Code of Good Agricultural Practices for Coffee
FOREWORD

This Code of Good Agricultural Practices (GAP) was developed in response to the request of the Philippine Council for Agriculture and Fishery (PCAF) Committee on Commercial Crops to develop Good Agriculture Practice (GAP) for Coffee. This Code aims to ensure food safety and sustainability of coffee production. The Bureau of Agriculture and Fisheries Product Standards (BAFPS) developed the Philippine National Standard (PNS): Green Coffee Beans – Specifications (PNS/BAFPS 01:2003) in 2003 and revised the said standard in 2012 (PNS/BAFPS 01:2012). This Code, therefore, supplements those contained in the PNS/BAFPS 01:2012 or its latest revision and should be read in conjunction with it.

A Technical Working Group (TWG) for the development of the Code of GAP for Coffee was organized and represented by the government sector such as the Bureau of Plant Industry (BPI) and the Department of Agriculture – High Value Crops Development Program (HVCDP); academic institutions particularly University of the Philippines Los Baños (UPLB) Cavite State University (CaVSU), and Benguet State University (BSU); private industry organizations including Philippine Chamber of Food Manufacturers and Philippine Coffee Alliance; and, Philippine Council for Agriculture and Fisheries (PCAF) Committee on Commercial Crops.

The Bureau of Agriculture and Fisheries Standards in collaboration with the members of the TWG conducted a series of technical reviews for the drafting of the standard and public consultations in Regions XII (General Santos), X (Cagayan de Oro) and IVA (Cavite). Comments gathered from the consultations with the stakeholders were considered, deliberated and incorporated during the finalization of the standard.
INTRODUCTION

Based on 2013 Philippine Statistics Authority (PSA) - Bureau of Agricultural Statistics (BAS) data, the top coffee producing provinces in the Philippines are Sultan Kudarat followed by Sulu, Davao del Sur, Bukidnon and Cavite (PSA-BAS, 2014). The same data showed that the land area planted to coffee gradually decreased by 4% from 121,399 hectares in the period of 2010 to 116,459 hectares in 2013. This downtrend is also reflected on the coffee production data for the two (2) types of Philippine coffee, which are robusta and arabica. These data provide one of the major considerations in reviving the coffee industry by strengthening market linkage, supporting the coffee growers, and encouraging more people to engage in coffee production. Enhancing industry competitiveness will be achieved through the support of standards.

Food safety and quality is one of the most prominent concerns worldwide and foodborne disease outbreaks continue to be a public health challenge. Since consumers deserved to be protected from hazards occurring along the entire food chain, food safety has to be ensured following the farm-to-table-continuum. Supporting this objective is the development of standards.

The standard particularly that of Good Agricultural Practices (GAP), provides guidance to farmers and other relevant stakeholders through principle-based practices from pre-planting operations up to postharvest handling. These practices are focused on ensuring food safety, produce quality, workers welfare and environmental management. To support the coffee industry, the Bureau of Agriculture and Fisheries Standards (BAFS) in collaboration with the experts of the Technical Working Group (TWG), developed the Code of Good Agricultural Practices (GAP) for Coffee.

This GAP for Coffee addresses the essential principles of food safety applicable to primary production through primary processing and packing of green coffee beans. It encompasses relevant provisions of Good Hygienic Practices (GHP) and Good Manufacturing Practices (GMP), as far as applicable, which will help minimize microbiological, chemical and physical hazards associated with all stages of production to processing.

SECTION 1 - OBJECTIVE

This Code addresses Good Agricultural Practices (GAP) that will provide guidance to farmers in minimizing the occurrence of microbial, chemical and physical hazards associated with primary production and primary processing through packing of dried green coffee beans supplied to processors/end users meant for human consumption; and in
maintaining product quality during transportation and storage. Additional guidance takes into account the relevant practices pertaining to Good Manufacturing Practices (GMP), as far as practicable.

The development of GAP for Coffee aims to assist farmers/growers to provide assurance on safety and quality of harvested and/or processed green coffee beans. It also aspires to be used as basis for the provision of appropriate assistance and technical support to increase productivity, improve quality and use of natural resources, and comply with at least minimum sustainability, leading to improved farmer income and making coffee farming attractive to future generations of coffee farmers/growers.

SECTION 2 - SCOPE

This Code covers relevant practices during primary production, primary processing (i.e. wet and dry), and storage and transport of green coffee beans to ensure food safety and sustainability of coffee production. This Code concentrates on addressing microbial and chemical hazards and addresses physical hazards only in so far as these relates to GAPs and GMPs, and provides specific guidance on how to minimize these hazards. This Code, however, does not provide recommendations on food safety practices for the processing of green coffee beans into its ground, blended, or ready-to-drink form; or its subsequent storage, transport and handling practices at wholesale, retail and food service or at home.

This Code takes into consideration the relevant practices in the Philippine National Standard (PNS) Code of Good Agricultural Practices (GAP) for Fresh Fruits and Vegetables (PNS/BAFPS 49:2011) (i.e. pesticide management).

SECTION 3 – DEFINITIONS

For the purposes of this Code, the following definitions apply:

**Agricultural inputs**
Any incoming material (e.g. seeds, fertilizers, water, agricultural chemicals, biological control agents, botanical pesticides, and the like.) used for the primary production of coffee.

**Biological control agent**
Active ingredients that are naturally occurring in organisms in any form intended to kill or control pests or control the behaviour or physiology of pests during production or storage of crops.
Cleaning
The removal of soil, dirt, grease or other foreign matter.

Clean water
Water that does not compromise food safety in the circumstances of its use.

Coffee
General term for the fruits and seed of plants of the genus *Coffea*, generally cultivated species, as well as products from these fruits and seed in different stages of processing and use, intended for consumption.

Coffee cherry
Fresh, complete fruit of the coffee tree (see Figure 1). This is also referred to as “coffee berry”.

Coffee bean / green coffee beans
Commercial term designating the dried seed of the coffee plant, disengaged from their external envelopes.

Composting
Natural process of 'rotting' or decomposition of organic matter such as crop residues, animal wastes, food garbage, some municipal wastes and suitable industrial wastes by microorganisms under controlled conditions.

Contaminant
Any substance not intentionally added to food which is present in such food as a result of the production (including operations carried out in crop industry, animal husbandry and veterinary medicine) post-harvest handling, manufacturing, processing, preparation, treatment, packing, packaging, transport or holding of such food as a result of environmental contamination.

Contamination
Food safety context:
The introduction or transfer of a food safety hazard to produce or to the inputs that contact produce, such as soil, water, chemicals, equipment and people.

Environmental context:
The introduction or occurrence of a hazard into the environment.
Control Measures
Any action and activity that can be used to prevent or eliminate food safety hazard or to reduce it to an acceptable level.

Dehulling (or hulling)
Primary processing step to separate the dried pericarp (in dry method) or the dried parchment and silver skin (in wet method) from the green coffee beans.

Depulper
Machine used to remove and separate the soft pulp of ripe coffee cherry without causing any damage to the parchment coffee. This is also referred to as “pulper”.

Depulping
operation in the wet processing of coffee which removes the pulp (exocarp) and as much as possible the mucilage (mesocarp) through mechanical means. A portion of the mucilaginous mesocarp usually remains adhering to the parchment (endocarp). This is also referred to as “pulping”.

Dry process
Treatment of coffee cherry consisting of drying to give husk coffee, followed by mechanical removal of the dried pericarp to produce green coffee bean.

Endocarp
Scientific term for “parchment.” The tough integument tightly pressed to the seed when fresh but from which the seed shrinks during drying.

Epicarp or Exocarp
Scientific word designating the skin of the fruit, a mono-cellular layer covered with a waxy substance ensuring protection of the fruit.

Farm
Any premise or establishment in which coffee is grown and harvested and the surroundings under the control of the same management.

Fertilizer
Includes any substance – solid or liquid – or any nutrient element or elements – organic or inorganic – used singly or in combination with other materials, applied directly to the soil/leaves for the purpose of promoting plant growth, increasing crop yield or improving their quality.
Fermentation
Treatment intended to digest the mucilaginous mesocarp adhering to the parchment of the pulped coffee, thereby, allowing its elimination by washing. The fermentation process can be replaced by a mechanical demucilaging system to remove the mucilage by friction.

Food safety hazard
Any chemical, biological or physical substance or property that can cause coffee to become an unacceptable health risk to consumers.

Grower
The person responsible for the management of the primary production and primary processing of coffee.

Hazard
A biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health and environmental effect/s.

Manure
Animal excrement which may be mixed with litter or other material, and which may be fermented or otherwise treated.

Mesocarp
Intermediate layer of tissues between the epicarp and the endocarp (parchment). It consists mainly of pectinacious mucilage and pulp.

Microorganisms
Include yeasts, mould, bacteria, viruses and parasites. When used as an adjective, the term “microbial” is used.

Moisture Content
Quantity of free water in a specified material; expressed either as a decimal ratio or as a percentage.

Mucilage
Common word to describe the slimy layer found between the pulp and adhering to the parchment inside a coffee cherry, but not removed by pulping. Not present in unripe and overripe coffee.
Pest
An unwanted animal, plant or microorganisms that affect the production, quality and safety of coffee – for example, insects, pathogens, weeds and rodents.

Pesticide
Any substance or product, or mixture thereof, including active ingredients, adjuvants and pesticide formulations, intended to control, prevent, destroy, repel or mitigate directly or indirectly, any pest. The term shall be understood to include insecticide, fungicide, bactericide, nematicide, herbicide, molluscicide, avicide, rodenticide, plant regulator, defoliant, desiccant and the like.

Potable water
Water that is suitable for human consumption as approved by the World Health Organization (WHO) or equivalent regulation.

Primary production
Those steps involved in the growing and harvesting of coffee such as planting, water management, nutrient management, pest management and shade management.

Primary processing
The preparation and/or transformation of a raw material for further processing, e.g. dry and wet methods.

Pulp
Part of the coffee cherry composed of the external exocarp and most of the internal mesocarp (mucilaginous tissue).

Risk
The chance of something happening that will impact upon a hazard (for example, food safety). It is usually measured in terms of likelihood and consequences.

Sanitize
Reducing the level of microorganisms through using chemicals, heat and other methods.

Site
A defined area on the property – for example, a production site.
Traceability
The ability to follow the movement of produce through the specified stages of production and distribution.

Wet process
Treatment of coffee cherry, consisting of mechanical removal of the exocarp in the presence of water, removal of all the mesocarp by fermentation or other methods, and washing followed by drying to expose parchment which is subsequently removed from the seed/bean to produce green coffee beans.

Winnowing
Process of removing the shell/husk/parchment/silver skin from the coffee bean using a mechanical winnower, a large winnowing pan or by using a fan/blower to blow away the shells/husks and the like.

SECTION 4 - PRIMARY PRODUCTION

4.1 Location of Production Site

For each primary production area and method of production, it is necessary to consider particular agricultural practices as provided for in Package of Technologies (POT) that will ensure the level of food safety of green coffee beans supplied to processors for human consumption. Procedures associated with primary production should be carried out under hygienic conditions to minimize contamination and potential sources of contamination of green coffee beans.

Potential sources of contamination from the environment should be identified. Primary production should not be carried out in areas where there are potentially harmful substances that may contaminate coffee during its growing stage, harvest and postharvest handling. The grower should implement measures that will minimize the presence of domestic and wild animals (i.e. installing fences, planting buffer plants, or confining animals to a designated area for livestock and poultry production).

In order to further promote environmental management, another important consideration in managing the production site is to ensure that the existing natural ecosystem is protected. As such it is essential that all aquatic and terrestrial ecosystems are identified so that they can be protected and preserved/restored. Before expanding a farm, the ecosystems on the farm and the areas around the farm are checked. It is also important to make sure that threatened or endangered plants and animal species are conserved.
As far as practicable, the areas that need to be protected should be identified in the location map, including:

- Forest, woods, bush
- Housing areas
- Roads
- Water sources
- Other infrastructure
- Other natural resources

When new production areas are established, this should be suitable for coffee production. Likewise, this should not be established in places where there could be extreme negative effects on public or private biological conservation areas. The site must also be accessible to transportation facilities. Summarized in Annex A are important parameters to be considered in site selection.

4.2 Farm Sanitation

Growers and agricultural workers should remove diseased or damaged plants to prevent the further spread of the disease in the production site. Removal of infested or infected plant parts (e.g. cherry) from the tree and the soil is recommended. Consequently, burning of the infested or infected plant parts in designated proper area is also encouraged.

4.2.2 Waste management

Waste should not be allowed to accumulate in the coffee processing area. It should be further managed by keeping the storage area for waste water clean and dry. Reuse of water as well as recycling of coffee pulp, coffee hull/husk and rejected beans are encouraged. These waste materials and by-products can be utilized as raw materials in the production of feeds, compost, and for other industrial uses (e.g. coffee pulp to silage and as a compost, coffee husk as a fuel and coffee waste water to biogas).

4.3 Selection of planting materials

Planting materials or seedlings should be free from pests and diseases. For the establishment of new farms, planting materials/varieties registered at the Bureau of Plant Industry (BPI) - National Seed Industry Council (NSIC) are recommended. Likewise, quality planting materials/seedlings is recommended to be sourced from the BPI certified plant material/seedlings coming from the accredited plant nursery operators. Records of the
source of planting materials shall be kept. The list of accredited nursery operators is attached in Annex B of this Code.

For coffee plantations that are already established, the source of planting materials should be recorded.

4.4 Land Preparation

It is recommended that the area for planting coffee should have deep, fertile, friable and well-drained soil but has sufficient water holding capacity. During transplanting, the hole should be sufficiently wide and deep to avoid breaking or bending the tap root as possible. When necessary, shade trees shall be planted to meet the appropriate sunshine requirements.

4.5 Soil Conservation

For areas with steep slope (above 18%), coffee plantations should implement erosion control measures which include contouring, silt pits, mulching, cover cropping and planting crops against the slope. In planting coffee trees along the contour, the rows of coffee should run at right angle to the direction of the slope. Meanwhile, other anti-erosion measures such as contour ridges, contour bunds, contour ditches and vegetative measures that are designed to disrupt the downward flow of rainfall run-off, collect, and convey the run-off to major waterways and then to a drainage channel should also run along the contour between the coffee rows. The examination of the contour map and the preparation of outline plans for selected erosion control measures will determine the contour interval at which the rows of coffee are to be planted.

4.6 Fertilization

Agricultural inputs (water, fertilizer, agricultural chemicals, organic inputs, and the like) should not contain microbial or chemical contaminants (e.g. heavy metals such as cadmium, mercury, lead and nickel) as defined under the General Principles of Food Hygiene (CAC/RCP 1-1969) and at levels that may adversely affect the safety of coffee beans. The competent authority regulates agricultural inputs used in coffee production.

The use of fertilizers particularly natural fertilizers or commercial organic fertilizers in coffee production should be managed to limit its potential as source of microbial and chemical contamination. If found to be contaminated with heavy metals or other chemicals at levels that may affect safety, these inputs should not be used.
Growers or agricultural workers must not use untreated solid nor liquid manure because pathogenic microorganisms can persist in soils for long periods of time. In cases when the farm produces its own organic inputs (e.g. compost), proper treatment procedures should be adopted to reduce or eliminate the pathogens present in the raw material and to minimize the probability of contaminating the product. A record of treatment procedures, including the raw materials used should be kept. The location of the composting site should also consider the slope and its proximity to production areas in order to prevent cross contamination from run-off or leaching. Composting area should be located at the lowest part of the production area.

Records of agricultural inputs should include origin and composition of fertilizers, date, frequency and location of application. Human manure and urine are not allowed.

In order to optimize yield, considerations like crop demand and available nutrients from the soil, farm manure and other crop residues may be useful in deciding the appropriate kind of fertilizer or amount of application. Soil analysis is highly recommended as basis for the application of fertilizer. In the absence of soil analysis, sample computation of the recommended rate of fertilizer application per tree is shown in Annex B. If organic fertilizer is preferred, this should be equivalently computed according to the sample computation in Annex B. Growers should use only registered agricultural chemicals and should use these for its intended purpose and according to manufacturer’s instructions. All organic and inorganic fertilizers are to be used appropriately, optimizing yield and minimizing negative impacts on human health, the environment and the quality of the coffee. Fertilizers must be clearly labeled and should be stored in a way that does not contaminate the environment.

4.7 Water Management

If coffee plantations are rainfed, plantings should be done at the onset of rainy season. Otherwise, irrigation is recommended for planting during dry months. Care should be taken to ensure that soil around the coffee tree is not dried out after planting and that the moisture is maintained. Furthermore, water use should be managed to ensure sustainability.

4.8 Pruning

Pruning will increase, maximize and improve yield, as such is a necessary activity for the growers. Pruning is recommended to maintain the correct balance between leaf area and crop, thus, preventing overbearing and dieback, maintaining good tree shape, reducing biennial bearing and providing a supply a good growth the next season’s crop.
Detopping of tall trees and rejuvenation of old trees are recommended to facilitate farm operations, attain desired height of coffee trees and obtain maximum yield.

**4.8.1 Detopping or Topping**

Detopping or topping is described as cutting back shoots of coffee trees to keep it at less than 1 to 1.5 meters high. This operation is done to newly planted or newly rejuvenated coffee trees. Detopped coffee trees give dwarf appearance, encourage elongation of branches and production of more twigs, ultimately leading to higher yield.

**4.8.2 Rejuvenation**

Coffee rejuvenation is the cutting of vertical stems or trunks of old coffee trees to induce growth of new sprouts. Rejuvenation brings back 100% of the coffee green bean yield and reduces labor cost up to 50%. Rejuvenation is generally recommended when coffee trees are ten (10) years old. Grafting may be employed to improve coffee productivity.

**4.9 Pest and Disease Management**

In order to control infestation and diseases such as coffee stem borers, coffee berry borer, coffee rust and berry rot, the grower should regularly inspect and monitor the production site for the presence of pests and diseases. Once observed, the infected tree(s) should be tagged and recorded for further observations. The results of the inspection and monitoring will be used as basis for deciding the best management strategy (i.e. management or control) and implementing interventions to treat the affected area(s), thus, eradicating pests and/or diseases. Aside from the production area, other facilities are also checked for presence and population density of pests, and the damages it has caused.

Integrated Pest Management (IPM) is an effective and environment-friendly approach to pest management to control and minimize pest damages. IPM combines the use of current and comprehensive information on the life cycles of pests; their interaction with the environment and the available pest control methods, e.g. varietal selection biological, cultural, physical, mechanical and chemical controls. Use of chemicals should be on a need basis.
4.9.1 Use of Biological control agents

Environmental and consumer safety should be considered when using competing biological organisms and/or their metabolites to control pests, mites, plant pathogens and spoilage organisms in coffee production. Growers should only use biological control agents, which are authorized for the cultivation of coffee and should use them for its intended purpose and according to the manufacturer’s instructions. Registration of biological control agents is based on existing national standards and regulations of BAFS.

4.9.2 Use of pesticides

The harvested coffee cherries are usually protected using chemical crop protection products. Pesticides that are target-specific and have minimal negative effect/impact on the agro-ecosystem and environment should be used. Choice of crop protection strategies should be appropriate to the pests and diseases being controlled. Growers should use agricultural chemicals that are FPA-registered for coffee cultivation and/or approved in the country where the produce is to be traded. These should be procured from licensed suppliers. Such agricultural chemicals must be used according to its intended purpose, approved label instructions and applied at approved dosages to prevent levels exceeding the maximum residue limits (MRLs). Growers who apply agricultural chemicals should be trained on proper application.

Pesticides must be always clearly labeled and stored in original container. They should be stored in a designated and secured area away from the main production area. Pesticides and other agrochemicals must be stored separately in an elevated area using pallets or similar material.

4.10 Harvesting operations

Normally, coffee cherries are harvested according to maturity indices to ensure good quality coffee. The harvesting is usually done by selective picking of ripe coffee cherries, which are ready for harvest within 7 to 14 months after flowering depending on the species and location.

In general, harvesting is done by any of the two (2) basic systems such as: stripping - where cherries harvested are predominantly ripe, and selective picking (hand picking) - where
only ripe cherries are harvested. Of the two (2) systems, selective picking of ripe cherries is highly recommended.

During harvesting, coffee cherries should be placed in clean harvesting containers prior to segregation or selection operations. Harvested cherries should not be placed in direct contact with the ground. Furthermore, newly harvested cherries should not be mixed with any of the fermented part of previously harvested cherries (e.g. from the previous day) as this will contaminate the current batch of coffee cherries and may result to deterioration of the entire batch.

Harvested cherries that are heavily bruised, damaged, diseased, or over-ripe should be segregated. Those that cannot be made safe by further processing should be disposed of properly to avoid contamination.

Containers (e.g. basket and plastic containers) used for harvesting should be made from non-toxic materials. These containers should be designed and constructed to ensure that, these can be cleaned, disinfected and maintained in working condition to avoid contamination. When using reusable harvesting containers and tools, a cleaning and disinfection schedule should be in place to prevent contamination. A record of cleaning should be available. Containers that are damaged and can no longer be kept in a hygienic condition should be discarded.

As far as practicable, harvesting containers should only be used to contain harvested produce. If these containers are used for other purposes, these must be cleaned and disinfected as necessary prior to use. Containers of agrochemicals shall not be used as harvesting container.

SECTION 5 - POSTHARVEST PRACTICES

This section applies hygienic recommendations for the primary processing of harvested ripe coffee cherries, which will then be supplied to processors for further processing. It provides recommendations on the application of relevant Good Manufacturing Practices (GMPs) principles for all stages of primary processing of coffee beans.

Overly-dried green coffee beans are brittle and mishandling can lead to increased percentage of broken beans during hulling (broken beans are considered defective beans). On the other hand, beans that have not been dried sufficiently have higher moisture content and are more prone to rapid deterioration caused by the attack of fungi, bacteria and other pests.
5.1 Types of Coffee Processing

Once the ripe cherries are harvested, the beans can be extracted by using either the dry or the wet method (Figure 1).

5.1.1 Dry method

The dry method also known as the traditional method is the oldest and simplest process that requires appropriate machinery. The method involves drying the whole cherry.

The harvested cherries are usually sorted to segregate unripe, overripe and damaged cherries; remove dirt, soil, twigs and leaves; and are then subsequently cleaned. The ripe cherries can also be separated by flotation in washing channels, which are installed close to the drying areas.

The coffee cherries are normally dried under the sun, either on large concrete or brick patios or on matting raised to waist height wire mesh tables. To ensure product quality, the use of ‘all weather drier’ (Figure 2) is, however, recommended. As the cherries dry, they are raked or turned to ensure even drying. This process may take up to 4 weeks before the cherries are dried to the optimum moisture content of 11-12 percent. The length or period of drying is dependent on the weather conditions. In larger plantations, mechanical dryer is sometimes used to speed up the process after the coffee has been pre-dried in the sun for a few days.

5.1.2 Wet method

Only ripe cherries are recommended to be processed using the wet method. This method requires the use of specific equipment such as depulper and just enough quantities of water to facilitate the flow of coffee cherries. When properly done, the qualities of the coffee beans are better preserved. This produces a green coffee which is homogeneous and has fewer defective beans. Hence, the coffee produced by this method is usually regarded as better in quality and commands higher prices.

As in the dry method, preliminary sorting and cleaning of the cherries is necessary and is carried out immediately after harvesting operations. This operation can be done by washing the cherries in tanks filled with clean water. Screens may also be used to facilitate separation of large and small cherries. Other strategies may include manual sorting of ripe and rejected cherries.
Depulping is the main difference between the dry and the wet method and is usually done through the aid of a machine which squeezes the cherries between surfaces. Depulping operation should also be carried out immediately after harvesting to avoid any deterioration of the cherries which later on might affect the quality of the beans. Because the depulping is done by mechanical means, it normally leaves some residual flesh as well as sticky mucilage that adhere to the parchment surrounding the beans. This has to be completely removed to avoid contamination of the coffee beans by products resulting from the degradation of the mucilage.

Fermentation is very critical in terms of final coffee quality. The newly depulped beans are placed in large fermentation tanks filled with clean water. At this step, the mucilage is broken down by natural enzymes and this can be easily washed away. The fermentation process has to be carefully monitored since the coffee can acquire undesirable and sour flavours. For most coffee, mucilage removal takes between 12 and 24 hours depending on the temperature, thickness of the mucilage layer and concentration of the enzymes. The end of the fermentation is assessed by feel, as the parchment surrounding the beans loses its slimy texture and acquires a rougher "pebbly" feel. When the fermentation is complete, the coffee is thoroughly washed with clean water.

To reduce the moisture content to a maximum of 12 percent, the parchment coffee is dried either in the sun, in a mechanical dryer, or by a combination of the two. The sun drying is preferably done on elevated tables made of fine mesh netting to encourage proper air circulation and ventilation. Sun drying normally takes from eight (8) to ten (10) days, depending on the temperature and humidity. Coffee dries more quickly if raised on tables because of the upward draught of warm air. The use of hot-air drying machines or mechanical dryer (figure 3) becomes necessary to speed up the process in large plantations especially during the peak of the harvesting period wherein the volume vis-à-vis the available space is insufficient. However, the mechanical-drying process must be carefully controlled and monitored to achieve satisfactory and economical drying without any damage to quality.

5.2 Packaging

The dried cherry and/or parchment coffee are packed in bulk in special silos or in bags until they are sent to the mill where dehulling, sorting, grading and bagging take place. Green coffee beans should be packed and sealed in bags made of food grade or non-toxic materials such as jute sacks. The sacks or bag should have a label imprinted on it indicating the production batch number and date, the cooperative/farmer/area presented in codes. Bags that were used to store chemicals, fertilizers and feeds must not be reused.
5.3 Storage

If storage is necessary, the bagged green coffee beans must be placed in pallets or similar material so that it will not be in direct contact with the ground; and in storage sheds that are weather-proof, well ventilated, free from moisture and insect pests and located away from sources of smoke and other odours that may contaminate the coffee. Storage facilities should be designed to minimize damage to the coffee. Moisture content of the green coffee beans should be monitored regularly during storage and maintained at a maximum of 12 percent. Storage area should be kept clean to avoid pest infestation.

5.4 Maintenance of Post-Harvest Equipment

All utensils, equipment and machineries should be cleaned and sanitized before and after use. Cleaning and sanitizing should be conducted in a manner that protects the coffee against possible contamination. Cleaning agents should be used, stored and labeled in accordance with the manufacturer’s instructions and relevant regulations.

Postharvest equipment should conform to applicable standard(s) indicating the manufacturing and performance requirements.

SECTION 6 – ESTABLISHMENT- DESIGN AND FACILITIES

Refer to General Principles of Food Hygiene.

SECTION 7 – CONTROL OF OPERATION

7.1 Control of food hazards

Refer to General Principles of Food Hygiene.

7.2 Management and supervision

Refer to General Principles of Food Hygiene.

7.3 Documentation and record keeping

Records of production, processing and distribution should be kept to facilitate traceability. Farmers should keep up-to-date comprehensive records of all farming activities. Records should be kept are as follows:
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PNS/BAFS 169:2015

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- types, species and sources of planting materials;
- types of pesticides and fertilizer and usage;
- production site with lot codes;
- suppliers of agricultural inputs;
- soil and water management practices;
- use of agricultural chemicals;
- water quality and safety;
- processing including the date, method and final volume of processed cherries; and
- pest control and cleaning schedules of premises, facilities, equipment and containers;
- related trainings;
- volume of production, and;
- cost of production.

SECTION 8 – WORKERS’ WELFARE, HEALTH AND HYGIENE

8.1 Labor conditions

All workers should be 18 years of age and above or should follow the minimum working age defined by the applicable local law. Workers that are below 18 years of age may be allowed to help in the farm under strict conditions that includes considerations on: appropriateness of assigned work versus the age and physical condition of the worker, duration of working hours, working condition, and availability of supervision and guidance during operations.

There should be no cases of forced labor and forced eviction. There should be no prohibition on membership or representation by labor union. Where provided by an employer, living quarters should be suitable for human habitation and contain basic services and facilities.

8.2 Personal hygiene and sanitary facilities

All agricultural workers including contractors or visitors should act in accordance with the appropriate sections of the Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1 – 1969) to maintain an appropriate degree of personal cleanliness; operate in an appropriate manner and to ensure that those who come directly in contact with coffee during or after harvesting will not likely contaminate the produce/product.

In particular, attention should be given to availability of hand-washing facilities with provisions of soap and clean running water during harvesting and postharvest handling operations. When gloves are used in the operation, there should be a proper and regular
cleaning and sanitation. If disposable gloves are used, they should be discarded when torn, soiled, or otherwise contaminated.

**8.3 Trainings**

Training on hygiene instructions should be conducted annually. Evidence on the conduct of training should be kept. Moreover, the farm should keep track of evidence that hygiene instructions are followed.

Regular environmental and personnel hygiene assessment as well as sanitary inspection of facilities should be conducted to serve as basis for corrective and preventive actions.

Subcontractors and visitors are made aware of relevant procedures on personal safety and hygiene (e.g. relevant instructions and signages are in visible place where all visitors or subcontractors can read them).

**SECTION 9 – PRODUCT INFORMATION AND CONSUMER AWARENESS**

Refer to the *General Principles of Food Hygiene* and the Philippine National Standard for Green Coffee Beans (PNS/BAFPS 01:2012). The following information is required for packaging green coffee beans:

- Name of product;
- Species and variety;
- Grade;
- Net mass;
- Name and address of producer/trader/exporter or Country Code/Exporter’s Code/Parcel No; and
- Product of the Philippines
REFERENCES:


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Figure 1. Coffee Cherry (Source: CAC/RCP 69-2009)
Figure 2. All-weather Dryer (Source: Philippine Center for Postharvest Development and Mechanization)
## ANNEX A

### General Recommendations on Selection of Production Site

*Table 1. Factors to consider in the selection of production site

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Liberica</th>
<th>Excelsa</th>
<th>Robusta</th>
<th>Arabica</th>
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<tr>
<td>Elevation (MASL) depending on the cultivar and available technology</td>
<td>less than 900</td>
<td>less than 900</td>
<td>less than 900</td>
<td>less than 1800</td>
</tr>
<tr>
<td>Sunshine requirements</td>
<td>Full</td>
<td>Full</td>
<td>Full</td>
<td>Partial shade / Full</td>
</tr>
<tr>
<td>Annual Rainfall (mm)</td>
<td>1000-2000</td>
<td>1000-2000</td>
<td>1000-2000</td>
<td>1500-2000</td>
</tr>
<tr>
<td>Soil pH</td>
<td>5.6-6.5</td>
<td>5.6-6.5</td>
<td>5.6-6.5</td>
<td>5.6 – 6.5</td>
</tr>
<tr>
<td>Soil depth, m</td>
<td>≈ 1.5</td>
<td>≈ 1.5</td>
<td>≈ 1.5</td>
<td>≈ 1.5</td>
</tr>
</tbody>
</table>

*The values and specifications cited on the table are just recommendations and should not be used as reference in the issuance of non-compliances of any applicable certification regulations.*
## List of Accredited and Re-accredited Nursery Operators for Coffee

<table>
<thead>
<tr>
<th>NAME OF OPERATORS</th>
<th>REGISTERED BUSINESS NAME</th>
<th>BUSINESS ADDRESS AND CONTACT NO.</th>
<th>DATE OF EXPIRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2013</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gerardo A. Magsino</td>
<td>Popoy's Plant Nursery</td>
<td>Brgy. Ulat, Silang Cavite</td>
<td>9/17/2015</td>
</tr>
<tr>
<td>Miguel D. Jayme</td>
<td></td>
<td>Brgy. Ambulong, Tanauan City, Batangas</td>
<td></td>
</tr>
<tr>
<td>William C. Coronado</td>
<td>Coronado's Farm Plant Nursery</td>
<td>Brgy. San Vicente/San Ignacio, San Pablo City</td>
<td>10/7/2015</td>
</tr>
<tr>
<td>Angelita E. Amat</td>
<td>Angelita Amat Plant Nursery Agri-Trading</td>
<td>Brgy. Bungoy, Dolores, Quezon</td>
<td>10/13/2015</td>
</tr>
<tr>
<td>Manolito A. Mendoza</td>
<td>M. A. Mendoza Plant Nursery</td>
<td>Brgy. Bañapero, Ambulong, Tanauan, Batangas</td>
<td>12/16/2015</td>
</tr>
<tr>
<td>Reymundo M. Mendoza</td>
<td>Green Heights Garden</td>
<td>Brgy. Balas, Ambulong, Talisay, Batangas</td>
<td>12/16/2015</td>
</tr>
<tr>
<td>Artemio M. Umali</td>
<td>Greenworld Agri-Farm Center</td>
<td>Malinta, Sampaloc 2, Dasmarnas, Cavite</td>
<td>12/26/2015</td>
</tr>
<tr>
<td>Caramay Coffee Plantes Multi-</td>
<td>FLT Agri Trading</td>
<td>Brgy. Aquilino, Roxas, Oriental Mindoro</td>
<td>12/16/2015</td>
</tr>
<tr>
<td><strong>2014</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albert Paul B. Dimas</td>
<td>Macnut Phils. Inc.</td>
<td>Pinsao Proper, Baguio City</td>
<td>4/20/2017</td>
</tr>
<tr>
<td>Johny D. Juanino</td>
<td>Juanino’s Plant Nursery</td>
<td>Bugnay, Diadi, Nueva Vizcaya</td>
<td>8/7/2017</td>
</tr>
<tr>
<td>Virgilda M. Austria</td>
<td>Virgilda M. Austria Plant Nursery</td>
<td>Brgy. Sampaloc/Sta. Maria, Talisay, Batangas</td>
<td>3/20/2017</td>
</tr>
</tbody>
</table>
## Code of Good Agricultural Practices (GAP) for Coffee

<table>
<thead>
<tr>
<th>Name</th>
<th>Company/Location</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danilo M. Abello</td>
<td>D.M. Abello Enterprises</td>
<td>Brgy. Tumaway, Talisay, Batangas</td>
<td>3/20/2017</td>
</tr>
<tr>
<td>Limmeo O. Buno</td>
<td>Berdie’s Agri-Trading</td>
<td>Brgy. Balas, Talisay, Batangas</td>
<td>10/2/2017</td>
</tr>
<tr>
<td>Jesus M. Dimapilis</td>
<td>JMD Plant Nursery &amp; Concrete Products</td>
<td>Little Tanauan, Roxas, Oriental Mindoro</td>
<td>5/18/2017</td>
</tr>
<tr>
<td>Ulysses L. Valdez</td>
<td>Ulysses L. Valdez Farm</td>
<td>Rizal St., Barotac, Iloilo City</td>
<td>5/22/2017</td>
</tr>
<tr>
<td>Proferio A. Necesario, Jr.</td>
<td>J &amp; P Fruit Nursery</td>
<td>Bacuyong, Pinan, Zamboanga del Norte</td>
<td>5/19/2017</td>
</tr>
<tr>
<td>Emma B. Dayot</td>
<td>Dayot Plant Nursery</td>
<td>Km. 10, Catalunan, Pequeno, Tolomo District, Davao</td>
<td>8/13/2017</td>
</tr>
<tr>
<td>Hermina G. Jangcan</td>
<td>Linan Nursery</td>
<td>National Highway, Poblacion, Tupi South Cotabato</td>
<td>8/28/2017</td>
</tr>
</tbody>
</table>

### 2015

<table>
<thead>
<tr>
<th>Name</th>
<th>Company/Location</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augusta S. Castaneda</td>
<td>Ambuclao Coffee Growers Association</td>
<td>Bangao, Ambuclao, Bokod, Benguet</td>
<td>7/19/2018</td>
</tr>
<tr>
<td>Nestle Phils. Inc.</td>
<td>Quirino Integrated Coffee Center</td>
<td>Dungo, Aglipay, Quirino</td>
<td>7/19/2018</td>
</tr>
<tr>
<td>Julius B. Gonzales</td>
<td>GMG Agri-Farm Products</td>
<td>Brgy. Tala, Orani, Bataan</td>
<td>3/23/2018</td>
</tr>
<tr>
<td>Gerardo A. Magsino</td>
<td>Popoy's Plant Nursery</td>
<td>Brgy. Leynes, Talisay, Batangas</td>
<td>6/28/2018</td>
</tr>
<tr>
<td>Mohammad I. Yusoph</td>
<td>M. Yusoph Plant Nursery</td>
<td>Brgy. Balas/Sta. Maria, Talisay, Batangas</td>
<td>7/19/2018</td>
</tr>
<tr>
<td>Lilwayway A. Amat</td>
<td>Liwayway Amat Agri-Trading</td>
<td>Brgy. Bungoy, Dolores, Quezon</td>
<td>8/2/2018</td>
</tr>
<tr>
<td>Aurelio B. Escala</td>
<td>Aurelio B. Escala Plant Nursery</td>
<td>San Isidro, Victoria, Oriental Mindoro</td>
<td>1/27/2018</td>
</tr>
<tr>
<td>Rufino D. Lumbres</td>
<td>Corrines's Garden</td>
<td>Little Tanauan, Oriental Mindoro</td>
<td>3/19/2018</td>
</tr>
<tr>
<td>Rufino D. Lumbres</td>
<td>Corrines's Garden</td>
<td>Little Tanauan, Oriental Mindoro</td>
<td>6/16/2018</td>
</tr>
</tbody>
</table>
## Code of Good Agricultural Practices (GAP) for Coffee

<table>
<thead>
<tr>
<th>Name</th>
<th>Location</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rufino D. Lumbres</td>
<td>Corrine's Garden</td>
<td>1/25/2018</td>
</tr>
<tr>
<td>Cresta Surta Suerta R. Mahilum</td>
<td>La Suerta's Fruit Tree Nursery</td>
<td>8/6/2018</td>
</tr>
<tr>
<td>Nestle Phils. Inc.</td>
<td>Nestle Coffee Plantlet Production and Training</td>
<td>7/19/2018</td>
</tr>
<tr>
<td>Jose A. Palad, Jr.</td>
<td>Green Palm Agro-Forest Nursery</td>
<td>4/9/2018</td>
</tr>
</tbody>
</table>

(Source: Bureau of Plant Industry)
Generally, the table below shows a sample computation of the recommended rate of fertilizer application per tree.

Table 2. Sample combination of fertilizer materials to satisfy the fertilizer recommendation (120-120-60) for non-bearing coffee trees.

<table>
<thead>
<tr>
<th>Year 1 (Non Bearing)</th>
<th>Schedule Every 3-months</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE OF FERTILIZER</td>
<td>1st Application</td>
</tr>
<tr>
<td>1) Granular (commercial)</td>
<td>grams/tree</td>
</tr>
<tr>
<td>Diammonium phosphate (18-46-0)</td>
<td>15</td>
</tr>
<tr>
<td>Urea (46-0-0)</td>
<td>9</td>
</tr>
<tr>
<td>Muriate of Potash (0-0-60)</td>
<td>6</td>
</tr>
<tr>
<td>Total granular fertilizer per tree</td>
<td>30</td>
</tr>
<tr>
<td>2) Organic Fertilizer (as defined by the PNS) application per tree</td>
<td>At least 1kg/tree</td>
</tr>
<tr>
<td>3) Foliar Fertilizer</td>
<td>based on product label recommendations and soil analysis</td>
</tr>
</tbody>
</table>

Table 3. Sample combination of fertilizer materials to satisfy the fertilizer recommendation (120-60-120) for bearing coffee trees.

<table>
<thead>
<tr>
<th>Year 2-10 (Bearing)</th>
<th>Schedule Every 4-months</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE OF FERTILIZER</td>
<td>1st Application</td>
</tr>
<tr>
<td>1) Granular (commercial)</td>
<td>grams/tree</td>
</tr>
<tr>
<td>Diammonium phosphate (18-46-0)</td>
<td>29</td>
</tr>
<tr>
<td>Urea (46-0-0)</td>
<td>38</td>
</tr>
<tr>
<td>Muriate of Potash (0-0-60)</td>
<td>38</td>
</tr>
<tr>
<td>Total granular fertilizer per tree</td>
<td>105</td>
</tr>
<tr>
<td>2) Organic Fertilizer application per tree</td>
<td>At least 1kg/tree</td>
</tr>
<tr>
<td>3) Foliar Fertilizer</td>
<td>based on product label recommendations and soil analysis</td>
</tr>
</tbody>
</table>
Chairperson:  

Ms. Karen Kristine A. Roscom  
OIC Executive Director  
Bureau of Agriculture and Fisheries Standards (BAFS)

Members:  

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Bureau of Plant Industry (BPI)  

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Prof. Valentino L. Macanes  
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Ms. Alvira C. Reyes  
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Mr. David T. Santos  
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