



CARICOM REGIONAL CODE OF PRACTICE

**Coconut – Good agricultural
practices (GAP)**

FDCRCP13 : 202X

Voting Deadline: 23 October 2026



CARICOM Regional Organisation for Standards and Quality (CROSQ)

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Voting Deadline: 23 October 2026

Foreword

This CARICOM Regional Standard CRCP13: 202x, Coconut - Agricultural Practices (GAP) has been developed under the authority of the CARICOM Regional Organisation for Standards and Quality (CROSQ). It was approved as a CARICOM Regional Standard by the CARICOM Council for Trade and Economic Development (COTED) at its xx Meeting in xx.

The development of the CARICOM Regional Coconut - Agricultural Practices (GAP) was carried out through a collaborative partnership between the United Nations Industrial Development Organization (UNIDO) and the CARICOM Regional Organisation for Standards and Quality (CROSQ). This partnership included a structured research process to identify and adapt an appropriate standard to enhance the CARICOM coconut value chain. This code of practice is intended to provide guidance to industry practitioners across CARICOM member states, by facilitating trade both within the CARICOM region and international markets.

This Coconut - Agricultural Practices (GAP) was identified to harmonise production practices across CARICOM member states to ensure consistency in produce quality, yield, pest and disease control, food safety and integrity, environmental management, worker health and welfare, and record keeping. The standard was carefully adapted from the Philippine National Standard PNS/BAFS 238:2018 — Code of Good Agricultural Practices for Coconut — in recognition of the shared tropical conditions, smallholder orientation, pest and disease relevance, and intercropping potential, thereby ensuring its suitability and effectiveness for the CARICOM context.

This Code may serve as the foundation for GAP certification, a critical requirement for CARICOM producers seeking to export both primary coconut products and value-added goods to regional and international markets. It serves as a practical tool to empower farmers by strengthening farm productivity and management, improving livelihoods, facilitating intra-regional trade in coconuts and coconut products, and enhancing access to and competitiveness in global markets.

In formulating this Coconut - Agricultural Practices (GAP), considerable assistance was derived from the following publications which were still current when this standard was being developed:

British Standards Institution

- BS EN 17972:2024 – Food authenticity. Food authenticity and fraud. Concepts, terms and definitions

Bureau of Philippine Standards

- PNS/BAFS 238:2018 — Code of Good Agricultural Practices for Coconut

Codex Alimentarius

- Draft guidelines for the prevention and control of food fraud.

International Organization for Standardization

- ISO 22000: 2018 – Food safety management systems — Requirements for any organization in the food chain

1 Scope

This Code of Good Agricultural Practice specifies requirements and recommendations for the hygienic production, harvesting, post-harvest handling, storage, and transport of coconuts intended for human consumption and industrial processing. It applies to primary production activities, including the sourcing of planting material, farm establishment and management, environmental considerations, harvesting of coconuts at different stages of maturity, and on-farm post-harvest operations.

This Code also provide requirements for ensuring environmental management, worker health and safety and recommendations that support documentation and records management, product traceability, food authenticity, and the prevention of fraud at the primary production stage.

This Code does not cover secondary processing, manufacturing, or packaging operations, which should be addressed through applicable Good Manufacturing Practices (GMP) and relevant processing standards.

2 Terms and definitions

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

2.1.

agricultural input

any incoming material used to produce coconut

EXAMPLES: seedlings, fertilisers, pesticides, machinery

2.2.

agricultural waste

generally regarded as unwanted materials produced from agricultural operations directly related to the growing of coconut and other crops or animals

Note 1 to entry Agricultural waste covers both biodegradable and non-biodegradable materials.

Note 2 to entry These materials are often residual or by-products that can be reused, recycled or disposed of.

2.3.

biological control

use of living organisms (microbes, fungi, insects, plants) to manage pests, diseases and weeds

2.4.

biopesticide

pesticide that is manufactured from natural sources such as plant extracts

2.5.

coconut fruit

one-seeded drupe consisting of a fibrous outer husk, a hard shell and an inner edible portion made up of coconut water (endosperm) and coconut meat (solid endosperm)

2.5.1.

young coconut

immature fruit harvested less than 9 months from spathe opening, the coconut meat (jelly-like endosperm) is tender, and water (liquid endosperm)

2.5.2

makapuno

naturally occurring mutant coconut (*Cocos nucifera*) characterised by thick, gelatinous endosperm, reduced or absent coconut water and soft, almost custard-like texture

2.5.3**mature coconut**

fruit 11 to 12 months from spathe opening, with fully developed coconut pulp (solid endosperm) and water (liquid endosperm)

2.5.4**toddy**

sweet translucent liquid obtained from tapping of unopened inflorescence (spadix) of coconut

2.6.**coconut palm**

Cocos nucifera L., pinnate-leaved palm cultivated primarily for its fruit, the coconut, which provides food, oil, fibre, and numerous industrial products

2.7.**coconut planting material**

the seednut, seedling, hybrid or other propagative part derived from selected mother plants with specific or desirable characteristics, e.g. high yield, copra quality, disease resistance, and adaptability to climate, that is used to establish new plantations or replant existing ones

2.8.**competent authority**

entity/agency that has the knowledge, expertise, and authority as designated by law

2.9.**composting**

process where biodegradable materials are subjected to controlled decomposition

2.10.**contaminant**

any substance not intentionally added to food or feed for food-producing animals, which is present in such food or feed as a result of the production (including operations carried out in crop husbandry, animal husbandry, and veterinary medicine), manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food or feed, or as a result of environmental contamination. The term does not include insect fragments, rodent hairs and other extraneous matter

[Source: CXS 193 – 1995 General standard for contaminants and toxins in food and feed]

EXAMPLES of major contaminants in soil: pesticide and herbicide residues; heavy metals such as lead, arsenic, cadmium, mercury), industrial waste, bacteria, solid waste materials (such as plastic, glass shards, discarded chemical containers).

2.11.**contamination**

presence of unwanted material in a commodity, storage place, conveyance, or container which reduces quality, safety or functionality

2.12.**debris**

plant residues or materials left in the farm which include but are not limited to stumps, felled palms, logs

2.13.**farmer**

an individual who cultivates, manages, and harvests coconuts on agricultural land, whether for subsistence or commercial purposes, and who assumes primary responsibility for production practices in line with GAP requirements

2.14

farm operator

a person or entity with overall control of coconut farm operations, including planning, resource allocation, and compliance with GAP standards. The operator may be the landowner, lessee, or an appointed manager.

2.15

farm worker

any hired worker engaged in coconut farming activities under the direction of a farm employer or operator, performing tasks such as planting, maintenance, harvesting, or processing, in accordance with GAP practices

2.16

fertigation

application of soluble fertiliser through an irrigation system

2.17

fertiliser

any substance (solid or liquid), or any nutrient element (organic or inorganic) applied for the purpose of promoting plant growth, increasing crop yield, or improving their quality

2.18

first filial generation (F1)

direct offspring produced from crossing two distinct, genetically stable parent plants (often from different varieties, species, or lines)

2.19

green manure

plant and plant material incorporated into the soil, while still green, for the purpose of soil improvement, prevention of erosion and nutrient loss, mobilisation and accumulation of plant nutrients, and balancing soil organic matter

2.20

hazard

biological, chemical, or physical agent with the potential to cause adverse health and environmental effect(s)

2.21

holing

practice of digging planting holes in the field prior to transplanting seedlings or planting propagules, especially for perennial crops and fruit trees

2.22

hybrid

a coconut palm produced by crossing two genetically distinct coconut varieties or ecotypes to combine desirable characteristics and traits

2.23

Integrated Pest Management (IPM)

system of preventative and control measures used to prevent, minimise or eliminate pests where necessary with a combination of methods while limiting the use of pesticides and with a resultant minimum impact on human health, the environment and non-target organisms

2.24

land lying fallow

agricultural land that is purposely left uncultivated, untilled or unseeded for at least one growing season to recover its natural fertility, moisture, and nutrients.

2.25**manure**

organic material, primarily animal waste, that is used to improve soil fertility, structure, water-holding capacity and support plant growth

2.26**maturity index**

indicator(s) used to measure or predict the maturity of coconut for harvesting purposes

2.27**micro propagated coconut planting material**

laboratory produced, disease-free plantlet developed from tissue segments of the mother plant, for which they are genetically identical and grown in a sterile environment using specific nutrients and plant growth regulators

2.28**perianth lobes**

the small leaf-like structures that form part of the outer whorl of the coconut flower's outer whorl which surround and protect the reproductive organs and help in the overall floral structure

Note to entry: The male flower has six perianth lobes arranged around the stamens. In the female flower, the perianth lobes are less prominent but still present, surrounding the ovary

2.29**pest**

any organism (plant, animal, or microbe) that adversely affects the production, quality, and safety of coconut palms, its intercrops and coconut products

2.30**pesticide**

any substance or product, or mixture thereof, of organic and synthetic origin, intended to control, prevent, destroy, repel, or mitigate directly or indirectly, any pest

Note to entry: The term shall be understood to include, but not limited, to insecticide, fungicide, bactericide, nematocide, herbicide, molluscicide, avicide, rodenticide, plant regulator, defoliant, desiccant, and the like.

2.31**pesticide residue**

any toxic substance found in food, agricultural commodities, or animal feed resulting from the use of a pesticide

2.32**pre-harvest interval****PHI**

number of days between the last spraying and harvest

Note 1 to entry: PHI is derived from a supervised pesticide residue trial where the pesticide is applied at the recommended rates and the residue levels are analysed

Note 2 to entry: Each pesticide active ingredient (AI) has its own PHI

2.33**primary processing**

preparation and/or conversion of a raw material for further processing or value adding

2.34**re-entry period**

period of time after the application of a pesticide during which farmers are safe to enter the field

2.35

risk

likelihood of an adverse health effect and the severity of this effect following exposure to a hazard

2.36

salt fertilization

practice of adding common salt (sodium chloride) around coconut plants to supply chlorine, an essential nutrient that supports plant growth, seednut development and copra yield

2.37

sap

the sweet liquid collected from cut flower buds (inflorescences) of the coconut palm

Note to entry: Sap has many uses including use as a fresh beverage, conversion to toddy, vinegar, sweetener or syrup and other nutritional and medicinal products

2.38

seedling

germinated from seednuts raised in nurseries

2.39

seednut

mature coconuts usually 11-12 months old, harvested from selected mother palms, which are high yielding and tolerant or resistant to common pests and diseases

2.40

site

defined area on the property such as a production site

2.41

soil additive

product or material that is added to the soil to improve fertility, structure, or control weeds.

Example: Decomposed animal manure, sawdust, compost, seaweed, fish- based products, or biofertilizers are soil additive examples.

2.42

variety

a distinct group of plants within the lowest recognised botanical category, which is defined by traits from a specific genotype (or combination of genotypes), can be clearly distinguished from other groups, and can be reproduced without change. (simplified from UPOV Convention)

2.43

virgin soil

land that has never been cultivated, ploughed, or used for agriculture, often characterised by its natural and undisturbed state

2.44

vitrification

a process which causes the abnormal growth of plants under conditions of excessive humidity and poor ventilation, leading to weak, brittle, and often non-viable plants

3 Recommended practices

3.1. Site selection and management

3.1.1. Site selection

3.1.1.1 Site selection should consider the following

- a) Optimum conditions for coconut production as recommended in Annex A
- b) previous and present usage of the production area and the adjoining sites or history of prior land use
- c) previous ownership/tenure records of land to ensure there should be no disputes or encumbrances.
- d) compliance with the country's zoning regulations for crop production

3.1.1.2 In the case of new site(s), the risk of causing environmental harm within or outside the site should be assessed for the proposed use. Risk assessment should consider:

- a) the prior and present use of the site
- b) the potential impacts of coconut production on adjacent farms
- c) potential impact of activities carried out in adjacent sites on the new site.

Note: If an Environmental Impact Assessment is available, it should be helpful in identifying and evaluating potential environmental risks of the proposed coconut farm.

3.1.1.3 If the results of the evaluation of the production or adjoining sites lead to the conclusion that a significant risk or potential hazard exists, the sites should be further evaluated through analysis and characterisation of the identified risk or hazards, and remedial action should be undertaken.

3.1.1.4 If contaminants are found in amounts that exceed the maximum limits set by the relevant competent authority, then the site shall not be used for production and primary processing until corrective or control measures are carried out as determined by the relevant competent authority.

3.1.1.5 Whenever remedial action is required to manage the risk or hazard, the action taken should be monitored to ensure that it is eliminated or kept within acceptable levels.

3.1.2 Site management

Management of site activities should conform to the requirements covering air, water, soil, biodiversity and other environmental considerations as set out by the relevant competent authority.

3.2. Farm planning and production site mapping

3.2.1. A production site map should be prepared to show the condition of the farm or how the farm is intended to be developed. It should indicate the topography and the locations of the following:

- a) coconut production area (*e.g. density, coconut spacing, variety*)
- b) primary processing area;
- c) intercropping and livestock areas (if applicable);

Note: Crop suitability maps, provided by the relevant competent authority, should be utilised, where possible, to plan for intercropping and livestock integration. However, crop suitability maps, though vital in coconut farming, are specialised geographic tools that require training for interpretation

- d) sources of water used on the farm (well, reservoir, rivers, lakes, farm ponds, etc.);
- e) chemical pesticides and fertiliser storage and mixing and contamination containment areas;
- f) tools and equipment cleaning and disinfection areas;
- g) storage area for agricultural inputs including tools and equipment;
- h) water storage, distribution networks, irrigation and drainage, and discharge points of wastewater;
- i) solid waste disposal area;

- j) composting areas;
- k) first-aid treatment area;
- l) toilet facilities and hand-washing areas;
- m) muster points, appropriate to farm size, identified hazards, emergency access and the documented emergency plan, and;
- n) property buildings, structures, and road networks.

3.2.2. Each production area shall be indicated on the property map and shall be identified by a unique name or code.

3.2.3. All hazard and risk areas to humans shall be clearly indicated.

3.2.4. All facilities and structures for coconut production and processing should be properly designed, constructed, and maintained to minimise postharvest losses and risk of contamination. All premises should adhere to the guidelines set by the competent authority.

3.3. Criteria for selection and sourcing of planting materials

3.3.1. Approved planting materials

3.3.1.1. Planting materials shall be selected based on yield, quality, market requirements, adaptability to local conditions, and farmer preferences.

3.3.1.2. Other considerations should include nutrient and water use efficiencies, pests and diseases resistance, soil type and nutrient levels, water availability, and prevailing climatic conditions.

3.3.1.3. Coconut planting materials should be of the highest quality, characterised by genetic purity, vigour, and free from pests and diseases. In addition, planting materials should demonstrate suitability to local agro-climatic conditions to ensure sustainable establishment and long-term productivity.

3.3.2. Sourcing and selection of planting materials

3.3.2.1. Sourcing planting materials

All planting materials should be:

- a) obtained from varieties approved by the relevant competent authority.
Note: Annex B contains information on commercial coconut varieties.
- b) sourced from suppliers or production centres, approved or certified by the relevant competent authority.

3.3.3. Selection of planting materials

Planting materials should be selected based on the following:

3.3.3.1. Seednuts

3.3.3.1.1. Mother palms of open-pollinated varieties should be selected from a block or area of highly homogenous bearing palms producing a minimum average of 10 nuts per bunch every 30 days for tall varieties and 15 nuts per bunch every 25 days for dwarf varieties.

3.3.3.1.2. Seednuts should be disease-free, undamaged by insects and rodents, physiologically mature, without deep punctures or cuts, with water, ungerminated, and resembles the distinct appearance of the specific variety of the mother palm.

NOTE The presence of water manifested by “sloshing sound” when shaken.

3.3.3.1.3. Seednuts should be stored in shade and, preferably, soaked in water after removing the perianth lobes. They must then be sown in well-prepared seedbeds located at an appropriate nursery site. Recommended steps for the preparation of seedbeds are given in Annex C

3.3.3.1.4. Seednuts should be positioned with the germ end facing upward, either upright for tall varieties or tilted for dwarf varieties, to ensure contact between the water in the nut and the haustorium.

3.3.3.1.5. Seednuts should be appropriately watered, weeded, and inspected for disease and pest incidence.

3.3.3.2. Seedlings

3.3.3.2.1. Healthy seedlings with characteristics typical of the variety should be selected for planting.

3.3.3.2.2. Seedlings should be transplanted once they reach the recommended age for their variety and have 4 to 6 leaves with a strong root system to ensure they establish well in the field. The recommended age for transplanting the three coconut types should be as follows:

- a) Dwarf: 6 months -8 months
- b) Tall: 12 months -18 months
- c) Hybrid: 10 months -12 months

3.3.3.3. Micro propagated planting materials

Micro propagated planting materials should be genetically stable, disease-free, physiologically vigorous, uniform, and properly, acclimatised, with certification and traceability as determined by the relevant competent authority. In addition, they should be:

- a) true-to-type and genetically identical to the donor plant of varieties approved by the relevant competent authority and verified through molecular markers or morphological uniformity
- b) healthy, robust plantlets with uniform growth and free from abnormalities such as vitrification, stunted growth, or malformed leaves
- c) well-developed root system and balanced shoot-to-root ratio capable of supporting transplant for successful establishment under field conditions
- d) hardened under controlled nursery conditions before field transfer

EXAMPLE: Examples of alternative evidence of authenticity could be considered such as checks into labels, registries, training, digital traceability tools, regional cooperation, and farmer-level protocols

3.3.3.4. Hybrid planting materials

3.3.3.4.1. Hybrids should be selected based on climate, soil type, and disease pressures in the region where the farm is being established.

3.3.3.4.2. Only the first filial generation (F1) of hybrids shall be used for planting. Seednuts and seedlings should not be obtained from hybrid parents.

Note: Seedlings obtained from the second filial generation (F2) tend to show highly variable characteristics, may be weak, low-yielding, or susceptible to pests and diseases.

3.4. Farm establishment

The ideal land for coconut farming should meet the climatic and other requirements for optimum growing conditions for coconut plants given in Annex A. It is also critical that this land should:

- a) be well-drained (sandy loam or alluvial preferred);
- b) not be waterlogged or in saline areas;
- c) ensure access to irrigation and proximity to markets or distribution points;
- d) be protected from potential sources of contamination from the surrounding environment including domestic and wild animals;

- e) comply with country regulations, such as zoning of crops and requirements for establishing coconut farms; and
- f) Land should be flat or slightly elevated (preferred).

3.4.1. Land clearing and preparation

The establishment of the coconut farm should involve appropriate land clearing and preparation activities, depending on the type of land and soil conditions.

3.4.2. Land clearing

3.4.2.1. Prior approval from the relevant competent authority should be obtained before clearing land for coconut production, where such authorisation is required. This measure ensures compliance with environmental regulations, supports sustainable land use, and prevents adverse impacts on ecosystems and community resources

3.4.2.2. Land clearing activities are typically done on virgin land, currently cultivated land, or fallow land. Activities should generally involve:

- a) removal of weeds, grasses, shrubs, unwanted existing crop(s), crop residues, stumps and invasive species;
- b) removal of debris without burning (to reduce carbon emissions) except where controlled destruction is required or approved by the competent authority for pest, disease or phytosanitary reasons;
- c) protecting valuable vegetation where possible to maintain biodiversity, or which can serve as intercrops, windbreaks or provide shade to the young plants; and
- d) dry season clearance is recommended to improve efficiency, timeliness and effectiveness of land preparation

3.4.2.3. Appropriate machinery and techniques should be used in land clearing to minimise soil compaction, preserve soil structure, maintain aeration and support healthy root development in coconut seedlings.

Examples 1: Hand tools such as hoes, machetes, and augers

Example 2: Light machinery such as small tractor and chainsaws for selective felling of small trees

Example 3: Application of non-selective herbicide

3.4.3. Land preparation

3.4.3.1. Tilling

3.4.3.1.1. Tilling for coconut production should be light or minimum to break up compacted soil and incorporate crop residues and/or organic manure into the soil. This should help to enable proper aeration, drainage control, weed control, reduce erosion and maintain or improve soil fertility.

Note: No till practices may be used to maintain soil structure and fertility.

3.4.3.1.2. Tilling should be carried out using an appropriate till machine or other suitable method.

3.4.3.2. Soil testing

Soil should be tested to determine quality characteristics, such as texture, pH (ideal range: 5.5–7.0), depth (minimum depth of 1.2 m –1.5 m for root growth) and assess nutrient levels and organic matter (since previous crops may have depleted or altered fertility). Soil testing should be done by a conformity assessment body or relevant competent authority, every two to three years in mature plantations. The farmer should undertake such adjustments that may be necessary based on the results and recommendations of the tests.

3.4.3.3. Conservation of soil moisture

3.4.3.3.1. Conserving soil moisture is essential to coconut palms as they require a consistently moist root zone to ensure healthy growth, high productivity, and resilience against drought stress. Primary measures to conserve soil moisture should consider one or more of the following:

- a) using crop residues as mulch to keep the ground covered as much as possible (e.g. coconut waste materials such as husks, leaves, coir);
- b) cover cropping using appropriate plants to protect soil from direct sunlight, reduce erosion, and enhance soil fertility;
- c) avoiding deep tillage to reduce soil disturbance;
- d) constructing bunds (small embankments) or trenches to slow water runoff depending on the slope of the land;
- e) applying organic manures, compost, or green manure to improve the soil's water-holding capacity;
- f) planting shade-giving plants or intercrops between rows of plants (see layout) along contours; and
- g) maintain proper grass coverage that is 1 to 3 inches high

3.4.3.4. Holing (pit preparation)

Constructing proper pits (or holes) is crucial to ensure good root establishment, moisture retention, and nutrient availability. Digging and preparing pits (or holes) should be prepared after clearing crop residues and unwanted vegetation from the area to be used for planting and should involve the following practices:

- a) identify and mark exact locations for planting coconut seedlings, based on the planting system preferred as illustrated in Annex D;
- b) excavate pits of adequate dimensions according to soil type, with a minimum of 60 cm x 60 cm x 60 cm in sandy soils and larger pits of 90 cm x 90 cm x 90 cm recommended for clay or poorly drained soils;
- c) enrich pit soil with organic matter (e.g. farmyard manure), fertilisers and or soil amendments (e.g. compost or green manure for fertility) before transplanting seedlings; and
- d) ensure drainage to prevent waterlogging around the pit while conserving moisture

3.4.3.5. Application of fertiliser

3.4.3.5.1. Based on the results of soil tests (see Clause 3.4.3.2) organic matter (compost, farmyard manure or green manure) should be applied, if necessary, to improve fertility, boost microbial activity and improve soil structure.

3.4.3.5.2. Organic fertiliser should be well-decomposed and incorporated into the topsoil to boost root establishment and early growth of coconut plants.

3.4.3.5.3. The current amount of organic matter or inorganic fertiliser should be applied based on the recommendation of the relevant competent authority to enrich or improve the soil.

3.4.3.6. Erosion control

On slopes and other places where erosion is likely to occur, the farmer should consider the following measures to reduce run-off of soil:

- a) avoid complete removal of vegetation on the soil surface;
- b) construct contour bunds or terraces following the contour lines;
- c) plant cover crops or grasses before planting time;
- d) apply mulch to keep the ground covered as much as possible (e.g. by using coconut waste materials such as husks, leaves, coir); and
- e) maintain existing erosion control structures, especially on land under cultivation or fallow land, if these have been effective.

3.4.3.7. Drainage and irrigation

Good drainage prevents root rot and nutrient leaching and safeguards young palms against drought and excess rainfall. Efficient irrigation ensures steady growth during establishment. To prepare an efficient drainage and irrigation system that would ensure healthy establishment and long-term productivity of the palms, the farmer should:

- a) construct drainage channels in heavy rainfall zones to carry excess rainwater away;
- b) ensure regular maintenance of drains to keep them clear of debris and vegetation to maintain the flow of rainwater;
- c) install efficient irrigation systems (e.g. drip irrigation, micro sprinklers) to provide water especially during dry seasons; and
- d) consider climate-smart practices such as rainwater harvesting to conserve water for irrigation purposes.

3.4.3.8. Establishing windbreaks

Young coconut plants should be safeguarded by planting suitable trees along boundaries of the farm to shield them from strong prevailing and hurricane-force winds. (e.g., *Gliricidia sepium*; *Casuarina equisetifolia*. Windbreak trees should be:

- a) fast-growing, deep-rooted and non-competitive with coconut palms for nutrients and water;
- b) planted in rows perpendicular to prevailing winds, 10 m – 15 m away from the first line of coconut palms with a space of 2 m – 3 m maintained between trees; and
- c) pruned regularly to prevent excessive shading and remove weak or diseased trees.

3.4.3.9. Shading

3.4.3.9.1. If the farm is to be established in open land areas, planting of shade plants (banana, plantain) should be established well ahead of the planting of the coconut palms and should be arranged in a manner to shelter the young plants from direct sunlight, which can cause leaf burn, stunted growth, and water stress.

3.4.3.9.2. Additionally, other ways of shading young coconut plants should be considered, such as using temporary shelters and shade nets.

3.4.4. Field layout and planting distances

3.4.4.1. Field should be laid out in either square, triangular, rectangular or other appropriate system depending on the farmers' preference and intended products.

3.4.4.2. The recommended planting distance should be from 8.0 metres to 10.0 meters, depending on cropping systems and other factors. Recommended planting systems and distances are shown in Annex D.

3.4.4.3. To optimise sun exposure or avoid overshadowing of palms throughout the day, the longest distance between palms should be in the east-west orientation.

3.4.4.4. The farmer should seek guidance from the competent relevant authority to determine the planting system best suited for the variety of seedlings to be transplanted.

3.4.5. Planting and replanting of palms

3.4.5.1. Root pruning

Seedlings should be pruned before transplanting to prevent them from becoming heavily root bound as this causes coiling and poor future growth. For good practices:

- a) select seedlings which are about 6 months - 12 months old and with 5 leaves - 6 leaves (See Clause 3.3.3.2.2 for the recommended ages for transplanting seedlings of the three coconut types);
- b) water seedlings thoroughly 1 day - 2 days before pruning;
- c) prune roots 4 days - 5 days before transplanting seedlings;
- d) cut away roots that are damaged, diseased or excessively long (coiled);
- e) keep seedlings in a shaded area for 4 days - 5 days after pruning to prevent sun stress; and
- f) after transplanting seedlings allow for 2 days – 3 days before heavy watering which encourages roots to rebuild

3.4.5.2. Seedlings should be appropriately planted preferably in holes or pits as recommended in 3.4.3.4, at the onset of the rainy season.

3.4.5.3. Seedling collar should not be covered with soil nor soil be allowed to get into the leaf axils.

3.4.5.4. Young palms should be protected from stray animals.

3.4.5.5. For newly established farms, young palms that are deformed, damaged, stunted in growth, or dead, as well as those exhibiting weakness should be replaced or replanted with seedlings of the same age.

3.5. Farm maintenance

All farm maintenance activities should be done to ensure farm efficiency, productivity, profitability, and safety.

3.5.1. Soil and soil conservation

Appropriate soil conservation measures recommended in Clause 3.4.3.3.1 should be integrated in the coconut production practices

3.5.2. Fertilisers and soil amendments

3.5.2.1. General requirements

3.5.2.1.1. To optimise nutrient use, the farm should apply the correct amount of fertilisers based on recommendations from soil or leaf tissue analysis and or agronomic recommendations by a relevant competent authority.

Note: Annex E provides general information and guidance on recommended fertilisation rates

3.5.2.1.2. If fertilisers are sourced commercially, only duly registered organic and inorganic fertilisers should be used to avoid the risk of heavy metal contamination.

3.5.2.1.3. The details of the source or supplier of all fertilisers and soil additives including potting medium used in the farm should be recorded and maintained.

3.5.2.1.4. Farm tools and equipment used in fertilisation activities on the farm operation should be well maintained to ensure efficiency and safety.

3.5.2.1.5. Sprayers used for herbicides should not be used for foliar fertiliser application.

3.5.2.2. Organic fertiliser

3.5.2.2.1. Organic fertilisers, whether produced on the farm or sourced commercially from certified suppliers, should be used to improve soil health, if necessary.

3.5.2.2.2. Composting areas for the production of farm-based organic fertilisers should be located away from processing and storage areas and from drinking and farm water sources.

3.5.2.2.3. Human waste, dog and cat excreta, whether processed or unprocessed, shall not be used for the production of coconuts.

3.5.3. Water and irrigation

3.5.3.1. Water used for irrigation, washing coconuts, sap handling, equipment sanitation, and any other food-related activity shall be safe and free from contamination. A water-quality verification plan, that includes the following requirements, shall be established and maintained:

a) testing water for safety using easy tools or kits;

- b) regular monitoring of water quality at set times (for example, once a month or before harvest;
- c) keeping record of test results;
- d) taking and documenting corrective actions if water is unsafe for use or use another clean source; and
- e) treating wastewater if needed to ensure it is properly cleaned and safe before use.

3.5.3.2. Where insufficient soil moisture hinders coconut growth and production, an irrigation system should be used. The irrigation system should be designed to save water, minimise effort and provide the right amount of water required to support coconut growth and production.

3.5.3.3. An irrigation schedule should be prepared for:

- a) young plants;
- b) plants at pre-bearing stage;
- c) plants at bearing stage, and
- d) plants at mature stage.

3.5.3.4. If treated wastewater is to be used for irrigation or fertigation, the water quality shall comply with the guidelines by the relevant competent agricultural authority or other relevant body.

3.5.4. Management of coconut palms

3.5.4.1. Soil tillage for established field

Soil tillage has a beneficial effect on coconut yields and should not be done too frequently or too deeply as this can damage the root system and reduce the yield of the plant. For best practices:

- a) shallow soil tillage should be carried out up to 20 cm deep and within a 2 m radius away from the base of the coconut plant;
- b) till the soil near the end of the dry season. The soil should also be ploughed before the onset of the dry season to break the soil capillaries; and
- c) the farmer should be guided by the relevant competent authority to determine the frequency and best times for soil tillage.

3.5.4.2. Crop nutrition and fertiliser application

3.5.4.2.1. Application of fertilisers should be practised, based on an established schedule and method of application.

3.5.4.2.2. The use of fertilisers containing essential nutrients, such as nitrogen, phosphorus and potassium, is highly recommended and these should be applied at different stages of plant growth as indicated in Annex E. Farmers should also be guided by the recommendations of the relevant competent authority regarding fertilisation rates and frequency based on the results of soil testing and tissue analysis.

3.5.4.2.3. In addition to these macronutrients, coconuts need high quantities of chloride and sulphur. It is highly recommended that fertilisers containing these nutrients should be applied at different stages of plant growth as indicated in Annex E.

3.5.4.2.4. If the farm is intended for organic farming, only approved organic fertilisers and soil amendments should be allowed.

Examples of soil amendments: lime (limestone); compost; aged manure; gypsum

3.5.4.3. Integrated Pest Management (IPM) in coconut

3.5.4.3.1. An Integrated Pest Management (IPM) strategy should be developed to sustainably manage pests and diseases on the coconut farm. It should emphasise prevention, monitoring and informed decision-making, using a mix of cultural, biological, mechanical, and chemical methods. The following major steps should be considered in developing an appropriate IPM strategy for the farm:

- a) ensure there is good sanitation, intercropping, proper spacing, mulching and pruning to promote healthy plant growth, improve biodiversity and reduce pest and disease build-up;
- b) undertake regular monitoring to detect pest or disease infestation early before they cause significant damage;
- c) correctly identify, if possible, the pest or disease affecting the coconut palms;
- d) keep appropriate records of the biology and impacts of the pest or disease infestation, e.g. location, population, environmental conditions, time at which pest/disease is most vulnerable, etc.;
- e) assess the extent of damage to coconut palms;
- f) if immediate intervention is necessary, consider the range of risky options first, focusing on non-chemical methods (cultural, biological, physical) that could be undertaken as recommended in Annex F;
- g) seek the guidance of the relevant competent authority to fully develop an effective strategy, that could include the application of chemical methods, to bring the pest or disease infestation under control; and
- h) plant different coconut varieties to manage pest and disease spread.

3.5.4.3.2. Effective solutions for weed suppression should include intercropping and mixed cropping systems, where appropriate.

3.5.5. Choice of crop protection products

3.5.5.1. Crop protection products should be appropriate for the control of pests and based on the approval of the competent authority.

3.5.5.2. Farmers should use agricultural chemicals that are registered for the cultivation of coconut and procured from licensed suppliers and approved by the competent authority. The use of such agricultural chemicals in coconut production shall comply with all applicable requirements, including:

- a) national agricultural chemical laws and regulatory frameworks governing agricultural chemical use.
- b) manufacturer's label directions on dosage, timing, and safety precautions
- c) guidance issued by competent authorities, particularly in cases where coconut specific agricultural chemical registrations are limited or unavailable.

3.5.6. Application of crop protection products

3.5.6.1. Farmers who apply agricultural chemicals should be trained on proper application.

3.5.6.2. Farmers should use appropriate personal protective equipment (PPE) during applications.

3.5.6.3. The IPM principles and techniques should be used whenever possible to minimise the use of pesticides. A rotation strategy for agricultural chemical application and other crop protection measures should be employed to avoid the development of pest resistance, i.e. use different chemical structural groups (e.g. organophosphates, synthetic pyrethroids, carbamates) of pesticides.

3.5.6.4. To ensure the protection of human health, neighbouring communities, and the environment during agricultural chemical use, farmers or farm operator shall:

- a) follow all PHIs indicated on product labels or national regulations to ensure harvested coconuts are safe for consumption;
- b) manage aerial or ground spraying using calibrated equipment, appropriate spray pressure, and drift reducing nozzles to minimise off site movement;
- c) mark areas applied with pesticides with appropriate warning signs and avoid re-entry of treated coconut fields until the prescribed re-entry period has elapsed;
- d) establish protective buffer zones between treated areas and neighbouring farms, homes, schools, waterways, and sensitive habitats;
- e) avoid spraying during high winds, imminent rainfall, or when conditions favour drift or runoff;
- f) ensure applications do not endanger adjacent farms, households, livestock, or community spaces; h) communicate with neighbours before large scale spraying; and

g) prevent contamination of rivers, streams, ponds, wetlands, and ecologically sensitive zones, biodiversity reserves or conservation areas.

3.5.6.5. All equipment, tools and instruments used in the application of agricultural chemicals shall be kept in good working condition so that they operate safely and effectively. To achieve this the farmer shall:

- (a) inspect the equipment or tool before use to ensure it is working properly;
- (b) follow manufacturer's instructions for the maintenance of the equipment or tool
- (c) calibrate equipment or tool regularly;
- (d) apply the agricultural chemical properly and in the right dosage to avoid waste and minimise harm to the environment; and
- (e) keep appropriate records, and make them available for verification as per the following:
 - (i) results and outcomes of inspections and calibration activities;
 - (ii) adjustments made to restore accuracy;
 - (iii) responsible person conducting the check or calibration;
 - (iv) corrective action taken to address deviations, faults, or non-conformities;
 - (v) Intervals for checks and calibration based on equipment type, usage frequency, and risk to product safety or quality; and
 - (vi) corrective action taken to address deviations and non-conformities

3.5.6.6. Good practices for the selection and safe handling of crop protection products should be followed as described in Annex G.

3.5.7. Replanting of unproductive coconut palms

3.5.7.1. Coconut palms that produce less than 25% of the optimum annual yield for their variety, due to age and despite the application of appropriate management practices, should be replaced with recommended high-yielding varieties. This could be done through underplanting and spot planting.

3.5.7.2. Replacement of unproductive palms should be done when the underplanted palms are already at the productive stage unless immediate removal is approved by the competent authority.

3.6. Farm diversification

3.6.1. Intercropping

Regardless of the planting system adopted on a coconut farm, there should be sufficient space for intercrops. When properly managed, these intercrops should enhance soil health, suppress weeds, diversify farm income, and reduce production risks. For good intercropping practices:

- a) The selection of intercrops should consider the age of the coconut palms, the conditions required for optimum growth, market availability, crop suitability, pest risk, soil fertility, and opportunities for value-added activities.
- b) Intercrops should be shade-loving or shade-tolerant. Recommended crops to be integrated with coconut farming are shown in Annex H.

Note: Intercropping could be year-round or seasonal depending on the age of coconut palms and seasonal suitability of the crop(s) to be used

- c) Intercrops should be planted in rows or strips between palms for systematic management.
- d) Overcrowding of intercrops should be avoided to reduce competition for light and nutrients.

Note 1: Fruits and other permanent crops like coffee or cacao are good intercrops for farms with coconuts

Note 2: Vegetables and cereals require a considerable amount of sunlight for healthy growth.

- e) Fast-growing intercrops should be avoided in newly established coconut fields, as they can create excessive shade and stunt the growth of young coconut palms.
- f) Both coconut palms and intercrops should be inspected regularly and diseased plants removed promptly to prevent spread.
- g) Adequate irrigation should be provided, especially for water-demanding intercrops.
- h) Intercrops should be rotated to maintain soil health and reduce pest buildup.
- i) The fertiliser needs of both coconut and intercrops should be determined and inorganic and/or organic fertiliser applied to sustain soil fertility where necessary.

3.7. Livestock integration

3.7.1. Livestock integration should be conditional on a documented risk assessment that requires separation, manure management, water protection, animal-health controls and records appropriate to the farm. Livestock integration should be employed, where possible, to maximise land use, farm productivity, and provide manure that can be processed into organic fertiliser to help control the weeds in the farm. Animals to be integrated with coconut production are recommended in Annex H.

3.7.2 Where livestock is integrated into coconut farming systems, the farmer shall establish and maintain measures to prevent contamination of coconuts and coconut-derived products. These measures shall include:

- a) housing or grazing livestock in designated areas that do not overlap with coconut harvesting, drying, storage zones or intercropped areas;
- b) collecting, storing and applying manure in a manner that prevents direct contact with coconuts, coconut water, or processing surfaces;
- c) safeguarding water sources against contamination from animal waste, with separate supply lines for processing and livestock;
- d) following documented hygiene protocols when handling both livestock and coconuts, including handwashing and use of protective clothing, before engaging in coconut-related tasks; and
- e) implementing and keeping appropriate records of routine inspections and corrective measures to ensure livestock activities do not compromise food safety.

3.8. Harvesting and postharvest handling

3.8.1. Harvesting

Coconuts are productive throughout the year and the yield should vary with the season and the variety. Appropriate harvesting techniques should be employed to optimise the quality and other desired characteristics of coconuts and other farm produce.

3.8.2. Sap

3.8.2.1. For collecting sap, coconut palms with healthy, unopened inflorescence should be selected. Proper bending of the inflorescence should be done to prevent breakage and maximise sap yield.

3.8.2.2. Tapping should be done by using a sharp scythe. The frequency of collection of coconuts should depend on the intended use. The tip of the inflorescence should be covered appropriately to prevent exposure to sun, wind, and insects.

3.8.2.3. Harvesting tools and collecting vessels should be used solely for the purpose. These should be made from food-grade materials, cleaned and disinfected regularly, and stored away from potential contaminants.

3.8.2.4. For coconut sap intended for food use, the farmer or farm operator shall implement the following practices to safeguard product quality and safety:

- a) tap trees using clean, sanitised tools and methods that minimise microbial contamination;
- b) collect sap only in containers made of food-grade materials and kept in a clean and sanitary condition;
- c) clean and sanitise all collection vessels, tools, and surfaces before use and at regular intervals;
- d) protect collection points to prevent entry of insects, dust or foreign by covering or screening them;
- e) transport sap promptly to processing or cooling facilities to reduce microbial growth;
- f) maintain sap under appropriate time and temperature conditions to preserve freshness and safety; and
- g) take measures to prevent spontaneous fermentation, such as immediate cooling or processing.

3.8.3. Fruit

3.8.3.1. Coconuts to be used for various purposes should be harvested at the correct stage as recommended below:

- a) coconuts intended for fresh water should be harvested at the tender nut age of 6 months – 7 months after flowering, when it is full of liquid endosperm, every 45 days - 60 days;
- b) coconuts for copra production should be harvested when fully mature at 11 months -12 months old and the harvesting interval should be every 45 days;
- c) for virgin coconut oil, the harvest age should be 10 months –12 months, when the kernel is thick and oil content is highest, and the copra harvest cycles should be 45 days – 60 days;
- d) for the desiccated coconut process, the harvest age should be 10 months –12 months and the harvest cycle every 45 days – 60 days, when nuts are fully mature; and
- e) for makapuno production, coconuts should be harvested 9 months -11 months after flowering, when the jelly-like endosperm has fully developed and the harvest cycle should be every 45 days –60 days.

3.8.3.2. Young coconuts should be harvested by bringing down bunches with the aid of a rope or other suitable method, to prevent breakage. They should be stored in the shade.

Note: Other possible methods include using a harvesting pole, mechanical lifts or platforms, or a rope and pulley system

3.8.3.3 For coconuts intended for water consumption, the farm operator shall implement the following practices to safeguard product quality and food safety during harvesting:

- a) orchards shall be maintained in a clean condition; fallen nuts and debris shall be removed promptly to minimise microbial contamination;
- b) machetes, knives, and harvesting equipment shall be cleaned and sterilised at regular intervals.
- c) coconuts shall not be allowed to touch the soil to reduce microbial load;
- d) potable or treated water shall be used for irrigation, washing, and cleaning operations; and
- e) farm workers handling coconuts practice good hygiene and are not a source of contamination

3.8.3.3. 3.8.3.4 De-husked nuts should be stored away from direct sunlight, should not be in direct contact with the soil and should be properly protected from pests.

3.8.4. Postharvest handling

3.8.4.1. Storage of harvested nuts

3.8.4.1.1. To maintain the quality of and avoid injury to coconuts during storage, they shall be:

- a) inspected to identify pests and diseases;
- b) washed, using water of suitable quality to reduce microbial contamination;
- c) transferred to a clean surface off the ground and allowed to air dry after sanitising;
- d) handled hygienically to maintain water quality;
- e) stored vertically in cool, dry and well-ventilated areas;
- f) stored indoors off the floor (at least 6") and away from surrounding walls (at least 18") to protect them from direct sunlight and high humidity. The room should have adequate ventilation to prevent contamination cross-contamination, sprouting and or fungal attack, protected from rats, insects and molds using fumigation or natural repellents where appropriate. If fumigation of the harvested nut is necessary, use chemical products and methods that comply with national

- requirements and residue limits;
- g) inspected regularly in the storage area to ensure optimum conditions prevail to ensure product quality is not compromised; and
- h) processed within 120 hours after harvesting when not separated from the bunch and up to 72 hours when separated from the bunch.

3.8.4.1.2 For coconuts harvested for their fresh water, the farmer shall implement the following storage practices to maintain product quality and safety during storage:

- a) the nuts shall be kept in a cool, clean and well-ventilated environment, away from direct sunlight and protected from pests and dust;
- b) the nuts shall be covered with a suitable food-grade material to reduce fungal growth, moisture loss and weight loss;
- c) the nuts shall be used within 24 – 48 hours after harvesting to ensure freshness and prevent microbial spoilage;
- d) where feasible, nuts shall be kept at 13°C–15°C to extend shelf life, or at ≤4 °C if water has been extracted;
- e) nuts shall be stored separately from agrochemicals, fuels, or other potential contaminants; and
- f) storage areas shall be inspected for signs of mold, pests, or spoilage before the water is extracted from the nuts.

3.8.4.1.3 For processing of copra from harvested nuts, the farmer shall implement the following practices to ensure product quality and safety:

- a) kernels should be scooped out from split nuts before drying;
- b) the kernels shall be dried on clean, raised platforms or mats to prevent contamination;
- c) drying shall avoid excessive smoke, dust, or foreign material that may affect quality;
- d) copra shall be dried uniformly until kernels are firm and brittle;
- e) final moisture content shall be maintained at safe levels (typically ≤ 6%) to prevent spoilage;
- f) copra shall be inspected regularly and kept dry to avoid fungal growth;
- g) properly dried copra should be stored in moisture-proof bags or containers and stored in clean, ventilated, and dry facilities, off the ground, and away from contaminants; and
- h) product quality of copra should meet standards for market value and consumer satisfaction.

3.8.4.2. Transportation of sap

3.8.4.2.1. Conveyances for transporting the harvested coconut sap should be made of such material and construction that will permit easy and thorough cleaning.

3.8.4.2.2. Facilities should be maintained clean and disinfected. All handling procedures should prevent the coconut sap from being contaminated.

3.8.4.2.3. For purposes other than vinegar and toddy, care should be taken to prevent fermentation and to protect against contamination.

3.8.4.3. Transportation of fruit

- a) Coconuts should be transported and delivered promptly after harvest to designated clean market areas or collection centres to maintain freshness.
- b) Coconuts should be sorted and graded before transport to reduce damage and ensure quality. These nuts should be free of cracks, show no visible sign of pest infestation, have no rancid odour or contents that are cloudy.
- c) Transport vehicles should be clean, dry, well-ventilated and free from contaminants.
- d) Transport vehicles should not be overloaded and to prevent or minimise crushing, coconuts should be stacked properly with cushioning material (e.g. straw, husk)
- e) During transport coconuts should be covered with tarpaulin or nets to protect against dust, rain, and direct sunlight.
- f) Rolling of coconuts while in transit and dropping during loading and unloading should be avoided to prevent cracking or mechanical injuries

- g) Prolonged storage of coconuts in vehicles under high temperatures should be avoided
- h) Workers should handle coconuts with clean hands and equipment.
- i) Coconuts should not be mixed with chemicals, fuel, or other goods that may cause contamination.
- j) Coconuts should be unloaded and handled carefully to prevent damage.
- k) Records of transport batches for traceability should be kept.
- l) Documentation for certification and quality assurance should be maintained.

3.9. Storage facilities

3.9.1. Agricultural inputs, farm implements, and harvesting tools should have separate storage areas. The storage areas should be well-ventilated and designed for ease of cleaning spills and leaks. It should be free from waste and does not provide a breeding place for pests.

3.9.2 Agrochemicals shall be stored in a manner that is safe and supports auditable implementation. Appropriate measures include the following:

- a) storage areas shall be kept locked, with access restricted to authorised personnel only;
- b) storage facilities shall be well-ventilated to prevent accumulation of fumes and reduce health risks;
- c) original labels of all agrochemicals shall be stored in their original containers with intact labels for identification and traceability;
- d) fertilisers shall be stored separately from pesticides to avoid cross-contamination and chemical reactions;
- e) the farm shall have spill containment measures and absorbent materials readily available to manage accidental releases;
- d) where available Safety Data Sheets (SDS) shall be used for all agrochemicals to guide safe handling and emergency response;
- f) Clear warning signs shall be posted at storage entrances to indicate hazards and restricted access; and
- g) agrochemical storage shall be located away from harvested produce, food preparation areas, water sources, and living quarters to prevent contamination and exposure.

3.10. Environmental safety

3.10.1. To prevent possible ecological imbalance, farmers should use biological controls for the cultivation of coconut that are approved or recommended by the competent authority and are suitable for the local environment.

3.10.2. Farm activities should comply with relevant national legislation covering protected plant and animal species

3.10.3. Measures should be used to control wild animals and environmental pests.

3.10.4. The generation of offensive odour, smoke, dust, and or noise generated from farm activities should be managed to minimise the impact on neighbouring properties.

3.11. Health, safety and welfare of farm workers

3.11.1. Farm workers shall be treated in accordance with legislation set by the relevant authority on labour and other relevant guidelines. All farm workers shall be promptly and rightfully paid for work done and provided with appropriate social benefits. There shall be no discrimination in the hiring of farm workers.

3.11.2. There shall be no cases of forced labour, unlawful termination, and prohibition on membership or representation by a labour union. Living quarters provided by the farm employer shall be suitable for human habitation and contain basic services and facilities.

3.12. Safety

Farmers shall comply with the relevant Occupational Safety and Health Standards and applicable laws. Wearing of appropriate PPE and safe handling of inputs and farm implements should be practiced. First aid kits should be readily available to treat farmers and farm workers of minor cuts and bruises and those that have been accidentally contaminated with chemicals prior to medical attention/treatment in a hospital.

3.13. Training

3.13.1. Farmers and workers should be trained on the proper handling of crop protection products and other inputs and proper records maintained.

3.13.2. Farmers and farm workers should have appropriate knowledge and proper training on their areas of responsibility that are relevant to good agricultural practice and proper records maintained.

3.14. Waste management

3.14.1. Waste management shall be in accordance with the provisions of relevant Solid Waste Management Standards and Legislation.

3.14.2. Adequate areas for the collection (and/or storage) of all wastes generated on the coconut farm should be provided. Non-biodegradable wastes such as plastics, metal containers, bottles, sacks of fertilisers, and others should be segregated from biodegradable waste materials and disposed of in accordance with the legislation set by the competent authority.

3.14.3. Proper disposal of empty pesticide and fertiliser containers and expired chemicals shall be in accordance with the legislation set by the national competent authority.

3.14.4. Farmers should adopt the principles of reuse, recycling, reduction and recovery of all types of agricultural waste generated on the farm to transform them into valuable products that will help to minimise adverse environmental impacts and, at the same time, maximise their economic returns from coconut production.

Examples 1: Husk fibres can be spread around crops to retain soil moisture (mulching) and suppress weeds or be reused as bedding for livestock

Example 2: Husk fibres can be processed into ropes, mats, brushes, and mattresses

Example 3: Efficient harvesting methods help to reduce waste.

3.15. Documentation and records

Documentation and records should be prepared and maintained to facilitate recalls, product safety, investigations and traceability of farm products. Information to be recorded relevant to maintaining good documentation and records for GAP certification is given in Annex I.

3.16. Food authenticity and food fraud

Measures to safeguard food authenticity and fraud prevention are necessary to ensure that products are genuine, safe, and traceable while protecting consumer trust and market integrity. Recommended actions include:

- a) The farm should assess and identify its vulnerabilities and risks of food fraud across all inputs and outputs, including mislabelling, seed and/or fertiliser substitution, and counterfeiting of agricultural inputs.
- b) Staff should be trained to recognise potential risks, follow proper receiving procedures, source only from approved suppliers, and control access to the produce.
- c) The farm's mitigation plan should be reviewed at least annually, to ensure all crops, inputs, and packaging are covered and any changes in varieties or practices are addressed.
- d) The farm should undertake regular testing of soil and quality control measures to detect contaminants and adulterants.

- e) Records should be kept, and farm data, such as input and production logs, should be accurate and up to date to maintain ongoing protection against fraud, ensure traceability and certification of products.
- f) The farm should undertake consumer education programmes to identify with consumers and build trust and demand for its genuine products.

Voting Deadline: 23 October 2026

Annex A
(informative)

Optimum conditions for coconut production

A.1 Coconut palms thrive under specific conditions of rainfall, temperature, soil type, and altitude, with supplementary irrigation and fertilisation required in drier or less fertile zones. Successful coconut cultivation in the Caribbean depends on careful alignment of farming practices with the region's agro-ecological realities. Adherence to these optimum conditions not only ensures higher yields and nut quality but also supports sustainability, resilience, and compliance with national and regional standards.

A.2 Table A.1 outlines the optimum conditions required for coconut establishment and productivity, emphasising that site selection, farm establishment, crop management, and resource use must be guided by competent authority recommendations and national environmental and agricultural regulations.

Table A.1 — optimum conditions

Factors	Description	
1. Rainfall	Total of 1,500-2,500 mm/year, almost uniformly distributed, with at least 125 mm per month. Not more than 3 successive dry months (rainfall less than 50 mm).	
2. Relative Humidity	Within 80-90 %. A persistently very high humidity favours the speed of fatal fungal diseases, common in very high elevations.	
3. Temperature	Annual mean optimum of 27 °C, with diurnal variation of 5-7 °C.	
4. Altitude	Below 400 m – 750 m for maximum productivity	
4.5. Soil		
4.5.1 Moisture	Field capacity at 23% to 15% available soil moisture temperature range 25-40 °C of available moisture of 12-15 %. Water-logged conditions lasting for more than 1 week are growth-limiting and yield-reducing.	
4.5.2 Drainage	Well-drained and aerated at all times. Root respiration is impaired and plant physiology is abnormal under poor drainage conditions.	
4.5.3 Acidity	Soil acidity of pH 5.5-7.0 (slightly acidic to neutral)	
4.5.4 Depth	> 75 cm (top plus sub-soil)	
4.5.5 Texture	Sandy to loamy grades	
4.5.6 Fertility	Soil analysis:	
	Organic matter	> 2 %
	Total N	1,000 – 2,000 mg/kg
	CEC	> 15 meq/100 g soil
	Exch. K	> 0.5 meq/100g soil
	Exch. Ca	> 15 meq/100g soil
	Exch. Mg	> 7 meq/100g soil
	Exch. Na	> 0.2 meq/100 g soil
	Available P	> 15 mg/kg
	Available S	> 20 mg/kg
	Soluble Cl	> 20 mg/kg
	Available micronutrients	B: > 2 mg/kg
		Zn: > 4 mg/kg

Factors	Description
	Cu: > 4 mg/kg Fe: > 50 mg/kg Mn: > 100 mg/kg
6. Sunlight	Above 2,000 sunshine hours/year with daily sunlight (above 48,438 lux [4,500 ft-candlelight intensity]). That provides full and stable bunches of year round.
7. Topography	Flat to moderately sloping (slope <20 %)
8.Wind speed	Minimal frequency of hurricanes for stable nut yields.

Annex B
(Informative)

Commercial coconut varieties in CARICOM

The success of a viable coconut plantation starts with the utilization of quality planting materials. Consequently, care should be taken in choosing seedlings to establish a plantation. This is especially important since unsuitable planting material will produce low yields and may result in an uneconomic enterprise. For the production of quality planting materials, it is essential to select superior mother palms of the desired varieties. Table B.1 provides information on the yield, copra potential, fruiting characteristics, and recommended product groups for key commercial open pollinated and hybrid coconut varieties cultivated in CARICOM.

Table B.1 – Open-pollinated varieties

No.	Variety name	Nuts/palm	Nut/ha	Copra/nut, (g)	Copra/palm, (kg)	Copra/ha (t)	Fruiting season, no. of months	Regularity of bearing	First bearing age years	Height, (m)	Recommended product group(s)
1	Jamaica Tall (JAT)	90.0±20.0	13000.0±4600.0	160.0±20.0	14.0±4.0	2.0±0.8	10.5±1.5	Moderate to regular	7.0±1.0	24.0±4.0	Oil, coir, and activated carbon
2	Trinidad Tall (TRT)	100.0±20.0	14400.0±4800.0	180.0±20.0	17.5±4.5	2.6±1.0	12	Regular	6.5±0.5	22.0±4.0	Oil, coir, and activated carbon
3	Panama Tall (PNT)	110.0±20.0	15800.0±5000.0	155.0±15.0	15.0±3.0	2.2±0.8	12	Regular	6.0±1.0	26.0±4.0	Oil (VCO), coir, and activated carbon
4	Puerto Rico Tall (PRT)	92.5±17.5	13300.0±4300.0	170.0±20.0	15.5±4.5	2.2±0.9	11.0±1.0	Regular	6.5±0.5	23.5±3.5	
5	Dominican Tall (DMT)	125.0±25.0	18000.0±6000.0	195.0±25.0	22.5±5.5	3.2±1.2	12	Regular to high	6.5±0.5	21.0±3.0	
6	Grenada Tall (GNT)	102.5±17.5	14700.0±4500.0	165.0±15.0	16.5±3.5	2.4±0.8	10.0±1.0	Moderate to regular	7.0±1.0	21.5±3.5	
7	Malayan Dwarfs	110.6 ± 9.7	18,910.3 ± 1,661.5	193.4 ± 14.2	21.3 ± 2.1	3.60 ± 0.40	12	Regular	20	8	Sap, sugar
8	West African Tall (WAT)	68.4 ± 19.6	9,227 ± 2,641	184.6 ± 20.8	12.6 ± 3.78	1.69 ± 0.52	12	Biennial	20	10.67 ± 0.76	Oil, coir, and activated carbon

Table B.2 – Hybrids

No	Hybrid Code/Name	Parentage	Nuts/pal m	Nut/ha	Copra/nut, g	Copra/palm, kg	Copra/ha, t	Fruiting season, no. of months	Regularity of bearing	Age, yrs. after planting	Height, m	Recommended product group(s)
1	Jamaica Tall × Malayan Dwarf (JAM × MD)	Jamaican Tall × Malayan Dwarf	145.0 ± 25.0	23200 ± 4000	170.0 ± 20.0	23.0 ± 5.0	3.7 ± 0.8	12	High	4.0±0.5	16.0 ± 2.0	
2	Maypan	Malayan Dwarf × Panama Tall	100 - 200	8000-10,000	250 - 300	25 - 30	4.6 – 5.0	12	High	4 - 5	15- 18	Copra, oil, coconut water
3	Brapan	Brazilian dwarf × Panama Tall	250 - 300	9,000 – 11,000	220 - 250	55 -65	2.0 – 2.5	11 – 12	Very High	3 - 4	12 - 15	Tender coconut water
4	PB121	Malayan Red Dwarf × West African Tall (MRD × WAT)	165.0 ± 25.0	26400 ± 4000	180.0 ± 20.0	28.0 ± 6.0	4.5 ±1.0	12	Very High	3.5 ± 0.5	14.0 ± 2.0	
5	PB132	Malayan Yellow Dwarf × Panama Tall (MYD × PNT)	155.0±25.0	24800 ± 4000	167.5 ±17.5	24.5 ± 5.5	3.9 ± 0.9	12	High	4.0 ± 0.5	16.5 ± 2.5	
6	PB212	Malayan Green Dwarf × Cameroon Tall (MGD × CMT)	170.0 ± 30.0	27200 ± 4800	190.0 ± 20.0	31.0 ± 7.0	5.0 ±1.2	12	Very High	3.5 ± 0.5	15.0 ± 2.0	
7	MAWA	Malayan Dwarf × West African Tall	152.5 ± 22.5	24400 ±3600	180.0 ± 20.0	26.5 ± 5.5	4.2 ± 0.9	12	High	3.8 ± 0.8	15.0 ± 2.0	
NOTE: Hybrid palms are not suitable sources of planting materials.												

Annex C (informative)

Preparing seedbeds for coconut seedlings

C.1 Proper seedbed preparation ensures healthy germination, uniform growth, and strong seedlings ready for transplanting. A well-prepared seedbed provides optimal soil conditions, moisture, and protection for young coconut plants.

C.2 The principal steps for preparing seedbeds for coconut seedlings are outlined as follows:

C.2.1 Site Selection

- a) Choose a well-drained area with fertile soil.
- b) Ensure access to irrigation or natural water sources.
- c) Select a location protected from strong winds and livestock.

C.2.2 Land Preparation

- a) Clear weeds, debris, and stones.
- b) Clear, plough and rotovate soil to a fine tilth
- c) Apply organic matter (compost or farmyard manure) to enrich fertility.

C.2.3 Seedbed Layout

- a) Construct beds of 10 - 20 cm in height and 2 m in width for easy management
- b) Provide pathways of 60 cm between beds for ease of inspection, irrigation, seedling care and transfer activities.

C.2.4 Soil Treatment

- a) Mix in well-decomposed organic manure.
- b) Apply lime if the soil is acidic, based on soil test results.
- c) Incorporate biofertilizers or beneficial microbes to improve seedling vigour.

C.2.5 Seed Placement

- a) Place seed-nuts in bed at a distance of 15cm between two seed-nuts along the row and at a distance of 15 cm - 20 cm between rows.
- b) Lay seed-nuts in trenches of 10 cm – 15 cm depth.
- c) Place selected nuts horizontally, with the stalk end slightly raised.
- d) Plant seed-nuts by firmly setting them either horizontally or vertically or slightly tilted with the embryo end at the top.
- e) Space nuts 30–45 cm apart to allow adequate root and shoot growth.
- f) Cover lightly with soil or mulch to conserve moisture.
- g) Cover 2/3 of the seed-nuts with topsoil so that 1/3 of their upper surface is visible.

C.2.6 Watering and Care

- a) Spread dry coconut fronds (ensure free of pests) and/or coir evenly as a mulch for the seedbeds.
- b) Water regularly to maintain consistent moisture.
- c) Protect seedbeds with shade nets or palm fronds to reduce heat stress.
- d) Monitor for pests and diseases; remove affected seedlings promptly

Annex D
(informative)

Recommended planting systems and distance

D.1 The number of coconut palms that can be established per unit area depends on the planting system adopted and the spacing between palms. Appropriate planting density is important to ensure efficient use of land, adequate sunlight interception, air circulation, and access for field operations.

D.2 The recommended planting density should be calculated based on the spacing arrangement and land area available. The following formulas may be used to estimate the recommended planting density for different planting systems.

D.2.1 Square Planting System

In the square planting system, palms are planted at equal distances in both directions.

$$\text{Planting Density (palms/ha)} = \frac{10,000}{S^2}$$

Where:

10, 000 = area of one hectare (m²)

S = spacing between palms (m)

D.2.2 Triangular (Equilateral) Planting System

The triangular system allows approximately 15% more palms per hectare than the square system.

$$\text{Planting Density (palms/ha)} = \frac{10,000}{0.866 \times S^2}$$

Where:

10, 000 = area of one hectare (m²)

0.866 is the area factor for an equilateral triangle arrangement

S = spacing between palms (m)

D.2.3 Rectangular planting system

In rectangular planting systems, the spacing between palms within a row differs from the spacing between rows. Planting density is calculated using both dimensions to determine the area occupied by each palm.

$$\text{Planting Density (palms/ha)} = \frac{10,000}{W \times R}$$

Where:

- 10 000 = area of one hectare (m²)
- W = spacing within rows (m)
- R = spacing between rows (m)

D.2.4 Table D.1 provides sample calculated densities per unit area for square and triangular planting systems rounded down to the nearest whole number to ensure that the recommended density does not exceed the available planting area. Table D.2 provides sample calculated planting density for different rectangular configurations in 1 hectare area. Figure D.1 illustrates the square, triangular and rectangular planting systems.

Table D.1 – Square and triangular systems and their planting densities

Method	Population density (palms/unit area)				
	1 ha	2 ha	3 ha	4 ha	5 ha
Square					
8 m x 8 m	156	312	468	625	781
8.5 m x 8.5 m	138	276	415	553	692
9 m x 9 m	123	246	370	493	617
10 m x 10 m	100	200	300	400	500

Method	Population density (palms/unit area)				
	1 ha	2 ha	3 ha	4 ha	5 ha
Triangular					
8 m x 8 m	180	360	541	721	902
8.5 m x 8.5 m	159	319	479	639	799
9 m x 9 m	142	285	427	570	712
10 m x 10 m	115	230	346	461	577

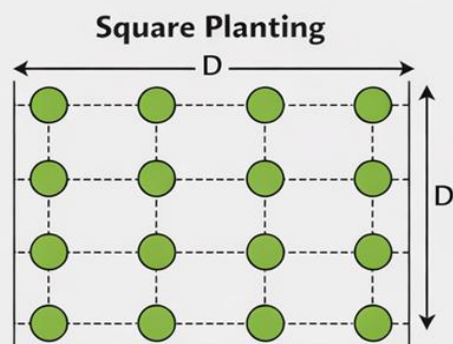
Table D.2 – Rectangular system planting density

Distance between rows(m)	Distance within row (m)	Planting density (palms/ha)
8.5	10	117
9.0	10	111
9.5	10	105
NOTE: Not recommended for monoculture		

Square Planting System



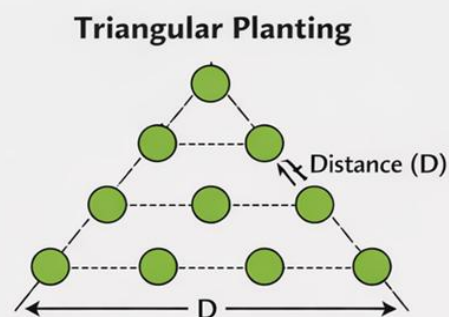
Coconut trees planted in a square pattern.



Triangular Planting System



Coconut trees planted in a triangular pattern.



Rectangular Planting System



Coconut trees planted in a rectangular pattern.

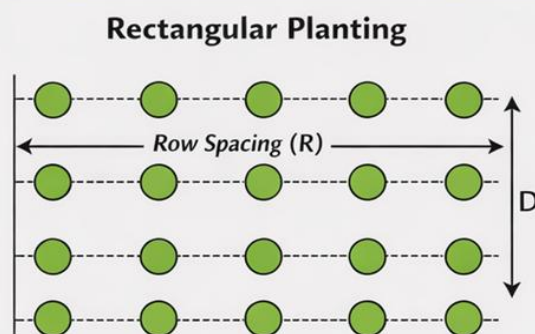


Figure D1 – Planting Systems

Annex E
(Informative)
Fertilisation Schedule for Coconut Plants

E.1 This annex provides guidance on the application, frequency, and quantity of fertilizers for sustainable coconut production in the Caribbean. The measures outlined herein emphasize the importance of soil testing, adherence to approved fertilizer formulations, and the integration of organic manures to complement chemical inputs. Fertilizer applications must be carried out in accordance with national phytosanitary regulations to safeguard crop health and prevent pest/disease spread, pesticide and fertilizer control laws for safe use, storage, and handling and environmental protection requirements to minimize nutrient leaching, protect water sources, and promote ecological balance. By following these principles, coconut farmers and stakeholders will ensure that fertilizer use supports both sustainable coconut yields and compliance with national and regional standards, thereby strengthening the resilience and competitiveness of the Caribbean coconut industry. Table E.1 provides recommended fertilizer applications.

Table E.1 — Recommended fertilizer application

Stage of plant growth	Application Coconut Production Guide – Step by Step
At transplanting	To encourage healthy root formation and supply vital nutrients for early growth: Apply, per plant: • 50 g of Azospirillum, Phosphobacteria, and Mycorrhiza (VAM-Vesicular Arbuscular Mycorrhiza/or Arbuscular Mycorrhiza (AM)) per palm during planting, coupled with • 5 kg of FYM (Farmyard Manure) each plant.
First year	Apply per plant: • 110 g urea, 250 g superphosphate, and • 225 g MOP (Muriate of Potash) and supplement with • 10 kg of organic manure (FYM/compost) to ensure balanced nutrition and healthy growth.
Second year	Apply per plant: • 235 g urea • 174 g DAP (Diammonium Phosphate), and 500 g MOP per plant • along with 10 kg of organic manure (FYM/compost) • 470 g of 17:17:17 (NPK fertiliser) and • 400 g of 20:20:0 balanced fertiliser, to provide comprehensive nutrition and support robust growth.
Third Year	Apply per plant: • 470 g urea • 348 g DAP (Diammonium sulphate) and • 1000 g MOP (Muriate of potash or potassium chloride) supplemented with: • 10 kg of organic manure (FYM/compost) • 940 g of 17:17:17 (NPK fertiliser) plus • 800 g of 20:20:0 balanced fertiliser, to ensure optimal nutrient supply and promote healthy growth and productivity.
Fourth year	Apply per plant: • 700 g urea, 522 g DAP, and • 1500 g MOP along with • 1410 g of 17:17:17 (NPK) complex fertiliser • 1200 g of 20:20:0 balance fertilizer and • 15–20 kg of organic manure (FYM/compost), to provide balanced nutrition and enhance soil fertility for sustained growth and high yields.

Stage of plant growth	Application Coconut Production Guide – Step by Step
Fifth year	Apply per plant, annually: • 940 g urea, • 696 g DAP, and • 2000 g MOP supplemented with: • 15–20 kg of organic manure (FYM/compost) • 1880 g of 17:17:17 (NPK fertiliser), and • 1600 g of 20:20:0 balanced fertiliser, to ensure comprehensive nutrient supply and maintain soil health for optimal growth and productivity.
NOTE: Fertilisation in coconut plantations are provided in ratios of available nutrients. Example Nitrogen-Phosphorous-Potassium (NPK) refers to the primary plant nutrients nitrogen (N), phosphorus (P_2O_5), and potassium (K_2O), expressed in terms of the quantity or ratio of these nutrients required to support optimal coconut growth.	

E.2 Time, Frequency, and Method of Fertiliser Application

E.2.1 Dosage period

When soil moisture levels are sufficient, fertilisers ought to be applied. Use two divided dosages in rainfed conditions: one-third in April–June and two-thirds in September–October. Apply three or four equal dosages in April-May, August-September, December, and February-March for irrigated conditions.

In April and May, lime or dolomite is added; in August and September, magnesium sulphate; and in June and July, organic matter. Every year, a mature palm needs 1 kg of lime and 0.5 kg of $MgSO_4$. After the southwest monsoon, fertilisers are deposited in circular basins that are 10 cm deep and 2.0 m from the base. In the summer, split doses can also be administered with irrigation water.

E.2.2 Magnesium and Boron Application

Apply 500 g $MgSO_4$ per palm yearly. For boron deficiency (causing malformed leaves, nut cracking, and flower drying), use 50 g Borax twice monthly after symptoms appear. In root (wilt) disease areas, apply 300 g Borax per seedling and 500 g per adult tree. Adding 500 g MgO per palm helps manage root (wilt) disease and boosts productivity.

E.2.3 Biofertilizer Recommendation

Biofertilizers, such as 50 g each of Azospirillum, Phosphobacteria, and mycorrhiza (VAM) per palm, enhance soil fertility and support healthy coconut growth by hosting nitrogen-fixing bacteria.

Additionally, salt fertilisers ($NaCl$) are cost-effective and eco-friendly, boosting coconut production by improving crop growth, increasing copra weight, and reducing leaf spot damage. Apply 1.5 kg $NaCl$ per tree annually, with split doses during the pre-bearing stage (1–4 years) to minimise nutrient loss. This method is especially beneficial in sandy soils or areas with distinct wet and dry seasons, ensuring optimal copra yield.

Annex F (Informative)

Selected Integrated Pest and Disease Management Strategies

The pest and disease management strategies outlined below promote a balanced approach that integrates cultural, biological, mechanical, and chemical control methods to minimise risks to human health, the environment, and market access. Interventions for effective pest and disease management must be implemented in strict accordance with competent authority guidance and relevant national phytosanitary regulations, pesticide use and regulations and environmental requirements. Pesticides biological control agents and phytosanitary practices should only be applied where approved or recommended by national competent authorities to ensure compliance with national legislation and safeguarding regional trade standards and GAP certification requirements for the export markets. Figure F.1 provides a visual hierarchy of approaches for integrated pest management. Table F.1 provides integrated insect pest management strategies and Table F.2 provides integrated disease management strategies.

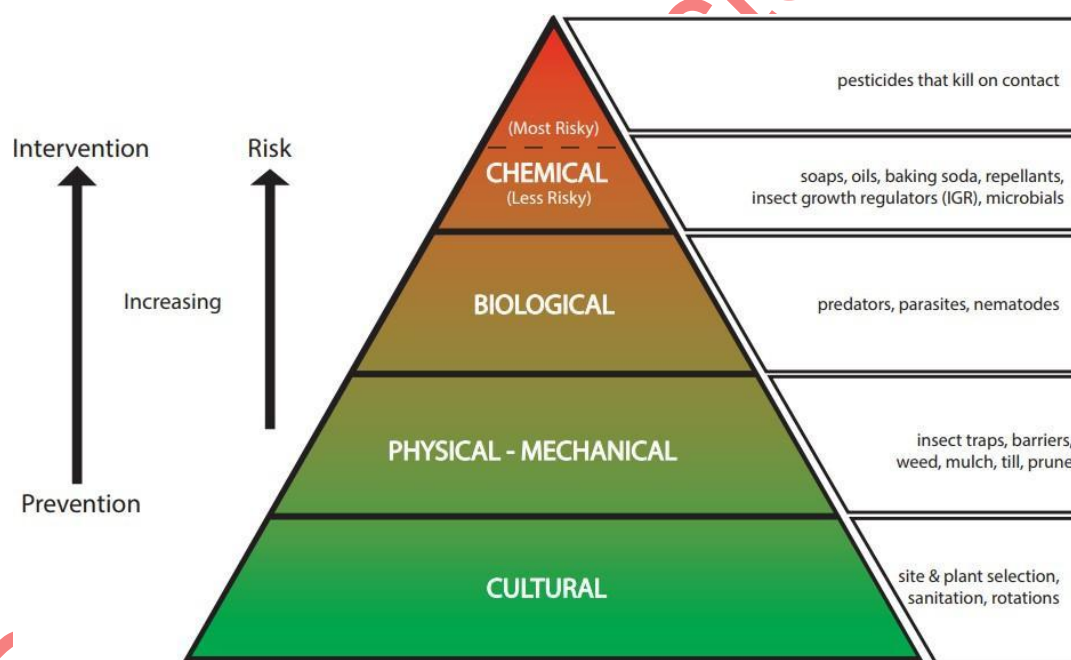


Figure F.1 – Pyramid of IPM tactics

F.1 Integrated insect pest management of coconut

1. Coconut leaf beetle	
Scientific name	<i>Brontispa longissima</i>
Synonyms	Coconut Leaf Hispine, Palm Leaf Beetle
Common name	Coconut Leaf Beetle
Family	Chrysomelidae
Order	Coleoptera
Damage characteristics	1. Yellowing of the coconut leaves 2. Wilting of developing buds 3. Curling of the leaflets
Host ranges	Coconut, Royal Palm, Chinese Fan Palm, Areca Nut Palm
Management/control	Blockading and cutting coconut palms up to three kilometres from the infestation spot are done to prevent the beetle from spreading.
• Mechanical control	
• Biological control	Two parasitoids of the coconut leaf beetle, <i>Tetrastichus brontispae</i> and <i>Asecodes hispinarum</i> , have been successfully used in the control of the beetle.
2. Asiatic palm weevil	
Scientific name	<i>Rhynchophorus ferrugineus</i>
Synonyms	Indian Palm Weevil, Coconut Weevil
Common name	Red Palm Weevil
Family	Curculionidae.
Order	Coleoptera
Damage characteristics	1. Wilting of leaves 2. Hollowed stems due to internal feeding 3. Presence of holes in the stems
Host ranges	Coconut, Sugar Palm, Sago Palm, African Oil Palm
Management/control	Practice proper sanitation; avoid wounding palms; destroy infested palms
• Cultural control	
3. Coconut scale insect	
Scientific name	<i>Aspidiotus destructor</i> or <i>Aspidiotus rigidus</i>
Common name	Coconut Scale Insect
Family	Diaspididae
Order	Hemiptera
Damage characteristics	1. Scales with yellow spots 2. Entire leaves turning yellow to brown and falls 3. The leaves tend to dry out in extreme cases
Host ranges	Coconut, Breadfruit, mango, cacao, papaya, cotton, oil palm, rubber, sugarcane, and tea
Management/control	Coconut scale insect can be eradicated from new areas by destroying infested plants and plant parts.
• Cultural control	
• Biological control	The most common predators of the coconut scale insect include Coccinellid beetle, <i>Chilocorus</i> spp, <i>Cryptognatha nodiceps</i> , <i>Pseudocymnus anomalus</i> , and <i>Telsimia nelida</i> . parasitoid of CSI.
4. Slug caterpillars	
Scientific name	<i>Delia platura</i> ; <i>Thosea</i> spp, <i>Microthosea</i> spp., <i>Setora</i> spp., <i>Darna</i> spp.
Common name	Slug Caterpillars
Family	Limacodidae
Order	Lepidoptera
Damage characteristics	Larvae feed at night on mature, firm leaves, initially scarifying the surface and later making holes; can defoliate plants at high population densities (outbreaks)
Host ranges	Corn, Broccoli; Cauliflower; Radish; fruit trees; coconut
Management/control	Make row covers, speed up germination, and avoid green manure
Cultural control	
Biological control	Predacious soil beetles, a predatory pentatomid, <i>Eocanthecona furcellata</i> (Wolff) and Reduviid bug, <i>Sycanus</i> sp.

5. South American Palm Weevil	
Scientific name	<i>Rhynchophorus palmarum</i>
Synonyms	Palm weevil, Giant palm weevil, Coconut weevil, Sugarcane weevil, Palm stem weevil, Palm trunk weevil (Note: Name used reflect insect's preferred host plants or its feeding behavior) <i>Calandra palmarum</i> , <i>Curculio palmarum</i> , <i>Cordyle barbirostris</i> , <i>Rhynchophorus cycadis</i> , <i>Rhynchophorus depressus</i> , <i>Rhynchophorus languinosus</i>
Common name	South American Palm Weevil
Family	Curculionidae (sometimes classified under Dryophthoridae)
Order	Coleoptera
Damage characteristics	1: Larval damage: Larvae burrow into the palm crown/apical meristem, destroying vascular tissue and often killing the palm. 2: Disease vector: Major vector of <i>Bursaphelenchus cocophilus</i> nematode, causing red ring disease in coconut, oil palm, and date palm. 3: Adult feeding: Adults feed on ripe fruits (banana, mango, papaya, citrus, avocado, cocoa, guava), but this rarely causes significant economic damage
Host ranges	1: Primary hosts (breeding): Coconut (<i>Cocos nucifera</i>), African oil palm (<i>Elaeis guineensis</i>), date palm (<i>Phoenix dactylifera</i>), Canary Island date palm (<i>Phoenix canariensis</i>), sago palm (<i>Metroxylon sagu</i>), juçara palm (<i>Euterpe edulis</i>), Guadalupe palm (<i>Brahea edulis</i>), Mexican fan palm (<i>Washingtonia robusta</i>). 2: Secondary hosts: Sugarcane (<i>Saccharum officinarum</i>), banana (<i>Musa spp.</i>), mango (<i>Mangifera indica</i>), papaya (<i>Carica papaya</i>), citrus (<i>Citrus spp.</i>), avocado (<i>Persea americana</i>), cocoa (<i>Theobroma cacao</i>), guava (<i>Psidium guajava</i>).
Manage/Control	1: Sanitation: Prompt removal and destruction of infested palms to prevent spread. 2: Trapping: Use of pheromone-baited traps (aggregation pheromone "rhynchophorol") to monitor and reduce adult populations. 3: Physical barriers: Covering wounds on palms to prevent oviposition. 4: Field hygiene: Avoiding injuries to palms that release volatiles attracting weevils.
• Mechanical	
• Biological	1: Parasitoids: Natural enemies such as parasitic wasps (<i>Billaea spp.</i>) attack larvae and pupae. 2: Entomopathogenic fungi: <i>Beauveria bassiana</i> and <i>Metarhizium anisopliae</i> have shown effectiveness against adults and larvae. 3: Nematodes: <i>Steinernema</i> and <i>Heterorhabditis</i> species can infect and kill larvae. 4: Biological integration: Combining pheromone trapping with fungal or nematode biocontrol enhances suppression
6. Red Palm Mite	
Scientific name	<i>Raoiella indica</i>
Synonyms	Coconut red mite, red date mite, scarlet mite, frond crimson mite, leaflet false spider mite
Common name	Red Palm Mite
Family	Tenuipalpidae
Order	Acariformes (suborder Prostigmata, superfamily Tetranychioidea)
Damage characteristics	Feeding damage: Mites suck sap from the underside of leaves, causing chlorotic patches, yellowing, necrosis, and premature leaf drop. Yield impact: Coconut production can decline by 50–70%, with similar losses in bananas and plantains.

	Ornamental damage: Palms and orchids lose aesthetic and market value. Mortality: Young palms may die under heavy infestation
Host ranges	1: Primary hosts: Coconut (<i>Cocos nucifera</i>), banana (<i>Musa spp.</i>), plantain, areca nut (<i>Areca catechu</i>). 2: Other hosts: Palms (ornamental and wild), heliconias, gingers, strelitzias, cycads, and orchids. 3: Distribution: Native to Asia and Africa; invasive in the Caribbean, Central and South America, and Florida since 2004
Manage/Control	
• Mechanical	1: Sanitation: Removal of heavily infested leaves to reduce populations. 2: Monitoring: Regular inspection of leaf undersides for clusters of red mites and cast skins. 3: Environmental factors: Populations decline with heavy rainfall; infestations thrive in hot, dry conditions
• Biological	1: Predatory mites: <i>Amblyseius largoensis</i> (Phytoseiidae) is the most effective natural enemy. 2: Other predators: Thrips (<i>Aleurodothrips fasciapennis</i>), lady beetles (<i>Stethorus spp.</i>), lacewings, and predatory mites like <i>Cheletogenes ornatus</i> . 3: Chemical control: Acaricides can reduce populations by >95% within 7 days, but application is difficult on tall palms. Integrated management: Combining biological control with selective acaricides and sanitation offers sustainable suppression
7. Red Ring Disease	
Scientific name	<i>Bursaphelenchus cocophilus</i>
Synonyms	Red ring nematode disease, coconut red ring disease
Common name	Red Ring Disease
Family	Aphelenchoididae
Order	Aphelenchida
Damage characteristics	1: Stem necrosis: A reddish-brown ring of dead tissue forms in the vascular cylinder, visible in stem cross-sections. 2: Leaf symptoms: Premature yellowing, wilting, and necrosis of fronds. 3: Fruit symptoms: Premature nut fall and reduced nut size. 4: Mortality: Palms usually die within 3–4 months of infection.
Host ranges	1: Primary hosts: Coconut (<i>Cocos nucifera</i>), African oil palm (<i>Elaeis guineensis</i>), date palm (<i>Phoenix dactylifera</i>). 2: Other hosts: Several ornamental palms and related species. 3: Vector association: Spread primarily by the <i>South American Palm Weevil</i> (<i>Rhynchophorus palmarum</i>)**, which carries nematodes in its body cavity and introduces them during oviposition
Manage/control	1: Sanitation: Immediate removal and destruction (burning or chipping) of infected palms to prevent spread. 2: Vector control: Trapping and reducing populations of <i>R. palmarum</i> to limit nematode transmission. 3: Field hygiene: Avoiding injuries to palms that attract weevils.
• Mechanical	
• Biological	1: Biological vector suppression: Use of entomopathogenic fungi (<i>Beauveria bassiana</i> , <i>Metarhizium anisopliae</i>) and nematodes (<i>Steinernema</i> , <i>Heterorhabditis</i>) against the palm weevil vector. 2: Resistant varieties: Breeding and selection of palms with tolerance or resistance to nematode infection. 3: Integrated management: Combining sanitation, vector control, and biological agents for sustainable suppression.

F2 INTEGRATED DISEASE MANAGEMENT

Technology	Brief description
8. Bud and fruit rots (<i>Phytophthora palmivora</i> Butl.)	
Colored coconut varieties are more susceptible to bud and fruit rots	The apparent susceptibility of colored coconut populations (reference to the immature nuts), the yellow (MYD) and red (MRD) as parent materials of coconut hybrids. A nationwide survey showed that the MAWA (Malayan Yellow Dwarf x West African tall) hybrid was found highly susceptible to the disease, while the local green dwarfs and tall varieties showed high levels of tolerance to the disease. Moreover, artificial inoculation (in-vitro) in the laboratory showed that colored (yellow, red or brown) populations are generally highly susceptible to <i>Phytophthora</i> infections more than the green populations.
Management/Control	
a) Fungal species as biocontrol agents against <i>Phytophthora</i> under laboratory conditions	<i>In-vitro</i> bioassay tests showed that <i>Trichoderma</i> sp. and <i>Chaetomium</i> sp. were found as potential biocontrol organisms/agents against the disease.
b) Farm sanitation as preventive control of the <i>Phytophthora</i>	Farm sanitation, cutting and burning of infected palms/nuts and other alternate infected hosts to prevent further spread of the disease.
c) Chemical application to control <i>Phytophthora</i> in young plantings	Application of cupric hydroxide at 25/g/l/palm every 6 mo. significantly lowered disease incidence. Treatment application is done through canopy spray and solution directed to the axils of leaves and fruits.
9. Leaf spot [<i>Pestalotzia palmarum</i> (Cooke) Steyart and <i>Helminthosporium</i> sp.]	
a) Resistant coconut variety to fungal leaf spots	Catigan Dwarf coconut variety has high tolerance to leaf spot disease in the nursery. Other varieties, such as Tacunan dwarf, Yellow dwarf and Red/Orange dwarf populations, are more susceptible to fungus leaf spot infection.
b) Clean culture to prevent leaf spot incidence in the nursery	Practice of cultural management through clean culture, removal of pruning of infected leaves, prevents leaf spot occurrence in the nursery.
c) Potassium chloride (KCl) fertiliser included resistance of palms to leaf spot	Application of potassium chloride (KCl) fertiliser on mature coconut farms induced resistance to coconut leaf spots. Common salt (NaCl), a cheaper and effective source of Cl nutrient and a.i., has been recommended, especially in coconuts grown in K-rich soils.
10. Socorro wilt	
Integrated disease management strategies against the Socorro wilt	Cutting and burning of infected palms at the earliest sign of infection minimises the spread of the disease as it has been observed to spread up to 12 km radius from the coconut farm where it was first identified to occur (Socorro, Oriental Mindoro). Strict quarantine regulations by restricting the outward movement of coconut products and by-products from areas of disease occurrence contained the disease.
11. Stem bleeding [<i>Thielaviopsis paradoxa</i> (de Seynes) Von Höhnel]	
Integrated control of stem bleeding	- Scrap out tissues affected with stem bleeding and apply fungicide paste and chemical repellent to prevent secondary infestation by other pests. Use of Cl-based fertilisers reduces it. - Avoid wounds on the trunk - Alliete and Benlate were found to inhibit the growth of <i>T. paradoxa</i> <i>in vitro</i>.
12. Algal leaf spot caused by <i>Cephaleuros virescens</i> and lethal yellowing disease caused by <i>Candidatus phytoplasma palmarum</i>	

Technology	Brief description
Integrated disease management strategies based on underlying causes such as nutrient deficiency, water and environmental stress and pests and diseases	Treatment technologies focus on correcting soil nutrition, improving water management, pest control, and—where lethal yellowing is present—using resistant cultivars or therapeutic injections. For lethal yellowing disease, there is no cure once the palms are infected. Management strategies include: 1. prompt removal and destruction of infected plants 2. planting resistant varieties 3. adopting strict quarantine and nursery hygiene, implementing vector control measures

**Annex G
(Informative)**

Guide to selection, mixing and safe handling of crop protection products

G.1 The mixing area should be located and chosen in such a way that the risk of contaminating the farmers and the environment is minimised.

G.2 Mixing agricultural chemicals should be carried out in a manner that will prevent ground and surface water contamination and the land in the surrounding areas.

G.3 The filling and mixing areas for the crop protection product should be equipped with appropriate tools for precise measurements and calibrations. The functionality of such should be checked before every cropping season by the farmer/applicator. The filling and mixing areas should have a floor brush, dustpan, plastic bags and adsorbent materials such as sand. These materials should be placed in a fixed location within the specific area, to be used in case of spillage of crop protection product.

G.4 Emergency facilities in the event of accidental spill during mixing should be readily available.

G.5 Prepare only the necessary volume of spray solution to avoid surplus application mix.

G.6 Surplus application mixes are disposed of in a manner that does not present a risk of contaminating the produce.

Annex H (Informative)

Recommended intercrops and livestock to be integrated with the coconut cultivation

H.1 The integration of intercrops and livestock into coconut farming systems can enhance productivity, diversify income, and strengthen resilience. However, the choice of species and management practices must be carefully aligned with local agro-ecological conditions, pest and disease risks, market opportunities, and advice from competent authorities. The following are some recommended crops and livestock that can be integrated into Caribbean coconut farming.

H.2 Recommended intercrops

Vegetables/Legumes

- Cabbage
- Okra
- Onion
- Peanut
- Musk Melon
- Tomato
- Squash
- Eggplant
- Bitter melon

Root Crops

- Sweet Potato
- Cassava
- Arrowroot
- Ginger
- Turmeric

Spice and Herbs Crops

- Hot Chilli
- Sweet Pepper
- Black Pepper
- Basil
- Rosemary
- Tarragon

Cereals

- Corn
- Rice

Fruit crop/Fruit Trees

- Banana
- Pineapple
- Citrus (Mandarin)

Beverage Crops

- Coffee
- Cocoa

H.3 Growth duration and productivity periods, levels of sunlight transmission and suitable intercrops

Phase (Stage)	Duration	Level of available sunlight/highly suitable intercrops
I	Field-planting to 6 years	High to Moderate/Highly Suitable Intercrops: Cereals – corn, upland rice Legumes – peanut, beans, Root crops – sweet potato Fruit crops – pineapple, citrus, watermelon, papaya, banana Vegetables – tomato, cabbage, eggplant, sweet pepper, hot pepper, okra
II	7 years - 25 years	Moderate to Low/Highly Suitable Crops: Black pepper, cacao, coffee, tomato, vanilla, ginger

Phase (Stage)	Duration	Level of available sunlight/highly suitable intercrops
III	26 years - 60 years	<u>High/Highly Suitable Crops^b</u> Cereals – corn, upland rice Legumes – peanut, beans Vegetables – tomato, eggplant, cabbage, sweet pepper, hot pepper, okra, ginger Root crops – sweet potato, cassava, Beverage crops – coffee, cacao Fruit crops –citrus Wood and lumber tree –Fibre crops –
^a Except for tomato, usually the suitable crops indicated require lower sunlight or moderate shade during the pre-bearing stage of the crops, thus field establishment is best done during this stage. ^b Should more sunlight transmission to intercrops needed for normal growth and high yields, the coconut leaf pruning (CLP) technique (removal of older lower leaves of the crown, maintaining the upper 20 leaves -23 leaves), allowing 0.5 meters of cut fronds attached to the trunk.		

H.4 Recommended livestock to be integrated with coconut

Animals, such as cattle, small ruminants such as goats, pigs, poultry and game birds, can be raised under mature stands of coconut, singly or in combination.

For cattle raising, 1-2 animal units per hectare is recommended, but for the cut and carry or feed lot system, more animals per hectare are suitable, provided adequate pasture grasses and legumes are available year-round.

In case of goat and/or sheep production systems, these should be raised only in areas without intercrops. Not more than 12 adult small ruminants per hectare is recommended. Also, the dung and urine of these could serve as a cheap source of fertiliser to increase coconut yield.

Annex I
(Informative)
Information to be recorded relevant to GAP certification

Section	Records
Site selection and management	New sites - cropping history for at least 2 years - potential hazards during assessment and remedial action, if any
	Existing sites - cropping history
	Multiple production areas - name or code of each production area
Planting material (for new sites and replanting)	From accredited nurseries - name and specifics of cultivar - name of supplier - date of procurement
	From within farm or non-accredited sources - chemical used for treatment, if applicable - purpose of the treatment - varietal classification (tall, dwarf, hybrid)
Fertiliser and soil additives	Type of fertiliser used (organic or inorganic)
	Name of fertilizer
	Source - brand name - supplier - lot number
	Date
	Quantity
	Expiration date (for liquid fertiliser)
	Fertilizer grade
	Application - date - location of the area fertilised - number of fertilised farms - application rate (per palm) - application method - name of applicator
Water quality	Water source
	Test results or certification
	Corrective actions, if there is a presence of contamination
	Treatment method used and monitoring results, if water treatment is done
	Irrigation use, if applicable - schedule and frequency of irrigation - location in the farm that is irrigated - Volume of water applied/duration of irrigation, name of personnel who managed the irrigation activity
Crop protection	Type of pesticide used (biopesticide, chemical, pesticide – synthetic or organic)
	Target organism(s)

Section	Records
	Source of pesticide
	Type of pesticide - common name - brand name/trade name - chemical name - lot number
	Date of purchase
	Quantity purchased
	Expiration date
	Active ingredient
	Pre-Harvest Interval
	Application - date and frequency of application - location of the area applied - number of treated palms - application rate (per palm) - application method - name of applicator - stage of growth
	For biocontrol agents - date and frequency of release - name of biocontrol agent(s) - target organism(s) - brand of biocontrol agent(s) - quantity released - area treated - stage of growth - method of application
	For stored chemicals - date and quantity obtained - expiry date and date when completely used or disposed of
	Maintenance and calibration activities for agricultural chemical sprayers
Harvest	Date of harvest
	Volume of harvest
Farm worker's health, safety and welfare	Medical certificate
	Record of salary and wages received by farmers
	Social protection (e.g. National insurance, health/medical insurance)
Waste management	Types of waste products generated, practices to minimise waste generation, procedures for reuse and recycling of waste, storage and disposal of waste
Traceability	Clear, verifiable and accurate records, logs and documentation across production, handling, and distribution that track product from farm to buyer

Note: A definite record retention time can be stipulated. This is typically set at 2 years – 5 years, aligned with international standards and accreditation body requirements.

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Voting Deadline: 23 October 2026

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CARICOM REGIONAL ORGANISATION FOR STANDARDS AND QUALITY

The CARICOM Regional Organisation for Standards and Quality (CROSQ) was established as an Inter-Governmental Organisation through an agreement signed by fourteen Member States of the Caribbean Community (CARICOM). CROSQ is the regional centre for promoting efficiency and competitive production in goods and services, through the process of standardisation and the verification of quality. It is the successor to the Caribbean Common Market Standards Council (CCMSC) and supports the CARICOM mandate in the expansion of intra-regional and extra-regional trade in goods and services.

CROSQ is mandated to represent the interests of the region in international and hemispheric standards work, to promote the harmonisation of metrology systems and standards, and to increase the pace of development of regional standards for the sustainable production of goods and services in the CARICOM Single Market and Economy (CSME), and the enhancement of social and economic development.

CROSQ VISION:

A global leader transforming lives through an innovative and sustainable Quality Infrastructure.

CROSQ MISSION:

To transform lives by delivering fit-for-purpose standards, metrology, accreditation and reliable conformity assessment solutions that promote collaboration, enhance trust-in-trade, foster reliability and consistency thereby improving the quality of CARICOM's products and services.

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