural waterways. The clearing of virgin forest areas for food cultivation disturbs the ecological balance and biodiversity of animals, insects, plants, and microbiological organisms.

The consequences of the destruction humans have wreaked upon the environment in the past 150 years are becoming increasingly obvious. Today, we have climate change impacts such as the rising global temperature, rising sea water levels, ocean acidification, and unpredictable and more severe weather conditions that have never been seen before.

We are often told that the real culprit for environmental destruction has been the manufacturing sector with its toxic waste

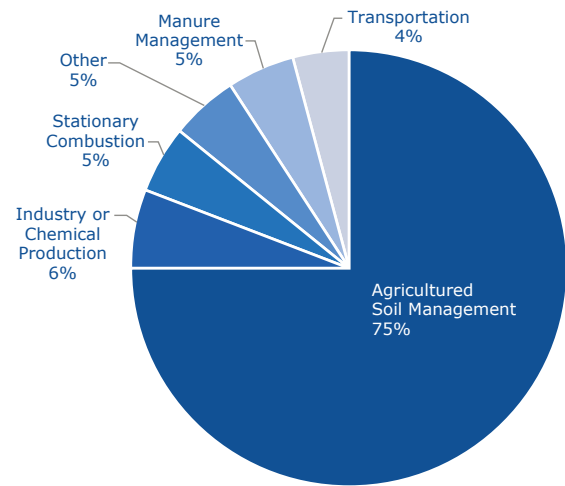


Figure 1. U.S. Nitrous Oxide Emissions by Source. All emission estimates from the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012 [25]



A dying tree, symbolic of our potential bleak future

in rivers and gasses in the atmosphere. However, the agricultural industry represents one of the world's greatest consumers of natural resources. It is ironic and unfortunate that although we are planting more crops and plants than ever before, this only harms the environment. In addition, the use of plastics has often drawn reproach from environmental advocates. But today, more than 90% of our everyday materials are plastic-based. Cutting trees down for wood for use in areas such as construction, furniture, and printing has become a thing of luxury.

There is no turning back from the way consumers want to live their lives. Food production and retailing will come from the international conglomerates. The modern conventional farming system will progress with further technological development.

GAP represents an opportunity to promote sustainable agriculture. With the global population at about 7 billion, food insecurity is a critical issue for the present day and will only increase in the future ahead. This critical issue of food insecurity is the basis for the definition of sustainable agriculture.

### **Sustainable Agriculture**

Sustainable agriculture is a farming approach that meets the need of safe, nutritious, and affordable food for the world population in a way that preserves the environment and natural resources by seeking to optimize skills and technologies to achieve long-term productivity and profitability of the stakeholders of the agriculture enterprise. This will ensure that future generations can also experience the same prosperity that we enjoy today.

## **5.2 THE GAP ENVIRONMENT AND RESOURCE CONSERVATION PROGRAM**

The use of water and land resources cannot be taken for granted anymore. Developed countries have started to delineate their land in an effort to manage increasing populations, manufacturing, and food crop cultivation. The other lands they can afford are demarcated for forests. Efficient allocation of water resources has also become increasingly vital. Cost benefit analyses are necessary before granting permission for the utilization of resources for growing crops and animal husbandry.

Farmers in developing countries must now also undertake similar efforts for their systems of growing food crops. Farmers in these countries must comply with environmental legislation covering the protection of the air and atmosphere, water, soil, biodiversity, and other environmental issues. This is a positive development, and the



Developed countries are demarcating land for forests.

accumulated actions of individual farmers will make a major impact on a global scale.

The GLOBALG.A.P. certification CPCC require farm managers to develop a farm conservation plan, a written action plan on the conservation of flora and fauna in the farm area. The objectives of the action plan include conserving natural resources and enhancing and maintaining biodiversity on the farm. The action plan should include the farm's activities in integrated pest management and integrated crop management [26].

### 5.3 INTEGRATED PEST MANAGEMENT (IPM)

Before the development of synthetic chemical pesticides, farmers practiced methods to control pests and diseases based upon their observations of pest and disease behavior and the effects of the use of naturally formed chemical compounds. Farmers also realized that the environment surrounding the farm had an impact on the control of pests and diseases. The farmers made observations on plants that host pests, pest-repelling plants, farm sanitation, and the beneficial effects of integrated cultivation techniques.

The modern system of crop cultivation that emphasizes large-scale monocropping, high yield productivity, and capital intensive and high density planting has tended to take a different approach to pest and disease control. Many of today's farmers see pests as the enemy and disease as an intrusion into the production system. They see the application of chemicals as an end-all solution to destroy pests and end plant diseases.

The downside of the injudicious use of chemical pesticides with extensive applications is that they result in high residue on the crop. Some chemical pesticides maintain their potency for very long periods. The persistent use of the same chemical class of pesticides will result in pest resistance to the pesticides. Farmers who do not understand the chemistry of pesticides will continue to use the chemicals, not realizing that they have become ineffective. Some may even increase the volume of the pesticides in the mistaken belief that it will strengthen their effect.



Beneficial insects, such as bees, perform useful services for farmers including pollination and pest control.

Such incorrect applications cause a host of problems for farm ecology. Some of these effects include upsetting the ecological balance of pests on the farm, the introduction of new pests and diseases, increased pest resistance to pesticides, and the destruction of beneficial insects such as bees and predators.

“The identification and diagnosis of the pest and disease problem is halfway to solving it.”

-Greenwood & Halstead [8]

Integrated pest management (IPM) is a decision-making process that utilizes all available pest management strategies, including cultural, physical, biological, and chemical controls, to prevent economically damaging pest outbreaks and to reduce risks to human health and the environment. The IPM approach does not prohibit the use of synthetic pesticides. However, it stipulates that prior to using synthetic pesticides, other non-invasive methods of pest management should be taken in a step by step manner.

### **The IPM Approach to the Management of Pests and Disease**

- Recognize the pest and disease problem before it arises (awareness)
- Take early action to suppress the problem (prevention)
- Take remedial action if the problem does occur (cure) [27]

### **Steps for Non-invasive Methods of Pest Management**

1. Prevention and/or suppression of harmful organisms. This is often best achieved by a combination of the following options:
  - Crop rotation/intercropping
  - Use of suitable cultivation techniques (e.g., seedbed sanitation, registering sowing dates and densities, under-sowing, conservation tillage, pruning and direct sowing)
  - Where appropriate, the use of seed and planting materials that are pest resistant/tolerant cultivars and standard/certified
  - Balanced soil fertility and water management and making optimum use of organic matter
  - Prevention of the spread of harmful organisms through field sanitation and hygiene measures (e.g., removal of affected plants or plant parts; regular cleansing of machinery and equipment)
  - Protection and enhancement of important beneficial organisms, (e.g., utilization of ecological infrastructures inside and outside production sites)
2. The emergence of harmful organisms must be monitored with adequate methods and tools where available. Such observations are made in the fields and, where feasible, warnings, forecasting, and early diagnosis systems should be employed.
3. Decisions on whether pesticides should be used for the control of the pest should be made based on the results of the monitoring of the effectiveness of the approaches and the pesticide tolerance levels of the pests.
4. Synthetic chemical pesticides should only be applied as a last resort when there are no adequate biological, cultural, or non-synthetic chemical alternatives available, and the use of pesticides is economically justified.
5. The pesticides selected and applied should be specific for the target pest and disease and should have the least side effects on human health, non-target organisms, and the environment.
6. Monitor the success of the applied pest management measures.

### **Steps for Synthetic Pesticide Application**

If a synthetic pesticide application is recommended, undertake the following steps of the pesticide application program:

1. Identify the pests and diseases that damage the crop through the following steps:
  - Draw up a pest list.
  - Determine the impacts of the infestation on the crop or plant.
  - Evaluate the conditions for emergence, period, and stage of growth of the crop.
2. Create a list of registered pesticides in the country where the farm is located and in the countries where the crop will be imported. Indicate the persistency and maximum residue limit for each of the chemical groups in each country.
3. Select the pesticides that are most suited to the pest (avoid broad spectrum pesticides).
4. Draw up spray application programs according to crop growth and production patterns. Follow pesticide label recommendations.
5. Document the pesticide application in the daily farm activity record.
6. Monitor the pest infestation behavior to see if it persists or declines as a result of the spray application.

Crop scouting is one of the major components of an IPM program, with the aim of providing accurate pest and crop development information on key pests and how they affect the crop. This includes information on the seasonal changes of the climate and the environment as these changes have an important influence on pests' life cycles, feeding habits, and reproductive behaviors.

Pest prevention is the other component of the IPM program, which can be achieved through a combination of cultural, physical, and biological controls to prevent a pest infestation from emerging and causing economic damage for the farmer. Farm cleanliness practices with the removal and disposal of plant waste prevent the creation of fertile grounds for insect pests and plant diseases from germination. Pesticide control methods should only be employed when the above controls fail to have an effect.



Mealybugs infestation



## 5.4 INTEGRATED CROP MANAGEMENT (ICM)

The objective of ICM is to manage the crop production to yield a high quality, profitable crop in ways that maintain and enhance the ecological environment of the whole farm for the wildlife and the community in and surrounding the farm. The ability to produce a successful crop requires the complete interaction of plant nutrition, soil management, crop protection, tree management, crop rotations, farm management, and farm sanitation. In order to sustain the production crop cycles to yield the same quality at the same operational efficiency, the organizational management, waste and pollution management, and wildlife and landscape management are also considerable contributions to the production process.



Bringing biodiversity into the farm

Farmers are urged not to use mono-cropping in their farms. Under the ICM approach to cultivation, farmers are encouraged to include as many complimentary crops/plants as possible, creating biodiversity in their fields. In the picture on the right, a farmer is growing mangos, but he has also incorporated lemongrass crops in the interrows. Lemongrass has a deterrent effect on the insect pests that attack the mango crop.

The GAP requirements for crop management operations require risk assessments to be described for these farm activities impacting the environment of the farm and the areas surrounding the farm.

### 5.4.1 Soil Management

Soil is the fundamental basis on which plants grow. The fertility of the soil is characterized by its physical structure and the chemical nutrients that it contains. The activities of the creatures and the micro-organisms that live in the soil affect how much the plants can capture the nutrients that they need for healthy survival and for successful crop yield.

Soils that are naturally fertile can support successive plant crops, especially if the soil fertility is continually replenished naturally.

Soil nutrients can be lost through excessive nutrient extraction by the planted crops, leaching through excessive rain, and over-irrigation. The fertile top soils in the farms



Composting farm waste

are lost due to soil erosion, rains, and surface water run-off or when the soils are excessively tilled. Preventing soil nutrient loss includes the following methods:

- Increase organic material in the soil to retain water if sandy soils are found.
- Mulching for tree crop canopy areas to maintain ground moisture.
- Maintaining a green cover in the inter-row areas of the tree lines.
- Avoid flood irrigation systems for tree crops.
- Terracing the fields or building bunds to break the swift flow of water run-off down the slopes.

When working with clay soils that have a likelihood of waterlog, drainage is needed to release unwanted stagnant water.

Soil management requires an understanding of the soil in the farm that is best done with a soil map. The soil map is a geographical representation showing diversity of soil types and soil properties in the farm area. The soil map provides the basic picture of the soil condition and soil type that can assist farmers in how best to prevent soil erosion or water logging and what actions can be taken. A soil map is drawn up with the following information:

- Type of soil, soil texture, and pH of the soil
- Content of organic matter
- Depth of the top soil
- Check for the presence of soil pans or impermeable layers

In managing the soil, farmers can undertake the following measures to maintain or improve the physical condition of the soil:

1. Cultivation practices

- Minimize damage to soil structure (e.g., minimum tillage)
- Assess the weather conditions and soil moisture to suit the crop water requirements to decide the precise water needs of the crop.

2. Soil moisture management

- Identify areas with risks of soil erosion and mitigate with appropriate actions of cover cropping, permanent grass cover, and bunds to break erosions of sloping land.
- Construct drainage where necessary to reduce excess soil water.
- Plan irrigation according to weather conditions.
- Reduce the moisture content of organic manures.
- Take precautions in the applications of organic material to avoid contamination to water ways or the neighbouring community surrounding the farm.

### 5.4.2 Crop Nutrition

When the soil cannot effectively support profitable crop production, farmers may choose to apply additional fertilizers to the crop. The fertilizers can be organic or chemical fertilizers. Chemical fertilizers can be naturally occurring compounds that are mined for fertilization purposes or they can be manufactured. Crops require the basic elements of carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur. These macronutrients are required in large amounts for growth sustenance in the form of water soluble ions that are mainly absorbed by the root system. While the water soluble ions are nutrients to the crops, they can pose a chemical hazard to humans. Any excess of synthetic fertilizers not taken up by the plant crop root system could find its way into the potable water sources that communities draw for their consumption.



A pitaya fruit, commonly known as a dragon fruit. The successful cultivation of dragon fruit demonstrates the skill of the farmer in understanding crop management.

Nitrogen fertilizers break down into nitrates and are absorbed by the root systems of the crops. Phosphate fertilizers do the same. Any excess of nitrates or phosphates from synthetic or organic fertilizers that are not taken up by the crop may end up in the water ways downstream, causing environmental problems to the location, such as algae bloom in freshwater lakes as well as in marine environments.

The use of animal dung as a fertilizer also needs to be monitored to assess how much animal dung is applied to the soil and how much moisture is found in the raw dung. The nutrient breakdown of animal dung use needs to be determined.

Measures to maintain and enhance nutrients in the soil with a minimal impact to the environment include the following:

- Plan crop rotation to avoid nutrient loss.
- Analyze soil for the status of nitrogen, phosphorus, and potassium to decide how much fertilizer to use.
- Decide on the nitrogen and phosphate application of crop requirements to avoid chemical contamination on spillage, run off, or deliberate discharge.
- Determine the nutrient contribution from animal dung that is used for the crop and avoid heavy metal contamination from the use of such sewage.
- Minimize nitrate and phosphate leaching; do not apply on water logged grounds.
- Seek professional advice on the quantity of fertilizers that needs to be applied.

The application of chemical and organic fertilizers is to maintain and enhance nutrient status. However, this needs to be practiced in a way that protects the soil fauna in the farm and areas surrounding the farm.

### **5.4.3 Waste and Pollution Management**

Farm wastes are generated from the activities of the crop production. The waste can be organic or inorganic waste. Organic waste includes solid farmyard manure, crop residue, tree pruning waste, and hedge trimmings. Inorganic waste includes oil waste from machines and tractors, packaging of farm input materials (fertilizer bags, PPP boxes, or bottles), crop packaging materials, etc. Chemical wastes are also generated from crop protection products, machine oils and gasses, and chemicals used in post-harvest washing and treatment of the crops. Some of the organic wastes are resources that can be converted into new plant nutrients, e.g., composting of crop residues and plant trimmings into fertilizers.

Some inorganic wastes can be reused. However, most chemical wastes are toxic in nature, and need to be reduced in their production through responsible usage. Please refer to [Appendix 17](#).



Bees building a hive in a tree stump and gathering food from fungi. This picture demonstrates the symbiotic nature of plants and insects, an example which farmers should aspire to follow.

The management of waste and pollution in the farm should take a minimizing approach that includes a review of current practices, avoidance or reduction of waste, re-use of waste, and recycling of the waste material. The remainder of waste material that cannot be reused or recycled should be disposed of in a responsible manner.

An action plan is essential in a waste and pollution management program. In developing this action plan, the following measures are taken:

- Identification of all possible waste products and sources of pollution in all the activities of the farm.
- Convey the risks of pollution on the farm to all the farm workers and what they should do to minimize the pollution.
- Documentation of a plan of the farm activities to avoid and/or reduce wastage and pollution.
- Adequate provision for waste disposal.
- Removal and clearance of all waste/litter materials from the immediate production vicinity and storage areas.
- All organic waste materials should be composted. Care should be taken so that there are no risks of diseases carried over in the composting process.

A well-managed farm waste and pollution management program will create better use of the farm resources and farm inputs. This will also create a better visual appearance for the farm and provide better assurance to the visitors and the farm workers.

#### 5.4.4 Conservation of the Environment

Farming activity is an intrusion on the natural habitat and landscape of the environment. The farming of crops (particularly mono-cropping practices) drives away the indigenous species of plants and animals and limits the biodiversity of the environment. Managing the wildlife and landscape of the farm represents only a small effort for bringing back the biodiversity that once existed.



Management through a wildlife conservation plan can be used to enhance the structural diversity and landscape features of the land, and to benefit from the abundance and diversity of flora and fauna. A wildlife conservation plan should include the following concrete actions and initiatives:

Saving the rainforest – we must not undertake agricultural activities at the expense of the natural environment.

- Farmers should undertake a baseline audit of the current levels, locations, and conditions of the flora and fauna on the farm.
- A clear list of priorities and actions should be made for enhancing the habitat for the flora, fauna, and biodiversity on the farm.
- Consideration should be given to the conversion of unproductive sites of the farm into conservation areas to support natural flora and fauna.

#### 5.4.5 Energy Management

A large part of farm activities that utilize energy involve farm vehicles, farm machinery, lighting, cooling, or heating usage. If pack houses and cold storage facilities are attached to the farm area, more energy is used in these operations.

The manufacturing of synthetic fertilizers and plant protection products consumes a large amount of energy. Thus, the usage of these products plays a large part in the total efficient use of energy in the farm. Much of this energy utilized for farm activities is sourced from fossil fuels and is thus considered to be a non-renewable resource.

The GAP approach to efficiently utilizing energy requires minimizing the use of energy, optimizing how energy is used, and seeking more renewable sources of energy. Because many farmers do not realize the consequences of wasteful energy usage, GAP brings awareness to the issue and helps farmers appreciate the savings they can

achieve through the incorporation of energy conservation methods in their cultivation activities. These initiatives involve the following efforts:

- Keeping a record of energy use.
- Awareness of where and how energy is consumed in farm activities, and a gradual change of farm equipment through enhanced selection and maintenance for optimum energy efficiency.
- Identify possible alternative energy sources (e.g., wind, biomass, solar, animal waste, crop residue, etc.).

#### **5.4.6 Water Management**

Water is a basic requirement in growing food crops. Some countries have very elaborate irrigation canal systems that bring irrigation water from the main rivers flowing through the country. In areas where canals are not available, farmers tap underground water. The availability of water from both these sources cannot be taken for granted. With climate change, the amount of water flow in the rivers and the pattern of flow have become unpredictable. Underground water can run dry if there is no rain seepage into the underground reservoirs.

GAP standards require farmers to note the natural sustainability of the water sourced for cultivation. Farmers must comply with the standards, which stipulate that the extraction of water from the source must be at a rate that does not deplete the natural replenishment of the water.



# MODULE 6: WORKERS' HEALTH, SAFETY, AND WELFARE

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## 6.1 WORKERS' HEALTH AND SAFETY

Farmers and farm workers represent the backbone of the agricultural industry and it is only through their extensive efforts that crops are nurtured to achieve a high quality. There are many hazards associated with farm work, and it is essential that farms recognize the importance of their workers and work toward the reduction and elimination of these hazards to protect them.

Workers must be taught how to properly handle machinery and trained to understand the dangers involved in their operation. In addition, pesticides and fertilizers can affect worker health and it is vital that the applications of pesticides on the crop are performed correctly. Pesticides and fertilizers are very complex chemicals and workers must be trained to understand the dangers they pose to the surrounding community, the crop, the environment, and the workers themselves. Training given to farm workers should be viewed as a continuous process and updated on a regular basis with new instructions and constant reminders for workers of dangers.

### 6.1.1 Workers' Health and Safety Risk Assessment

The potential dangers and risks for the health and safety of farm workers can best be outlined in a risk assessment analysis of all of the daily farm work and activities. The risk assessment would include potential risks involved in farm work as described below:

- In operating farm machinery, workers are at risk when handling machine parts, sharp tools, and motorized equipment. For example, potential dangers include amputation of limbs by moving machine parts, inhalation of engine exhaust gases, and injuries from malfunctioning equipment.
- In handling pesticide and fertilizer products, the chemicals may come into contact with the worker's body (e.g., contact with the eyes, inhalation, or ingestion).
- There are risks associated with performing farm cultivation (tree pruning, harvesting from tall trees, etc.).
- If new machinery, equipment, or chemical products are purchased, workers must be taught how to use them correctly. If new farm activity procedures are implemented, workers must be properly trained in them.
- The frequency and severity of risks and accidents on farms should be documented.
- For each risk or potential danger, recommendations should be generated to minimize or eliminate dangers and promote a safe workplace. These recommendations should lead to the implementation of concrete actions.

### **Five Steps for a Risk Assessment [28] [29]**

Step 1 – Identify the hazards.

Step 2 – Decide who might be harmed and how.

Step 3 – Evaluate the risks and decide on precautions.

Step 4 – Record findings and implement responses.

Step 5 – Review your risk assessment and update it if necessary.

For a more detailed explanation of these five steps, please refer to module 2.

## **6.1.2 Written Workers' Health and Safety Procedures**

The creation of a written document with health and safety procedures that address the issues identified in the risk assessment will provide effective instructions and guidelines to farm workers on safely undertaking work. The health and safety procedures should have the following objectives:

- Explain and demonstrate to farm workers how to operate equipment and machines using the operations manuals. The farm workers should operate the equipment and machines a few times under supervision before they are allowed to use them on their own.
- Each of the risks identified in the risk assessment should be addressed with accident and emergency procedures. These procedures should include the following information: contact numbers of people in charge, hospitals, police stations, etc.; the locations of emergency exits; locations of fire extinguishers; and procedures to halt water, electricity, and gas accidents.
- Workers who regularly handle pesticides should receive an annual medical check-up.
- Contact information and access to medical assistance should be made available to farm workers.
- First aid material, emergency safety material, and clean bottled water should be available for use in the event of an emergency.
- The farm should employ at least one person with training to administer first aid in case of accidents.

## **6.1.3 Workers' Health and Safety Training**

Workers should undergo physical and visual training on health and safety procedures to ensure they understand them and that they can competently undertake emergency tasks in the event of an accident. The safety training exercises should be conducted annually for all workers. Records of the training exercises and the names of the participating workers should be kept.

The training should include instructions on emergency and first aid treatment for cases in which workers accidentally ingest or inhale pesticides during spraying, if the chemicals make contact with the eyes, or if workers are injured while operating farm vehicles or machinery. Safety materials and protective clothing should be provided and accessible to workers.



## 6.2 WORKER HYGIENE

A clean and hygienic working environment on the farm will create an inspiring atmosphere for workers and visitors. It will also reduce incidences of food contamination in crop products, and the transfer of contagious illnesses from one worker to another. However, cleanliness and personal hygiene habits vary among people. Thus, hygiene standards must be clearly and repeatedly laid out and farm workers should receive training on maintaining them. In addition to training, workers need to be provided with all the utilities, utensils, equipment, and clothing necessary to maintain cleanliness in the farm and packing areas.

### 6.2.1 Written Risk Assessment on Cleanliness and Hygiene

The risk assessment on cleanliness and hygiene covers the personal hygiene habits of workers, their general health, and the cleanliness of the packing area. The risk assessment also covers the packers' hygiene practices when handling the crop products. The assessment can be utilized to determine the kinds of training necessary to educate workers on cleanliness and hygiene practices. Please refer to [Appendix 14](#).

### 6.2.2 Cleanliness and Hygiene Checklist

The check list should include the following:

- A list of utensils, equipment, cleaning materials, protective clothing, etc.
- The availability of clean toilets, washing areas, and clean water.
- Personal hygiene checks for workers.
- The placement of posters and banners in strategic locations to remind workers about the need for cleanliness and hygiene practices. Please refer to [Appendix 13](#).

### 6.2.3 Cleanliness and Hygiene Procedures

The procedure should have the following documented routines:

- A scheduled cleaning routine of the workplaces, toilets, washing areas, and workers' resting areas, with responsibilities assigned to workers and with records of the cleaning work performed.
- A record of cleanliness and hygiene training carried out annually.
- A record of rodents and pest control in the packing area.
- Documentation of the occasions when workers have failed to uphold the cleanliness and hygiene standards and records of penalties imposed on the workers.

## 6.3 WORKERS' WELFARE

### 6.3.1 Fundamental Conventions on Workers' Rights

The constituents of the International Labor Organization (ILO) have drawn up international labor standards that serve as legal instruments in setting out the basic principles

and rights of workers at the workplace. The international labor standards may either be conventions (which are legally binding international treaties that may be ratified by member countries of the ILO) or recommendations (which serve as non-binding guidelines). The ILO has identified eight fundamental conventions that form the basic principles and rights of workers. They cover the following areas:

- Freedom of association and the effective recognition of the right to collective bargaining.
- The elimination of all forms of forced or compulsory labor.
- The effective abolition of child labor.
- The elimination of discrimination with respect to employment and occupation.

Member countries of the ILO have ratified these eight fundamental conventions to varying degrees. For the GAP standards, farm worker employment conditions should comply with applicable local and national regulations.

#### **Fundamental Conventions on Workers' Welfare [30]**

- Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)
- Right to Organize and Collective Bargaining Convention, 1949 (No. 98) 1949 (No. 98)
- Forced Labour Convention, 1930 (No. 29)
- Abolition of Forced Labour Convention, 1957 (No. 105)
- Minimum Age Convention, 1973 (No. 138)
- Worst Forms of Child Labour Convention, 1999 (No. 182)
- Equal Remuneration Convention, 1951 (No. 100)
- Discrimination (Employment and Occupation) Convention, 1958 (No. 111)

### **6.3.2 Responsibilities for Workers' Health, Safety, and Welfare**

The GAP program recommends that a member of the farm management be assigned the responsibility of looking after the health, safety, and welfare conditions of all the farm workers. The responsibilities of this workers' representative would include the following:

- Ensuring compliance and the implementation of existing, current, and relevant local and national regulations concerning workers' health, safety, and welfare.
- Conducting two-way communication through meetings between the management and the workers, during which the issues of workers' health, safety, and welfare are discussed openly.
- Presenting a complaint procedure which enables workers to lodge formal complaints to the management. The complaint procedure should specify the time frame that the management takes to resolve the complaint [31].

### **6.3.3 Documentation of Employment Contracts and Payment of Salaries**

There must be a written contract/employment agreement between workers and the management. The contract should state the terms of employment for work responsibilities, wages, overtime payment, working hours, break times for meals, days off, etc. The terms of employment should comply with local and national regulations on minimum wages, number of working hours per month, overtime rates, and number of overtime hours per month.

#### Guidelines for documentation

- A copy of the employment contract should be given to and kept by the worker.
- Full-time workers are entitled to workers' accident compensation insurance.
- All forms of payment to farm workers must be documented in the form of pay slips, bank transfers, etc.
- The wages and overtime payments must conform to the signed employment contract.

### **6.3.4 On-site Living Quarters**

If accommodations are provided to workers, the living quarters must be habitable and equipped with the basic utilities of electricity, water, toilets, basic furniture, and basic cooking facilities.

## **SELF-ASSESSMENT QUIZ 3: QUESTIONS FOR MODULES 5 AND 6**

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1. What do some farmers unintentionally do that harms the environment?
  - a. Add nitrous gases into the atmosphere through the application of chemical fertilizers.
  - b. Produce food to feed a growing population.
  - c. Recognize the impact of their cultivation activities on the ecosystem.
  - d. Adopt IPM and ICM practices in their cultivation techniques.
2. In terms of environmental impact, which of the following is true for the management of food crop cultivation?
  - a. The consumption of natural resources for food production must be performed in a sustainable manner.
  - b. The consumption of natural resources can continually support greater food production to feed the world population.
  - c. The consumption of natural resources is justified by the growth of the global economy.
  - d. The consumption of natural resources for food production is not exhaustible.
3. Which of the following cultivation practices does not fit into the GAP farm management conservation plan?
  - a. Integrated pest management (IPM)
  - b. Integrated crop management (ICM)
  - c. Enhancement of biodiversity of fauna and flora in the farm
  - d. Enhancement of cultivation for greater yield productivity
4. The prevention and/or suppression of harmful organisms can be done by all of the following options except one. Which one is it?
  - a. Crop rotation/inter-cropping.
  - b. Use of suitable cultivation techniques (e.g., seedbed sanitation, registering sowing dates and densities, under-sowing, conservation tillage, pruning, and direct sowing).
  - c. Use of the most toxic chemical pesticide that is most effective in organism control.
  - d. Where appropriate, use of pest-resistant/tolerant cultivars and standard/certified seed and planting material.
5. Protection against soil nutrient loss includes all of the following methods except for one. Which one is it?
  - a. Mulching for tree crop canopy areas to maintain ground moisture.
  - b. Promoting a flood irrigation system for tree crops.
  - c. Maintaining a green cover in the inter-row areas of the tree lines.
  - d. Increasing organic material in the soil to retain water if sandy soils are found.

6. The management of a GAP wildlife conservation plan is undertaken to achieve all of the following aims except one. Which one is it?
  - a. Enhancing species diversity.
  - b. Enhancing the structural diversity of the land and landscape features.
  - c. Benefiting from the abundance and diversity of flora and fauna.
  - d. Enhancing the mono-cropping approach to increase crop yield productivity.
7. Which of the following approaches is NOT a sustainable water management system for GAP farms?
  - a. Taking note of the natural sustainability of the water sourced for cultivation and making appropriate decisions on the crop to be cultivated.
  - b. Introducing a flood irrigation system for tree crops.
  - c. Complying with local standards such that the extraction of water from the source is at a rate that does not deplete the natural replenishment of the water.
  - d. Never taking the availability of water from underground sources for granted.
8. Why is workers' health and safety becoming an important criterion of GAP?
  - a. Consumers are championing greater accountability for workers' welfare and safety.
  - b. The premium on workers' insurance has increased in recent years.
  - c. Farm worker unions are lobbying for greater insurance coverage.
  - d. Farm worker unions are gaining greater political influence.
9. Pesticides and fertilizers are toxic substances to humans and the application of pesticides on the crop must be performed accurately to prevent any harm to workers. Which of the following is NOT a recommended practice?
  - a. Provide safety training on pesticide applications to workers.
  - b. Provide protective clothing for pesticide applications to workers.
  - c. It is sufficient to simply provide higher insurance compensation coverage to workers.
  - d. Provide technical training on how pesticides work.
10. Which item from the following checklist does NOT belong in the workers' cleanliness and hygiene procedure?
  - a. A scheduled cleaning routine of the workplaces, toilets, washing area, and worker resting areas, with responsibilities assigned to each worker and with records of the cleaning work that has performed.
  - b. A record of the workers' education levels.
  - c. A record of the cleanliness and hygiene training that is carried out annually.
  - d. A record of rodents and pest control in the packing area.

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<Answers>

1. a    2. a    3. d    4. c    5. b    6. d    7. b    8. a    9. c    10. b

## **MODULE 7: QUALITY MANAGEMENT SYSTEMS (QMS)**

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This GAP Manual is a compilation of good agricultural practices that farmers can benchmark against for their own practices. The first requirement in the adoption of GAP practices is the need to keep records. Farmers also need to develop a crop production manual of what they are cultivating. As experts with direct experience in their crops, farmer can easily create crop production manuals themselves. One example of a crop production manual would be a crop cycle document that explains the necessary fertilization, crop care, or irrigation. As essential components of quality management systems, crop production manuals are compiled with other documents to produce a quality manual.

A quality management system (QMS) is a means by which control is exercised over all the activities which affect the achievement of quality and customer satisfaction. A QMS is essential for cluster farms. The QMS demonstrates the legality of the business activities, the competency of the experts and farmers, and the effectiveness in assigning responsibilities in order to maintain the group's compliance with GAP standards.

For a cluster farm group, each of the group members works independently in monitoring and controlling their own workers. A cluster farm group is created with the aim of marketing their crop produce under one name or brand. Under a GAP system, the cluster group must have direct control over each group member and the group function as one business management entity in order for its crop produce be recognized as a certified product.

In order to work as a unit, the cluster group must set up a QMS that has a complete monitor and control mechanism and procedures to ensure that every member of the group works toward a common strategy and complies with the GAP standards. The QMS determines the common standards of work and product quality definitions that apply for every member of the group. Failure by even one group member to comply with any of the requirements of the common standards hurts the entire group's accountability.

Individual farmers implementing GAP standards on their farms do not require a QMS as the farm and the farmer are one legal entity. Farmers managing their own farms under a GAP system can operate with full control over farm workers. The training of the farm workers on GAP practices can be carried out by farmers or by experts engaged to train the workers. Individual farmers only need to register their farms with the authorities to legally execute business activities.

## 7.1 DEVELOPING A QMS FOR A CLUSTER GROUP

A QMS is a tool to combine the resources of the cluster group and operate the business as one entity, sharing a common objective to comply with regulations and provide high quality products and services to customers.

### **GAP and the Stakeholders of the Food Production Supply Chain**

It is important that all the stakeholders involved in the food production supply chain implement and support the principles of GAP in order to maintain consumer confidence in produce.

### **Commitments for GAP Stakeholders of Cluster Groups**

1. Maintain consumer confidence in food quality and safety
2. Minimize detrimental impacts on the environment and conserve nature and wildlife
3. Reduce the use of agrochemicals
4. Improve the efficiency of natural resource use
5. Ensure a responsible attitude toward worker health and safety.

The QMS used by a cluster group should consist of the following management tools and operation procedures:

- Legal administration of the cluster group
- An organizational structure for the cluster group
- Contracts between the group members and the cluster group
- A quality manual (e.g., policy statements, operating procedures)
- Administrative management (e.g., a register of group members, document control, work instructions, record keeping, management of the QMS)

### **7.1.1 Legal Administration**

The cluster group must register the organization with the authorities as a business entity to legally carry out agricultural production and the group trading activities. In doing so, the cluster group is bound by the laws and regulations of the country. Contamination incidents or environmental accidents may lead to consequences determined by legal or government authorities. Registration documents contain information such as the name of the group, its address, management team members, contact numbers, and names of products. In addition to the registration documents, the cluster group must have an organizational chart that describes the role of each member of the management team that controls the group's activities.

### **7.1.2 Organizational Structure of the Cluster Group**

The organizational chart for the cluster group depicts its structure, including the

management team and their individual roles and responsibilities. The leader is responsible for making decisions related to GAP standards that apply to the entire group. The technical advisor who interacts with the group members on farm technical issues is also identified in the organizational chart, as well as trainers who lead training exercises. The names and responsibilities of the persons in charge of each operational activity should be clearly identified. Please refer to [Appendix 18](#).

### **7.1.3 Contracts between Group Members and the Cluster Group**

It is essential that there is a signed contract between the individual group members and the cluster group's chief representative. The contract is a legal document. The contract between the group members and the cluster group is a binding commitment to uphold the principles of and comply with GAP. The contract also protects the parties in the event of any disagreements.

The contract should include the following:

- Signatures of the parties, named and dated.
- Cluster group name, address, and legal identification (registration record).
- Group members' names, addresses, and contact information, details of the farm (crops, location, acreage, etc.), and the production capacity of the farm area.
- Group members must have legal registration/documents to manage their own farms.
- Commitment from the cluster group to comply with GAP standards.
- Agreement to comply with the cluster group's documented procedures, policies, and technical advice.
- Terms of agreement of the production, production schedules, supply quantity, quality, price of the products, payment terms, marketing of the products, etc.
- Penalties for group members in the event of noncompliance with the critical control points of the GAP standard. The penalty clause may include warnings, levels of non-compliance, sanctions prohibiting participation in the cluster group for a specific period of time, etc.

The signed contract demonstrates a firm commitment between the parties to uphold compliance with the GAP standards. The penalty clause is a useful deterrent against any group members who think lightly of the compliance criteria of the GAP standards. The penalty clause also helps the cluster group dispense fair judgment if any one member fails in the compliance criteria. Legal actions may be taken in the event of foul play which results in a serious case of contamination.

### **7.1.4 The Quality Manual**

A quality manual is an official document of the cluster group that details the operations of its QMS and how the organization conducts its business. The quality manual is unique for each organization because each group conducts its business differently. All members of the cluster group should refer to the document for guidance on the daily business operations of the group. Typically, the quality manual includes the following:



- The cluster group's quality policy and goals. The quality policy details how the group satisfies its clients through the quality of its products and services. This includes the vision statement or mission statement.
- The quality manual describes the role and responsibilities of the administration office in the quality control system (e.g., the organization structure of the cluster group, the leader of the group charged with providing instructions, and the persons in charge of organization work).
- A detailed description of the crop cultivation practices, procedures, and any resources related to producing high quality crops. The crop cultivation practices detailed here serve as a common code of practice that all the farmers in the group adhere to. This includes the role, information given to group members, and regular interaction with group members of the technical advisor.
- The roles and responsibilities of the group members. The responsibilities include keeping records and exchanging information.
- A description of how the common crop products are routinely harvested, as well as the mechanism for marketing the crop products. Please refer to [Appendix 19](#) and [Appendix 20](#).

### 7.1.5 Document Control

The flow of instructions and information between the cluster group and the farm members should be done in writing to enable the documents to be referenced at a later date. These documents also serve as proof of the transfer of this information. In the case that documents need to be updated, replaced, or superseded, a control procedure is necessary to ensure that the correct document is distributed to the group members and the older document is retracted or destroyed.

This document control system enables recordkeeping of the movement and status of documents. According to the system, the following records should be kept:

- Name of document, index number, date of document, subject matter, and person authorizing the distribution.
- Recipient name, date of receipt, signature of receipt, and mode of transfer of the document.
- An updated document should have the preceding index number written on it. An exchange of the older version may occur, or the new document may be attached to the older version and held in a folder.
- All documents should be regularly reviewed, updated, and exchanged by an authorized person.
- Reasons for the changes of the documents should be written down and made known to the recipients.

Documents released for the cluster group must come from only one administrative office and must be signed by only one authorized person. This is to prevent the duplication of work and instructions for the group members.

### **7.1.6 Control of Records**

Recordkeeping provides evidence that work has been performed in compliance with requirements and standards. Records are useful for the group members as a monitoring tool.

The QMS requires that a documented procedure be established for the control of records. The procedure should include the name of the record, dates, index number, storage date, and location. The records should be stored in a safe location where they can be retrieved easily and quickly and made available during the audit process. Records must be kept in a common language, legibly written, and signed by the person making the record. Records should be kept for a period of two years.

### **7.1.7 Register of the Cluster Group Members**

The members' list is an official record of the farmers participating in the GAP program. The list should include the farmers' names, addresses, and contact numbers. In addition, farm addresses, acreage, crops planted, and production capabilities should be recorded.

## **7.2 INTERNAL AUDIT**

The internal audit of the cluster group is a 'first party assessment' for the organization, and determines the extent of compliance with legal and contractual requirements and GAP compliance criteria. The internal audit also determines if the QMS has been effectively implemented and maintained. The internal audit is performed by an independent internal auditor to monitor and check the documentation (data, records, operations, and performance) and evaluate it objectively to determine the extent to which the audit criteria of the GAP standards are fulfilled. The internal audit exercise is performed using a checklist based on the itemized compliance criteria and requirements presented in this GAP Manual.

### **7.2.1 Control of Noncompliance with the GAP Compliance Criteria and Requirements**

The internal audit is a planned and documented process to obtain evidence for an objective evaluation of compliance with the audit criteria. When audit evidence is not available or incomplete, the evaluation cannot be made and compliance cannot be confirmed.

Noncompliance with the various requirements entails varying degrees of risk. GAP schemes have different definitions and degrees of compliance, which are categorized as major, minor, or recommended. Major compliance criteria must be completely fulfilled. There is leeway for minor compliance criteria. Recommended compliance criteria are encouraged to be fulfilled as they are helpful to farmers for achieving better farm quality operations and management.

The assessment level of each GAP scheme is determined by the amount of major criteria for the audit and the tolerance for minor compliance criteria. A very stringent GAP scheme is not necessarily best. The purpose of the scheme is defeated if the participants are simply not able to comply with the requirements. The most suitable GAP scheme for each community should reflect the capacity of the producers to comply with the scheme's standards.

### **7.2.2 Corrective Actions and Preventive Measures**

Cluster groups must take corrective actions and establish preventive measures to rectify any noncompliance with GAP requirements within the group. This process entails identifying weaknesses in the operations and management of the cluster group and finding ways to make improvements.

The audited cluster group is given a reasonable period of time for this process. After receiving the corrective action report, the manager of the cluster group is required to investigate the problem, determine the cause, decide the appropriate correction action and target date of implementation, and execute the corrective action. Please refer to [Appendix 21](#).

## **7.3 TRAINING AND TECHNICAL ADVICE**

Most farmers already possess superb knowledge and skills in their areas of crop cultivation. However, some farmers may need to be guided in the more technical aspects of GAP, especially if they involve chemical or biological input elements. Such training exercises and technical advice are vital components of the QMS for both the individual farmers or for cluster groups that wish to implement GAP practices.

Training modules and technical advice must be dispensed only by a qualified or trained person of the specified field. The training and technical advice given to farmers must conform to the principles of food safety and environmental conservation as found in the GAP Manual.

## **7.4 TRACEABILITY**

The traceability system of the crop production chain is the ability to verify the origin of the crop product and the ability to track the distribution of the product after harvest from the farm. This encompasses the locations of the growers and the farm through all the stages of the chain, including production, processing, and distribution and up to the final consumers. The QMS requires the traceability system to be active during the production and distribution of the product to consumers. All records and documents of the traceability system should be accessible and made available when required to any stakeholder of the chain.

## **7.5 RECALL AND WITHDRAWAL PROCEDURES**

The product identification and traceability system facilitates the rapid and effective recall and withdrawal of contaminated products from the production line and the

marketplace. This minimizes exposure of the contaminated product to the workers and consumers. The QMS should have a recall and withdrawal procedure according to the standards of the GAP Manual. The producer, shipper, and consignee must all be aware of the procedure and must understand the steps involved for recalls and withdrawals. Please refer to [Appendix 22](#).

## **7.6 COMPLIANCE PROCEDURES**

The ability of the cluster group to effectively deal with complaints demonstrates that the organization manages a transparent system. This increases consumer confidence in the way the product has been produced and delivered. The QMS requires the top management of the organization to be involved in compliance procedures. Solutions and resolutions for complaints should be documented.

Consumer clients of cluster groups demand that the crop products delivered to them are verified for safety and hygiene. A well-designed QMS assists cluster groups in managing and controlling their business and in achieving crop quality that meets GAP standards. The QMS should be designed to achieve and maintain a quality standard that is recognized and trusted by consumers.

## **SELF-ASSESSMENT QUIZ 4: QUESTIONS FOR MODULE 7**

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1. Which of the following best describes a farm quality management system (QMS)?
  - a. A means by which control is exercised over all the activities in the farm.
  - b. A system that enables control of farm activities which affect the achievement of quality.
  - c. A system that enables control of farm activities which affect the achievement of customer satisfaction.
  - d. All of the above.
2. Which of the following components is NOT applicable for a QMS?
  - a. Legal administration of the cluster group.
  - b. An organizational structure for the cluster group.
  - c. Acquiring financial subsidies in export promotion of the cluster group.
  - d. Quality manual for the production process of the cluster group.
3. Which of the following elements of the contract between the cluster group and the group members is irrelevant for the QMS?
  - a. Farm size and production capacity.
  - b. Group members' socioeconomic backgrounds.
  - c. Named and dated signatures of the contractual parties.
  - d. Agreement to comply with the cluster group's documented procedures, policies, and technical advice.
4. Which of the following categories of processes does NOT apply for the quality manual of the QMS?
  - a. The cluster group approach in securing operational funding from the authorities.
  - b. The cluster group quality policy and goals.
  - c. Quality control system through the role and responsibilities of the administration.
  - d. Detailed description of the crop cultivation practices and procedures that relate to producing a high quality crop product.
5. Why is an internal audit critical for the operations of the QMS of the cluster group?
  - a. The internal audit is a way of determining the extent of conformity and compliance of the cluster members with the QMS.
  - b. The internal audit is a way of determining how the benefits of the cluster group's earnings can be distributed among the members.
  - c. The internal audit is an effective way to eject cluster members from the cluster group due to their non-compliance with the QMS.
  - d. The internal audit is an effective way to sweep the non-compliance under the carpet before the external auditors see the problems.

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<Answers>

1. d   2. c   3. b   4. a   5. a

## FINAL EXAMINATION

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**Note:** The examination comprises 50 questions with two points given for each correct answer. Total marks are 100. The passing score is 70 or more.

1. Which of the following is NOT a valid reason that GAP is relevant for the food production system that we have today?
  - a. GAP is a system that is accessible for small producers.
  - b. GAP exemplifies a sustainable food production system that is imperative for the future.
  - c. GAP exemplifies a safe food production system for consumers.
  - d. GAP is the one production approach that guarantees increases in income for small farmers.
2. Through the adoption of GAP cultivation systems, what do farmers learn that creates a positive impact?
  - a. Farmers learn to conserve the farm ecology and the environment and continually produce crops of high quality.
  - b. Farmers learn to use more pesticides to produce crops of better quality.
  - c. Farmers learn to use more fertilizers to increase crop productivity.
  - d. Farmers learn to extract the most out of the soil fertility for each crop cycle.
3. What is the basic GAP guiding principle in food crop production?
  - a. Achieving high productivity (e.g., yield per plant or crop yield per unit of land area).
  - b. Achieving high prices for the crop.
  - c. Achieving safe food assurance and sustainable production.
  - d. Achieving the best aesthetic quality for the crop.
4. Which one of the following concepts is NOT a characteristic principle of GAP?
  - a. Forest reserve lands should be developed for commercial cultivation for economic growth.
  - b. Food safety is a consumer's right.
  - c. Sustainable cultivation is vital to safeguard a future for farmers.
  - d. Risk assessment is not foolproof but it is an effective system to assure food safety.
5. Which of the following stakeholders of the supply chain can exert the biggest influence on safe food production?
  - a. The farmer.
  - b. The pesticides company.
  - c. The retailer/supermarket.
  - d. The consumer.

6. Which of the following is a trade barrier policy?
  - a. Border controls on the importation of diseased plant and animal products.
  - b. Development of standards of sanitary and phytosanitary measures.
  - c. A requirement for GLOBALG.A.P. and HACCP standards for imported food products.
  - d. Border control of a similar food commodity grown in two countries sharing a common border
7. In considering the guiding principles of GAP, which of the following approaches is the most sustainable rationale?
  - a. Food security overrides all other priorities.
  - b. Raising the income of small and rural farmers shall be the core guiding principle.
  - c. There needs to be a trade-off between food safety and economic returns for farmers.
  - d. Food safety and sustainable agriculture production shall be the core guiding principles.
8. Which of the following phenomena is NOT driving any change in food production and consumption today?
  - a. Urbanization.
  - b. More regulatory controls in the market.
  - c. Rising income of consumers in emerging economies.
  - d. The rise of supermarkets as competitive international conglomerates.
9. What is the issue on produce food safety that is of most concern for consumers?
  - a. Physical quality of the produce.
  - b. Proper packaging of the produce.
  - c. Pesticide residue level in the produce.
  - d. All of the above.
10. What is the main objective of ASEAN GAP?
  - a. To facilitate the harmonization of national GAP schemes within the ASEAN region.
  - b. To protect the welfare of farm workers in the ASEAN region.
  - c. To protect the environment from pollution in the ASEAN region.
  - d. None of the above.
11. Who are the drivers of GAP and GLOBALG.A.P. in Germany and the EU?
  - a. Retailers and food service companies.
  - b. Non-governmental organizations and the media.
  - c. The government and regulators.
  - d. None of the above.

12. How does GLOBALG.A.P. certification work?
  - a. Accredited third party certification.
  - b. Self-inspection.
  - c. External control through supermarkets.
  - d. Demands by the supermarkets to comply with GAP standards.
13. Many small and rural farmers complain that they cannot undertake GAP cultivation because of their lack of capital and resources. How could this issue be best overcome?
  - a. Providing the farmers with more financial subsidies to purchase more inputs.
  - b. Providing the farmers with more modern machinery and tools in postharvest technology.
  - c. Providing the farmers with access to GAP qualified extension officers.
  - d. Making GAP cultivation mandatory for these farmers.
14. Farmers can benefit from GLOBALG.A.P. certification of their crops because of which of the following reasons?
  - a. The certification provides opportunities for more market access for the crop.
  - b. The certification confers the highest prestige in terms of crop quality.
  - c. The certification provides a better price for the crop.
  - d. The certification provides a guarantee to sell the crop in the most expensive retail markets.
15. Which of the following is NOT a benefit of GLOBALG.A.P. certification?
  - a. Improvement in farm operations and management.
  - b. A guaranteed increase in the product price in the EU market.
  - c. Opening an access channel to trade with the established supermarkets in the EU.
  - d. Potential increase in the yield and quality of production.
16. Which of the following is a true statement about GAP implementation by small and rural farmers?
  - a. Small and rural farmers will never understand what GAP is.
  - b. Small and rural farmers cannot read and write. Therefore, they are not relevant.
  - c. GAP reduces the competitiveness of small and rural farmers.
  - d. GAP is another step for small and rural farmers to add value to their production.



17. How can supermarkets' requirement of GAP certification bring any benefits to small and rural farmers?
  - a. Supermarkets will have a preference for sourcing their fresh produce directly from GAP farms.
  - b. The requirement of GAP certifications will reduce the number of small and rural farms that compete in the market.
  - c. Supermarket demands are always detrimental to small and rural farmers.
  - d. Supermarkets will be able to gain better quality food products from small and rural farmers without paying more for them.
18. Which one of the following factors has the least impact on the changing consumer trends of food consumption today?
  - a. Urbanization – more people live in cities in high rise buildings that have smaller kitchens.
  - b. The changing lifestyles of urban consumers have caused greater demand for fast and convenient foods.
  - c. Women are financially independent and are able to freely make their own purchasing decisions.
  - d. Traditions die hard. Many consumers still cling to their traditional lifestyles.
19. Small farms often lack the capacity to participate in the mainstream supply chain. Which of the following is the most sustainable approach to solve this problem?
  - a. Support small farmers by bringing the market to the farms.
  - b. Support farmers' farm-gate prices to help them compete with the big players.
  - c. Support farmers with technical assistance on GAP-certified production and build effective linkages to the market.
  - d. Support farmers with financial assistance to pay for GLOBALGAP certification.
20. What are the latest trends in GAP and GLOBALG.A.P. in German agriculture?
  - a. Increasing transparency in the supply chain through database applications.
  - b. New requirements on carbon foot print.
  - c. Products produced according to fair trade standards.
  - d. Consumer demands for more restrictive trade regulations from developing countries.
21. Which of the following statements is false?
  - a. Achieving GLOBALG.A.P. certification helps promote market access.
  - b. Benchmarking national GAP schemes with GLOBALG.A.P. is a way to promote recognition.
  - c. Developing national GAP schemes allows more inclusive participation of small producers.
  - d. The development of national GAP schemes should focus on food safety assurance only for exportable products.

22. Which of the following statements concerning GLOBALG.A.P. certification is true?
- a. GLOBALG.A.P. certification is the only certificate that retailers recognize in the EU.
  - b. GLOBALG.A.P. is a business - to - business initiative.
  - c. GLOBALG.A.P. certification is only for export purposes.
  - d. Certification in GLOBALG.A.P. overrides the mandatory safety rules in the EU.
23. Which of the following national trends would NOT exacerbate climate change impacts?
- a. Urbanization.
  - b. Rising consumer income.
  - c. Increased consumption of meat.
  - d. Promoting consumer rights awareness.
24. Which of the following would sustain the development process of national GAP schemes?
- a. Better market access for certified produce.
  - b. Receiving a premium price for produce.
  - c. Increasing farm productivity.
  - d. None of the above.
25. Which of the following implementation strategies is most ineffective and costly to control food safety adherence?
- a. Control from NGO-based watchdog organizations.
  - b. Mandatory government regulations.
  - c. Promoting consumption awareness for children in school.
  - d. Control from consumer-based watchdog organizations.
26. Which of the following statements does NOT confidently describe food safety assurance?
- a. Food safety is assured if all the known hazards are eliminated.
  - b. Food safety is assured if the national GAP scheme becomes mandatory.
  - c. Food safety is assured if all the safety procedures have been followed diligently.
  - d. Food safety is assured if consumers have confidence in the food safety scheme.
27. Which of the following statements is NOT a step in the construction of a risk assessment?
- a. Identify the hazards.
  - b. Define the risks involved.
  - c. Evaluate the risks and decide on precautions.
  - d. Place a heavy penalty on the exporter each time it fails to comply with food safety rules.

28. Which of the following statements is NOT true about monitoring food safety?
- Government regulators are more effective in monitoring food safety compliance.
  - Food safety responsibilities now affect all stakeholders of the food chain.
  - Exporters are now warned to prevent hazard contamination at every critical control point of the food chain.
  - The adoption of a food chain framework facilitates a consumer-driven, monitor and control approach in the production and food safety system.
29. Which of the following is a true statement about the “middleman”?
- The middleman is responsible for all the food safety problems in each country.
  - Eradicating the middleman will solve food safety assurance issues in the market.
  - The middleman has a role to play in the supply chain.
  - The primary goal of the middleman is to impoverish the small farmer.
30. Which one of the following is a true statement about sustainable agriculture?
- Sustainable agriculture is a concept that is only relevant for large producers.
  - Sustainable agriculture is relevant only for developed countries.
  - Sustainable agriculture concerns producing food for the future.
  - Sustainable agriculture will increase the cost of production for small farmers.
31. In what way is the procedure for dealing with complaints an important part of GAP management?
- The procedure helps farmers acknowledge the problem, rectify the issue, and prevent it from happening again.
  - The procedure keeps customers happy by assuring them that the GAP producer is responsible.
  - The procedure promotes the brand name of the company and the certification.
  - The procedure trains the staff of the company to be courteous.
32. While undertaking a risk assessment exercise for a new farm set-up, which of the following is the most important outcome regarding the previous land use of the site?
- Farmers can plan their marketing strategy for the new farm.
  - Farmers can assess the risk of making similar mistakes to those of the previous owner.
  - Farmers can assess the risk of soil pathogens or chemical contamination in the soil from the previous use.
  - Farmers can assess the risk of climate change affecting the new farm.

33. Which of the following is NOT a correct guidance in the farm site management and risk assessment?
- a. Identify all potential problems arising due to the land use of the site.
  - b. Identify the impacts of cultivation activities on the surrounding environment.
  - c. Take actions to understate the problem so that it is eventually forgotten.
  - d. Take actions to minimize the intensity of the problem and impacts when they arise.
34. In the application of pesticides, which one of the following practices is deemed acceptable?
- a. Use only one pesticide product to minimize the accumulation of residue in the crop.
  - b. Use only the recommended pesticide and follow the dilution rate as written on the label.
  - c. Use a more toxic pesticide product but at a lower dilution rate for better pest control.
  - d. Use a less toxic pesticide product but at a higher dilution rate for better pest control.
35. GAP recommends best practices for PPP field application and the handling of pesticides. Which of the following practices is NOT recommended in preparing PPP for field applications?
- a. IPM practices should be introduced and used prior to using chemical pesticides to control the pest and the disease.
  - b. Records should be kept with reference to the application on the farm, information on the pesticide label, condition of the plant/crop growth, and justification for the choice of the pesticide.
  - c. A competent technical advisor should be responsible for recommending the correct pesticides used for the pest problem.
  - d. Farmers should find out from their neighbors what PPP they are using and copy their applications if they seem to be more successful in their practices.
36. Which of the following food production approaches is acceptable in GAP implementation?
- a. Hazard Analysis and Critical Control Point (HACCP)
  - b. Integrated pest management (IPM)
  - c. Integrated crop management (ICM)
  - d. All of the above

37. The management of the food crop cultivation with respect to environmental impact must consider which of the following approaches?
- The consumption of natural resources for the production of food must be done in a sustainable manner.
  - The consumption of natural resources is needed to support greater food production to feed the world population.
  - The consumption of natural resources is justified by the greater growth of the global economy.
  - The consumption of natural resources for food production is not exhaustible.
38. Which of the following is NOT a goal of the management of a GAP wildlife conservation plan?
- Enhancing the mono-cropping approach to increase crop yield productivity.
  - Enhancing the species diversity and identity.
  - Enhancing the structural diversity of the land and landscape features.
  - Benefiting from the abundance and diversity of flora and fauna.
39. Which of the following is NOT a recommended practice in the GAP management of pesticide application?
- Providing safety training on pesticide application to the workers.
  - Providing protective clothing for pesticide application to the workers.
  - Providing a higher wage scheme for the workers who handle pesticide applications.
  - Providing technical training on how pesticides work.
40. Which of the following practices is NOT acceptable under the sustainable water management system for GAP farms?
- Farmers must take note of the natural sustainability of the water sourced for crop cultivation. They must therefore make a decision on the suitability of the crop to be cultivated.
  - The traditional flood irrigation system for tree crops should be maintained in the same way it has been performed over many generations.
  - Local standards should be complied with such that the extraction of water from the source must be at a rate that does not deplete the natural replenishment of the water.
  - The availability of water from underground sources cannot be taken for granted.
41. What is the objective of the internal audit of the QMS for the cluster group?
- The internal audit is a way of determining how the benefits of the cluster group's earnings should be distributed among the cluster members.
  - The internal audit is an effective way to eject cluster members from the cluster group due to their non-compliance with the QMS.
  - The internal audit is an effective way to sweep non-compliance under the carpet before the external auditors are able to see the problems.
  - The internal audit is a way of determining the extent of conformity and compliance of the cluster members with the QMS.

42. Which of the following cluster group operation processes does NOT fit appropriately into the quality manual of the QMS?
- a. The cluster group approach in securing operational funding from the authorities.
  - b. The cluster group quality policy and goals.
  - c. The quality control system through the role and responsibilities of the administration.
  - d. Detailed descriptions of the crop cultivation practices and procedures that relate to producing a high quality crop product.
43. HACCP is a management system for addressing food safety through a preventive and risk assessment approach. Which of the following is NOT a principle that HACCP is based on?
- a. Identifying hazard and preventive measures.
  - b. Identifying Critical Control Points.
  - c. Setting critical limits based on the company's capacity.
  - d. Establishing corrective action procedures.
44. GAP safety aspects on farm sites cover soil management practices. Which of the following soil management practices is NOT recommended under GAP standards for food crops?
- a. Tilling the soil regularly to prevent insect pests from hibernating underground.
  - b. Undertaking a laboratory soil analysis of the site prior to first planting.
  - c. Planting trees on the borders of the farm site to act as wind breakers to prevent strong winds blowing over the soil.
  - d. Building and cultivating on the terraces if farmers have to work on slopes to prevent the deterioration of the soil during heavy rains.
45. Various individuals have described GAP in accordance with their farm management practices. Which one of the following descriptions of GAP is correct?
- a. The GAP cultivation systems and organic farming are the same.
  - b. The GAP system does not allow the use of pesticides in the farm.
  - c. The GAP system is based on safe food production and sustainable cultivation.
  - d. The GAP system encourages the use of chemical fertilizers to promote a green revolution in food crop production.
46. In developing a cleanliness and hygiene checklist for farm workers prior to harvesting activities, which of the following checks is NOT relevant?
- a. Availability of harvesting utensils, equipment, cleaning materials, and protective clothing.
  - b. Availability of clean toilets, washing areas, and clean water.
  - c. Workers' age and gender eligibility.
  - d. Personal health and hygiene checks for all workers.

47. GAP certification pays a great deal of attention to farm workers' welfare and workers' basic rights. Which of the following categories of workers' welfare is NOT compliant to the GAP standard?
- Freedom of association and the effective recognition of the right to collective bargaining.
  - The hiring of only male workers in accordance with traditional practices.
  - The elimination of all forms of forced or compulsory labor.
  - The effective abolition of child labor.
48. Under the GAP certification compliance of responsibilities for workers' health, safety and welfare, which of the following is NOT a valid criteria?
- Forcing workers to work every day of the year to increase productivity, but compensating them with a higher salary. This would be a way to increase the income of the farm workers.
  - Ensuring compliance and the implementation of existing, current, and relevant local and national regulations concerning workers health, safety, and welfare.
  - Conducting two-way communication through meetings between the management and the workers, where the issues of workers' health, safety, and welfare are discussed openly.
  - Presenting a complaint procedure whereby workers have access to make formal complaints to the management. The complaint procedure specifies a time frame that the management should take to resolve the complaint.
49. Which one of the following does not contribute to the principles of GAP?
- Minimizing detrimental impacts on the environment whilst conserving nature and wildlife.
  - Guaranteeing the income of small farmers over all other objectives.
  - Reducing the use of agrochemicals.
  - Improving the efficiency of natural resource use.
50. Which one of the following statements is NOT a principal element of the HACCP system?
- Hazard identification and preventive measures.
  - Identifying CCP.
  - Establishing corrective action procedures.
  - Establishing punitive procedures for non-compliance criteria.

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<Answers>

1. d   2. a   3. c   4. a   5. d   6. d   7. d   8. b   9. c   10. a   11. a   12. a   13. c  
 14. a   15. b   16. d   17. a   18. d   19. c   20. a   21. d   22. b   23. d   24. a   25. b   26. b  
 27. d   28. a   29. c   30. c   31. a   32. c   33. c   34. b   35. d   36. d   37. a   38. a   39. c  
 40. b   41. d   42. a   43. c   44. a   45. c   46. c   47. b   48. a   49. b   50. d

## REFERENCES

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- [1] Wal-Mart Stores Inc. Walmart Annual Report 2014. <http://cdn.corporate.walmart.com/66/e5/9ff9a87445949173fde56316ac5f/2014-annual-report.pdf>.
- [2] Tesco PLC. Tesco Annual Report 2013. <http://www.annualreportowl.com/Tesco/2013/Annual%20Report> last accessed on 29 June 2015
- [3] E-Learning Course on GAP and GLOBALG.A.P. for Greater Market Access for Agrifood Products, 2010. Asian Productivity Organization. Project Code: 10-AG-37-GE-TRC-B, 31 August 2010.
- [4] E-Learning Course on GLOBALG.A.P. Standard for Greater Market Access, 2013. Asian Productivity Organization. Project Code: 13-AG-26-GE-TRC-B, 27 March 2013.
- [5] Workshop on Good Agricultural Practice (GAP) for Increasing Farm Productivity and Enhancing Environmental Sustainability, Manila, 2014. Asian Productivity Organization. Project Code: 14-AG-26-GE-WSP-B, 28 April 2014.
- [6] GLOBALG.A.P. Homepage. [http://www.globalgap.org/uk\\_en/](http://www.globalgap.org/uk_en/).
- [7] GLOBALG.A.P. GLOBALG.A.P. General Regulations - Part 1 General Rules. [http://www1.globalgap.org/north-america/upload/Standards/IFA/v4\\_0-1/120206\\_gg\\_gr\\_part\\_i\\_eng\\_v4\\_0-1.pdf](http://www1.globalgap.org/north-america/upload/Standards/IFA/v4_0-1/120206_gg_gr_part_i_eng_v4_0-1.pdf).
- [8] GLOBALG.A.P. GLOBALG.A.P. General Regulations - Part 2 Rules for Option 2 and Option 1 Multi Sites with QMS. [http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315\\_gg\\_gr\\_part\\_ii\\_v4\\_0-2\\_en.pdf](http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315_gg_gr_part_ii_v4_0-2_en.pdf).
- [9] GLOBALG.A.P. GLOBALG.A.P. General Regulations - Part 3 Certification Body and Accreditation Rules. [http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315\\_gg\\_gr\\_part\\_iii\\_v4\\_0-2\\_en.pdf](http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315_gg_gr_part_iii_v4_0-2_en.pdf).
- [10] GLOBALG.A.P. GLOBALG.A.P. Integrated Farm Assurance – Introduction. [http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315\\_gg\\_ifa\\_intro\\_and\\_specific\\_rules\\_v4\\_0-2\\_update\\_Mar13\\_en.pdf](http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315_gg_ifa_intro_and_specific_rules_v4_0-2_update_Mar13_en.pdf).
- [11] GLOBALG.A.P. GLOBALG.A.P. Integrated Farm Assurance – CPCC for All Farm Base/Crops Base/Fruits & Vegetables. [http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315\\_gg\\_ifa\\_cpcc\\_af\\_cb\\_fv\\_v4\\_0-2\\_en.pdf](http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315_gg_ifa_cpcc_af_cb_fv_v4_0-2_en.pdf).



- [12] GLOBALG.A.P. GLOBALG.A.P. Glossary. [http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130409\\_GG\\_Glossary\\_V1\\_0\\_en.pdf](http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130409_GG_Glossary_V1_0_en.pdf).
- [13] World Trade Organization. The WTO SPS Agreement. [http://www.wto.org/english/tratop\\_e/sps\\_e/spsagr\\_e.htm](http://www.wto.org/english/tratop_e/sps_e/spsagr_e.htm).
- [14] Food and Agriculture Organization of the United Nations. List of International Standards for Phytosanitary Measures, ISPM (2009). <http://www.fao.org/docrep/009/a0450e/a0450e00.htm>.
- [15] Food and Agriculture Organization of the United Nations. Understanding the CODEX ALIMENTARIUS. [ftp://ftp.fao.org/codex/Publications/understanding/Understanding\\_EN.pdf](ftp://ftp.fao.org/codex/Publications/understanding/Understanding_EN.pdf).
- [16] European Commission. DG SANCO on Importation Regulation on Food Hygiene. [http://ec.europa.eu/food/safety/international\\_affairs/trade/docs/interpretation\\_imports.pdf](http://ec.europa.eu/food/safety/international_affairs/trade/docs/interpretation_imports.pdf).
- [17] European Commission. DG SANCO Explanation on Pesticides Residue (September 2008). [http://ec.europa.eu/food/plant/protection/pesticides/explanation\\_pesticide\\_residues.pdf](http://ec.europa.eu/food/plant/protection/pesticides/explanation_pesticide_residues.pdf).
- [18] European Commission. DG SANCO EU Pesticides MRL for Mango (April 2014). [http://ec.europa.eu/sanco\\_pesticides/public/?event=download.MRL](http://ec.europa.eu/sanco_pesticides/public/?event=download.MRL).
- [19] Japan Good Agricultural Practice. JGAP CPCC 2010, Fruits & Vegetables - Section B6, Management of Plant Protection Products. [http://jgap.jp/LB\\_01/JGAP\\_2010\\_Fruits\\_and\\_Vegetables\\_24Dec14.pdf](http://jgap.jp/LB_01/JGAP_2010_Fruits_and_Vegetables_24Dec14.pdf).
- [20] GLOBALG.A.P. GLOBALG.A.P. CPCC V.4 - CB7 & CB8, IPM & Plant Protection Products [http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315\\_gg\\_ifa\\_cpcc\\_af\\_cb\\_fv\\_v4\\_0-2\\_en.pdf](http://www.globalgap.org/export/sites/default/.content/.galleries/documents/130315_gg_ifa_cpcc_af_cb_fv_v4_0-2_en.pdf).
- [21] Maryland Cooperative Extension, University of Maryland. Mode of Action of Insecticides. <http://www.docstoc.com/docs/91869139/Mode-of-Action-of-Insecticides-and-Related-Pest-Control-Chemicals>.
- [22] Insecticide Resistance Action Committee. MOA Code Summary. <http://www.irac-online.org/modes-of-action/>.
- [23] Fungicide Resistance Action Committee. MOA Code List. [http://www.green-resource.com/wp-content/themes/greenresource/uploads/resource\\_files/resource\\_golf/FRAC%20Code%20List.pdf](http://www.green-resource.com/wp-content/themes/greenresource/uploads/resource_files/resource_golf/FRAC%20Code%20List.pdf).

- [24] Pesticide Action Network (PAN) Germany. Field Guide to Non-Chemical Pest Management in Mango Production.  
[http://www.oisat.org/downloads/field\\_guide\\_mango.pdf](http://www.oisat.org/downloads/field_guide_mango.pdf).
- [25] United States Environmental Protection Agency. U.S. Nitrous Oxide Emissions by Source.  
<http://www.epa.gov/climatechange/ghgemissions/gases/n2o.html>.
- [26] University of Wisconsin Integrated Pest and Crop Management (IPCM) Programs.  
<http://ipcm.wisc.edu/ipm/>.
- [27] Greenwood P., Halstead A. The Royal Horticultural Society Pests & Diseases. Dorling Kindersley Publishers Ltd; 1997.
- [28] Health and Safety Executive. Risk Management on Workers' Safety. <http://www.hse.gov.uk/pubns/indg163.pdf>.
- [29] Health and Safety Executive. Five Steps to Risk Assessment.  
<http://www.hse.gov.uk/pubns/priced/hsg268.pdf>.
- [30] International Labour Organization. Member Countries Ratification of the Fundamental Conventions.  
<http://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang--en/index.htm>.
- [31] International Labour Organization. Table of Ratifications of the Fundamental Conventions.  
<http://www.ilo.org/global/standards/introduction-to-international-labour-standards/conventions-and-recommendations/lang--en/index.htm>.


## Appendix 1: Overview of the Japan GAP by Yasuaki Takeda

JGAP


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Overview of the Japan GAP  
and current state  
of implementation and adoption in Japan GAP

Presented by: Yasuaki Takeda, JGAP Managing Director  
Aug. 2014



Salada leaf farm in Taiwan



Tea leaf farm in Japan

These PowerPoint slides were originally developed by Yasuaki Takeda, JGAP Managing Director, Japan, and presented at the APO Workshop on Good Agricultural Practices (GAP) for Increasing Farm Productivity and Enhancing Environmental Sustainability, Manila, Philippines, 11- 15 August 2014, and are reproduced here with permission.

1

JGAP

---

### History of GAP in Japan

- ✪ In 2002, retailers and food service providers started their own GAP standard to manage their supplier and farmers for their store brand produce.
- ✪ Local government also established local GAP standard. Those GAPs had different Control Point and Criteria, and most of them had no certification system.
- ✪ More than 100 different GAP standards in Japan
- ✪ In 2006, JGAP office was founded by retailers and supplier-farmers to harmonize GAP scheme in Japan. Most of main retailer in Japan joined JGAP, and JGAP became the common standard GAP scheme in Japanese farming scene.

2

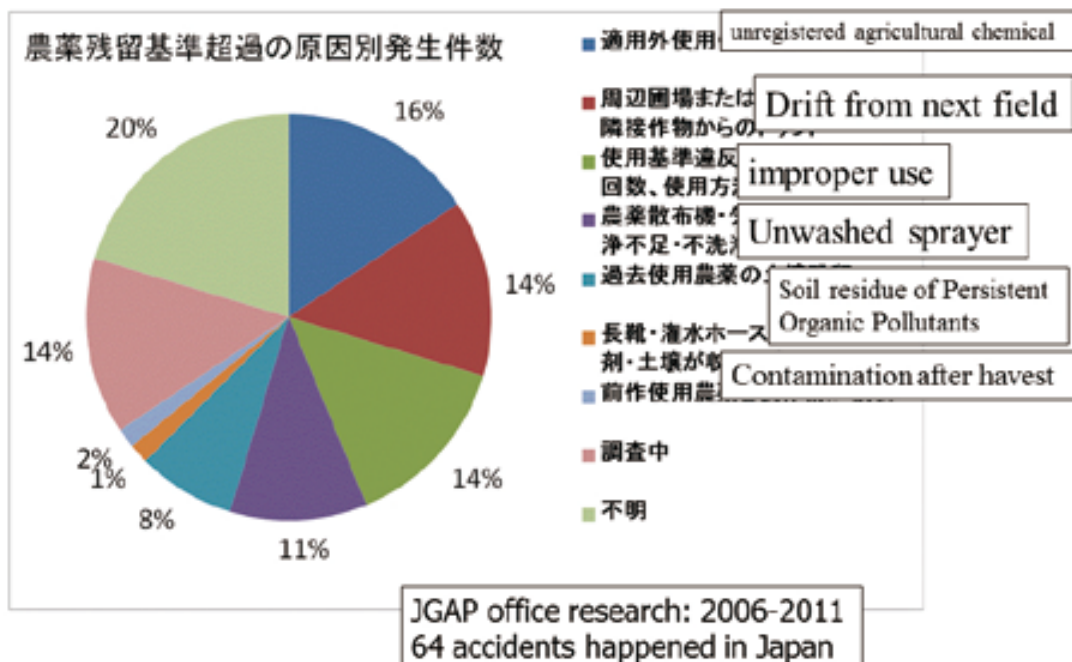
## History of GAP in Japan



- ✦ In 2009, national government released GAP guideline for GAP scheme owners. JGAP was the 1st GAP scheme to meet this government guideline.
- ✦ In 2010, JGAP started B to C labeling guideline
- ✦ In 2011, JGAP started new standard that prevents contamination of radioactivity material.
- ✦ In 2013, JGAP started benchmarking system for other GAP. Some GAP scheme in Japan already benchmarked to JGAP.
- ✦ In 2013, JGAP English version was released, and also started JGAP self-declaration of conformity system.
- ✦ In 2014, JGAP Chinese version started.

3

## The cause of pesticide residue over safety level in Japan



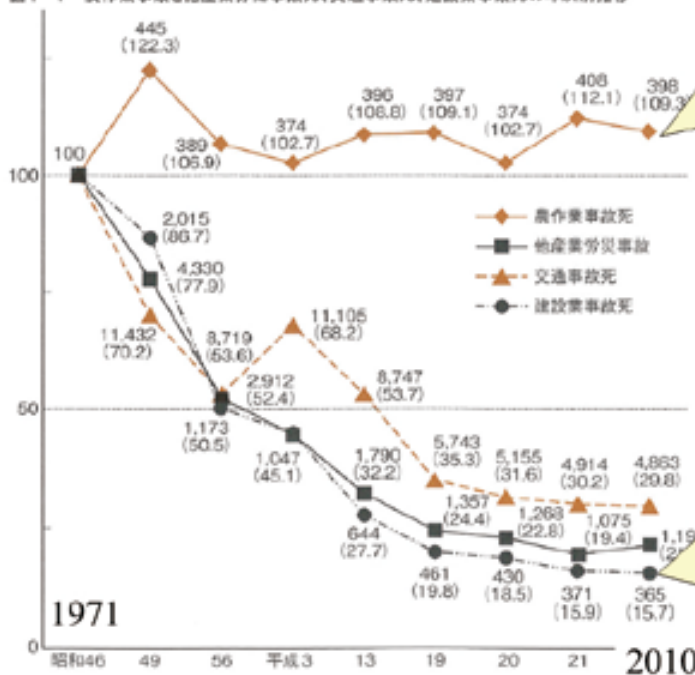
4

## Example of foreign material contaminated to F&V, rice and tea **JGAP**



## Statistics of work accident during farm operation **JGAP**

図1-1 農作業事故と他産業労働事故死、交通事故死、建設業事故死の年次別推移



**Death accident during farm operation**  
About 400 death/year  
Since 1971

**Death accident during construction work**  
About 350 death/year  
85% down compare to 1971



## JGAP standard is for everyone


**産地別 管理点と適合基準**

JGAPの標準に、加付点への対応が追加されました。(農薬部 2000、肥料 第21版、日本標準 第1版)  
これにより、JGAP認証農場は付付点についても安全管理が行われていると確認されます。  
これまで通り、産地農業・生産者・消費者にたいしては管理が行われます。

品名	品名とファイル	審査・認証期間	適合情報
農薬部 2000		2002年7月(日本)審査・認証開始	20満足情報
農薬部 2000(食品) JGAP2000 Fruits and Vegetables		2003年1月20日(日本)審査・認証開始	
農薬部2000 (中国語 簡体字版)		2004年1月14日(日本)審査・認証開始	
農薬部2000 (中国語 繁体字版)		2004年1月14日(日本)審査・認証開始	
肥料 2002		2002年9月(日本)審査・認証開始	20満足情報
肥料 第21版		2003年6月(日本)審査・認証開始	
日本標準 第1版		2002年3月(日本)審査・認証開始	20満足情報
日本標準 第1版		2003年2月20日(日本)審査・認証開始	

**団体事務局別 管理点と適合基準**

品名	品名とファイル	審査・認証期間	適合情報
肥料 2002		2002年6月(日本)審査・認証開始	20満足情報
日本標準 第1版		2003年5月(日本)審査・認証開始	

**総合規格**

品名	品名とファイル	審査・認証期間	適合情報
総合規格 2003		2003年5月(日本)審査・認証開始	20満足情報

JGAP standard is open for everyone at JGAP website.

Fruits and Vegetable  
Grain and rice  
Tea

General Regulation  
for audit and certification

Individual certification  
Group certification

Japanese, English and Chinese

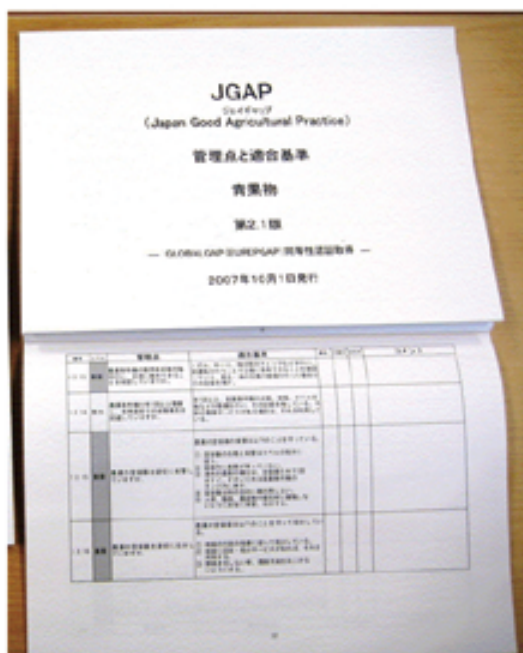
## What is JGAP?



- ✪ JGAP is the strict and excellent standard of farm management for food safety and sustainable agriculture.
- ✪ JGAP is the up-to-date quality management technology for food safety on farm level in Japan, and keeps communication with GLOBALGAP in EU.
- ✪ JGAP is focusing on safety from chemical residue, food poisoning caused by bacteria, contamination of foreign material and radioactive material.
- ✪ JGAP focus on not only food safety but also eco-friendly and work safety on farm.
- ✪ Most of major retailer in Japan supports JGAP, and use it for supplier management to keep food safety thorough farm to store.

## Why JGAP?

JGAP



- ✦ JGAP is the most famous GAP certification scheme in Japan.
- ✦ More than 130 control point for food safety and sustainability and work safety in farm.
- ✦ JGAP has a certification system. There are 4 certification bodies those are accredited by JGAP.
- ✦ JGAP is the trust mark of excellent Japanese farm.

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## JGAP English version and Chinese version

JGAP

JGAP  
English

**JGAP**  
Japan Good Agricultural Practice  
Control Points and Compliance Criteria  
Fruits and Vegetables  
2010  
Issue date: 26th May 2010  
Certification starts: 1st July 2010

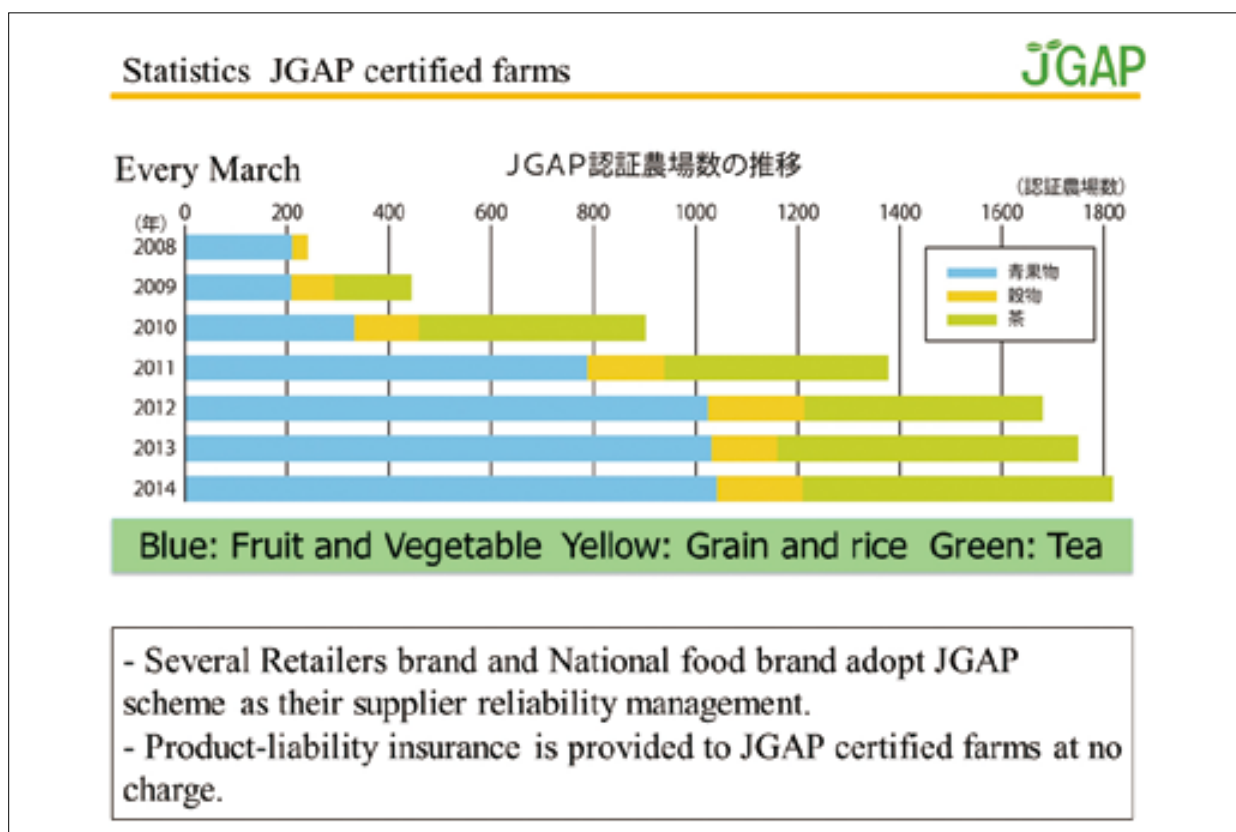
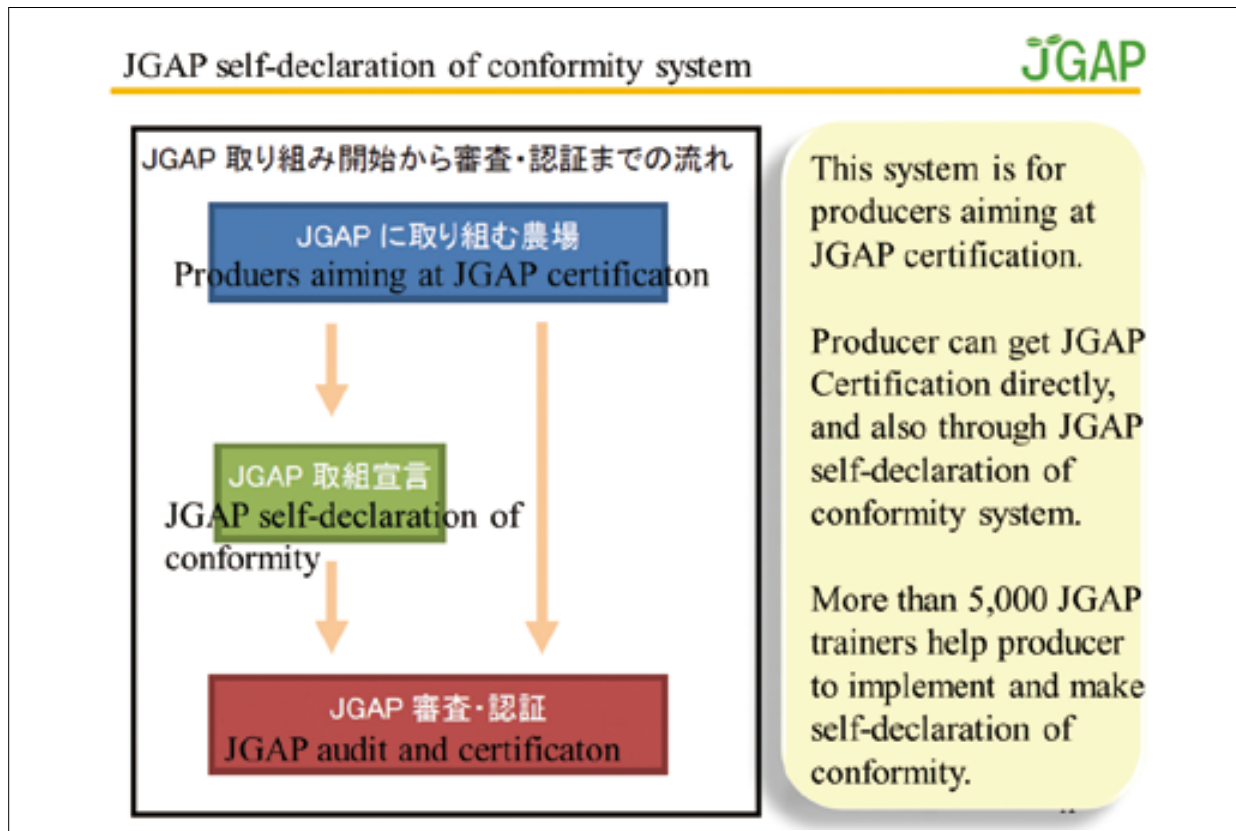
No.	Issue Control Points	Compliance Criteria	Yes	No	Not	Comment
<b>A. Farm operation and safety management</b>						
<b>1. Farm operation</b>						
<b>1.1 Basic principles</b>						
1.1.1	Is the product safety management system established?	The producer has adopted the system for the implementation of GAP and the system of implementation.				
1.1.2	Is the farm in compliance with the system?	1) The plan and information periodically updated 2) There is no record of safety and health management.				
<b>1.2 Management of materials</b>						
1.2.1	Is the management system established and implemented?	The producer management system that meets the requirements of the system.				
1.2.2	Is the system established and implemented?	The plan and information periodically updated and there is no record of safety and health management.				
1.2.3	Is the system established and implemented?	The plan and information periodically updated and there is no record of safety and health management.				
1.2.4	Is the system established and implemented?	The plan and information periodically updated and there is no record of safety and health management.				

JGAP  
Chinese

将日本农林水产省(农林省)生产安全管理(JGAP)的农业标准  
符合以国际GAP标准(JGAP)为主的GAP认证生产标准

**JGAP**  
Japan Good Agricultural Practice  
(日本农林水产省)  
农场专用控制点与符合基准  
果蔬版  
2010  
2010年10月26日发行  
2010年7月1日实施认证

No.	Issue Control Points	Compliance Criteria	Yes	No	Not	Comment
<b>A. Farm operation and safety management</b>						
<b>1. Farm operation</b>						
<b>1.1 Basic principles</b>						
1.1.1	Is the product safety management system established?	The producer has adopted the system for the implementation of GAP and the system of implementation.				
1.1.2	Is the farm in compliance with the system?	1) The plan and information periodically updated 2) There is no record of safety and health management.				
<b>1.2 Management of materials</b>						
1.2.1	Is the management system established and implemented?	The producer management system that meets the requirements of the system.				
1.2.2	Is the system established and implemented?	The plan and information periodically updated and there is no record of safety and health management.				
1.2.3	Is the system established and implemented?	The plan and information periodically updated and there is no record of safety and health management.				
1.2.4	Is the system established and implemented?	The plan and information periodically updated and there is no record of safety and health management.				



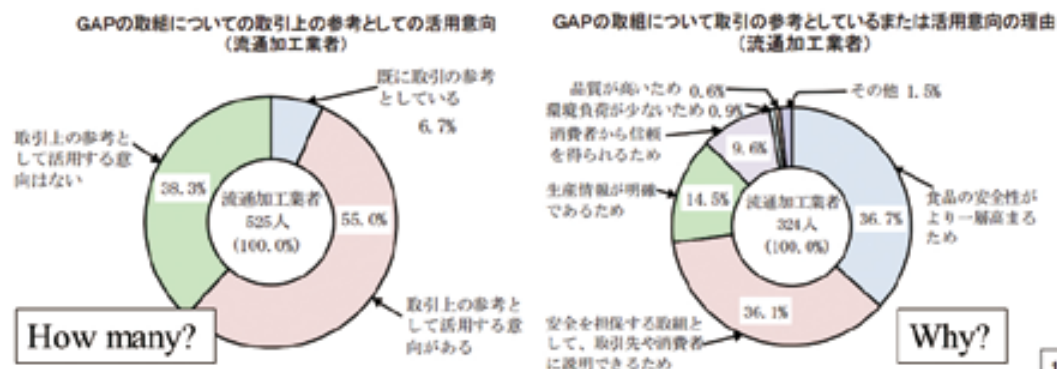


## In Japan, Buyer's attitude



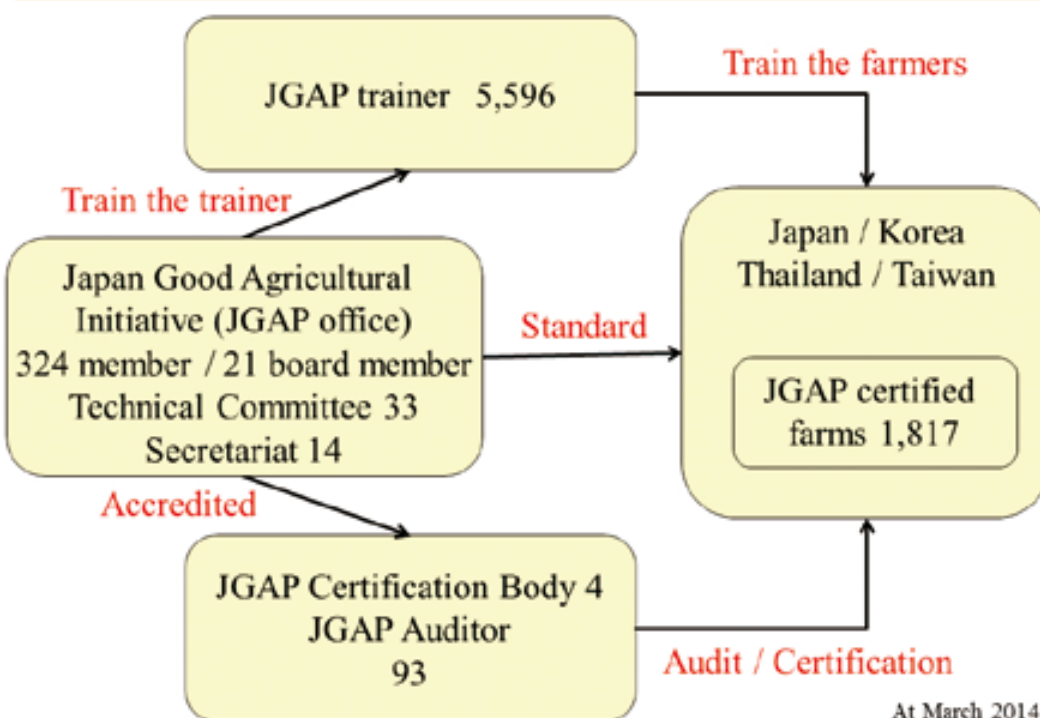
## How many buyers consider GAP certification for their buying decision?

(Japanese Ministry of Agriculture research to 542 retail, food-maker and food service provider on 2012)



- 61.7% of buyer consider GAP certification for their buying decision.
- Those of 96.9% buyer answer food safety and supplier reliability management as reason to consider GAP certification for their buying.

## Structure of JGAP training and certification



## JGAP Board Member 1



### ✦ Management

- ✦ Hirokazu Kiuchi, Chairman of JGAP, Farmers group WAGOEN.
- ✦ Noboru Uesugi, Vice-Chairman of JGAP Mitsubishi Shoji Agri-Service Corporation
- ✦ Yasuaki Takeda, Managing director of JGAP
- ✦ Akihisa Iwamoto, Chairman of JGAP technical Committee, former official of MAFF.

### ✦ Producer representatives

- ✦ Kazuhiro Izawa , Vegetable producer
- ✦ Hideaki Shinpuku, Vegetable producer
- ✦ Kazushi Saito, Rice producer
- ✦ Hisashi Hirano, Green tea, Japan Agricultural Cooperatives
- ✦ Yosuke Tamatsukuri, Vegetable producer org
- ✦ Katsunori Handa, Rice, Japan Agricultural Cooperatives
- ✦ Kazunari Hattori, Fruit producer org



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## JGAP Board Member 2



### ✦ Retail & Food service representatives

- ✦ Kazuo Uchiyama, Japan COOP union
- ✦ Yoshinobu Emoto, Ito-Yokado, SEVEN&I holdings
- ✦ Yoshiyasu Osaki, Delca Foods
- ✦ Hironobu Nozaki, CGC, Cooperative Grocer Chain
- ✦ Yoshiyuki Mitsuhashi, Mitsuhashi Cooperation
- ✦ Rikyu Sakashita, Oisix
- ✦ Muneo Nishida, Hana-musubi, Hong Kong
- ✦ Akira Shinohana, Valor



### ✦ Consumer and others

- ✦ Mutsuo Masuda, former vice-presidents of The Norinchukin Bank
- ✦ Hiroshi Mizogami, Gurunavi



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### JGAP Implementation Case study : Kiwi fruit

JGAP



One brand, from several country, from several farmers cooperative, from more than 1,000 farmers.

How do you manage the product quality and food safety on this situation?

17

### JGAP Implementation Case study : Tea beverage

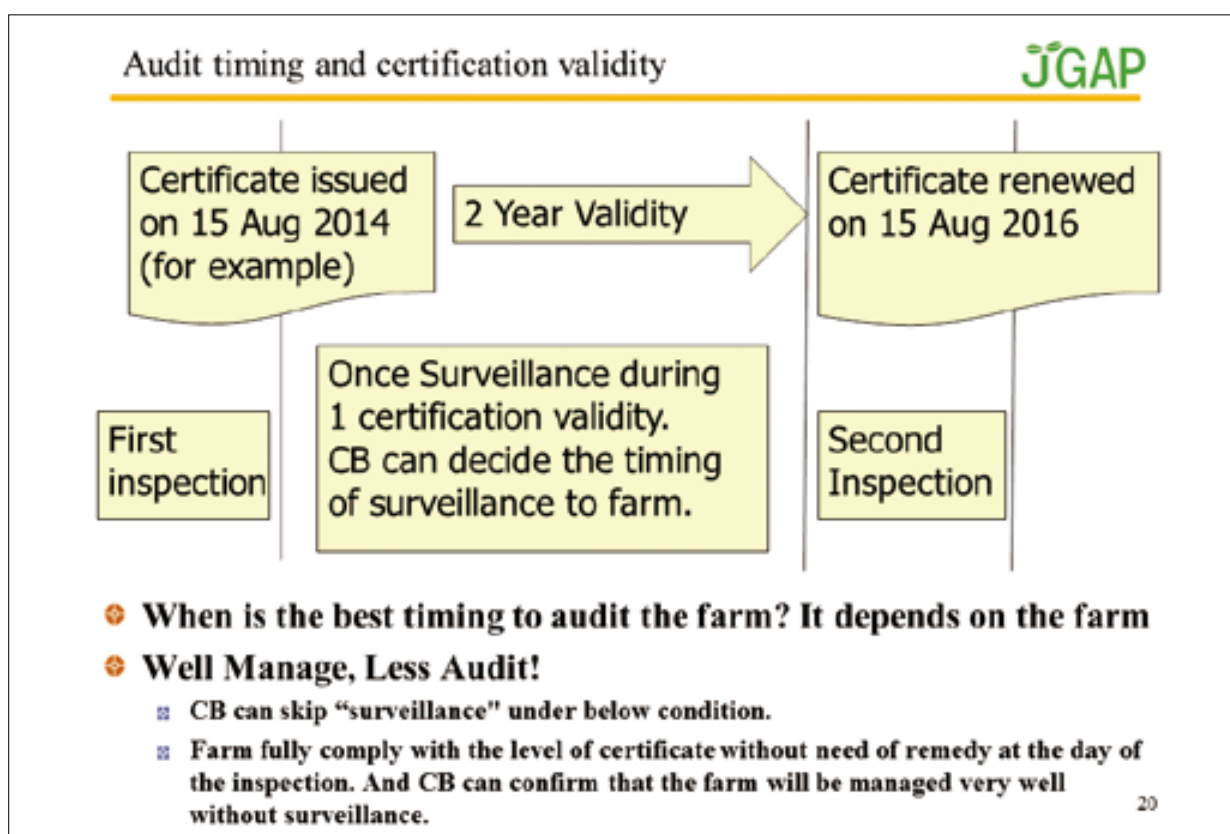
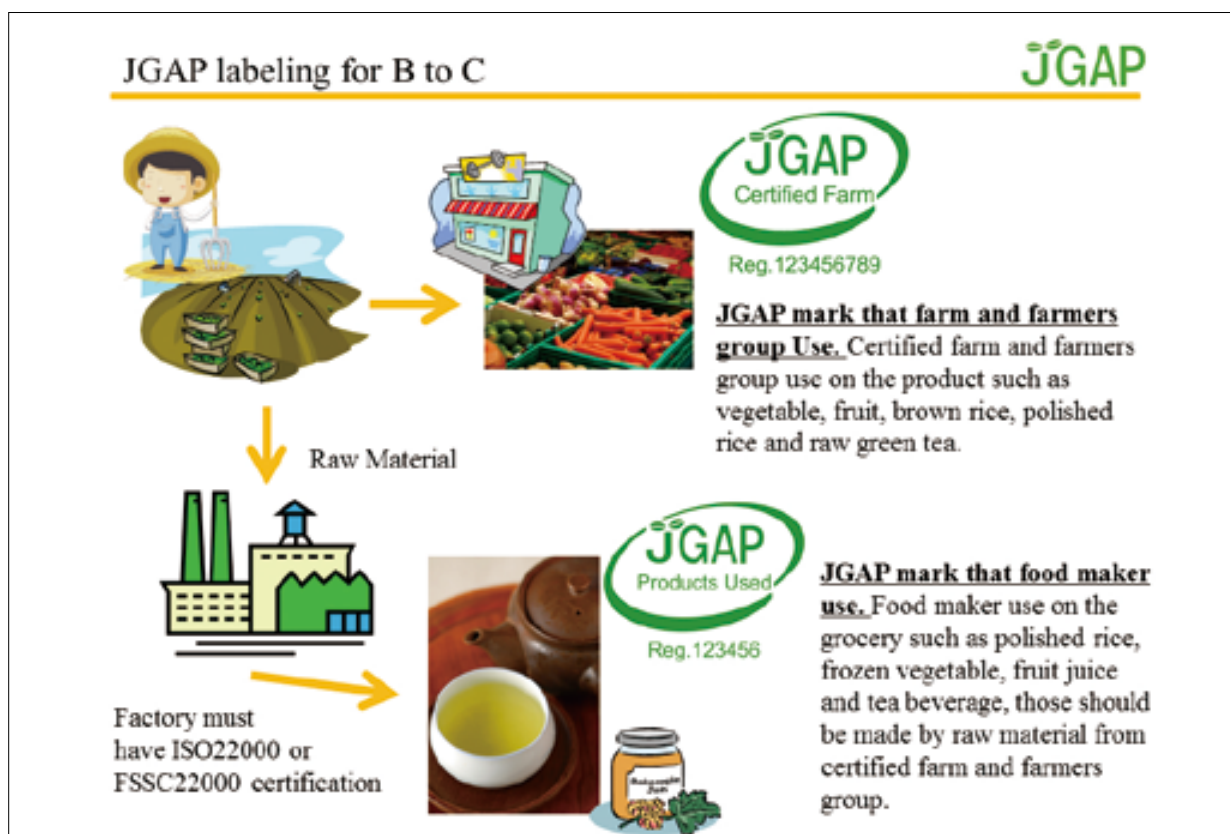
JGAP



Global beverage company has own supplier code of practice. This include food safety, sustainability, worker safety and human rights and ethics.

Global head quarter give local branch the strict order to follow their code all ingredient within 2 years.

How do you achieve and comply this order?

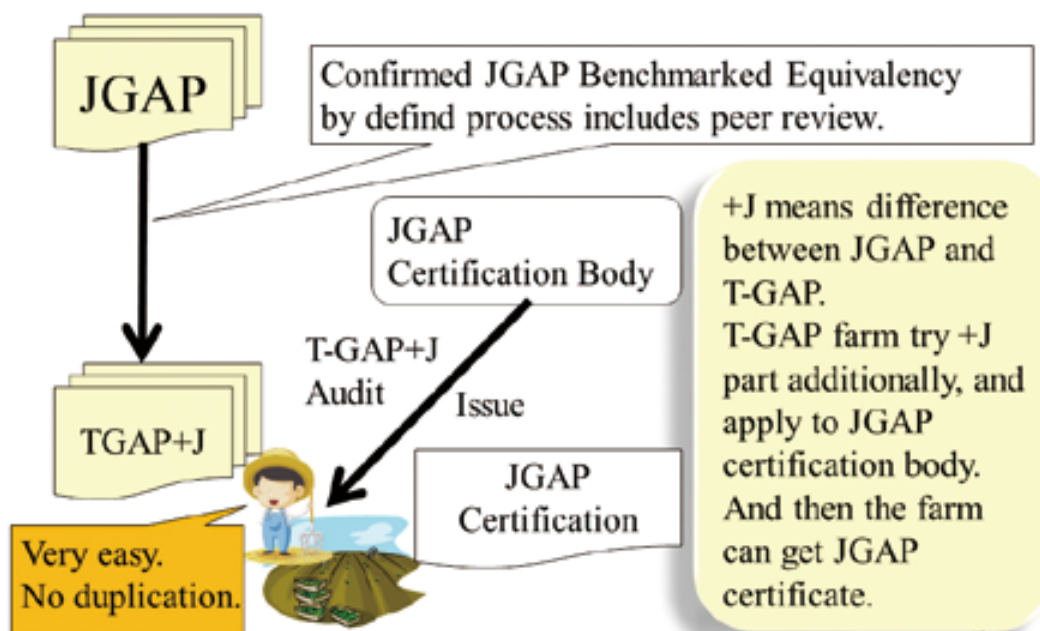




## JGAP Benchmarked Equivalent Standards



Example: T-GAP, this is localGAP used in Sizuoka Japan



## JGAP and GLOBALG.A.P.



GLOBALG.A.P.承認  
Approved by GLOBALG.A.P.

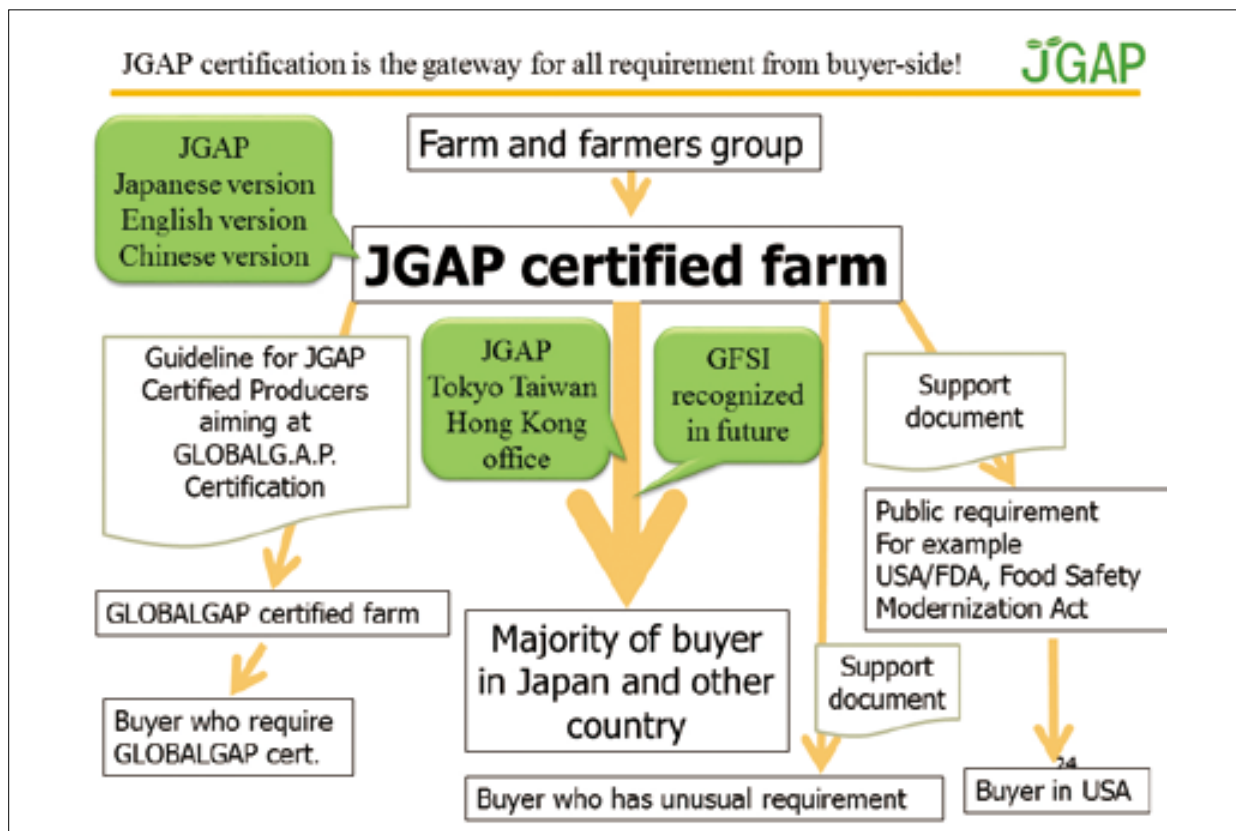
GLOBALG.A.P.認証を目指す  
JGAP認証生産者のための  
ガイドライン  
Guideline for JGAP Certified Producers  
aiming at GLOBALG.A.P. Certification

「JGAP青果物2010」対応

2013年10月20日発行

Document Name	Type	Version	PUBLISHED
GLOBALG.A.P.認証を目指す JGAP認証生産者のためのガイドライン FSC Japanese PDF 889 KB	Guidelines and Supporting Documents		Oct 22, 2013

This guideline helps JGAP certified producer to get GLOBALG.A.P. certification, as needed. You can find it at GLOBALG.A.P. website.



## Latest study of radioactive from Fukushima

JGAP

## ■ Concept of the Japanese limits

**1 mSv  
/year**

Category	Limit
Drinking water	10
Milk	50
General Foods	100
Infant Foods	50

(Bq/kg)

- ◆ The limits are based on 1 mSv in a year consistent with an intervention exemption level adopted by codex
- ◆ The limits are based on more conservative assumption than codex
  - Even if as much as 50% of the foods are contaminated at the limit value, effective dose of most vulnerable age group is expected to be below 1 mSv/year (the intervention level), including the exposure to strontium, etc.



Ministry of Health, Labour and Welfare

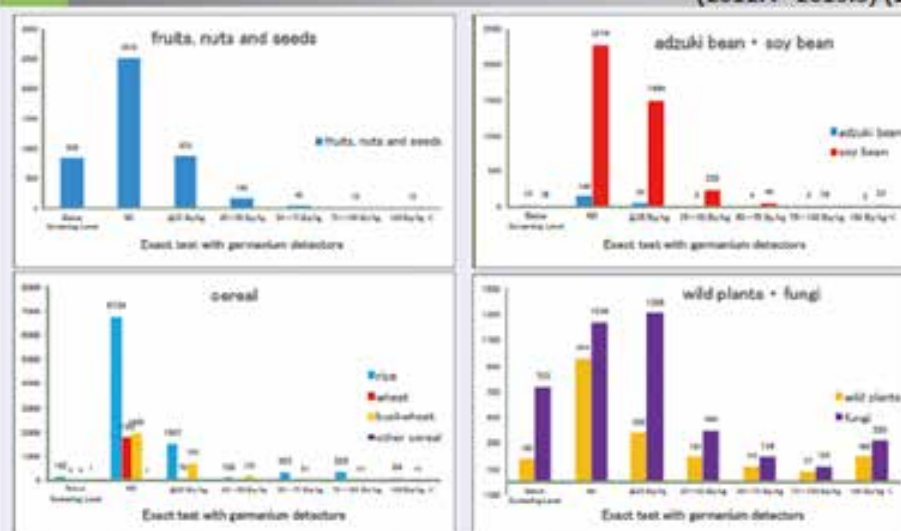
3

## Latest study of radioactive from Fukushima

JGAP

## ■ Number of samples in monitoring of radioactive Cesium in foods

(2012.4~2013.3) (2)



\* Monitoring of radioactive materials in food are mainly carried out before shipment.  
 Most of the food items exceeding the limits are derived from areas where restrictions of distribution have been instructed.  
 The lot of testing item, which exceeds the limits, is treated as violation of Food Sanitation Act.



Ministry of Health, Labour and Welfare

15



# Latest study of radioactive from Fukushima

Japan and Japanese Food are Safe

### 1 Air radiation dose in Japan is in the harmless range

Atmospheric radiation level in Japan is equivalent to those in other major cities in the world.

<div style="background-color: #d0d0ff; padding: 5px; border: 1px solid black; margin: 5px auto; width: 60%;">Shinjuku (Tokyo)</div> <div style="background-color: white; padding: 5px; border: 1px solid black; margin: 5px auto; width: 60%; text-align: center;">0.034<math>\mu</math>Sv/h <small>(avg of 37 locations, 2014)</small></div>	<div style="background-color: #d0d0ff; padding: 5px; border: 1px solid black; margin: 5px auto; width: 60%;">Kumamoto City (Fukushima Pref.)</div> <div style="background-color: white; padding: 5px; border: 1px solid black; margin: 5px auto; width: 60%; text-align: center;">0.05<math>\mu</math>Sv/h <small>(avg of 37 locations, 2014)</small></div>	<div style="font-size: 2em;">+</div> <div style="font-size: 2em;">=</div>	<div style="background-color: #d0d0ff; padding: 5px; border: 1px solid black; margin: 5px auto; width: 60%;">New York, U.S.A. London, U.K., Seoul, Korea, Beijing, China,</div> <div style="background-color: white; padding: 5px; border: 1px solid black; margin: 5px auto; width: 60%; text-align: center;">0.09<math>\mu</math>Bq/h 0.08<math>\mu</math>Bq/h 0.10<math>\mu</math>Bq/h 0.10<math>\mu</math>Bq/h <small>(all 37 locations, 2014)</small></div>
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(Information source: [http://www.mhlw.go.jp/stf/shingakusai/seisaku/01\\_00000.html#stf01](#))

(Environmental air radiation dose in Tokyo after the nuclear accident was equivalent to 0.02mSv/year (dose from radiation dose from space travel between Tokyo and New York: 0.01mSv/y))

### 2 Strict control ensures safety of Japanese Food

Food safety is secured by (1) setting internationally proper limits, (2) rigorous inspections, and (3) prompt restrictions of food distribution.

Limits on radioactive cesium  
(Date of enforcement: April 3, 2013)

Food Category	Limit ( $\mu$ Bq/kg)
Drinking water	10
Rice	30
General Foods	100
Infant Foods	30

(Restrictions are based on international standards except infant foods, which follow the International Standard (ISO).)

- So far, over 700,000 monitoring tests were implemented. (21million tests of all rice bags were also implemented.) The tests will be conducted continuously.
- Percentage of samples exceeded the limits are constantly decreasing to 0.3% (2013 Apr ~ 2014 Feb.) [most of the excesses were wild mushrooms and Meats of wild birds and animals. The number of excesses in farm goods for sale is extremely small.]
- Distribution of food failing the limits would be immediately restricted, denying them entry into overseas markets such as Hong Kong, as well as the Japanese market.

Hong Kong Causeway Bay detected by Takeda 2011

Fukushima Soma 40km from Fukushima nuclear power stations detected by Takeda 2014

JGAP corporate profile		JGAP			
Corporate name	JGAP office (JGAI)				
Organizational Status	incorporated nonprofit organization				
Date Established	Nov. 2006				
Office	Nihon Nogyo Kenkyujo Bldg. 4F 3-29 Kioi-cho Chiyoda-ku, Tokyo, Japan  Tel: +81 – 3 – 5215 – 1112  Website: <a href="http://jgap.jp">http://jgap.jp</a> / E-mail: <a href="mailto:info@jgap.jp">info@jgap.jp</a>				
Activities	1. Develop voluntary standards, JGAP, for the certification of farm and farm group in Japan  2. Train the-JGAP-trainer				
Membership	330 member of Farmer, food retailer and all stakeholders of agriculture and food industry				
Partnership	GLOBALGAP (scope: F&V)				





Salamat! Mabuhay! Masarap

JGAP



## Appendix 2: GAP and GlobalGAP Perspectives by Kit Chan



### Good Agriculture Practice and GlobalGAP Perspectives

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**Kit Chan**

**APO E-Learning Course on GlobalGAP Standards for Greater Global Market Access**

These PowerPoint slides were originally developed by Kit Chan, Managing Director, K-Farm Sdn Bhd, Malaysia, and presented at the APO e-Learning Course on GLOBALGAP Standard for Greater Global Market Access (Session 1) at the videoconferencing facility in Kuala Lumpur, Malaysia 18–20 June 2012, and are reproduced here with permission.



### Principles behind Good Agriculture Practices

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*Embedded in GAP are two principles -*

- 1. Assurance of safe food production*
- 2. Sustainable production*

*Assurance of food safety is a fundamental responsibility of the producer.*

*Sustainable production ensures that producer must reap **economic returns** for his efforts and investments, and able to do so continually.*

## Modes of certification

### 1<sup>st</sup> Party Certification

- Supplier designs & comply own food safety program standards
- Supplier hires (independent) CB to audit its operations & quality

### 2<sup>nd</sup> Party Certification

- Buyer's own food safety scheme that requires suppliers to comply
- Standards are designed by themselves or have been adopted
- Standards compliance and supplier operations are audited by Buyer or by independent CB / auditor

### 3<sup>rd</sup> Party Certification

- Buyer adopts independent food safety scheme for themselves and the suppliers
- The Buyer or Supplier hires independent CB to audit Supplier

CB – Certification Body

3

## GAP and the Emergence of GlobalGAP

4

## GAP and the Emergence of GlobalGAP - 1

---

### International Initiatives of GAP

- FAO (FAOGAP), EISA (Common CODEX for Integrated Farming),  
CIES Retailer Business Forum (Global Food Safety Initiative, GFSI)
- Australia (AFFA, Farm Food Safety Guidelines), NZ (Approved Supplier Program)  
England (Assured Produce Scheme),
- TESCO (Natures Pride), CAPESPAN, Unilever (Growing for the Future), FreshCare,

### Issues covered in the GAP Schemes:

- Food safety criteria , Quality, Quarantine, Environment, Sustainability, Workers  
Health and Safety, Food Security (Bio-Terrorism), Allergens
- Guidelines, Standards, Marketing Schemes, Company Missions, Company Labels,

5

## GAP and the Emergence of GlobalGAP - 2

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### GAP Standards Scope

- Food Safety Hazards
- Laboratory verification and certification
- Standards certification and verification

### Steps in developing a GAP Scheme

- 1.Design Scheme – Stakeholders, Principles, Scope, Structure, Purpose
- 2.Joining Scheme – Membership, Rules
- 3.Meeting Standards – Documentations, record keeping, training
- 4.Assessment – Assessment of history, documented evidence
- 5.Certification – Certificates of compliance on the evidence
- 6.Benefits – Growers, customers, consumers

6

## GAP and the Emergence of GlobalGAP - 3

<u>Designing GlobalGAP</u>	<u>Standards Criteria</u>
<b>1.Scope of Compliance</b>	<ul style="list-style-type: none"> <li>- Pre-farm or on-farm standards of IFA</li> <li>-All farm base, Crop base, Livestock base, Aquaculture</li> <li>-Covering whole agricultural production process</li> </ul>
<b>2.Standards framework</b>	<ul style="list-style-type: none"> <li>-Independent 3<sup>rd</sup> Party certification based on ISO/EC 65</li> <li>-Normative Documents (GR, Checklist, control points, )</li> </ul>
<b>3.Guiding Principles (Value)</b>	<ul style="list-style-type: none"> <li>-Assured safe food production, minimize impact on environment &amp; sustained economic returns to farmer</li> </ul>
<b>4.Stakeholders of scheme</b>	<ul style="list-style-type: none"> <li>-Retailers and producers</li> </ul>

7

## GAP and the Emergence of GlobalGAP - 4

<u>Designing GlobalGAP</u>	<u>Standards Criteria</u>
<b>5.Meeting the standards (compliance)</b>	<ul style="list-style-type: none"> <li>-Compliance rules, 100% major must, 95% minor must</li> <li>-Rules of inspection, announced &amp; unannounced audit</li> </ul>
<b>6.Certification</b>	<ul style="list-style-type: none"> <li>-Accredited certification body</li> </ul>
<b>7.Benefits to producers</b>	<ul style="list-style-type: none"> <li>-Reduce food safety risk, reduce cost of compliance, increase integrity of farm assurance, one level of auditor competency</li> </ul>

8

## Introducing GlobalGAP

*GLOBALGAP is a private sector organization that sets voluntary standards for certification and implementation of GAP around the world*

*The GLOBALGAP Standards designed to give consumers assurance of sustained and safe food production on the farm via minimizing the impacts of farm operations on the environment, reducing the use of chemical inputs and ensuring a responsible regard for the worker health and safety as well as animal welfare*

*GLOBALGAP is a business – to - business initiative*

9

## GlobalGAP - Integrated Farm Assurance

- Reducing food safety risks in primary production by encouraging development & adoption of national/regional farm assurance schemes
- Has a clear risk-assessed **HACCP-based** reference standard serving the consumer and food chain
- Reducing cost of compliance by avoiding multiple product audits on mixed farming enterprises
- Increase the integrity of farm assurance scheme worldwide by defining and enforcing a common level of auditor competence, verification status reporting and harmonizing interpretation of compliance criteria

GL IFA – Introduction and Specific Rules

10



## Assessment Process

---

### Option 1 (single site and multi-sites without QMS)

- The individual producer is the certificate holder
- Farmer performs self assessment
- Annual external inspection by CB

### Option 2 with QMS and Option 1 Multi-site with QMS

- Farmer / producer group is the certificate holder
- Internal inspection of all producer group members
- Annual internal audit of the QMS
- Annual external inspection on a sample of individual producers
- Annual external QMS audit
- Unannounced inspection

*Part 1 General Rules, GL - Assessment Process,*

## Appointment of Certification Bodies

---

- The License and Certification Agreement between GlobalGAP Secretariat and the CB established that the former is the GlobalGAP System coordinator and the CB is the **neutral** organization for auditing, inspection, certification and licensing activities - 3<sup>rd</sup> Party Certification
- CB approval by GlobalGAP
  - Complete GlobalGAP training and examination for the GR and CPCC of relevant sub-scope
  - CB nominate and setup scheme manager and in-house training program
  - CB to obtain accreditation to EN 45011 or ISO/IEC Guide 65 or ISO/IEC 17065 in relevant GlobalGAP sub-scope.

*GL Part 3 – CB and Accreditation Rules*

CB – Certification Body

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## How well is GlobalGAP accepted and recognized?

### One-stop-shop to GAP standard certification

- Avoid multiple product audit
- Pro-active adoption by the industry
- Achieve global harmonization leading to a more level playing field

### Industry acceptance of GlobalGAP

- No GlobalGAP No access
- Is GlobalGAP a universally recognized and accepted?
- Secondary market and wholesale market not recognizing GlobalGAP
- Big supermarkets adding more criteria on top of GlobalGAP
- Cost of certification and benefits of certification

**What alternative to GlobalGAP certification to gain market access ?**

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## GAP Practices in Asia

14



## GAP Practices in Asian Countries - 1

---

### 1. Examples of GAP systems in Asian Countries

- SALM – Initiated by authorities to advance competitiveness
- JGAP – Inspired by growers supplying to supermarkets
- ChinaGAP – Concern for food safety / Concern for export markets
- ThaiGAP – Initiated by regulators / Adopted from research cluster
- ASEANGAP – Harmonizes ASEAN countries GAP systems

### 2. What drives these countries to develop GAP systems?

- Governments want to develop, expand and sustained export sector
- Consumers want assurance of food safety in their purchases
- Exporters want to move from domestic to export trade, from wholesale buyers to niche and to more developed retail markets

## GAP Practices in Asian Countries - 2

---

### 3. Developing GAP systems in Asian Countries

- 2 - prong, 2 - tier approach
  - Develop National GAP Schemes, and Benchmark with GlobalGAP
  - More progressive farmers moved independently with GlobalGAP

### 4. Cautions and lessons learnt from these country's practices

- Communication - clear, defined, committed
- Raise awareness - to all stakeholders
- Transparency - accreditation and certification process
- Agency support - in farm extension is strong & effective
- Mandatory GAP standard is costly to monitor and ineffective
- GAP standard is for export **AND** also domestic consumers

## GAP Practices in Asian Countries - 3

---

### 5. GAP development for Asian Pacific – Way forward

- Shift of global trade from **South – North** to **South – South**
- Trade **competition** among countries will increase
- There is **No** reversal for high standards and high quality
- Trading countries will demand **reciprocal** standards and qualities
- **Eventual** harmonization of international GAP standard of a high level
- **Slow reformers** will be left behind

# Thank you

---




For more enquiries, please write to

[kitchan@kfarm.com](mailto:kitchan@kfarm.com)

or visit us @

[www.kfarm.com](http://www.kfarm.com)

## Appendix 3: Implementation of GAP and GlobalGAP by Kit Chan



### Implementation of GAP & GlobalGAP in Asian Countries

**Kit Chan**

#### APO E-Learning Course on GlobalGAP Standards for Greater Global Market Access

These PowerPoint slides were originally developed by Kit Chan, Managing Director, K-Farm Sdn Bhd, Malaysia, and presented at the APO e-Learning Course on GLOBALGAP Standard for Greater Global Market Access (Session 1) at the video-conferencing facility in Kuala Lumpur, Malaysia 18–20 June 2013, and are reproduced here with permission.

### Good Agriculture Practice, GAP

---

#### Misconceptions

- *GAP is an Alien concept*
- *GAP does not relate to my business*
- *GAP reduces my competitiveness*

2

## Concerns of the Global Food Economy

Concerns	Interventions
▪ Food Insecurity	
▪ Cost of Food ( <a href="#">Global food crisis</a> )	
▪ Farm Productivity	
▪ Market Access	
▪ Economics of small farms, rural poverty, length of food chain, etc	
▪ Food Safety	
▪ Ecological concerns on farming	
▪ Climate Change	

## Concerns of the Global Food Economy

Concerns	Interventions
▪ Food Insecurity	Protection, Diversification, Innovation,
▪ Cost of Food ( <a href="#">Global food crisis</a> )	Subsidize food prices, Price ceilings, Food coupons,
▪ Farm Productivity	Increase farm yield, Reduce farm waste, P&D management, Post-harvest handling,
▪ Market Access	Promotion, Enhance competitiveness,
▪ Economics of small farms, rural poverty, length of food chain, etc	Logistics management, cluster farms / small farm integration,
▪ Food Safety	Food safety assurance (traceability)
▪ Ecological concerns on farming	Soil fertility, Water management, P&D resistance, Bee population, environment
▪ Climate Change	

## Major changes and trends in the agrifood system

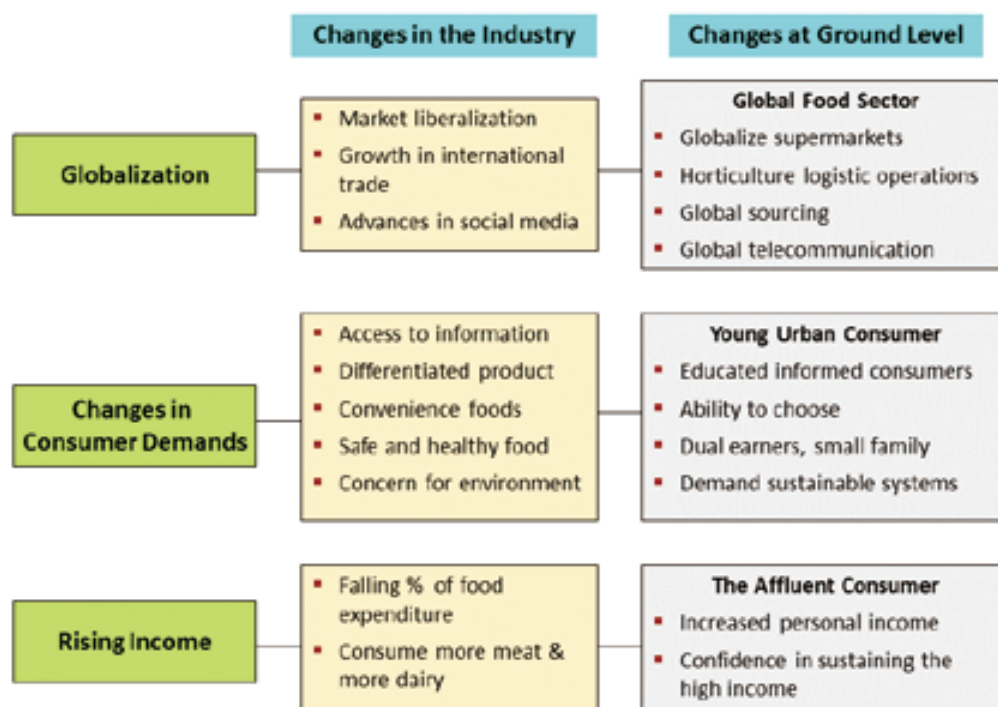
### The agrifood system operates in a globalize market now

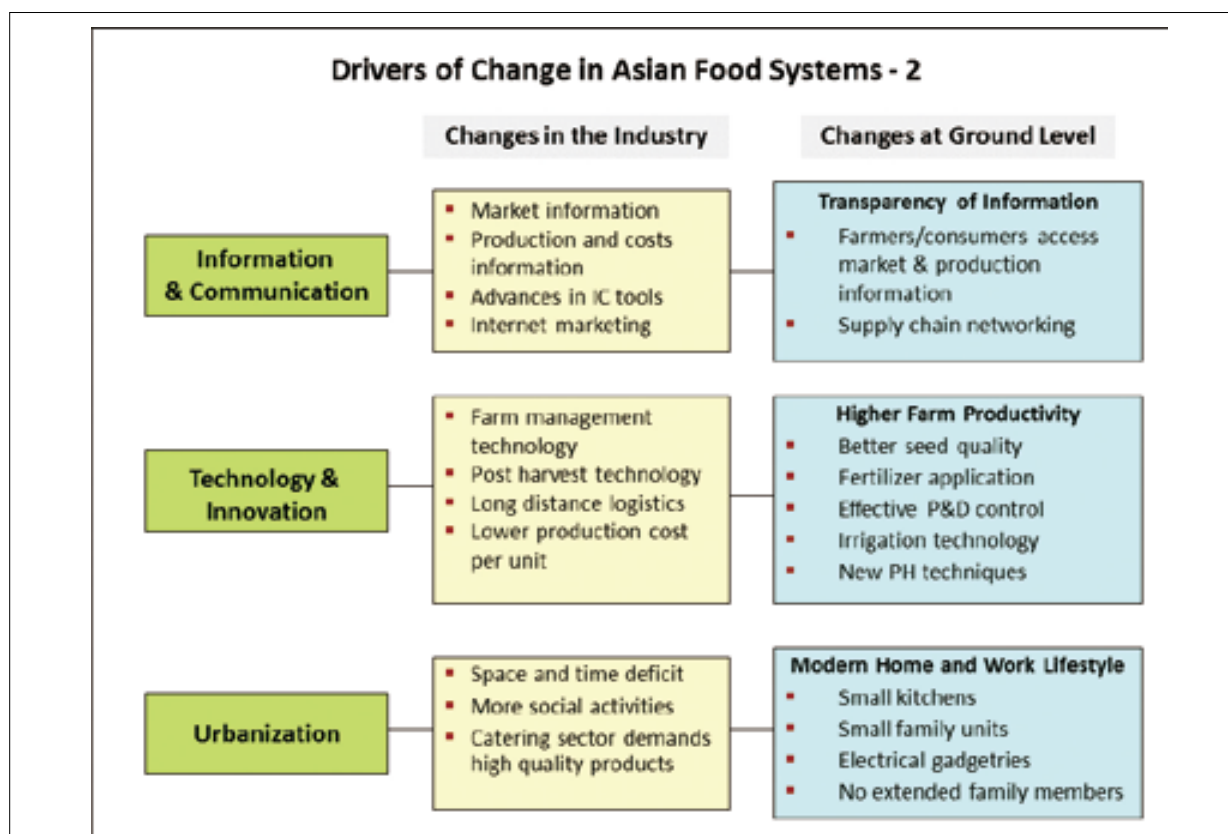
- Food supply chains making cross border destinations
- Sources of production comes from all corners
- Survival in the business rests on stakeholder competitiveness

### Consumption patterns have changes

- Food not destine to hungry stomachs
- Destination guided to what consumers are willing to pay
- Consumers demand for quantity, quality, standards and choice
- Supermarkets will continue to expand and influence the system

### Drivers of Change In Asian Food Systems - 1







## Monitoring Food Safety

---

- Historically, food safety concerns involved only food processors.
- Food safety responsibilities now affect all stakeholders of food chain.
  
- Food safety regulators traditionally use enforcement mechanisms to remove unsafe food from the market.
- Exporters are now warned to take prevention of hazard contaminations at every critical control point of the food chain.
  
- In the past, regulators are responsible to monitor & control food safety.
- Adoption of food chain framework facilitates a consumer driven, monitor & control approach in production and food safety system.

9

## Sustainable Agriculture

---

.... a farming system that provide the needs of **safe, nutritious and affordable** food for the world population, in a way that progressively **conserve** the natural environment and natural resources, by seeking to optimize the skills and technologies to achieve **long term productivity and profitability** of the stakeholders of the agriculture enterprise, to ensure that future generations can also experience the same satisfactions that we enjoy today.

10

## Sustainable Agriculture

From the definition above, 3 major concerns have emerged –

- **Ecological concerns**
  - Soil productivity (Erosion, depletion of top soil)
  - Water (Depletion, groundwater usage, contamination)
  - Pest and Disease resistance to pesticides
  - Greenhouse effect and Climate Change
- **Economic and social concerns**
  - Price of food
  - Income of the small and rural farmers
- **Impacts on human health**
  - Food safety and food hygiene
  - Farm workers health and welfare

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## Good Agriculture Practice - GAP

GAP is a production pathway that identifies **critical control points** and establish compliance standards at varying degrees to **eliminate hazards** and **prevent accidents** in order to progressively promote safe and hygienic fresh produce at farm with minimum negative impacts to the environment.

The good practices proposed in GAP are universally established **science - based rationales and justifications.**

The close monitoring and specific control system provides **assurances** of safety to the consumers of GAP produce.

12



## Challenges in GAP Certification - Countries in Asia

---

### For the small and rural producers

- Farmers lack management skills and production practices
- Lack understanding the certification schemes and requirements
- Lack the ability for data collection and documentation
- Costs of compliance and certification

### Marketing small and rural farm produce

- Small farm produce do not enter supermarkets
- Price incentives for GAP products do not compensate the efforts
- Majority Asian consumers do not ask for GAP certification

## Opportunities in GAP Certification - Countries in Asia

---

### For the small and rural farmers

- Access to information on new cultivation techniques
- Participate in mainstream domestic and export supply chain
- Gain benefits of efficient & sustainable cultivation techniques

### Marketing small and rural farmers produce

- Participate in bringing farmers to market programs
- Access to domestic and export market chains

## The way forward in promoting GAP certification - 1

---

### Approaches of the private sector / NGO

- Ensure a continual pressure on producers' production system to assure safe food production vigilance
- **Promote awareness** of GAP principles to the public
  - Via dissemination of information
  - Via education of consumer rights to the public
  - Provide access to information to the public

## The way forward in promoting GAP certification - 2

---

### Approaches of the public sector / authorities

- **Integrate** small / SME farms into global food supply chains
- Capacity building and technical assistance for farmers
- Development of national GAP schemes
- Harmonizing regional GAP schemes
- Approaches in implementing GAP
  - Setting enabling environment for better dissemination of GAP
  - Supporting stakeholders in accessing information on GAP
  - Support NGO efforts in consumer awareness in GAP
  - Promote open markets in production and distribution of food
  - **Do not intervene** in market price and trade interference

# Thank you

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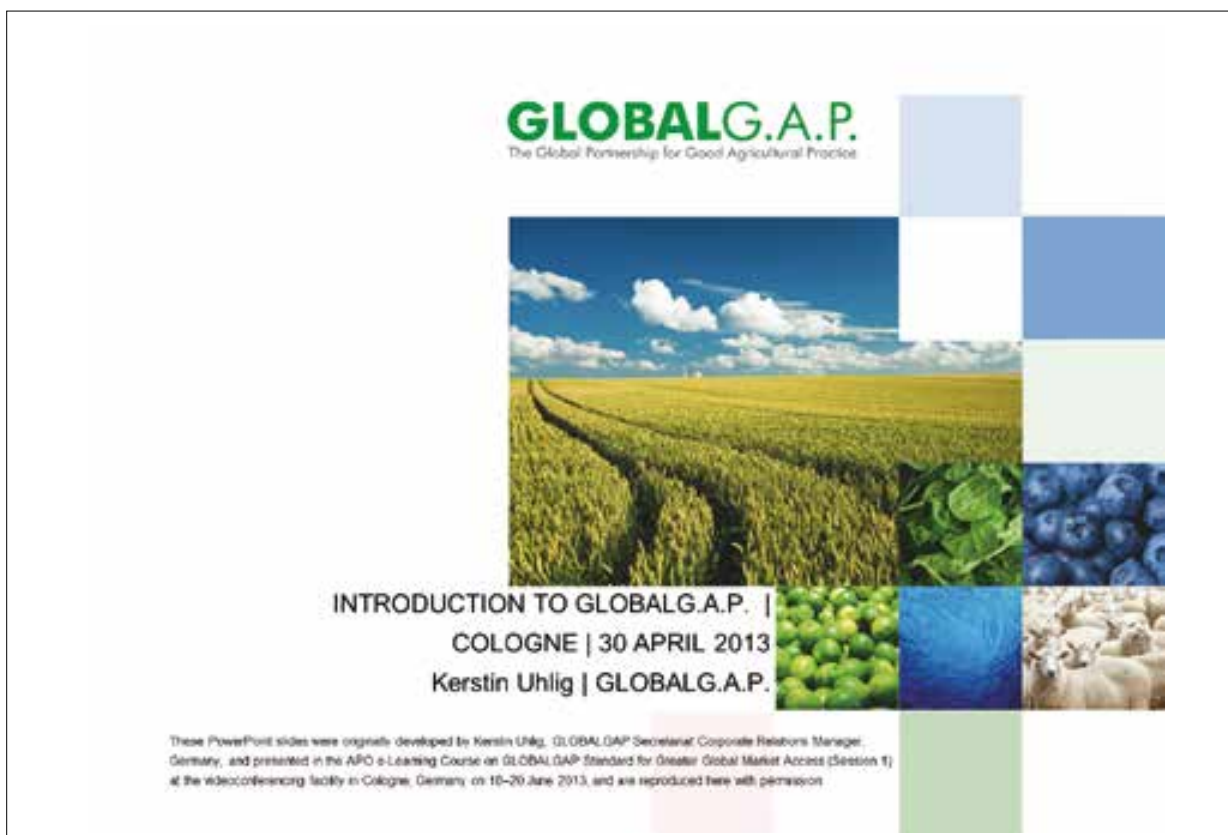
For more enquiries please write to

[kitchan@kfarm.com](mailto:kitchan@kfarm.com)

or visit us @

**[www.kfarm.com](http://www.kfarm.com)**


## Appendix 4: Introduction to GLOBALG.A.P. by Kerstin Uhlig



**GLOBALG.A.P.**

**GLOBALG.A.P. MISSION**

"We want to be the preferred solution for farm assurance worldwide."



**GLOBALG.A.P.**

**DRIVERS FOR GAP AND GLOBALG.A.P.**



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GLOBALG.A.P.

GLOBALG.A.P. BREAKING NEWS


NEW GLOBALG.A.P. BOARD 2013 - 2017




**Guy Callebaut**  
VBT - Association of  
Belgian Horticultural  
Cooperatives  
Belgium  
Supplier  
Representative Crops




**Martin Hofstede**  
CLAMA GMBH & CO.  
KG  
Germany  
Supplier  
Representative  
Aquaculture




**Jim Jefcoate**  
IPL / Asda / Walmart  
United Kingdom  
Retail Representative




**Dr. Horst Lang**  
Globus SB  
Warenhaus Holding  
GmbH & CO. KG  
Germany  
Retail Representative




**Leon Mol**  
Royal Ahold  
Netherlands  
Retail Representative




**Mari Carmen  
Morales Abad**  
Anecoop S.Coop.  
Spain  
Supplier  
Representative Crops




**Hugh Mowat**  
Morrisons  
Supermarket PLC  
United Kingdom  
Retail Representative



**Bert Urlings**  
VION Food Group  
Netherlands  
Supplier  
Representative  
Livestock



**Richard Yudin**  
Jyffes  
United Kingdom  
Supplier  
Representative Crops




**Zhiqiang (David)  
Zhang**  
Buyers Council  
China  
Retail Representative

10


11

GLOBALG.A.P.


OTHER COMMITTEES




SHC GRASP




SHC Water



SHC Animal Welfare



SHC Microbiological Risk Assessment



SHC Crop Protection

12

13

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## GLOBALG.A.P.

## MEMBERS IN THE TECHNICAL COMMITTEE CROPS

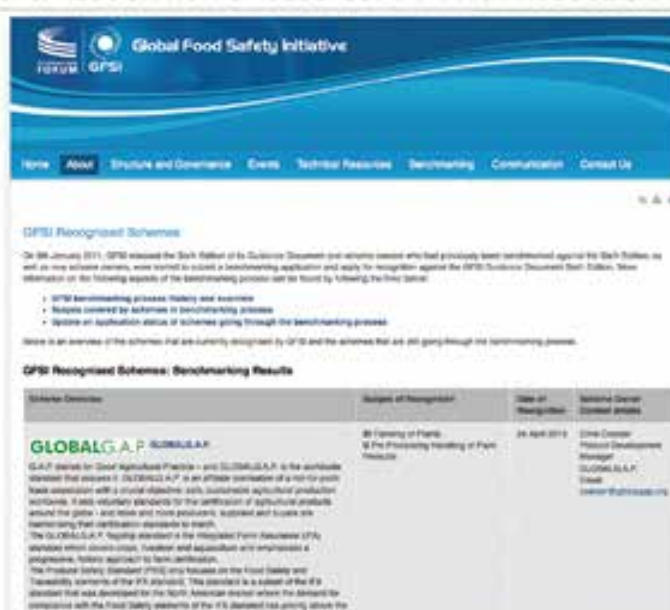
Name	Company	Country
Ricardo Adonis	FDF/Asoex	Chile
Lindi Benic	Fruit South Africa/Shaffle	South Africa
Ulf Berbig	ALDI SÜD	Germany
Paul Bol	Dutch Produce Association	Netherlands
Raf de Blaiser	Lava	Belgium
Martin de la Harpe	Finlays Horticulture	United Kingdom
Peter Ensor	ADFSC/Farmer's Service Center	United Arab Emirates
David Gombas	United Fresh	United States of America
Ian Harrison	IP Ltd. / ASDA	United Kingdom
Willem Hofmans	Ahold	Netherlands
Theresa Huxley	Sainsburys	United Kingdom
Massimiliano Laghi	Apofruit	Italy
Sharan Lanini	Chiquita	USA
Jasmin Mangels	EDEKA	Germany
Stephen Mbithi	FPEAK	Kenya
Tony Palmer	TESCO	United Kingdom
Bizhan Pourkormalian	McDonald's	United Kingdom
Leon Sanchez Blanco	Metro Group	Germany
Sabrina Schackmann	Globus	Germany
Chiyuki Uehara	AEON	Japan
Frank van Oorschot	LTO	Netherlands

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## GLOBALG.A.P.

## GLOBALG.A.P. BREAKING NEWS

## GFSI RECOGNITION OF GLOBALG.A.P. IFA &amp; PRODUCE SAFETY STANDARD



**GLOBALG.A.P. IFA & PRODUCE SAFETY STANDARD**

On 26 January 2019, GFSI released the 2019 Global Food Safety Initiative (GFSI) Benchmarking Report. This report highlights the progress of the GFSI Benchmarking process and the progress of the GFSI Benchmarking process. The report also highlights the progress of the GFSI Benchmarking process and the progress of the GFSI Benchmarking process.

**GFSI Recognized Schemes:**

- GFSI Benchmarking process: Safety and security
- Schemes covered by schemes in benchmarking process
- Update on application status of schemes going through the benchmarking process

Below is an overview of the schemes that are currently recognized by GFSI and the schemes that are still going through the benchmarking process.

**GFSI Recognized Schemes: Benchmarking Results**

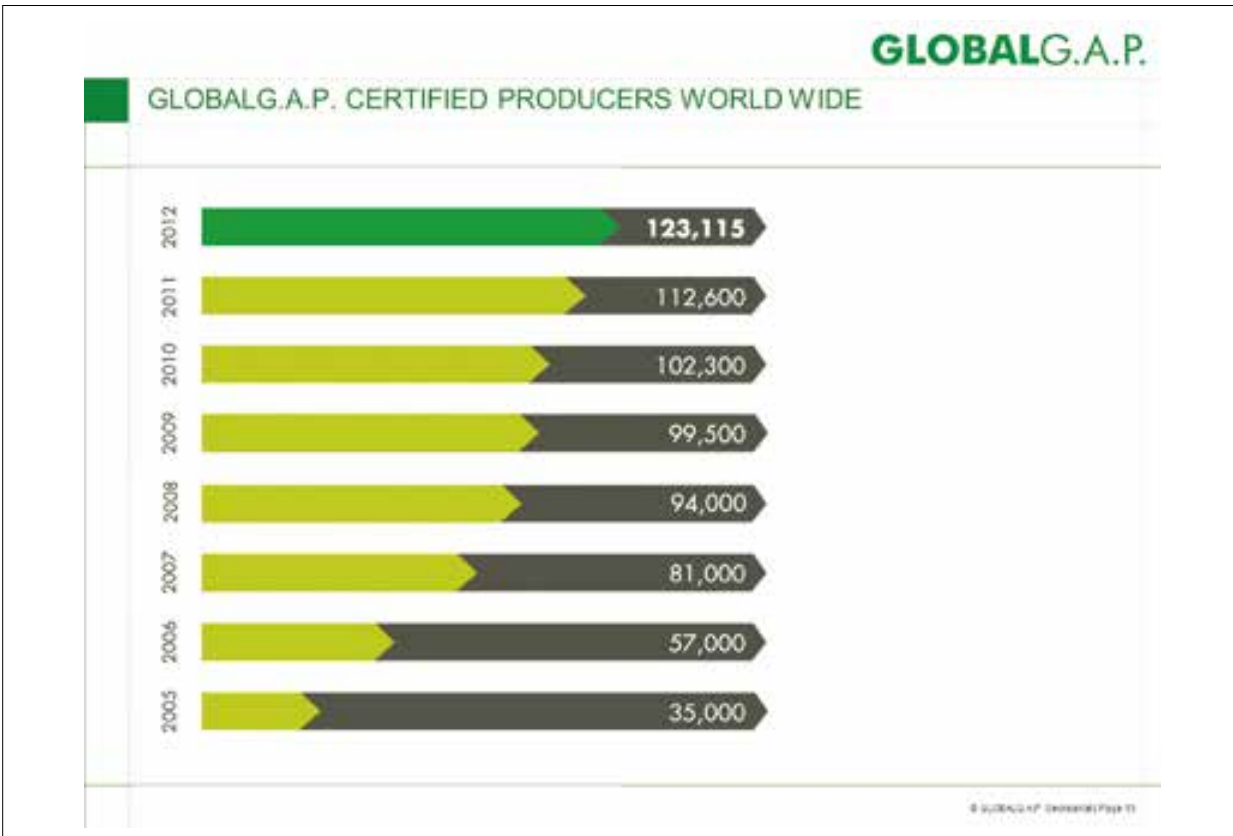
Scheme Details	Scope of Recognition	Date of Recognition	Responsible Person
<b>GLOBALG.A.P. IFA &amp; PRODUCE SAFETY STANDARD</b>	IFA Farming of Plants IFA Processing Handling of Plant Products	26 April 2019	Chris Cooper Product Development Manager GLOBALG.A.P. Email: <a href="mailto:chris@globalgap.org">chris@globalgap.org</a>

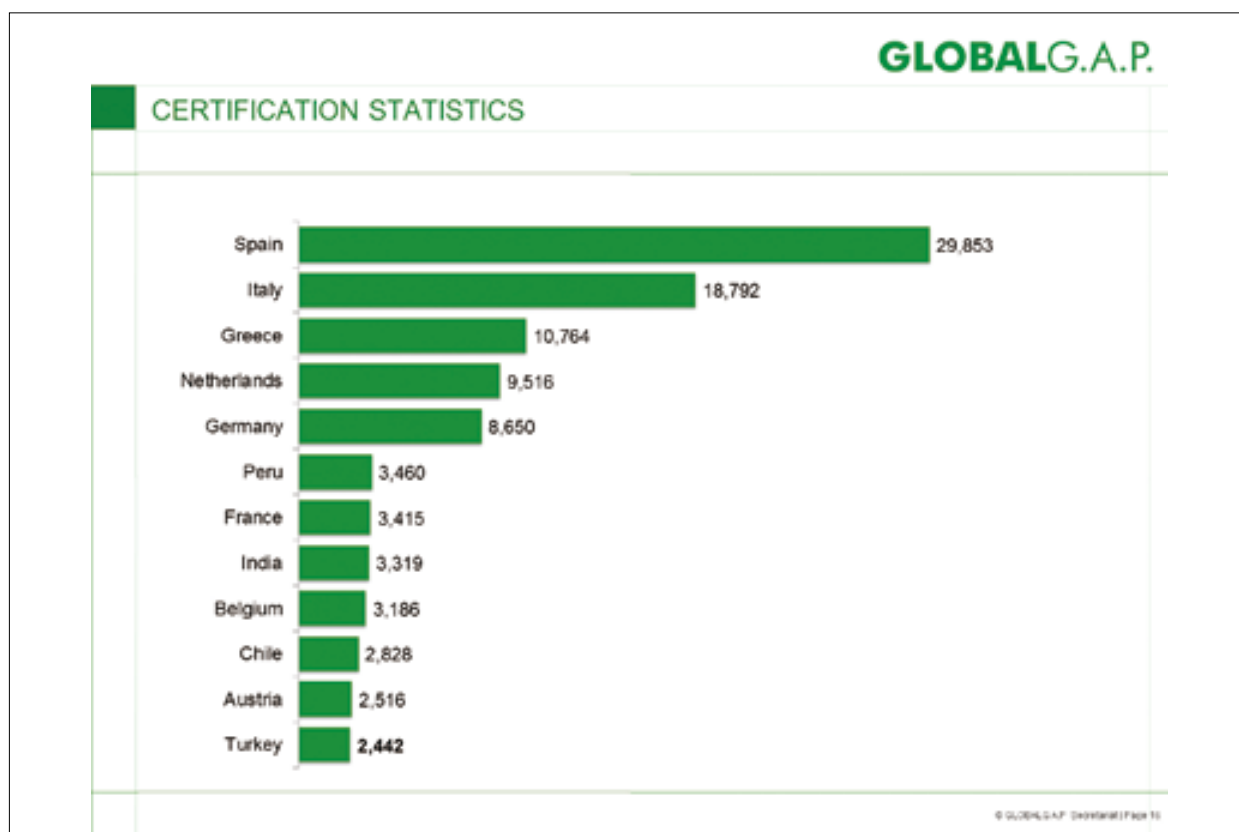
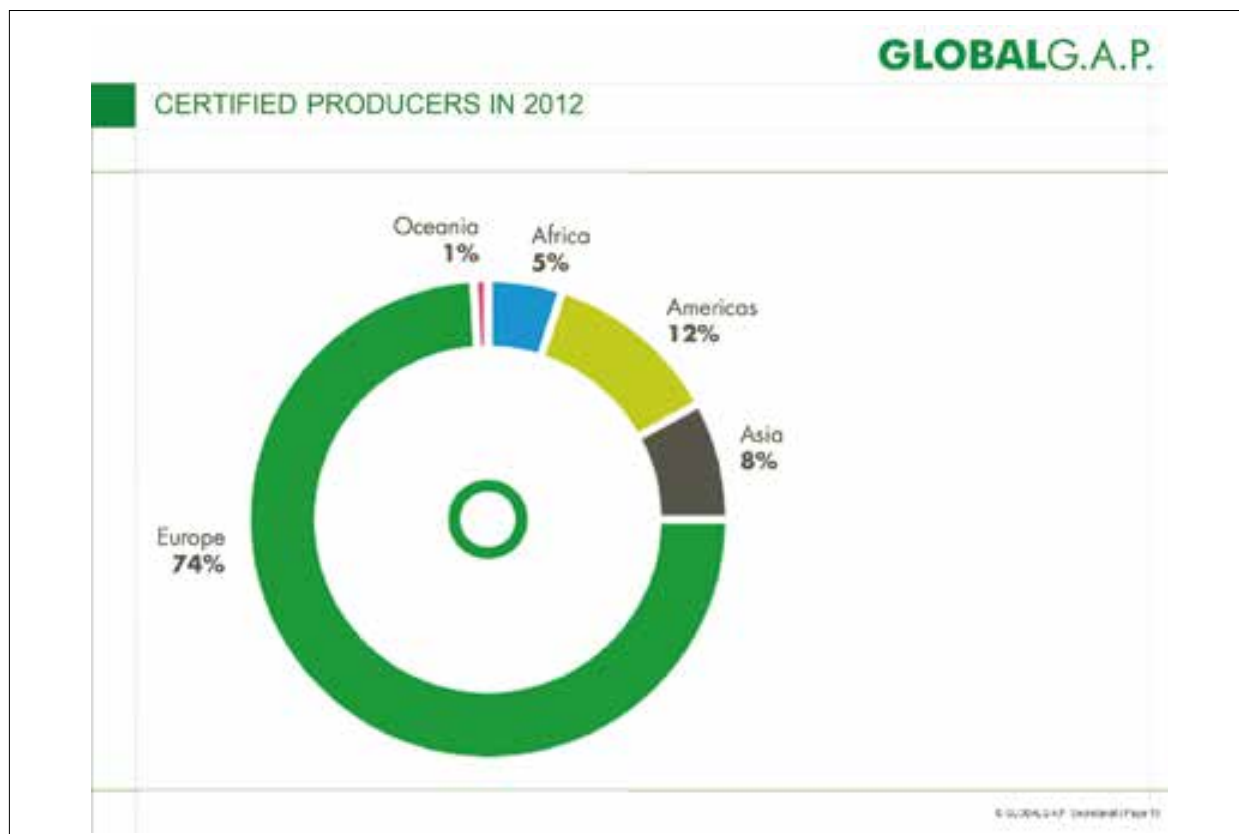
GLOBALG.A.P. IFA & PRODUCE SAFETY STANDARD is the worldwide standard that ensures that GLOBALG.A.P. is an official recognition of a not-for-profit food association with a similar objective: to improve agricultural production worldwide. It sets voluntary standards for the production of agricultural products around the globe and links and more products, national and local, are benchmarking their certification against the standard.

The GLOBALG.A.P. IFA & PRODUCE SAFETY STANDARD is the worldwide standard that ensures that GLOBALG.A.P. is an official recognition of a not-for-profit food association with a similar objective: to improve agricultural production worldwide. It sets voluntary standards for the production of agricultural products around the globe and links and more products, national and local, are benchmarking their certification against the standard.

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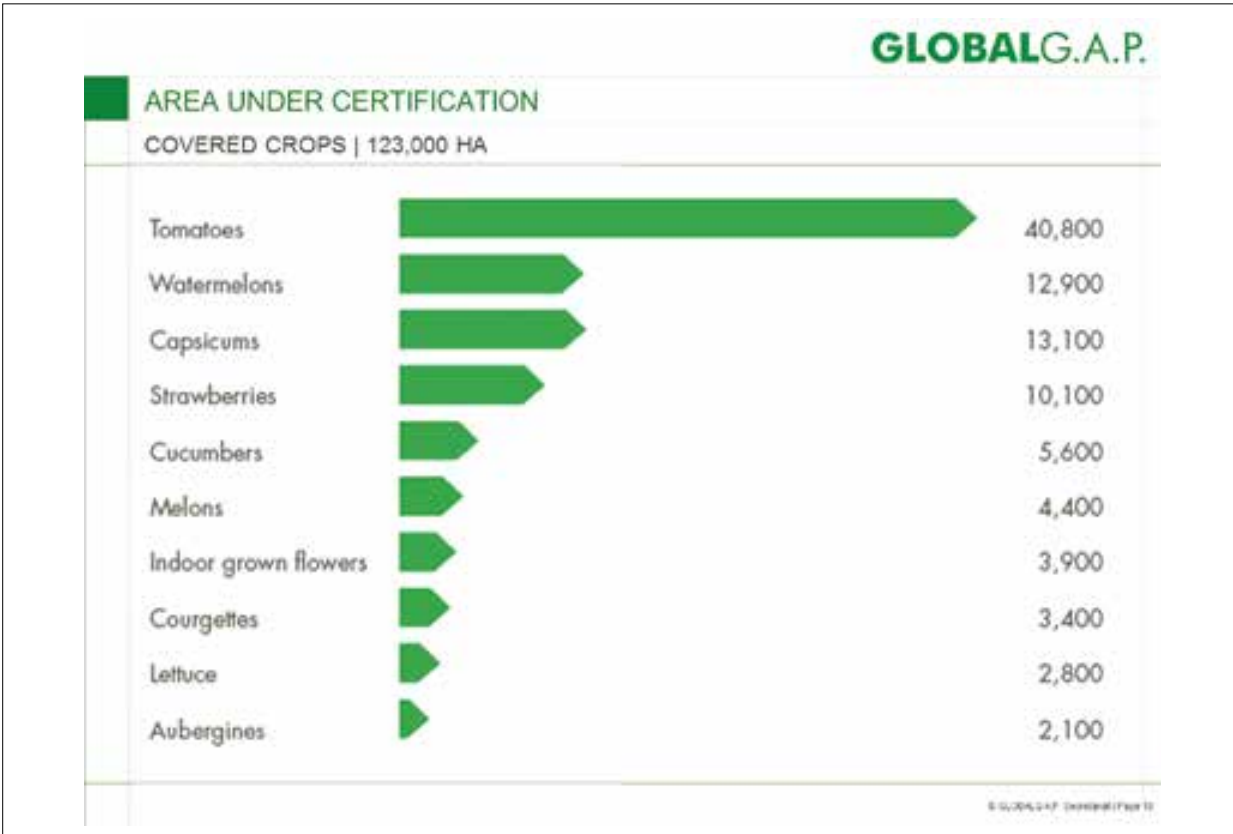


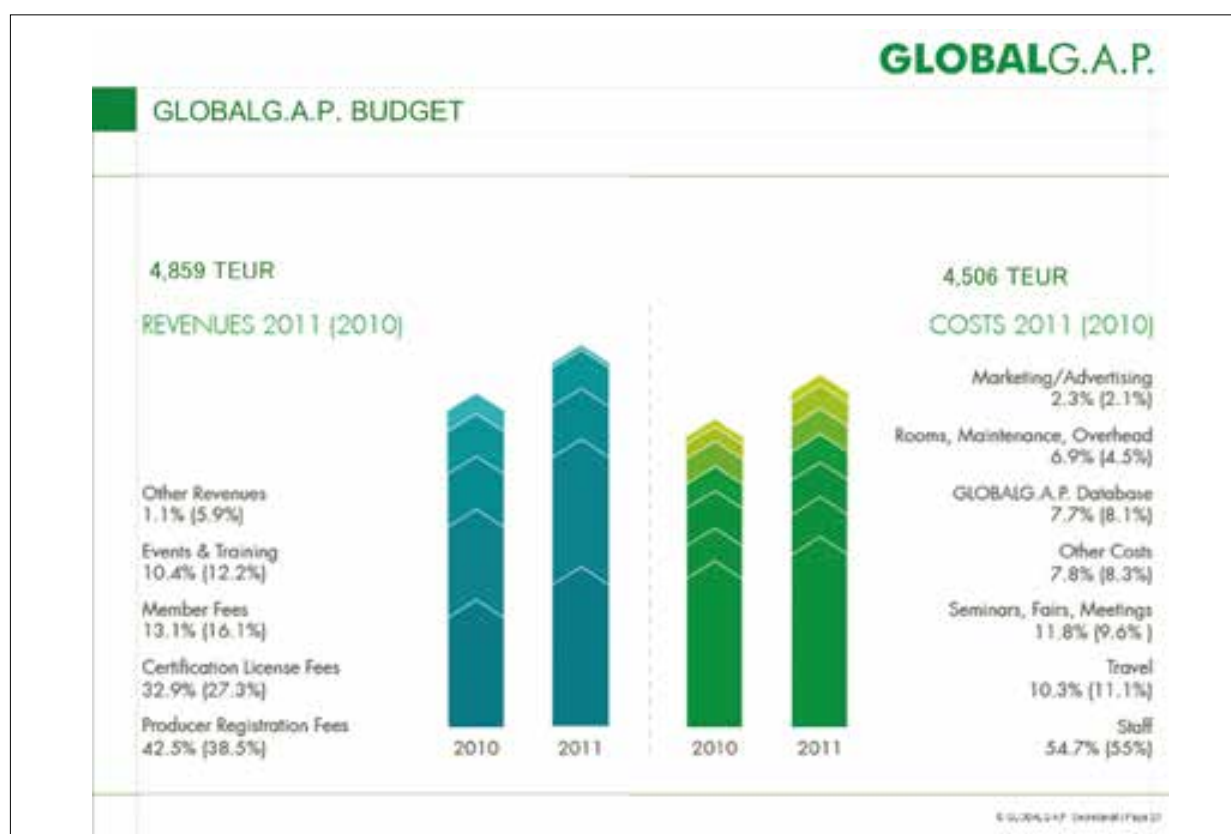
GLOBALG.A.P.

PRODUCER CERTIFIED IN ASIA

Country	Number of Producers	Country	Number of Producers
India	4.252	Sri Lanka	23
Turkey	2.077	Georgia	17
Israel	1.398	Malaysia	12
Cyprus	1.191	Taiwan	11
Palestinian Territories	405	Philippines	7
Thailand	276	Saudi Arabia	4
China	271	Iran	2
Korea (South)	260	Armenia	1
Japan	168	Azerbaijan	1
Vietnam	165	Bahrain	1
Lebanon	46	Bangladesh	1
Indonesia	30	Oman	1
Jordan	29	United Arab Emirates	1
Pakistan	26		

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## PRODUCER REGISTRATION FEE

## COVERED CROPS

**2 PRODUCER REGISTRATION FEE FOR ALL OPTIONS (1, 2, 3 AND 4)****2.1 Producer Registration Fee for all Options (1, 2, 3 and 4)  
Integrated Farm Assurance: Crop Based Scopes and Plant Propagation Material  
For Covered Crops<sup>1</sup>**

Area under Production	Amount per year	Notes
< 0.5 ha	5 €	GLOBALG.A.P. Producer Registration Fees are calculated according to the production surface of certified crops.  (Any surface that is used more than once in an annual certification cycle shall be registered as further harvest. Surfaces registered under further harvest are not subject to additional producer registration fee.)
≥ 0.5 - < 1 ha	10 €	
≥ 1 - < 1.5 ha	15 €	
≥ 1.5 - < 5 ha	30 €	
≥ 5 - < 10 ha	50 €	
≥ 10 - < 30 ha	80 €	
≥ 30 - < 100 ha	150 €	
≥ 100 - < 500 ha	300 €	
≥ 500 ha	500 €	

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## PRODUCER REGISTRATION FEE

## NON-COVERED CROPS

**2.2 Producer Registration Fee for all Options (1, 2, 3 and 4)  
Integrated Farm Assurance: Crops and Plant Propagation Material  
For Non-covered Crops<sup>1</sup>**

Area under Production	Amount per year	Notes
< 0.5 ha	2 €	The Producer Registration Fee is calculated based on the area registered under first harvest.  (Any surface that is used more than once in an annual certification cycle shall be registered as further harvest. Surfaces registered under further harvest are not subject to additional producer registration fee.)
≥ 0.5 - < 2 ha	4 €	
≥ 2 - < 5 ha	10 €	
≥ 5 - < 15 ha	15 €	
≥ 15 - < 100 ha	30 €	
≥ 100 - < 1000 ha	70 €	
≥ 1000 - < 5000 ha	150 €	
≥ 5000 - < 10,000 ha	300 €	
≥ 10,000 ha	500 €	

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**GLOBALG.A.P.**

**HARMONIZATION THROUGH DIFFERENTIATION**

**CUSTOMIZED SOLUTIONS**



**Add-on:**

- Customized solutions delivered through the GLOBALG.A.P. system
- GLOBALG.A.P. as basis for retailer brands
- GLOBALG.A.P. as basis for consumer labels



**Emerging markets:**

- Get producers on the way towards Good Agricultural Practice
- Sub-set of the GLOBALG.A.P. checklist for emerging growers

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**GLOBALG.A.P.**

**GLOBALG.A.P. RISK ASSESSMENT ON SOCIAL PRACTICE (GRASP)**

**HOLISTIC APPROACH TO FARM ASSURANCE**

**GRASP Principles:**

1. Worker representation
2. Complaint procedure
3. Self-declaration of good social practices
4. Knowledge about national labor regulations
5. Contracts
6. Pay corresponds to contract specifications
7. Wage and overtime in compliance with regulations
8. No minors employed
9. Children of employees living on farm have access to school education
10. Time recording system
11. Hours and breaks in compliance with regulations



Country	Count
Spain	756
Italy	173
Austria	111
Vietnam	8
Costa Rica	4
Morocco	1

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**GLOBALG.A.P.**

TRENDS IN EUROPEAN RETAIL

**EFFECTIVE MANAGEMENT OF PRODUCER INFORMATION**

Use the GLOBALG.A.P. database to get a structured overview of your suppliers

All information collected during the inspection can be made available through the database such as:

- name, address of producer
- certified products
- production size
- completed checklists
- pesticide application information

• Comfortable database tools allow market participants to monitor their producers



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**GLOBALG.A.P.**

GGN USE AS OF TODAY

**Landgard**  
**INGWER**  
200g Ursprung: China  
L 502872 + 0601  
GGN 4050373842772  
Produkt: 117401410  
405228 4486027  
Landgard GAG Chweitz + Gerdien  
Horsman-Pige-98,11 + 41120 Chweitz

**Äpfel**  
**Sorte: Elstar**  
Ursprung: Deutschland Cal: 7080 KG,1  
**1000 g**  
L 4028  
Mediensteinen - Alex Land  
Walter Part Dietel & Co KG  
Stauffenbergstrasse 17  
81378 Leinfelden

**ELO** L0439  
**Klasse I**  
**Broccoli 500g**  
Ezzengegrüßland Langförder-Oldenburg eG  
49377 Vechta/Langförder (www.elo-online.de)  
Ursprungsland: Deutschland  
GGN 4018742052566  
GGN 4049321168160

**aus Columblen**  
GGN 4048930596100  
GEWICHT 0,900kg  
GRÜNDREI 1,09kg  
L0439  
F-Haus  
10330 Visseling 3 717178 000000

**Trauben hel**  
**KERNLOS**  
Sorten: Thompson Seedless  
Thompson Seedless  
H.L. 1 8000 G P 210113  
L 1019 GGN 4048930596100  
Landgard (Chweitz) + Gerdien

**Garnelen**  
Aus Aquakultur in Indonesien - 17 Thailand  
Zusatz: Garnelen 61-70 g/g (L-Kernmarken verpackt)  
geschält und gekocht, Thawingzeit, Lagerungszeit  
Einspeisung, Müllabfall  
GGN 4048930596100  
Nach dem Öffnen gekühlt aufbewahren und  
maximal 24 Stunden verbrauchen  
Bei Lagerung von  
-2°C bis +1°C  
unverändert haltbar bis  
Unter Schutzatmosphäre verpackt  
Heinrich BV  
Rommweg 14, 9914 Gd.  
Deutschland  
Lot: 2013153157

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## GLOBALG.A.P.

## GLOBALG.A.P. NUMBER (GGN) ON THE PRODUCT

## BENEFITS

- The GGN is a 13 digit GLN number that identifies each producer registered in the GLOBALG.A.P. Database
- Market participants worldwide can have assurance that any **farmed** product arriving at their stores identified by a **GGN number**, has been **checked at farm** level;
- And that proper **segregation and hygiene** are in compliance through the **whole food chain** following the GLOBALG.A.P. Chain of Custody Standard

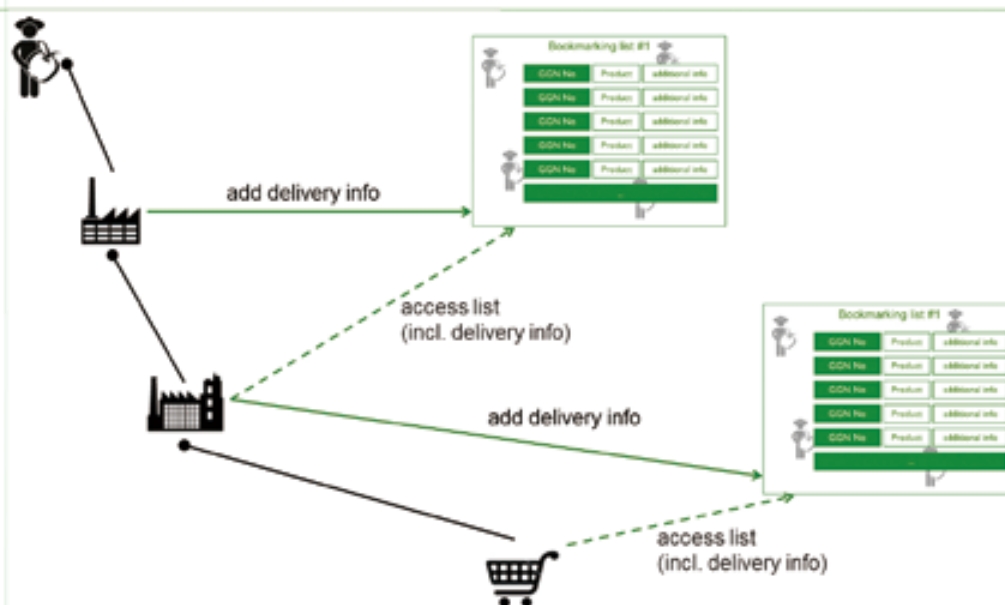


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## GLOBALG.A.P.

## GLOBALG.A.P. BOOKMARKING

## GET OR GIVE ACCESS TO LISTS – IN BOTH DIRECTIONS OF THE SUPPLY CHAIN



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**GLOBALG.A.P.**

**GLOBALG.A.P. WEB APP**

ACCESS ONLINE CERTIFICATE VIA QR CODE ON MOBILE DEVICE

1. Add your GGN to the end of this URL link:  
<http://database.globalgap.org/mobile/4050373748074>
2. Use this unique link to create your personal QR code.
3. Scan it to find out how it works and share the QR code with your business partners & clients!





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**GLOBALG.A.P.**

**GLOBALG.A.P. WEB APP**

ACCESS ONLINE CERTIFICATE VIA QR CODE ON MOBILE DEVICE






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**GLOBALG.A.P.**

**INFORMATION ALSO AVAILABLE FOR CONSUMERS**

[WWW.MY-FISH.INFO](http://WWW.MY-FISH.INFO)

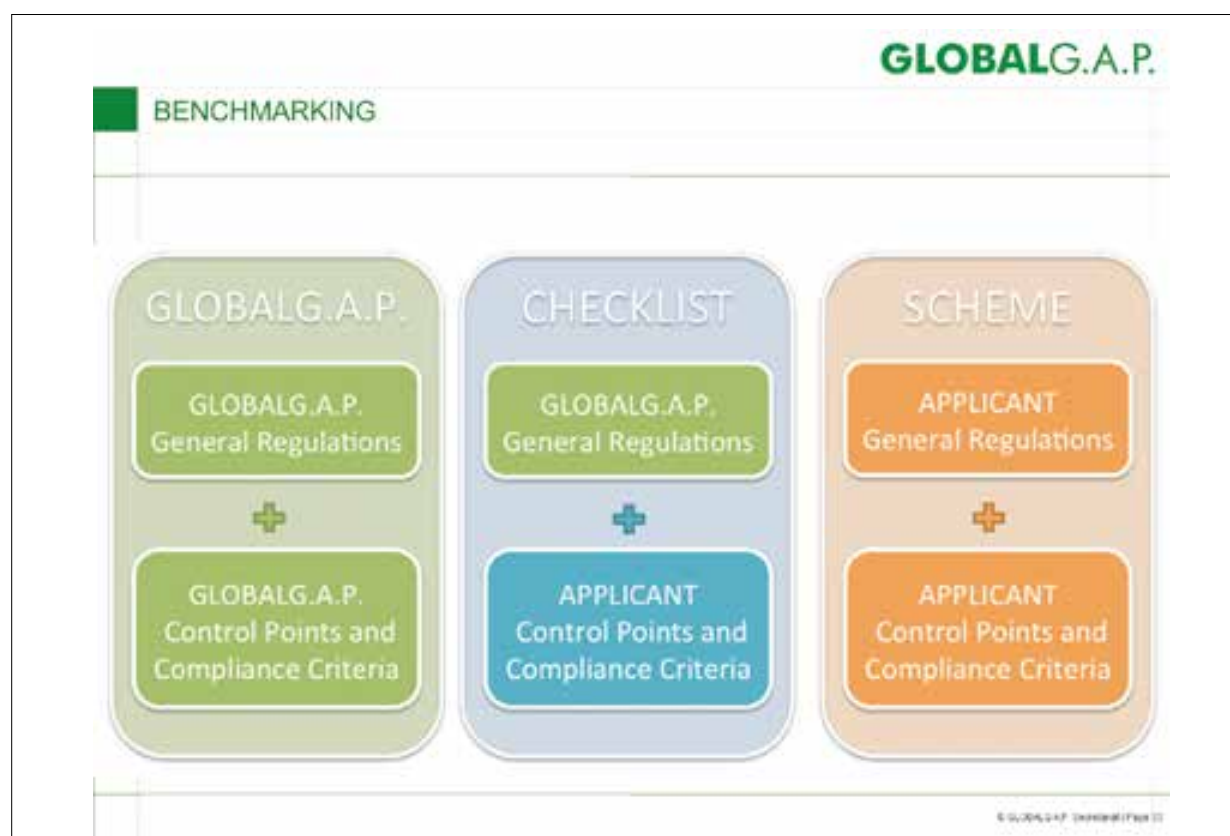
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**GLOBALG.A.P.**

**HARMONIZATION THROUGH BENCHMARKING**  
**RECOGNIZING NATIONAL SCHEMES**











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**GLOBALG.A.P.**

**HARMONIZATION THROUGH BENCHMARKING**

**FULLY BENCHMARKED SCHEMES**

Logo	Name	Scheme Owner	Country	Scope
	AMAGAP	Agramarkt Austria Marketing GesmbH	Austria	Fruit & Vegetables
	ASSURED PRODUCE	AssuredProduce	UK	Fruit & Vegetables
	NEW ZEALAND GAP	New Zealand GAP	New Zealand	Fruit & Vegetables
	QS-GAP	QS Fachgesellschaft Obst-Gemüse-Kartoffeln GmbH	Germany	Fruit & Vegetables
	UNE 155000	AENOR	Spain	Fruit & Vegetables
	FLORVEDE	Asocoflores	Colombia	Fruit & Vegetables
	MPS-GAP	MPS Milieu ProgrammaSiereteelt	The Netherlands	Flowers
	SWISSGAP HORTIKULTUR	Verein SwissGAP	Schweiz	Flowers










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## GLOBALG.A.P.

## HARMONIZATION THROUGH BENCHMARKING

## APPROVED MODIFIED CHECKLIST

Logo	Name	Scheme Owner	Country	Scope
	CHILEGAP	Fundación para el Desarrollo Frutícola	Chile	Fruit & Vegetables
	IP SIGILL GAP	SigillKvalitetssystem AB	UK	Fruit & Vegetables
	MEXICOG.A.P	Mexico Calidad Suprema A.C.	Mexico	Fruit & Vegetables
	NATURANE	ANECOOP Spain COOP	Spain	Fruit & Vegetables
	NATURSENSE	E. Martinavarro S.A.	Spain	Fruit & Vegetables
	CERTIFIED NATURAL MEAT PROGRAM	Instituto Nacional de Carnes	Uruguay	Rinder-und Schafzucht
	KENYAGAP*	Fresh Produce Exporters Association of Kenya	Kenya	Fruit & Vegetables, Flowers
	CHINAGAP STANDARD AND CERTIFICATION RULE*	Certification and Accreditation Administration of the People's Republic of China	China	Fruit & Vegetables, Combinable Crops
	JGAP*	Japan Good Agricultural Initiative	Japan	Fruit & Vegetables

\* vorläufig anerkannt

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## GLOBALG.A.P.

## HARMONIZATION THROUGH NATIONAL TECHNICAL WORKING GROUPS

## LOCAL INPUT IN STANDARD SETTING

## America

Argentina  
Brazil  
Chile  
Colombia  
Costa Rica  
Guatemala  
Mexico  
Peru  
Uruguay  
USA



## Europe

Belgium  
Bulgaria  
Czech Republic  
Denmark  
France  
Germany  
Greece  
Italy  
Netherlands  
Norway (Aqua and Aquafeed)  
Poland  
Spain  
Turkey  
Ukraine

## Asia

India  
Malaysia  
Thailand  
Japan

## Africa

Cote D'Ivoire  
Egypt  
Ghana  
Kenya  
South Africa  
Tanzania

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**GLOBALG.A.P.**

THE GLOBALG.A.P. FARM ASSURER PROGRAM



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**GLOBALG.A.P.**

FORMAL QUALIFICATION FOR FARM ASSURER

<p><b>1. Formal Qualifications (mandatory)</b>  A post high school diploma in a discipline related to the scope of certification <b>and</b> 2 years of work experience in the relevant sub-scope  <b>Or</b> 3 years of full-time work experience in the relevant sub-scope</p> <p><b>2. Work experience in consultancy (mandatory)</b> CV/Resume/proof  Minimum 1 year of work experience as a consultancy (advisory) service provider related to production in the relevant scope</p> <p><b>3. H.A.C.C.P. Principles (mandatory)</b></p> <p><b>4. Food/Feed Hygiene Training (mandatory)</b></p> <p><b>5. G.A.P. Training: Principles (mandatory)</b>  For Crops Scope: Plant protection, fertilizer and IPM training.</p> <p><b>6. GLOBALG.A.P. Training</b></p> <p><b>7. On-Farm day with witnessing of a GLOBALG.A.P. audit</b></p>
---

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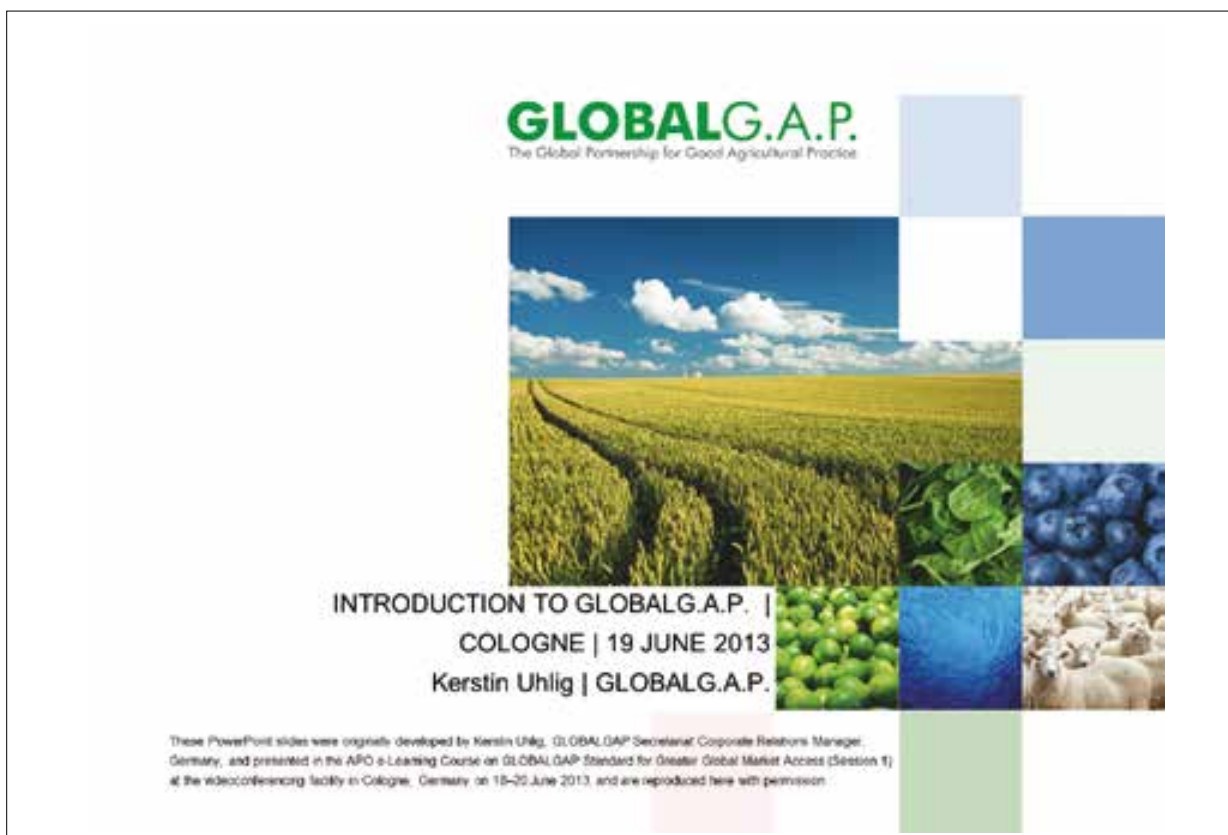
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## Appendix 5: GLOBALGAP Certificaton Process by Kerstin Uhlig





## GLOBALG.A.P.

## HOW WERE THE STANDARDS DEVELOPED?



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## GLOBALG.A.P.

## GLOBALG.A.P. MEMBERS

43 GLOBALG.A.P. RETAIL &amp; FOOD SERVICE MEMBERS



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## GLOBALG.A.P.

## MEMBERS IN THE TECHNICAL COMMITTEE CROPS

Name	Company	Country
Ricardo Adonis	FDF/Asoex	Chile
Lindi Benic	Fruit South Africa/Shaffle	South Africa
Ulf Berbig	ALDI SÜD	Germany
Paul Bol	Dutch Produce Association	Netherlands
Raf de Blaiser	Lava	Belgium
Martin de la Harpe	Finlays Horticulture	United Kingdom
Peter Ensor	ADFSC/Farmer's Service Center	United Arab Emirates
David Gombas	United Fresh	United States of America
Ian Harrison	IP Ltd. / ASDA	United Kingdom
Willem Hofmans	Ahold	Netherlands
Theresa Huxley	Sainsburys	United Kingdom
Massimiliano Laghi	Apofruit	Italy
Sharan Lanini	Chiquita	USA
Jasmin Mangels	EDEKA	Germany
Stephen Mbithi	FPEAK	Kenya
Tony Palmer	TESCO	United Kingdom
Bizhan Pourkomailian	McDonald's	United Kingdom
Leon Sanchez Blanco	Metro Group	Germany
Sabrina Schackmann	Globus	Germany
Chiyuki Uehara	AEON	Japan
Frank van Oorschot	LTO	Netherlands

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## GLOBALG.A.P.

## INPUT VIA NATIONAL TECHNICAL WORKING GROUPS

## LOCAL INPUT IN STANDARD SETTING

**America**

Argentina  
Brazil  
Chile  
Colombia  
Costa Rica  
Guatemala  
Mexico  
Peru  
Uruguay  
USA

**Europe**

Belgium  
Bulgaria  
Czech Republic  
Denmark  
France  
Germany  
Greece  
Italy  
Netherlands  
Norway (Aqua and Aquafeed)  
Poland  
Spain  
Turkey  
Ukraine

**Asia**

India  
Malaysia  
Thailand  
Japan

**Africa**

Cote D'Ivoire  
Egypt  
Ghana  
Kenya  
South Africa  
Tanzania

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**FINAL VERSION OF IFA VERSION 4**

PUBLISHED IN MARCH 2011

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- Translation into:  
Afrikaans, Arabic, Dutch, French, Chinese, German, Greek, Italian, Portuguese, Spanish, Turkish
- All documents are freely available on our website



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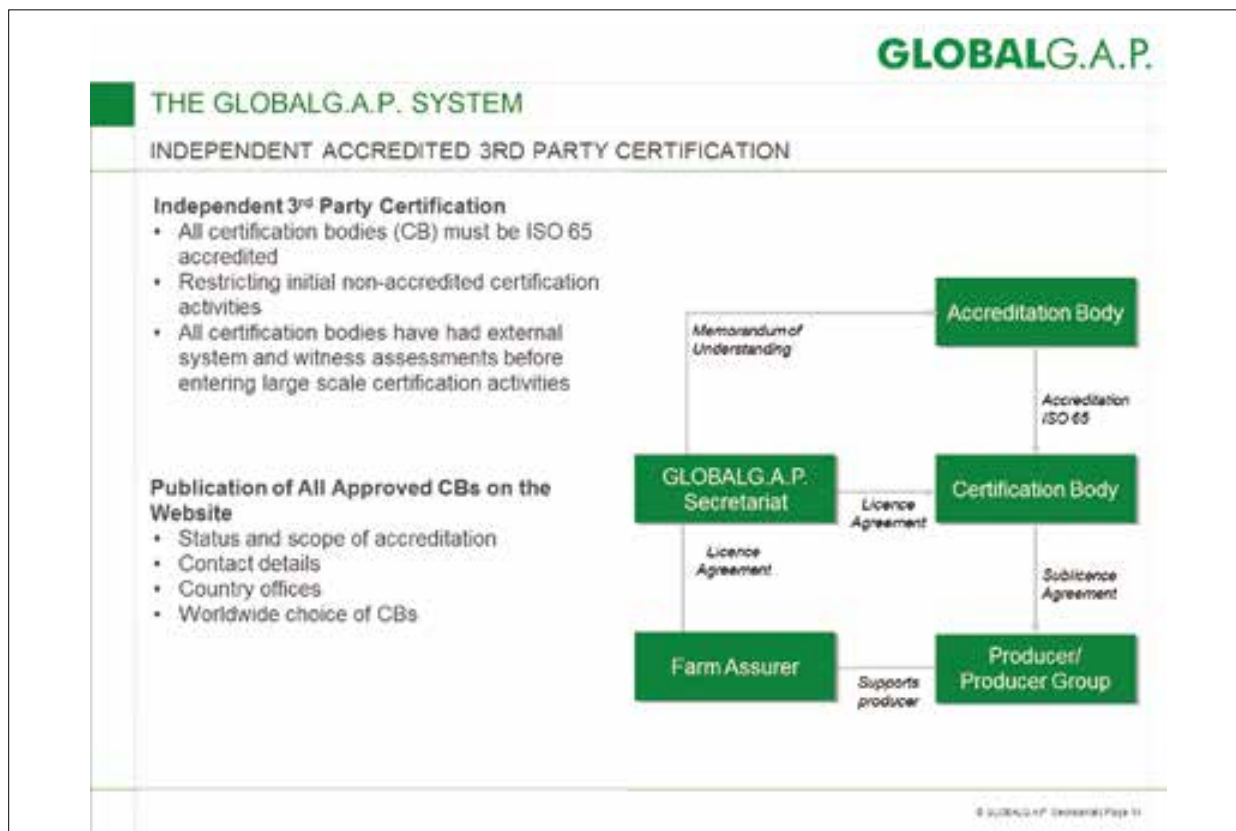
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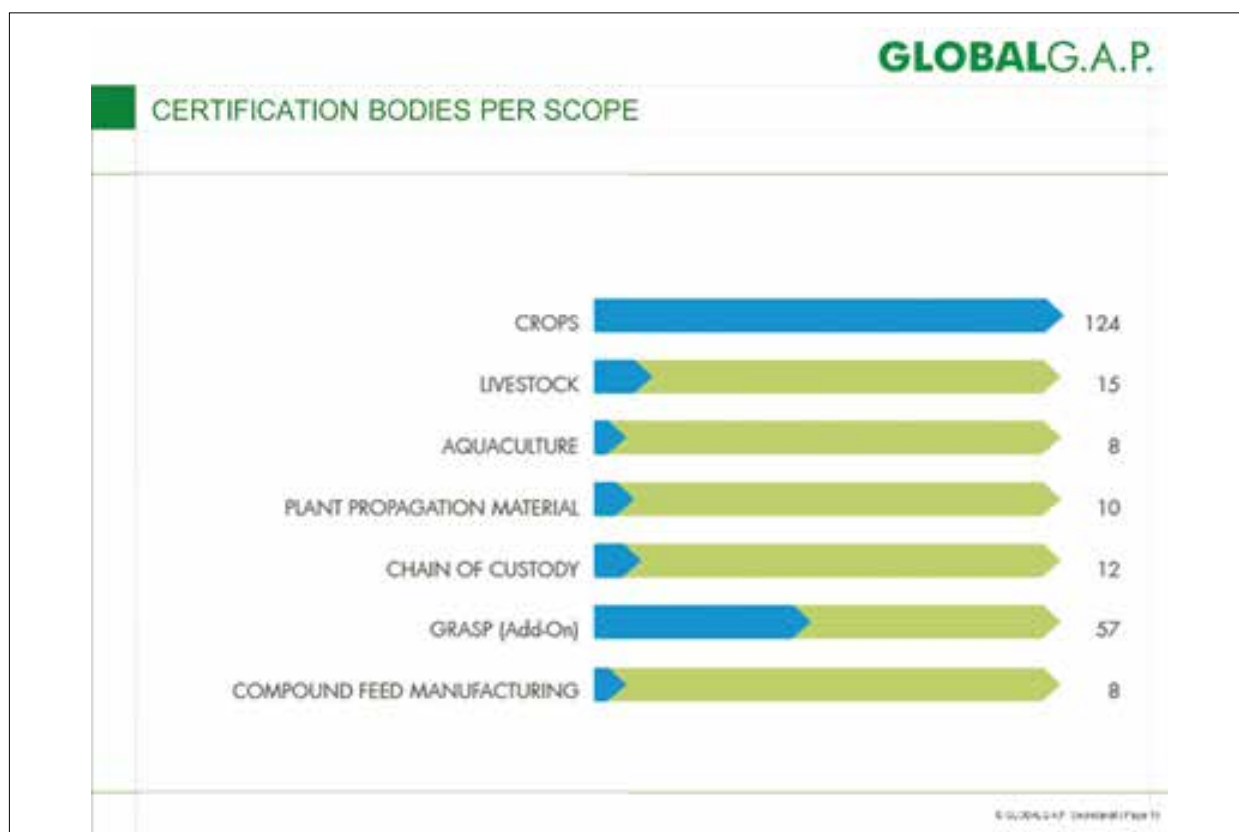
**GLOBALG.A.P. NORMATIVE DOCUMENTS**

GENERAL REGULATIONS & CONTROL POINTS



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**GLOBALG.A.P.**

GENERAL REGULATIONS

PART 1 | GENERAL RULES

- General introduction, terms definitions
- Registration Process
- Assessment Process
- Certification Process
- Trademark rules
- Registration data requirements
- Parallel production




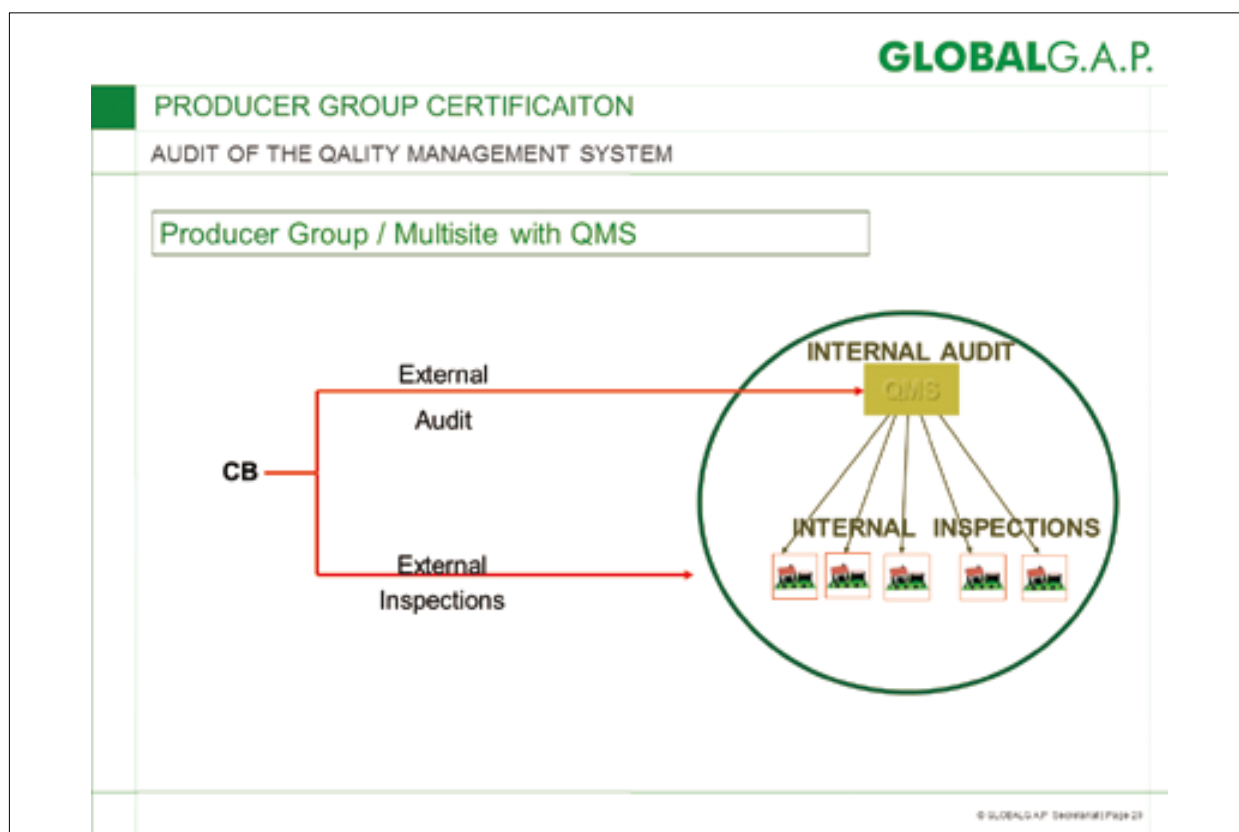
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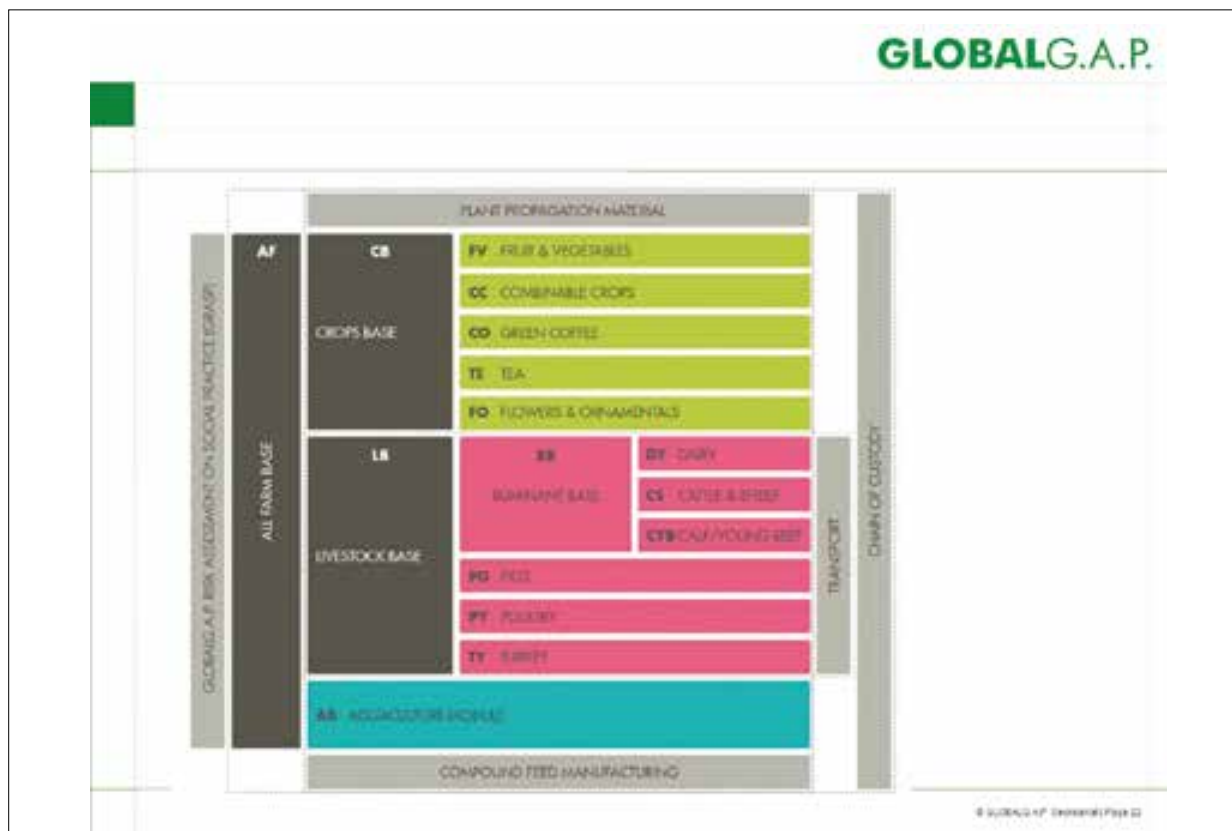
GENERAL REGULATIONS

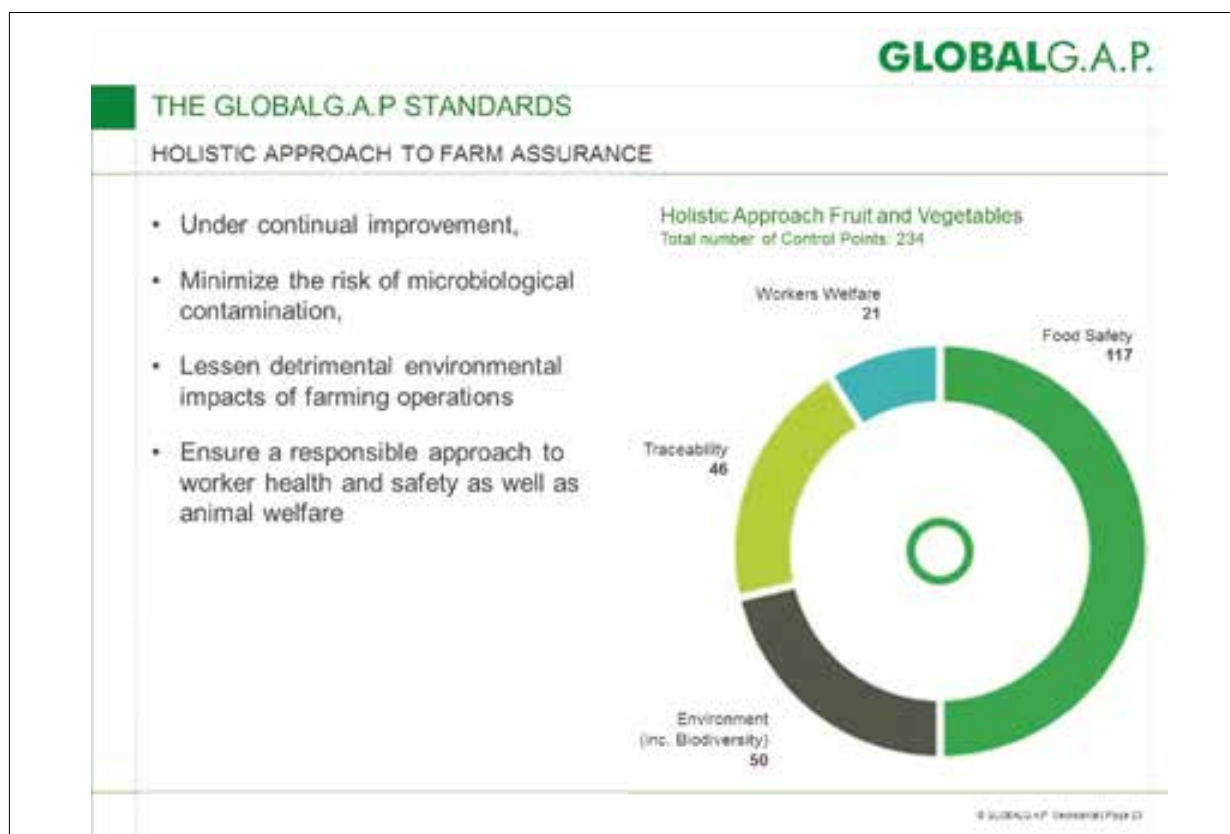
PART 2 | RULES FOR MULTI SITE AND PRODUCER GROUPS

- Legality, administration and structure
- Document control
- Internal quality management system
- Traceability and segregation









**GLOBALG.A.P.**

## CONTENT OF THE GLOBALG.A.P. CONTROL POINTS

### ALL FARM BASE

AF.1 SELF-ASSESSMENT SITE HISTORY AND SITE MANAGEMENT	
AF.2 RECORD KEEPING AND INTERNAL SELF-ASSESSMENT/INTERNAL INSPECTION	
AF.3 WORKERS HEALTH, SAFETY AND WELFARE	
AF.4 SUBCONTRACTORS	
AF.5 WASTE AND POLLUTION MANAGEMENT, RECYCLING AND RE-USE	
AF.6 ENVIRONMENT AND CONSERVATION	
AF.7 COMPLAINTS	
AF.8 RECALL/WITHDRAWAL PROCEDURE	
AF.9 MASS BALANCE	
AF.10 LOGO USE	
AF.11 TRACEABILITY AND SEGREGATION	

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**CONTENT OF THE GLOBALG.A.P. CONTROL POINTS**

**CROPS BASE**

- CB.1 TRACEABILITY
- CB.2 PROPAGATION MATERIAL
- CB.3 SITE HISTORY AND SITE MANAGEMENT
- CB.4 SOIL MANAGEMENT
- CB.5 FERTILISER USE
- CB.6 IRRIGATION/FERTIGATION
- CB.7 INTEGRATED PEST MANAGEMENT
- CB.8 PLANT PROTECTION PRODUCTS
- CB.9 EQUIPMENT



**CONTENT OF THE GLOBALG.A.P. CONTROL POINTS**

**CROPS BASE – GUIDELINES AND SUPPORTING DOCUMENTS**

**GLOBALG.A.P. Guidelines:**

- Microbiological Hazards
- Responsible Water Use
- Integrated Pest Management Toolkit
- PPP Use In Countries That Allow Extrapolation
- Residue Analysis
- Mrl Exceedance Risk Assessment
- For Visual Inspection And Functional tests of application equipment



GLOBALG.A.P.

## CONTENT OF THE GLOBALG.A.P. CONTROL POINTS FRUIT AND VEGETABLES

- FV.1 SOIL MANAGEMENT
- FV.2 SUBSTRATES (N/A if no substrates are used)
- FV.3 PRE-HARVEST
- FV.4 HARVESTING
- FV.5 PRODUCE HANDLING



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## GET MORE INFORMATION

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## Appendix 6: JGAP A Trust Mark of Excellent Farm Food Safety and Eco-Friendly by Yasuaki Takeda



**JGAP**  
(Japan Good Agricultural Practice)  
**A trust mark of  
excellent farm  
Food safety and eco-friendly**

Presented by:  
Yasuaki Takeda, JGAP Managing Director

March 2013

These PowerPoint slides were originally developed by Yasuaki Takeda, JGAP Management Director, Japan, and presented at the APO e-Learning Course on GLOBALGAP Standard for Greater Global Market Access (Session 1) at the videoconferencing facility in APO Secretariat in Tokyo, Japan on 18–20 June 2013, and are reproduced here with permission.

### History of GAP in Japan

- In 2002, Retailer AEON started A-Q-GAP to manage their supplier and farmers for their brand “TopValue-Green Eye”. Then, other retailer and food service provider made their GAP standard. Local government also established local GAP standard. Those GAPs had different Control Point and Criteria, and most of them had no certification system.
- In 2006, JGAP office was founded by retailers and supplier-farmers to harmonize GAP scheme in Japan. Most of main retailer in Japan joined JGAP, and JGAP became the common standard GAP scheme in Japanese farming scene.
- In 2009, national government released GAP guideline for GAP scheme owners. JGAP was the 1st GAP scheme to meet the guideline.

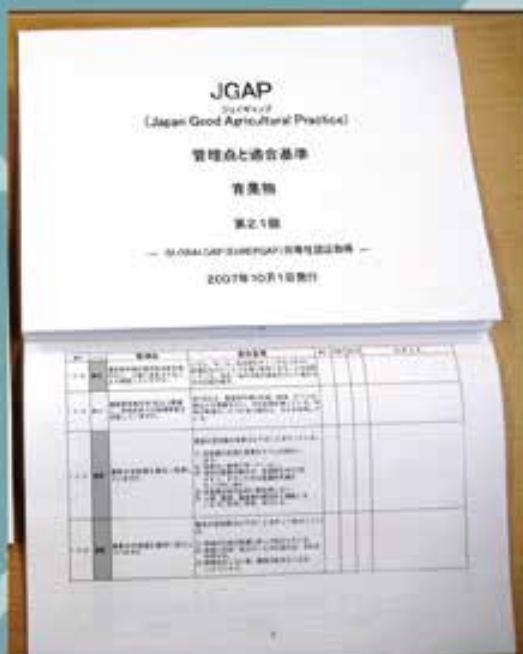


## What is JGAP?

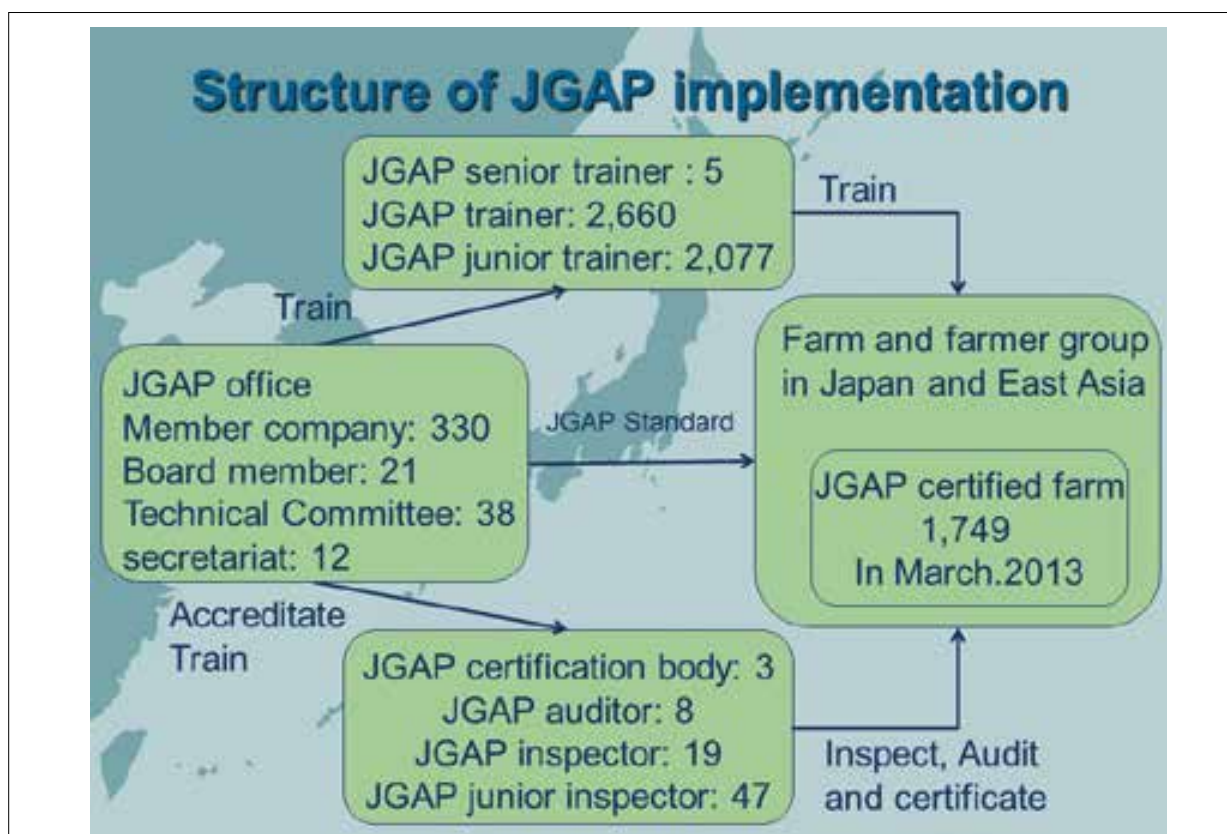


- JGAP is the strict and excellent standard of farm management for food safety and eco-friendly agriculture.
- JGAP is the up-to-date quality management technology for food safety on farm level in Japan, and keeps communication with GLOBALGAP in EU.
- JGAP is focusing on safety from chemical residue, food poisoning caused by bacteria, contamination of foreign material and radioactive material.
- JGAP focus on not only food safety but also eco-friendly and work safety on farm.
- Most of major retailer in Japan supports JGAP, and use it for supplier management to keep food safety thorough farm to store.

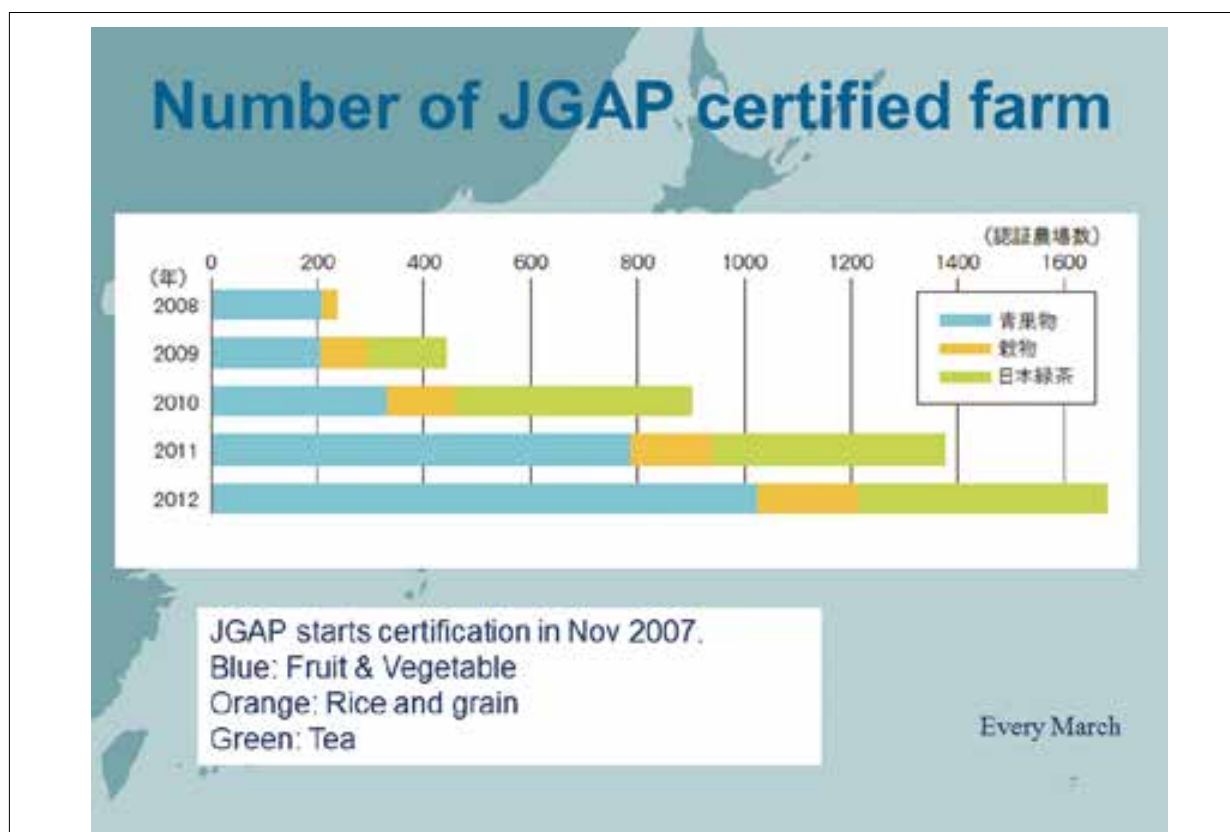
## Why JGAP?



- JGAP is the most famous GAP certification scheme in Japan.
- More than 130 control point for food safety and eco-friendly and work safety in farm.
- JGAP has a certification system. There are 4 certification bodies those are accredited by JGAP.
- JGAP is the trust mark of excellent Japanese farm.

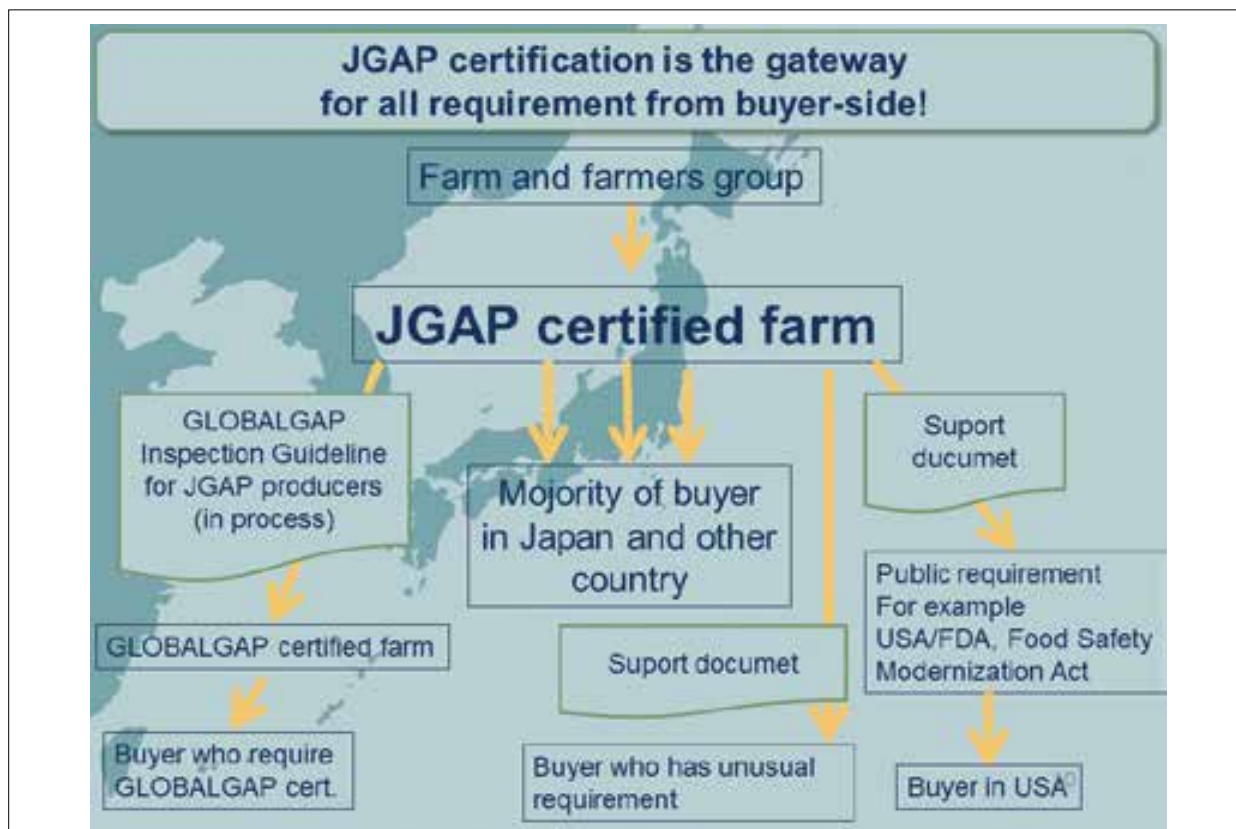
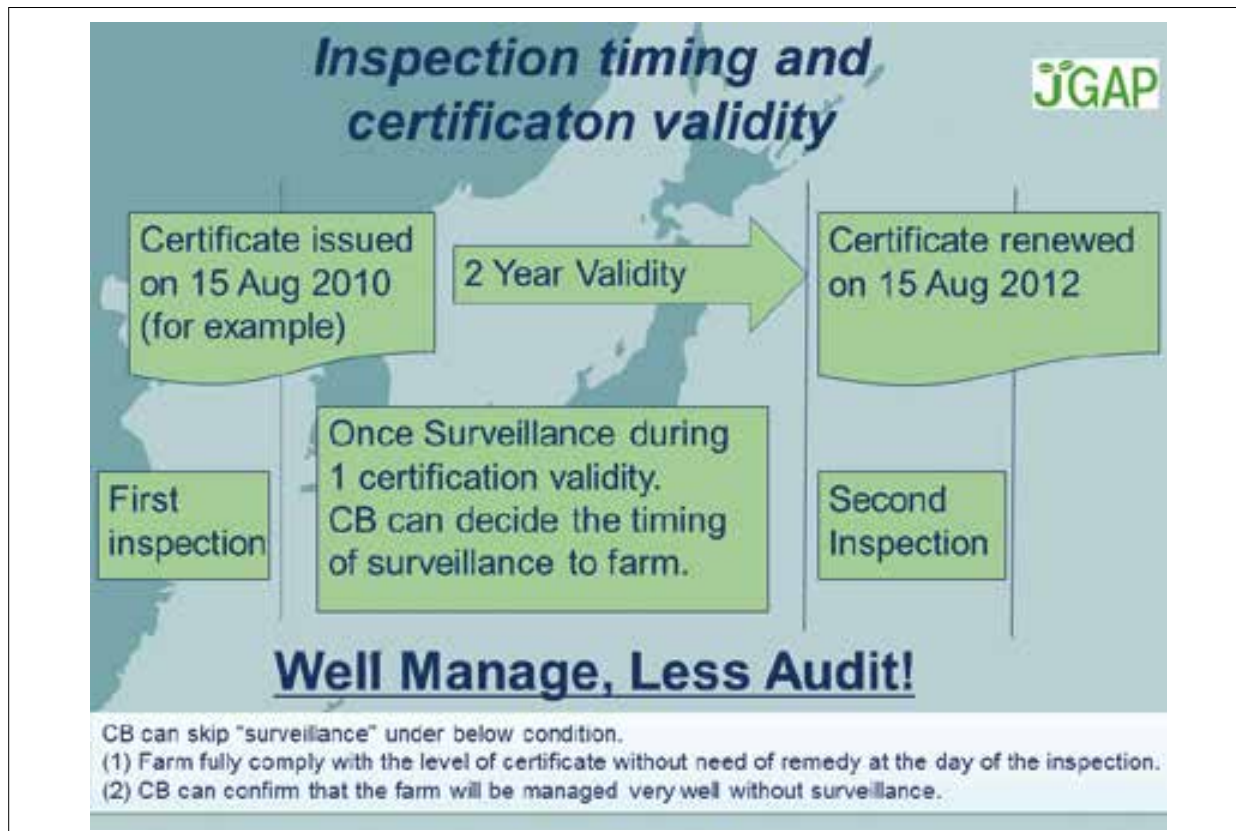


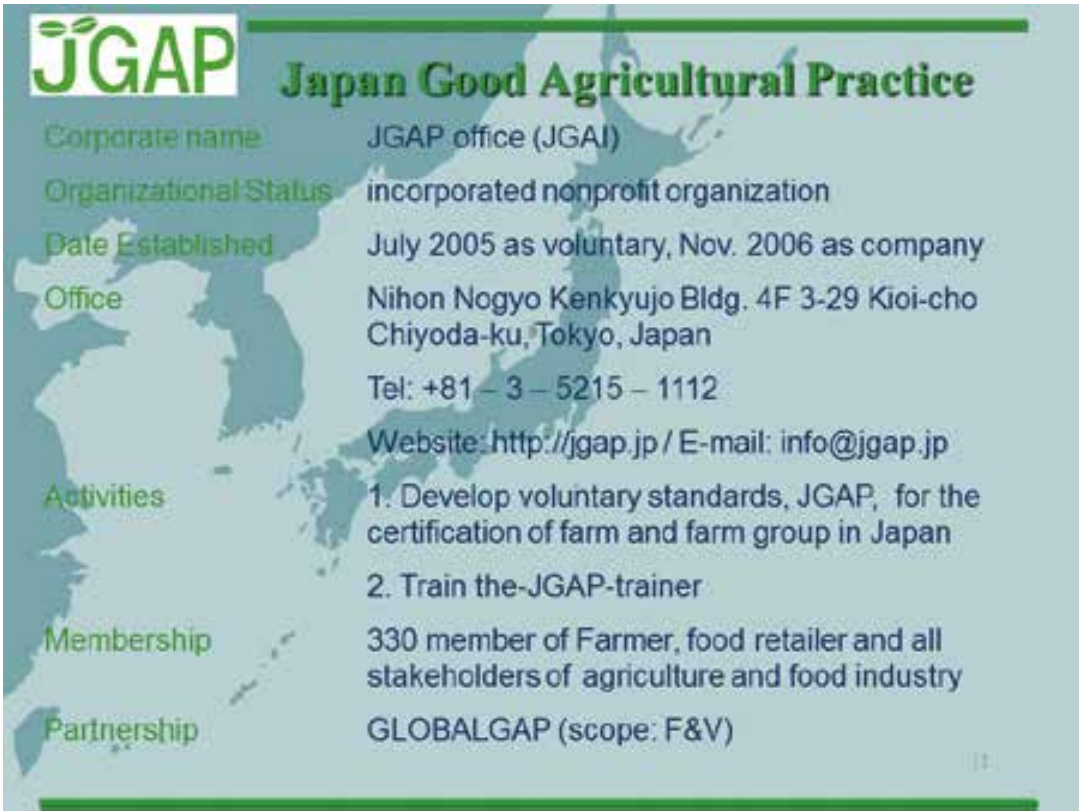




### JGAP mark that farm and farmers group can use after certified for labeling, including for use of B to C. It started from July 2010.

<p><u>JGAP mark that farm and farmers group use</u></p> <p>Certified farm and farmers group use on the product such as vegetable, fruit, brown rice, polished rice and raw green tea.</p> <div style="text-align: center;">  <p>登録番号 123456789</p> </div>	<p><u>JGAP mark that food maker use</u></p> <p>Food maker use on the grocery such as polished rice, frozen vegetable, fruit juice and tea beverage, those should be made by raw material from certified farm and farmers group.</p> <div style="text-align: center;">  <p>登録番号 123456789</p> </div>
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**JGAP** Japan Good Agricultural Practice

<b>Corporate name</b>	JGAP office (JGAI)
<b>Organizational Status</b>	incorporated nonprofit organization
<b>Date Established</b>	July 2005 as voluntary, Nov. 2006 as company
<b>Office</b>	Nihon Nogyo Kenkyujo Bldg. 4F 3-29 Kioi-cho Chiyoda-ku, Tokyo, Japan Tel: +81 – 3 – 5215 – 1112 Website: <a href="http://jgap.jp">http://jgap.jp</a> / E-mail: <a href="mailto:info@jgap.jp">info@jgap.jp</a>
<b>Activities</b>	1. Develop voluntary standards, JGAP, for the certification of farm and farm group in Japan 2. Train the-JGAP-trainer
<b>Membership</b>	330 member of Farmer, food retailer and all stakeholders of agriculture and food industry
<b>Partnership</b>	GLOBALGAP (scope: F&V)

## **Appendix 7: Malaysia GAP, SALM (MyGAP) by Norma Othman**

### **THE GOOD AGRICULTURAL PRACTICE SCHEME IN MALAYSIA**

**BY  
NORMA OTHMAN  
DIRECTOR  
HORTICULTURE DIVISION  
DEPARTMENT OF AGRICULTURE MALAYSIA**

These PowerPoint slides were originally developed by Norma Othman, Director, Horticulture Division of Department of Agriculture Malaysia, and presented at the APO e-Learning Course on GLOBALGAP Standard for Greater Global Market Access (Session 1) at the videoconferencing facility in Kuala Lumpur, Malaysia on 18-20 June 2013, and are reproduced here with permission.

### **SCOPE OF PRESENTATION**

- WHAT IS GAP?
- WHAT IS SALM?
- ELEMENTS OF SALM
- CERTIFICATION PROCESS
- IMPACT OF SALM
- AWARENESS PROGRAMME
- ISSUES AND CHALLENGES
- WAY FORWARD
- SUMMARY



## GAP - Good Agricultural Practices

Practices used to prevent or reduce the risk of things going wrong (hazards) during production, harvesting and postharvest handling

Food is  
safe

Quality is  
right



Environment is  
not harmed

Workers are  
protected

## GAP IN MALAYSIA

- GAP scheme for food crops in Malaysia known as **Farm Certification Scheme for Good Agricultural Practice (SALM – Skim Amalan Ladang Baik Malaysia)**
- Developed by Department Of Agriculture (DOA), Ministry Of Agriculture & agro Based Industries
- Launched in 2002





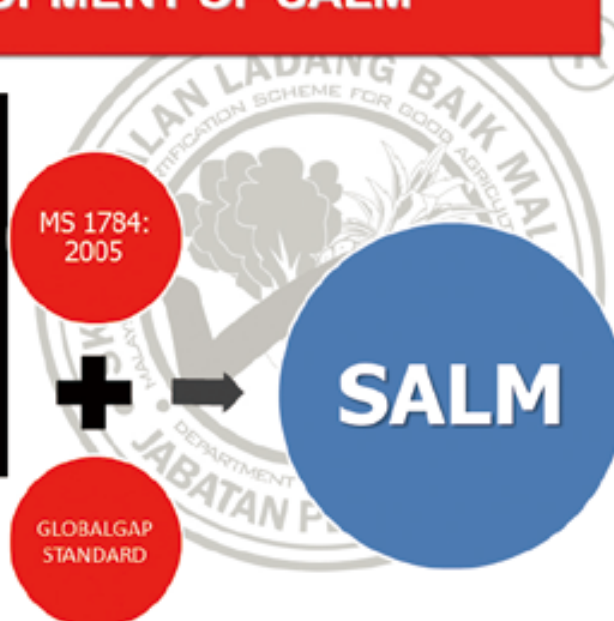
## WHAT IS SALM ?

- A **certification program** to **recognize farms** that **adopt Good Agricultural Practices (GAP)**, operate in a sustainable and an environmentally friendly way, considering workers health and safety and yield produces that are of quality and safe for consumption



## DEVELOPMENT OF SALM

- Crop Commodities – Good Agricultural Practice (GAP)
- By Department of Standard Malaysia (DSM) in 2005



## **ELEMENTS of SALM**

1. Traceability
2. Record Keeping and Internal Audit
3. Planting materials and Rootstock
4. Site History and Site Management
5. Soil and Substrate Management
6. Fertilizer Management
7. Irrigation and fertigation
8. Crop protection
9. Harvesting
10. Post Harvest handling

## **ELEMENTS of SALM**



11. Pesticide Residue Analysis of Produce
12. Waste and Pollution Management, Recycling and Re-use
13. Workers` Health, safety and welfare
14. Environmental issues
15. Record of complaints
16. Legal Requirements

## 1. TRACEABILITY



- The produce shall be traceable to the farms where it has been produced

## 2. RECORD KEEPING AND INTERNAL AUDIT

- Farms shall keep up-to-date records
- 19 types of farm records
- Records must be maintained at least 6 months
- Internal audit must be carried out at least once a year

### 3. PLANTING MATERIAL & ROOTSTOCKS



- Records of all planting materials and any treatment used must be kept
- Avoid the use of GMO
- Protected varieties shall respect IPR legislation

### 4.SITE HISTORY AND SITE MANAGEMENT

- Layout of the field and site history
- EIA for new areas > 50 ha
- Farms located < 1,000m above sea levels (developed after 1 Jan 2002)
- Appropriate soil conservation shall be undertaken for farms located on sloping land within permissible level
- Legal status of the farm

## **5. SOIL AND SUBSTRATE MANAGEMENT**

- Cultivation technique should reduce soil erosion
- Use of chemical for fumigation and to sterilize substrate must be justified and recorded
- Use of organic substrate, inorganic substrate should be recycled

## **6. FERTILIZER MANAGEMENT**

- Fertilizer application machinery must be maintained
- Fertilizers stored separately from pesticides, fresh produce and nursery stock
- Fertilizer store must be covered, clean, dry and no risk of contamination of water sources
- Human sewage sludge and pig waste is prohibited

## 6. FERTILISER MANAGEMENT...cont



- Composting sites are located and constructed to prevent contamination of production sites and water sources
- Organic materials are not applied in direct contact with the edible part of the crop

## 7. IRRIGATION AND FERTIGATION

- The most efficient and commercially practical water delivery system should be used
- Untreated sewage water is prohibited
- Water source should be analyzed once a year for microbial, chemical and mineral pollutants



## 8. CROP PROTECTION

- Minimize the use of pesticides, apply IPM techniques
- Use registered chemicals under the pesticides Act
- For crops to be exported, chemicals used must meet the regulations of the importing countries
- Records of pesticides application should be recorded.

### Integrated Pest Management (IPM)





### **8. CROP PROTECTION.....cont**

- Pesticide operators shall be trained on safe and proper use of pesticides
- Operators shall be equipped with personal clothing and equipment which shall be cleaned and stored separately from pesticides
- Pre-harvest interval as prescribed on labels shall be strictly adhered

### **8. CROP PROTECTION.....cont**

- Pesticides shall be stored in sound secured, well ventilated and well lit location away from other materials
- Emergency facilities e.g. bucket of sand must be available at pesticide storage to deal with accidental spillage
- Pesticides shall be stored in original package
- Danger signs shall be placed on access door



PESTICIDE STORAGE

## 9. HARVESTING

- Workers handling fresh produce shall undergo training in basic hygiene and food safety
- Clean toilet and washing facilities shall be available in the vicinity of work
- Packaging materials shall be stored in a proper place to avoid contamination
- Re-usable crates shall be cleaned

## 9. HARVESTING...cont

- Harvest during the coolest time of the day
- Place produce in the shade after harvest
- Cover containers to reduce moisture loss and minimise exposure to sun

- Packaging material shall be stored properly to avoid contamination
- Should be protected from rodents, birds and other animals



## 10. POST HARVEST HANDLING

- Use of chemicals for post harvest treatment shall be in accordance with Food Act and Regulations
- For crops to be exported, shall not use chemicals that are banned in the importing countries
- Potable water shall be used for washing produce

## 10. POST HARVEST HANDLING...cont



- Instructions for cleaning and sanitation of packing, handling and storage areas and equipment, tools, containers and materials



## TRANSPORTATION



- Use packages that can be stacked without damaging produce
- Cover loads to prevent water loss and exposure to sun

## 11. ANALYSIS OF PRODUCE

- Crop producers/suppliers shall provide evidence of residue testing
- Residue test results should be traceable to the crop producer and the production site
- Preventive and corrective actions should be in place in the event of MRL is exceeded

## **12. WASTE AND POLLUTION MANAGEMENT, RECYCLING AND RE-USE**

- Identify all possible waste products and source of pollution in the farm areas
- Crop debris may be composted or re-used for soil conditioning
- Avoid land filling or burning by recycling the waste

## **13. WORKERS HEALTH, SAFETY AND WELFARE**

- Trained all workers operating dangerous equipment
- Accident and emergency procedures shall be available with clear instructions to the workers
- First aid boxes available at permanent site on the farm
- Employment conditions shall comply to national regulations
- On site living quarters shall be habitable and have basic amenities and facilities

## 14. ENVIRONMENTAL ISSUES



- Crop producers shall conform to existing environmental legislation
- EIA required for opening new areas > 50 ha

## 15. RECORDS OF COMPLAINTS

- Records of complain on all produce not in compliance with the requirements in the standard and their remedial actions shall be kept



## 16. Legal Requirements

- All farm activities and produce shall comply with the requirements of the legislations currently in force in Malaysia e.g Food Act 1983, Pesticide Act 1974 , Environmental Quality Act 1974 and Occupational Safety and Health Act 1994

## CERTIFICATION PROCESS

- Producers need to COMPLY to requirements on the site inspection, verification on agronomic practices & produce analysis



## CURRENT STATUS

1166  
farms  
registered

602  
awarded  
with SALM  
Certificate



## IMPACT OF SALM

**Survey by Malaysian Productivity Corporation (MPC) "Enhancing Total Factor Productivity in Agro-based Industry - Companies Practices Using SALM"**

- 71% reported their products have been attained quality assurance and food safety
- 52.2% agreed that SALM has enabled them to have better market access especially in the export market

**Survey by MPC "Enhancing Total Factor Productivity  
in Agro-based Industry - Companies Practices Using  
SALM"...cont**

-15.2% reported that their farm produce were sold at a premium due to SALM certification

-13% reported that their farms attained higher productivity due to the inculcation of Gap as propagated by SALM

**RESULT OF RAPID APPRAISAL SURVEY**

- Improvements in farm management due to its systematic approach of documenting every process
- Farmers are practicing farm hygiene and food safety
- Serves as the spring board to the export market
- Assist farmer in increasing farm activity and farm record keeping

## AWARENESS PROGRAMME

### TRAINING

- ✓ Farm Advisors
- ✓ Auditors
- ✓ Producers

### PROMOTIONAL ACTIVITIES

- ✓ Exhibition
- ✓ Mass Media
- ✓ Billboard
- ✓ Supermarket









## ISSUES AND CHALLENGES

- There is no price difference in the products of SALM certified farms from uncertified farms
- Volumes of documentation requirements
- High cost involved in adhering to the SALM requirement
- Lack of Awareness by Consumers

## **WAY FORWARD**

### **Rebranding of SALM to My GAP**

- Crops
- Livestock
- Aquaculture

## **SUMMARY**

**SALM are needed** for the following reasons:

- To safeguard the health of consumers
- To meet WTO regulatory requirements for food safety and quarantine
- To gain access to markets in other countries



THANK YOU  
*TERIMA KASIH*



## **Appendix 8: Harmonizing and Benchmarking with ASEANGAP by Norma Othman**

**E - LEARNING COURSE ON THE GLOBAL GAP  
STANDARD FOR GREATER MARKET ACCESS  
18 – 20 June 2013**

**HARMONIZATION AND BENCHMARKING OF  
NATIONAL GAP WITH ASEAN GAP STANDARD**

**BY  
NORMA OTHMAN  
DIRECTOR  
HORTICULTURE DIVISION  
DEPARTMENT OF AGRICULTURE  
MALAYSIA**

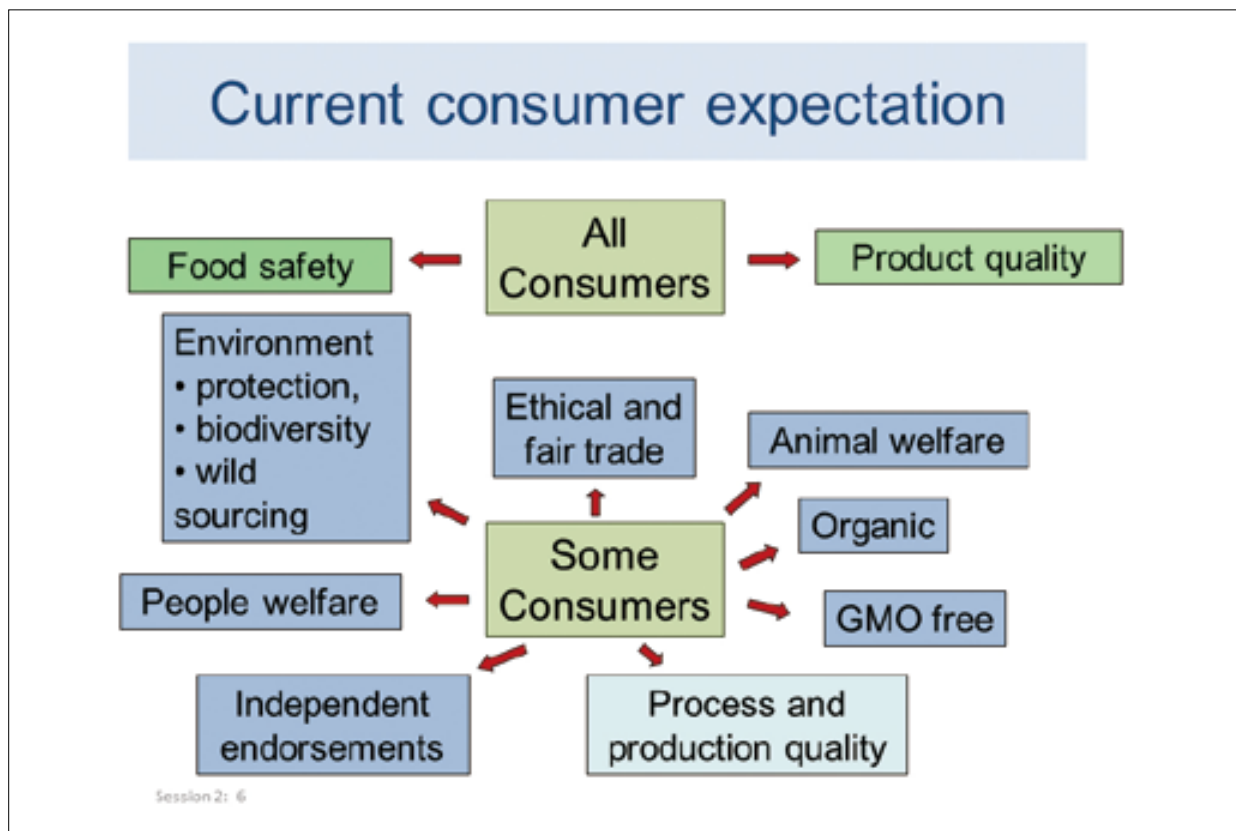
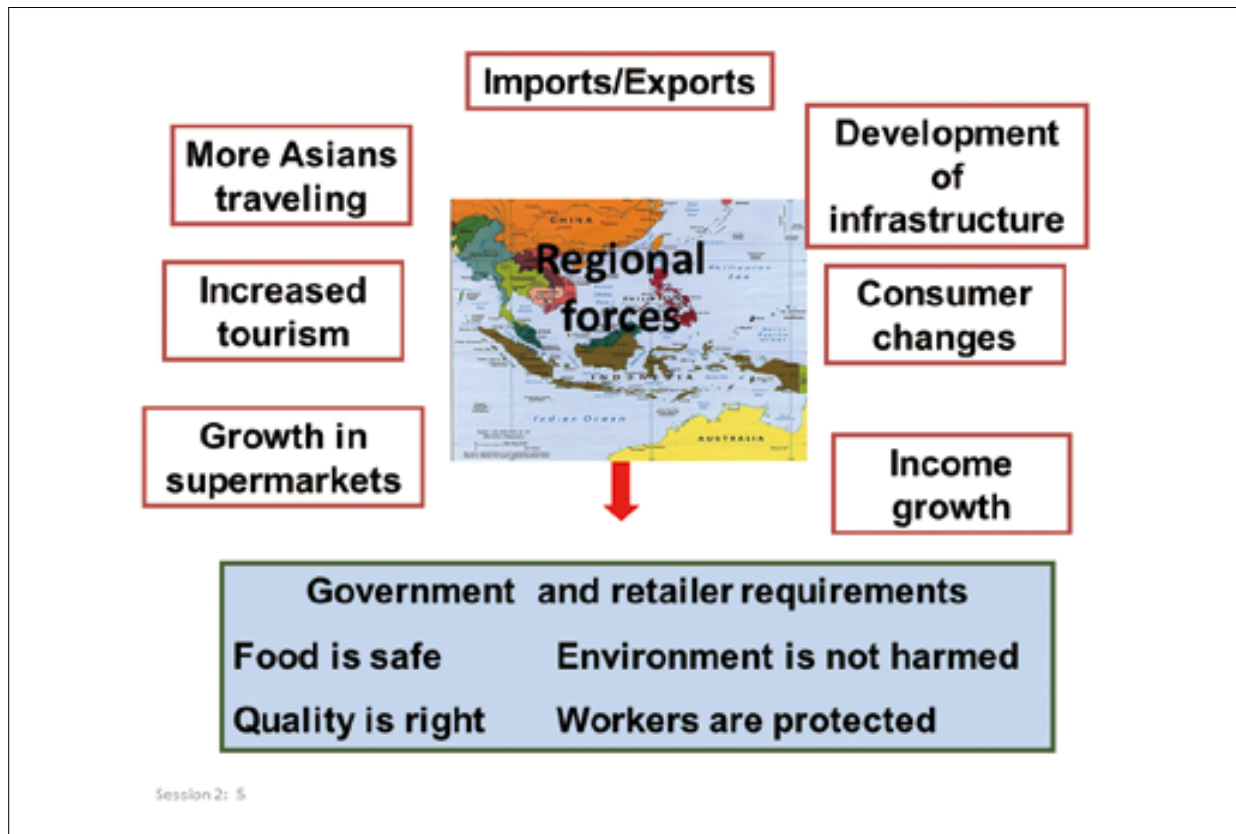
These PowerPoint slides were originally developed by Norma Othman, Director, Horticulture Division of Department of Agriculture Malaysia, and presented at the APD e-Learning Course on GLOBALGAP Standard for Greater Global Market Access (Session 1) at the videoconferencing facility in Kuala Lumpur, Malaysia on 18–20 June 2013, and are reproduced here with permission.

### **SCOPE OF PRESENTATION**

- Introduction
- Development of ASEAN GAP
- Scope, Aim and Objective of ASEAN GAP
- Implementation of ASEAN GAP
- Vision of ASEAN GAP
- Alignment of National Gap to ASEAN GAP
- Way Forward
- Challenges
- Summary

# INTRODUCTION





## Food safety hazards



### Why is food safety important?

To protect consumer health

To gain market access

- Retailer requirements
- Government requirements

## How widespread are food safety outbreaks?

### **USA, Canada – 2004**

Salmonella causes illness in 561 people

Contamination linked to tomatoes

### **USA – 2003**

Hepatitis causes illness in 400 people and 3 deaths

Contamination linked to green onions

### **USA – 2006**

3 deaths and over 200 people sick from eating fresh cut spinach contaminated with E. coli

Suspected cause is flooding of blocks or use of animal manure

## How widespread are food safety outbreaks?

### **South Korea – 2005**

Imports from China stopped due to parasite eggs found in marinated cabbage, radish and lettuce for kimchi

### **Taiwan - 2005**

High levels of carbendazim found in crown daisies at 19 supermarkets and traditional markets (9 x MRL)

### **India – 2006**

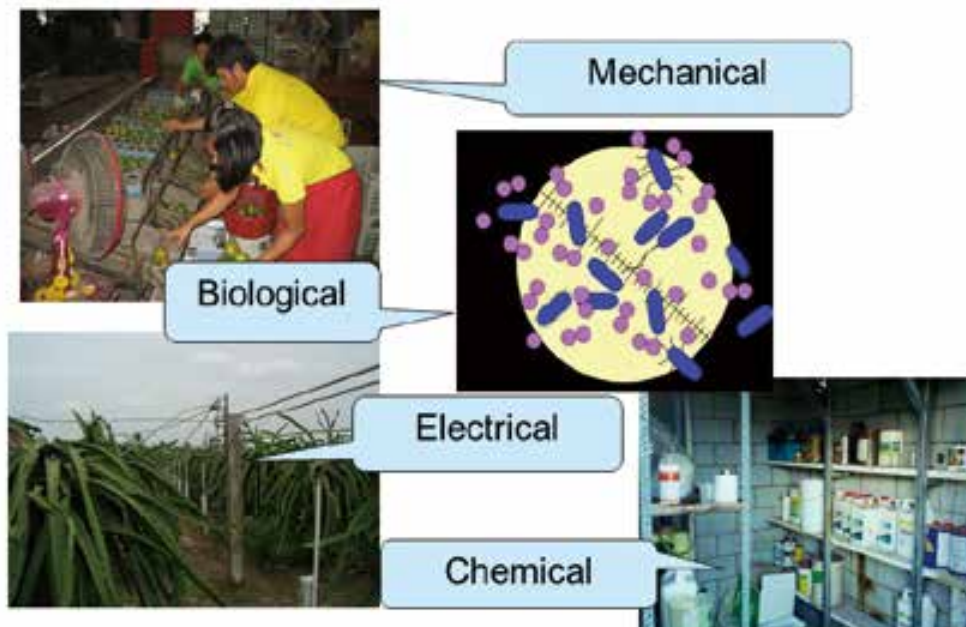
High residues of heavy metals detected in vegetables grown in industrial areas

### **Philippines – 2006**

Export consignment of mangoes halted in Japan due to insecticide residues above MRL



## B. Worker's health, safety & welfare



## C. ENVIRONMENTAL MANAGEMENT

### What is an environmental hazard?



Any negative impact that occurs to the environment on and off the property as a result of production, harvesting and postharvest handling of fruit and vegetables.



## Why is the environment important?

To protect the soil, water and other finite resources



To gain market access

- Retailer requirements
- Government requirements



## How widespread is environmental harm?

Agriculture consumes 70% of the freshwater withdrawn annually by humans. Irrigation is draining more water than is being replenished by rainfall, causing water tables to fall. Many water sources are being polluted by excessive use of fertilizers and pesticides.

About 15 million hectares of forests are cut down each year, much of it for conversion to agricultural use by farmers.

### D. Produce Quality

#### **Basic quality expectations**

Free from major injury, blemish or spoilage

Not overripe, soft or wilted

Free from foreign matter – dirt, chemical residues

Free from foreign odours and taste

### GAP - Good Agricultural Practices

Practices used to prevent or reduce the risk of things going wrong (hazards) during production, harvesting and postharvest handling

Food is  
safe

Quality is  
right



Environment is  
not harmed

Workers are  
protected

## ASEAN Economic Community

### Blueprint for GAP

- Establish Good Agriculture / Aquaculture Practices (GAP), Good Animal Husbandry Practices (GAHP), Good Hygiene Practices (GHP), Good Manufacturing Practices (GMP), and Hazard Analysis Critical Control Point (HACCP) based systems; for agricultural and food products with significant trade / trade potential by 2012

## How ASEAN GAP was developed



- Working group with representatives from each ASEAN member country and Australian experts
- Member country GAP programs and international GAP programs and guidelines were reviewed

## GAP around the world



Session 2: 19

## GAP in ASEAN region



Session 2: 20

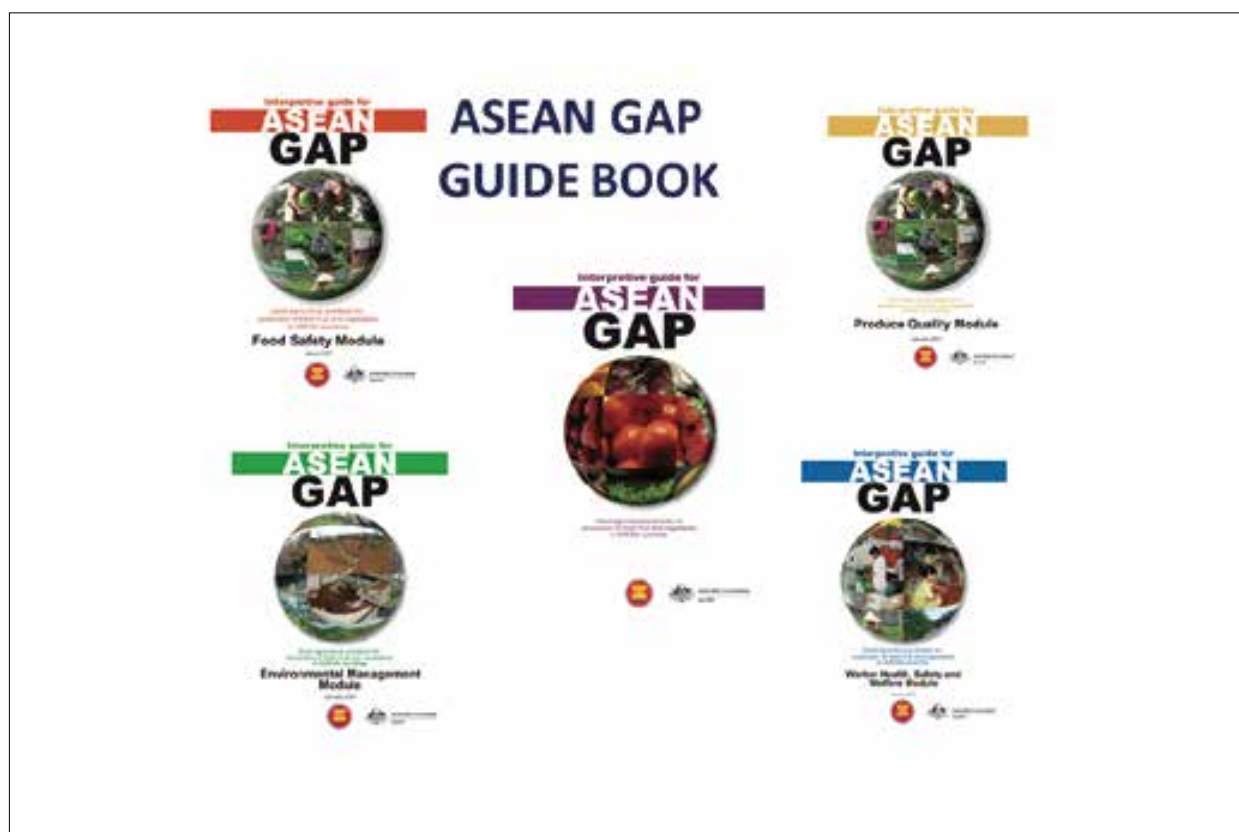
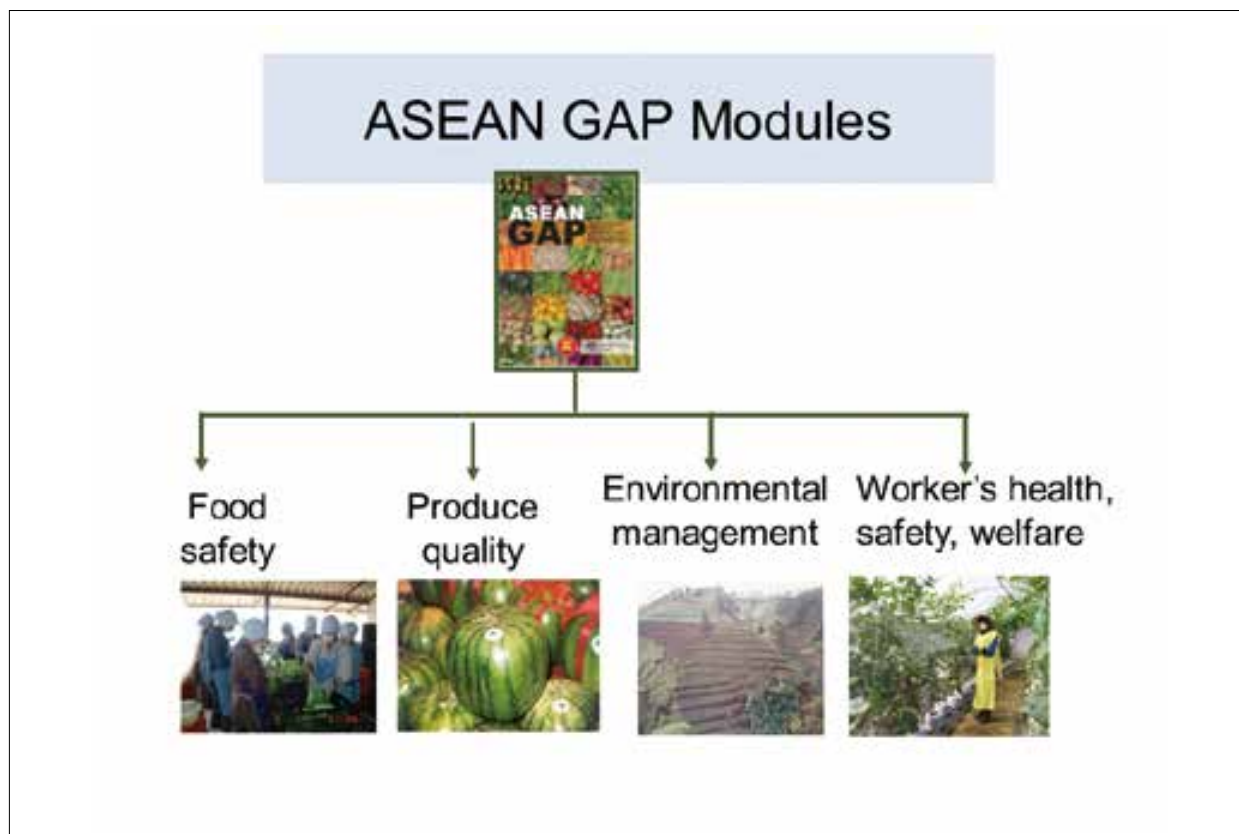
## **ASEAN MEMBER COUNTRIES**

- Brunei Darussalam
- Cambodia
- Indonesia
- Lao PDR
- Malaysia
- Myanmar
- Philippines
- Singapore
- Thailand
- Vietnam

## **ASEAN GAP**

- ASEAN GAP, which has been developed to enhance the harmonisation of GAP programs among ASEAN Member States,
- A voluntary standard for good agricultural practices to control hazards during the production, harvesting and post-harvesting of fresh fruits and vegetables in the ASEAN region.





## ASEAN GAP scope

- Fresh produce – fruit and vegetables
- Production and harvesting – conventional and hydroponics
- Postharvest handling on farm and in locations where produce is prepared and packed for sale
- Excludes high risk products such as sprouts and minimally processed produce
- not for organic or GMO free produce

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## AIM

By adopting ASEAN GAP, it is expected to attain broad-range of effects including upgrading of food safety, conservation of environment, labour safety, strengthening of competitiveness, quality of agricultural products, efficiency of agricultural management and trust from dealers and consumers.



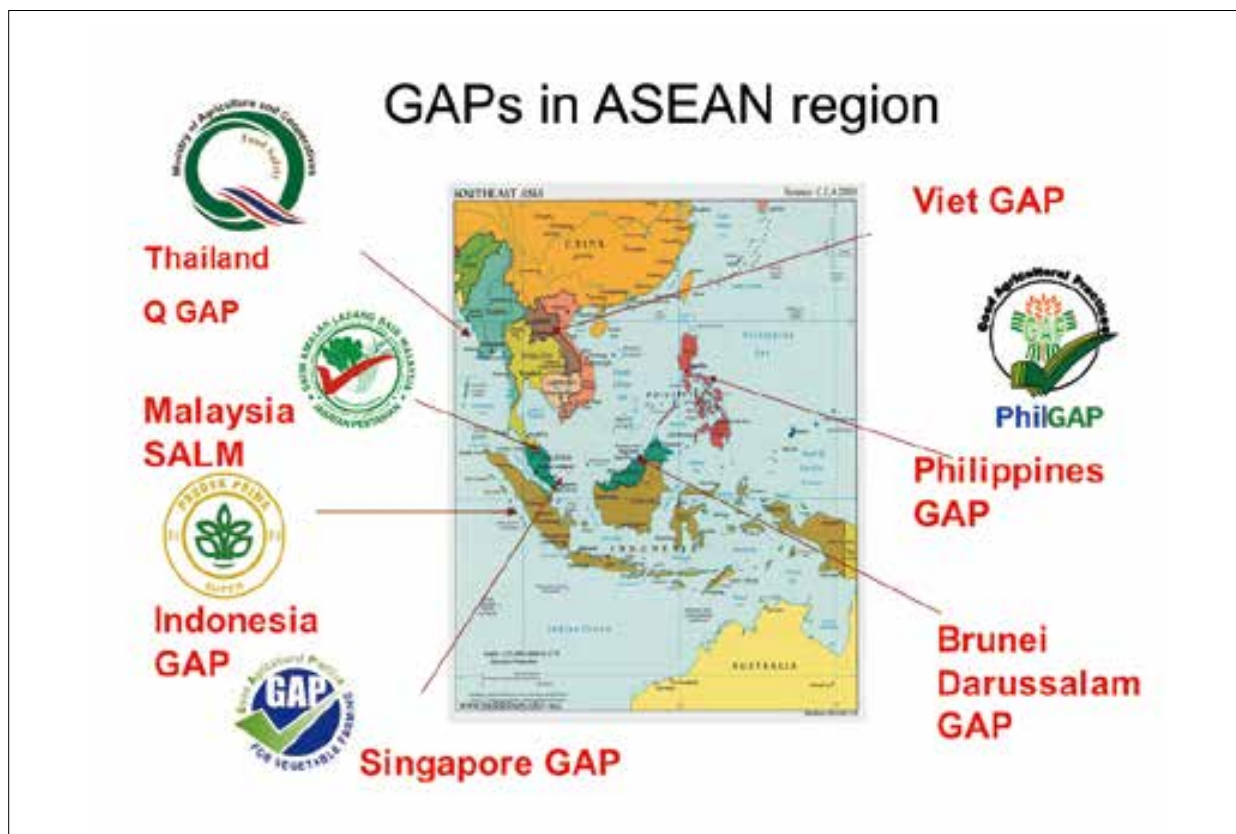


## **OBJECTIVE of ASEAN GAP**

- to facilitate the harmonization of GAP programs within the ASEAN region
- facilitate trade regionally and internationally
- enhance the safety and quality of fruits and vegetables for consumers
- enhance the sustainability of the environment in the ASEAN region
- protect the health, safety and welfare of workers

## **Implementation of ASEAN GAP**

- Those member countries with national GAP should benchmark against ASEAN GAP while those without national GAP should adopt ASEAN GAP
- ASEAN GAP should be promoted towards gaining equivalency with other international GAP and
- Recognised by WTO as an international trading standard



## Vision for ASEAN GAP

- ASEAN GAP is recognised as a voluntary standard for production, harvesting and postharvest handling of fruit and vegetables by stakeholders within the ASEAN region and globally in trading countries
- All member countries have implemented a national GAP program and have aligned their program with the relevant modules of ASEAN GAP

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## Vision for ASEAN GAP ...cont

- The ASEAN organisation has developed a system for recognising national GAP programs
- Promotion and training activities are being run in member countries and at the regional level for farmers, advisers, trainers, and auditors to increase awareness and knowledge of ASEAN GAP

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### Status Alignment/Harmonization of National GAP Programs with ASEAN GAP

Country	Food safety	Environmental management	Worker's health, safety and welfare	Produce quality
Thailand	T	P	P	C
Malaysia	T	C	C	S
Indonesia	T	C	P	P
Singapore	T	N	N	S
Philippines	T	P	P	P
Brunei	T	N	N	N
Vietnam	T	-	-	-

T = Total alignment   C = close alignment   P = partial alignment  
 N = no alignment   S = covered by another national standard

## **ASEAN GAP Strategic Plan**

- Establish a mechanism to manage ASEAN GAP
- Establish national GAP programs based on ASEAN GAP
- Create awareness and knowledge of ASEAN GAP
- Engage the private sector, civil society organisations and non-governmental organisations in future development of ASEAN GAP
- Experts Working Group on ASEAN GAP was established to support the implementation of Strategic Plan

## **WAY FORWARD FOR ASEAN GAP**

- **Australia (AADCP II)**
  - Global Recognition of ASEAN GAP for Fruits and Vegetables (regional & national activities)
  - CLMV Competitiveness
- **Germany (GIZ)**
  - Lao GAP Strategic Planing



## Challenges for Implementation of ASEAN GAP

- Private sector engagement, buy-in/adoption
- Voluntary to semi-voluntary (mandatory on “food safety” module)
- Mobilisation of resources, cooperation and partnership arrangement to support ASEAN GAP
- ASEAN GAP Certification Scheme: Accreditation and 3<sup>rd</sup> Party Certification systems

## OTHER ASEAN GAPs/GAP related initiatives

- - **ASEAN GAP: Aquaculture (GAqP)**
  - Establishment of ASEAN Good Aquaculture Practices (GAqP)
- - **ASEAN GAP: Animal Husbandry (GAHP)**
  - Establishment of ASEAN Good Animal Husbandry Practices (GAHP)

## Summary

**GAPs have been used** by supermarkets to gain/maintain market share

**Global Recognition of ASEAN GAP for Fruits and Vegetables**

**ASEAN GAP as a global branding and equivalent to Global GAP**

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## Appendix 9: Assessing site management risk and control for new farms

### Risk Assessment on Site Management and Control for New Farm (SAMPLE FORMAT)

Grower Name:

Farm Location:

Description of Risk on Site Condition	Tolerance and Compliance	Frequency	Severity	Control and Actions Taken
1. Land Contours - Planting on hill slopes. Land slide occurring	Crops not cultivated on slopes of $> 20^\circ$	Not happening	Very severe	Cut terrace on the hill slopes and plant on the flat.
2. Soil content of heavy metals and soil suitability for crop cultivation. Contamination of the crop.	No heavy metal contents exceeding National Standards	High possibility	Very severe	Perform soil analysis on: <ul style="list-style-type: none"> <li>- presence of heavy metal</li> <li>- soil type and soil fertility</li> </ul> Add organic fibre in soil low in fertility
3. Soil erosion on river banks. Riverside destruction.	Planting distances away from river banks as recommended in National Standards			Build humps around the tree rings. Mulching will reduce fertilizer sweep during heavy rain.
4. Groundwater quality. Contamination of crop and workers.	Ground water does not contain toxic chemicals nor microbial levels exceeding National Standards			Undertake water analysis for <ul style="list-style-type: none"> <li>- Microbial content</li> <li>- Mineral content</li> <li>- Water pH, salinity</li> </ul> Nullify effects with buffering and or filtering

Appendix 10: Daily Practices Record Keeping

DAILY PRACTICES RECORD KEEPING  
(SAMPLE FORMAT)

Farm / Grower name:

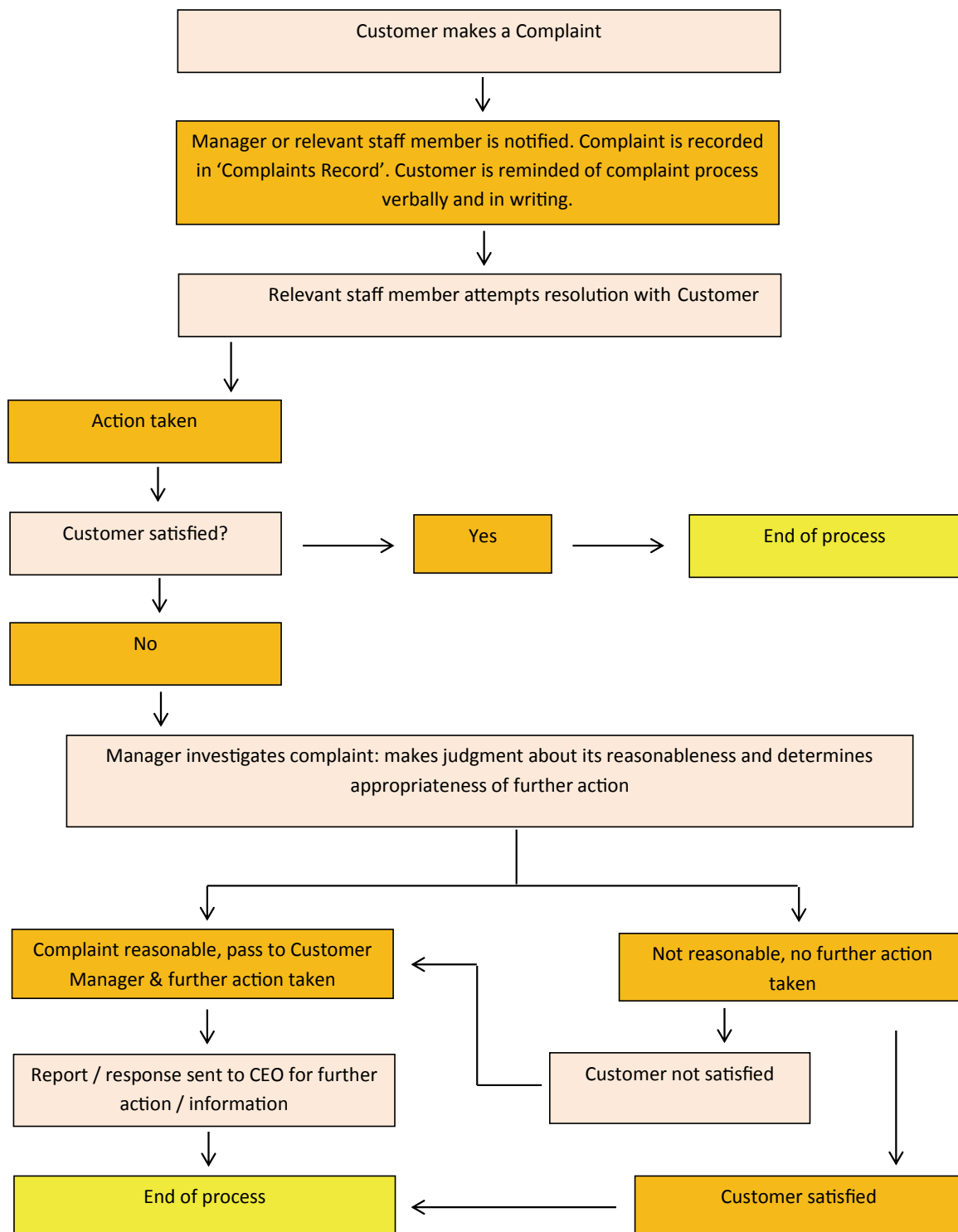
Date	Field Block or Site	Growth Stage of the Crop	Trade name of Pesticides	a.i. name and concentration of a.i.	Application dosage or dilution rate	Reason and Justification for application

## Appendix 11: Customer Complaint Form

Customer Complaint Form (SAMPLE FORMAT)			
Date			
Product		Product traceability Code	
Customer detail	Name:		
	Organization:		
	Contacts:		
Nature of complaint			
Cause(s) of the complaint			
Actions taken		By when	Person responsible
To the customer			
To solve the problem			
Form completed by		Case closed (V)	
Signature			

## Appendix 12: Customer Complaint Handling Flow Chart

Customer Complaint Handling Flow Chart  
(SAMPLE FORMAT)



## Appendix 13: Hygiene and Safety Hazard During Harvesting Checklist

Handling Process	Handling Procedure	Checklist
1. Days before Harvest	<ol style="list-style-type: none"> <li>Chemical Spray <ul style="list-style-type: none"> <li>PHI of the chemical spray complied with</li> </ul> </li> <li>Inland Transportation <ul style="list-style-type: none"> <li>Serviced tractor</li> <li>Cleaned wheel barrows</li> </ul> </li> <li>Baskets <ul style="list-style-type: none"> <li>Identified and repaired baskets</li> <li>Cleaned baskets</li> </ul> </li> <li>Packing tools and utensils <ul style="list-style-type: none"> <li>Confirmed good working order</li> <li>Confirmed cleaned, rust and stains free</li> </ul> </li> <li>Packing material <ul style="list-style-type: none"> <li>Confirmed inventory check</li> <li>Confirmed no exposure of contamination by chemicals or rodents.</li> <li>Confirmed usability of packing material.</li> </ul> </li> <li>Sorting area <ul style="list-style-type: none"> <li>Tidied and cleaned sorting area</li> <li>Removed waste and rubbish from sorting area</li> <li>No chemicals and fertilisers in the sorting area</li> <li>No GLASS or clear hard plastics in sorting area and fruit table</li> <li>All lamps have protective caps and gauze to prevent breakage</li> <li>Removed rodent traps</li> <li>Cleaned sorting table</li> <li>Clean water and soap available for washing</li> <li>Cleaned toilets</li> </ul> </li> <li>Temporary storage <ul style="list-style-type: none"> <li>Tidied and cleaned area</li> <li>Protection provided to the area against rain, sun and exposure to rodents</li> </ul> </li> </ol>	
2. Day of Harvest	<ol style="list-style-type: none"> <li>Packing area <ul style="list-style-type: none"> <li>Confirm all cleaning works of the previous day.</li> </ul> </li> <li>Packers personal hygiene <ul style="list-style-type: none"> <li>All packers present were not suffering from any infectious diseases, diarrhoea, or have any cuts on the limbs.</li> <li>All packers are not suffering from any colds, running nose or fever</li> <li>All packers have not applied any kinds of medication on limbs.</li> <li>Long finger nails cut. No false fingernail attachments allowed.</li> <li>All packers are not wearing any kinds of jewellery on limbs.</li> <li>Clean clothes and protective shoes worn.</li> <li>Headgear and gloves are available and put on by packers.</li> <li>Clean hands before starting work.</li> <li>Clean hands after having used the toilet.</li> <li>No eating or drinking permitted in the packing area.</li> </ul> </li> <li>Animals and pets. <ul style="list-style-type: none"> <li>No domesticated or pets and birds are allowed in the vicinity of the packing area.</li> </ul> </li> </ol>	
3. Handling of Glass and Hard Objects	<ol style="list-style-type: none"> <li>Glass lamps are protected from breakage</li> <li>Protective covering for Glassware found near packing area</li> <li>Perform a Glass and tiny hard object check / sweep before start of work</li> </ol>	
4. Harvesting Time	<ol style="list-style-type: none"> <li>When harvesting from trees: <ul style="list-style-type: none"> <li>Ensure that the fruits are not dropped on to the ground or come into contact with the ground or soil.</li> <li>Ensure that the fruits harvested are brought back to the packing area as soon as possible.</li> <li>Ensure that the fruits are not subjected to bumpy rides on its way to the sorting area.</li> <li>Do not expose the harvested fruits to the sun or rain where possible.</li> </ul> </li> <li>Packing of fruits: <ul style="list-style-type: none"> <li>Ensure that correct physical handling of the fruits, as described during training, are all followed strictly.</li> <li>Fruits dropped on the floor cannot to be used.</li> <li>Once the fruits are packed they are not to be removed from the box or exposed to the open.</li> </ul> </li> </ol>	

## Manual on Good Agricultural Practices (GAP)

(Continued)

Handling Process	Handling Procedure	Checklist
	<ul style="list-style-type: none"> <li>- Ensure all cleanliness and hygiene criterias are kept during packing.</li> </ul>	
	3. Harvest quantum	
	<ul style="list-style-type: none"> <li>- Ensure only a workable quantity of fruits are to be harvested for each day of work, this is to avoid leaving fruits unpacked overnight.</li> <li>- Ensure no fruits left overnight in the field.</li> </ul>	
5. Transportation to Coldroom	1. Packed fruits <ul style="list-style-type: none"> <li>- Ensure no packed fruits are exposed to the rain, heat, chemicals or rodents at the temporary storage area.</li> <li>- All packed fruits must be delivered to the coldroom on the same day of packing.</li> </ul>	
	2. Transport trucks	
	<ul style="list-style-type: none"> <li>- Trucks must be covered when transporting packed fruits.</li> <li>- Trucks used in transporting the packed boxes must not be used to carry any kinds of toxic materials, raw dung, fertilisers or organic waste on previous trip</li> <li>- Journey to the coldroom must be direct.</li> <li>- The packed fruits carried in trucks must not be transported together with any other kinds of loads (e.g. live animals, fish, vegetables, chemicals) except of other similarly packed fresh fruits of grower</li> </ul>	
6. Produce and Waste Material	1. Where possible, recycle all waste material when not usable again. 2. Dispose of waste material in environmentally accepted manner. 3. Rejected fresh produce are to be composted or reconstituted	

Procedure and Checklist Supervised and Prepared by:



## Appendix 14: Harvesting and Produce Handling Risk Assessment

Harvesting & Packing	Identification of Hygiene Risks	Severity*	Frequency*	Precautions and Actions Taken
Preparation of:				
Inland transport	Fumes, oil spills and dirt	7	5	Regular service. Reject contaminated fruits.
Baskets	Dirty baskets - bacteria, pests	7	5	Repair if possible. Clean baskets before harvest.
Sorting area	Dirty floors - bacteria, rodents	8	5	Cement floor. Clean and dry floors.
Sorting tables	Dirty tables - metal scrap, bacteria	7	5	Sturdy & clean tables. Protect with foam sheets and cloth.
Packers clothings	Dirty and contaminated	7	5	Clean and tidy clothings. Wear apron, gloves, caps
Packers health	Contagious diseases, diarrhoea, open wounds, fever and colds	8	6	Workers with any such symptoms to stay out of work until recovery is 100% complete.
Packers hygiene	Personal hygiene - bacteria	8	5	Body hygiene, finger nails, hands, hair. Wash, clean and dry. Training and awareness of hygiene conducted continually.
Produce handling hygiene	Mishandling produce	8	6	Training for new workers. Visual reminders. Verbal reminders by floor supervisors.
Packing material	Dirty and contaminated	9	3	Correct storage & inventory. Reject contaminated material.
Temporary storage	Dirty and contaminated	8	5	Clean and suitable location. Screen from contaminants.
Toilets	Dirty and contaminated	9	5	Clean toilets. Sufficient distance from packing area.
Hand wash area	Dirty and contaminated	9	5	Clean and dry area. Soap available.

Scales of 1 - 9, where 1 denotes least severe / frequent and 9 denotes most severe / frequent.

K-Farm GAP Quality Management System

## Appendix 15: Handling Empty PPP Containers Checklist

Handling Stage	Handling Procedure	Checklist
1. Preparation of Spray Tank	<ul style="list-style-type: none"> <li>– Ensure chemicals used are within shelf life</li> <li>– Utilise all open bottles and packages first</li> <li>– Ensure all chemicals are in the original packaging</li> <li>– Use chemicals in accordance to label instruction</li> </ul>	
2. When Containers are Empty	<p>For Plastic bottle containers:</p> <ul style="list-style-type: none"> <li>– Rinse the bottle under a high pressure water jet</li> <li>– Pour the rinsate into the mixed spray tank</li> <li>– Do this three times (3X)</li> <li>– Puncture a hole at bottom of bottle to prevent reuse.</li> </ul> <p>For Glass bottle containers:</p> <ul style="list-style-type: none"> <li>– Rinse the bottle under a high pressure water jet</li> <li>– Pour the rinsate into the mixed spray tank</li> <li>– Do this three times (3X)</li> </ul> <p>For Box packaging with plastic bag lining inside:</p> <ul style="list-style-type: none"> <li>– Rinse plastic bag under high pressure water jet</li> <li>– Pour the rinsate into the mixed spray tank</li> <li>– Do this three times (3X)</li> <li>– Make a hold into the bag to prevent reuse</li> <li>– Do the same for the external paper box</li> </ul>	
3. Holding Bottles in the Farm	<ul style="list-style-type: none"> <li>– Place the empty bottles and bags in separate bin bags for plastic, glass and paper.</li> <li>– Tie and secure bin bags</li> <li>– Place these bin bags in a holding container, e.g. steel drum or tank with cover.</li> <li>– The steel drum or tank are located in the far corner of the farm away from the packing area</li> <li>– Mark holding tank with a large "DANGER" sign</li> </ul>	
4. Disposal Methods	<p>For Private Contractor Recycling – Disposal Scheme:</p> <ul style="list-style-type: none"> <li>– Transfer the bin bags to the collection centre for disposal</li> </ul> <p>For Municipal Council Recycling Schemes:</p> <ul style="list-style-type: none"> <li>– Transfer the bin bags into the appropriate recycling bins at the collection centre</li> </ul>	

# Appendix 16: PPP and Fertilizer Application Record Keeping

## PPP and FERTILIZER APPLICATION RECORD KEEPING (SAMPLE FORMAT)

Farm / Grower name:

Date	Field Block or Site	Growth Stage of the Crop	Trade name of Pesticides / Fertilizer	A.I. name and concentration of A.I.	Application dosage or dilution rate	Reason and Justification for application

## Appendix 17: Farm Waste and Pollution Minimization Plan

### FARM WASTE AND POLLUTION MINIMISATION PLAN (SAMPLE FORMAT)

Grower name : \_\_\_\_\_ Farm name : \_\_\_\_\_  
Crop & Variety : \_\_\_\_\_

Type of Waste / Pollutant	Source of Waste	Dispose or Reuse or Recycle	Time Frame to Achieve Practice	Disposal Location	Remarks
Paper	Paper bags, corrugated carton box	Re-use corrugated box. Recycle box	October 2014	Send to paper mill for recycling	
Plastic	Packing foam, P.E. bags	Recycle			
Chemicals	Pesticides, fertilizers	Reduce or appropriate application			
Bio-mass	Plants and rejected fruits	Composting and mulching (nutrient recycle)	May 2012		
Wood	Pallets	Reuse or Recycle			
Metal	Wires	Reuse or Recycle			

# Appendix 18: Delegation of Work and Responsibility Matrix

**GAP Delegation and Responsibility Matrix  
(SAMPLE FORMAT)**

Personnel \ Work and Department	GAP Policy and Planning	GAP Training	GAP Production & Extension	GAP Recording & Monitoring	Research & Advise	Marketing & Planning	Harvest & Packing	Packhouse Monitor & Control	Transport & Delivery Logistics	Information Processing	GAP Management	GAP Workers Health Safety Issues
1 Managing Director (Internal Auditor - GAP Director)												
2 Mr Wong (GAP Director)												
3 Mr Lim (GAP Inspector)												
4 Ms Elizabeth (GAP Inspector)												
5 Mr Frankie (GAP Trainee)												
6 Mr Swee												
7 Ms Chin												
8 Ms Lucy												
9 Mr Tan												

## Appendix 19: Policy on Consumer Confidence

### Cluster Group Policy for Consumer Confidence (SAMPLE FORMAT)

The Cluster Group is committed to do the following:

1. Produce the fruit product that is wholly safe and hygienic to be consumed fresh.
2. To market the fruit that retains its nutritional, taste and aesthetic quality that is acceptable by the consumer.
3. The packaging and delivery of the fruit is in a manner to protect the fruit and promote satisfactory consumption of the fruit.

The above three commitments are achieved by doing the following:

1. Minimize the use of chemical pesticides by applying Integrated Pest Management, IPM practices; such that pesticides are only used as a last resort, at the minimum rate and toxicity for an effective control of the pest.
2. Where possible, substitute chemical pesticides with bio-pesticides or employ natural and physical methods to control pests and diseases.
3. Apply Integrated Crop Management, ICM practices using good tree management techniques, fruit wrapping, nutrition and irrigation that minimizes pollution and damage to the soil in the farm and the surrounding areas.
4. Every care and effort of hygiene is taken in handling the fruit during pre-harvest and post-harvest. Cold chain handling for the fruit is maintained throughout the pack house to the consumer.
5. The packaging materials used are strong, effective and attractive.

Signed: ..... (Managing Director of Cluster Group)

Dated: .....

## Appendix 20: Policy on Environmental Protection and Conservation

### Cluster Group Policy for Environmental Protection and Conservation (SAMPLE FORMAT)

To achieve the policy of environmental conservation and protection, the Cluster Group has embarked on the following ventures:-

1. Environmental Goals
  - (i) Reduction of pollution load at every stage of growth of the crop.
  - (ii) Support and adopt production technologies that promote environment preservation.
2. Methods
  - (i) Make aware the environment aspects and impacts to all the Group Farmers in the Cluster Group. Promote and ensure that the Group Farmers will initiate the practices in their fields. Monitor their activities. Farmers to achieve the targets within 3 years.
  - (ii) Encourage the development of natural flora and fauna of the unutilized lands in the farm.
  - (iii) Minimise tillage. Prevent soil erosion.
  - (iv) Reduce the frequency of use of agrochemicals, pesticides and chemical fertilizer at every stage of growth of the crop. Use the minimum quantity and the appropriate chemical at the appropriate time.
  - (v) Use bio-pesticides where possible.
  - (vi) Use alternative / natural agriculture cultivation method where possible.

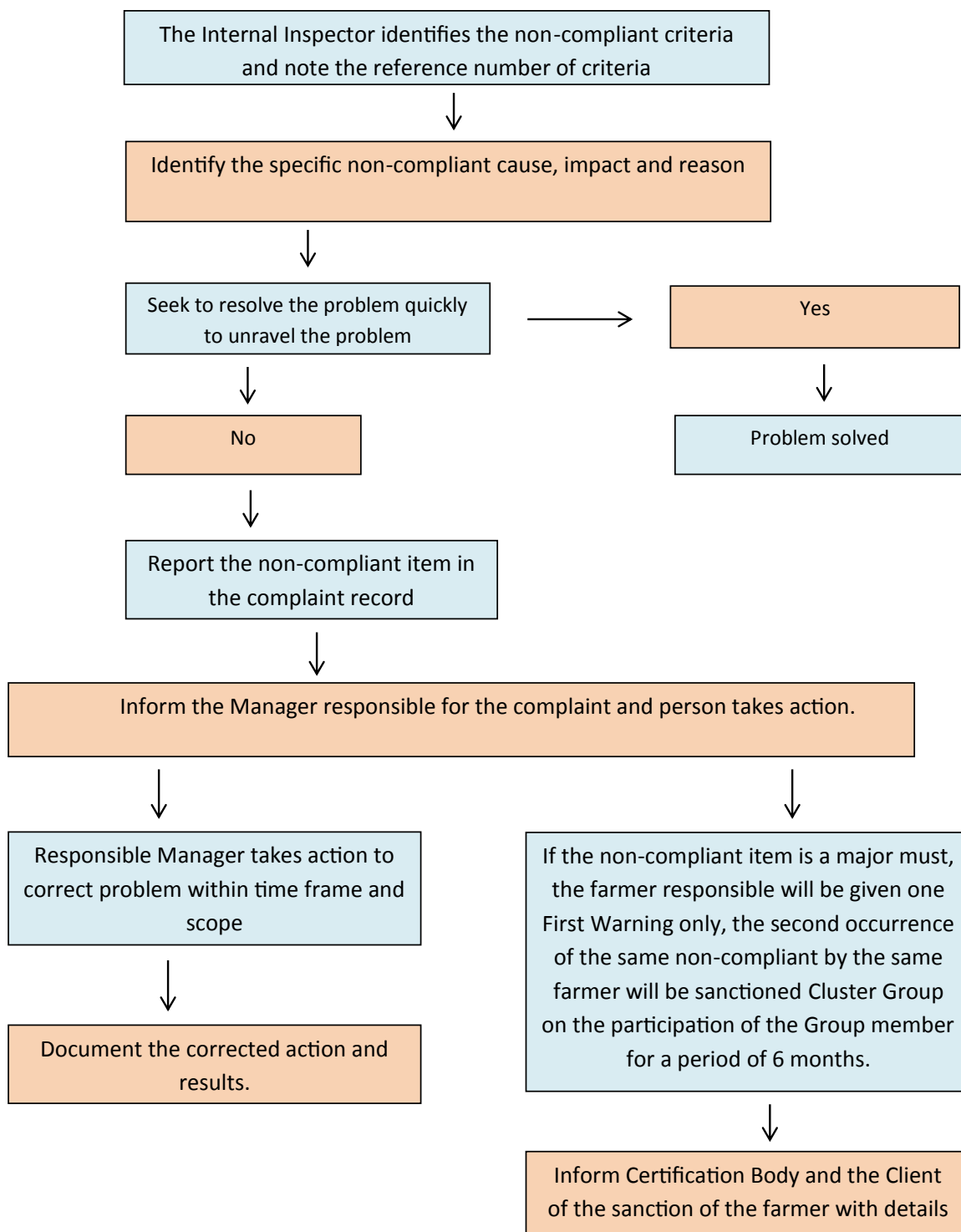
Signed: ..... (Managing Director of Cluster Group)

Dated: .....



## Appendix 21: Corrective Action for Non-compliance and Sanction

### Corrective Action for Non-compliance and Sanctions during Internal Inspection Audit (SAMPLE FORMAT)



## Appendix 22: Product Recall and Withdrawal Procedure

### Objective:

- To establish procedures for the effective recall and or withdrawal of the potentially found unsafe product in the distribution system

### Scope:

- The procedure is applicable to the potentially found to be unsafe (non-compliance) product which needs to be withdrawn

### Procedures:

1. A product recall shall be initiated on the discovery, either by the buyer or supplier or sub-contractor of any of the following occurrences:
  - a. Pesticide Residues found to be above acceptable levels
  - b. Discovery of hazardous foreign body contamination in product
  - c. Product contravene hygiene practices
  - d. Microbiological element found in product
  - e. Pest element found in product
  - f. Any additional requirements on food safety issues of the buyer / supplier.
2. The Company is notified of any product being or needing to be recalled by the buyer / supplier. The Company will refer to the Marketing Manager for product recall procedure at all times to ensure they are provided with the correct information. It is the responsibility of the Marketing Manager to inform the end customer (retailer).
3. The Company C.E.O/ Technical Manager / Technologist is to gather all the following information to establish the location of all the related stock:
  - a. Consignment Number, Supplier, PO number.
  - b. Quantity inloaded
  - c. Current location of all the product
  - d. Quality of the product when it arrived
  - e. Length of time of stock
4. If the product is on site then it is to be marked with a red 'Hold QC' label stating 'Do Not Use'.

## **ACRONYMS**

APO	Asian Productivity Organization
ASEAN	Association of Southeast Asian Nations
BRC	British Retail Consortium
CAC	Codex Alimentarius Commission
CCP	Critical Control Point
CPCC	Control Points and Compliance Criteria
DGSANCO	Health and Consumers Protection Directorate General of the European Commission
EU	European Union
EurepGAP	Europe Good Agricultural Practices
FSC	Food Supply Chain
FAO	Food and Agriculture Organization of the United Nations
FAO GAP	FAO Good Agricultural Practices
GAP	Good Agricultural Practices
GFSI	Global Food Safety Initiative
GlobalGAP	Global Good Agricultural Practices
HACCP	Hazard Analysis and Critical Control Point
HSCM	Horticultural Supply Chain Management
ICM	Integrated Crop management
ICT	Information and Communication Technology
IFS	International Food Standard
ILO	International Labor Organization of the United Nations
IndiaGAP	Indian Good Agricultural Practices
IndoGAP	Indonesia Good Agricultural Practices
IPCM	Integrated Pest and Crop Management
IPM	Integrated Pest management
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
JGAP	Japan Good Agricultural Practice
MRL	Maximum Residue Limit
MyGAP	Malaysia's Good Agricultural Practices (previously called SALM)
National GAP	National Good Agricultural Practices
PAN	Pesticide Action Network
PHI	Preharvest Interval
PhilGAP	Philippine Good Agricultural Practices
PPP	Plant Protection Products
QMS	Quality Management System
REI	Restricted-entry Interval
SARD	Sustainable Agriculture and Rural Development
SCM	Supply Chain Management
SPS	Sanitary and Phytosanitary
TEU	Twenty-foot equivalent unit (20x8x8 feet, describing a ship's cargo carrying capacity, or a shipping terminal's cargo handling capacity)

TGAP	Taiwan Good Agriculture Practices
ThaiGAP	Thailand GAP
US - NASA	National Aeronautics and Space Administration of the United States of America
VietGAP	Vietnam's Good Agricultural Practices
WTO	World Trade Organization



ASIAN PRODUCTIVITY ORGANIZATION

ISBN 978-92-833-2463-8 (paperback)

ISBN 978-92-833-2464-5 (PDF)