



Coconut Specialist Course

FACILITATORS' GUIDE

TRAINING ON COCONUT SPECIALIST COURSE FACILITATORS' GUIDE

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Course**

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ACRONYMS

AOC	Articles of Cooperation
APW	Asiatic Palm Weevil
BL	By-Laws
CAPR	Coop Annual Progress Report
CDA	Cooperative Development Authority
CFID	Coconut Farmer Industry Development
CHED	Commission on Higher Education
CLB	Coconut Leaf Beetle
CME	Coconut Methyl Ester
CSI	Coconut Scale Insect
DA-ATI	Department of Agriculture- Agricultural Training Institute
DA-BAI	Department of Agriculture- Bureau of Animal Industry
DA-HVCDP	Department of Agriculture- High Value Crop Development Program
DBP	Development Bank of the Philippines
DENR	Department of Environment and Natural Resources
DOLE	Department of Labor and Employment
DOST	Department of Science and Technology

ACRONYMS

DOST-ITDI	Department of Science and Technology - Industrial Technology Development Institute
DOST-PCAARRD	Department of Science and Technology-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
DPWH	Department of Public Works and Highways
DTI	Department of Trade and Industry
GAP	Good Agricultural Practices
IGR	Insect Growth Regulators
IPM	Integrated Pest Management
LBP	Land Bank of the Philippines
NDA	National Dairy Authority
PCA	Philippine Coconut Authority
PCIC	Philippine Crop Insurance Corporation
PhilHealth	Philippine Health Insurance Corporation
PhilMech	Philippine Center for Postharvest Development and Mechanization
RCO	Regular Coconut Oil
TESDA	Technical Education and Skills Development Authority
VCO	Virgin Coconut Oil

About the Facilitators' Guide

Contents of the Guide

This Facilitators' Guide on Coconut Specialist Course is based on the learning materials provided by the Department of Agriculture and its governing agencies. The 15 modules aim to equip the Filipino coconut farmers with the necessary knowledge and skill sets to improve the status of the coconut industry.


Through the passage of the Republic Act 11524, also known as the Coconut Farmers and Industry Trust Fund Act, this material was developed as part of the Coconut Farmers and Industry Development Plan (CFIDP). It aims to contribute to the effective and efficient implementation of training on the coconut system and its entrepreneurial potential to our Filipino coconut farmers.







Users of the Guide

This Facilitators' Guide is intended for training implementers, specifically designed for Farm School (FS) owners and Training of Trainers (ToT) graduates who plan to conduct training on Coconut Specialist Course.

Using the Guide

This Facilitators' Guide has been conveniently packaged to help the users prepare and deliver the training. Within each module the users will find the following symbols and components:

Symbol	Component	Description
	Objectives	Set based on the participants' needs and refers to what the participants will be able to accomplish or become after the training.

Symbol	Component	Description
	Duration	Length time needed to deliver each module.
	Topics	Includes the lessons covered, appropriate method/s and tools needed for each module.
	Notes to the Facilitator	Consists of reminders and instructions to the facilitators in conducting the training.
	Lesson	Indicates the number and title of the lesson.
	Key Learning Points	Contains points or concepts that need to be emphasized during the training-discussion.
	Suggested Activity	Designed to stimulate participation and enhance their learning experience.

About the Training

Rationale of the Training

The Coconut Farmers and Industry Trust Fund (CFITF) Act or the Republic Act 11524 was approved on February 26, 2021 to consolidate the benefits for the poor and marginalized coconut farmers. This is to attain increased income, alleviate poverty and achieve social equity among coconut farmers. In line with this, the Coconut Farmers and Industry Development Plan (CFIDP) was developed to set the directions, policies, and mechanisms to attain these objectives. The plan lays out the components, strategies as well as the Implementing Agencies (IAs) for each component. Among the agencies, the Agricultural Training Institute (ATI), being the capacity builder of the Department of Agriculture.

The ATI, under its training component shall conduct a series of Training of Trainers (TOT) at the national and regional levels to equip various stakeholders such as the ATI-Regional Training Centers (RTCs) and personnel from other

CFIDP IAs at the national level, as well as the Agricultural Extension Workers (AEWs) from the Local Government Units (LGUs), and farmer leaders with the proper knowledge and harness their skills on coconut production across the value chain.

One of the ToTs that shall be conducted is the Coconut Specialist Training Course. This training shall develop the knowledge and skills of the participants as coconut specialists proficient on the various steps, processes, and theories related to the coconut value chain. This includes preparatory activities in coconut production; coconut plantation management; harvesting and post-harvesting; economics, environment, social and human relations; and other policy-institutional aspects. Hence, this training is hereby proposed.

Implementation Guide

Pre-Training Phase	During Training Phase	Post-Training Phase
i. Preparation of Training ii. Procurement of Goods and Services iii. Selection of Resource Person (RP) iv. Invitation of RPs and Participants v. Confirmation of RPs and Participants vi. Final Preparation	i. Opening the Training ii. Daily Management and Facilitation of Activities <ul style="list-style-type: none"> • Accomplishment of Attendance Sheet, Participant's Registration Form, Pre and Post Training Tests, RP and Overall Evaluation Form, Expressions of Learnings and Insights Form • Facilitation of scheduled daily activities • Documentation of activities iii. Closing the Training	i. Post-training Activities <ul style="list-style-type: none"> • Highlights of Activity, Pre- and Post-Training Tests Analysis, Training Implementation Assessment Report • Financial documents ii. Monitoring of Participants

Criteria for Selection of Participants

The training will be participated in by 30 ATI RTC personnel. The participants must have background and experience in agriculture and are willing to serve as resource persons for training and other related activities.

Curriculum Outline

Module	Lesson	Duration (hour)
I. Coconut Industry Situationer	<ol style="list-style-type: none"> 1. Global Status 2. Philippine Production 3. Economic and Social Impact 	1.5
II. Overview of the Coconut Farmer Industry Development Program (CFIDP)	<ol style="list-style-type: none"> 1. Overview of the CFIDP 2. RA 8048 3. Support Services of the Implementing Agencies 	2
III. Leadership Transformation and Social Preparation	<ol style="list-style-type: none"> 1. Role as Coconut Specialist 2. Transformational Leadership 	4
IV. The Coconut: Physiology, Morphology, and Growth Stages	<ol style="list-style-type: none"> 1. Physiology 2. Morphology 3. Growth Stages 	3.5
V. Coconut Varieties and Seed Nut Selection (with Practicum)	<ol style="list-style-type: none"> 1. Economically Important Coconut Varieties 2. Coconut Varietal Identification 	4
VI. Coconut Plantation Management (with Practicum)	<ol style="list-style-type: none"> 1. Site Selection and Management 2. Sourcing and Selection of Planting Materials 3. Nursery Establishment 4. Farm Establishment 5. Farm Maintenance 6. Coconut Age and Productivity 	7.5
VII. Coconut Pests and Diseases Management (with Practicum)	<ol style="list-style-type: none"> 1. Coconut Pest Management 2. Coconut Disease Management 	7.5

Curriculum Outline

Module	Lesson	Duration (hour)
VIII. Farm Diversification	<ol style="list-style-type: none"> 1. Intercropping with Cacao and Coffee 2. Livestock Integration (swine, cattle, goat, and poultry) 	2
IX. Harvesting and Postharvest Operations (with Practicum)	<ol style="list-style-type: none"> 1. Handling Practices and Treatment Methods 2. Harvest and Postharvest Technologies 	1.5
X. Coconut Processing	<ol style="list-style-type: none"> 1. Coconut Coir-based Processing 2. Coconut Sap Sugar Processing 3. Coconut Shell Charcoal Processing 4. Coconut Water Processing 5. Virgin Coconut Oil Processing 6. Food Safety Standards 	6.5
XI. Economics of Coconut Production	<ol style="list-style-type: none"> 1. Economics of Coconut Production 2. Typhoon damage Assessment Protocol 	2
XII. Environmental and Personnel Safety	<ol style="list-style-type: none"> 1. Environmental Safety 2. Workers Health, Safety, and Welfare 3. Waste Management 	2
XIII. Good Agricultural Practice Certification	<ol style="list-style-type: none"> 1. Requirements 2. Certification, Guidelines, and Procedures 3. Inspection Procedure 4. Mock Inspection 	7.5
XIV. Clustering and Community Organizing	<ol style="list-style-type: none"> 1. Community Organizing 2. Requirements in Registration 3. Clustering and Consolidation 	3.5
XV. Extension and Communication Skills	<ol style="list-style-type: none"> 1. Extension principles, Approaches, and Methods 2. Presentation and Facilitating Skills 3. E-learning and ICT Application 	4

Proposed Schedule of Activities

Day	Time	Activity
Day 1	7:00 - 8:00 AM	Opening Program Invocation and National Anthem Acknowledgement of the participants Welcome Message Overview of the Activity House Rules and Host Team
	8:30 - 10:00 AM	Module 1: Coconut Industry Situationer Lesson 1. Global Status Lesson 2. Philippine Production Lesson 3. Economic and Social Impact
	10:00 - 12:00 NN	Module 2: Overview of the Coconut Farmer Industry Development Program (CFIDP) Lesson 1. Overview of the CFIDP Lesson 2. RA 8048 Lesson 3. Support Services of the Implementing Agencies
	12:00 - 1:00 PM	Lunch Break
	1:00 – 5:00 PM	Module 3: Leadership Transformation and Social Preparation Lesson 1. Role as Coconut Specialist' Lesson 2. Transformational Leadership
Day 2	8:00 - 8:30 AM	Preliminaries
	8:30 - 12:00 PM	Module 4: The Coconut: Physiology, Morphology, and Growth Stages Lesson 1. Physiology Lesson 2. Morphology Lesson 3. Growth Stages
	12:00 - 1:00 PM	Lunch Break
	1:00 – 5:00 PM	Module 5: Coconut Varieties and Seednut Selection (with Practicum) Lesson 1. Economically Important Coconut Varieties Lesson 2. Coconut Varietal Identification

Proposed Schedule of Activities

Day	Time	Activity
Day 3	8:00 - 8:30 AM	Preliminaries
	8:30 - 12:00 PM	Module 6: Coconut Plantation Management (with Practicum) Lesson 1. Site Selection and Management Lesson 2. Sourcing and Selection of Planting Materials Lesson 3. Nursery Establishment
	12:00 - 1:00 PM	Lunch Break
	1:00 - 5:00 PM	Module 6: Coconut Plantation Management (with Practicum) Lesson 4. Farm Establishment Lesson 5. Farm Maintenance Lesson 6. Coconut Age and Productivity
Day 4	8:00 - 8:30 AM	Preliminaries
	8:30 - 12:00 PM	Module 7: Coconut Pests and Diseases Management (with Practicum) Lesson 1. Coconut Pest Management
	12:00 - 1:00 PM	Lunch Break
	1:00 - 5:00 PM	Module 7: Coconut Pests and Diseases Management (with Practicum) Lesson 2. Coconut Disease Management
Day 5	8:00 - 8:30 AM	Preliminaries
	8:30 - 5:00 PM	Field Practicum (Plantation Management)
Day 6	8:00 - 8:30 AM	Preliminaries
	8:30 - 5:00 PM	Field Practicum (Continuation of Plantation Management Practicum)
Day 7	REST DAY	
Day 8	8:00 - 8:30 AM	Preliminaries
	8:30 - 10:30 AM	Module 8: Farm Diversification Lesson 1. Intercropping with Cacao and Coffee Lesson 2. Livestock Integration (swine, cattle, goat, and poultry)

Proposed Schedule of Activities

Day	Time	Activity
Day 8	10:30 – 12:00 NN	Module 9: Harvesting and Postharvest Operations (with Practicum) Lesson 1. Handling Practices and Treatment Methods Lesson 2. Harvest and Postharvest Technologies
	12:00 - 1:00 PM	Lunch Break
	1:00 – 6:00 PM	Module 10: Coconut Processing Lesson 1. Coconut Coir-based Processing Lesson 2. Coconut Sap Sugar Processing Lesson 3. Coconut Shell Charcoal Processing Lesson 4. Coconut Water Processing Lesson 5. Virgin Coconut Oil Processing
Day 9	8:00 - 8:30 AM	Preliminaries
	8:30 – 10:30 AM	Harvesting and Postharvest Operations (Practicum) Lesson 1. Handling Practices and Treatment Methods Lesson 2. Harvest and Postharvest Technologies
	10:30 – 12:00 NN	Module 10: Coconut Processing Lesson 6. Food Safety Standards
	12:00 - 1:00 PM	Lunch Break
	1:00 – 3:00 PM	Module 11: Economics of Coconut Production Lesson 1. Economics of Coconut Production Lesson 2. Typhoon damage Assessment Protocol
	3:00 – 5:00 PM	Module 12: Environmental and Personnel Safety Lesson 1. Environmental Safety Lesson 2. Workers Health, Safety, and Welfare Lesson 3. Waste Management

Proposed Schedule of Activities

Day	Time	Activity
Day 10	8:00 - 8:30 AM	Preliminaries
	8:30 - 5:00 PM	Module 13: Good Agricultural Practice Certification Lesson 1. Requirements Lesson 2. Certification, Guidelines, and Procedures Lesson 3. Inspection Procedure Lesson 4. Mock Inspection
Day 11	8:00 - 8:30 AM	Preliminaries
	8:30 - 12:00 NN	Module 14: Clustering and Community Organizing Lesson 1. Community Organizing Lesson 2. Requirements in Registration Lesson 3. Clustering and Consolidation
	12:00 - 1:00 PM	Lunch Break
	1:00 - 5:00 PM	Module 15: Extension and Communication Skills Lesson 1. Extension principles, Approaches, and Methods Lesson 2. Presentation and Facilitating Skills Lesson 3. E-learning and ICT Application
Day 12	8:00 - 8:30 AM	Preliminaries
	8:30 - 5:00 PM	Micro Teaching
	5:00 - 6:00 PM	Closing Program
Day 13	Departure / Homeward Bound	

MODULE 1

Coconut Industry Situationer



OBJECTIVES

At the end of this module, the participants shall be able to:

1. Discuss the contribution of coconut industry in Philippine agriculture; and
2. Identify and discuss strategies to increase the economic and social impact of coconut production, especially for the farmers.



DURATION

1 hour 30 minutes



TOPIC/S

Topic	Method	Tools
Lesson 1. Global Status	Lecture and presentation	Visual Presentation
Lesson 2. Philippine Production	Lecture and presentation	Visual Presentation
Lesson 3. Economic and Social Impact	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Prepare the necessary materials for the module.
- Encourage the participants to ask questions or share their ideas and experiences about the topics.



Lesson 1: Global Status



KEY LEARNING POINTS

- The global supply and demand of coconuts and coconut-based products have increased over the past decades due to its health benefits.
- The coconut industry has become one of the significant economic contributors to countries like the Philippines.
- Coconuts are commonly labeled as the “Tree of Life” due to the multiple uses of its different parts.
- The industry forms an integral component of the social, economic and cultural lives of nearly 80 million people in 92 countries.
- Coconut production is heavily confined to the Asia and Pacific region and the major producers in the world are Indonesia, Philippines, India, Sri Lanka and Brazil, but the consumption is dispersed around the globe.
- Coconut water and virgin coconut oil (VCO) remains to be the most popular due to their recently discovered health benefits.
- However, across the globe, there has been an increasing trend on the decline of coconut productivity due to:
 - » Climate change
 - » Lack of empowerment among farmers and producers
 - » Outdated policies for greater productivity and socioeconomic protection
 - » Lack of access to new knowledge and skill set to improve the processes.
- In the global market, the Philippines remains to be a ‘Sleeping Giant’ for the Coconut Industry.
 - » The Philippines was the third-largest producer of coconuts in 2020, behind Indonesia and India.
 - » For that year, the country produced 14.49 million metric tons (MMT) of coconut while Indonesia and India accounted for 16.82 MMT and 14.7 MMT, respectively.



Lesson 2: Philippine Production



KEY LEARNING POINTS

- Coconut is considered as a Filipino heritage crop that plays significant role in country's agriculture
- The industry covers 3.65 million hectares of land planted to coconut where 69 out of 82 provinces are dominated by coconut.
- There are 42 downstream products from coconuts.
- From 2014 to 2019, 25% of Philippine agricultural export earnings is attributed to the coconut industry amounting to 91.4 billion pesos.
- There are 15 billion nuts annually from 345 million bearing palms.
- However, the industry is challenged by decreasing productivity despite efforts in land expansion for coconut production
 - » Only 4.0 mt/ha for the yield gap in the coconut production sector with a range of 80-150 nuts/tree/year.
- Challenges in the coconut industry are the following:
 - » 51% of 2.5 million coconut farmers are landless tenants and workers
 - » Majority are food insecure with no social protection
 - » Farmers lack access to capital and formal credit sources
 - » 80% of coconut farms are mono cropped
 - » 10% of the 98% native tall palms are senile
 - » 50% of coconut areas are nutrient deficient
 - » Processing sector is challenged by poor copra quality, fragmented value chains with multi-layered marketing, and lack of integrated coconut processing.



Lesson 3: Economic and Social Impact



KEY LEARNING POINTS

- COCOFIRM's 7 Thematic Recommendation for a more Resilient, Secure, Sustainable, and Globally Competitive Coconut Production with Empowered Farmers
 - » Anchored in Philippine Development Plan for 2017 to 2022, Ambisyon Natin 2040, and ONE DA 12 Point Agenda: "Masagang Ani at Mataas na Kita"
 - a. Promoting Coconut Farmers' Welfare and Social Protection
 - Educational Scholarship Program for Coconut Farmers' Children
 - Health Insurance for Coconut Farmers
 - Intensive Information Campaign on Crop Insurance Programs and Expansion of their Coverage
 - b. Strengthening and Empowering Coconut Farmers' Organizations (CFOS)
 - Organization of coconut farmers into empowered organizations or cooperatives
 - Upgrading and improvement of skills through various training programs
 - Establishment and or expansion of farm business schools in coconut communities at the barangay level
 - Creation of local small farmers councils to provide mechanisms for consultation and participation
 - c. Increasing and sustaining coconut production to maintain Philippine's stature as major and reliable supplier of quality coconut in global and domestic markets
 - Hybridization program and research
 - Recalibration and upgrading of PCA seed gardens and hybridization farms

- Accelerated and strategic planting and re-planting program
 - Professionalization of coconut farm workers through farm service crew
- d. Establishing Coconut-Based Farming Systems (CBFS) agri-business hubs and corridors for coconut products, intercrops, and livestock
- Establishment of community-based integrated coconut processing plants that are market-driven and market-based.
 - Improving copra quality through a farmer owned white copra centrals (wcc)
 - Establishment of farmers owned buying stations for dehusked nuts and copra
 - Livestock integration in coconut production areas
- e. Improving competitiveness of traditional and non-traditional coconut products in local and global markets
- Construction of product quality testing laboratories in coconut supply grid areas in Visayas and Mindanao
 - Adoption of automated systems for production and processing
 - Training of out of school youths as “mananguetes” and on other skills in process to encourage entrepreneurship
- f. Enhancing trade and marketing
- Institutionalization of a market information network system
 - Promotion of the domestic consumption of coconut through extensive market promotion programs
 - Expansion of the utilization of coco nets or geotextiles in various industries
 - Market facilitation, linkages, and matching among others
- g. Strengthening institutional, policy, and support services
- Improving the access to credit and capital for coconut farmers organizations and MSMEs

- Development of accreditation standards and protocols for coconut seed gardens and nurseries
 - Digitization of business transactions of buying stations and branch registration process of PCA
 - Revival of Executive Order 259 on the use of CNO-Based Surfactants in detergents
 - Increasing of coconut methyl ester blend (CME) from B2 to B5 (2% to 5%)
- By 2040, coconut farmers must live above the poverty threshold and must have social protection.
 - By 2040, 24 billion nuts will be produced.



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MODULE 2

Overview of the Coconut Farmer Industry Development Program (CFIDP)



OBJECTIVES

At the end of this module, participants shall be able to:

1. Summarize the Coconut Farmer Industry Development Program (CFIDP) and its benefits for them;
2. Discuss the existing laws and regulations that can help in increasing the productivity and protection as coconut farmers; and
3. List the implementing agencies and its services for future plans.



DURATION

2 hours



TOPIC/S

Topic	Method	Tools
Lesson 1. Overview of the CFIDP	Lecture and presentation	Visual Presentation
Lesson 2. RA 8048	Lecture and presentation	Visual Presentation
Lesson 3. Support Services of the Implementing Agencies	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Prepare the necessary materials for the module.
- Encourage the participants to ask questions or share their ideas and experiences about the topics.



Lesson 1: Overview of the CFIDP



KEY LEARNING POINTS

- RA 11524 or Coconut Farmers and Industry Trust Fund Act is an act creating the coconut farmers and industry trust fund, providing for its management and utilization, reconstituting for the purpose the Philippine Coconut Authority Board, and other purposes.
 - » Only registered coconut farmers can get benefits who are:
 - Farm owner with 5 has. and below
 - Owner-tiller
 - Tenant or Tenant-worker
 - Farm worker or laborer
- The Coconut Farmer Industry Development Program (CFIDP) aims to supplement the direction of RA 11524.
 - » National Development Program for Coconut Farmers and Industry
 - Social Protection
 - Coconut Farmers Organization and Development
 - Hybridization
 - Community-Based Farm Enterprise Development (Farm Rehabilitation and Improvement)
 - Integrated Coconut Processing and Downstream Products (Shared Facilities)
 - Support Services
 - Innovative Research Projects (Practical Application on Coconut Processing, Production and Distribution)
 - Monitoring and Evaluation



Lesson 2: RA 8048



KEY LEARNING POINTS

- Republic Act No. 8048 or Coconut Preservation Act of 1995 is an act providing for the regulation of the cutting of coconut trees, its replenishment, providing penalties therefore and for other purposes.
- Section 2 states that considering the importance of the coconut industry in nation building. Being one of the principal industries and one of the largest income earners of the country, it becomes mandatory for the government to step in and regulate the unabated and indiscriminate cutting of the coconut trees.
- Section 4 states all the prohibitions. No coconut tree shall be cut except in the following cases and only after a permit had been issued therefor:
 - » When the tree is sixty (60) years old
 - » When the tree is no longer economically productive;
 - » When the tree is disease-infested;
 - » When the tree is damaged by typhoon or lightning;
 - » When the agricultural land devoted to coconut production shall have been converted in accordance with law into residential, commercial or industrial areas;
 - » When the land devoted to coconut production shall be converted into other agricultural uses or other agriculture-related activities in pursuance to a conversion duly applied for by the owner and approved by the proper authorities: Provided, that no conversion shall be allowed by the PCA until after it shall have been verified and certified that for a period of at least three (3) years the majority of the coconut trees have become senescent and economically unproductive or where the coconut farm is not adaptable to sound management practices on account of geographical location, topography, drainage and other conditions rendering the farm economically unproductive; and
 - » When the tree would cause hazard to life and property.
 - » No other causes other than those above mentioned shall be considered as a valid ground for cutting.

- Section 5 states that no coconut tree or trees shall be cut unless a permit therefore, upon due application being made, has been issued by the PCA pursuant to Section 6 of this Act.
 - » No permit to cut shall be granted unless the applicant, in coordination with the PCA and the local government unit concerned, has already planted the equivalent number of coconut trees applied for to be cut.
 - » Such replantings, however, shall not apply to areas converted into industrial, commercial or residential sites or land transformed in accordance with law, into other agricultural purposes
- Section 6 states that The Philippine Coconut Authority shall have the exclusive authority to grant permits for the cutting of coconut trees. The authority may be delegated to the city or municipal mayors as the PCA may determine.
- Section 7 states that the Philippine Coconut Authority shall be the lead agency to implement the provisions of this Act. For this purpose, the Philippine Coconut Authority shall prescribe the necessary rules and regulations for the immediate and effective implementation of this Act.
- Section 8 states that those found guilty of violating this Act or any rules and regulations issued pursuant hereto shall, upon conviction, be punished by imprisonment of not less than one (1) year but not more than six (6) years, or a fine of not less than fifty thousand pesos (P50,000) but not more than five hundred thousand pesos (P500,000), or both in the discretion of the court.



Lesson 3: Support Services of the Implementing Agencies



KEY LEARNING POINTS

- CFID has support services under the National Development Program for Coconut Farmers and Industry. Each support service has implementing agencies.
 - » Social Protection
 - Philippine Health Insurance Corporation (PhilHealth) for health and medical
 - Philippine Crop Insurance Corporation (PCIC) for Crop insurance
 - Commission on Higher Education (CHED) for scholarships
 - Department of Agriculture’s Agricultural Training Institute (DA-ATI) and Technical Education and Skills Development Authority (TESDA) for training
 - » Coconut Farmers Organization and Development
 - Implementing Agency: Cooperative Development Authority (CDA)
 - » Hybridization
 - Philippine Coconut Authority for Operations
 - Department of Science and Technology (DOST)’s Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAANRRD) for Research
 - » Community-Based Farm Enterprise Development (Farm Rehabilitation and Improvement)
 - DA High Value Crop Development Program (HVCDP) for Coffee and Cacao Intercropping
 - DA Bureau of Animal Industry (BAI) for Native Livestock and Poultry
 - National Dairy Authority (NDA) for Dairy Integration
 - Department of Trade and Industry (DTI) for Marketing
 - Development Bank of the Philippines (DBP) and Land Bank of the Philippines (LBP) for Credit

- ATI and TESDA for Training
- Cooperative Development Authority (CDA) for Organizing
- PCA for Coconut Farm Rehabilitation
- PhilHealth and Department of Public Works and Highways (DPWH) for Shared Facilities and Infrastructure
- PCIC for Crop Insurance
- » Integrated Coconut Processing and Downstream Products (Shared Facilities)
 - Philippine Center for Postharvest Development and Mechanization (PhilMech)
 - DPWH and PCA for Infrastructure Support
 - CDA, ATI and PCA for Establishment of Farm Service Crews
 - CDA, LBP, DBP, and PCA for Assessment of Recipient Cooperatives
 - Department of Science and Technology - Industrial Technology Development Institute (DOST-ITDI), TESDA, and PCA for the Development of Training Modules for Process Control and Quality Analysis
 - DTI and PCA for Marketing Assistance
- » Support Services
 - LBP and DBP for Credit
 - DTI for Market Assistance, Promotion and Research
 - DPWH for Infrastructure
 - PCA for Policies and Regulations



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Coconut Farmers and Industry Trust Fund Act. (2021). Republic Act No. 11524: An Act Creating the Coconut Farmers and Industry Trust Fund, Providing for its Management and Utilization, Reconstituting for the Purpose the Philippine Coconut Authority Board, and Other Purposes. <https://www.officialgazette.gov.ph/downloads/2021/02feb/20210226-RA-11524-RRD.pdf>.

Coconut Preservation Act of 1995. (1995). Republic Act No. 8048: An Act Providing for the Regulation of the Cutting of Coconut trees, its Replenishment, Providing Penalties therefore and for Other Purposes. <https://pca.gov.ph/pdf/issuances/ra%208048.pdf>.

Philippine Coconut Authority. (2022). Coconut Farmers and Industry Development Plan (CFIDP). Retrieved from <https://www.youtube.com/watch?v=-VTFszV2uCQ&t=62s>.

MODULE 3

Leadership Transformation and Social Preparation



OBJECTIVES

At the end of this module, participants shall be able to:

1. Discuss the steps in conducting social preparation;
2. Identify how coconut specialists can become transformational leaders;
3. Discuss how to be a Leader of Oneself;
4. Discuss how to be a Leader of Others; and
5. Plan how to build effective teams that perform at a high level



DURATION

4 hours



TOPIC/S

Topic	Method	Tools
Lesson 1. Role as Coconut Specialist	Lecture and presentation	Visual Presentation
Lesson 2. Transformational Leadership	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Prepare the necessary materials for the module.
- Engage the participants during the discussion, especially the module focuses on their empowerment as coconut specialists and leaders.
- Encourage the participants to ask questions or share their ideas and experiences about the topics.



Lesson 1: Role as Coconut Specialist



KEY LEARNING POINTS

- Coconut Specialists are expected to serve as resource persons who will deliver topics on the various steps, processes, and theories related to the coconut value chain.
- Coconut Specialists are expected to serve poor and marginalized farmers in helping them attain increased income, alleviate their poverty and achieve social equity among other coconut farmers.



Lesson 2: Transformational Leadership



KEY LEARNING POINTS

- Transformational Leadership is about helping people cope with change. It is about influencing people to accept new directions and ways of doing things.
- Social Preparation is the conduct of preliminary social analysis of a target community of coconut farmers. It will help prepare the specialist, the coconut farmers and their community to actively participate in new programs.
 - » Steps for Social Preparation
 - a. Assessment of the Area
 - The Questioning Funnel can be used to determine the appropriate questions for assessment.

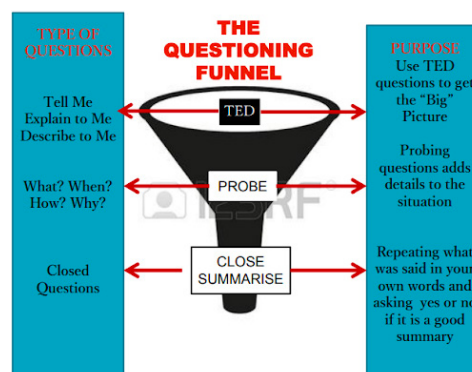


Figure 1. The Questioning Funnel

- b. Community Entry
- c. Community Integration
- d. Social Investigation
- e. Problem Identification, Analysis, Planning

- To become Transformational Leaders, coconut specialists must take into consideration both the private and public victories.
 - » Private Victories or Being a Leader of Oneself
 - Transformational leaders are expected to respond to the situation's needs vs. reacting to it. It requires action with self-awareness, imagination, conscience, and independent will.

REACT VERSUS RESPOND

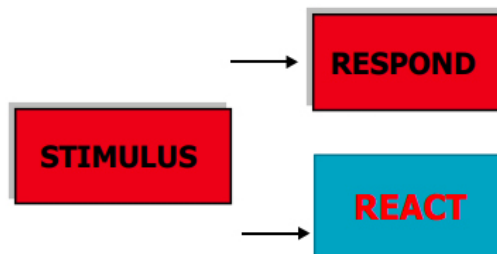


Figure 2. React Versus Respond

The PRO-ACTIVE Model

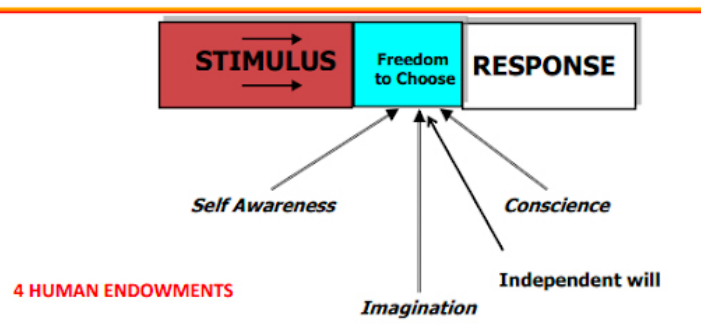


Figure 3. The Pro-Active Model

- Transformational leaders are expected to know their purpose
- Transformational leaders are expected to use their time wisely based on urgency and importance.

Prioritization on the Use of Time

		URGENCY	
		High	Low
IMPORTANCE	1	Urgent and important Do it now	2
	4	Urgent not important Delegate it	Important not urgent Decide when to do it
		Low	
		3	3
		Not important not urgent Dump it	

Figure 4. Prioritization on the Use of Time

- » Public Victories or Being a Leader of Others
 - Transformational leaders seek to benefit all
 - Transformational leaders seek to understand first
- There are 3 Communication Styles:
 - Visual
 - Audio
 - Kinesthetic
- Transformational leaders seek to work as a team which means learning to work with different personalities.

Organizing According to Team member's Situation

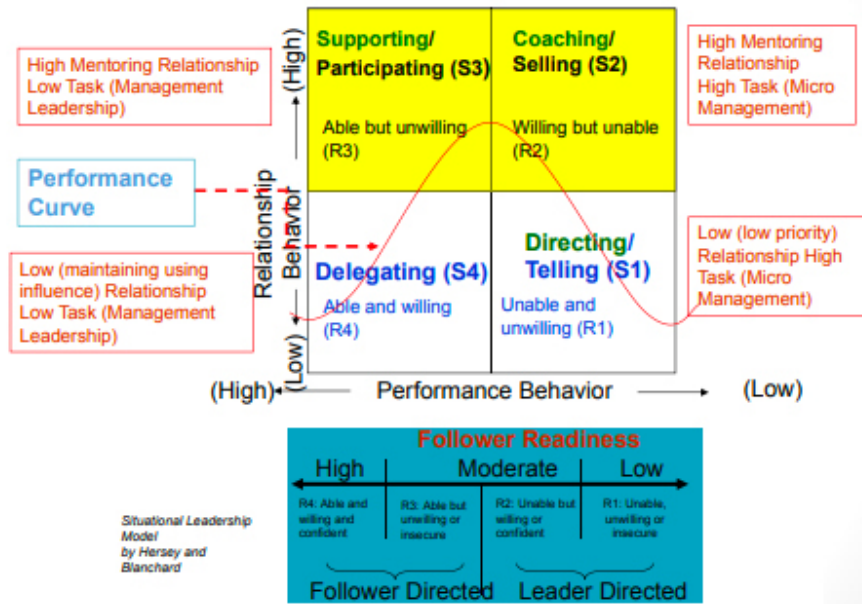


Figure 5. Organizing According to Team Member's Situation

- Using Transformational Leadership, coconut specialists are expected to:
 - » Lead by influence, individual consideration, inspirational motivation and intellectual stimulation.
 - » Applicable in all industries, jobs, levels in organization.
 - » Ethics are determined by transcendental values and intrinsic reward.
 - » Difficult to measure success in the short term but evidently manifests results in the long term.
 - » Inspires company loyalty.
 - » Contrast this to using Transactional Leadership where:
 - a. People lead by contingent reward and management by exception.
 - b. Ethics is determined by reward and security.
 - c. Effects of this leadership are easily measurable by short term results.
 - d. Generate less loyalty and trust.

REFERENCES

Stephen A. Sandoval, LeadCore Training and Directory. (2022). Leadership Transformation and Social Preparation.

MODULE 4

The Coconut: Physiology, Morphology, and Growth Stages



OBJECTIVES

At the end of this module, participants shall be able to:

1. Discuss the botanical and eco-physiological requirements of coconut;
2. Identify the internal structures and components of coconut; and
3. Describe the life cycle of coconut.



DURATION

3 hours 30 minutes



TOPIC/S

Topic	Method	Tools
Lesson 1. Physiology	Lecture and presentation	Visual Presentation
Lesson 2. Morphology	Lecture and presentation	Visual Presentation
Lesson 3. Growth Stages	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Prepare the necessary materials for the module.
- Encourage the participants to ask questions or share their ideas and experiences about the topics.
- Translate the English terms into Filipino or any other local language if necessary.



Lesson 1: Physiology



KEY LEARNING POINTS

- The environment of the palm can be viewed in terms of space occupied by its parts and matter and energy supplied to it.
- Factors to consider in the Environment:
 - » Sunlight provides energy in photosynthesis, affecting other physiological functions and plant development.
 - » Coconut is sensitive to low temperatures, which counts for its inability to thrive in high elevations.
 - » Rainfall has been extensively used as a guide in determining the suitability of a particular location for coconut growing.
 - » Excessive rains may also have negative affects that includes reduced sunlight due to cloudiness, water-logging of the soil, and excessive leaching
 - » Drought, on the other hand, also adversely affects the number of nuts produced, size of nuts, and amount of copra per nut.
 - » Soil, varying in sizes, is a determining factor for coconut growth that can be improved through proper cultivation.

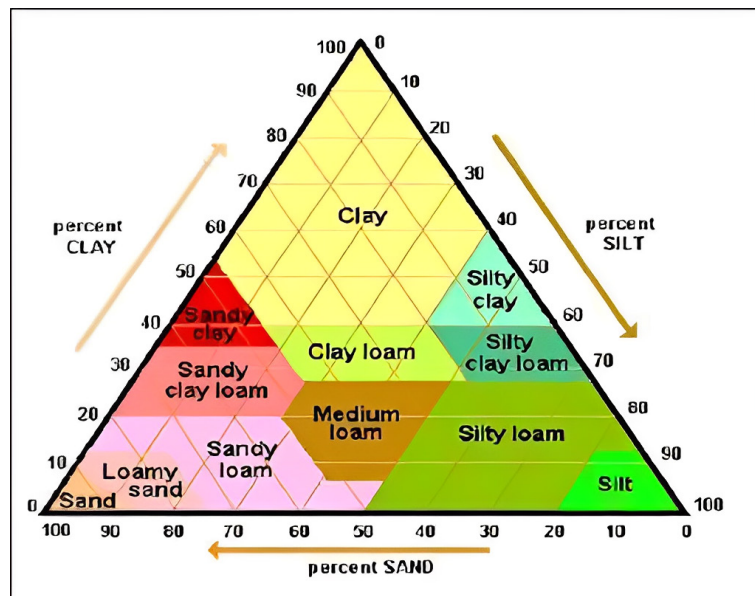


Figure 6. Soil Particles

- » The physical properties of soil are more important to coconuts than the chemical properties (Child, 1974).
- » Coconuts have been observed to grow in various kinds of soil such as alluvial, lateritic, volcanic, sandy, clay, peat or coralline soil.
- » The best soil for coconut is a deep mellow soil (i.e. sandy or silty loam; or clay with granular structure which makes it friable) with good drainage, but has freely moving water.
- » In summary, the optimum weather conditions for good growth and nut yield in coconut are well-distributed annual rainfall between 130 and 230 cm, mean annual temperature of 27°C, and abundant sunlight at least 120 hours per month of sunshine period



Lesson 2: Morphology



KEY LEARNING POINTS

- Important details about coconut palms are:
 - » Scientific Name: *Cocos Nucifera* L.
 - » Genus: *Cocos*
 - » Family: (Palmae) *Arecaceae*
 - » Group of Flowering Plants: Monocot Perennial crop
 - » Length or Height: 6 to 25 meters
- Coconut palms have different parts such as:
 - » Roots are between 5 to 10 meters.
 - Coconuts have a fibrous root system with adventitious roots continuously produced.
 - Roots live for years while rootlets are short-lived with colors starting from yellowish, light red to light brown.
 - » Trunk or stem has grayish hard surface with leaf scars and soft inner part containing phloem-xylem vessels
 - Boles are swollen parts in the trunk in Tall Coconut Trees while cylindrical in dwarfs.
 - Height is affected by variety (e.g. shorter trunk in dwarfs), management (e.g. closer density, upward growth), and environment (e.g. favorable, taller palms).
 - » Bud are protected by the crown of opened leaves and developing leaves
 - Buds should be protected because the death of the bud will result in the death of the tree.
 - » Leaves have glossy green with midrib and longitudinal veins.
 - Varying number of leaves depend on the environment, nutrition, and genetics
 - » Inflorescence should involve one female flower accompanied by two fertile male flowers.
 - Male flowers have a shorter life span than female flowers that have two years from differentiation to nut ripening.

- Number of female flowers is affected by genotype, environment, climate (e.g. drought), and nutrition
- » Fruit can be expected after a year, from pollination to ripening of coconut
 - Color, size, and shape will vary, but weight of ripe nuts usually ranges from 1.5 to 2.0 kg.
- » Fruit development can be through anthesis or pollination.
 - Anthesis is act of expansion of the flower/inflorescence
 - Pollination is the transfer of pollen from anther to stigma
- » Fruit development differs in terms of phase:
 - Female Phase is the splitting of stigma and secretion of nectar that turns brown after receptive stage
 - Male Phase is the pollen shedding on or one day after anthesis
 - Potassium has the most effect on fruit development.

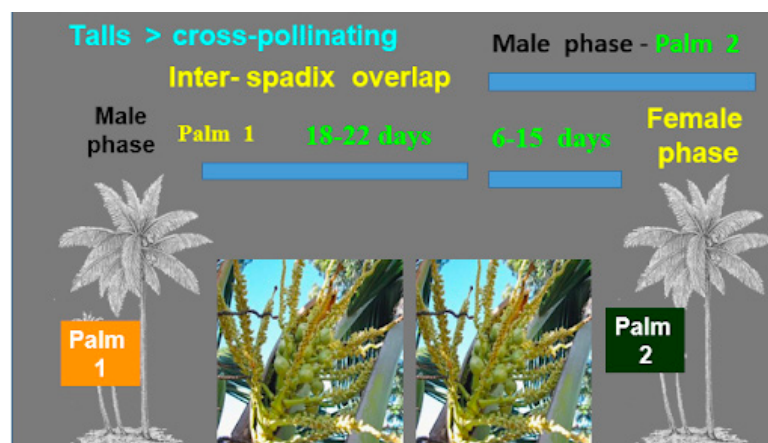


Figure 7. Fruit Development

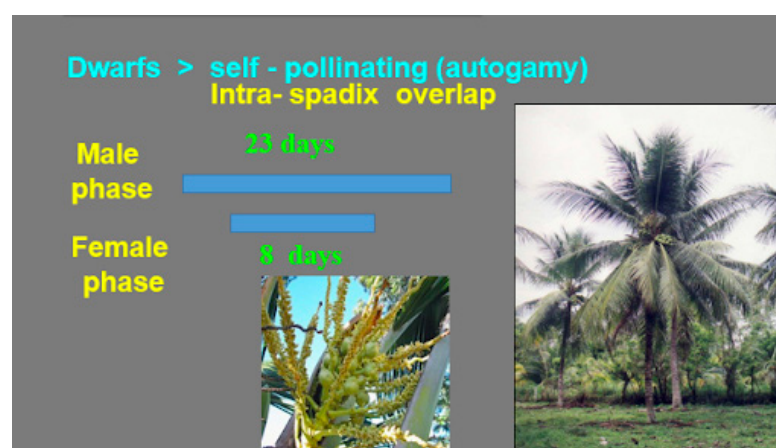


Figure 8. Fruit Development (Dwarf Coconut)



Lesson 3: Growth Stages



KEY LEARNING POINTS

- The coconut tree grows from a single seed.
- 3 to 8 years to bear fruit, and living between 60 and 100 years.
- Each coconut takes almost a year to develop from a flower into a fruit.
- Life Cycle of a Coconut Tree
 - » Germination
 - Growth starts with germination of the seed.
 - After several weeks to months, the outer husk of the coconut begins to split. The roots then shoot out of the bottom of the coconut and a palm tree begins to break out of the top of the seed.
 - Most trees take up to 3 months to germinate.
 - » Newly Sprouted Plant
 - Within just a couple months of sprouting, the palm fronds can reach 2 to 3 feet in length and the trunk grows taller and starts to increase in width.
 - » Growing
 - Over a few months, a coconut's sprout will reach 60-100 centimeters.
 - The sprout's trunk will also increase in diameter and become thicker.
 - » Reaching Maturity
 - Takes 3 or 6 years before it starts flowering.
 - The tall variants are approximately 8 meters tall, while the Dwarfs can be just 2-3 meters tall when producing fruits.
 - The tree will also grow about 30 leaves, which grow in layers.
 - Old layers on the bottom fall off, while new layers develop on top to maintain the umbrella shape.
 - » Flowering
 - After 3 to 6 years, flowers begin to grow from the tree tops.

- The flowers cluster together near where the leaves cluster.
- The flowers eventually produce fruits, more coconuts, after about 9 to 12 months.
- » Fruiting
 - A coconut takes a full year to develop from a flower into a ripe nut.
 - Once the nuts mature, they drop to the ground, and the cycle restarts.

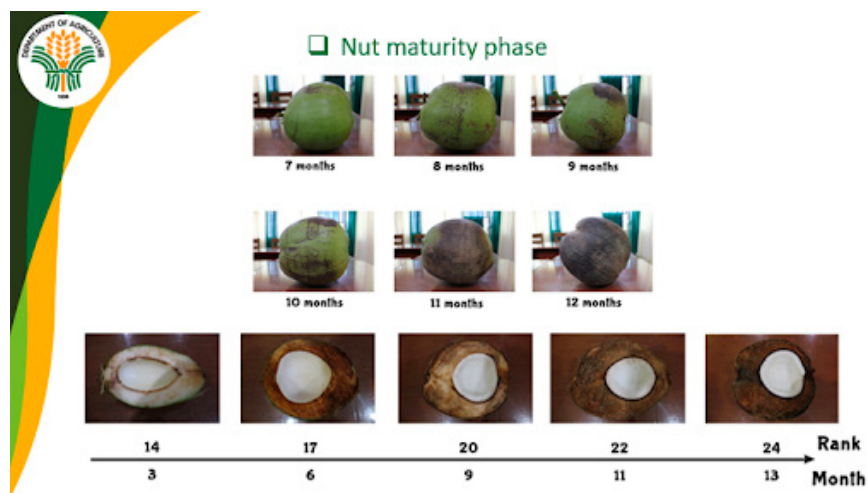


Figure 9. Nut Maturity Phase



SUGGESTED ACTIVITY

Title: Coconut tree parts and seed nut maturity identification

As summary of the Module, the trainer shall provide an exercise/exam for the trainees. At least 15 tree parts and split or open coconut in various maturity stage shall be displayed on a table. Trainees will identify the parts and age of nut as instructed by the trainer.



REFERENCES

- Toraja, A. P. (2022). Environmental Requirements: The Botany & Ecophysiological Requirements of Coconut. Department of Agriculture, Philippine Coconut Authority, North Cotabato.

MODULE 5

Coconut Varieties and Seed Nut Selection (with Practicum)



OBJECTIVES

At the end of this module, participants shall be able to:

1. Identify the good seed nut selection practices for economically important coconut varieties; and
2. Illustrate the different coconut varieties in the Philippines.



DURATION

4 hours



TOPIC/S

Topic	Method	Tools
Lesson 1. Economically Important Coconut Varieties	Lecture and presentation	Visual Presentation
Lesson 2. Coconut Varietal Identification	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Prepare the necessary materials for the module.
- Encourage the participants to ask questions or share their ideas and experiences about the topics.
- Translate the English terms into Filipino or any other local language if necessary.



Lesson 1: Economically Important Coconut Varieties



KEY LEARNING POINTS

- Seed Nut Selection is the action or fact of carefully choosing a seed nut as being the best or most suitable.
- Criteria for Selection of Quality Seed Nuts includes:
 - a. Uniform sizes
 - b. Typical of the variety
 - c. Physiologically mature
 - d. No deep cracked/punctures on the shell
 - e. No damage by insect/s or disease

Defective Seednuts for Exclusion as Planting Materials



Figure 10. Defective Seed Nuts for Exclusion as Planting Materials

- Selecting the best planting materials before field planting assures high productivity per unit area and time.
- There are outstanding coconut populations registered with the National Seed Industry Council (NSIC) of the Department of Agriculture:
 - » For Dwarf Accessions:
 - Catigan Green Dwarf, Malayan Red Dwarf, Tacunan Green Dwarf, and Aromatic Green Dwarf

- » For Tall Accessions:
 - Baybay Tall, Tagnanan Tall, Rennell Island Tall, Laguna tall, Bago Oshiro Tall, Polynesian or Tahiti Tall, West African Tall
- Most of the 347 fruit-bearing coconut trees nationwide are of the low-yielding tall variety and not the high-yielding hybrid variety.
- Tall varieties that are common in the Philippines can yield only 50 coconuts per year, which is low compared to hybrids developed locally that can yield from 100 to as much as 250 coconuts per year.
- High yielding coconut is sometimes not confined to one accession only.
 - » Research shows that high yielding coconut hybrids can provide farmers with high yields and incomes above the poverty level.



SUGGESTED ACTIVITY

Activity included in the Practicum Activity of Module 6, Lesson 3:
Nursery Establishment.



Lesson 2: Coconut Varietal Identification



KEY LEARNING POINTS

- Coconut Varietal Identification is a general term to denote a single strain or a group of strains that distinctly differ in structural or functional characteristics or a group of the same species than can be depended upon to reproduce itself true to type (Menon and Pendalai, 1958)
- There are two types of varieties distinguished from palm species *Cocos nucifera*:
 - » Tall that is allogamous or uses crossed fertilization
 - The allogamous varieties are designated with the term “large coconut palm” or Typica
 - » Dwarf that is autogamous or uses self-fertilization
 - The autogamous varieties are designated with smaller coconut palms. They are known as “dwarf varieties.” They are classified according to the color of the inflorescence and the fruit.
- Coconut Varieties in the Philippines
 - » Typica or Tall Variety
 - Dominant cultivars
 - 5-7 years bears fruit after planting
 - 60 years productive life
 - With bole
 - » Javanica or Dwarf Variety
 - Shorter
 - No bole
 - 50 years productive life

Table 1. The Basic Characteristics of the Tall and Dwarf Coconuts

Traits	Tall	Dwarf
Geographical Distribution	More widely distributed and commercial	Less widely distributed and non-commercial
Stem Circumference	Enlarged and with a bulbous base	Thin and either with a cylindrical or tapering base
Mode of Pollination	Highly crossed	Highly selfed
Nut size (whole)	Very small to large	Very small to medium
Genetic variability		
Within cultivar	High	Low
Between cultivar	Low	High
Root Distribution	Generally more dense and plentiful	Less dense and few
Pigmentation of nuts and petiole of leaves	Most are mixtures of greens and browns	Either pure greens, browns, yellows and reds
Height increment/year	> 50 cm	< 50 cm
Years to start reproductive maturity	Late (5 to 7 years)	Early (3 to 4 years)
Reaction to adverse conditions or environment	Generally less sensitive	Sensitive to hypersensitive
Cultural Requirement	Average	High input required
Leaf and bunch attachment	Very strong	Fragile
Expected life span	> 50 years	< 50 years

Source: Toraja, A. P. (2022). *Coconut Varietal Identification*. Department of Agriculture, Philippine Coconut Authority, North Cotabato.

- Tall Varieties
 - » Baybay Tall
 - » Laguna Tall
 - » Spicata Cultivar
 - » Bago –Oshiro Tall
 - » San Ramon Tall
 - » Makapuno
 - » Hijo Tall
 - » Tagnanan Tall

- Dwarf Varieties
 - » Catigan Green Dwarf
 - » Tacunan Green Dwarf
 - » Galas Green Dwarf
 - » Aromatic Green Dwarf
 - » Kinabalan Green Dwarf
 - » Malayan Dwarf



SUGGESTED ACTIVITY

Title: Coconut variety identification

The trainer shall provide at least 15 tree parts, including mature coconut fruit, of the different important coconut varieties on a table. Trainees will identify the coconut varieties depending on the unique characteristic of the coconut plant part or fruit.



REFERENCES

- Dar, W. (2022) PH Coconut Industry a 'Sleeping Giant', The Manila Times. The Manila Times. Available at: <https://www.manilatimes.net/2022/08/11/business/agribusiness/ph-coconut-industry-a-sleeping-giant/1854139> (Accessed: November 18, 2022).
- Pamplona, P.P. (2016) Hybrid Coconut: Its Potential to Help Overcome Poverty, Philippine Coconut Authority. Available at: <https://pca.gov.ph/index.php/10-news/194-hybrid-coconut-its-potential-to-help-overcome-poverty> (Accessed: November 18, 2022).
- Toraja, A. P. (2022). Coconut Varietal Identification. Department of Agriculture, Philippine Coconut Authority, North Cotabato.
- Toraja, A. P. (2022). Seednut Selection. Department of Agriculture, Philippine Coconut Authority, North Cotabato.

MODULE 6

Coconut Plantation Management (with Practicum)



OBJECTIVES

At the end of this module, participants shall be able to:

1. Summarize the basics of coconut plantation management;
2. Differentiate the importance of farm planning, establishment, and maintenance; and
3. Identify the necessary knowledge and skills in estimating the coconut productivity.



DURATION

6 hours



TOPIC/S

Topic	Method	Tools
Lesson 1. Site Selection and Management	Lecture and presentation	Visual Presentation
Lesson 2. Sourcing and Selection of Planting Materials	Lecture and presentation	Visual Presentation
Lesson 3. Nursery Establishment	Lecture and presentation	Visual Presentation
Lesson 4. Farm Establishment	Lecture and presentation	Visual Presentation
Lesson 5. Farm Maintenance	Lecture and presentation	Visual Presentation
Lesson 6. Coconut Age and Productivity	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Prepare the necessary materials for the module.
- There are six lessons in this module. Make sure you take a pause to avoid information overload among the participants.
- Always have an “Understanding Check” to gauge the attention and interest of the participants during the lecture and presentation.
- Encourage the participants to ask questions or share their ideas and experiences about the topics from time to time.
- Translate the English terms into Filipino or any other local language if necessary.



Lesson 1: Site Selection and Management



KEY LEARNING POINTS

- Site Selection and Management
 - » Coconut farms should be located in areas suitable for food production and processing, preferably with an altitude of no more than 600 meters above sea level for optimum growth.
 - » Management of site activities conforms to country environmental legislation covering air, water, soil, biodiversity and other environmental issues.

Table 2. Optimum Conditions for Coconut Production

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 favors the speed of fatal fungus diseases, common in very high elevations.
3. Temperature	Annual mean optimum of 27C and monthly mean of 20C, with diurnal variation of 5-7C
4. Soil	
4.1. Moisture	Field capacity moisture (within temperature range 25-40C of available moisture of 12-15%. Water-logged conditions lasting for more than 1 week are growth-limiting and yield-reducing.
4.2 Drainage	Well-drained and aerated at all times. Root respiration impaired and plant physiology abnormal under poor drainage conditions.
4.3 Acidity	Soil acidity of pH 5.5-6.5
4.4 Depth	> 75 cm (top plus sub-plus)
4.5 Texture	Either sandy, loamy and clayey grades

Factors	Description
4.6 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 Exch. Ca > 15 meq Exch.Mg > 7 meq Exch. Na > 0.2 meq/100 g soil Available P > 15 mg/kg Available S > 20 mg/kg Soluble S > 20 mg/kg Available micronutrients B: > 2 mg/kg Zn: > 4 mg/kg Cu: > 4 mg/kg Fe: > 50 mg/kg Mn: > 100 ppm
5. Sunlight	Above 2,000 sunshine hours/year with daily full sunlight (above 4,500 ft-candle light intensity). Provides full and stable bunches of the palm crown, year round.
6. Topography	Flat to slightly sloping, rolling to moderately sloping (below 20%)
7. Wind Speed	Minimal frequency of typhoons for stable nut yields.

Source: Toraja, A. P. (2022). Plantation Management. Department of Agriculture, Philippine Coconut Authority, North Cotabato.

- Farm planning aims to improve the standard of living of the farmer and the immediate goal is to maximize the net incomes of the farmer through improved resource use planning.
- Farm planning helps the farmer in the following ways:
 - » Helps with current and future decision making by looking at his existing resources and past experiences.
 - » Identify the various supply needs for the existing and improved
 - » Find out the credit needs, if any, of the new plans.
 - » Gives an idea of the expected income after costs.



Figure 11. Farm Planning Layout

- Production Site Mapping
 - » A production site map should be prepared to show the condition of the farm or how the farm is intended to be developed.

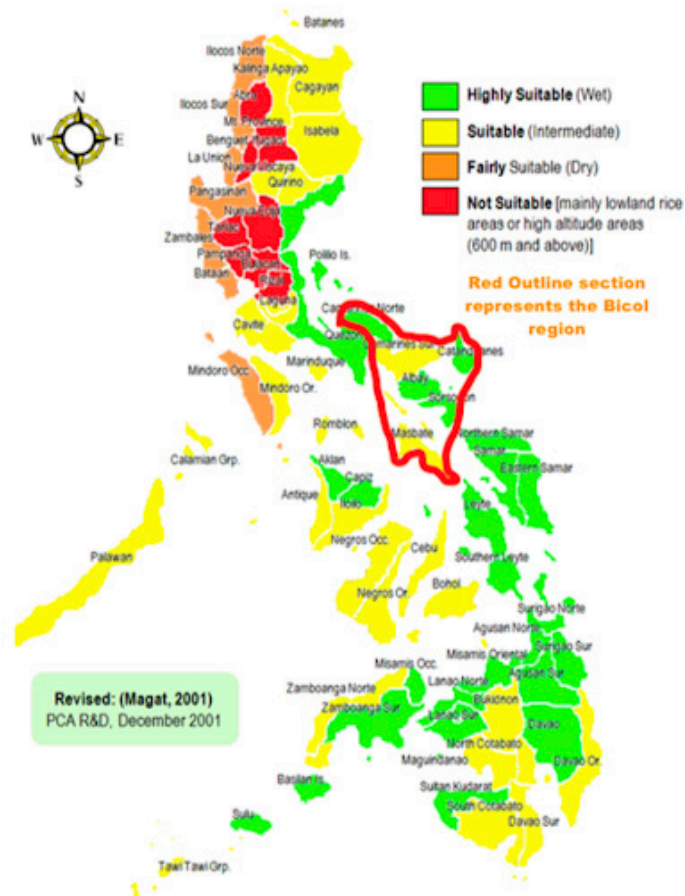


Figure 12. Production Site Mapping

- » Production Site Mapping includes:
 - Coconut production area
 - Primary processing area
 - Intercrops and livestock areas (if applicable);
 - Sources of water used on the farm
 - Storage and mixing areas of chemical pesticides and fertilizers
- » Each production area, in case of multiple production areas in a site, should be identified by name or code, and shall be indicated in the property map.
- » All hazard and risk areas to humans should be clearly indicated.
- » All facilities and structures for coconut production should be properly designed, constructed, and maintained to minimize postharvest losses and risk of contamination.
- » All premises should adhere to the guidelines set by the competent authority.



SUGGESTED ACTIVITY

- Group the trainees into 4-5 member subgroups.
- Provide materials such as cartolina, manila paper, meta cards, construction papers, tape, and other supplies that can be used for the activity.
- Instruct the groups to create their own farm plan based on proposed or available farm development area in one of the subgroup member's locality. Take into consideration the farm planning considerations as described in the lesson.
- The group with the best Farm Plan wins the activity.



Lesson 2: Sourcing and Selection of Planting Materials



KEY LEARNING POINTS

- Success of coconut plantation establishment starts with the production of good quality planting materials.
- Considerations of Choosing Varieties:
 - » Market requirements
 - » Farmer preference
 - » Adaptability to the locality.
 - » Soil type and nutrient levels
 - » Water availability
 - » Prevailing temperatures and humidity
 - » Pest and disease history.
- The planting materials should be of high quality and shall be sourced from the following:
 - » PCA seed gardens and seed production centers
 - » BPI or PCA-Accredited nurseries
 - » PCA-recommended varieties and seed nut producers
 - » Farmer selected mother palms.
- Considerations when Selecting Seed Nuts
 - » Healthy seedlings with characteristics typical of the variety should be selected for planting.
 - » Seed nuts should be sourced from selected mother palms of the National Seed Industry Council (NSIC) registered of PCA recommended varieties.
 - » Mother palms of open-pollinated varieties shall be selected from a block or area of highly homogenous bearing palms producing an average of at least 10 nuts per bunch every 30 days for tall varieties and 15 nuts per bunch every 25 days for dwarf varieties.
 - » Seed nuts shall be disease-free, undamaged by insects and

rodents, physiologically mature, without deep punctures or cuts, with water manifested by “sloshing sound” when shaken, ungerminated, and resembles the distinct appearance of the specific variety of the mother palm.

- Proper sourcing and selection of quality seed nuts should be done to ensure productivity of palms.
- In case of hybrid seedlings, only F1 (Filial 1) or the first filial generation offspring of distinct mother palms shall be used for planting. Hybrid seedlings shall be sourced only from either PCA or PCA-supervised or accredited coconut hybridization farms.



SUGGESTED ACTIVITY

Activity included in the Practicum Activity of Module 6, Lesson 3: Nursery Establishment.



Lesson 3: Nursery Establishment



KEY LEARNING POINTS

- Proper care must be taken in raising and choosing the seedlings to start a plantation since plantings will be in the field for many years.
- Rearing coconut seedlings in a well-maintained nursery facilitates efficient selection of normal uniform seedlings.
- High quality planting materials provide a good head start to sustain the coconut palms' productive and economic lifespan of 60 or more long years in the field under extremely variable conditions.
- Characteristics of a Good Nursery include:
 - » Open, level, and well-drained
 - » Have light or loose textured soil to facilitate nursery operations
 - » Have a good source of water without possibility of flooding
 - » Accessible to transportation
 - » Far from potential sources of coconut insect pests and diseases
 - » A nursery site with a minimum area of 3,600 m² is needed to accommodate about 12,000 seed nuts good for 50 ha.
 - » A hectare of seedbed nursery holds about 150,000 to 180,000 seednuts
- Requirements of Fully Operational Nursery
 - » Fence for security
 - » Farm implements
 - » Small equipment
 - » Shed to house the implements
 - » Source of water for Irrigation
 - » Sufficient trained manpower
- The seedbed is preferably in the center of the nursery that should be cleared, plowed, and harrowed to facilitate sowing of nuts.
- Sowing of Seed Nuts
 - » Nuts are planted firmly setting them either upright or slightly tilted with the germ end at the top.
 - » The nuts are set close to one another to prevent them from floating in case of heavy rains

- » The nuts are then covered with soil, with about 2/3 of their size buried.
- » As precaution, compact the sides of the seedbed soil either by feet or hands.
- Maintenance of the seedbed includes:
 - » Daily watering except when it is raining
 - » Regular weeding
 - » Inspection for disease and pest incidence
 - » Partial shading when needed
- Pricking means separating out seedlings growing together and transferring them into their own plugs or pots of potting mix
- Best Pricking Practices
 - » Seedlings of the same age are pricked on the same day and immediately planted in the field or polybag nursery. Pricking can be scheduled once a week.
 - » After pricking the germinated seed nuts from the seedbed, the vacated plot is refilled with soil so as not to destabilize the remaining ungerminated seed nuts.
 - » Discard all nuts producing plumule, which are multiple, thin or etiolated, bent or spindled, and albinos
 - » The optimum waiting period for ending the observations of germination in each seedbed is around 16 weeks from the date of sowing or when 85% germination has been achieved, whichever comes first.
- Polybag nursery uses black polyethylene bags which as the following benefits:
 - » Transplanting shock is greatly minimized, thereby promoting early establishment of transplanted seedlings.
 - » Seedlings can be retained longer in the nursery when conditions for field planting are not favorable.
 - » Age-wise, seedling selection is easily accomplished.
 - » Polybagging of germinated nuts

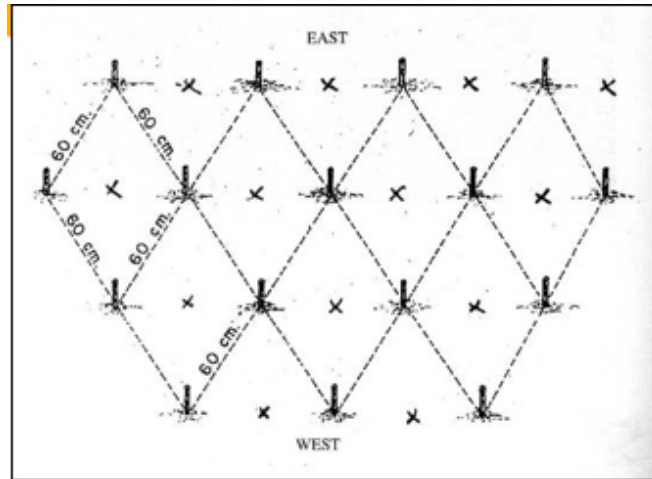


Figure 13. Polybag Nursery Staking

- Setting the Polybagged Seedlings
 - » The polybagged seedlings are placed in front of the stake, set firmly and with the erect shoot aligned at the stake
 - » The emerging shoot should be set in only one direction at a point closest to the stake.
 - » Set the polybagged seedlings in the same order as they germinated, from early to late germinating seedlings.
 - » A signboard indicating the type/variety, the number of seedlings and date of sowing is installed in front of each plot.
- Maintenance of the Polybag Nursery
 - » In order of priority, this involves watering, weeding, and inspection for pest and disease incidence.
 - » Fertilizer application for each seedling is recommended as follows:

Table 3. Fertilizer Application for Polybag Nursery

Age after Germination (Months)	(NH ₄) ₂ SO ₄ (21-0-0) (g)	KCl (0-0-60) (g)	NaCl (optional) (g)
2	20	20	20
5	40	45	40

Source: Toraja, A. P. (2022). Coconut Nursery Site Selection, Establishment, and Management. Department of Agriculture, Philippine Coconut Authority, North Cotabato.

- » At 6-8 months after polybagging, leaf splitting occurs, indicating that the seedlings are ready for field planting.



SUGGESTED ACTIVITY

Title: Practicum Activity

Methodology: Hands-on Activity

Procedure:

- Assumption: 30 participants each training batch
- The participants will be provided with proper PPE, pegs, straw rope, and other equipment needed for the nursery establishment activity.
- Participants will be divided into five groups.
- The participants will choose 10 nuts each of good quality of the same variety with the group his/her members. The trainer will inspect each nut chosen by the group member if it passes quality check. Each group must have 60 seed nuts to plant in the seedbed.
- The groups will then perform the correct nursery establishment steps from land clearing and preparation to positioning seed nuts in the seedbed. The trainer will inspect all steps to be followed by the groups and correct trainees as needed.
- This activity is intended to be conducted in the morning and should be completed in 4 hours. The trainer will check the elements such as seednut angle, alignment, and soil compaction of the nursery established by the trainees.



Lesson 4: Farm Establishment



KEY LEARNING POINTS

- Recommendations for Land Preparation:
 - » Clear the area of all debris and thick vegetation and collect in heaps.
 - » These may be covered with cover crops, allowed to decay or burned if the area is prone to rhinoceros beetles.
 - » For areas covered with cogon, prepare the land using a plow or tractor or apply herbicides: glyphosate at 3.1 kilogram per hectare or paraquat at 2 liter per hectare
 - » Best to cultivate the soil thoroughly
 - » On sloping land to minimize erosion, plant cover crops before planting or construct terraces following contour lines
 - » Do not plant in water-logged areas such as coconut palms that exhibit yellowing, stunted growth and have poor yield
- Planting Systems that can be used:
 - » Rectangular
 - Rows are cut at right angles to one another
 - Distance between the palms in a row is nearer than that between the rows
 - This planting system allows more room for raising intercrops in the farm
 - » Square
 - Square method is more common than the triangular method
 - Does not give the best sunlight utilization and soil coverage because of the big light patches at the center of each square
 - » Triangular
 - Palms are set at fixed equal distances at the corners of an equilateral triangle
 - Accommodates about 15% more palms compared to the square method per unit area
 - Provides the maximum use of sunlight by the palms for its growth and crop yield

- » Quincunx
 - Used for replanting old coconut plantations where the old palms will be removed as soon as the new seedlings are established.
 - Seedlings are planted in the center of each square of old palms
- » Irregular
 - Uses a variety of measurements and plant spacing..
- Materials needed for field lay-outing such as:
 - » Compass for sighting proper direction on the field
 - » Two sets of calibrated rope for calibration that is done either by marking the length with a fine wire loop around the calibrated points;
 - » Stakes that are 1 meter long, straight narrow, and pointed at one end
- Plant Hole Reminders
 - » Holes should be dug at 50 x 50 cm size, considered as knee-deep.



Figure 14. Plant Hole Measurements

- » Operation commences as early as 2 months before planting to allow for weathering of the soil on the sides and bottom of the holes.
- » Weathering is encouraged to promote early root contact.
- » Topsoil should be separated from the subsoil.
 - Fertilization before planting is important
 - Fertilization for coastal area: 150 grams ammonium sulfate and 100 grams potassium chloride
 - Fertilization for inland areas: 150 grams ammonium sulfate and 200 grams potassium chloride
- Transplanting Reminders:
 - » Should be done at the start of rainy season for 7-month old and above seedlings
 - » Open leaves & protruding roots should be pruned before transplanting
 - » Plants should be taken from the nursery very early in the morning or late in the afternoon
 - » Seedlings, which are not immediately planted, should be placed under the shade, watered and protected from damage
- Caring for Young Plants Practices:
 - » Protect from stray animals by putting fences
 - » Check drainage since water should not stagnate in seedling holes continuously for long periods
 - » Remove weeds within about 1-2 m radius of palms or apply mulch using dry weeds, coco husks, farm wastes and other organic mulches
 - » Replace dead plants, unhealthy & stunted seedlings. Reserve 15 healthy seedlings/ha for replacement
 - » Apply fertilizers regularly
- First 3 to 4 years are the most critical period for the growing of palms so health management is important.



SUGGESTED ACTIVITY

Title: Practicum Activity

Methodology: Hands-on Activity

Procedure:

- Participants will be divided into 5 groups
- Each group should plant 3 seedlings
- Each group will have a designated task:
 - » Group 1
 - Calibrate the rope for Planting Distance (PD), Inter-row distance (IRD) and fertilizer container
 - Check the final output of layout
 - » Group 2
 - Establish the North-South line and stake
 - » Group 3
 - Establish the East-West line and stake
 - » Group 4
 - Establish 2 parallel lines along North-South line and stake
 - » Group 5
 - Establish 2 parallel line along East-West line and stake



Lesson 5: Farm Maintenance



KEY LEARNING POINTS

- Measures should be taken in order to ensure farm efficiency, productivity, and safety.
 - » Considerations for Soil
 - Coconut can thrive in a wide range of soil textures (sandy to clay). However, it prefers fertile and well-drained soils with a minimum depth of 75 cm and with high water holding capacity.
 - The palm tolerates soil pH from 5.0 to 8.0. For optimum growth, however, a pH range of 5.5 to 6.5 is ideal.
 - » Considerations for Soil Conservation
 - Conservation measure should be integrated in the coconut production practices in order to improve or maintain the soil structure and tilth, and minimize soil compaction and erosion.
 - Use measures such as:
 - a. Minimum tillage
 - b. Contour planting
 - c. Crop rotation
 - d. Cover cropping
 - e. Green manuring
 - f. Mulching
 - Use of crop suitability maps to plan for intercropping and livestock integration is encouraged.
- Fertilizers and soil amendments can help in increasing coconut productivity.
 - » Apply the correct amount of fertilizers based on recommendations from soil or leaf analysis to optimize nutrient use and minimize nutrient losses,
 - » Use only duly registered organic and inorganic fertilizers to avoid the risk of heavy metal contamination.

- » The use of organic fertilizers, whether produced in the farm or sourced commercially, is encouraged.
- » Composting areas for the production of farm-based organic fertilizers should be located away from processing and storage areas and from drinking and farm water sources.
- » Production procedures, such as composting, solarization, and heat drying, should be designed to reduce pathogens to tolerable limits in manure and biosolids
- » Human waste, dog and cat excreta, whether processed or unprocessed, shall not be used for the production of coconuts.
- Water management is essential in farm maintenance to avoid the risk of chemical or biological contamination of coconuts.
- Water Management Considerations:
 - » The proximity of water sources to possible sources of contamination (e.g. dumping site, septic tanks, composting area) should be considered to ensure suitability.
 - » Water used from sources that may cause environmental harm to the land and soil, waterways, and environmentally critical areas should be managed or treated to minimize the risk of health and environmental harm.
 - » Untreated sewage water should not be used for irrigation or fertigation.
 - » Whenever treated sewage water is used, water quality shall comply with the WHO 1989 published Guidelines for the Safe Use of Wastewater and Excreta in Agriculture and Aquaculture, or the country's guidelines on the matter which is the Republic Act No. 9275: Philippine Clean Water Act and Presidential Decree No. 856: Code on Sanitation of the Philippines, specifically on use of waste water.
- Soil Tillage Management
 - » Soil tillage should not be done too frequently or too deeply.

- » Shallow tillage is up to 20 cm deep and 2 m radius away from the base of the coconut palm, stimulates the production of new roots and incorporates organic matter into the soil.
- » The best time to till the soil is near the end of the dry season.
- » The soil may also be plowed before the onset of the dry season to break the soil capillaries.



SUGGESTED ACTIVITY

Title: Practicum Activity
Methodology: Hands-on Activity

Procedure:

- Participants will be divided into five groups.
- PPE, fertilizers, and other equipment for planting and fertilizing coconut trees and seedlings will be provided.
- Each group will be assigned 3 coconut trees to fertilize, and 3 coconut seedlings to plant using fork-in and perimeter hole fertilization methods.
- Fertilization of mature trees: Clear the base of the area. Apply the steps in fertilizing mature coconuts and considering fertilizer requirement. Make sure to apply both methods of fertilizer application.
- Fertilizing coconut seedlings: Trainees will clear areas for planting the 3 coconut seedlings assigned to each group. Once clean, trainees will perform the recommended steps in planting and fertilizing coconut seedlings using both methods of fertilizer application.



Lesson 6: Coconut Age and Productivity



KEY LEARNING POINTS

- Guide in Estimating the Age of Coconut
 - » Factors to be considered in knowing coconut age are:
 - Estimated height of the coconut
 - Number of leaf scars or meter
 - Number of total opened leaves
 - Step-by-step Procedure in Estimating the Age of Coconut
 - » Estimate the height of the coconut tree from the collar girth to the crown.
 - » Measure one meter of the trunk starting from one meter above the ground.
 - » Count the number of scars within the one (1) meter length
 - » Estimate the number of open leaves in the crown
 - » Add to the estimated number the factor of four to take care of the spears
 - » Take note of the formula in determining its age:
$$X = \frac{H \times S + L + 4}{12}$$
- Where:
- X = age
 - H = Estimated height of coconut
 - S = no of leaf scars/meter
 - L = Total leaves (open + 4 whorl)
 - 4 = factor (years prior to bole formation)
 - 12 = no of leaves produced per year
- Guide in Estimating Palm Productivity
 - » Estimating palm productivity aims to determine baseline or benchmark yield data and to measure response of coconuts to applied technologies and experimental treatments.
 - » Difference between productivity of coconut and production of coconuts:

- Productivity of coconuts is the quantity of nuts or copra (dry coconut meat) produced per palm, per hectare for a certain period of time (e.g. per year)
 - Production of Coconuts is the volume (kg or metric ton) produced by a farm, an area, a locality or province, even by a country or region, regardless of the productivity
 - Step-by-step in Estimating Palm Productivity
 - » Select sample or observation palms using random sampling within the area for at least 15 normal palms from the three oldest bunches of each sample palm
 - » Count the nuts from each 3 oldest bunches (per sample palm) and record the data for each palm
 - » Compute mean or average nut count per palm (total nuts, all bunches divided by the number of sample palms used, e.g. 15.)
 - » To estimate the nut yield, remember the formula:
 - For Tall Varieties:

$$\text{NPT/Yr-Tall (NPTYrT)} = \text{ANCT.3B} \times \text{BF} \times \text{PPF}$$
 - For Hybrid Varieties:

$$\text{NPT/Yr-Hybrid (NPTYrH)} = \text{ANCT.3B} \times \text{BF} \times \text{PPF}$$
- Where:
- BF – Bunch factor
 - PPF – Production Projection Factor
- » To estimate the nut production per hectare per year, remember the formula:
 - For Tall Varieties:

$$\text{NPHYr} = \text{NPTYrT} \times \text{APD}$$
 - For Hybrid Varieties:

$$\text{NPHYr} = \text{NPTYrH} \times \text{APD}$$
- Where:
- APD = Adjusted Planting Density (trees/ha) where it is 5% less of the computed value (e.g. at 9m x 9m square system is 123 palms/ha, so ADP is 117)
- » In estimating the copra yield, remember the step-by-step procedure:
 - Sample the nuts for meat thickness

- Harvest and split at least 3 nuts. Do not forget to discard the coconut water
- Measure the meat thickness in millimeters at the thickest portion of the pairs of split nuts. Calculate mean meat thickness.



SUGGESTED ACTIVITY

Title: Practicum Activity

Methodology: Hands-on Activity

Procedure:

- Participants will be asked to work with a partner
- PPE will be provided during the conduct of the activity.
- Each partner will be asked to select two mature coconuts of either tall or dwarf variety.
- Based on the lesson, they are to identify or compute for the the age, years of productivity, and copra yield of their chosen coconut trees.
- The partners will discuss their findings to the trainer who will mark them as pass or fail.



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MODULE 7

Coconut Pests and Diseases Management (with Practicum)



OBJECTIVES

At the end of this module, participants shall be able to:

1. Identify and discuss the best practices of a well-managed coconut farm;
2. Identify and discuss major coconut pests and diseases;
3. Describe the Disease Triangle; and
4. Apply disease management in coconut-based farming systems.



DURATION

7 hours 30 minutes



TOPIC/S

Topic	Method	Tools
Lesson 1. Coconut Pest Management	Lecture and presentation	Visual Presentation
Lesson 2. Coconut Disease Management	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Prepare the necessary materials for the module.
- Engage the participants during the discussion, especially in terms of knowledge and best practices sharing on coconut pest and disease management.
- Prepare the participants for the practicum indicated in this module.



Lesson 1: Coconut Pest Management



KEY LEARNING POINTS

- Rhinoceros beetles feeds on unopened leaves and bud
 - » 3 Methods in Rhinoceros Beetle Management:
 - Cultural methods include farm sanitation, planting of cover crops, intercropping, manual collection, and fertilization.
 - Chemical methods include trunk or frond injection of systemic insecticide, soil drenching/root infusion, and use of pheromones
 - Biological methods include the use of entomopathogens such as Green muscardine fungus and *Oryctes nuditarsis*
- Coconut Leaf Beetle (CLB) damages unopened and young fronds
 - » 3 Methods in CLB Management:
 - Biological control with predators includes mass rearing of earwigs or *Chelisoches morio*
 - Use of entomopathogens (e.g. green muscardine fungus, white muscardine fungus)
 - Use of parasitoids such as *Tetrastichus brontispae*.
 - » Regulatory Controls that help in mitigating the damages of CLB.
 - BPI Special Quarantine Order No. 03 Series of 2005 that declares Coconut Leaf Beetle, *Brontispa longissima* (Gestro) an Invasive Quarantine Pest of Coconut, *Cocos nucifera*, and Providing Measures to Regulate and Prevent its Spread
 - Executive Order No. 664 that establishes emergency measures to control and eradicate the spread and damage of *Brontispa* in the Philippine coconut industry and designating the Philippine Coconut Authority as the lead agency for the purpose
 - Land-based plant quarantine checkpoint and port-based quarantine checkpoint
 - Information Awareness Campaigns
 - Cultural Management includes the removal of infested leaves, proper disposal, and fertilization

- Coconut Scale Insect (CSI)
 - » Rapid Ground Assessment must be practiced for a systematic detection survey to determine the degree of infestation and the geographical spread of CSI.
 - » 4 methods in CSI Management:
 - Cultural Management includes leaf pruning or nut pruning, fertilization, creating favorable microenvironments for predators, parasites and other natural enemies, encourage high pollination rate, harvesting regularly, increase diversification, field sanitation, and cutting and replanting
 - Chemical Control includes insect growth regulators (IGR), botanical biocides, synthetic insecticides, and horticultural oils
 - Biological control includes introduction of predators, augmentation, and conservation.
 - Regulatory control including laws, regulations and checkpoints, and information campaigns
- Asiatic Palm Weevil's (APW) management measures include:
 - » Collect and destroy all stages
 - » Drill and pour into the trunk chemicals (systemic pesticides or botanicals) following recommended rates
 - » Plug in holes made by the insects
 - » Pheromone trapping and destruction of insects caught in traps
- Mealybugs or Nipaecoccus Nipae
 - » Coconuts will have sooty molds from mealybug infestation
 - » Management measures:
 - » Leaf pruning (PCA recommended)
 - » Fertilization
 - » Augmentative release of biological control agents
- Slug caterpillar
 - » Management measures:
 - Spraying slug caterpillar-infested palms with virus-water suspension to control infestation
 - Collection and destruction of pupal cocoons and light trapping
 - Leaf pruning (PCA recommended procedure only)
 - For young palms and seedlings, spraying with fungal suspension or virus suspension from macerated virus-infected larvae

- Spider Mites or *Rarosiella cocosae*
 - » Biological control with predatory beetle can help in avoiding or mitigating spider mites infestation
- Coconut Spike Moth
 - » Attacks the inflorescence..
- Vertebrate Pest such as Rodents (*Rattus rattus mindanensis*)
 - » Management measures
 - Banding
 - Baiting
- Ecological engineering can help in coconut pest management in terms of:
 - » Limited and selective use of pesticides
 - » Alternate food source
 - » Right diversity
 - » Refugia
 - » Microclimate
 - » Alternate host/prey insect
 - » Behavioral manipulation
 - » Host plant resistance
 - » Other cultural practices



SUGGESTED ACTIVITY

As a summary of the Lesson, the trainer shall provide an exercise/ exam for the trainees. At least 15 specimen samples of common coconut pests in various growth stages shall be displayed on a table. Trainees will identify the insect pests as instructed by the trainer.



Lesson 2: Coconut Disease Management



KEY LEARNING POINTS

- Poorly-managed farms are caused by no maintenance, no good agricultural practices (i.e. irrigation, fertilization, and planting system), and pest and disease infested.
- Diseases for coconuts are inevitable but farmers can use different preventive measures and disease management.
- Epidemic diseases arise from the interaction of three factors: a susceptible host, a virulent pathogen and a favorable environment

DISEASE TRIANGLE



Figure 15. Disease Triangle

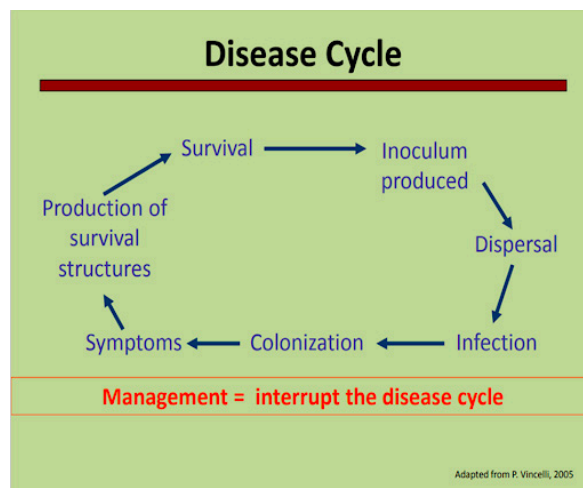


Figure 16. Disease Cycle

- Bacteria, fungi, viruses, and nematodes are the major causes of plant diseases.

Table 4. Comparison of Diseases Cycles

	Fungi	Bacteria	Viruses	Nematodes
Survival	Crop Residue Soil Alt. Hosts -	Crop Residue Soil Alt. Hosts Insect Vectors	- - Alt. Hosts Insect Vectors	Crop Residue Soil - -
Dispersal	Wind Rain Insects	Wind Rain Insects	- - Insects	Tillage Equipment Water Run-Off
Infection	Directly Wounds Insect Feeding	- Wounds Insect Feeding	- - Insect Feeding	Directly - -

Source: Lamban, S. Q. (2022). *Coconut Diseases and Management in Coconut-Based Farming System*. Department of Agriculture, Philippine Coconut Authority- Davao Research Center.

- Disease Management Practices aim to interrupt the disease cycles through variety selection, management of insects, weeds, and nematodes, cultural practices, reduce plant stress, and fungicides (i.e. seed treatments, foliar fungicides)
- There are three major coconut diseases:
 - » Cadang-Cadang
 - a. Symptoms: Increase from early stage, middle stage, to late stage.
 - b. Disease management focuses on prevention and early detection.
 - Restricted movement of planting materials and infected palm parts outside identified disease boundaries.
 - Early detection of the disease using molecular hybridization assay (MHA)
 - Removal of sources of infection in the field by cutting down and burning diseased palms.
 - Replanting with early bearing palms or with seedlings from survivor palms.

- » Phytophthora or “Bud Rot”
 - a. Caused by a water mold called Phytophthora palmivora, which spreads very rapidly in humid environments and in homogenous susceptible cultivars.
 - b. Symptoms: Wilting of the spear leaf, spear leaf turns brown and bends down, and drooping of leaves and falling of leaves one by one, leaving only the lower mature.
 - c. Disease management focuses on:
 - Adopt proper spacing and avoid high density planting
 - Implement regular field sanitation.
 - Provide adequate drainage in water logged areas
 - Spraying and trunk injection
- » Leaf Spot Diseases
 - a. Caused by several types of fungi like Pestalotiopsis palmarum and Helminthosporium sp.
 - b. Symptoms: Spots gradually turn brown with an ashen gray center surrounded by dark brown bands. Minute, black, ovoid fruiting bodies of the fungi may be seen on the upper surface of the affected leaf.
 - c. Disease management focuses on:
 - i. Preventive Measures
 - Space seedling at 60 x 60 cm triangular distance to provide adequate room for developing palms.
 - Prune and collect damaged leaves and burn severely infected seedlings in the nursery.
 - Do not overgrow seedling in nursery,
 - Overcrowding predisposes young palms to infection.
 - ii. Control Measures
 - Apply recommended fertilizer both for coconut seedlings and fields planted.
 - Spray fungicides like Vitigran Blue, Captan 500, Daconil 2787 at 3 tbsp. per gallon of water every 15 days for leaf spot still occurring despite fertilization.
 - Application of Potassium Chloride can deter the occurrence of leaf spots.

- Disease Management in Coconut-Based Farming Systems (CBFS)
 - » Recommendations for Coconut and Cacao CBFS Disease Management
 - Plant resistant varieties of cacao to Phytophthora diseases.
 - Intercrop cacao in non-elevated areas with low relative humidity.
 - No cacao-coconut intercropping in areas with a history of Phytophthora disease incidence.
 - In case of disease incidence, treat both coconut and cacao with systemic fungicides (Aliette, Ridomil, Fosject) through trunk injection or root infusion technique.
 - No cacao intercropping in MYD, MRD and hybrids (cross with MYD and MRD) known to be susceptible to Phytophthora.
 - No intercropping in areas planted with MAWA hybrids which were devastated by the Phytophthora disease in early 1990's.
 - Cut and burn infected trees and spray with systemic fungicides the surrounding trees 10 meters radius to eradicate them.
 - Avoid high density planting in coconut-cacao intercropping.
 - For disease prevention, adopt the GAP for CBFS.
 - Ensure regular monitoring of Phytophthora diseases both in cacao and coconut for early detection and prevention.

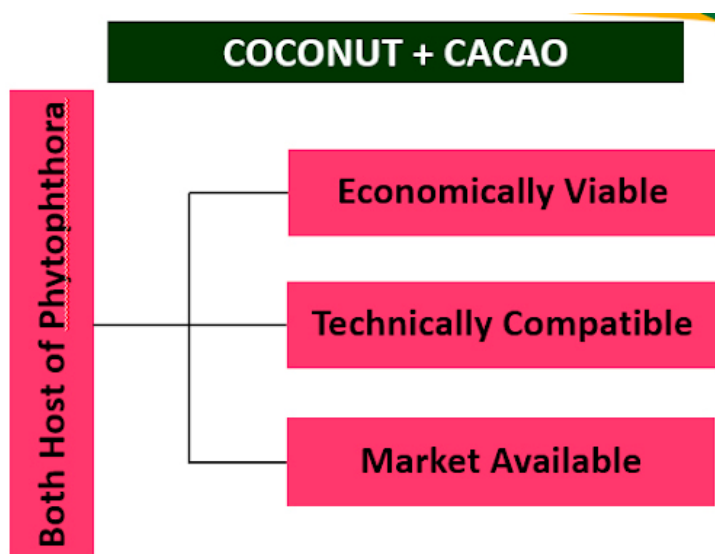


Figure 17. Coconut and Cacao CBFS Disease Management

- Recommendations for Coconut and Coffee CBFS Disease Management
 - » Ensure proper disposal of infected plant parts.
 - » Ensure regular pruning and trimming of coffee plants.
 - » Prevent dispersal of fungal spores through spraying of copper fungicides
 - » Avoid high planting density of coffee in dwarf varieties of coconut.
 - » Provide fertilization of Potassium Chloride

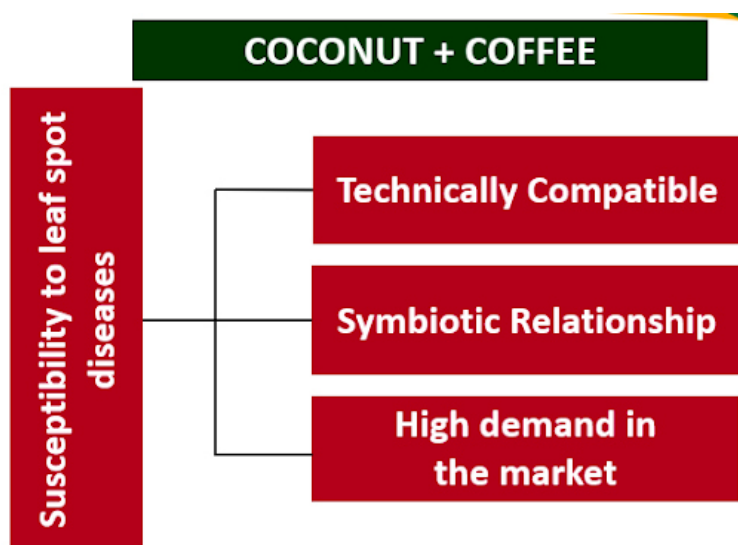


Figure 18. Coconut and Coffee CBFS Disease Management



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MODULE 8

Farm Diversification

OBJECTIVES

At the end of this module, participants shall be able to:

1. Summarize the benefits of intercropping of coconut and livestock integration;
2. Enumerate and discuss the factors to be considered for a successful intercropping system and livestock integration; and
3. Summarize the risks associated with intercropping and livestock integration.

DURATION

2 hours

TOPIC/S

Topic	Method	Tools
Lesson 1. Intercropping with Cacao and Coffee	Lecture and presentation	Visual Presentation
Lesson 2. Livestock Integration (Swine, Cattle, Goat and Poultry)	Lecture and presentation	Visual Presentation

NOTES TO TRAINER

- Prepare the necessary materials for the module.
- Engage the participants during the discussion, especially in terms of knowledge and best practices sharing on coconut pest and disease management.
- Prepare the participants for the practicum indicated in this module.



Lesson 1: Intercropping with Cacao and Coffee



KEY LEARNING POINTS

- Coconut-Based Farming System or CBFS is the integration of complementary enterprises in coconut farming including intercropping, livestock integration, processing of coconut and intercrops products and by-products
- Intercropping is the process of growing of two or more crops simultaneously on the same piece of land
- Coconut is suitable for intercropping because of its planting distance, its morphological features, its nature of canopy in relation to solar radiation, and its root system.
- There are 4 subcategories of intercropping:
 - » Mixed intercropping is when two or more crops are grown without a pattern.
 - » Row intercropping is when two or more crops are grown in a distinct row arrangement
 - » Strip intercropping is when cultivation of different crops in alternate strips of uniform width and on the same field
 - » Relay intercropping is growing of two or more crops on the same field with the planting of the second crop after the first one has completed its development.
- There are factors to be considered for a successful intercropping system:
 - » Market demand
 - » Selection of good quality planting materials
 - » Sunlight availability at the different growth stages of coconut palms
 - » Favorable growing conditions to attain the potential productivity of the crop

Table 5. Factors to be Considered for a Successful Intercropping System

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 - cowpea, peanut, mungbean, sitao, beans Root crops - sweet potato, gabi Fruit crops - pineapple, citrus, watermelon, papaya, banana Vegetables - tomato, cabbage, eggplant, sweet pepper, hot pepper, okra
II	7-25 years	Moderate to Low/Highly Suitable Crops: Black pepper, cacao, coffee, tomato, vanilla, ginger, lanzones, rambutan, durian, mangosteen, gmelina tree (for wood and lumber)
III	26-60 years	High/Highly Suitable Crops: Cereals - corn, upland rice Legumes - cowpea, peanut, mungbean, beans Root crops - sweet potato, gabi, cassava, ubi Beverage crops - coffee, cacao Fruit crops - banana, lanzones, rambutan, durian, mangosteen, citrus Wood and Lumber Tree - gmelina Fiber crops - ramie, abaca

Source: Mercullo, W. A. (2022). *Coconut-Based Farming System: Livestock Integration*. Department of Agriculture, Philippine Coconut Authority, Davao Research Center.

- Coconut + Cacao Cropping Model
 - » Cacao is a popular, stable and marketable long term beverage crop and is widely planted under and between stands of coconut trees.
 - » To be compatible and productive intercrop, the cacao tree is planted not closer than 2m from the base of coconut trees, at 3m between hills and 3m between rows.

Table 6. Growing Conditions for Coconut and Cacao

Climatic/Soil factors	Coconut	Cacao
Altitude (MASL)	Less than 600	Less than 300
Temperature (°C)	24-29	18-32
RH (%)	80-90	
Light	>2000 sunshine hours	Shade Tolerant
Total Annual Rainfall (mm)	1500-2000	1250-2800 (no drought > 3 months)
Typhoon Frequency (%)	< 20	< 20
Soil Depth (cm)	> 75	> 1500
Drainage	Moderate to well drained	Well drained
Soil Acidity (pH)	5.5-7.5	4.5-7.0
Soil Texture	Sandy, loamy, clayey	Loamy, clayey
Major Nutrients	N, K, Cl, S, P, Ca, Mg, B	N, P, K, Ca

Source: Mercullo, W. A. (2022). *Coconut-Based Farming System: Livestock Integration*. Department of Agriculture, Philippine Coconut Authority, Davao Research Center.

- Necessary Preparations for Coconut + Cacao Cropping Model
 - » During planting, one must take into consideration the following:
 - Fertilization method
 - Pruning
 - Shaping
 - Achieving the economical tree height
 - Adequate air circulation and sunlight penetration
 - Minimize pest and disease incidence
 - Bagging to prevent pest and diseases infestation.
 - » During harvesting, one must take into consideration the following:
 - Pods turns yellowish or reddish orange in color
 - Pick cacao fruits only when they are fully mature (147 days)
 - Done regularly to avoid overripe pods in the trees
 - Selective harvesting is done by hand using knives or machetes
 - Pulling the pods from the tree damages the flower cushions

and destroys the bark

- » During the postharvest, one must take into consideration the following:
 - Dry under the sun or by a mechanical dryer
 - Dried beans are kept in gunny sacks and stack on raised platforms
 - Avoid damp conditions to control fungus attack which lower the bean quality.
 - Avoid injuring the beans during pod-splitting.
 - Wet cocoa beans should undergo fermentation for 7 days in order to kill the seeds and enhance the chocolate flavor.
- Coconut + Coffee Cropping Model
 - » Excelsa, like Robusta, grows well in moderately shaded conditions in elevation up to 600 meters above sea level. Fruits or berries ripen in about 12 months from flowering (berry size bigger than Robusta and Arabica).
 - » Pruning Steps:

Table 7. Growing Conditions for Coconut and Coffee

Climatic/Soil factors	Coconut	Coffee
Altitude (MASL)	Less than 600	Arabica 700-1800
Temperature (°C)	24-29	15-29
RH (%)	80-90	70-85
Light	>2000 sunshine hours	1,000-3,000 ft Candles
Total Annual Rainfall (mm)	1500-2000	1500-2000
Typhoon Frequency (%)	< 20	
Soil Depth (cm)	> 75	> 75
Drainage	Moderate to well drained	Well drained

Climatic/Soil factors	Coconut	Coffee
Soil Acidity (pH)	5.5-7.5	4.5-6.5
Soil Texture	Sandy, loamy, clayey	Loamy, clayey
Major Nutrients	N, K, Cl, S, P, Ca, Mg, B	N, P, K, S, Ca

Source: Mercullo, W. A. (2022). *Coconut-Based Farming System: Livestock Integration*. Department of Agriculture, Philippine Coconut Authority, Davao Research Center.

- Removal of unnecessary branches (excess, old and dead branches) and undesirable sprouts
- Regulates the height of the plants facilitates harvesting and other field operations, promotes better aeration and light penetration
- Best done before general flowering or after harvest.
- » During harvesting, one must take into consideration the following:
 - Maturity of berries is 6 to 8 months after blooming but varies on the environmental factors from region to region
 - For quality beans, harvest only matured berries (i.e. berries turn red from its green color)
 - Some growers pick up coffee berries by priming or berries selected individually
- Coconut + Banana Cropping Model
 - » A farm layout of a coconut-banana cropping model under square and triangular planting system of coconut spaced 8-10m using square and triangular methods.
 - » During the planting of coconut and banana, one must take into

Table 8. Growing Conditions for Coconut and Banana

Climatic/Soil factors	Coconut	Banana
Altitude (MASL)	Less than 600	Less than 750
Temperature (°C)	24-29	15-35
RH (%)	80-90	
Light	>2000 sunshine hours	3,000-8,000 ft Candles
Total Annual Rainfall (mm)	1500-2000	> 1000 (10-12 mos)
Typhoon Frequency (%)	< 20	
Soil Depth (cm)	> 75	> 75
Drainage	Moderate to well drained	Well drained
Soil Acidity (pH)	5.5-7.5	6.0-7.5
Soil Texture	Sandy, loamy, clayey	Loamy, clayey
Major Nutrients	N, K, Cl, S, P, Ca, Mg, B	N, P, K, Ca, Zn, B

Source: Mercullo, W. A. (2022). *Coconut-Based Farming System: Livestock Integration*. Department of Agriculture, Philippine Coconut Authority, Davao Research Center.

consideration the following:

- Dig a hole the size of the planting materials.
- Planting corms in a slanting position with growing points on top.
- Suckers must be in an upright position and cover with soil up to the collar and press gently.
- For tissue cultured seedlings, remove polybag upon planting
- » Harvest indicators for coconut and banana:
 - Fruits are full, plum, round and light green
 - Angles of the fingers are rounded
 - Leaves turn yellow
- » There are advantages of intercropping such as:
 - Increase yield and food security
 - Increased stability of farmers through crop diversification

- Cash crop during farm establishment
- Efficient labor utilization
- Gain knowledge about other crops
- Conserving foreign exchange by supplying domestic market with essential food products
- Increase soil fertility
- Lower the air temperature
- » There are also disadvantages of intercropping such as:
 - Competition between intercrops and the main crop
 - Intercrops may be uneconomical when light is insufficient
 - Intercrops may harbor diseases or attract pests for coconut and oil palm
 - Increase in farm inputs such as fertilizer and labor
 - Growth habits of intercrops may cause difficulty in certain management for the main crop
 - Intercropping may demand a high level of skill from the farmer



Lesson 2: Livestock Integration (swine, cattle, goat, and poultry)



KEY LEARNING POINTS

- Livestock integration is important as the animals are beneficial to the management of coconut and this practice is meant for reducing costs and increasing yield by exchanging resources between systems (e.g. crop residues are used for animal feed while excreta are used as organic manure for the crops)
- In monoculture, coconut palms utilize only 25% of the space. It gives ample possibilities for systemic integration of livestock to increase farm productivity
- Benefits of livestock integration:
 - » Optimization of the productivity of the lands
 - » Efficient system of nutrient cycling
 - » Reduce cost of production
 - » Minimize risk (during crop failure and low price)
 - » Serves as a saving
 - » Efficient use of crop and animal by-products
- There are two livestock production systems:
 - » Ruminant production system for cattle, carabao, goat and sheep
 - Grazing: Livestock can directly consume the growing forages under coconut.
 - Cut-and-Carry: Fresh forages are collected daily to feed housed livestock.
 - » Non-ruminant production system for poultry and pigs
 - » Small Ruminant:
 - It should only be raised in areas without intercrops
 - Not more than twelve adult per hectare is recommended
 - » Large Ruminant:
 - One to two animal units per hectare is recommended, but for cut and carry or feedlot system, more animals per hectare
 - With adequate pasture grasses and legumes are available year-round

- Factors to be considered in Livestock Integration
 - » Type of livestock to be integrated depends on purpose of keeping
 - » Available resources
 - » Demand for Output (Market of the Product)
 - » Environmental factors
 - » Growth stages of plantation
 - » Type of livestock to be kept
- Socio-economic Barriers that affect the Pasture/Fodder Production
 - » The economic value and marketability for the animal products
 - » The availability of land and land tenure
 - » Accessibility to finance and knowledge
 - » Motivation of the farmer
 - » Economic alternative within the farming system
- Qualities of pasture/fodder species to be established
 - » Low competition for plant nutrients and soil moisture
 - » Able to withstand shade
 - » Good response to fertilizer application
 - » High yielding and compatible for growing of legumes
 - » Relished by livestock
- Suitable grasses serve as main feed for ruminants and it produces more biomass than legumes.
- Suitable legume crops are cheap and it has a better quality source of feed. It provides protein, vitamins and minerals for livestock raising. Also, it has a lesser chance of ingesting infective larvae as compared to grazing lower growing vegetation.
- Proper pasture management is essential to get the maximum herbage production to avoid undesirable effects on palms. It involves fertilizer application, watering during dry season and grazing management.
- Proper grazing management is essential to avoid competition with palms and overgrazing, and to ensure maximum herbage production
 - » Rotational Grazing is when the grazing area is divided into several paddocks and allow the livestock to graze
- Dry season feed and feeding system determine the quantity and quality

of forage available for animal decline

- » Surplus of forage during wet season can be used to overcome the feed shortage in dry season
- » Excess forage can be preserve as hay or silage
- Limitations of Animal Integration
 - » Socio-cultural Factors such as religious barriers and personal belief
 - » Large ruminants can cause damage to soil structure if they are grazed on heavy soils under wet conditions and if high stocking rates are maintained.
 - » Dominance of some weed species
 - » Some plant species will be removed to give way for the growth of needed plant species, losing the plant biodiversity
 - » Young palms can be damaged by the animals
 - » Pasture and fodder are affected by the dry season with the lack of feed.

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MODULE 9

Harvesting and Postharvest Operations (with Practicum)



OBJECTIVES

At the end of this module, participants shall be able to:

1. Discuss the importance of proper handling of coconut products and by-products;
2. Discuss the different treatment technologies; and
3. List and discuss the different harvest and postharvest technologies available.



DURATION

1 hour 30 minutes



TOPIC/S

Topic	Method	Tools
Lesson 1. Handling Practices and Treatment Methods	Lecture and presentation	Visual Presentation
Lesson 2. Harvest and Postharvest Technologies	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Emphasize the importance of the handling procedures and treatment methods for high-quality coconut products and by-products.
- Prepare the necessary materials and visual aids for better understanding of the processes.
- Conduct the discussion on the demo site, with actual equipment, for better appreciation of the processing technologies.
- Encourage participation and exchange of ideas and questions.



Lesson 1: Handling Practices and Treatment Methods



KEY LEARNING POINTS

- Proper harvest and postharvest handling practices prevent losses and optimizes the quality of produce.
- When collecting sap:
 - » Select bearing palms with healthy unopened inflorescence
 - » Proper bending of inflorescence should be done to prevent breakage and maximize sap yield.
 - » Tapping should be done by using a sharp scythe.
 - » Frequency of collection of coconut sap is generally two to four times a day depending on the intended use.
 - » The tip of the inflorescence should be covered appropriately to prevent exposure to sun, wind, and insects.
 - » Harvesting tools and collecting vessels should be used solely for the purpose. Tools should be made from food-grade materials, cleaned and disinfected regularly, and stored away from potential contaminants.
- When harvesting coconut fruit, consider:
 - » Maturity indices according to purpose:
 - For young coconut or “buko” processing: 9 months or less
 - For bukayo processing: 10 months
 - For makapuno: 9-11 months
 - For oil, milk and desiccated coconut processing and for seed purposes: 11-12 months
 - » Harvesting technique
 - Young coconut or buko should be harvested by bringing down bunches with the aid of rope to prevent breakage.
- For postharvest handling, consider:
 - » Storage
 - Harvested fruits should be stored under shade.
 - Husked nuts should be stored away from direct sunlight and not in direct contact with the soil, and properly secured from stray animals.

- » Preparation for market
 - Discard fruits which are unmarketable due to excessive insect damage, decay or undesirably small fruit
 - Cleaning with damp cloth or cotton gloves to remove dirt, dust or undesirable stains
 - De-husk coconuts dried for several days
 - To prevent browning for 5-7 days, de-husked coconuts can be dipped in a 1% to 3% sodium metabisulfite solution for 2-5 minutes
 - Grade coconuts intended for export according to size, uniformity of shape, and degree of skin blemishes
 - Categorize coconut size as: small, medium and large
 - Extend market life of water coconut by waxing with paraffin
 - Domestic coconuts usually sold in bulk are packed in large synthetic or mesh sacks or in large wooden bins
 - Coconuts for export are usually de-husked and packed in strong well-ventilated fiberboard cartons, with a minimum 275 psi test strength. The carton typically has a net weight of 18 kg (40 lb)
- » Transport
 - Conveyances for transporting the harvested coconut sap should be made of such material and construction that will permit easy and thorough cleaning.
 - Facilities should be maintained clean and disinfected.
 - All handling procedures should prevent the coconut sap from being contaminated.
 - For purposes other than vinegar and toddy, care should be taken to prevent fermentation and to protect against contamination.
 - Avoid rolling of the fruits while in transit and dropping during loading and unloading to prevent cracking or mechanical injuries.



Lesson 2: Harvest and Postharvest Technologies



KEY LEARNING POINTS

- Healthy palms can produce 12 bunches a year and proper harvesting techniques should be used to ensure coconut quality.
- Two most common methods are: pole and climbing methods.
- Pole method:
 - » Requires a scythe which will be used to cut the coconut bunch from the palm.
 - » Less tedious, more efficient, and generally faster
 - » Done to shorter coconut trees
- Climbing method:
 - » Farmer climbs up the coconut tree then proceeds to snap the coconut off.
 - » Farmers may climb the tree with or without the help of a climbing device
 - » Done for taller coconut trees
- For seednuts or tender coconuts, the bunches should be brought down by a rope
- After harvesting, the following operations must be done:
 - » Collection
 - » Ripening
 - » Dehusking
- Collected coconuts must be left to ripen on a dry place, which increases coconut quality especially for less mature nuts.
- Coconuts must be dehusked before being transported for production.
- Dehusking is usually a manual process unless producers invest in machines.

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MODULE 10

Coconut Processing



OBJECTIVES

At the end of this module, participants shall be able to:

1. List the different coconut products;
2. Discuss the processes of the said coconut products; and
3. Discuss the importance of upholding high food safety standards.



DURATION

6 hours 30 minutes



TOPIC/S

Topic	Method	Tools
Lesson 1. Coconut Coir-based Processing	Lecture and presentation	Visual Presentation
Lesson 2. Coconut Sap Sugar Processing	Lecture and presentation	Visual Presentation
Lesson 3. Coconut Shell Charcoal Processing	Lecture and presentation	Visual Presentation
Lesson 4. Coconut Water Processing	Lecture and presentation	Visual Presentation
Lesson 5. Virgin Coconut Oil Processing	Lecture and presentation	Visual Presentation
Lesson 6. Food Safety Standards	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Showcase the coconut products and materials they would need during the discussion for better appreciation of the topic.
- Conduct the discussion on the demo site, complete with equipment and sample materials to be used, for better understanding.
- Highlight the increase in profit if coconut products are successfully produced.
- Encourage participation, exchange of ideas, and asking of questions.
- Provide additional learning videos found on the PCA-NFPDD online channels.



Lesson 1: Coconut Coir-based Processing



KEY LEARNING POINTS

- Coir is a versatile fiber obtained from coconut palms.
- Coir is extracted from the coconut husks through either:
 - » Retting
 - » Decorticating
 - » Defibering
- Retting:
 - » Husks are soaked in ponds or waterholes which causes the fibers to loosen
 - » Cheapest yet longest process
- Decorticating:
 - » Husks are fed in a cylinder then crushed, forcing coir fiber and dust to separate
 - » Popular method here in the Philippines
- Defibering:
 - » Scraping of coir and coir dust from the coconut husk
- Available coconut husk processing machines
 - » Single Pass Mobile Decorticating Machine
 - » Manual Coir Baling Machine
 - » Manual Twining Machine
 - » Pedal-Type Twining Machine
 - » Mechanized 2-Ply Twining Machine: Model 1 and 2
 - » Ratchet-Type Looming Machine
- Potential coir products:
 - » Coir placemats
 - » Bags
 - » Vases
 - » Lampshades
 - » Pots
 - » Baskets



Lesson 2: Coconut Sap Sugar Processing



KEY LEARNING POINTS

- Coconut sap is the sweet, translucent liquid that comes from the tapped, unopened, inflorescence of the coconut palm.
- Also known as toddy or “tuba”.
- Coconut sap sugar is the sweetener that comes from boiling fresh coconut sap.
- Steps of the coconut sap sugar production:
 - » Harvesting of sap
 - Tools used to harvest sap must be disinfected regularly.
 - Make sure to harvest only from a healthy, unopened inflorescence or spathe.
 - Inflorescence must be positioned downward for one week to allow easy removal of sap.
 - Collect sap in a clean, plastic vessel
 - Once finished, producer must cover the inflorescence to avoid contamination.
 - » Evaluation of sap
 - Collected sap must be evaluated for a pH less than or equal to 6.
 - Must also be translucent to clear.
 - Sap may be filtered using a stainless steel strainer.
 - » Transportation of sap
 - Vehicle of transportation must be clean without any dust
 - Sap container must be sealed and covered.
 - » Boiling of sap
 - Boil sap up to 115 to 120 degree celsius to remove water.
 - Stir continuously until sap becomes brown thick syrup.
 - » Granulation of sap
 - Allow syrup to cool until sugar granules are formed.
 - A stainless steel wire whisk can help the granulation process.
 - Press and crush the granules when cooling is done.

- » Grinding and Sieving
 - Sieve the crushed sugar granules to produce a more uniformed size.
- » Drying
 - Let dry in oven until moisture content is below 4%
- » Packing and Storing
 - Pack coconut sugar in either polyethylene bags, laminated plastic, or laminated aluminum foil.
 - Store in a cool place with a relative humidity of 30 to 40% RH.
 - Inspect storing facility regularly for pests or infection.
- » Marking and Labeling
 - Provide the final product with the appropriate product labeling



Lesson 3: Coconut Shell Charcoal Processing



KEY LEARNING POINTS

- Coconut shell is suitable for carbonization and can be easily created into charcoal.
- Shell charcoal is obtained by burning fully matured coconut shells with a limited supply of air.
- Briquette is the molded charcoal made from the carbonized coconut shells and mixed with a binder to retain its shape.
- Briquette-Making Process:
 - » Coconut biomass collection
 - » Drying of biomass
 - » Carbonization
 - » Grinding of charcoal
 - » Mixing of charcoal powder with binder
 - » Molding of mixed charcoal into briquette
 - » Sun-drying
 - » Quality testing
- Machineries needed:
 - » Brick charcoal kiln with smoke trap
 - » Charcoal grinder
 - » Charcoal mixer
 - » Briquette dryer
 - » Briquetting machine



Lesson 4: Coconut Water Processing



KEY LEARNING POINTS

- Coconut water is a pure, nutritious and healthy natural beverage.
- Coconut water is high in electrolytes, vitamins, and other nutrients.
- Coconut water harvested from matured coconuts contains more organic ions e.g. calcium, potassium, magnesium, phosphorous, and magnesium compare with young coconut water (Santosoa et al., 1996)
- Coconut water production:
 - » Selection and harvesting of matured coconuts with no cracks or holes
 - » Dehusking the coconut fruits
 - » Handling and transporting of the coconut fruits to the processing site
 - » In-site pre cleaning of coconuts
 - » Washing, sanitizing and rinsing of pre-cleaned coconut fruits in a series of washing tanks
 - » Draining and air drying of washed and rinsed coconuts
 - » Extracting and filtering of the coconut water
 - » Precooling the pasteurized coconut water
 - » Chilling the precooled coconut water
 - » Packing
 - » Storage



Lesson 5: Virgin Coconut Oil Processing



KEY LEARNING POINTS

- Virgin Coconut Oil or VCO is obtained from the fresh and mature meat of the coconut and is the purest form of coconut oil.
- VCO should be:
 - » Colorless
 - » Sediment-free
 - » Has a natural coconut scent
 - » Free from rancid odors or taste
- Compared to regular coconut oil or RCO, VCO has more vitamins, minerals, and antioxidants.
- VCO processing technologies:
 - » Fresh-dry process
 - » Fresh-wet process
- Usual processing and post-processing procedures include:
 - » Grating and extraction
 - » Settling and fermentation
 - » Oil separation
 - » Filtration



Lesson 6: Food Safety Standards



KEY LEARNING POINTS

- Consumers demand coconut products that are high-quality, nutritious, and safe for consumption.
- Contamination can happen at every stage of the coconut production process.
- Food safety challenges in every step include:
 - » Harvesting
 - Contamination from harvesting tools which are not properly disinfected
 - Unsuitable raw materials were not segregated properly
 - » Processing
 - Improper handling of waste materials during and after the coconut production process, increasing chances of contamination.
 - Contamination from processing equipment which was not regularly disinfected.
 - » Packaging
 - Cross contamination from packaging materials.
 - Packaging materials were not handled properly.
 - » Storage and transport
 - Finished product was not transported using a clean, dry, and cool vehicle.



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MODULE 11

Economics of Coconut Production



OBJECTIVES

At the end of this module, participants shall be able to:

1. Discuss the steps on creating a productive and sustainable farming business;
2. Discuss the importance of record-keeping;
3. Discuss how to properly track and analyze their operations; and
4. Explain the need for proper storage facilities and ventilation.



DURATION

2 hours



TOPIC/S

Topic	Method	Tools
Lesson 1. Economics of Coconut Production	Lecture and presentation	Visual Presentation
Lesson 2. Typhoon Damage Assessment Protocol	Lecture and presentation	Visual Presentation
Lesson 3. Storage Facilities	Lecture and presentation	Visual Presentation
Lesson 4. Ventilation	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- What are important highlights that the trainer needs to discuss?



Lesson 1: Economics of Coconut Production



KEY LEARNING POINTS



Figure 19. Workflow of Productive Coconut Farm

- Key measures of financial performance:
 - » Liquidity
 - » Profitability
 - » Solvency
- To determine the three measures of financial performance, coconut producers must practice record keeping.
- Basic phases of record-keeping include:
 - » Creation of receipts
 - » Maintain and store
 - » Analyze information
- There are two ways to analyze farm finances:
 - » Ex-Ante approach which uses projected yields and prices.
 - » Ex-Post approach which uses actual prevailing prices and yield after project implementation.
- Ex-Ante approaches:
 - » Enterprise budgeting
 - Records the revenue, expenses, and profit of a single enterprise.
 - Helps compare profitability of enterprises
 - » Whole farm budgeting
 - Records the type and volume of production
 - Helps create an estimate of income and expenses
- Important records to take note of:

- » Revenue or income
- » Variable expenses
- » Fixed costs
- Possible sources of documents for cost and return analysis
 - » Daybook record with list of farm activities
 - » Record of returns from production
 - » Record of farm labor
 - » Record of input expenses
 - » Farm inventory record
 - » Record on financing
 - » Production inventory
- Important measures of profitability:
 - » Net cash farm income
 - » Gross margin
 - » Net farm income
 - » Return to capital
 - » Rate of Return on Investment



SUGGESTED ACTIVITY

Title: Recording Keeping Activity

Materials: Papers, pens, calculators

Procedure:

1. Ask participants to list down the typical farming activities of the following:
 - a. Returns from Crop production
 - b. Record of Farm Labor
 - c. Record of Input Expenses
 - d. Farm Inventory and Schedule of Depreciation
2. After ask participants to compute for the total values and total at the bottom
3. Ask participants to computer the depreciation cost
4. Ask participants to compute for the cost and return analysis



Lesson 2: Typhoon Damage Assessment Protocol



KEY LEARNING POINTS

- Types of DRRM reports needed. Forms can be found in Annex E to G

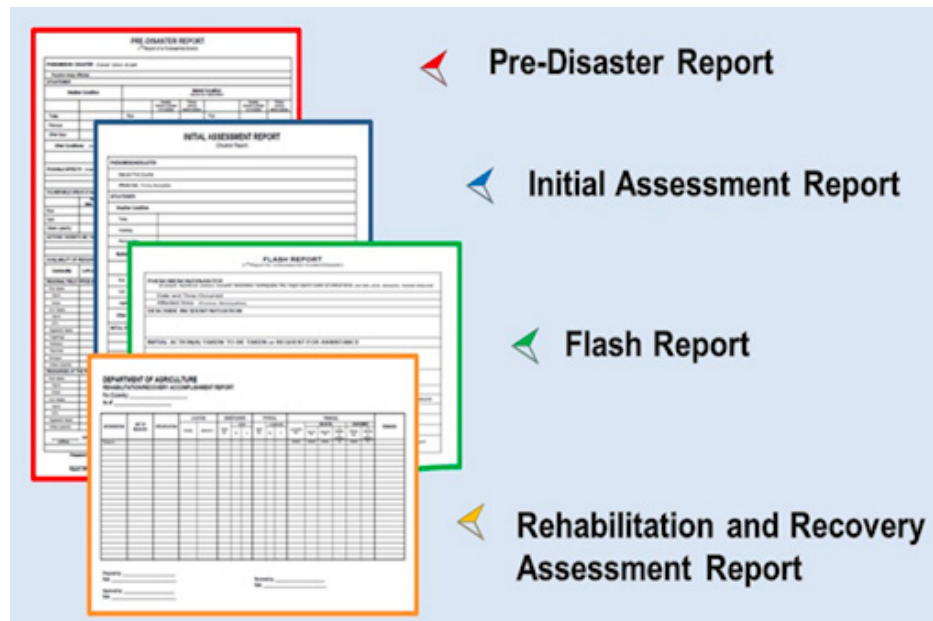


Figure 20. Types of DA DRRM Reports

- Damage and Loss reports

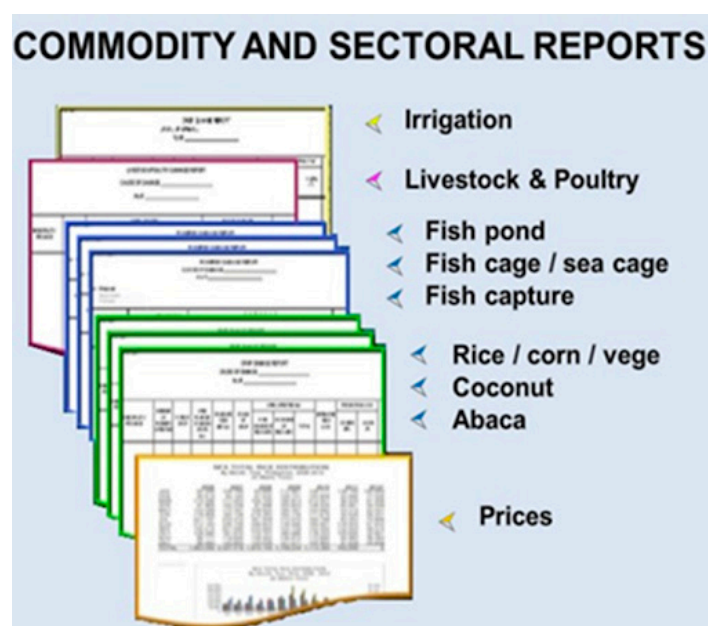


Figure 21. DA DRRM Commodity & Sub-Sector Reports

- Situation, Damage, Loss and Needs Data for Crops (See Annex H for Prescribed DA Report Form)
 - » Standing Crop Before Typhoon
 - Area (ha)
 - Trees (number of trees/ha)
 - » Area affected (ha)
 - Totally Damaged (if yield loss is 90-100%)
 - Partially Damaged (if yield loss is at most 89%)
 - Total Damaged Area (ha) = Totally Damaged (ha) + Partially Damaged (ha)
 - » Trees Affected (number)
 - Totally Damaged (if yield loss is 90-100%)
 - Partially Damaged (if yield loss is at most 89%)
 - Total Damaged Area (ha) = Totally Damaged (ha) + Partially Damaged (ha)
 - » Yield (MT/ha)
 - Yield before typhoon
 - Yield after typhoon
 - » Yield Loss %
 - Indicates % of yield that cannot be harvested
 - % Yield Loss = $\left[\frac{\text{Yield}_{\text{before calamity}} - \text{Yield}_{\text{after calamity}}}{\text{Yield}_{\text{before calamity}}} \right] \times 100$
 - » Total Losses Based on Cost of Production:
 - For Totally Damaged Area:

Value = Totally Damaged Area (ha) x Yield Loss (%) x Cost of Production per Hectare (PhP)
 - For Partially Damaged Area:

Value = Partially Damaged Area (ha) x Yield Loss (%) x Cost of Production per Hectare (PhP)
 - Total Value Loss for the Damaged Areas:

Value = Loss based on Cost of Production per Hectare for Totally Damaged Area + Value loss based on Cost of Production per Hectare for Partially Damaged Area

- » Total Losses Based on Farmgate Price:
 - For Totally Damaged Area:
 - Volume = Totally Damaged Area (ha) x Yield before Calamity (MT) x Yield Loss (%)
 - Value (Php) = Volume (Totally Damaged) x Farmgate price x 1,000
 - For Partially Damaged Area
 - Volume = Partially Damaged Area (ha) x Yield before Calamity (MT) x Yield Loss (%)
 - Value (Php) = Volume (Partially Damaged) x Farmgate price x 1,000
- » Total Loss for the Damaged Areas:
 - Total Volume = Volume (Totally damaged) + Volume (Partially damaged)
 - Total Value = Value (Totally damaged) + Value (Partially damaged)
- » Grand Total (PhP)
 - The monetary value of the damage and losses
 - Formula: Grand Total = Total Value Loss based on Cost of Production + Total Value Loss based on Farm gate Price

- Reporting timeline

Table 9. Timetable of submission of forewarned disasters

Time	Type of Report	Nature of Report
Upon advisory of impending disaster from DOST-PAGASA, PHIVOLCS, and other Early Warning Institutions	Pre-Disaster Report	<ul style="list-style-type: none"> – Identifies areas and commodities at risk – Describes prevailing situations – Forecasts potential effects – Outlines planned responses
Within 12 hours after disaster impact or as soon as conditions allow field assessment	Initial Assessment Report	<ul style="list-style-type: none"> – Provides initial description of the magnitude of the disaster and its effects – Outlines interventions needed and resources available to respond/cope
Twice a day with cut-off times at 9:00 AM and 3:00 PM for succeeding/ update reports	Update Reports	<ul style="list-style-type: none"> – From rough quantifications to more precise information
3 days after impact of a minor event (e.g. flooding of a limited area) or as soon as conditions allow, conduct field validation 7 days after impact of a major event, such as disaster of multiple incidents affecting many areas,	Partial Validated Reports	<ul style="list-style-type: none"> – 50% of affected area is validated for minor calamities – Geo-tagging of affected areas – 30% of affected is validated for major calamities – Geo-tagging of affected areas
7 days after impact of a minor event (e.g. flooding of a limited area) or as soon as conditions allow, conduct field validation 10 days after impact of a major event, such as disaster of multiple incidents affecting many areas	Final Report	<ul style="list-style-type: none"> – Final results of assessment (with geo-tagged files)
12 days after impact of a major event	Rehab Plan	<ul style="list-style-type: none"> – Final Rehabilitation Plan

Source: DA. (n.d.). *Disaster Risk Reduction and Management in Agriculture and Fisheries Operations Manual Part I. Department of Agriculture.*

Table 10. Timetable of submission of un-forewarned disasters

Time	Type of Report	Nature of Report
Upon occurrence of a disaster	Flash Report	<ul style="list-style-type: none"> – Informs that a disaster had occurred – Provides initial description of the magnitude of the disaster, secondary threats, and responses taken
Within 12 hours after disaster impact	Initial Assessment Report	<ul style="list-style-type: none"> – Provides initial description of the magnitude of the disaster and its effects – Outlines the interventions needed and resources available to cope
Twice a day with cut-off times at 9:00 AM and 3:00 PM for succeeding/update reports	Update Reports	<ul style="list-style-type: none"> – From rough quantifications to more precise information
<p>3 days after impact of a minor event (e.g. flooding in a limited area) or as soon as conditions allow, conduct field validation</p> <p>7 days after impact of a major event, such as disaster of multiple incidents affecting many areas</p>	Partial Validated Reports	<ul style="list-style-type: none"> – 50% of affected area is validated for minor calamities – Geo-tagging of affected areas – 30% of affected is validated for major calamities – Geo-tagging of affected areas
<p>7 days after impact of a minor event (e.g. flooding of a limited area) or as soon as conditions allow, conduct field validation</p> <p>10 days after impact of a major event, such as disaster of multiple incidents affecting many areas</p>	Final Report	<ul style="list-style-type: none"> – Final results of assessment (with geo-tagged files)
12 days after impact of a major event	Rehabilitation Plan	<ul style="list-style-type: none"> – Final Rehabilitation Plan

Source: DA. (n.d.). *Disaster Risk Reduction and Management in Agriculture and Fisheries Operations Manual Part I. Department of Agriculture.*

Table 11. Report cut-off times

Report	Purpose	RFOs/AAs/ACs to the Central Office	Central Office to the Secretary
<ul style="list-style-type: none"> Situationer Damage and Loss 	<ul style="list-style-type: none"> For Secretary's report to the President For the Secretary's day news 	9:00 AM	12:00 PM
	<ul style="list-style-type: none"> For the Secretary's afternoon / evening news and following day's early morning news 	3:00 PM	5:00 PM
<ul style="list-style-type: none"> Flash Report 	<ul style="list-style-type: none"> For Secretary's report to the President For the Secretary's day, evening news 	As soon as possible	As soon as possible

Source: DA. (n.d.). Disaster Risk Reduction and Management in Agriculture and Fisheries Operations Manual Part I. Department of Agriculture.

• Report flow

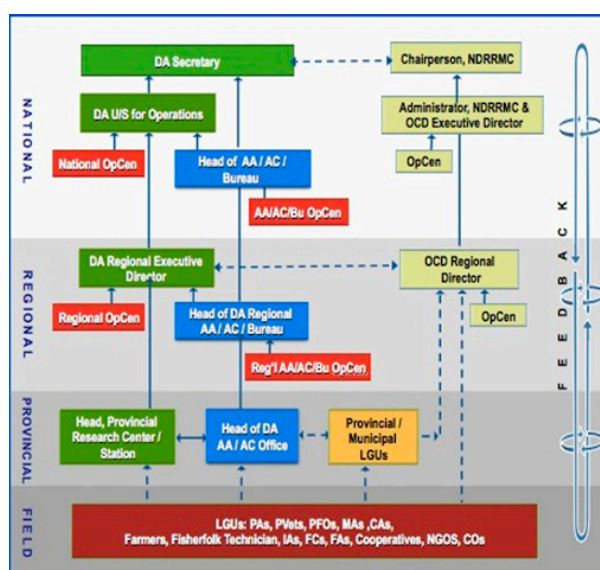


Figure 22. Report flow of DRRM reports

REFERENCES

DA. (n.d.). Disaster Risk Reduction and Management in Agriculture and Fisheries Operations Manual Part I. Department of Agriculture.



Lesson 3: Storage Facilities



KEY LEARNING POINTS

- Agricultural inputs, farm implements, and harvesting tools should each have its own storage facility.
- Storage areas should be well-ventilated, dry, and clean.
- Agrochemicals should have its separate storage away from from the coconut production site, living quarters of farmers, and water sources.
- Important storage practices:
 - » Liquid formulations must not be stored above powders.
 - » Filling and mixing areas must always be prepared in case of any spillages from production.
 - » Chemicals must be stored away and locked.
 - » Storage facilities must always be free from waste.



Lesson 4: Ventilation



KEY LEARNING POINTS

- Coconuts should be provided with adequate ventilation.
- Proper ventilation draws in fresh outdoor air that is also filtered from particles. The air is then mixed in with indoor air
- Assuring an adequate supply of outdoor air will help with coconut quality and will support the health of workers.

REFERENCES

Department of Agriculture. (n.d.) Economics of Coconut Production: Farm Record Keeping and Cost and Return.

Philippine Coconut Authority. n.d. Implementing Rules and Regulations to Enforce Standards in the Production and Marketing of Virgin Coconut Oil (VCO). Quezon City, Metro Manila. Retrieved from: https://pca.gov.ph/pdf/techno/vco_standard.pdf

University of Massachusetts. n.d. Proper Ventilation Guidelines. Retrieved from: <https://ehs.umass.edu/sites/default/files/Ventilation%20Guidelines.pdf>

MODULE 12

Environmental and Personnel Safety

OBJECTIVES

At the end of this module, participants shall be able to:

1. Discuss the importance of providing a safe environment for their workers and farm outputs;
2. Explain the necessary guidelines when creating safe environments; and
3. Discuss the importance of waste management.

DURATION

2 hours

TOPIC/S

Topic	Method	Tools
Lesson 1. Economics of Coconut Production	Lecture and presentation	Visual Presentation
Lesson 2. Typhoon Damage Assessment Protocol	Lecture and presentation	Visual Presentation
Lesson 3. Waste Management	Lecture and presentation	Visual Presentation

NOTES TO TRAINER

- Prepare the necessary materials for the module.
- Encourage the participants to ask questions or share their ideas and experiences about the topics



Lesson 1: Environmental Safety



KEY LEARNING POINTS

- Biological controls such as pesticides are used to prevent possible ecological imbalance.
- The Integrated Pest Management or IPM should be used to minimize the use of pesticides.
- Different methods:
 - » Mechanical and physical through the use of traps and devices
 - » Cultural through the use of crops or soil tillage
- Farm activities, including the use of pesticides, should still comply with the Department of Environment and Natural Resources (DENR) regulations.
- Farmers must also minimize offensive odor, smoke, dust, and noise when dealing with pests.



Lesson 2: Workers Health, Safety, and Welfare



KEY LEARNING POINTS

- Farmers and farm help shall be treated in accordance to the rules and regulations set by the Department of Labor and Employment (DOLE)
- Here are some of the following conditions that must be met:
 - » Labor
 - No forced and unlawful labor
 - No discrimination during the hiring process
 - Farmers must be promptly and rightfully paid
 - » Safety
 - Safety conditions must comply with the Occupational Safety and Health Standards of DOLE
 - Farmers must always wear the appropriate equipment when handling farm inputs
 - First aid kits must always be available for accidents.
 - » Training
 - Farmers must be trained on the proper handling of coconuts and its production.
 - Farmers must have training on how to operate the equipments, chemicals, and how to proceed during accidents.
 - Instructions must also be displayed in common working areas.



Lesson 3: Waste Management



KEY LEARNING POINTS

- Coconut farms must have a proper waste disposal area.
- Coconut farmers must not throw coconut waste into rivers or streams.
- Coconut wastes must not be burnt in open air as these waste will release toxic fumes that are harmful to human health.
- Traditionally, farmers throw away coconut waste such as husks, but now these coconut wastes can become another source of income.

REFERENCES

Bureau of Agriculture and Fisheries Standards. 2018. Code of Good Agricultural Practices (GAP) for coconut (ppt). Quezon City, Metro Manila.

Rainforest Alliance. n.d. Sustainable Coconut Production. Retrieved from: <https://unctad.org/system/files/non-official-document/ditc-tab-112017-vanuatu-RainForest-II-3.pdf>.

MODULE 13

Good Agricultural Practice Certification



OBJECTIVES

At the end of this module, participants shall be able to:

1. Enumerate the requirements for GAP Certification;
2. Become familiar with the GAP Process Flow;
3. Elaborate the GAP inspection and certification process; and
4. Conduct GAP Inspection in an actual farm



DURATION

7.5 hours



TOPIC/S

Topic	Method	Tools
Lesson 1. Requirements	Lecture and presentation	Visual presentation
Lesson 2. Certification, Guidelines, and Procedures	Lecture and presentation	Visual presentation
Lesson 3. Inspection Procedure	Lecture and presentation	Visual presentation
Lesson 4. Mock Inspection	On-site mock audit	Farm site



NOTES TO TRAINER

- Prepare the necessary materials for the module.
- During the lecture and presentation, encourage interaction among participants by sharing ideas and experiences, and asking questions



Lesson 1: Requirements



KEY LEARNING POINTS

- Certification is the granting of official recognition that an entity's system of doing things conforms to required standards for quality
- 3 kinds of application for GAP:
 - » Individuals including partnerships;
 - » Groups (cooperatives, corporations, institutions organizations/ associations)
 - » Agencies managing demonstration farms of government, academic and/or research institutions, including LGUs
- Documentary Requirements for Individual and Group Application In PhilGAP Certification Process
 - » Endorsement of application from regional executive director
 - » Application form
 - » Farm and/or organizational profile
 - » Farm location map
 - » Farm layout
 - » Field operation procedures
 - » Production and harvesting records
 - » Farm inputs
 - » Soil nutrient analysis
 - » Certificate of training on GAP conducted by ATI, BPI, LGU, DA RFO, SUCs or by ATI accredited service providers
- For group applicants:
 - » Quality Management System/Internal Control System or equivalent
 - » Certificate of Registration (i.e. SEC, DOLE, CDA) and other related permits (e.f. ECC), as applicable
 - » Certificate for accreditation of farmers/growers
 - » Procedure for outgrowership scheme which will show that the group have 100% control of all registered or accredited growers



Lesson 2: Certification, Guidelines, and Procedures



KEY LEARNING POINTS

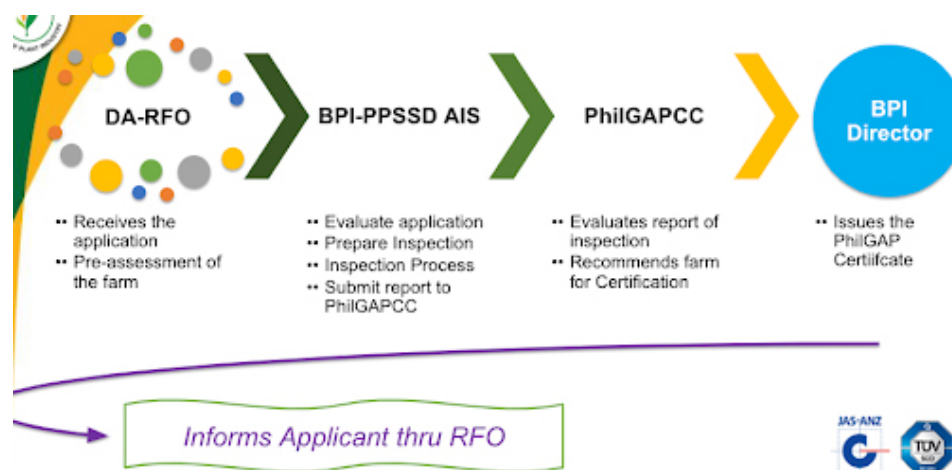


Figure 23. PhilGAP Certification Process

- Procedures for Certification
 - » All requirements must be submitted to the DA-RFO
 - » DA-RFO endorses the requirements to the BPI-Plant Product Safety Services Division Accreditation and Inspection Section (BPI-PPSSD AIS)
 - » BPI-PPSSD AIS submits report to PHILGAPCC
 - » PhilGAPCC recommends farm for certification
 - » BPI Director issues the PhilGAP Certificate
- The PhilGAP Certificate shall bear the following information:
 - » PhilGAP Certificate Number
 - » Farm identification number
 - » Name of the farm/applicant
 - » Address of the farm
 - » Name of farm/crop certified
 - » Validity period
 - » Signing authority, and

- » Terms and conditions
- » For group certification, the PhilGAP certificate shall be accompanied by an annex of the list of farm members, farm area and name of produce
- PhilGAP Certificate shall be displayed in signboards and/or billboards with the following details:
 - » Size: 1.2 m x 0.9 m
 - » Height from the ground: 2 m
 - » White background with black lettering
- Monitoring of PhilGAP Certified Farms is done at least once during the two-year validity of certificate
- Validity and renewal of PhilGAP Certificate
 - » Certificate validity is two years
 - » Requirements for renewal:
 - Updated farm operations records in the last 2 years
 - Updated list of fertilizers and pesticides used
 - Updated farm map
 - Revised manual of operation (if applicable)
 - » Renewal should be filed not later than 3 months
- PhilGAP Certificate could be revoked on the following grounds:
 - » Non-compliance with major provisions of PNS Code of GAP
 - » Failure to comply with audit report
 - » Reports of investigation of filed complaints
- Appeals could be submitted for reconsideration



SUGGESTED ACTIVITY

Assumption: Trainees shall visit a farm in the process of applying for GAP Certification

As a summary of the Module, the trainer shall instruct trainees to inspect the farm based on the inspection form. The trainees are to take note of the different farm operation activities such as production, post-production, waste disposal, and storage. The trainees are also expected to provide recommendations and suggestions on the future improvement of the farm.



Lesson 3: Inspection Procedure



KEY LEARNING POINTS

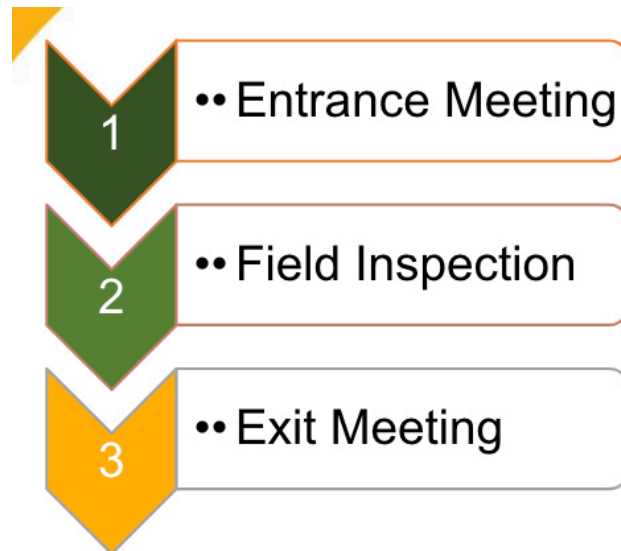


Figure 24. PhilGAP Inspection

- PhilGAP Inspection Processes
 - » Entrance meeting
 - Introduction of the PhilGAP Inspection Team
 - Presentation of the overview of PhilGAP inspection activity
 - Persons involved in Entrance Meeting
 - a. RFO Representative
 - b. PhilGAP Inspectors
 - c. PhilGAP Secretariat
 - d. Applicant
- Field Inspection
 - » Uses the Farm Layout as guide
 - Field or production area
 - Storage
 - Farm facilities
 - » Follows the farm operation from land operation to post-harvest operations
 - » Standing crops preferably be at harvestable stage

- » Plant produce will be collected to check:
 - Heavy Metal Contaminants
 - Microbial Contaminants
 - Pesticide Residues
- » Persons Involved
 - PhilGAP Inspectors
 - PhilGAP Secretariat
 - Applicant
- Exit Meeting
 - » Discusses the non-compliances observed and the timeline of the corrective actions
 - » Persons Involved
 - RFO Representative
 - PhilGAP Inspectors
 - PhilGAP Secretariat
 - Applicant
 - » Payment of Fees under Article V, Section 17
 - Application and cost of required analysis for PhilGAP certification shall be free of charge
 - In cases of non-compliance to standards, subsequent cost of laboratory analyses shall be shouldered by the applicant
 - » Monitoring of PhilGAP Certified Farms
 - » Once a farm is granted with a PhilGAP certificate, it shall be subjected to monitoring for compliance at least once or as deemed necessary during the validity of the certificate.
 - » The frequency of monitoring shall be based on the inspection and monitoring report



Lesson 4: Mock Inspection



KEY LEARNING POINTS

Discuss the highlights of this lesson such as key concepts and names, key theories, key practices and things to consider)



REFERENCES

Department of Agriculture. (2018). Rules and Regulations on the Certification of Philippine Good Agricultural Practices (PhilGAP) for Crops, Superseding Administrative Circular No. 10 Series 2013. Administrative Order No. 01 Series of 2018.

DA. (2018). Rules and Regulations on the Certification of Philippine Good Agricultural Practices (PhilGAP) for Crops, Superseding Administrative Circular No. 10 Series 2013. Administrative Order No. 01 Series of 2018. Department of Agriculture.

DA-BPI (n.d.) PhilGAP Certification process. Lecture presentation. Industry, Plant Product Safety Services Division.

Jollibee Group Foundation. (2019). Manual on Philippine Good Agricultural Practices (PhilGAP). Access on March 2 2023 from <https://www.jollibeefoundation.org/public/assets/pdf/publications/02%20-%20PhilGAP%20Manual.pdf>

MODULE 14

Clustering and Community Organizing



OBJECTIVES

At the end of this module, participants shall be able to:

1. Differentiate the different types and functions of cooperatives; and
2. List and discuss the different requirements needed for a new and existing cooperative.



DURATION

3 hours 30 minutes



TOPIC/S

Topic	Method	Tools
Lesson 1. Community Organizing	Lecture and presentation	Visual Presentation
Lesson 2. Requirements in Registration	Lecture and presentation	Visual Presentation
Lesson 3. Clustering and Consolidation	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- What are the important highlights that the trainer needs to discuss?



Lesson 1: Community Organizing



KEY LEARNING POINTS

- Cooperative is an autonomous and duly registered association of persons that have common bond of interest and who joined voluntarily to achieve common goals.

- Advantages of a cooperative:
 - » Accessibility to opportunities
 - » Possible share of funds
 - » Potential network

- Cooperative Principles:
 - » Voluntary and open membership
 - » Democratic member control
 - » Members economic participation
 - » Autonomy and independence
 - » Education, training, and information
 - » Cooperation among cooperatives
 - » Concern for community

- Types of cooperative:
 - » Credit cooperative:
 - » Consumers cooperative
 - » Producers cooperative
 - » Marketing cooperative
 - » Advocacy cooperative
 - » Dairy cooperative
 - » Education cooperative
 - » Water service cooperative
 - » Workers cooperative
 - » Labor service cooperative

- » Financial service cooperative
- » Fisherman cooperative
- » Transport cooperative
- » Health service cooperative
- » Agrarian reform cooperative
- » Housing cooperative
- » Multipurpose cooperative
- » Agriculture cooperative



Lesson 2: Requirements in Registration



KEY LEARNING POINTS

- Potential cooperatives can now register online through the E-Coop RIS
- New cooperatives must have the following requirements ready for registration:
 - » Online cooperative information form
 - » Articles of Cooperation or AOC
 - » By-Laws or BL
 - » Economic Survey
 - » Treasurer's Affidavit
 - » Other paperwork unique to the cooperative type
- Requirements must be completed within 30 days of email registration.
- Payment must be then issued to the partner bank within 10 days of passing.
- Certificate of Registration will be sent once if approved.
- Existing cooperatives must have the following requirements annually:
 - » Coop Annual Progress Report or CAPR
 - » Audited Financial Statements
 - » List of Officers and Trainings undertaken
 - » Social Audit Report
 - » Performance Audit Report
 - » Semi-annual Conciliation-Mediation Report
 - » Certificate of Compliance
- These requirements must be done not later than the 120th day from close of calendar year.



Lesson 3: Clustering and Consolidation



KEY LEARNING POINTS

- Clustering is now a key strategy to help farmers attain a more productive, profitable, and competitive business.
- Farm clustering can allow the government and partner institutions to provide great and faster farm service support.
- Advantages of clustering small farms:
 - » Easier financial loans
 - » Cheaper procurement of farm inputs
 - » Stronger selling prices and marketing strategies
- Types of clustering strategies:
 - » Contract growing
 - Clusters farmers with produce ready for shipment
 - » Private consolidation
 - A large investor leases large number of small farms for agrarian reform benefits.



REFERENCES

Cooperative Development Authority. n.d. Organizing a Cooperative (ppt).

Habito, Cielito. 2021. Farm Cluster: Why and How (article). Retrieved from:
<https://opinion.inquirer.net/139689/farm-clusters-why-and-how>

MODULE 15

Extension and Communication Skills



OBJECTIVES

At the end of this module, participants shall be able to:

1. Compare and contrast the different approaches and methods to improve the communication skills; and
2. Describe the necessary skills to be effective presenters and facilitators;
3. Describe the basics of e-learning and ICT to be applied to their practices in coconut production.



DURATION

4 hours



TOPIC/S

Topic	Method	Tools
Lesson 1. Extension principles, Approaches, and Methods	Lecture and presentation	Visual Presentation
Lesson 2. Presentation and Facilitating Skills	Lecture and presentation	Visual Presentation
Lesson 3. E-learning and ICT Application	Lecture and presentation	Visual Presentation



NOTES TO TRAINER

- Prepare the necessary materials for the module.
- Emphasize the value of ethics in communication.
- Encourage the participants to ask questions or share their ideas and experiences about the topics.
- Translate the English terms into Filipino or any other local language if necessary.
- Be a good example of a competent presenter and facilitator as the module talks about the necessary skills and attitude to be one.



Lesson 1: Extension Principles, Approaches, and Methods



KEY LEARNING POINTS

- Communication is a process by which information is exchanged between individuals through a common system of symbols, signs, or behavior.
- Role of Communication in Agriculture Extension:
 - » Making sure that knowledge is distributed;
 - » Encouraging a two-way communication between project and program implementers, and beneficiaries;
 - » Promoting equity which influences good policy making decisions;
 - » Promoting behavioral changes in clients; and
 - » Offering solutions for conflict resolutions (FAO 2012)
- Communication in agricultural extension enhances a two-way of information in which farmers share information among themselves.
- Effective communications is when:
 - » It involves both verbal and non-verbal language.
 - » It is two-way communication.
 - » It is not simply information-giving.
 - » Receiver's response is the intention of source

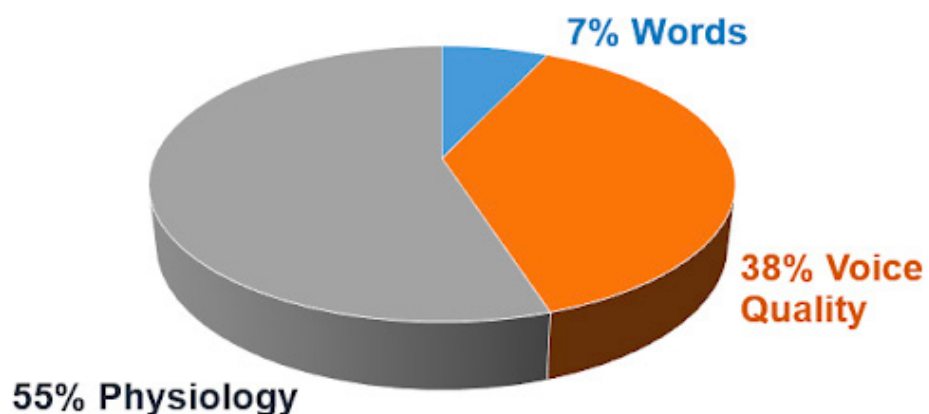


Figure 25. Communication and Understanding (Albert Mehrabian)

Elements of Effective Communication

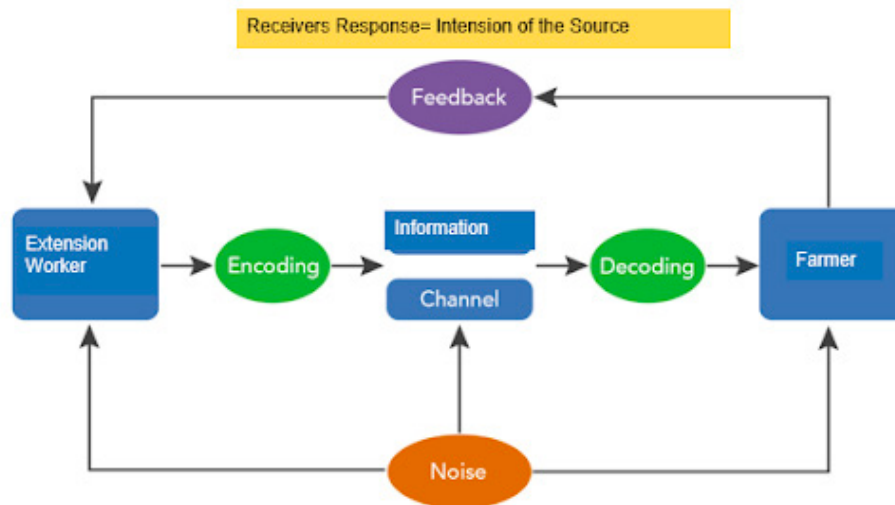


Figure 26. Elements of Effective Communication

- In communication, there are different types of barriers that must be taken into consideration.
 - » Channel noise, Semantic noise, Environmental Noise, Socio-Psychological Factors, Physical Barriers, Perceptual Barriers, Emotional Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Other Barriers such as Ethnocentrism, past experiences, lack of verbal skills
- Communication is different from Information which is the provision of figures, facts and other materials
- Communication Competence is the ability to put a message across effectively on the part of the source, and to receive the message correctly on the part of the receiver.
- Elements of Communication Competence includes:
 - » Knowledge
 - » Skills
 - » Sensitivity
 - » Values
- Competency List for the Communication Aspects of Extension Work (Fox, 1990)
 - » Knowledge of the organization (in which the extension agent works)
 - » Knowledge of the community (area or work coverage)

- » Knowledge of individual farmers
- » Knowledge of resources
- » Skill in relating to people
- » Skill in motivating and mobilizing people
- » Skill in working with people
- » Skill in demonstrating farming methods and procedures
- » Skill in making and using educational aids
- » Respect for the existing knowledge and skill
- » Empathy with people living on low incomes in rural areas.
- » Patience and tolerance when recommendations are not taken up.
- » Readiness to listen to and from those he is teaching.
- » Readiness to review and revise methods and approaches
- Characteristics of a Competent Communicators
 - » They have a “we-not-me” orientation
 - » They understand communication competence
 - » They have a sense of appropriateness
- In communication, ethics must be applied at all times.
 - » Ethics is a system of moral principles (i.e. Right vs Wrong; Goodness and badness of motives and ends of such actions).
 - » Communication ethics must maintain the correct balance between speaking and listening with honesty and sincerity as well as the degree of criticism and praise (i.e. none or much of either result in unfavorable consequence)
 - » Basics of Communication Ethics
 - Listen when others speak.
 - Speak non-judgmentally
 - Speak from your own experience and perspective
 - Seek to understand others
 - Avoid speaking for others
 - Manage your own personal boundaries
 - Respect others personal boundaries
 - Avoid interrupting and side conversations.
 - Make sure that everyone has equal time to speak
 - Advocate truthfulness, accuracy, honesty and reason
 - Endorse freedom of expression, diversity of perspective and tolerance of dissent
 - Strive to understand and respect the opinion of others

- Promote access to communication resources and opportunities
- Promote a communication climate of caring and mutual understanding
- » Principles of Ethical Communication
 - Condemn communication that degrades individuals and humanity
 - Advocate sharing of information, opinion and feelings
 - Respect privacy and confidentiality
 - Accept responsibility for the short and long term consequences

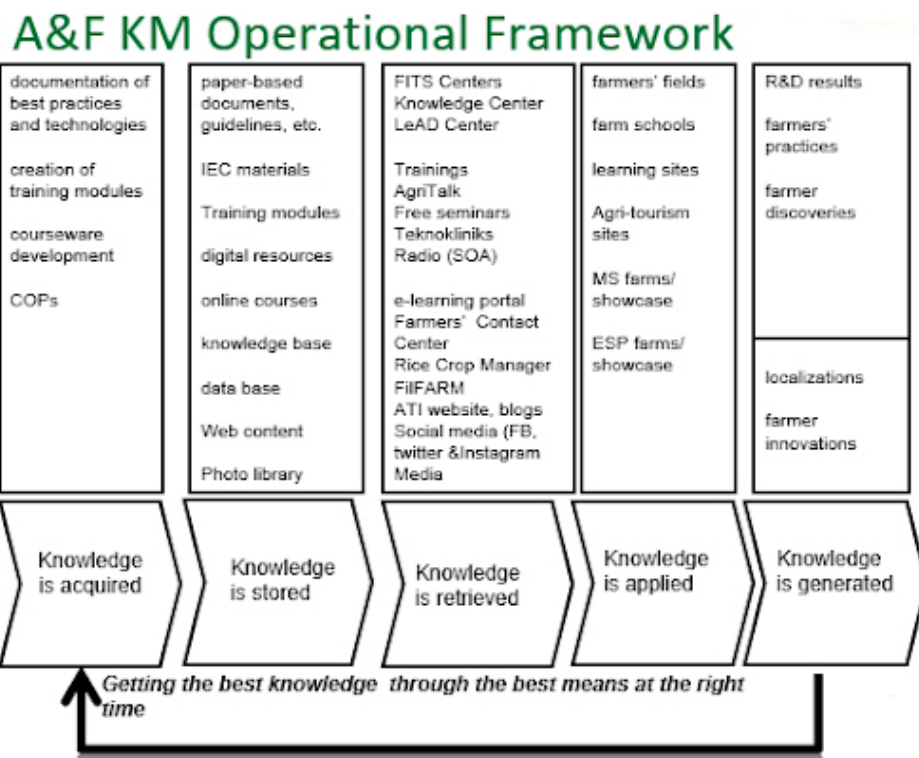


Figure 27. A&F Operational Framework



SUGGESTED ACTIVITY

Title: Identification of Communication Competencies

Procedure:

- This activity will be done per group.
- In your respective groups, discuss and identify what communication competencies extension workers should have. You may categorize them or simply list them down.
- Assign a member to report the group's output. Five minutes will be allotted per presenter.



Lesson 2: Presentation and Facilitating Skills



KEY LEARNING POINTS

- Presentation allows a person to share useful information with other people about certain topics.
 - » Presentation skills include the following considerations:
 - Presentor must be knowledgeable about the topic to be confident while speaking and to be ready for some clarification and questions from the audience.
 - Make sure to have a tech run before a presentation to avoid any technical issues.
 - Wear something that is comfortable yet appropriate for the setting
 - Make sure to connect with the audience
 - » Presentation skills can be further improved by visual materials.
- Facilitating skills are used to guide and direct key parts of organizing work with groups of people such as meetings, planning sessions, and training of members and other leaders.
 - » Good facilitation skills are necessary to meet the goals and accomplish what the endeavor has set out to do.
 - » The role of the facilitator is to concentrate on how everyone will move through your agenda and meet those goals effectively.
 - » The facilitators aim to draw out opinions and ideas of the group members.
- Good facilitators should:
 - » Make sure everyone feels comfortable participating
 - » Develop a structure that allows for everyone's ideas to be heard
 - » Make members feel good about their contribution to the meeting
 - » Make sure the group feels that the ideas and decisions are theirs, not just the leader's.
 - » Support everyone's ideas and not criticize anyone for what they've said.
- To have a good facilitation process, the facilitator should consider these three aspects:

- » Climate and Environment:
 - The environment and general “climate” of a meeting, planning session, or training session sets an important tone for participation.
- » Logistical Arrangements
 - Ensure that all materials are prepared before the start of the meeting or any session. Think about any technical difficulties or delays that can happen during the facilitation process.
- » Ground Rules:
 - Most meetings, training sessions, and other engagements have ground rules to ensure the smooth running of the program.
- In summary, here are the differences between Presentation and Facilitation Skills from the Association for Talent Development.

Table 12. Presentation and Facilitation Skills

Presentation	Facilitation
The presenter delivers information, usually through a lecture.	The facilitator enhances learning for everyone, usually through discussion or activities such as role plays.
The presenter is the expert sharing their knowledge of the subject matter.	The facilitator provides opportunities for members of the group to share knowledge and learn from one another.
The presenter spends most of the time talking.	The facilitator spends most of the time asking questions, encouraging others to speak, and answering learners' questions during activities
The presenter is usually on a stage or at the front of the room.	The facilitator is usually moving around the classroom to help address learners' questions or monitor how activities are progressing

Source: Association for Talent Development (n.d.). What is Facilitation?



Lesson 3: E-learning and ICT Application



KEY LEARNING POINTS

- e-Learning is a method of learning using electronic technologies or gadgets to access educational curriculum outside of a traditional classroom. It refers to a course, program or degree delivered completely online.
- It is an effective method of teaching to reach more people unlike the traditional learning that is often bounded by geographical locations.
- The e-Learning for Agriculture and Fisheries is a major component of the Department of Agriculture's e-Extension Program, with the Agricultural Training Institute as the lead implementing agency, in collaboration with other government agencies, state universities and colleges and nongovernment organizations.
- In 2016, ATI has started offering e-Learning courses which can be accessed through mobile devices and tablets. There are even courses available for download and offline browsing.
- As e-Learning requires technical skills to navigate the applications and devices, most farmers are given digital literacy.
- Although there are a lot of advantages when it comes to e-Learning, access to technology can be a major issue for people, especially in the Philippines.
- Information and Communications Technology (ICT) enables e-Learning.
- In agriculture, ICT provides farmers with vital information such as:
 - » Updated sowing and crop protection
 - » Improving soil fertility
- ICT also provides online, web-based services to extension workers and farmers such as advisories, online training, distance learning, e-library, and knowledge databases in agriculture.
- Existing government ICT infrastructure and network backbones such as DA-ATI provide an open learning environment.
- ICT also organizes expertise and digitizes all available information, data

and knowledge in agriculture to make them accessible to farmers, given they are equipped with proper knowledge and skills to maximize the available platforms, applications, and knowledge.



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ANNEXES

Training on Coconut Specialist Course

ANNEX A

The Botany and Eco-physiological Requirements of Coconut

Factor	
Altitude (m above sea level)	Less than 600
Temperature	(°C) 24-29
Light	>2000 sunshine hours/year
Total Annual Rainfall (mm)	1500-2500 (well distributed)
Typhoon Frequency (%)	<20

Soil Condition	
Soil Depth (cm)	>75
Drainage	Moderate to well-drained
Soil Acidity (pH)	5.5-7.5
Soil Texture	Sandy, loamy, clayey (with good structure)
Organic Matter Content	Medium to High
Major Nutrients	N, K, Cl, S, P, Ca, Mg, B

*Source: Severino S. Magat, PhD1 and Millicent I. Secretaria, MSc2
1Scientist IV, PCA-Agricultural Research Management Department, Diliman, QC 2Scientist I, PCA-
Davao Research Center, Bago-Oshiro, Davao City*

ANNEX B
Defective Seednuts for Exclusion as
Planting Materials



Punctured or cut



Too small and deformed



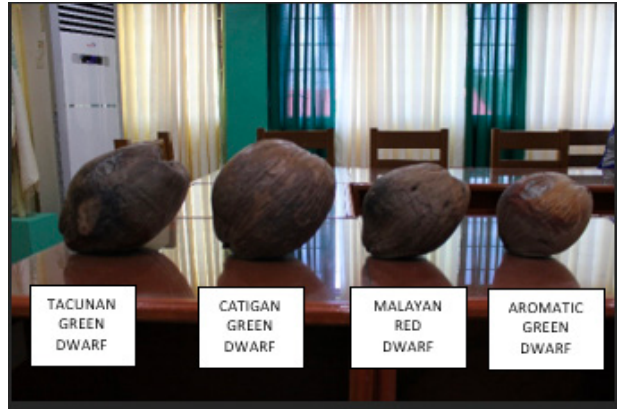
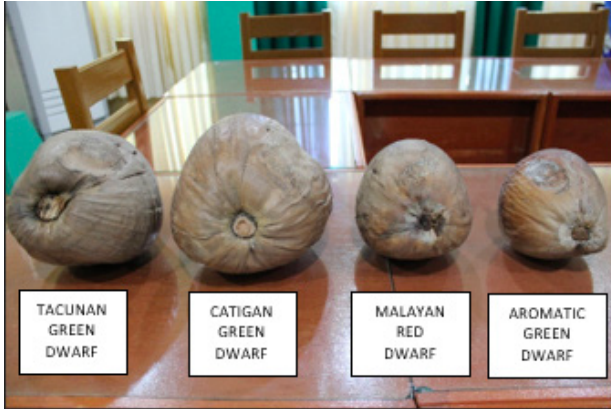
Rodent - damaged



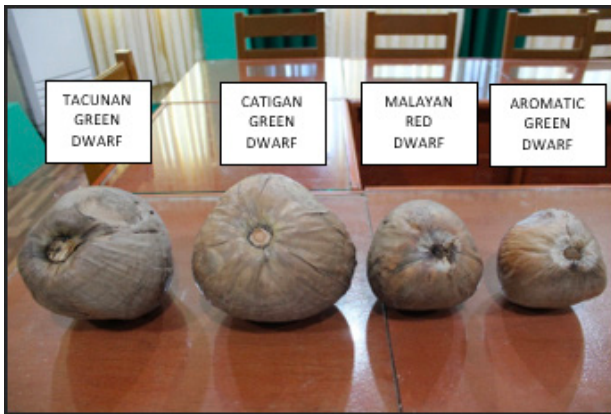
Disease-infected seednuts

ANNEX C

Documentation of Matured Dwarf Coconut Seednuts



Documentation of Matured Dwarf Coconut Seednuts Pt. 1



Documentation of Matured Dwarf Coconut Seednuts Pt. 2





Malayan Red Dwarf



Aromatic Green Dwarf



Tacunan Green Dwarf (Size: 24.5 cm)



Catigan Green Dwarf (Size: 23 cm)



Malayan Red Dwarf (Size: 19.5 cm)



Aromatic Green Dwarf (Size: 16 cm)

ANNEX D Variety Classifications



Green Dwarf Coconut Classifications Pt. 1

MALAYAN RED DWARF



AROMATIC GREEN DWARF



Young nuts and petiole of leaves are bright orange; matured nuts turned dark brown.



Nuts are deep green when immature; sweet water and meat; mature nut show navel at the eye when split-opened.



Green Dwarf Coconut Classifications Pt. 2

ANNEX E

Pre-Disaster Report Form

PRE-DISASTER REPORT (1 st Report of a Forewarned Event)						
PHENOMENON / DISASTER (Example: Typhoon, dry spell)						
Possible Areas Affected						
SITUATION						
Weather Condition			Market Condition <small>(Use only from ABCOMAP)</small>			
			<small>Supply (Indicate available/ not available)</small>	<small>Prices (Indicate available/unavailable)</small>		<small>Supply (Indicate available/ not available)</small>
Today		Rice			Fish	
Previous		Corn			Meat/Poultry/Egg	
Other Days		Vegetables			Others (specify)	
Other Conditions: (Include external conditions that may influence the effect of the event (e.g. Flooding, dam water at critical level)						
POSSIBLE EFFECTS (Positive or negative effect of impending hazard, i.e. availability of water/electrification, dam water level, seeds, prices, pests and diseases, etc.)						
VULNERABLE AREAS IN DECLARATION (Use additional sheet if necessary)						
	<small>Seeding / New Transplant</small>	<small>Vegetative</small>	<small>Reproductive</small>	<small>Maturity</small>	<small>Total</small>	
Rice						
Corn						
Others (specify)						
ACTIONS TO BE TAKEN						
AVAILABILITY OF RESOURCES AT THE REGION / PROVINCE FOR RECOVERY (in Bufferstocks, include (if) information is available)						
Commodity	Sufficient/insufficient	Available Resources		Needs / Requirement		
		Quantity	Units of Measure	Quantity	Units of Measure	
REGIONAL FIELD OFFICE BUFFERSTOCKS						
Rice Seeds						
Hybrid						
Inbred						
Corn Seeds						
Hybrid						
OPY						
Vegetable Seeds						
Fertilizers						
Pesticides						
Biologics						
Others (specify)						
RESOURCES AT THE PROVINCE / LGU						
Rice Seeds						
Hybrid						
Inbred						
Corn Seeds						
Hybrid						
OPY						
Vegetable Seeds						
Others (specify)						
_____ DRRM Operations Center: <input type="checkbox"/> White Alert <input type="checkbox"/> Blue Alert <input type="checkbox"/> Red Alert <small>(Office)</small>						
Prepared by: _____ Report Officer		Reviewed by: _____ DRR Focal Person		Approved by: _____ Head of Office		

ANNEX F

Flash Report Form

FLASH REPORT <small>(1st Report for Unforewarned Incident/Disaster)</small>				
PHENOMENON/DISASTER <small>(Example: flashflood, bulaw, tsunami, landslides, earthquake, fire, major dam's water at critical level, red tide, pest, diseases, human-induced)</small>				
Date and Time Occurred				
Affected Area <small>(Province, Municipalities)</small>				
DESCRIBE INCIDENT/SITUATION				
INITIAL ACTION(S) TAKEN/ TO BE TAKEN or REQUEST FOR ASSISTANCE				
AVAILABILITY OF RESOURCES AT THE REGION/ PROVINCE TO RESPOND FOR RECOVERY <small>(Ex. bufferstocks)</small>				
Items/ Commodity	Available Resources		Needs / Requirement	
	Quantity	Unit of Measure	Quantity	Unit of Measure
_____ DRRM Operations Center: <input type="checkbox"/> White Alert <input type="checkbox"/> Blue Alert <input type="checkbox"/> Red Alert <small>(Office)</small>				
<small>Send this report immediately after the incident/disaster via SMS, phone, or any available communication medium.</small>				
Prepared by:	Reviewed by:	Approved by:		
_____	_____	_____		
Report Officer	DRR Focal Person	Head of Office		

ANNEX G

Initial Assessment Report Form

INITIAL ASSESSMENT REPORT (Situation Report)						
PHENOMENON/DISASTER						
Date and Time Occurred						
Affected Area (Province, Municipality)						
SITUATION						
Weather Condition						
Today						
Yesterday						
Previous Days						
Market Condition (Get input from AMAG/RRAS)						
	Supply <small>(Indicate available/ not available)</small>	Prices <small>(Indicate stable/volatile)</small>		Supply <small>(Indicate available/ not available)</small>	Prices <small>(Indicate stable/volatile)</small>	
Rice			Fish			
Corn			Meat/Poultry/Egg			
Vegetables			Others (specify)			
Other Conditions (Include antecedent conditions that may influence the effect of the event, e.g. flooding)						
INITIAL EFFECTS						
INITIAL ESTIMATE OF DAMAGES AND LOSSES (The damage assessment form may be used as an attachment)						
Province/ Municipality	Commodity	Approximate Affected Area, Hectare			Production Loss	
		Partially	Totally	Total	Volume (MT)	Value (Php)
POSSIBLE EFFECTS (Positive or negative effect of impending hazard, e.g. availability of water/electrification, dam water level, roads, prices, pest & diseases, etc.)						
ACTIONS TAKEN/ TO BE TAKEN (Prioritize actions and resources needed)						
<div style="display: flex; justify-content: space-between; align-items: center;"> _____ DRRM Operations Center: <small>(office)</small> <div style="display: flex; gap: 20px;"> <input type="checkbox"/> White Alert <input type="checkbox"/> Blue Alert <input type="checkbox"/> Red Alert </div> </div>						
<small>Report may be sent via SMS, phone call, or any available communication medium. This should be submitted within 12 hours after the occurrence of an event.</small>						
Prepared by:		Reviewed by:		Approved by:		
Report Officer _____		DRR Focal Person _____		Head of Office _____		





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