# QUALITY MANAGEMENT SYSTEM: GOOD AGRICULTURAL PRACTICE (GAP) IN THAILAND

**Surmsuk SALAKPETCH**

**Chanthaburi Horticultural Research Center, Khlung,**
**Chanthaburi, 22110 Thailand**
**chrc@ksc.th.com, chrc_chanburi@yahoo.com**

## Summary

Thailand has gradually developed Quality Management System (QMS): Good Agricultural Practice (GAP) for on-farm production by modifying concepts of international standards since 2001. Although development of the system by ourselves may be slower than adoption of an international system as our own system, the developed system will be for Thai growers. The system has been developed to assure safety and quality of food, especially fresh fruits and vegetables. Water, field and land history, pesticides issues, on-farm stocking and transporting of produce, crop protection, production process, post harvest handling and records are 8 items of core concept of the system. The concept of Hazard Analysis and Critical Control Point (HACCP) and ISO method was modified to develop the quality plan. The critical control point (CCP) and the control point (CP) through the whole process of production cycle which are indicated in the quality plan will be used as guideline practices to get quality produce to meet customer requirements. The certification was divided into 3 levels; Level 1 food safety, Level 2 food safety and free of pests and Level 3 food safety, free of pests and quality.

## 1. Introduction

Since Thailand is one of the leading fresh fruit and vegetable producers in Asia and Pacific regions, country strategic plan to encouraging commercial production of fresh produce for export, local consumption and processing has been focused. Also, safety and quality of fresh fruit and vegetable have been emphasized. Food safety and quality management system (QMS) schemes in Thailand's agriculture and food sectors is widely recognized and new systems. Recognizing of the potential to undermine the integrity of Thai food and agricultural produce and to impede competitiveness, Ministry of Agriculture and Cooperatives established the government-private sector working group. The Department of Agriculture, as a chair of the working group, played a role in facilitating a number of ideas and concepts to enhance Agricultural Quality Management System to assure quality of plant, fishery and livestock goods of Thailand.

The document of Plant Quality Management System provides information relating to on-farm food safety for fresh produce. The code of practices are designed for use by growers, trainers, facilitators, auditors and customers to achieve greater certainty and consistency in the development, implementation and auditing of on-farm food safety

program. Details and experience in implementation of the system for fishery and livestock production are excluded in this paper.

## 2. How the system was developed

A working group, initiated by Department of Agriculture and consisted of people experienced in developing quality management system for fresh produce, helped develop a system to assure quality of fresh produce. The system was announced to public on September 25, 2002 to ensure growers, traders and customers get familiar to the system. Two years later, the government emphasized their policy by campaigning *Food Safety Year 2004* to aware people for safety and quality food.

Quality Management System of Thailand for agricultural goods was developed based upon the concept of Good Manufactured Practice (GMP), Good Agricultural Practice (GAP), Hazard Analysis and Critical Control Point (HACCP), Sanitary and Phytosanitary (SPS), Quality Assurance (QA) and ISO method. QMS is designed to give guidance applicable for any Certification Body (CB) to certify on-farm production process of individual growers or of produce marketing firms. The system associated with management system to prevent, eliminate or minimize physical, chemical and biological hazards, to produce free of pests and marketable quality acceptance from farm through distribution of fresh fruits and vegetables for markets and processing. Other agricultural crops e.g. rice, herbs and field crops are also included. It is also the applicable practices for growers to ensure safety and quality of fresh produce for customers. The on-farm management system is emphasized on integrated pest management (IPM) and integrated crop management (ICM).

## 3. Core concept of the system

The core concept or requirements of the system is grouped into 8 items. The details of those items were appeared in operation procedures in the document. The following is 8 key items that can serve quality objectives of the system (Table 1).

**Table 1** Core concept of Quality Management System (QMS): Good Agricultural Practice (GAP) for on-farm quality and safety for fresh produce

| Quality and safety items | Quality objectives |
|---|---|
| 1. Water | Physical, chemical and biological safety |
| 2. Field and land history | |
| 3. Pesticide issues | |
| 4. On-farm stocking and transporting of produce | |
| 5. Crop protection | Free of pests |
| 6. Production process | Quality to meet customer satisfaction |
| 7. Post harvest handling | |
| 8. Records | Trace back |

## 4. Components of the system

The following is the components of QMS for on-farm production;

4.1 Quality policy
4.2 Quality objectives
4.3 Quality plan
4.4 Operation procedures and work instruction
4.5 Forms and checklist

The document of the system has to be produced for individual crops due to the different details in each component, particularly, quality plan.

### 4.1 Quality policy

It is the policy or vision of growers in the system. Normally, growers present their policy as *'We strive to produce fresh fruits and vegetables for fresh markets and processing and offer the best customer satisfaction'*. If they are durian growers, their quality policy will be *' We strive to produce quality durian for fresh markets and processing and offer the best customer satisfaction'*.

### 4.2 Quality objectives

Quality objectives are developed based on customer requirements and used as a guideline to establish a quality plan. The concept of quality objectives is to produce fresh fruits and vegetables that meet customer satisfaction, physical, chemical and biological safety and free of pests. Durian growers show their quality objectives as

- To produce mature durian with no symptom of hard flesh, wet core and mummy flesh
- To produce chemical safety durian
- To produce durian that free of pests

while mangosteen growers present their quality objectives as

- To produce shiny mangosteen with no symptom of translucent flesh and interior gummosis and fruit weight not less than 70 g
- To produce chemical safety mangosteen
- To produce mangosteen that free of pests

The difference of quality objectives between those two crops is eating quality of each crop that meets customer satisfaction.

### 4.3 Quality plan

The working group modified HACCP and ISO method to develop the quality plan that was used as a practical framework to get quality produce in accordance with quality objectives. The concept of HACCP help them enable to identify where potential product quality hazards may occur and what practices are needed to prevent, eliminate or minimize the hazards. Therefore, the agro-techniques for the whole process of production cycle must be well prepared and developed.

A quality plan describes on-farm practices required to provide quality fresh produce that meets the customer satisfaction. The 8-column-table quality plan (Table 2) offers interest and value to growers and other suppliers, auditors and customers. Growers must follow practices in the quality plan in order to provide fresh produce in accordance with quality objectives. Auditors can use a plan to implement and audit

on-farm food safety program. Customers can make sure that quality and safe fresh produce will be provided.

**Table 2** Example of 8-column-table quality plan

| Process step | Hazards | Control measures | CP/CCP | Operating limits | Monitoring | Corrective actions | Records |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

*Process step* : Stage of plant growth and development affected quality objectives.
*Hazards* : Problems or hazards related to quality objectives (descriptive information).
*Control measures* : The control measures of problems and hazards.
*CP/CCP* : Do practices in a particular stage of plant growth and development should (control point, CP) or must (critical control point, CCP) be followed to get produce in accordance with quality objectives?
*Operating limits* : Indicators to control or monitor hazards or CCP.
*Monitoring* : What, how to and frequency of monitoring.
*Corrective actions*: Corrective actions when problems or hazards exceed operating limits.
*Records* : All corrective actions must be recorded.
Examples of generic and durian quality plan are showed in table 3.

### 4.4 Operation procedures and work instruction

Operation procedures describe all procedures required in the system and details of core concept that has to be achieved. The work instruction is steps of on-farm techniques to ensure growers enable to produce quality and safety fresh fruits and vegetables.

### 4.5 Forms and checklist

All practices indicated as critical control points (CCP) in the quality plan must be recorded in the provided forms for the purpose of trace back. The checklist can be used to supplement existing and auditing checklists used by certification bodies or for internal audits carried out by group of growers, or grower cluster or individual business.

## 5. Organization involved in the system

The Ministry of Agriculture and Cooperatives who is in charge of food safety policy of the country assigns Department of Agriculture and Extension acts as an advisory body (AvB), Department of Agriculture takes a role of a certification body (CB) and National Bureau of Agricultural Commodity and Food Standard acts as an accreditation body (AB). Government agency plays a role of CB during an early stage of QMS launching, then auditing will be empowered to private institution in a near future. The implementation of the system in Thailand is shown in figure 1.

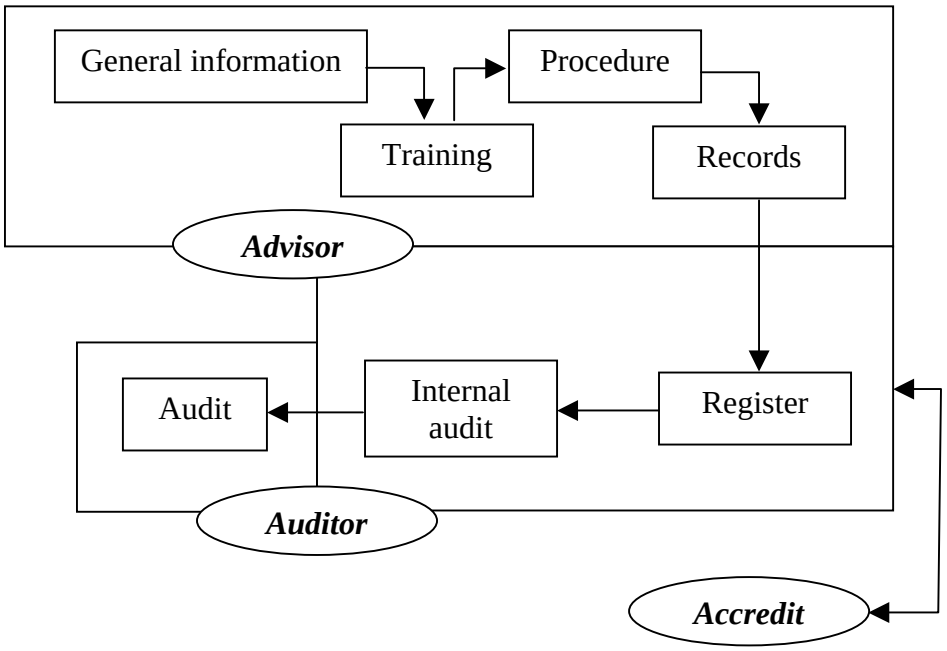


**Figure 1** Implementation of quality management system: GAP for on-farm production in Thailand

## 6. Status of Quality Management System (QMS) in Thailand, 2005-2006

Food safety based upon QMS is still being the country policy. Commencing in 2003 fiscal year, a generic document of the system and documents, in particular, quality objectives, quality plan, work instruction and forms of 28 crops developed by Department of Agriculture have been published. Twenty-eight crops are 14 fruit crops, rice and 8 kinds of tropical vegetables. Vegetables in family cruciferae, leguminosae, capsicum and eggplant, melons and herbs are also documented. The certification in the system was divided into 3 levels; Level 1 safety level, Level 2 safety and free of pests level and Level 3 safety, free of pests and quality level.

Since Thailand is an agricultural producer country, about 60% of total population is in agricultural sector, farm certification is a big task. Business cluster of growers and between growers and traders is emphasized to certify in group and to strengthen fruit trade of the country. Information technology for food safety and trace back has been developed to visualize and control the outbreak of avian influenza disease since 2003. Information management of fruit supply chain: a case study in durian and mangosteen will be commenced in the end of 2006 to help managing logistics system of fresh produce and to support the development of trace back system. Then, trace back system will be developed overlapping. Revision of the existing system and implementation is needed since the system was launched for 2 years.

## 7. Recommendations

### 7.1 Key success of quality management system in Thailand

- Strong support by government policy makers is important.
- System is acceptable, understandable, practicable and achievable for growers and traders. The system should be scientific knowledge.
- Trade and consumer awareness for food safety have increased.

### 7.2 Obstacles to overcome in implementation

- Education and extension is important to create awareness for growers and other industry stakeholders (produce collectors, packers, wholesalers, processors and retailers).
- Consumer groups need to be encouraged to stimulate demand for safe and quality food.
- Government officials and others involved in the quality management system are encouraged to be educated and well understood at each level in the system.
- Private sectors or others interested in the system are welcome since implementation may be limited by the capacity of government organization to provide resources.

## References

1. Anon. 2002. The Committee of Standard and Certification System for Commodity Development, Department of Agriculture, Thailand. (In Thai).
2. Anon. 2004. Quality management system. Chanthaburi Horticultural Research Center, Department of Agriculture, Thailand. (In Thai).
3. Anon. 2004. Quality Management system: GAP. Royal Thai government gazette, No. 121, July 19, 2004.
4. Salakpetch, S. 2005. Quality management system: Good agricultural practice (GAP) for on-farm production in Thailand. Proceedings of International Seminar on Technology Development for Good Agriculture practice in Asia and Oceania, October 25-26, 2005, Epochal Tsukuba, Japan. p.44-53.

**Table 3** Example of details should be filled in a quality plan to provide fresh produce in accordance with quality objectives.

**Quality plan**

| No. | Process step | Hazards | Control measures | CP/ CCP | Operating limits | Monitoring | Corrective actions | Records |
|---|---|---|---|---|---|---|---|---|
| 1. | Seed or propagation material Preparation | • Produce is not true to type<br>• Non-marketable quality<br>• Non-acceptance to quality objectives | Seed or propagation material must come from reliable sources | CCP | True to type and in accordance with marketable quality | Seed or propagation material pedigree including source of origin or source of purchasing must be investigated | • Variety required by market is needed<br>• Seed or propagation material must meet its standard and come from the reliable sources | • Variety name<br>• Source of origin or of purchasing<br>• Date and amount of purchasing |
| 2. | Crop protection during growth and development of leaf, flower and fruit (depending upon which plant parts are consumed) | • Non-marketable quality<br>• Non-acceptance to quality objectives | • Diseases and insects affecting the produce during its growth and development until harvest will be examined and compared to key pest economic threshold | CCP | Key pest economic threshold level of a particular crop | Need to examine pests during a certain stage of plant growth and development at 5 to 7-day-intervals and compare to their ETL | • Integrated pest management (IPM) techniques of a particular crop is fully applied<br>• Sorted out is needed to provide produce that is free of pests and any damage from pests | • Choice and rate of chemical applied<br>• Records of application |

## Quality plan

| No. | Process step | Hazards | Control measures | CP/ CCP | Operating limits | Monitoring | Corrective actions | Records |
|---|---|---|---|---|---|---|---|---|
| | | | level (ETL) of a particular crop | | | | | |