PHILIPPINE NATIONAL STANDARD

PNS/BAFS 141:2019
ICS XX

Code of Good Agricultural Practices for Rice

BUREAU OF AGRICULTURE AND FISHERIES STANDARDS
BPI Compound Visayas Avenue, Diliman, Quezon City 1101 Philippines
Trunkline: **(632) 928-8741 to 64 loc. 3301-3319**
E-mail: **info.dabafs@gmail.com**
Website: **www.bafs.da.gov.ph**

Foreword

The Philippine National Standard (PNS) Code of Good Agricultural Practices for Rice (PNS/BAFS 141:2014) was developed in 2014 and reviewed together with other rice-related standards in 2018 by the Bureau of Agriculture and Fisheries Standards (BAFS) to check if its provisions are still relevant and effective to the current regulatory and market needs. It has been revised by the Technical Working Group (TWG) for the review of various PNS related to rice as per Department of Agriculture Special Order No. 522 Series of 2017. This Standard has been approved by the Secretary of the Department of Agriculture in 2019.

This PNS/BAFS 141:2019 cancels and replaces PNS/BAFS 141:2014 which has been technically revised.

This edition includes the following significant changes compared to the previous edition:

- updated terms and definitions;
- removal of examples of nutrients and heavy metals that are required for soil analysis;
- revision of water requirement at different growth stages;
- revision of requirements for other cultural management practices;
- modification on the wordings for moisture content of drying, ’14 % and below’ to ‘14% or lower’;
- replacement of the term ‘transport’ with ‘hauling’;
- inclusion of reference to PNS Good Warehousing Practices for Bagged Grains for requirements on storage of bagged grains; and
- removal of certification requirements.

This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2.

1 Scope

The Code of Good Agricultural Practices for Rice (GAP for Rice) is a set of consolidated safety and quality standards covering the production, harvesting and on-farm post-harvest handling and storage of rice. This code of practice is also based on the concept of Hazard Analysis Critical Control Point (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, nutrient/soil management, pest management, weed management, water management, harvest practices, and post-harvest practices);
e. Workers' health and safety; and
f. Farm management (e.g. farm records, traceability, staff training).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

PNS/BAFS 49, *Code of good agricultural practices (GAP) for fresh fruits and vegetable farming*

PNS/BAFS 20, *Good agricultural practice for corn*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
bund
dike
embankment to maintain adequate level of water in the rice field

3.2
competent authority
entity/agency who has the knowledge, expertise, and authority as designated by law

3.3
fallow period
rest period of the field for at least one (1) month between two (2) cropping seasons

3.4
Integrated Pest Management (IPM)
system for managing pests that integrates multiple strategies to minimize the use of chemical pesticides, such as: encouraging beneficial insects and microorganisms to flourish; good crop hygiene and plant health; regular monitoring of crops for pests; using biological control agents and less toxic pesticides; and use of selective chemical pesticides

3.5
irrigated rice
field grown rice where irrigation is the main water source during dry season and/or wet season

3.6
paddy rice
rough rice
palay
unhulled grain of *Oryza sativa* L.

3.7
pre-harvest interval
recommended period to be followed between the last application of pesticides and harvest time

3.8
synchronous planting scheme
planting within one (1) month period covering adjacent rice fields within an area

3.9
tillering
period that extends from the appearance of the first tiller until the maximum number of tillers is reached

3.10
upland rice
grown in flat or sloping field that is not bunded and has no standing water; is prepared and seeded under dry condition and dependent on rainfall for its water requirement

4 Farm location

4.1 The production area and adjoining sites or farms shall be evaluated for their suitability for agricultural land use. It is necessary to obtain a history of prior land use (e.g., sanitary landfill, cemetery, industrial plants, mining, etc.) in order to identify potential hazards specifically chemical (heavy metals) and physical hazards (broken glass, plastics, etc).

NOTE: This provision is mandatory unless mitigating measures are provided as recommended in Section 4.4.

4.2 The evaluation of the suitability of the farm location shall also include an assessment of the adjoining crops and degree of fertilizer and pesticide usage.

4.3 Production sites situated near urban and industrial areas should be thoroughly assessed by the competent authority for possible contamination.

4.4 The farmer shall implement appropriate preventive or mitigating measures against potential hazards identified (e.g. planting of border plants around the farms near processing plants, filtration pond).

5 Farm environment

The production, post-harvest, and storage areas shall be kept clean and organized at all times. Field sanitation shall always be practiced.

5.1 Soil and soil nutrients

5.1.1 Prior to land preparation, the soil samples shall be gathered and analyzed for appropriate fertilizer recommendation towards balanced nutrient application. Soil analysis shall be done at least every 3 years by laboratories recognized by the competent authority.

5.1.2 For areas prone to heavy metal contamination, the soil shall be analyzed by laboratories recognized by the competent authority for heavy metals every three (3) years; and the concentrations shall not exceed the safety limits based on the recommendation of the competent authority.

5.2 Irrigation water

5.2.1 Water source(s) for farm operations shall be identified for possible contamination.

5.2.2 Contaminated water sources shall be analyzed for water quality which shall be done by laboratories and thereafter as per recommendation of the competent authority based on the prevalence of perceived hazards or contaminants.

5.2.3 Corresponding preventive or mitigating measures shall be provided against potential hazards (e.g., phytoremediation or use of plants to remove chemical contaminants/heavy metals in soils).

6 Farm structure and facility maintenance

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

There should be separate or centralized structures for the following:

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

6.2 All farm structures, facilities, and equipment shall always be kept clean and well-maintained for optimal operating conditions.

6.3 Sewerage, waste disposal, and drainage systems shall be appropriately constructed to minimize the risk of contaminating the production areas and water supplies with hazardous chemicals such as pesticides and heavy metals; and biological hazards like pathogens from raw manure or crop residues.

6.4 Irrigation water ways shall be maintained to provide effective delivery of water.

6.5 Stray animals shall not be allowed into or kept in production areas with standing crops. Animal proofing and implementation of adequate pest control measures shall also be implemented in storage and packing areas.

6.6 Toilet facilities should be provided for farm workers and shall be properly cleaned and maintained. These shall not be located close to water sources or in places where these could cause contamination.

7 Farming practices

7.1 Land preparation

7.1.1 Proper land preparation based on the contour, soil type, and rainfall pattern in the production area in various rice ecosystems shall be observed. This will ensure healthy and uniform plant growth, conserve or improve soil physical condition, and provide effective weed control measures.

7.1.2 For irrigated rice production areas, the following shall be ensured:

7.1.2.1 Land preparation shall ensure that no high and low soil spots are present after final leveling. Fields shall have no visible mounds of soil above the water surface of 2 cm to 5 cm depth after the final land leveling.

7.1.2.2 Dikes and ditches are cleaned and repaired.

7.1.2.3 Weeds and stubbles shall be plowed under within 10 cm to 20 cm deep from 3 weeks to 4 weeks before transplanting or direct wet seeding.

7.1.2.4 Harrowing of fields may be done at least twice at one week interval.

7.1.2.5 For Direct Wet-Seeded Rice (DWSR), small canals may be constructed along the dikes surrounding the field and in the middle of the field.

7.1.3 For upland rice production areas that are flat (0 % to 3 % slope) to slightly rolling (>3 % to <18 % slope):

7.1.3.1 Field cleaning shall be done at the end of the dry season.

7.1.3.2 The farmer shall plow once at the onset of rainy season or depending on the weed population level and soil type.

7.1.3.3 Harrowing may be done once or depending upon the status of the soil, that is, if it is already well pulverized, weed free and ready for planting.

7.1.3.4 For flat, plowing and repeated harrowing may be done to ensure good tilth, uniform soil and fine in texture to promote good plant growth and effective weed control. For slightly rolling, minimum tillage should be done.

7.1.4 For steep hills and 18% and above slope:

7.1.4.1 In areas where tillage is practiced, contour plowing is recommended.

7.1.4.2 In areas where tillage is not practiced, the farmer shall employ dibbling method of seeding.

7.2 Planting and seed materials

7.2.1 The farmer shall use high quality seed varieties approved by the competent authority and adapted in the locality.

7.2.2 The farmer shall record the sources of seed materials including product identity (e.g. company name, lot number, variety, germination percentage, date tested, yield potential and maturity).

7.2.3 The farmer should follow the recommended seeding rate per hectare, size of seedbed area, number of seedlings per hill, age of seedlings and appropriate planting distance.

7.3 Use of pesticides and other agrochemicals

The farmer shall follow proper pesticide application and other interventions to levels that are economically justified and reduce risks to human health and the environment.

7.3.1 Usage of pesticides (insecticides, fungicides, herbicides, molluscicides, rodenticides, etc.) and other agricultural chemicals (adjuvants, disinfectants, plant growth regulators, etc.) during rice production and post-harvest handling shall comply with the regulations set by the competent authority.

7.3.2 Farmers/farm workers shall be trained or supervised by certified pesticide applicators on proper pesticide application.

7.3.3 Farmers/farm workers shall use pesticides and other agricultural chemicals registered with the competent authority according to approved label recommendations.

7.3.4 Pesticides and other agricultural chemicals shall be clearly labeled and stored in their original containers and kept under lock and key. Warning signs shall be displayed at the storage area.

7.3.5 Disposal of containers of pesticides and other agricultural chemicals shall be done according to instructions included on the approved label and/or in accordance with the regulations set by the competent authority. Empty containers shall not be recycled for other usage.

7.3.6 Records of purchase, application, storage, and disposal of pesticides and other agricultural chemicals shall be kept for traceability (e.g. log records, procedures, or instruction manual).

7.3.7 Spraying equipment shall be regularly cleaned and maintained to ensure that the equipment operates at its optimum condition so that right application rates are delivered and unnecessary leakage is avoided.

7.3.8 Withholding periods or pre-harvest intervals shall be strictly observed.

7.3.9 Farm personnel involved in the use of pesticide and other agricultural chemicals shall wear personal protective equipment (PPE).

7.4 Integrated Nutrient Management

7.4.1 The application rate of fertilizer shall be based on any or combination of the following: methods of determining soil nutrient deficiency: laboratory analysis, Minus-One Element Technique (MOET), Leaf Color Chart (LCC), and Rice Crop Manager.

7.4.2 As part of land preparation, the farmer shall incorporate rice straws, other organic materials, or crop residues; avoid burning of rice straws; and use compost fungus activators to hasten the decomposition of rice straw.

7.4.3 The farmer shall use only fully decomposed organic materials. Raw and/or slightly decomposed animal manure and other farm waste shall be confined in a designated area while undergoing further decomposition.

7.4.4 The farmer shall observe appropriate method and time of application of the recommended combination and amount of fertilizers based on the results of soil and plant-based analysis. Registered chemical fertilizers and/or commercially produced organic soil amendment registered by the competent authority should be used accordingly.

7.4.6 The farmer shall store fertilizers separate from pesticides in a clean and dry area (preferably slightly elevated above ground on pallets).

7.4.7 The farmer shall isolate storage area of fertilizers from paddy rice drying and storage areas to prevent contamination due to leaching, runoff or wind drift.

7.4.8 The farmer shall keep a complete set of records of fertilizers and fertilizer preparations. 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.

7.5 Integrated Pest Management

A pest management program should be followed to manage rice pests. The farmer:

- shall ensure good land preparation and crop establishment;
- should use varieties that are resistant to major insect pests and diseases prevalent in the locality;
- shall use good quality seeds, plant healthy seedlings, and follow good agronomic practices;
- shall follow synchronous planting scheme after a fallow period;
- shall perform cultural practices that are favorable to the conservation of beneficial insects;
- shall practice varietal and/or crop rotation to minimize build-up of insect pests and diseases;
- shall conduct regular monitoring of crops to assess the prevalence of pests and for timely farm management interventions; and
- shall use officially registered pesticides for rice judiciously and as a last resort with proper observance of pre-harvest intervals.

7.6 Weed management

The farmer shall practice appropriate weed control measures such as:

- proper land preparation
- use of weed seed-free rice seed materials
- use of healthy seedlings to provide head-start of rice plant against weeds
- water management
- manual or mechanized weeding (if established in rows)
- off-barring and hilling-up for upland rice
- timely and proper tillage operations
- use of appropriate herbicides

7.7 Water management

The farmer shall maintain the water requirement at different growth stages to avoid moisture stress and excessive water particularly during flowering up to the maturation stage.

Unless alternate wet drying water management is practiced, the following shall be followed:

- For direct seeded:
  - 0 cm to 1 cm water depth is recommended from sowing until 30 days after seeding (DAS)
  - 2 cm to 3 cm water depth is recommended from 30 DAS to flowering
  - 3 cm to 5 cm water depth is recommended from flowering until two (2) weeks before harvesting

- For transplanted:
  - 0 cm to 1 cm water depth is recommended from transplanting until 5-10 days after transplanting (DAT)
  - 2 cm to 3 cm water depth is recommended from 5-10 DAT until flowering
  - 3 cm to 5 cm water depth is recommended from flowering until 1-2 weeks before harvesting

7.8 Other cultural management practices

7.8.1 The farmer should follow other recommended cultural practices of rice including maintenance of the recommended row and plant spacing to avoid overcrowding.

7.8.1.1 For transplanted rice,

- the recommended seeding rate is 20-40 kg/ha Registered Seeds/Certified Seeds for inbred varieties and 15-20 kg/ha for hybrid varieties
- seedbed area of at least 400 square meters for the required seeding rate/ha should be used
- the spacing should be 20-30 cm (distance between rows) by 20-30 cm (distance between hills) depending on the cropping season
- replanting of missing hills should be done within 5-7 DAT
- there shall be at least 9-25 hills per square meter of healthy tillering plants at 10 DAT

7.8.1.2 For Direct Wet-Seeded Rice,

- the recommended seeding rate is 40 kg seeds/ha
- pre-germinated seeds should be sown
- plant density shall be at least 150 plants per square meter at 15 DAS

7.8.2 The farmer shall conduct regular monitoring at all crop stages and provide appropriate measures to address problems that may arise.

7.9 Harvesting practices

The following practices shall be done to prevent losses and ensure good quality of harvested paddy rice.

7.9.1 Harvesting shall be done when 80-85 % of the paddy rice grains are mature for shattering varieties and 90 % for non-shattering varieties.

7.9.2 Harvesting shall be completed in the shortest time possible especially during the rainy season. Care shall be exerted to prevent damage and contamination of paddy rice with soil.

7.9.3 If applicable, harvested paddy rice shall be arranged in a criss-cross manner or bundled and placed on top of the bund.

7.9.4 The farmer shall use functional, clean, and well-maintained machines for harvesting operations.

7.9.5 The farmer shall sort out paddy rice that show visible signs and symptoms of insect or microbial damage.

7.9.6 The farmer shall thresh paddy rice immediately and not later than the day after reaping.

7.10 Post harvesting practices

7.10.1 Hauling (farm to dryer)

The farmer shall haul newly harvested paddy rice immediately after harvest. Hauling facilities to be used for collecting and transporting the harvested paddy rice from the farm shall be clean and dry.

7.10.2 Drying

7.10.2.1 The farmer shall immediately dry the paddy rice to reduce the moisture content (MC) to 14 % or lower after harvest; use prescribed methods of drying to minimize if not avoid grain deterioration, fungal infection, and pest infestations.

7.10.2.2 Paddy rice shall be dried using clean mechanical driers or appropriate clean drying pavements to minimize contamination and grain damage.

7.10.2.3 The farmer shall use clean and appropriate sacks and containers for the dried paddy rice. Recycled sacks should be properly cleaned before use.

7.11 Hauling (dryer to storage)

7.11.1 The paddy rice shall be moved to a suitable storage area within the day after drying.

7.11.2 Paddy rice to be hauled shall be properly stacked inside the transport vehicle and covered with any protective material to avoid re-wetting of grains, pest infestations, and contamination.

7.12 Storage

7.12.1 The storage area should be properly built, designed and managed to meet the following minimum requirements:

a) prevent re-wetting of dry paddy rice;

b) minimize the entry of insects, birds, and rodents;

c) provide good ventilation to the stored paddy rice; and

d) maintain the recommended moisture content (14 % maximum) of the paddy rice.

7.12.2 Bagged grains should be stored in accordance with PNS/BAFS 193 Good Warehousing Practices for Bagged Grains.

8 Workers' health and safety

8.1 Farm workers and/or personnel who will be involved in production and post-production activities shall wear personal protective equipment.

8.2 Farm workers shall be trained and shall follow the recommended personal hygienic and sanitary practices.

8.3 Employers/farm owners shall follow the regulatory requirements set by the competent authority for the payment of wages and employment of children.

9 Farm management/ farm records

9.1 All farm activities shall be properly recorded.

9.2 The farmer shall keep copies of laboratory analyses and other certificates that may help establish compliance with good agricultural practices.

9.3 Updated records shall be kept for up to two years.

10 Traceability

10.1 Each package/bulk-packed produce leaving the farm shall be traceable to farm/sources.

10.2 Records of lot or batch numbers shall be maintained for all produce leaving the farm.

11 Staff records and training

11.1 The farmer shall maintain complete personnel and health records of all farm workers.

11.2 Staff training records should be maintained and should be available.

Bibliography

ASEAN-Australia Development Cooperation Program – Program Stream. 2007. *Interpretive Guide for ASEAN GAP: Food Safety Module*.

CODEX STAN 198-1995, *Codex Standard for Rice*

Fertilizer and Pesticide Authority. 2001. *Pesticide Regulatory Policies and Implementing Guidelines*, 2nd ed. Philippines

Ministry of Agriculture and Rural Development. 2010. *Good Agricultural Practice for Rice (VietGAP)*. Vietnam.

National Food Authority. 2002. *Primer on Philippine Grains Standardization Program*.

Philippine Rice Research Institute. 2008. Palay Check System. ISBN 978-971-9081-66-1

Thai Agricultural Standard (TAS) 4401-2008, *Good Agricultural Practices for rice*