

## ASEAN GOOD AGRICULTURAL PRACTICES FOR COCOA PRODUCTION



# ASEAN GAP

Good Agricultural Practices for  
production of good quality cacao  
beans in the ASEAN Region



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## **Foreword**

Worldwide implementation of Good Agricultural Practices (GAP) has been given an utmost importance due to high expectations in terms of food safety, environmental health and social sustainability requirements in international trading. Efforts in its implementation are being done through the different GAP Programs, such as: FAO GAP, EUREP/Global GAP, USDA GAP, Australian GAP, Japan GAP, and ASEAN GAP. All the GAP Programs address the environmental, economic, and social sustainability encompassing all on-farm activities resulting to lower production costs but following sustainable farming practices. Joint commitment to economic, social and environmental sustainability is required from everyone involved in the value chain. Codes of conduct and standards are excellent examples of this sort of cooperation.

The ASEAN GAP for Cacao, will contribute to sustainable agriculture in general. This may serve as a reference tool for farmers in deciding at each step in the production process, on practices and/or outcomes that are environmentally sustainable and socially acceptable. Development of standards for cacao production should be a common understanding of sustainability evolved among producers, the Industry sector and civil society in both producer and consumer countries. This brings about economic, social and environmental improvements in production and processing that ultimately benefit everyone involved particularly the cacao smallholder farmers. These farmers will be guided in sustainable farming to produce high quality products that commands high price to generate more income, healthy environment surrounding them; thus, a better living condition for them and their families.

## **Acknowledgement**

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## References

- Cocoa Foundation of the Philippines. 2008. Defects of Cacao Beans due to Improper Pod Breaking, Improper Fermentation and Improper Drying and Quality Defects of Cacao Beans.
- Codex Alimentarius Commission. Code of Hygienic Practice for Fresh Fruits and Vegetables (CAC/RCP 53-2003).
- Codex Alimentarius Commission. Code of Hygienic Practice for the Transport of Food in Bulk and Semi-Packed Food (CAC/RCP 47-2001).
- Codex Alimentarius Commission. Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003).
- Codex Alimentarius Commission. Recommended International Code of General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 4 2003).
- Consultative Board on the World Cocoa Economy. Manual of Best Known Practices in Cocoa Production (CB/16/2). Document reviewed by the Consultative Board at its 16th meeting in Berlin last 26 May 2008.
- Espino R.R.C. and J.V. Ramos (editors).2008. Cacao Technology Resource Manual. Quezon City, Philippines: Department of Agriculture (DA, DA Ginintuang Masaganang Ani (GMA) High Value Commercial Crops (HVCC) Program and Cocoa Foundation of the Philippines, Inc. (CocoaPhil).
- International Cocoa Organization. Accessed from: <http://thechocolatereview.com/where-does-chocolate-come-from-/where-does-chocolate-come-from.html>.
- Malaysian Standard 2016. Good Agricultural Practices (GAP) – Crop Commodities (Second Version 1784:2016)
- Malaysian Standard. 2017. Cocoa Beans – Specification. MS 2672:2017)
- Malaysian Standard. 2017. Planting Materials - Specification. MS 2681:2017
- Philippine National Standard for Cacao or Cocoa Beans (PNS/BAFPS 58:2008). Philippine National Standard Code of Good Agricultural Practices for Fruit and Vegetable (GAP-FV) Farming (PNS/BAFPS 49:2007 ICS 65.020.20).
- UTZ Certified.2008. Code of Conduct for Cocoa (Draft for Public Revision).
- Viet Nam GAP Standard for Fruits and Vegetables N0739/QA-BNN-KWCA

## **INTRODUCTION**

“The ASEAN GAP for Cacao Production was developed in accordance with the Good Agricultural Practices for the production of fresh fruit and vegetables in the ASEAN Region (ASEAN GAP). As provided in the standard, ASEAN Good Agricultural Practice (GAP) is a ‘regional standard to prevent the risks associated with the production, harvesting and post-harvest handling of fresh fruit and vegetables and to facilitate their trade within and beyond the region.’ It sets the standard and practice of on-farm production activities as well as that of local industries where the produce are processed and packed for sale.” (ASEAN GAP, 2006)

Implementation of GAP in cacao production will ensure the highest standards for safety and quality of cacao beans for utilization and trade. The implementation of GAP will ensure the following underlying principles:

1. Food safety
2. Environmental management
3. Worker health, safety and welfare; and
4. Produce quality

On another note, we emphasize the importance of coherence of the ASEAN GAP for Cocoa production with the four (4) modules of the ASEAN GAP, namely (i) food safety; (ii) environmental management; (iii) worker health, safety and welfare; and (iv) produce quality. The 4 areas covered under the ASEAN GAP provide minimum requirements during the production and conformity assessment once the products are traded among the AMS.

### **1.1 Scope**

This publication aims to provide general guidelines and technical advice on good agricultural practices for the production of good quality beans. The principles and practices in this GAP standards is expected to achieve the goal of ensuring that cacao produced from the different ASEAN Member States (AMS) is of good quality, safe and suitable for human consumption.

This standard covers general good agricultural practices (GAP) primarily for production, post-harvest operations, storage and transport or shipment of fermented cacao beans. Emphasis is made on the prevention of contamination from chemical hazards, environmental, and physical hazards as they relate to GAP. This standard does not provide recommendations on food safety practices for the processing, storage, transport and handling practices of chocolate at wholesale, retail and food service or in the home.

### **1.2 Use**

This code follows the format of the ASEAN GAP for Vegetables and Fruits. Alignment of the standards from the different national standards for GAP of the different AMS was taken into consideration.

## **GOOD AGRICULTURAL PRACTICES FOR CACAO PRODUCTION**

### **1. SITE HISTORY AND MANAGEMENT FOR NEW ESTABLISHMENT**

- 1.1 Previous and present usage of the production area and the adjoining sites or history of prior land use
- 1.2 Planting on deforested area should not be allowed and follow government regulation
- 1.3 Access of farm and wild animals to the site and to water sources used in primary production
- 1.4 Potential for contaminating cacao areas from leaking, leaching or overflowing of polluted surface waters
- 1.5 Environmental impact assessment, if available.
- 1.6 Remedial action should be taken if significant risk is identified and actions taken should be monitored and noted
- 1.7 Site used for production should comply with country regulations, such as zoning of crops
- 1.8 Farm planning and layout should be done
- 1.9 Cacao farms may be established as an intercrop to existing coconut farms, in existing agro-forestry systems or logged over forest areas.
- 1.10 If the cacao farm is to be established in open land areas, planting of permanent and temporary shade trees should be established a year before new cacao trees are planted. The shade trees should be well arranged to shelter the young plants.”

Rationale: Based on the Code of Practice Philippine Cacao Beans (PNS/BAFPS 104:2011 ICS 67.020) Potential sources of contamination from the environment should be identified. Primary production should not be carried out when there are potentially harmful substances that may contaminate cacao during harvest. As far as possible, domestic and wild animals should be kept out of the area by installing fences or confining animals to a designated area for livestock production as they may also be sources of contamination.

## 2. PLANTING MATERIALS

- 2.1 Records of the source of planting materials should be maintained
- 2.2 Planting materials for intercropping should be the recommended crop and variety
- 2.3 Planting material should be selected for disease/insect resistance
- 2.4 Planting materials should be free of insect pests and diseases
- 2.5 Planting materials should be the recommended variety by government

## 3. SOILS AND SUBSTRATES

- 3.1 Soil should be tested and analysed for the presence of heavy metals before planting for new establishment. If ever heavy metals will be detected from harvested beans, soil should be analysed and appropriate remedial action should be done

- 3.2 Cultivation practices that lead to soil degradation should be avoided. The farmers should use techniques to prevent soil erosion. During the first five years after (re)planting, the farmer can prevent erosion through leaving - or planting - shade trees during land preparation and by planting other plants (food crops, fruit trees, cover crops, etc.). If cacao is planted on slopes over 8%, the producer can use techniques to prevent erosion.
- 3.3 Cultivation practices that improve soil structure and fertility should be done. The farmer should use natural techniques to maintain and optimize soil fertility and structure. Disease-free organic waste, such as pruned branches and leaf litter, are left in the field or used for composting.

#### 4. FERTILIZER AND SOIL ADDITIVES

- 4.1 Fertilizer and soil additives must be registered and recommended to minimize the risk of contamination. Raw manure or human waste must not be used for cultivation.
- 4.2 Fertilizer and soil additives should be recorded. Records, including origin and composition of organic fertilizers, date, frequency, and location of application, should be kept. Analysis for heavy metals should likewise be conducted.
- 4.3 Farmers should practice effective use of farm wastes, particularly pod husks, by shredding them as base material in making compost or organic fertilizer. Farm wastes may include diseased pods or parts of the plants in the cacao farm. However, it is critical to make sure that these wastes are properly composted whereby organisms or pathogens are destroyed during the composting process.
- 4.4 Equipment used to apply fertilizers and additives should be maintained and kept in the proper storage area
- 4.5 Used and unused fertilizers and soil additives should be stored securely, out of reach of children, and away from tools and food products
- 4.6 Farmers and agricultural workers should be trained on proper handling and application
- 4.7 Fertilizer application must follow recommended requirements and methods and should comply with regulations

Rationale: Based on the Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 3(1997)) at levels that may adversely affect the safety of cacao. The World Health Organization (WHO) guidelines on the safe use of water and excreta should also be adopted.

#### 5. WATER

- 5.1 Source of water should be derived from sustainable sources, free from biological and chemical contamination and be analyzed at least once a year
- 5.2 Corrective actions should be made to prevent or minimize contamination from livestock, sewage treatment and human habitation.

- 5.3 The producer should allow a strip of native vegetation (at least 5 meters wide) or guard plants to grow along water streams and sources to control erosion, filter out agrochemicals and protect the wildlife habitat.
- 5.4 Irrigation should be based on cacao requirements and environmental impact
- 5.5 Farm workers should be trained on proper irrigation

Rationale: Based on Malaysian Standard GAP on Cocoa (MS 1784: Part 4: 2005, 4.7.3 Quality of Water), the quality of water source is one of the most important things especially in nursery area, whereas a sustainable source is required to minimize the contamination. Thus, the source water should be analysed consistently for microbial, chemical and mineral pollutants.

## 6. PEST AND DISEASE MANAGEMENT

- 6.1 Integrated Pest Management (IPM) system must be in place
- 6.2 The farmer should perform good cultural control within the cacao farm. Proper pruning should be practiced in order to reduce pest and disease infestation (especially for cacao pod borer and black pod);
- 6.3 Pruning should be carried out regularly and through the use of appropriate tools;
- 6.4 Maintenance of good sanitation practices on the farm is important. Diseased or infested pods, branches and other plant material should be regularly removed from the trees, and properly disposed of in a way that prevents contamination. Tools used should be dedicated for this purpose only and disinfected before and after each use.
- 6.5 In situations where cacao trees are already old and/or less productive, rehabilitation should be done by either side-grafting or bark-grafting. The scion or budwood should come from known/registered budwood garden of high productivity and resistance/tolerance to major pests and diseases.

## 7. PESTICIDES – SYNTHETIC and BIO-PESTICIDES

- 7.1 Farm owners and workers must follow recommended application procedures stated in the product's label
- 7.2 Chemicals must be purchased from authorized dealers; based on recommendations from member state authorities and included in the list of allowed and regulated chemicals by the government
- 7.3 Withholding periods for the interval between chemical application and harvest should be followed
- 7.4 Unused chemicals should be stored properly until next use or disposal; empty chemical containers should be kept secured until disposal
- 7.5 A record of chemicals obtained should be kept, detailing chemical name, supplier of chemical, date, and quantity obtained, and expiry or manufacture date
- 7.6 Farm owners and farm workers should be trained to a level appropriate to their area of responsibility for chemical application
- 7.7 Crop protection measures should be appropriate for the control of pests and diseases and be based on recommendations from member state authorities

- 7.8 Integrated Pest Management systems and non-chemical products should be used as much as possible to minimize the use of synthetic agrochemicals
- 7.9 A rotation strategy for chemical application and other crop protection measures should be used to avoid pest resistance and pest resurgence
- 7.10 Re-entry requirement should be followed
- 7.11 Equipment used for chemical application should be properly cleaned and securely stored
- 7.12 Medical facilities and first aid measures should be available to treat farm workers contaminated/intoxicated with chemicals
- 7.13 Workers handling and applying chemicals and entering newly sprayed sites should be equipped with protective clothing and equipment
- 7.14 Protected clothing should be cleaned and stored separately from crop protection products
- 7.15 Chemical application in areas of public access should be marked with warning signs

## 8. HARVESTING AND HANDLING PROCEDURES

- 8.1 Harvest health ripe pods at approximately 75% ripeness.
- 8.2 Unripe pods should not be harvested. Beans of unripe cacao pods contribute to defects such as 'slaty' beans.
- 8.3 Care should be taken to ensure that the pods are not damaged, wounded or cut while it is removed from the tree. Damage can lead to fungal infection of the tree and ochratoxin contamination of the bean.
- 8.4 Equipment, containers, and materials should be cleaned prior and after use
- 8.5 Containers for harvesting should be stored properly
- 8.6 Workers should have proper training
- 8.7 Method of harvesting shall not cause damage to the bean quality. Pod shall be carefully cut with durable tools.
- 8.8 Post-harvest handling during fermentation and bean drying should be included to avoid operation that might cause contamination to the bean after harvest.

## 9. WASTE AND ENERGY EFFICIENCY

- 9.1 A waste management plan should be followed
- 9.2 Proper waste disposal should be done in designated locations, follow recommended segregation, reuse and recycling

## 10. BIODIVERSITY

- 10.1 Farming activities should comply with member state regulations, covering protected plant and animal species to ensure that protected species are not endangered
- 10.2 Conservation of biodiversity and wildlife by enhancing the habitats and increase agricultural biodiversity

Rationale: Based on Malaysian Standard GAP on Cocoa (MS 1784: Part 4: 2005, 4.14.2 Wildlife and Biodiversity Conservation), cocoa should always be conscious of the need to conserve biodiversity and wildlife areas. Action plan is needed to be further discuss by this Working Group.

## 11. TRANSPORTATION

- 11.1 Vehicle for farm implements should be checked for contamination and should be kept clean at all times
- 11.2 Vehicle used for handling soil, animal manures, chemical fertilizers and pesticides shall be appropriately cleaned prior to delivering.

## 12. RECORD KEEPING

Record forms and documents shall be updated as follows:

- 12.1 Record showing planting site, date of planting, date of harvesting, quantity of harvested bean weight and selling places for the benefit of productivity improvement and traceability.
- 12.2 Source of planting materials
- 12.3 Record on sources of acquired production inputs, such as pesticides and fertilizers by indicating the details on dates, quantity, name of the fertilizers.

## Appendix 1. Integration of Modules

Contents	Modules			
	Food Safety	Environmental Management	Worker health, safety, welfare	Produce Quality
Site History And Management for New Establishment	√	√	√	√
Planting Materials				√
Soils and Substrates	√	√		√
Fertilizer and Soil Additives	√	√	√	√
Water	√	√	√	√
Pest and Disease Management		√	√	√
Pesticides – Synthetic and Bio-Pesticides	√	√	√	√
Harvesting and Handling Procedures	√		√	√
Waste and Energy Efficiency		√	√	
Biodiversity		√		
Transportation	√		√	√
Record Keeping	√		√	√

## **Appendix 2. Glossary**

**Agricultural Biodiversity**- broad term that includes all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agricultural ecosystems

**Agrochemicals**- a chemical used in agriculture, such as a pesticide or a fertilizer.

**Agroforestry**- land use management system in which trees or shrubs are grown around or among crops or pastureland

**Biological Contamination**- A general definition of a hazard as related to food safety is conditions or contaminants that can cause illness or injury. Biological hazards include microorganisms such as bacteria, viruses, yeasts, molds and parasites. Some of these are pathogens or may produce toxins

**Budwood**- short lengths of young branches with buds prepared for grafting onto the rootstock of another plant.

**Budwood Garden**- is a nursery where sturdy and improved varieties and plant species are tended for their buds to be used in plant propagation, particularly grafting.

**Chemical Contamination**- used to indicate situations where chemicals are either present where they shouldn't be, or are at higher concentrations than they would naturally have occurred.

**Composting**- natural process of recycling organic material such as leaves and vegetable scraps into a rich soil amendment

**Crop Rotation**- the practice of growing a series of dissimilar or different types of crops in the same area in sequenced seasons

**Cultural Control**- the practice of modifying the growing environment to reduce the prevalence of unwanted pests.

**Environmental Management**- use and conservation of natural resources, protection of habitats and control of hazards

**Food safety**- refers to handling, preparing and storing food in a way to best reduce the risk of individuals becoming sick from foodborne illnesses.

**Heavy Metals**- any relatively dense metal or metalloid that is noted for its potential toxicity, especially in environmental contexts

**Intercropping**- practice involving growing two or more crops in proximity.

**Integrated Pest Management (IPM)**- a broad-based approach that integrates practices for economic control of pests.

**Natural Fertilizer**- an organic substance added to soil that contains vital plant nutrients, such as nitrogen, phosphorus, and potassium.

**Ochratoxin**- toxin produced by different *Aspergillus* and *Penicillium* species — is one of the most-abundant food-contaminating mycotoxins.

**Organic Waste**- organic material such as food, garden and lawn clippings. It can also include animal and plant based material and degradable carbon such as paper, cardboard and timber.

**Pest**- any animal or plant which has a harmful effect on humans, their food or their living conditions. Pests include animals which: carry disease-causing micro-organisms and parasites,

**Pest Resurgence**- the rapid reappearance of a pest population in injurious numbers, usually brought about after the application of a broad-spectrum pesticide has killed the natural enemies which normally keep a pest in check

**Postharvest**- the stage of crop production immediately following harvest, including cooling, cleaning, sorting and packing

**Protected Species**- a species of animal or plant which it is forbidden by law to harm or destroy.

**Pruning**- a horticultural and silvicultural practice involving the selective removal of certain parts of a plant, such as branches, buds, or roots

**Pest Resistance**- heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve the expected level of control when used according to the label recommendation for that pest species'.

**Sanitation**- an important and highly effective farm practice to keep most pests under control.

**Shade Trees**- any tree grown specifically for its shade. This term usually applies to large trees with spreading canopies

**Soil Fertility**- ability of a soil to sustain agricultural plant growth, i.e. to provide plant habitat and result in sustained and consistent yields of high quality.

**Variety** - a taxonomic nomenclature rank in botany, below subspecies, but above subvariety and form.