

PHILIPPINE NATIONAL STANDARD

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Good agricultural practice for corn – (GAP corn)



BUREAU OF PRODUCT STANDARDS
Department of Trade and Industry

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Foreword

This Code of Good Agricultural Practices for Corn herein referred to as GAP Corn is a set of consolidated safety and quality standards formulated by the Department of Agriculture (DA) for the production, harvesting and on-farm post harvest handling and storage of corn. The development of this standard is primarily aimed at providing safe and high quality corn to consumers and feed millers/processors. The focus is to reduce the risk of pesticide and aflatoxin contamination. Additional benefits of the code are workers health, safety and welfare and environmental sustainability.

The Philippine National Standard (PNS) GAP Corn was prepared by the Technical Working Group on Corn Quality Management (TWG-CQM) chaired by the Bureau of Agriculture and Fisheries Product Standards (BAFPS) created per Special Order No. 111 dated 30 January 2007. In close coordination with the TWG-CQM members, series of technical reviews and public consultations were conducted to gather inputs from different corn stakeholders on the draft standard for GAP Corn.

1 General information

1.1 The Code of Good Agricultural Practices for Corn (GAP Corn) is a set of consolidated safety and quality standards formulated by the Department of Agriculture (DA) for the production, harvesting and on-farm post harvest handling and storage of corn. This code of practice takes into account the Philippine GAP for Fruits and Vegetables which is based on the concept of Hazard Analysis of Critical Control Points (HACCP) and quality management principles from farm to table continuum with emphasis on the following six (6) key areas:

- a. Farm location;
- b. Farm environment;
- c. Farm structure and facility maintenance;
- d. Farming practices (land preparation, seed material, pesticide and fertilizer application, pests and disease management, weed management, water management, harvesting practices and post-harvesting practices);
- e. Worker's health and safety; and
- f. Farm management (farm records, traceability, staff training).

1.2 Considering the increasing incidence of food-borne illnesses and incidence of aflatoxicosis in swine, poultry and other animals, the GAP Corn is primarily aimed at providing safe and high quality corn to consumers and feed millers/processors. The focus is to reduce risk of pesticide and aflatoxin contamination. Additional benefits of the program are workers health, safety and welfare and environmental sustainability.

Section I – Farm location

1. The production area and adjoining sites or farms should be evaluated for its suitability for agricultural land use. Obtain a history of prior land use (e.g., sanitary landfill, cemetery, etc.) in order to identify possible potential hazards specifically chemical (heavy metals) and physical hazards (broken glass, plastics, etc).

2. Provide corresponding preventive or mitigating measures to the potential hazards identified.

Section II – Farm environment

Production area

The production area, post harvest and storage areas should be kept clean and tidy at all times. Field sanitation practices should always be ensured.

Soil and soil nutrients

1. Prior to land preparation, soil samples should be analyzed for pH, nutrient status for appropriate fertilizer recommendation and soil characteristics. Soil analysis should be done every 2 years and carried-out by an accredited laboratory.
2. Where applicable, soil mapping may be established to plan crop rotation and/or production programs.

Water

Identify the location of water sources and if possible, water should be made available throughout the corn production cycle.

Section III – Farm structure and facility maintenance

1. Farm structures such as warehouse for the corn produce, storeroom for fertilizer, pesticide and other farm supplies and materials including protection shed of farm machineries should be appropriately designed to the intended purpose. These should be constructed in a considerable distance from each of the farm structure and in the production area to minimize contamination.
2. All farm structures should be kept clean at all times. Farm equipment used in cultivation, harvesting and post harvest operations of corn should be attuned and well-maintained for optimal operating conditions.
3. Sewage, waste disposal and drainage system should be appropriately constructed to minimize the risk of contaminating the production area and water supply with chemical hazards such as pesticides and heavy metals.
4. Irrigation system should be maintained to provide effective delivery of water. Remove litters, wastes and weeds in the water ways and dispose them properly to prevent blockage.

Section IV – Farming practices

A. Pre-harvest practices

Land preparation

Proper land preparation should be observed to ensure healthy and uniform plant growth and provide advance effective and efficient weed control measures.

Planting and seed materials

1. Use quality seed materials. Use high-yielding varieties or hybrids that are adaptable to the locality and approved by National Seed Industry Council (NSIC).
2. Record the sources of seed materials including product identity (i.e., company name, lot number, variety, germination percentage, date tested).

3. Follow the appropriate planting distance and seeding rate as recommended.

Use of pesticides and other agrochemicals

Pesticide (insecticide, fungicide, bactericide, rodenticide, etc.) and agrochemical (adjuvant, detergent, disinfectant, plant growth regulators, etc.) usage during corn production and post harvest handling should comply with the regulations set by the Fertilizer and Pesticide Authority (FPA) as follows:

- a. Only trained/certified pesticide applicators are allowed to carry out pesticide application in the farm.
- b. Use registered pesticides and agrochemicals according to the manufacturer's recommendation.
- c. Pesticide and agrochemicals should be clearly labeled and stored in original container and kept under lock and key. Warning sign should be displayed at the storage area.
- d. Disposal of pesticides and agrochemical containers and residues should be done according to instructions included on the manufacturer's label or in accordance with the FPA regulation. Empty pesticide container should not be recycled for other usage.
- e. Records of purchase, application and disposal of the pesticides and agrochemicals must be kept (log records, procedures, or instruction manual).
- f. Spraying equipment should be regularly maintained to ensure that the equipment operates at its optimum condition so that right application rates are delivered and unnecessary leakage is avoided.
- g. Withholding periods or pre-harvest intervals should be strictly observed.
- h. Farm personnel involved in the use of pesticide and agrochemicals should wear appropriate protective clothing and safety gadgets.

Fertilizer management

1. Use only fully decomposed organic materials. Raw and/or slightly decomposed animal manure should be confined in a designated area for treatment.
2. Use only the registered commercial fertilizers. Observe appropriate method and time of application of the recommended combination and amount of fertilizers based on the result of soil analysis.
3. Seed inoculant may be used to supplement part of the corn plant nutrient requirement.
4. Fertilizers should be stored separately from pesticides in a clean and dry area (preferably slightly elevated above ground on pallets).
5. Storage area of fertilizers should be isolated from corn drying and storage areas to prevent contamination due to leaching, runoff or wind drift.
6. A complete set of records of fertilizers and fertilizer preparation should be kept. Information includes source of fertilizer materials, details of the composting procedures, dates, amounts and methods of applying the fertilizer as well as the person responsible for the application.

Insect pest and disease management

1. A pest and disease management programme should be put in place taking into account historical data, trends and current conditions.
2. Practice Integrated Pest Management (IPM) to control the incidence of crop pests.
3. Practice crop rotation to minimize built-up of insect pests and diseases. The continuous planting of the same plant species within a piece of land leads to the build-up of insect pests and diseases.

Weed management

Practice appropriate weed control measures like using appropriate cultural practices such as proper land preparation, off-barring and hilling-up and/or using herbicides. Ensuring proper tillage operations provides head-start of corn plant against weeds.

Water management

Maintain the water requirement to avoid moisture stress particularly during flowering up to the maturation stage. At these stages, the crop is more susceptible to aflatoxin contamination.

Other cultural management practices

1. If detopping of corn plants is to be practiced, this should be done after physiological maturity has been attained.
2. Follow the other recommended cultural practices of corn including the maintenance of the recommended row and plant spacing to avoid overcrowding.
3. Conduct regular monitoring at all crop stages to provide measures to problems that may arise.

B. Harvesting practices

1. Harvest corn at full maturity as recommended. Harvesting should be completed in the shortest time possible especially during the rainy season. Care should be exerted to prevent damage and contamination of corn ears with soil. Use clean mats, screens and/or other suitable underlays to prevent corn ears from soil or foreign matter contamination.
2. Before using machines for harvesting and post harvest operations, ensure that all the equipment to be used are functional, clean, and well-maintained.
3. Sort-out and discard corn ears that show visible signs and symptoms of insect or microbial damage.

C. Post harvesting practices

Hauling and piling

Haul newly harvested corn ears immediately after harvest. Hauling facilities to be used for collecting and transporting the harvested corn from the farm should be clean and dry.

Shelling

1. Before shelling, dry the corn ears to at least 21 % moisture content (MC). This is the optimum MC that will bring about less damage to corn kernels during shelling.
2. Use clean, dry and properly calibrated mechanical sheller for efficient shelling.
3. Use clean and dry containers of the shelled corn.

Drying

1. Immediate drying of the corn grains to reduce the MC after harvest should be done by any available means, to minimize if not avoid grain deterioration, mould and fungi attack and pest infestation.
2. If immediate drying is not possible, temporarily store the corn ears in cribs or any structure with good ventilation.
3. As much as possible, immediately dry the shelled corn to 13 to 14 % MC. Ensure that corn has been dried uniformly to this MC.
4. Use clean suitable containers for the dried corn grains.

Transport

1. The corn should be moved to a suitable storage or processing area as soon as possible after drying.
2. Avoid grain moisture accumulation during transport by using an appropriate covering for the container. Corn grains to be transported should be properly stacked inside the transport vehicle and covered with any protection against moisture and pests.

Storage

The storage containers, warehouse or silos should be properly designed and should be able to meet the following minimum requirements such as:

- a. prevent re-wetting of dry corn grains;
- b. prevent entry of insects, birds and rodents; and
- c. provide good ventilation to the stored corn.
- d. Maintain the recommended moisture content (13 to 14%) of the corn grain during storage to minimize aflatoxin contamination.
- e. During storage, follow the first-in first-out (FIFO) principle.

Section V – Worker’s health and safety

1. Farm workers and/or personnel who will be involved in production and post production activities should wear appropriate clothing and protective gadgets.
2. Farm workers should be trained and should follow the recommended personal hygienic and sanitary practices.

Section VI – Farm management

Farm records

1. Identify or designate an in-charge to deal with matters associated with GAP Corn certification.
2. All farm records required under the GAP Corn certification must be updated.
3. Updated records must be kept for up to two years. New farm applying for certification must have at least 3 months of farm records which should be presented during audit.
4. Copies of laboratory analysis and certificates that verify compliance with the Department of Agriculture’s regulations must be filed.

Traceability

1. Each package/bulk packed produce leaving the farm must be traceable (i.e tagged with GAP Corn Certification Number or farms name, date of harvest) to farm/sources.
2. Records of lot or batch numbers must be maintained for all produce leaving the farm.

Staff training

1. Records of personnel and/or farm workers should be maintained.
2. Staff training records must be maintained and should be available during audit.

References

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The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

A Flora of Manila. E.D. Merrill. 1984.

ASEAN GAP. 2006. Good Agricultural Practices for Production of Fresh Fruit and Vegetables in the ASEAN Region. Jakarta: ASEAN Secretariat. 28 pp.

Codex Alimentarius Commission. Code of Practice for the Prevention and Reduction of Aflatoxin Contamination in Peanuts.

DA-BAFPS. 2004. Philippine National Standards in Corn. PNS/BAFPS10:2004.

DA. 2005. Code of Good Agricultural Practices for Fruits and Vegetable Farming.

Det Norske Veritas Italia. International Certification Processes: Specific Regulations for the Certification of Good Agricultural Practices According to the EUREPGAP Scheme.

Food and Agriculture Organization. 2003. Development of a Good Agricultural Practice Approach. Rome.



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