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Good Agricultural Practices (GAP) for Corn

DEPARTMENT OF AGRICULTURE
PHILIPPINES

BUREAU OF AGRICULTURE AND FISHERIES STANDARDS

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Foreword

The Philippine National Standard (PNS) Good Agricultural Practices (GAP) for Corn was established and adopted in 2008 with the guidance of the Technical Working Group and comments from the stakeholders through a series of technical reviews and public consultations.

In 2016, a call for the revision of the PNS/BAFPS 20:2008 was made in order to clarify some provisions that were vague to the stakeholders.

A Technical Working Group (TWG) for the revision of the said standard was created through Special Order No. 945 Series of 2016 and spearheaded by the Department of Agriculture through the Bureau of Agriculture and Fisheries Standards (BAFS) with representation from other government sector namely the Bureau of Animal Industry (BAI), Corn and Cassava Program, Food and Nutrition Research Institute (FNRI), National Food Authority (NFA), and Philippine Center for Postharvest Development and Mechanization (PHilMech) and academe namely the University of the Philippines – Los Baños Postharvest Horticulture Training and Research Center (UPLB – PHTRC)

This document was drafted in accordance with the editorial rules of the BPS Directives, Part 3.

This Standard cancels and repeals PNS/BAFPS 20:2008.

Introduction

The Code of Good Agricultural Practices (GAP) for Corn is a set of consolidated safety and quality standards formulated by the Department of Agriculture (DA) for the production, harvesting and on-farm postharvest 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 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).

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.

1 Scope

This Code of Good Agricultural Practices (GAP) for Corn covers practices in primary production and postharvest handling of corn for food, feeds and as raw materials for industrial uses.

2 Normative references

There are no normative references in this document.

3 Farm location

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

3.2 The corresponding preventive or mitigating measures should be provided to the potential hazards identified. If beyond mitigation, the site should not be used for corn production.

3.3 Farm signage must be displayed in the production area.

4 Farm environment

The production area, postharvest facilities and storage areas should be kept clean and tidy at all times. Field sanitation practices should always be observed to prevent mycotoxin contamination.

4.1.1 Soil and soil nutrients

4.1.1.1 Prior to land preparation, soil samples should be analyzed for pH, nutrient status for appropriate fertilizer recommendation and soil physical characteristics. Soil analysis should be done every 2 years and carried-out by a DA integrated analytical laboratory or DA recognized laboratory.

4.1.1.2 Where applicable, soil mapping or farm utilization map may be established to determine areas suitable for corn production and plan crop rotation and/or production programs, respectively.

4.1.2 Water

The location of water sources should be identified and if possible, water should not originate or pass through mining sites.

5 Farm structure and facility maintenance

5.1 Farm structures and facilities should be appropriately designed for the intended purpose and constructed separately from one another to minimize contamination.

There should be at least 3 structures:

5.1.1 Storage areas for fertilizer, pesticide, other farm supplies, materials and tools and provision for toilet;
5.1.2 Shed for machineries; and
5.1.3 Storage structure for safekeeping of produce.

5.2 All farm structures, facilities and equipment should always be kept clean and in good condition for optimal operations.
5.3 Sewerage, waste disposal area and drainage should be appropriately located and constructed to minimize the risk of contaminating the production area and water supply with chemical hazards such as pesticides and heavy metals.
5.4 Irrigation system should be properly maintained to provide effective delivery of water.
5.5 Farm structures and facilities must have signages.
5.6 First aid kit should be readily available to the farm workers.

6 Farming practices

6.1 Pre-harvest practices

6.1.1 Land preparation

Proper land preparation (minimum tillage for rolling areas, 2 plowings and 2 harrowings for flat areas) should be observed to ensure healthy and uniform plant growth and provide advance, effective and efficient weed and erosion control measures.

Soil moisture must be at field capacity during land preparation; soil should not be too dry or too wet as to avoid soil carbon losses and changes of the soil structure.

6.1.2 Planting and seed materials

6.1.2.1 Quality seed materials should be used. High-yielding varieties or hybrids that are adaptable to the locality and registered by National Seed Industry Council (NSIC) should be used.

6.1.2.2 The sources of quality seed materials including product identity (i.e., company name, lot number, variety, germination percentage, date tested) should be recorded.

6.1.2.3 The appropriate planting distance and seeding rate should be followed as recommended.

6.1.3 Use of pesticides and other agrochemicals

Pesticide (including but not limited to insecticide, fungicide, bactericide and rodenticide) and agrochemical (including but not limited to adjuvant, detergent, disinfectant and plant growth regulators) usage during corn production and postharvest handling should comply with the regulations set by the competent authority as follows:

6.1.3.1 Only trained/certified pesticide applicators should be allowed to carry out pesticide application in the farm.

6.1.3.2 Only registered pesticides and agrochemicals should be used according to the manufacturer's recommendation.

6.1.3.3 All storage areas should be properly labeled, well ventilated and locked. Warning signs should be displayed. Pesticides and agrochemicals should be properly stored and clearly labeled.

6.1.3.4 Records of purchase, application and disposal of the pesticides and agrochemicals must be available (log records, procedures, or instruction manual).

6.1.3.5 Spraying equipment should be regularly maintained and calibrated to ensure that the equipment operates at its optimum condition so that right application rates are delivered, and unnecessary leakage is avoided.

6.1.3.6 Withholding periods or pre-harvest intervals must be strictly observed.

6.1.3.7 Farm personnel involved in the use of pesticide and agrochemicals must wear appropriate protective clothing and safety gadgets.

6.1.3 Fertilizer management

6.1.3.1 Only fully decomposed organic materials should be used as fertilizer.

6.1.3.2 Only registered commercial fertilizers should be used. Appropriate method and time of application of the recommended combination and amount of fertilizers based on the result of soil analysis should be observed.

6.1.3.3 Raw and/or slightly decomposed animal manure should be confined in a designated area for further decomposition or treatment.

6.1.3.4 Seed inoculant may be used to supplement part of the corn plant nutrient requirement.

6.1.3.5 Fertilizers should be stored in a clean and elevated dry area on pallets.

6.1.3.6 A complete set of records of fertilizers and fertilizer preparation should be kept. Information includes source of fertilizer materials, methods of composting, dates, amount, and methods of applying the fertilizer as well as the person responsible for the application.

6.1.4 Insect pest and disease management

6.1.4.1 A pest and disease management program like Integrated Pest Management (IPM) should be followed to manage pest and diseases.

6.1.4.2 Crop rotation should be practiced to minimize build-up of insect pests and diseases.

6.1.5 Weed management

Appropriate weed control measures should be practiced like using cultural practices such as proper land preparation, intertillage cultivation and/or using herbicides. Ensuring proper tillage operations provides head-start of corn plant against weeds.

6.1.6 Water management

Water requirement should be maintained to avoid drought stress particularly during flowering up to the physiological maturity. At this condition, the corn is more susceptible to aflatoxin contamination.

6.1.7 Other cultural management practices

6.1.7.1 Other cultural practices of corn should be followed specifically the recommended row and hill spacing.

6.1.7.2 If detasseling of corn plants is to be practiced minimizing the incidence of Asian corn borer, it should be done two (2) weeks after pollination.

6.1.8 Waste management

6.1.8.1 Proper waste segregation should be practiced in the farm.

6.1.8.2 Litters, wastes and weeds in the water ways should be removed and disposed properly to prevent blockage.

6.1.8.3 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 competent authority.

6.1.8.4 Empty pesticide container should not be recycled for other usage.

6.2 Harvesting practices

6.2.1 Corn should be harvested at full maturity as recommended. Harvesting should be completed in the shortest time possible especially during the rainy season. Clean mats, screens and/or other suitable underlays should be used to prevent corn ears from direct contact to soil or foreign matter.

6.2.2 Before using machines for harvesting and postharvest operations, all the equipment to be used should be clean, and well-maintained.

6.2.3 Corn ears that show visible signs and symptoms of insect or microbial damage should be sorted out.

6.3 Postharvest practices

6.3.1 Hauling and piling

Newly harvested corn ears should be hauled immediately to a drying facility after harvest. Hauling vehicles and containers to be used for collecting and transporting the harvested corn from the farm should be clean and dry.

6.3.2 Shelling

6.3.2.1 Before shelling, the corn ears should be dried at 18% to 20% moisture content (MC). This is the optimum MC that will cause less damage to corn kernels during shelling.

6.3.2.2 If immediate shelling is not possible, the corn ears should be temporarily stored in cribs or any structure with good ventilation.

6.3.2.3 Clean, dry and properly adjusted mechanical sheller should be used for efficient shelling.

6.3.2.4 Clean and dry containers should be used for shelled corn.

6.3.3 Drying

6.3.3.1 Harvested corn should be immediately dried to minimize or avoid grain deterioration, mold and fungal attack, and pest infestation. If immediate drying is not possible, the harvested corn should be temporarily stored in cribs or any structure with good ventilation.

6.3.3.2 The shelled corn must be immediately dried to 13 to 14 % MC. The corn should be dried uniformly to this MC.

6.3.3.3 Clean sacks and other suitable containers must be used for the dried corn grains.

6.3.4 Transport

6.3.4.1 Dried corn grains should be immediately transported to a suitable storage or processing area.

6.3.4.2 Bagged corn grains to be transported should be properly stacked inside the transport vehicle and covered with any protection against moisture.

6.3.5 Storage

6.3.5.1 The storage structure should be properly designed in order to:

6.3.5.1.1 prevent re-wetting of dry corn grains;

6.3.5.1.2 minimize the entry of insects, birds and rodents;

6.3.5.1.3 provide good ventilation to the stored corn; and

6.3.5.1.4 maintain the recommended moisture content (13 to 14%) of the corn grain during storage to minimize aflatoxin contamination.

6.3.5.2 During storage, the first-in first-out (FIFO) principle should be followed.

7 Worker's health and safety

7.1 Farm workers and/or personnel involved in the production and post production activities should wear appropriate clothing and protective gadgets.

7.2 Farm workers should be trained and should follow the recommended personal hygienic and sanitary practices.

8 Farm management

8.1 Farm records

8.1.1 All farm activities must be properly recorded.

8.1.2 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.

8.1.3 Results of laboratory analysis and copies of certificates that verify compliance with the Department of Agriculture's regulations must be filed.

8.2 Traceability

Records of farm activities and lot or batch numbers must be maintained for corn leaving the farm.

8.3 Staff training

8.3.1 Farm workers /personnel must undergo trainings relevant to GAP.

8.3.2 Staff training records must be maintained and should be available during audit.

Bibliography

Bureau of Agriculture and Fisheries Standards. 2008. Philippine National Standard (PNS) on Good Agricultural Practices for Corn (PNS/BAFPS 20:2008).

Bureau of Agriculture and Fisheries Standards. 2017. Philippine National Standard (PNS) on Grains -Grading and Classification -Corn (PNS/BAFS 10:2017).

Bureau of Agriculture and Fisheries Standards. 2018. Philippine National Standard (PNS) Code of Practice (COP) for the Prevention and Reduction of Aflatoxin Contamination in Corn (PNS/BAFS 27:2018)

Bureau of Agriculture and Fisheries Standards. 2017. Philippine National Standard (PNS) Code of Good Agricultural Practice (GAP) for Fruits and Vegetables Farming (PNS/BAFPS 49:2017)

Department of Agriculture (DA). 2018. Rules and Regulations on the Certification of Philippine Good Agricultural Practices (PhilGAP) for Crops, Superseding Administrative Circular No. 10 Series 2013

Annex A
(informative)

Format of Farm Signage

1. Material: Wood, Plastic, Tarpaulin or Metal
2. Size of signage: 1.2 m by 0.9 m
3. Readable size of letters/print
   White background with black letterings
   Height from the ground: 2 m
4. Information included in the signage:
   a.) Name of farm/ farm owner/ farmer
   b) Crop and variety
   c.) farm code
   d.) Location of the farm
   e.) Area of farm planted
   f.) Validity period

Annex B
(normative)

Form for Record keeping

Name of Farmer: _____
Location and size of farm lot: _____

Activity	Date	Applicable Quantity and Brand	Remarks
Land preparation			
Plowing			
Harrowing			
Furrowing			
Others			
Planting			
Off-barring			
Side-dressing			
Hilling up			
Weed control			
1st			
2nd			
etc			
Pests management			
Harvesting			
Drying			
Shelling			
Drying			
Others			

Figure B.1 Sample of form for record keeping

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