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NATCCO Network

A HANDBOOK ON

COFFEE PRODUCTION AND PROCESSING

FROM BEAN TO CUP



**A handbook on Coffee
Production and Processing
From Bean to Cup**

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A woman with grey hair, wearing a red long-sleeved shirt, is leaning over a wooden tray filled with dark coffee beans. She is looking down at the beans with a focused expression. The background shows a wooden structure, possibly part of a coffee processing facility.

**A handbook on Coffee
Production and Processing
From Bean to Cup**

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TABLE OF CONTENTS

TABLE OF CONTENTS	
MESSAGES	
PREFACE	
ACKNOWLEDGMENT	
INTRODUCTION	

FARM PLANNING AND PREPARATION

Farm Planning	1
Objectives of Farm Planning	1
Steps in Making a Farm Plan	1
Farm Planning Tips	7
<i>Three C's for Winifredo: Corn, Cassava, and Now, Coffee</i>	9

COFFEE-GROWING TECHNIQUES

Differences Between Arabica and Robusta	12
Site Selection	13
Field Planning	13
Selection and Preparation of Coffee Seeds	14
Methods of Propagation	16
<i>A Young Farmer's Dream: from 'Biro' to Big-time Competition</i>	20

NURSERY ESTABLISHMENT AND MANAGEMENT

Site Selection	23
Potting Mix Preparation	23
Coffee Nursery Fertilization Guide	24
Care and Maintenance of Seedlings	24
Nursery Diseases and Pests	27
<i>Minsamongan: Hope from Coffee</i>	29

COFFEE NUTRITION AND FERTILIZATION

How to Make Soils Healthy for Coffee Production	33
Soil Sampling Procedure	33
Leaf Sampling Procedure	33
Importance of plant Nutrition and Fertilization	35
Organic, inorganic, and Foliar Fertilizers	35
Signs of nutrient deficiencies in coffee plants	38
What Is Bio-solution?	41
Composting Mechanics	41
Aerobic Composting Mechanics	42
Minimum Biological Requirements	44
<i>Kaatuan: Coffee Is Here to Stay</i>	46

MAJOR COFFEE PESTS AND DISEASES AND CONTROL

What is a Pest?	49
Coffee Berry Borer	49
Red Stem Borer	50
White Stem Borer	50
Coffee Black Twig Borer	51
Green Scale Insect	51
Brown Scale Insect	51
Ants	52
Plant Diseases	53
Coffee Leaf Rust	53
Damping Off (Nursery Disease)	54
Cercospora	55
Coffee Berry Diseases/Anthracnose	56
<i>Imdalsa ARC: A Lesson from Fallen Cherries</i>	58

PRUNING AND REJUVENATION

Pruning	62
Benefits of Pruning	62
General Reminders in Coffee Rejuvenation	62
Types of Pruning and Rejuvenation	62
The Beaumont-Fukunaga System	64
<i>Brewing Success in Pangantucan's Coffee Farms</i>	67

HARVESTING, POST-HARVEST HANDLING, AND PROCESSING

What is Specialty Coffee?	72
Harvesting	73
Pre-cleaning	75
Natural Processing Method	75
Fully Washed (Wet) Process	76
Honey Processing Method	77
Proper Drying Practices	79
Hulling	80
Polishing	81
Size Grading	81
Sorting	81
Storage	82
Transporting Coffee	83
<i>Miarayon Coffee: The Secret Is in the Process</i>	85
Online References	88

Message from the **CHIEF EXECUTIVE OFFICER (CEO)**

Across our islands, cooperatives have always turned individual effort into shared strength. This handbook is a testament to that power. It gathers the everyday discipline of our farmers, the stewardship of our Indigenous communities, and the enterprise of our co-ops into one practical guide — from rejuvenation and pruning to post-harvest and market linkage — so that quality in the cup begins with quality in organization.

What makes this publication distinct is not only the agronomic know-how, but the cooperative way it was built: members learning from members, federations and partners aligning services, and local stories shaping standards that fit our terrain and culture. When cooperatives adopt these practices together, they do more than raise yields — they raise household incomes, professionalize operations, open fairer markets, and keep young people meaningfully engaged in the value chain.

We also recognize that climate pressures, price volatility, and uneven access to technology continue to test our sector. The answer is coordinated action: strong governance, transparent finance, gender-responsive and youth-inclusive programs, and disciplined execution from farm to federation. This handbook is one tool among many in NATCCO’s broader push to help cooperatives compete without losing their cooperative soul.

Co-funded by the European Union and the German Ministry of Economic Cooperation and Development (BMZ), the project is part of the “Strengthening the Implementation of Regional and Local Peace Development Agendas in Mindanao (SPADe),” under the broader “Mindanao Peace and Development Program (MinPAD RISE)” implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

To every farmer, manager, mentor, and partners who contributed: thank you. May this handbook help your cooperative move from seasonal gains to sustained enterprises, owned by members, governed with integrity, and build for the next generation.



Sylvia O. Paraguya

Chief Executive Officer
National Confederation of
Cooperatives (NATCCO)

Message from the **PROJECT MANAGER**

Coffee for our cooperatives is more than a crop. It is a shared enterprise, a living story of *bayanihan*, and a pathway to dignity, peace, and prosperity in our communities. This handbook was created in that spirit. It gathers practical, field-tested lessons from co-operative partners in Bukidnon and translates them into clear, actionable steps that farmers, families, and youth groups can follow from land preparation to the final drying of the bean.

This guide is cooperative in both content and origin. Farmers exchanged what works. Cooperatives aligned services and markets. Partner institutions provided training, inputs, and quality support. When farmer-members adopt a few core practices such as shade management, pruning, careful picking, and proper drying, value increases across the chain: higher yields at the farm, improved consistency for processors, stronger cooperative brands, and fairer prices for families.

Small changes on the ground produce system-wide returns. You will find practical how-to sections alongside short, grounded stories. Some recall farmers who pruned old trees back to life. Others tell of young people who stayed to build with their hands and indigenous communities anchoring production in careful land stewardship. These accounts remind us that coffee quality begins with organized people, not machines, and that resilience is planned rather than improvised. The cup our customers enjoy is, ultimately, a cup of cooperation. This handbook and the broader work behind it were made possible through the generous support of the European Union and the German Ministry of Economic Cooperation and Development (BMZ).

The project is part of the “Strengthening the Implementation of Regional and Local Peace Development Agendas in Mindanao (SPADe),” under the broader “Mindanao Peace and Development Program (MinPAD RISE)” implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Their partnership strengthened our capacity to document, test, and scale practices that uplift our members and their communities. On behalf of the CAFÉ DAIRY Project team, I offer sincere thanks to every farmer, cooperative, mentor, and partner who contributed.

May this handbook help our cooperative move from single harvests to sustained enterprise rooted in shared ownership, disciplined practice, and hope for the next generation.



Maribel Gulay-Isidro

Project Manager CAFÉ-
DAIRY Project-NATCCO

Message from the Principal Advisor

Maayad ha adlaw! Mabuhay!

My warmest congratulations to the Cooperative Assistance and Farm Extension to Develop Agri-entrepreneurs, Indigenous Peoples, and Rural Youth (CAFÉ DAIRY) Project of the NATCCO Network for the successful development of the *“From Bean to Cup: The Coffee Production and Processing Handbook.”*



Peter Hinn
Principal Advisor
SPADe / MinPAD RISE

This remarkable handbook stands as a testament to the shared vision of empowering our farmers and cooperatives through knowledge, innovation, and collaboration. It embodies the spirit of collective action—where people, communities, and partners work hand in hand to transform agriculture into a more inclusive, resilient, and sustainable enterprise.

Beyond its technical value, this handbook tells a deeper story — one of hope, perseverance, and empowerment. It celebrates the dedication of coffee farmers, the leadership of cooperatives, and the creativity of rural youth who continue to nurture their communities with passion and purpose. Through this initiative, CAFÉ DAIRY has shown how agriculture, when coupled with enterprise and cooperation, can uplift lives and foster unity among diverse peoples in Mindanao.

The CAFÉ DAIRY project came to life through the steadfast support of the project “Strengthening the Implementation of Regional and Local Peace and Development Agendas” (SPADe) — commissioned and financed by the German Federal Ministry for Economic Cooperation and Development (BMZ), co-financed by the European Union (EU), and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. As part of the broader Mindanao Peace and Development Programme (MinPAD RISE), SPADe is honored to have contributed to the conceptualization and realization of this meaningful endeavor that connects peacebuilding, livelihood, and sustainability.

Through SPADe’s support, this initiative demonstrates how peacebuilding can take root in everyday livelihoods — in farms, in cooperatives, and in the relationships built through shared enterprise. By strengthening local capacities, enhancing agri-enterprise development, and promoting community cooperation, CAFÉ DAIRY exemplifies how local action can advance regional peace and inclusive development.

This collaboration between NATCCO and SPADe also highlights a broader truth: that peace and progress flourish when communities are given the tools, trust, and opportunities to build their own future. The “From Bean to Cup” handbook is not just a technical guide — it is a symbol of empowerment and partnership. It bridges the gap between knowledge and practice, between local traditions and modern enterprise, and between economic progress and social harmony.

May this publication continue to serve as an inspiration to other cooperatives, farmers, and development practitioners who aspire to make rural transformation a reality. As we savor every cup of coffee born from these communities, let it remind us of the hard work, hope, and harmony that make every bean a story of peace and possibility.

Once again, congratulations to the CAFÉ DAIRY Project Team of NATCCO Network, coffee mentors, farmers and all partners for this meaningful achievement. Your commitment to empowering people and communities continues to brew a better, fairer, and more peaceful future for all.

PREFACE

The National Confederation of Cooperatives (NATCCO) implemented the Cooperative Assistance and Farm Extension to Develop Agri-enterprises of Indigenous Peoples and Rural Youth (CAFÉ-DAIRY) Project starting in November 2022. CAFÉ-DAIRY aims to promote peace through agriculture development using the value chain approach in dairy and coffee industries in Regions 9 and 10 to benefit 1,800 farmers including Indigenous Peoples, women and youth.

Co-funded by the European Union and the German Ministry of Economic Cooperation and Development (BMZ), the project is part of the “Strengthening the Implementation of Regional and Local Peace Development Agendas in Mindanao (SPADe),” under the broader “Mindanao Peace and Development Program (MinPAD RISE)” implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Of the federation’s nearly 900 members comprising multipurpose and credit cooperatives, at least 20 percent are engaged in agricultural enterprises. NATCCO selected dairy and coffee as priority agricultural commodities based on the findings and recommendations of a GIZ-initiated study conducted by the Philippine Family Farmers’ Fishery Forestry Cooperatives Federation (AgriCooPh). The study found that aside from addressing development issues, the participation of the target cooperatives engaged in dairy and coffee production can significantly contribute to the industry and to the achievement of peace and development in the regions.

For the coffee side of the project, NATCCO partnered with seven primary cooperatives, namely: Milalitra Farmers Agriculture Cooperative, Panaw Sumilao Multi-Purpose Cooperative, Kauyagan Savers Multi-Purpose Cooperative, Imdalsa Agrarian Reform Cooperative, Bukidnon Government Employees Multi-Purpose Cooperative, Bayanihan Millennium Multi-Purpose Cooperative, and Minsamongan Farmers Multi-Purpose Cooperative. These cooperatives are all based in Bukidnon province, which has drawn a roadmap for its coffee industry and is positioning to become the country’s Arabica capital.

These partnerships are envisioned to continue beyond the term of the CAFÉ-DAIRY project with the aim of sustaining the current momentum the communities have gained in their coffee enterprise. For its part, NATCCO will always find means to help improve the productive capacity of coffee farmers as part of its mission to strengthen the rural economy.

This handbook is an initial contribution to sustaining the gains of our coffee farmers. It is the hope of the publisher that, as a technical guide, this material will encourage more rural communities, including Indigenous Peoples, to devote more of their effort and resources to what is undeniably a flourishing coffee industry.

ACKNOWLEDGMENT

The publisher wishes to thank the following individuals whose lecture materials that were used during the training activities on coffee production under the CAFÉ-DAIRY project serve as the main references for the topics presented in this handbook:

Ms. Novelyn H. Valerio, Consultant, AG Farm Innovation, Finca de Garces

Mr. Renjie Lucas, Consultant, AG Farm Innovation

Ms. Karen Arado, Consultant, AG Farm Innovation, Quality Grader

Engr. Gerry Burdas, Project Manager, CSA

The publisher is also grateful to the following coffee farmers and cooperative leaders who willingly shared their personal experiences and plans that are narrated in the stories featured in this handbook:

Mr. Jemel S. Aninloy, Member, Kauyagan Savers Multi-Purpose Cooperative

Ms. Belinda D. Besto, Processor, MILALITTRA Farmers Cooperative

Ms. Alma F. Hewe, Chair, Bayanihan Millennium Multi-Purpose Cooperative

Ms. Corazon M. Llauderres, Chair, IMDALSA Agrarian Reform Cooperative

Mr. Rogelio S. Limbag, Chair, Minsamongan Farmers Multi-Purpose Cooperative

Mr. Winifredo M. Sanha-an, Committee Chair, Panaw Multi-Purpose Cooperative

Mr. Eugene Sumaya, Member, Bukidnon Government Employees Cooperative

Assistance from and supervision by **Ms. Irish Queen Saway-Baoy**, NATCCO Technical Specialist, greatly helped in accessing the reference materials and in reaching out to the coffee farmers who were interviewed for the stories featured in this handbook.

Mr. Christian Baoy likewise deserves heartfelt thanks for allowing his vehicle to be used in going to the communities for the interviews. His driving skills assured safe travel along difficult roads to those communities.

The publisher also likes to thank **Ms. Xenia Nichole Porras** for lending her talent as the layout artist of this handbook.

Finally, this handbook would not have been possible without the support of the project “Strengthening the Implementation of Regional and Local Peace and Development Agendas in Mindanao (SPADe)” co-funded by the European Union and the German Federal Ministry for Economic Cooperation and Development, and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). SPADe is part of the broader “Mindanao Peace and Development Programme (MinPAD RISE).

INTRODUCTION

Disaster struck the global coffee industry in the late 19th century in the form of a coffee rust epidemic that hit South America and Africa, and later Asia. Filipino farmers adopted by turning to other cash crops, further causing Philippine coffee to decline. It wasn't until the late 20th century that the country's coffee industry experienced a revival, thanks to small-holder farmers who propagated once more the old varieties, learned sustainable farming practices and found ways to improve bean quality.

Such a revival has manifested itself in many ways – the number of coffee shops in cities and towns (and even along the highway in isolated villages), the recognition given to Philippine coffee beans in international competitions, and, of course, the growing number of farmers who have shifted to coffee as a major source of income, using techniques like integrated pest management and directly trading with buyers. The direct transactions with buyers have eliminated middlemen, enabling the farmers to get a fair price for their produce. Cooperatives have played a significant role in empowering these farmers.

In addition to knowledge gained from direct experience, coffee farmers are getting training, technical and marketing assistance, inputs like seedlings and fertilizers, and other forms of support from both the private sector and government. These interventions have led to improvements in farming methods, as well as in the handling and processing of beans, a vital element in the effort to obtain quality produce and better returns.

This handbook seeks to contribute to the initiatives to support the country's coffee farmers. It presents the instructions in a step-by-step manner along with photos, images, and illustrations to aid in understanding. The content is spread across seven chapters, namely: Farm Planning and Preparation; Coffee-Growing Techniques; Nursery Establishment and Management; Coffee Nutrition and Fertilization; Major Coffee Pests and Diseases and Control; Pruning and Rejuvenation; and Harvesting, Post-harvest Handling, and Processing.

The content of this handbook is mainly based on the presentation materials prepared by the resource persons who shared their expertise to the participants of the training series under the Cooperative Assistance and Farm Extension to Develop Agri-Entrepreneurs, Indigenous Peoples and Rural Youth (CAFÉ-DAIRY) project. Additional inputs were obtained from online references.

After each chapter, the handbook features stories about the experiences of coffee farmers and leaders of cooperatives that have been instrumental in the growth of the coffee industry in their respective areas. Three of these cooperatives have won major awards at the Philippine Coffee Quality Competition, and one among the three represented the Philippines in the three-day Specialty Coffee Expo on April 19 to 22, 2018 in Seattle, Washington in the US.

This handbook is by no means comprehensive. Nonetheless, the publisher is hopeful that it would serve as a useful guide for coffee farmers who aspire of improving farm productivity and bean quality. And may the stories contained in this material inspire other farmers to join the growing number of coffee growers and contribute to the economic uplift of the country's rural and indigenous communities.



FARM PLANNING AND PREPARATION



Farm Planning

Farm planning is the act of organizing farm production in a manner that allows for the efficient use of scarce resources, leading to increased income for the farmers. All family members, women, men and youth should participate in this stage.

A comprehensive farm plan defines the farming family's vision and objective, the layout including the combination of intercropped plants and animals based on commercial value and land suitability, family food security, and resource conservation measures. It helps the family identify the input and financial needs as well as the overall estimate value of future costs and returns.

Scientific farm planning rests on factual documentation. It could face limitations if there are no farm records containing sufficient information being kept by the farmers, and there are no data about the weather, water resources, markets and other relevant information.

Objectives of Farm Planning

1. Efficient Use of Farm Resources. By optimizing scarce resources, the farmers can enhance productivity and overall efficiency in their agricultural operations.
2. Increase Income. Optimum profitability can be achieved by making informed decisions on farm production methods such as crop schedule and marketing strategies.
3. Efficient Use of Labor. This involves simplifying processes and adopting technology to reduce labor requirements without sacrificing productivity.
4. Risk Reduction and Management. It has become necessary to adopt measures to mitigate and adapt to the impact of climate change on agriculture, as well as marketing risks like price fluctuations. Farmers can protect their economic interests by identifying potential risks and adopting appropriate proactive measures.
5. Sustainability. Farm planning must include practices and technologies that enhance ecological health and conserve strategic resources like water and ensure resiliency of farm operations.

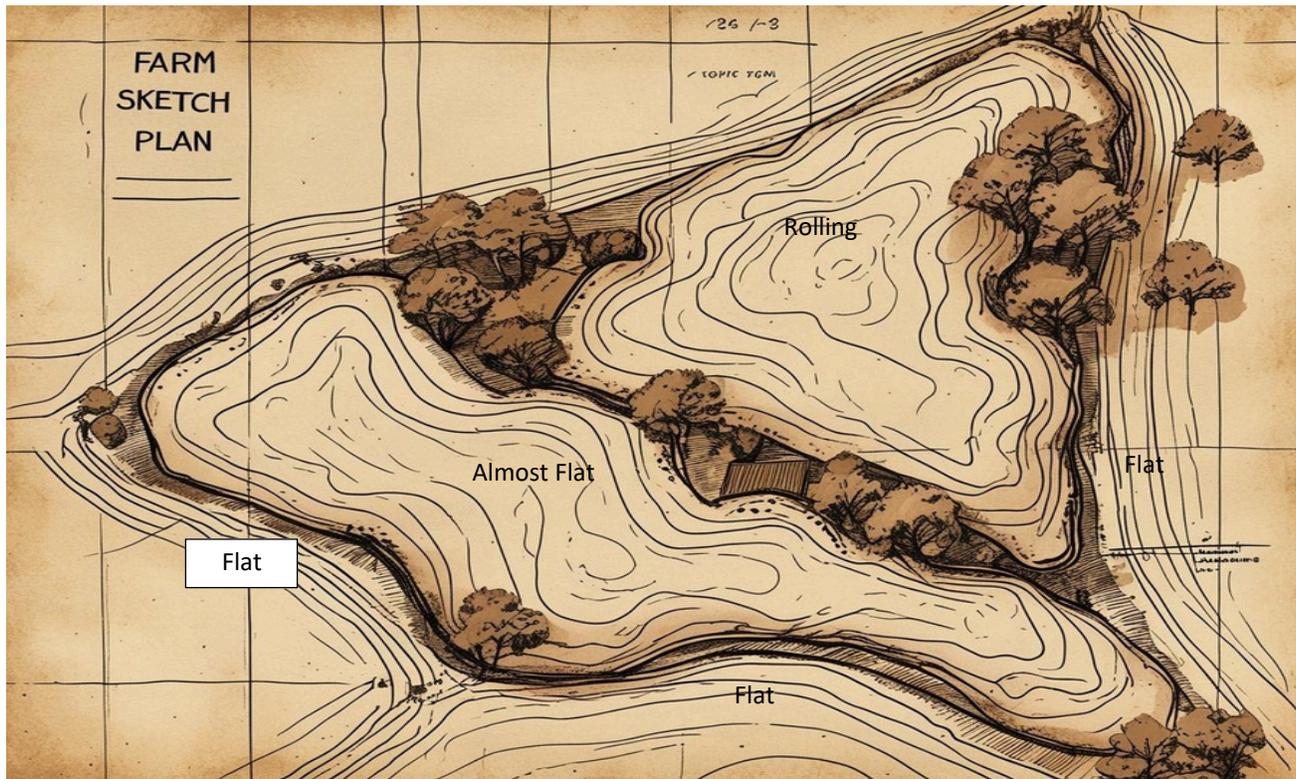
Steps In Making a Farm Plan

Step 1: Farm walk using VORAD

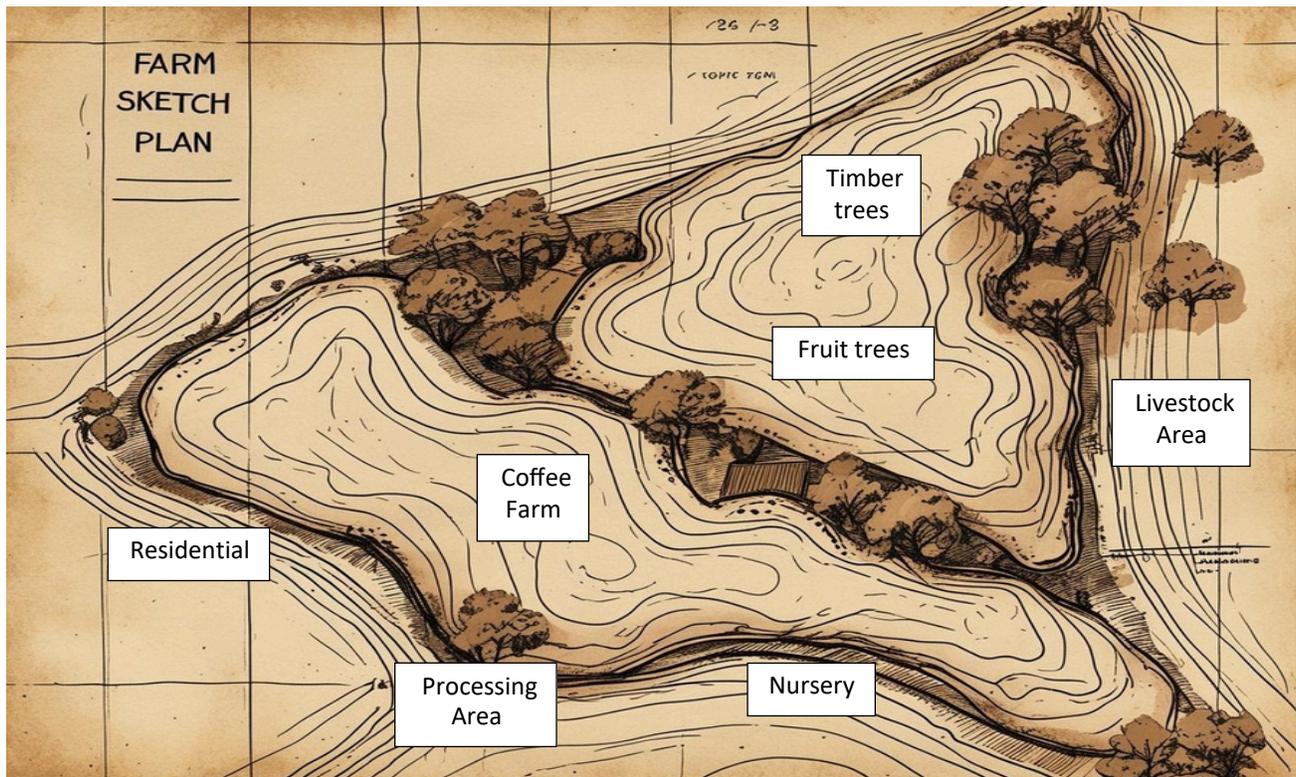
- Visit or survey the area to be developed.
- Observe and map out/draw the farm area taking notes of the existing crops, varieties, planting distance, layout, slope, elevation, boundary, road network, sources of water, potential area to be developed, among others.
- Record all the important observations in a notebook.
- Analyze the data or information gathered by matching the area map with the requirements of the intended plants to grow and then determine suitability.
- Decide what the development plan will be, and where, when, and how it will be implemented.

Step 2: Farm Sketch Map

Make an area map showing the topography, slope and elevation:



Visualize how the farmland will look after five years:



Step 3: Farm SWOT Analysis

Identify the strengths, weaknesses, opportunities, and threats to determine the interventions needed and potential for value-adding agri-enterprise component.

An Example of SWOT Analysis

One-Hectare Coffee Farm			
Strengths	Weaknesses	Opportunities	Threats
Long experience in coffee farming	Lack of post-harvest facilities	Assistance from government and private sector	Unpredictable weather patterns
Knowledge and skills from several trainings	Competing financial obligations	Growing demand for coffee	Disease and pest infestation caused by environmental factors

Step 4: Farm Household Profile

Identify labor, farm resources, income, and expenses shared by the family or people living in one household, and determine the adequacy of resources in relation to their needs.

It is highly recommended that all members of the household be involved so as to consider various perspectives and ensure joint decision-making.

Tools for Farm Household Profiling:

- 1. Farm Household/Farm Resource Inventory.** This will enable the farmers to know the available and required resources, including land, structures, animals, equipment, household assets, and cash.
- 2. Farm Household Gross Income Statement.** Make projections on the farm's income from sale of crops and livestock net of expenses on inputs and labor.
- 3. Farm Household Budget.** This covers projected expenses on food, education, transportation, medicines, and clothing. It may also include expenses for celebrations like birthdays and fiestas and non-essential items such as beverages and tobacco.

Sample of Farm Household or Farm Resource Inventory

Assets	Quantity	Estimated Current Market Value/Unit	Total Amount
FARM ASSETS			
Land (ha)	1.5	200,000.00	200,000.00
Farm Building	1	50,000.00	50,000.00
Goat House	1	30,000.00	30,000.00
Others			
Farm Animals			
• Goats	5	2,000.00	2,000.00
• Carabaos	1	25,000.00	25,000.00
• Pigs	4	4,000.00	4,000.00
• Others			
Farm Equipment			
• Plow	1	1,500.00	1,500.00
• Harrow	1	1,300.00	1,300.00
• Sprayer	1	1,500.00	1,500.00
• Others			
TOTAL FARM ASSETS			435,000.00
HOUSEHOLD ASSETS			
• House	1	200,000.00	200,000.00
• Furniture		50,000.00	50,000.00
• Appliances		60,000.00	60,000.00
• Savings		30,000.00	30,000.00
TOTAL HOUSEHOLD ASSETS			340,000.00
TOTAL ASSETS			775,300.00
LIABILITIES			
• Short-term Loan			150,000.00
• Long-term Loan			200,000.00
TOTAL LIABILITIES			350,000.00
CURRENT NET WORTH (total assets less liabilities)			425,000.00

Sample Annual Farm Household Budget

Particulars	Monthly Expenses x 12 Months	Total
Food	3,000 x 12	36,000
Education	2,500 x 12	30,000
Transportation	1,500 x 12	18,000
Medicines	500 x 12	6,000
Clothing	300 x 12	3,600
Fiesta	5,000 x 1	5,000
Birthdays (3 family members)	3,000 x 3	9,000
Others (tobacco, beverages)	800 x 12	9,600
Total		117,200

Sample Annual Farm Household Income Statement

Particulars	No. of Hills	Harvest (kg)	Current Market Price/Kg	Projected Expenses	Projected Net Income
Income from crops					
• Coffee	1,000	600	250	10,000	140,000
• Coconut	300	1,500	50	5,000	70,000
• Cacao	600	300	250	5,000	70,000
Income from Livestock	No. of Heads		Current Market Price/Kg		
• Goat		150	250	2,500	35,000
• Pig		300	250	3,000	72,000
Other Income					
Hired laborer (5 days per month @ P200/day)					12,000
Total Annual Gross Income					399,000

Step 5: Goals and Objectives

Write down the family's goals and objectives to help in target setting. These include the overall goal and objective for the farm, and the timeframe to achieve such goals.

Goal is a desired result that a person, system or organization plans and aims to achieve. It can be short-term (1-3 years), medium-term (4-5 years), or long-term (up to 10 years).

Goals are broad, aspirational statements of desired outcomes, while objectives are specific, measurable steps taken to achieve those goals. Think of goals as the destination and objectives as the individual steps or landmarks along the journey. Goals provide the "what" and the "why", while objectives answer the "how" and "when".

Sample Goals, Objectives and Timeframe

Our GOALS:

- Increased farm productivity to improve income.
- Improved farm ecology for sustainability.

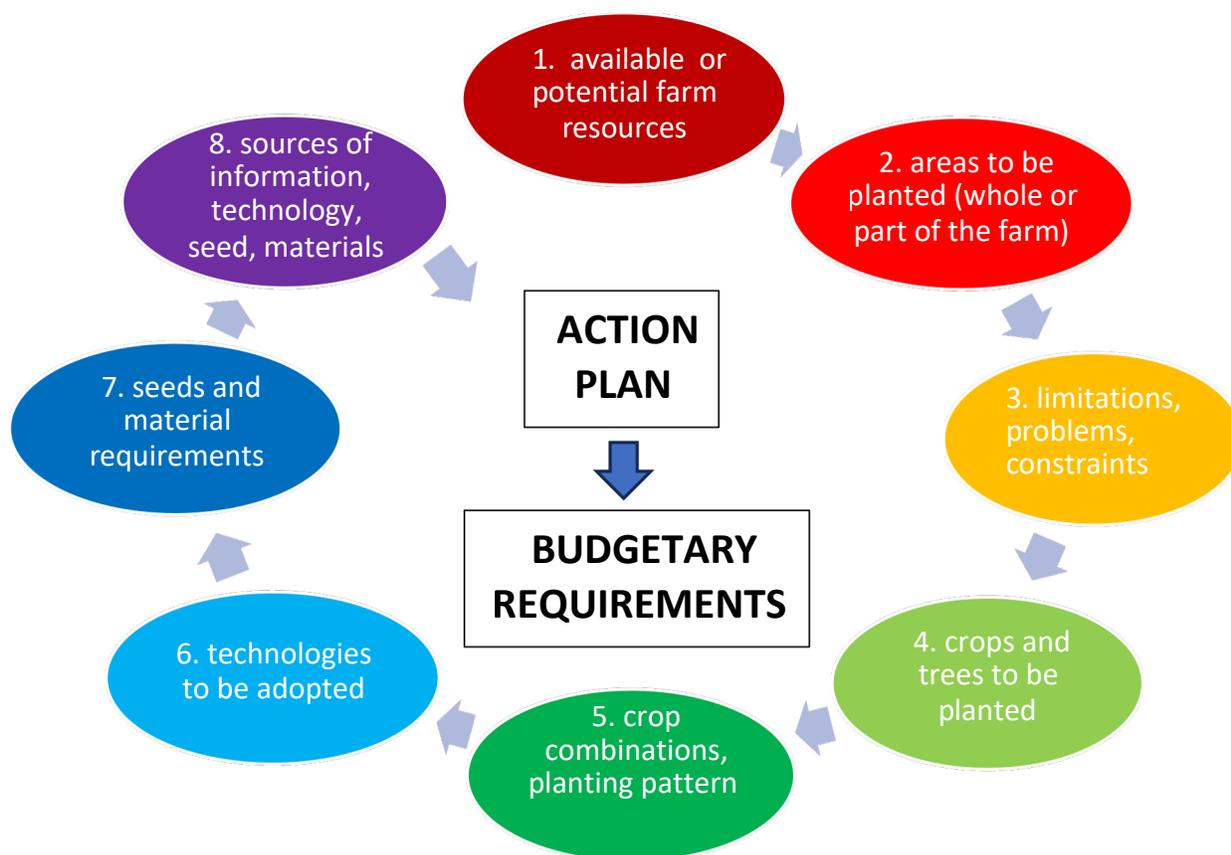
Our OBJECTIVES:

- Increase the coffee harvest by 20% starting on the first year.
- Expansion of area planted to coffee by at least one hectare every year for five years.
- Increase income from coffee by at least 10% through good post-harvest practices and value-adding activities.
- At least 80% adoption of organic farming methods midway through the plan implementation.
- Improved soil health in the farm through soil and water conservation measures.

Step 6: Action Plan

An action plan is a detailed document that outlines the specific steps, tasks, and resources needed to achieve a particular goal or objective. It breaks down the goals into actionable steps to guide the members of the family in plan implementation.

Your action plan should consider the following:



1. Use the Farm Household Profile as a guide in identifying available or potential resources.
2. Identify what area is more convenient to optimize and/or maximize with consideration of slopes, soil type, water, trees and other topographical features.
3. List the expected problems and constraints for farm development, e.g., absence of water supply, poor soil fertility, weather conditions, poor access.
4. You will need crop and tree information (yield, fertilizer and pesticides management, labor cost, income, price and quantities sold, constraints in the cultivation of specific crops or trees, marketing).
5. Crop combinations will depend on topography and specific needs of the farm.
6. Technologies may include farming methods and certain equipment and facilities.
7. List sources of labor, planting materials like seeds and seedlings, other inputs, plastic bags and tools.
8. Sources of information include local government units, the Department of Agriculture, other government agencies, nongovernment organizations, and the private sector.

Sample Activities in an Action Plan

Activity	Person Responsible	Timeframe/ Schedule	Required Resources	Budget (Pesos)	Source/s
Land preparation	Family members and hired personnel	May 2025	Bolos	5,000.00	
Lay-out and staking	Farm owner	June 2025	Bamboo pole for staking	3,000.00	
Planting of 500 hills of quality arabica coffee seedlings	Family members and hired personnel	June 2025	Coffee Seedlings, Organic and inorganic fertilizers	30,000.00	LGU, Gov't agencies, NGO's

Step 7: Budgetary Requirements

Budgeting is a process of allocating resources to specific activities within a certain period of time. It is concerned with the coordination of resources, production, and expenditures, and provides a basis for making farm management decisions. This process serves as the financial road map for the next production period to be incorporated in the farm business plan.

Budgets are made to estimate expenditures and cash flow (receipts and expenses), allowing for the anticipation and avoidance of problems that may be encountered based on previous records. In farm planning, this requires knowing the prices of inputs, transport and labor cost, and other information.

Farm Planning Tips

- Prepare farm plans on an annual basis and evaluate to determine what has been accomplished based on the objectives.
- Review and update the farm plan diagrams every year.
- nMake a farm plan for the whole farm, but if resources are scarce you may focus on a few parts of your farmland and make modification as your resources may allow.
- Determine whether the family needs can be fully met by the crops, livestock, and other income sources.
- Make sure to account for the contributions of all members of the household.



Members of Panaw Sumilao Multipurpose Cooperative resorted to drip irrigation using plastic bottles for their coffee plants during the drought that hit Mindanao from July 2023 until May 2024. NATCCO photo



Winifredo proudly shows how his Robusta coffee trees that have started to bear fruit. HMC Mordeno

Three C's for Winifredo: Corn, Cassava, and Now, Coffee

It was already noontime when Winifredo M. Sanhaan brought us to his modest farm in Barangay San Vicente, Sumilao, Bukidnon. Adjacent to a cornfield, around 200 Robusta coffee trees that he planted there in February 2024 had grown to nearly a man's height.

Prior to planting coffee, Winifredo planted bananas of the lakatan variety, some of which were already heavy with fruits. It was a deliberate measure. He said he got the technique from another farm, where the bananas serve as shade for the juvenile coffee trees. He observed that Robusta, the variety he planted, is sensitive to the sun's heat.

A staffer of NATCCO's CAFÉ-DAIRY Project, which provided the coffee seedlings, earlier posted on social media Winifredo's technique of using bananas as shade. The post drew a negative comment that bananas are not advisable as shade because they could infect neighboring plants with their disease.

However, Winifredo's coffee plants showed no symptoms of any disease. The stems and leaves appeared healthy, and green beans, which showed no defects too, had emerged. "Maybe I can start harvesting in October," he said. For now, he is relying on corn and cassava as his main sources of income.

"We have to manage well our coffee plants. We have to ensure that they are fertilized and well-maintained. Who knows, we might receive more projects in the future," he enthused.

Currently, he is still using seeds to propagate Robusta. But he has been advised to use cuttings to maintain the plant's characteristics since Robusta is a cross-pollinating variety.

Winifredo is among the 100 members of Panaw Sumilao Multi-Purpose Cooperative (Panaw MPC) who received seedlings and other inputs from NATCCO. Since this is the first time for most of them to grow coffee, the average area currently planted to the crop by each member is only 200 to 300 square meters.

(Panaw MPC is a “child” of the Mapalad Farmers, whose members waged a much-publicized protracted struggle – both legal and meta-legal – for ownership of a 144-hectare land in San Vicente under the Comprehensive Agrarian Reform Program. They finally won in 2007, when, after marching from Sumilao to Malacañang, the government revoked the conversion order covering the contested property and returned its ownership to the farmers.)

The cooperative is buying coffee beans from members and non-members alike, and sells them in ground, roasted form.

It is planning to buy cherries to ensure good quality and go into processing. However, at present, it doesn't have the necessary equipment aside from a sorting table provided by NATCCO.

Asked to compare growing coffee with producing other crops, Winifredo said he finds the former less toilsome. “Weeding is the only laborious part. And, unlike corn, coffee is a perennial crop. You only plant once, and you keep harvesting after it matures. A price of P250 per kilo for the commercial kind would be good enough,” he said.

He shared that he happened to meet the owner of Café sa Bukid, a popular coffeeshop along the national highway in Barangay Kibangay, Lantapan, Bukidnon. He said the latter encouraged him to plant more Robusta, pointing out that its price is likely to go up because many people want coffee with a stronger “kick”.

Robusta is known for its higher caffeine content, and Arabica for its aromatic flavor.

“I planted in 2024, and the trees started to bear flowers in mid-2025. It's not too late for me,” Winifredo said with a laugh.

The same thing is apparently true for his fellow coffee farmers, who he said are mostly young.



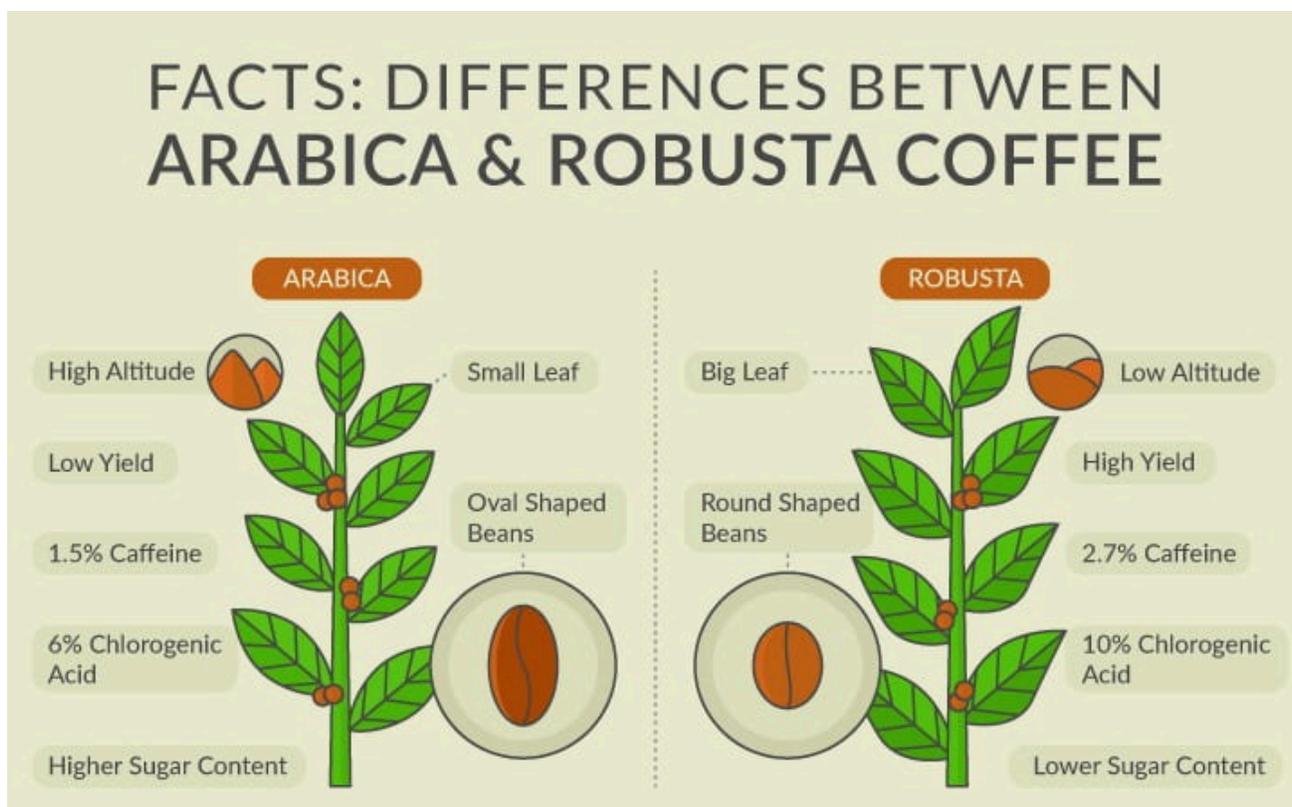
COFFEE-GROWING TECHNIQUES



Differences Between Arabica and Robusta

Filipino coffee farmers, particularly those in Mindanao, are mainly growing the Arabica and Robusta varieties, which are known for their aroma and high caffeine content, respectively. It is important to know their characteristics to give farmers an idea which of these two varieties are better suited to their farms especially in relation to environmental factors such as altitude and temperature.

Plant Characteristics	Arabica	Robusta
Altitude (masl)	800 - 2,200	0 – 1,100
Temperature	150C - 240C	180C - 360C
Rainfall (millimeter)	1,200 - 2,200	2,200 - 3,000
Pollination	Self-pollinating (10% probability of cross-pollination)	Cross-pollinating
Root System	Deep; tap root can reach 5 meters when fully developed	Stem cutting (shallow root system); sexually propagated plants have established tap root system
Flowers to ripe cherries	9 months	10 - 11 months
Yield (GCB/ha)	1,500 - 3,000	2,300 - 4000
Caffeine Content (%)	0.53 - 1.45	1.94 - 3.04
Sugar/Sucrose (% dry basis)	5 - 12	4 - 6
Lipids (% dry basis)	12 - 18	9 - 13



www.coffeechronicles.com

Site Selection

Site Preparation and Field Planting

Start site preparation before the seedlings are ready for planting to create favorable conditions for coffee seedlings and to facilitate planting procedures.

- Remove grass and weeds to a minimum of 50 centimeters in all directions.
- Avoid the slash-and-burn techniques.
- On sloping land (greater than 15% slope), plan for additional measures:
 - Contour planting or terracing
 - Planting leguminous ground cover such as *Arachis pintoi* (mani-mani) to control soil erosion and weeds

Shade and Shade Regulation

Shade reduces the nutritional input requirements of the coffee plant by slowing down its metabolism. It also gives other benefits like moisture retention, promotion of biodiversity, slow weed growth, soil erosion control, and as a windbreaker.

Shade trees also enrich the soil with organic matter and nutrients from leaf fall and capture carbon in the environment. However, permanent shade trees should be managed to allow roughly 70% of sunlight to reach the coffee plant.

Nitrogen-fixing tree species like madre de cacao and ipil-ipil can be planted with coffee.

For short tree species, the recommended planting distance is 2m x 2.5m or at least 2,000 plants per hectare. For tall trees, it should be 2m x 3m or 1,667 per hectare.

Field Planting

Dig holes and plant at the start of the rainy season to give young plants enough time to establish roots before the dry season sets in.

Prior to hole-digging, clear weeds 50 cm around the center of the hole, and cut back any roots or shade trees or plants that are near the planting hole.

Steps in Field Planting

1. Dig holes 40 cm wide and 60 cm deep. This will be enough to accommodate a ball of earth with roots intact.
2. While digging, make sure to separate the top soil from the subsoil, and to return the topsoil into the hole.
3. Prepare the following fertilizers:
 - 56 g Complete
 - 56 g Calcium/Dolomite
 - 56 g Extra P (Trebels superphosphate)
 - 15 g Micro element mix (Zn, Cu, B)
 - 1 kg Wormcastings/Compost

4. Cut off 1-2 inches from the bottom of the seedling bag to remove any circling roots. Place the seedling in the hole and remove any remaining plastic.
5. Fill the planting hole with subsoil and fertilizer mix, pressing it firmly around the seedling.

Selection and Preparation of Coffee Seeds

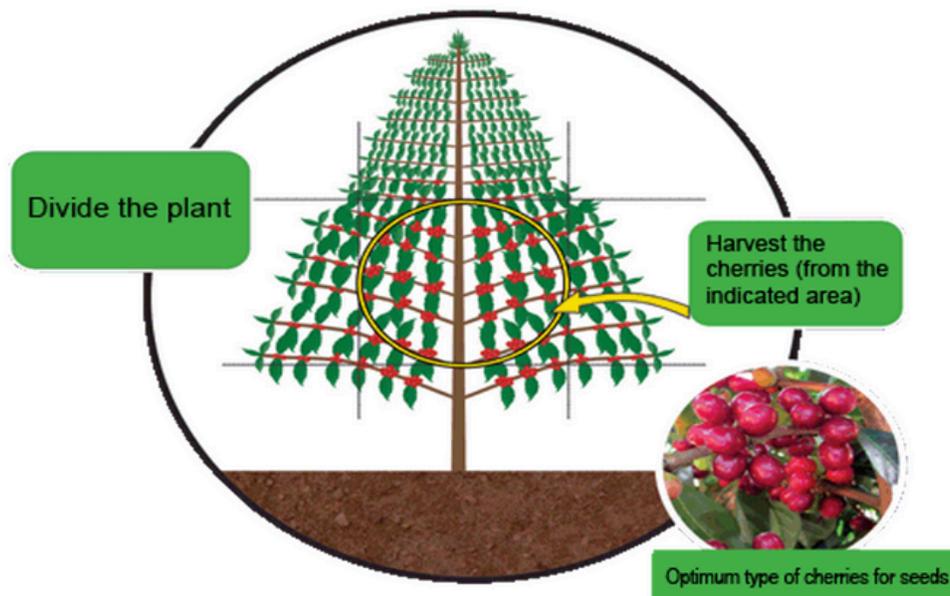
Step 1. Selecting the Mother Plant

A mother plant should be:

- one that comes from a farm planted to a single variety;
- 4-10 years old that demonstrates consistency in production and high productivity;
- coming from healthy, vigorous coffee trees;
- resistant to pest and diseases; and
- of good cup quality, i.e., its cherries have a sugar content of 25⁰Bx.

Step 2. Harvesting Cherries from the Mother Plant

- Collect ripe fruits during the principal harvest.
- 750 grams of quality coffee parchment is enough to plant an hectare.
- Pick only ripe cherries.
- Select fruit as indicated in the diagram below



Step 3. Flotation or Buoyancy Test

- Place about 100 coffee cherries in enough water to check for “floaters”.
- Discard cherries that float and process separately. If fewer than six cherries float, you have a good mother plant to extract seeds from.
- Process only the cherries that sink.

Step 4. Processing of the Coffee Cherries for Germination

- Pulp the cherries on the same day they are harvested.
- Pulp by hand or with an adjustable pulping machine so that the seed embryo is not damaged.

- Ferment for 12-18 hours depending on the altitude to avoid high mortality of the embryo.
- Wash seeds with clean water until they are free of mucilage.
- Drying should be gradual, for a period of 2-3 days, in a shaded well-ventilated location until it reaches 20% moisture content.

Step 5. Seed Selection

This operation involves removing all seeds with defects as shown in the images below:



Step 6. Packing the Seeds

- Sprinkle five tablespoons of agricultural lime into a kilogram of parchment coffee to prevent bacterial and fungal attack.

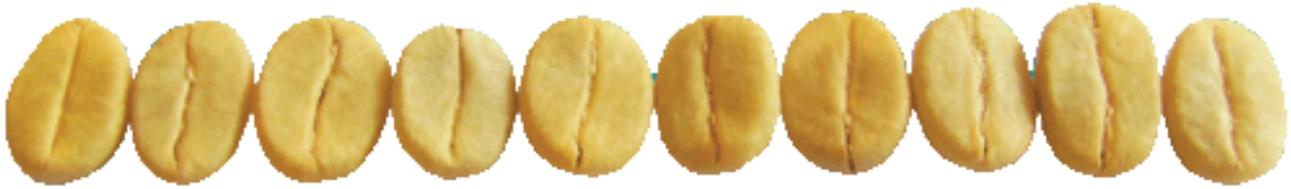
Step 7. Storing the Seeds

- Use clean paper bags, jute sacks or any other material that allows air to flow.
- Place information sheet inside the bag indicating the following:
 - Variety
 - Date of Harvest
 - Total Weight
 - Origin (farm, owner, location)
 - Germination Rate

Seed Viability

- Store the seeds in a clean, dry, well-ventilated area.
- Seeds will be viable for germination within three months from the harvest date. When seeds are stored properly under suitable conditions, a germination rate of more than 90% can be guaranteed. After three months, germination rates gradually decrease.

Examples of optimal seeds for germination



Methods of Propagation

Sexual Propagation

Sexual propagation in plants refers to the process where new plants are produced from seeds, resulting from the fusion of male and female reproductive cells (gametes). This method involves pollination, where pollen (containing sperm) is transferred from the male part of a flower (stamen) to the female part (pistil or carpel), followed by fertilization, which creates a zygote that develops into a seed.

Arabica trees are self-pollinating; thus, plants are true to type. The presence of bees and other pollinating agents would further enhance the pollination process, increasing coffee productivity.

Coffee seeds are germinated without putting them into a seedbed. They will start to germinate in nine days depending on the consistency of temperature and available moisture. Coffee seedlings are ready for field planting in about 6-8 months.

Asexual Propagation

Asexual propagation does not involve seeds. It includes methods such as cuttings, scions for grafting, “cell culture,” and layering. Cuttings make use of stems, while grafting is done by joining the root-stock and scion. “Cell culture,” on the other hand, is called somatic embryogenesis.

This method allows for the production of new plants more quickly than through seed propagation. It is suitable for plants that don’t readily produce viable seeds, or whose seeds may not be true to type.

Vegetative propagation, a form of asexual propagation especially used for Robusta varieties, involves using parts of the parent plant such as shoots, leaves or roots, to produce genetically identical clones. This technique is preferred for Robusta coffee to ensure uniformity and preserve desirable traits.

Vegetative Propagation Methods

Stem cuttings

One of the most common methods of vegetative propagation is using stem cuttings. Here’s how it’s done:

- **Selection of cuttings:** Choose healthy, disease-free stems from a high-yielding parent plant. The cuttings should be about 15-20 centimeters long and have at least 2-3 nodes.

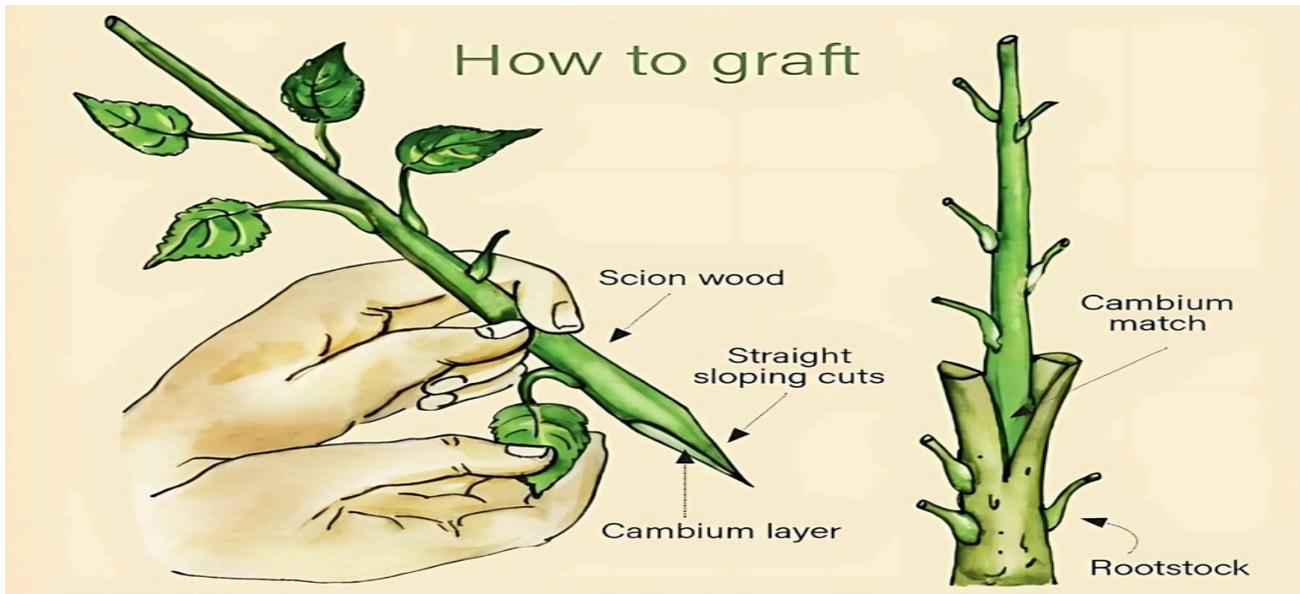
- **Preparation of cuttings:** Remove any leaves from the lower part of the cuttings and dip the cut ends in a rooting hormone to promote root development.
- **Planting the cuttings:** Insert the cuttings into a well-draining soil mix, ensuring that at least one node is buried in the soil. Keep the cuttings in a shaded area and maintain consistent moisture.
- **Root development:** Rooting usually takes 4-6 weeks. During this period, it's crucial to keep the soil moist and provide protection from pests and diseases.
- **Transplanting:** Once the cuttings have developed a robust root system, they can be transplanted to the main field or larger pots.



Grafting

Grafting is another vegetative propagation technique used to propagate coffee plants. It involves joining a scion (a shoot or bud) from a desired coffee plant to a rootstock from another plant. Here's a step-by-step guide to grafting:

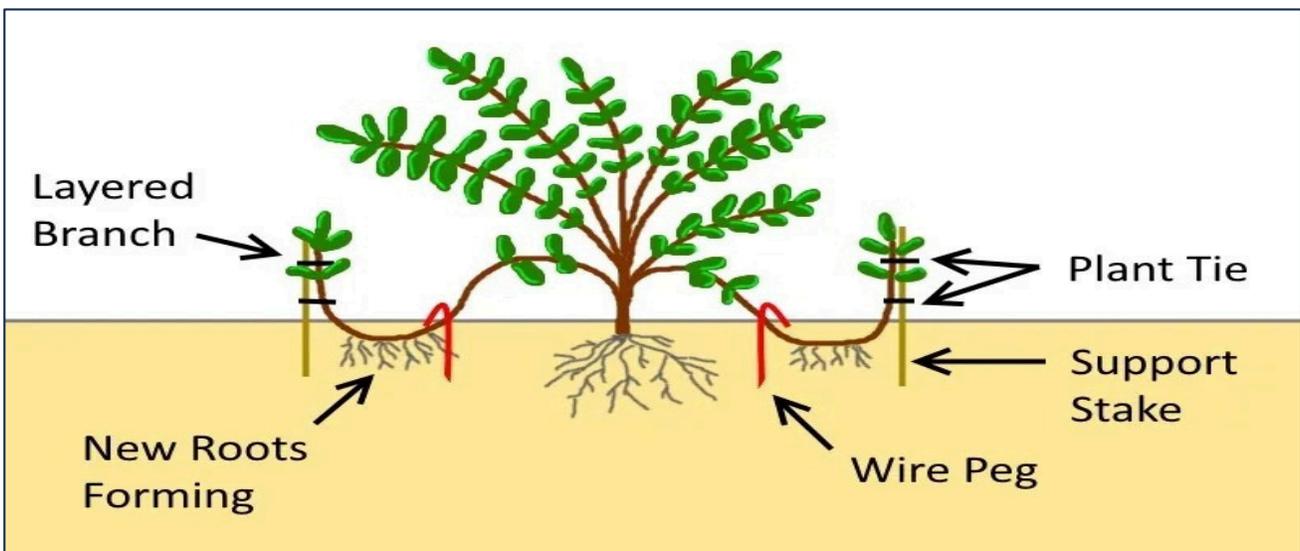
- **Selection of scion and rootstock:** Choose a healthy scion from a high-yielding parent plant and a compatible rootstock with a robust root system.
- **Preparation of scion and rootstock:** Cut the scion and rootstock at an angle to create a matching surface for joining. Make sure the cuts are clean and smooth.
- **Joining the scion and rootstock:** Align the cut surfaces of the scion and rootstock and secure them together using grafting tape or a similar material.
- **Healing and care:** Place the grafted plant in a shaded area and maintain consistent moisture. The graft should heal and form a strong union within a few weeks.
- **Transplanting:** Once the graft has healed and the plant shows signs of new growth, it can be transplanted to the main field or larger pots.



Layering

Layering is a vegetative propagation method where a stem or branch is encouraged to develop roots while still attached to the parent plant. Here's how layering is done:

- **Selection of branches:** Choose healthy, flexible branches that can be bent to the ground without breaking.
- **Preparation of branches:** Make a small cut or wound on the underside of the branch where it will touch the soil. This encourages root development.
- **Burying the branch:** Bend the branch to the ground and bury the wounded section in the soil, leaving the tip exposed. Secure the branch in place using stakes or pins.
- **Root development:** Keep the soil moist and provide shade if necessary. Roots should develop within a few weeks to a few months.
- **Severing and transplanting:** Once the branch has developed a robust root system, it can be severed from the parent plant and transplanted to the main field or larger pots.





Arabica coffee beans at the farm of Jemel Aninloy in Barangay Guihean, Impasugong, Bukidnon. HMC Mordeno



Jemel: brewing a dream. HMC Mordeno

A Young Farmer’s Dream: from ‘Birot’ to Big-time Competition

Having started cultivating coffee only in 2024, Jemel S. Aninloy has harvested but a few kilos from his farm in Barangay Guihean, Impasugong, Bukidnon. He decided to give more attention to growing coffee after attending a series of training activities and receiving free farm inputs such as seedlings from the Department of Agriculture, Department of Trade and Industry, the provincial government, and NATCCO.

Jemuel belongs to the Guihean Clusters Farmers Association. Since the organization is one of the beneficiaries of the CAFÉ-DAIRY Project, 100 farmers from the group, including himself, were able to attend the seven-module coffee production training organized by NATCCO, the project implementer.

He said they are trying to apply the techniques he had learned from the training, particularly the proper methods of propagation.

“Before, we just planted birot (seedlings that randomly grow on the ground and uprooted for replanting) of Arabica and Robusta,” he recalled. Farmers in Guihean grow the Catimor and Typica varieties of Arabica.

The 26-year-old Higaonon farmer is tilling at least one hectare of land, part of an inheritance that has been divided between him and his siblings. At the start, he planted 1,000 coffee seedlings in his farm and added 500 more from DTI and other agencies. He has planted not just coffee but also abaca, chili, and giyong (tiger grass), the main material for soft brooms.

“For now, while waiting for more harvest from my coffee, my main source of income is giyong,” he said.

But for Jemel, aside from the training and assistance from the government and nongovernment organizations, the inspiration to go into coffee farming came from realizing how a neighbor, Gerard Lithon, has improved his life as a coffee farmer. Gerard now has at least 3,500 trees with an average age of 20 years.

“Moasenso ta kung ato gyud atimanon atong kape. Akong gibasehan si Uncle Gerard (We’ll prosper if we take good care of our coffee. I’m basing it on Uncle Gerard),” he said. “It was also him who sent me to places and trainings to learn more about coffee.”

Jemel, like Gerard, is also a mentor, having attended a training for trainers organized by NATCCO.

He noted that farmers in Guihean have expanded their coffee farms after getting free inputs.

During the last harvest season, the Kauyagan Savers Multi-Purpose Cooperative, which is based in Impasugong and serves as the consolidation point of cherries and dried beans, bought a total of 25 tons of beans from Guihean and from Barangays Dumalaguing, Kalabugao and Sayawan, all in Impasugong. The beans are sold to Nestle in Cagayan de Oro City and to individual coffee shops.

A former Sangguniang Kabataan kagawad in their barangay, Jemel said he wishes to see young people like him go into farming.

“Farming should not be left to the elders, the youth should also engage, particularly in growing coffee. I’ll be the model,” he said.

“Only a few young people are left here (Guihean). Many are working in other places. But I’m encouraging them, I guess they’ll be encouraged once they see that coffee farmers have increased their income,” he added.

But if there’s one other thing that Jemel is wishing for at the moment, it is the satisfaction of joining the annual Philippine Coffee Quality Competition. He said this dream took shape after witnessing the competition’s 2025 edition in Makati City, where farmers from Bukidnon bagged top honors across different categories.

He said that for this to come true, he may need the help and expertise of Neil Guinontao, a quality grader who lives just a few meters away, to improve the quality of his coffee from the bean to the cup.

At 26, Jemel surely has a plenty of time to fulfill his dream.



NURSERY ESTABLISHMENT AND MANAGEMENT

Site Selection

Establish the nursery in an area that is not waterlogged and close to an adequate water source and the farm. It must be built far from big trees or shaded areas. An ideal nursery is in the coffee farm itself or near it.

Clean the selected area and provide 35% shade, use shade nets, and provide a 40-cm distance in between plots/beds for convenient passage. Ideally, build a perimeter fence to restrict entry of domestic animals.

Potting Mix Preparation

There are two options to choose from. One is using 1/3 compost or organic fertilizer, 1/3 river sand, and 1/3 garden soil. The other one is using 1/3 coconut fiber or rice hull, 1/3 river sand, and 1/3 organic fertilizer or worm casting. Chicken dung and rice hull can also be a good potting mix.

Using 100% soil in the seedling bags is not advisable as it provides poor drainage and aeration and roots cannot properly penetrate and grow.

For every 1,000 kilograms of potting mixes, add the following: 2.5 kg superphosphate, 1 kg dolomite, 500 g of muriate of potash, 5 g borax, 5 g zinc (zinc sulphate), and 5 g copper sulfate.

The size of polybags should at least be 5 inches in diameter and 10 inches tall. Polybags measuring 6 inches x 10 inches may also be used. Taller and wider polybags mean more potting mix for root growth, allowing good strong seedlings to develop within six to seven months in the bags.



MILFACO nursery in Miarayon, Talakag, Bukidnon. HMC Mordeno

Coffee Nursery Fertilization Guide

At three months, apply urea (46-0-0) at 60 grams per 10 liters. This is enough for 100 seedlings or 100 ml per seedling. Apply every 15 days. Stop the procedure once the leaves turn green.

For liquid fertilization/fertigation or hinubig, dissolve 3 kg of urea/DAP in 50-80 liters of water and apply 50-80 ml per seedling of the solution every two weeks. This is good for 1,000 seedlings.

Hinubig fertilizer application is more effective when there is no rain.

At an interval of two to three weeks, spray foliar fertilizers (NPK, Zinc, Sulfur, Magnesium and Milorganite), fungicide (Copper base, e.g., Mancozeb or Dithiane), and insecticides that are either green- or yellow-labeled.

Care and Maintenance of Seedlings

- Remove weeds regularly.
- Water as required to keep the soil damp. Don't overwater as this can cause damping-off, a disease caused by a fungus that can kill the seedlings.
- Remove seedlings infested with pests and diseases.
- Two months before field planting, harden the seedlings by exposing them directly under the sun.
- During the growing stage of coffee seedlings, allow more space in between polybags to allow them to grow evenly. Separate inferior seedlings. Eliminate the infected and diseased ones.

Individual farmers, households or groups that have nurseries should keep records and documentations.

A germination box or table is recommended to allow seeds to germinate without putting them into a seedbed, avoiding damage as a result of uprooting and transplanting. Seeds will start to germinate within nine days, depending on the consistency of temperature and moisture. Note that seeds cannot be kept viable for more than three months and they need to have 20% moisture content.

In building a pre-germination table or chamber, the following materials are needed:

- 4 pcs of 2" x 3" x 1 meter post
- 2 pcs of 2" x 3" x 1.2 meters for table sides
- 2 pcs of 2" x 3" x 2 meters for table sides
- 1 pc of 2" x 3" x 1.2 meters for center support
- 50 pcs bamboo slats @ 2" wide and 2 meters long for top and bottom support
- 8 pcs 1" x 2" x 30 cm brace support
- 4 pcs jute sack
- 2meters UV plastic for roofing
- Optional: Amazon (Green plastic screen)



NATCCO Photo

The UV plastic for roofing will need:

- 2 pcs of 2" x 3" x 0.5 meter for center post
- 1 pc of 2" x 3" x 2 meters for center post
- 6 pcs of 1" x 2" x 0.7 meter for side frames (width)
- 4 pcs of 1" x 2" x 2 meters for side frames (length)
- 1 pc of 2.5 meters UV plastic
- 2 pcs of 2" x 3" hinges
- Nails: ¼ kilo of 1.5"; ¼ kilo of 2"; ¼ kilo of 3"; ¼ kilo of 4"
- Tacker

Building the Germination Table/Chamber

- Build first the table frame and attach all the legs and braces.
- Nail all the bamboo slats at the bottom of the frame. Slats are spaced at 1 cm apart.
- Place the UV plastic on the frame, forming a shallow basin that will hold water.
- When attaching the UV plastic, use tacker instead of nails and be careful to tack only at the upper portion of the frame.
- Place additional layer of bamboo slats on top of the table.

Note: You can also use Amazon (green plastic net) firmly stretched, nailed to bamboo slats on the frame.

Building the UV Roofing

- Assemble the roofing center post and center support.
- Construct the two frames for your UV roofing.
- Attach the frames to the center support using hinges on the sides.

Completing the Pre-germination Table

- Combine the completed roofing on the base table.
- Attach the UV plastic on the frames of the roofing. (Do not cut the UV plastic. Use tackers to ensure that it stays in place.)
- Use an additional UV plastic to cover both sides of the roofing. (Make sure to leave at least 20 centimeters of opening to let the air flow.)

Setting up the Seeds for Germination

- Put water in the table's shallow basin. Water level of the basin should only be 50% full.
- Cut the jute sack and sterilize either by putting it on boiling water or sun dried for one full day.
- Lay down the sterilized jute sack, covering all the table frame.
- Place all the seeds in an organized line, spaced at 1-2 cm apart.
- Cover with additional sterilized jute sack.

Sowing Germinated Seed

- Pre-germinated seeds will germinate in nine days depending on the consistency of moisture and temperature, ready for sowing in a polybag in 20 days.
- Place germinated seeds on top of potting media and cover lightly with soil.
- Leave 1/2 inch without soil on top of polybags to allow water to absorb and avoid water runoff.
- After six weeks, matchstick-like growth of the coffee seedlings will develop.
- At three months old, the first two leaves should be well-developed.

Maintenance of the Germinating Seeds

- Make sure to place the table with seeds in a well-lit area.
- The jute sacks should always be wet.
- Monitor the growth of the germinating seeds once a day.
- Once the radicle appear on the seeds, these should be immediately transferred or sown in the seed bags.

Seedbed may be the traditional method to germinate seeds, but it is not recommended due to the following issues: it requires constant weeding and watering; the top of the seedbed dries out easily; transplanting requires pulling or digging the seedlings out, resulting in damaged feeder roots; transplanting is a shock to the plant and needs time to recover; and inserting small tap root of the coffee seedling into the polybag without bending and creating a J-root poses the biggest problem.



Nursery Diseases and Pests

Damping-off disease usually attacks young seedlings. It is caused by soil-borne pathogens often found in old and diseased potting medium, overwatering, too much shade, or inadequate space in between plants.

Control: Immediately drench the seedlings with copper-based fungicides following the recommended application in the product label.

Cercospora (brown eye spot) is caused by a fungus that develops when plants are under stress, overshadowed, deficient in nitrogen, overwatered or overcrowded, and when they receive too much sunlight.

Control: Remove infected seedlings and spray with copper-based fungicides.

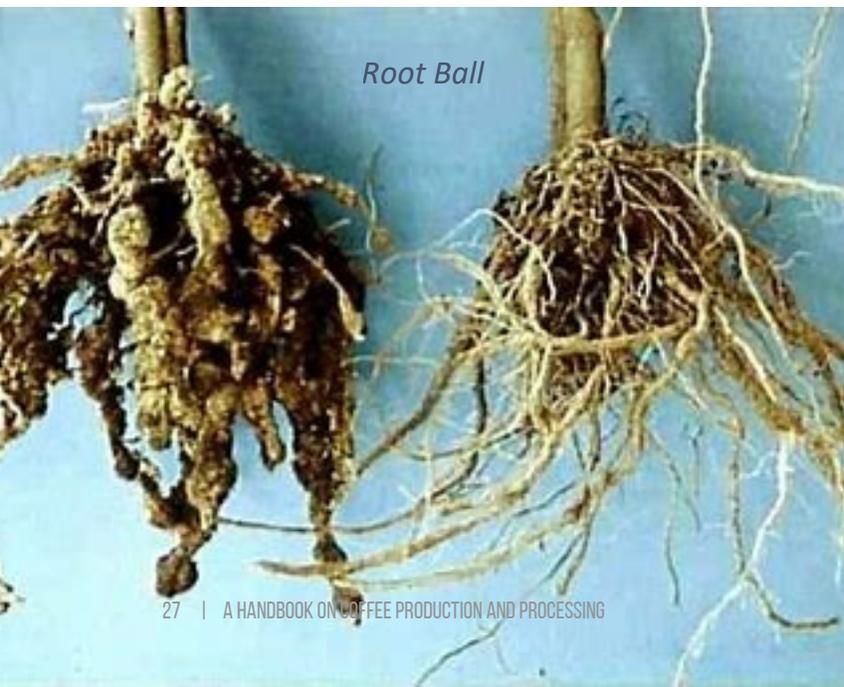
Root Diseases and Problems

Pythium, Phytophthora, and Rhizoctonia can be treated with regular drenching using fungicide. A fungicide solution of 2 oz or 57 grams can treat around 6,300 seedlings. Use different fungicide brands to prevent resistance.

Using the wrong planting bags may result in the roots forming into a short and small root ball. Seedlings with root ball appear small and poor-looking. This problem can be prevented by using the proper planting bags and making sure the media is not too compact and does not impede root development.

Circular roots develop when the seedling's roots reach the bottom of the bag and grow in a circling pattern. The solution is to cut the circular roots about one-half or one inch from the bottom of the bag. As a prevention measure, use the proper polybag size and plant the seedlings when they have six pairs of leaves without lateral branches.

J-root or bent root is caused by improperly inserting the tap root into the planting hole. There is no solution to a J-root. Plants with J-root will weaken and eventually die within two to three years, as their root structures prevent a good flow of nutrients from the soil.





A coffee tree in Barangay Minsamongan, Quezon, Bukidnon six months after it was subjected to rejuvenation. NATCCO photo



Rogelio: continuing a family tradition. HMC Mordeno

Minsamongan: Hope from Coffee

When Rogelio S. Limbag arrived in Barangay Minsamongan, Quezon, Bukidnon in 1969 with his parents as a boy, there was still a thick forest in the area and the soil was fertile, making it suitable for growing coffee.

He remembered his parents cultivated rice and corn, but they also planted Robusta and Excelsa coffee. Many of their neighbors also grew the same crop. “It was mostly coffee here from the 70s until the 90s; you’d be delighted because they bore plenty of beans that really looked good.”

“The price was not good but it was all right since we had plenty of harvest,” he said, adding they would sell their harvest to middlemen in Quezon Poblacion.

Upon starting out as a coffee farmer, Rogelio said he simply copied his parents’ ways. “Inato lang (self-taught methods). We had no training at that time. We’d just plant the seedlings that we found growing on our farm.”

When the price of coffee dropped to 5 to 10 pesos, many farmers in Minsamongan abandoned the crop. They cut down their coffee trees and converted the land into corn farms.

Rogelio did not touch his coffee plants like his neighbors did despite the price drop. That decision would pay off years later with the rising demand for coffee and various forms of assistance from both the government and private sectors for the industry.

His coffee trees are mostly 40 years old. But he said it doesn’t matter because they would only die if infected with borer and nothing is done to control the disease. He has eliminated the Excelsa though because the variety is not in demand; only the Robusta variety has remained.

“You’ll only plant coffee once. If you take good care of it, you’ll earn well,” he said.

Of late, farmers in the barangay, apparently encouraged by the good prices and a growing market, are also showing renewed interest in coffee production as a source of income.

Rogelio, who is currently the chairman of the Minsamongan Farmers Multipurpose Cooperative, said 60 out of their 150 members have attended the training organized by NATCCO. All of them own coffee farms with an average size of one hectare. They were given a total of 3,000 seedlings. Unfortunately, some of these were affected by the El Niño occurrence in 2024.

He said around 60 percent of those who attended the training are adopting the technology taught to them, particularly rejuvenation of old stands and correct spacing to improve yield. He added that those who are not applying the technology yet may just be preoccupied with other things. He noted that harvest has really become better after the farmers employed this method.

“Before, we would not mind the trees and left them to grow tall. Since it’s tiresome to climb them we just bent the branches when harvesting, and some would break. But I noticed that if you give enough care and attention to coffee, you’ll really earn. In the past, what I earned from selling was just enough for the labor cost,” he said.

At present, members of Minsamongan MPC are selling their dried beans at P250 per kilo to Nestle Philippines, which has also trained them in coffee growing. They used to deliver it to the company’s plant in Cagayan de Oro City. Later, it put up a buying center in neighboring Maramag town. Lamac Multipurpose Cooperative based in Valencia City is now acting as Nestle’s conduit in buying beans from the farmers.

They also previously sold to the Bayanihan Millennium Multipurpose Cooperative in Pangantucan, also in Bukidnon, both “all-in” and quality beans. All-in refers to beans of lesser quality because the ripe and unripe cherries are mixed during harvest.

Rogelio said they have established a demonstration farm to encourage more farmers to go into coffee production, as well as engaged in processing (roasting) using a machine. The roasted beans are sold at the One Town One Stop shop in Malaybalay City and at the Pasalubong Center in Quezon. Sometimes, the local government of Quezon would purchase roasted beans for their visitors.

For now, he said the cooperative needs more capital as a consolidation point because most farmers want immediate cash upon selling their beans especially if they have emergency needs. There has been an agreement to set a markup of ten pesos per kilo that will go to the association’s coffers.

Expansion and other plans

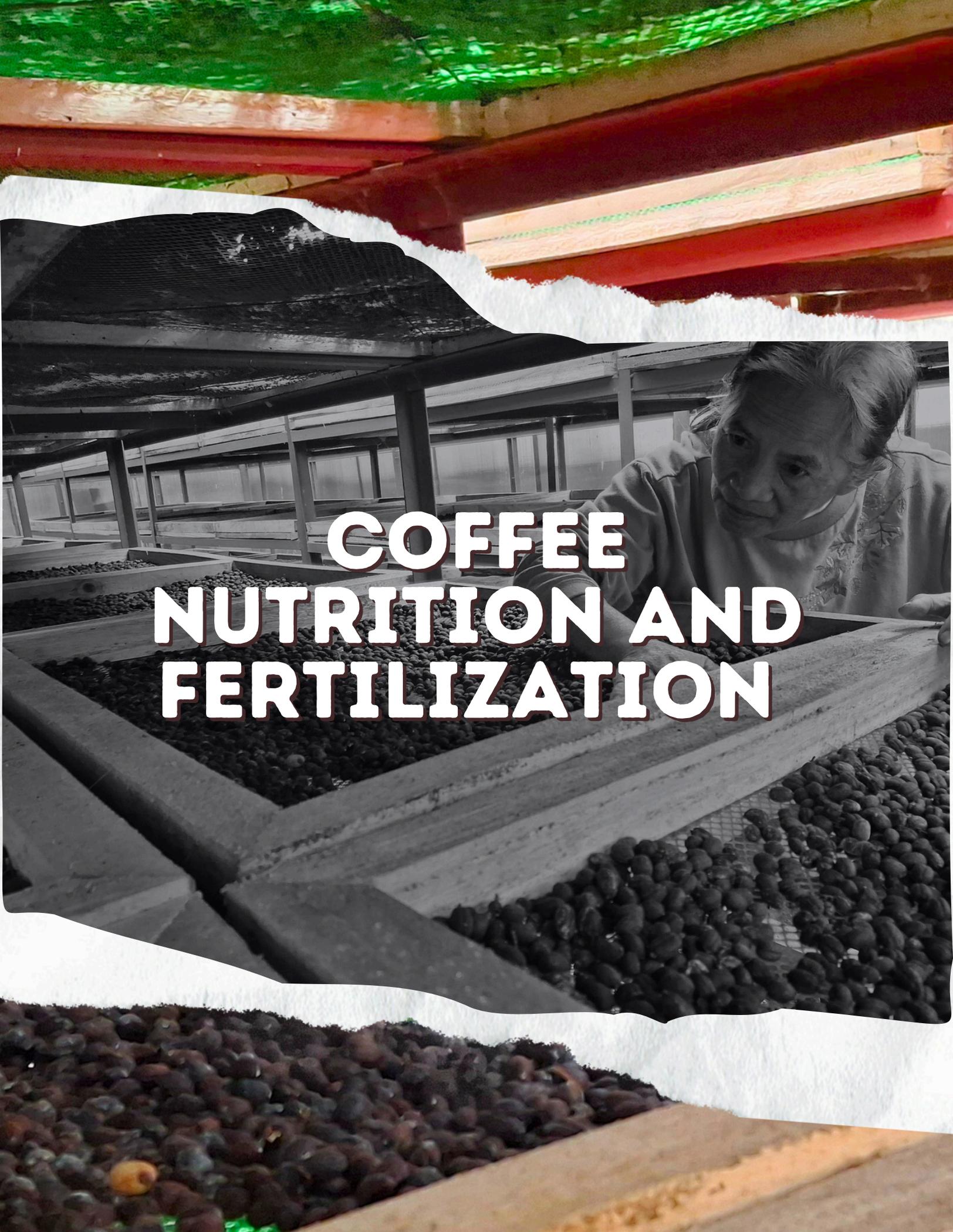
Rogelio said the cooperative is eyeing other barangays in Quezon with a higher elevation for Arabica production. One of these barangays is Santa Fe, an 80-percent Menuvu community, where they will initially provide 1,500 seedlings.

He said they have built a nursery using seed beds and compost materials. In addition to Arabica propagation, they will produce Robusta seedlings as an enterprise, citing that the current thrust of the provincial government is to make coffee a leading agricultural produce of the province.

The cooperative already has a huller donated by a nongovernment organization. This year, they are expecting the arrival of a depulper from the Department of Agriculture-Region 10. It is part of an assistance package that includes a building for coffee machineries. The cooperative's role is to find a piece of land – to be bought by the government – where the structure will be built.

On the way back from his coffee farm after the interview for this story, Rogelio shared a legend about how Minsamongan got its name. He said that in olden times a woman named Minsa and a man named Mongan fell in love with each other. Unfortunately, their families as well as powerful members of the community were against their relationship. In desperation the two lovers decided to end their lives under a balete tree. The place later came to be called Minsamongan in memory of a love that was not meant to be.

The tragic love story of Minsa ang Mongan still haunts the place, but no sign of the balete tree that witnessed their death can be found anywhere near the barangay. Maybe it has died long ago, its remains spread beneath the ground that now teems with coffee, the plant that now brings hope to the farmers and their families.



COFFEE NUTRITION AND FERTILIZATION

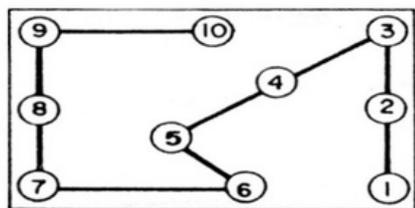
How to make soils healthy for coffee production

Land intended for coffee production can be made healthy with rational use of pesticides, fungicides and mineral fertilizers, and by managing soil pH (acidity). Managing soil structure, soil water, and soil air involves the use of little cultivation and keeping it moist not saturated.

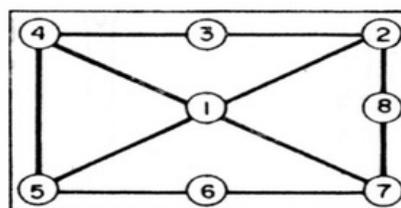
Cover crops such as nitrogen-fixing legumes may be used as a weed control measure. In addition, add soil organic matter like manure and farm wastes, preferably composted coco pod husks.

Soil Sampling Procedure

1. Remove the top layer of the soil along with stones, trash or grass to expose the soil before sampling.
2. Dig into the soil and take a sample slice two cm thick and four cm wide to a depth of 40-60 cm.
3. Get similar samples (using the methods shown in the diagram below) from as many as 8-10 holes per two to three hectares depending on the uniformity of soil.



1) S method



2) X method

4. Mix the soil samples in a container. Pass through a screen to remove foreign matter. Pulverize the soil to get a finer texture.
5. Take out two cups or one kilo of soil (depending on lab specifications) and air-dry.
6. Once dry, store the soil inside a sealable bag.
7. Label the soil sample (inside and outside the bag):
 - o Name of the farmer:
 - o Farm location:
 - o Area in hectares:
 - o Crops grown:
 - o Previous soil treatment:
8. Send the sample to a soil laboratory that provides a full analysis, including micronutrients, within one week.

Leaf Sampling Procedure

1. A leaf sample should be representative of a number of trees in an orchard. Different cultivars, rootstocks, age and soil types should be sampled separately. Sample different management systems separately.
2. Select the trees, well distributed throughout the orchard. The selected trees must be clearly marked, so that both the soil and leaf samples can be taken from the same marked tree every year. Mark the selected trees and sample the same trees every year. Soil samples should be taken at the same location. Those for an existing orchard should be taken every two to three years.

3. Sample mature, healthy leaves.
4. Leaf samples must only be taken from trees bearing fruit.
5. Avoid sampling from isolated abnormal, weak, or unhealthy plants. These plants can be sampled separately to aid in identifying the problem.
6. Sample leaves free of pesticide, fertilizer residue and free from insect, disease or mechanical damage. Wait for several days after any foliar spray before collecting leaf samples.
7. Sample enough leaves – rather too much than too little.
8. Leaves should preferably be collected in the morning; if it is taken when it is already hot, it can affect the leaf composition.
9. When submitting a leaf sample from a particular orchard for the first time, it must be accompanied by a soil sample. It is essential to consider the results of both soil and leaf samples when making fertilizer adjustments.

Actions to Sampling

- Make sure that the leaves are dry during sampling.
- Place the leaves in clean perforated plastic bags, brown paper bags or in netlon bags.
- After sampling the bag must be tightly closed and each sample must be marked with waterproof ink. The sample number is your reference when you receive the results.
- Place in a refrigerator overnight. Samples must not be frozen.
- Sample containers must be clearly labeled. The following information must accompany the samples:
 1. Contact details
 2. Crop type
 3. Cultivar
 4. Tree age
 5. Farm / Sample number

Leaf Sampling Macronutrients Guide

Level	% dry matter					
	N	P	K	Mg	Ca	S
Deficient	<2.2	<0.1	<1.4	<.26	<.5	<.1
Marginal	2.2 – 2.6	.1 - .14	1.3 – 1.8	.26 - .30	.5 - .9	.10 - .14
OK	2.7 – 3.2	.15 – 2	1.9 – 2.4	.31 - .36	1.0 – 1.4	.15 - .20
High	3.3 – 3.5	.21 - 23	2.5 – 2.7	.37 - .39	1.5 – 1.7	.21 - .25

Leaf Sampling Micronutrients Guide

Level	ppm dry matter (parts per million)					
	Fe	Mn	Cu	Zn	B	Ma
Deficient	<50	<40	<5	<4	<20	<.10
Marginal	50 – 59	40 – 119	5 – 7	4 – 7	20 – 58	.10 - .14
OK	90 – 180	120 – 210	8 – 16	8 – 16	59 – 80	.15 - .20
High	180 - 220	211 – 300	17 – 25	17 – 30	81 – 90	.21 - .30

Importance of plant nutrition and fertilization

Plant nutrition refers to the process through which plants obtain essential nutrients from their environment for growth and development, while **fertilization** is the process of adding nutrients to make the soil and, consequently, the plants better. Fertilizers are added to provide nutrition and increase production.

Organic, inorganic, and foliar fertilizers

Organic fertilizers work over time to create a healthy growth environment for plants. Fertilizers derived from organic sources, including compost and manure, obtain their nutrients from natural sources such as microbes, organic waste, and other similar materials from plants and animals. This kind of fertilizer should be fully decomposed prior to application.

Inorganic/Synthetic fertilizers are synthetic nutrient-rich products with high solubility rates used to provide essential minerals to plants, such as nitrogen, phosphorous and potassium. They provide rapid nutrition to plants. However, over-reliance on inorganic fertilizers can disrupt the natural balance of nutrients in the soil, leading to nutrient imbalances and reduced soil quality.

Foliar fertilizers are liquid fertilizers that are applied directly to the leaves of plants, allowing plants to absorb nutrients directly through their foliage. It can quickly address nutrient deficiencies and can supplement soil fertilization.

Amend fertilizer requirements based on the result of the soil analysis (annually or as recommended) and/or leaf analysis. However, in the absence of that, the following may serve as a general guide for fertilizer and nutrient dosages per planting hole.

Initial Planting (Per Plant Application)

Complete	56 g
Calcium/Dolomite	56 g
Micronutrient Mix*	15 g
Extra P	56 g
Warm Castings or Compost Mix	1000 g (or 1 kg)

*In the absence of a micronutrient mix, foliar application with zinc sulfate components is recommended.

General Recommendation of Fertilizer Requirements of the Coffee Plant for the First Five Years in Quarterly Application

Age	NPK grams 14-14-14 16-16-16	Liming (Dolomite) grams	Organic grams	Foliar grams	Ammonium Sulfate/Urea grams
Basal	60	60	1000	See label	
Year 1	60	60	500	See label	
Year 2	113	60	500	See label	
Year 3	141	60	500	See label	
Year 4	333	75	1000	See label	99/45
Year 5	333	75	1000	See label	99/45

When to Apply Macro & Micronutrients on Coffee ProductVe Stage (25 Months Onward)

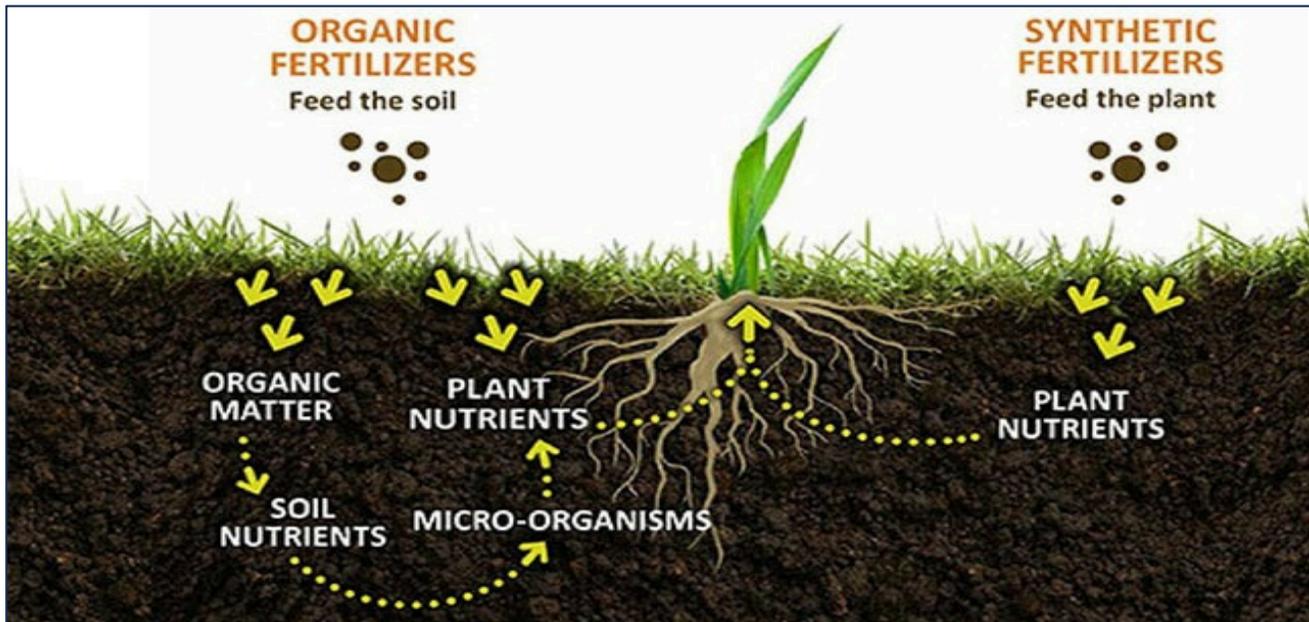
ProductVe Stage	NPK	Micro/Foliar (Cu, Zn, B)	Organic	Calcium Dolomite
Stage 1 Induc6on & forma6on of general & serial buds				
Stage 2 Forma6on of flower buds & flowering				
Stage 3 Fruit se@ng & fruit filling				
Stage 4 Fruit ripening	before harvest			
Stage 5 Recovery stage				

How to apply granular fertilizers

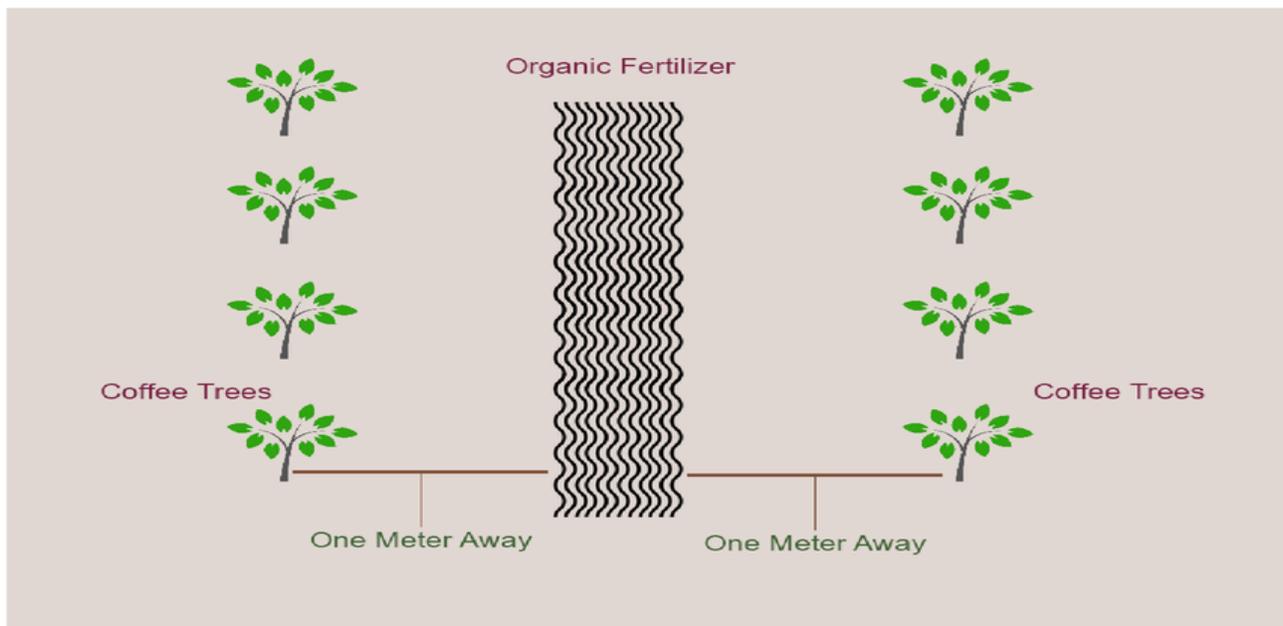
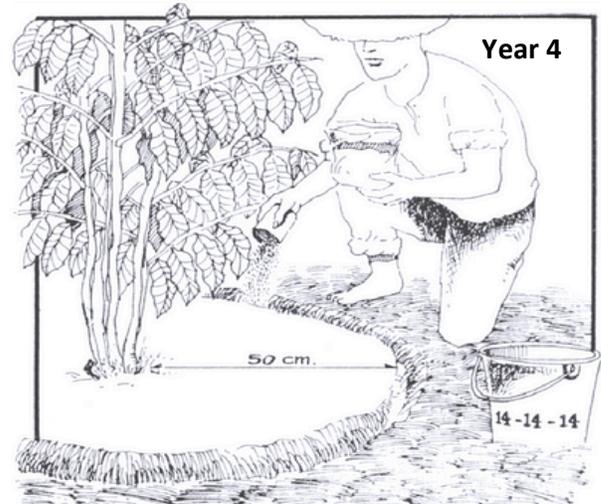
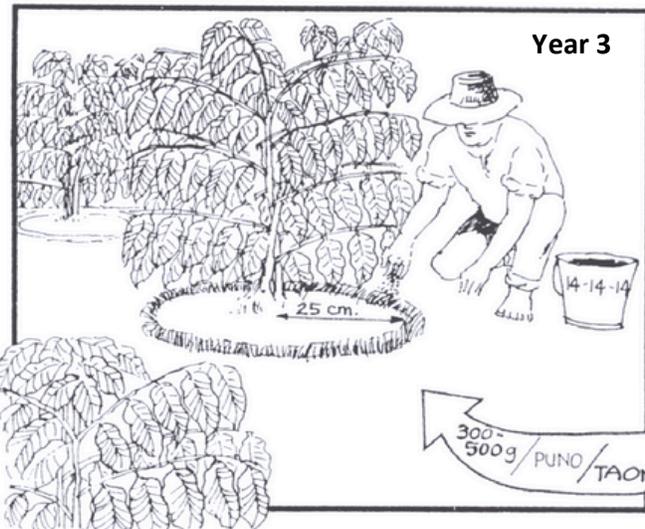
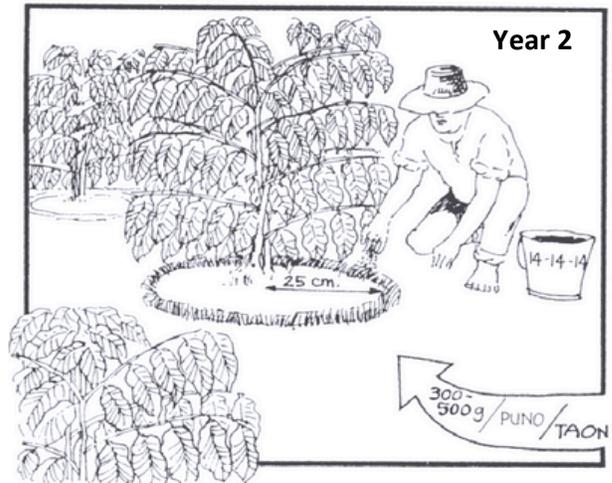
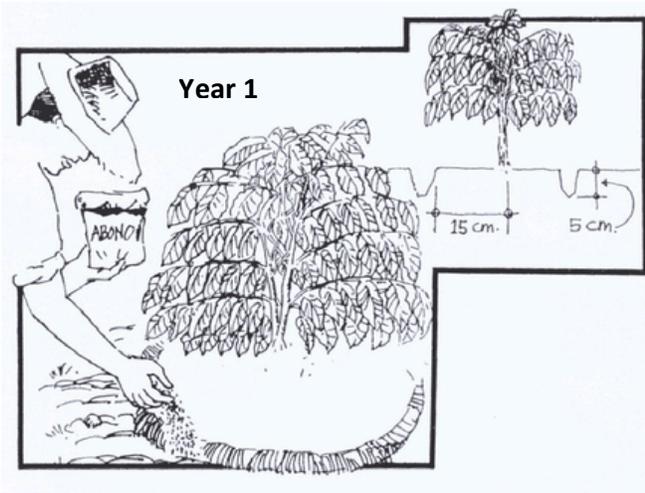
Basal application – Incorporate 60 grams of NPK, 60 grams of dolomite, and 1 kg of organic fertilizer to the soil during planting.

For existing coffee plants – In a flat area, spread inorganic fertilizer evenly on the soil around the drip line (almost the outside edge of the canopy) of a coffee tree.

How Organic and SyntheTc Fertlizers Work



How to apply fertilizers



Signs of nutrient deficiencies in coffee plants

Nutrient	Symptoms and Remedies	Excess Supply
Nitrogen (N)	<p>Yellowing of older leaves commencing from petiole, midrib, veins and extending to the whole leaf. Yellowing intensifies to olive or yellowish orange under more open conditions. Defoliation and die back, reduction in leaf size, poor growth when deficiency is severe.</p> <p>Remedial measure: Foliar application of 0.5 – 2.5% urea or soil application of N fertilizers</p>	<p>Succulent growth, leaves will be dark green, thick and brittle; poor fruit set</p>
Phosphorous (P)	<p>Reduced growth of plant, restricted root development and leaves dark green. Symptoms appear in older leaves. Irregular yellow areas appear first which may spread to the whole leaf producing mottled appearance. Leaves may turn red or violet under severe conditions and drop easily.</p> <p>Remedial measure: Foliar application of 0.5% SSP or 1% DAP</p>	<p>Shows up as deficiency of Zn, Fe, or Co. Interferes with N absorption</p>
Potassium (K)	<p>Necrosis or scorching of tip and margins in older leaves. Defoliation and dieback under severe deficiency.</p> <p>Remedial measure: Foliar application of 0.1% MOP</p>	<p>Causes N deficiency in plant and may affect the uptake of other positive ions such as Mg and Ca</p>
Calcium (Ca)	<p>Inhibition of bud growth; young leaves abnormally green; leaf tips may stick together; curling/cupping of young leaves; stem structure weakened; premature shedding of fruit and buds.</p> <p>Remedial measure: Liming of soil with good quality calcitic lime</p>	<p>Interferes with Mg absorption; high Ca usually causes high pH which then precipitates many of the micronutrient so they become unavailable to the plant</p>
Magnesium (Mg)	<p>In older leaves, large yellow areas (usually surrounded by a light green band) appear in between lateral veins and in either side of the midribs. Yellowing will gradually extend towards leaf margin. Severe deficiency leads to dark, necrotic spot on leaf tip and heavy defoliation.</p> <p>Remedial measure: Soil application of dolomitic lime or foliar spray of 0.1% Magnesium sulphate</p>	<p>Interferes with Ca uptake; small necrotic spots in older leaves; smaller veins in older leaves may turn brown; in advanced stage, young leaves may be spotted</p>
Sulphur (S)	<p>Yellowing of the youngest pair of leaves; chlorosis of mature leaves with newer leaves smaller in size and more chlorotic than the mature leaves; shoot growth is restricted; roots and stems are thinner, hard and woody.</p>	<p>Excess S is usually from air pollution.</p>

	Remedial measure: Soil application of elemental S or fertilizer containing S.	
Zinc (Zn)	Young leaves are abnormally small and narrow, lanceolate in shape with interveinal chlorosis; leaves bunched at the end of branch (rosette); short internodes; defoliation and dieback in severe deficiency. Remedial measure: Foliar spray of 0.25% Zinc Sulphate neutralized with spray lime.	Appears as Fe deficiency; interferes with Mg
Iron (Fe)	Interveinal chlorosis primarily on young tissue, which may turn light green to yellowish and white when deficiency is severe; all veins including the smallest ones remain green giving a very fine mottling/reticulation. Remedial measure: Provide good drainage.	Rare except on flooded soils
Manganese (Mn)	Interveinal chlorosis in young leaves with checkered effect/coarse mottling; induced by excessively high pH Remedial measure: Correcting soil pH	Smaller leaves, cupping of leaves along mid-rib; yellowing of the leaf margin; shortening of internodes; defoliation; found under strongly acid conditions
Copper (Cu)	Young leaves twisted and bent along the midrib; may show slight chlorosis in leaf margins; secondary veins salient ("ribs"), brown symmetric spots.	Can occur at low pH; shows up as Fe deficiency. Watery and blackish spots in the central part of leaf can also occur.
Boron (B)	Young leaves smaller, irregular in shape, leathery texture and without chlorosis; characteristic death of growing tip which turns black; development of lateral branches resulting in fan shaped structure. Remedial measure: Foliar application of boric acid 100g/200 litre water	No reduction in leaf size, mottled chlorosis near the margin, purple hue in the base of mid rib. Tips and margins of leaves exhibit chlorotic/necrotic spots coalescing into a marginal scorch; oldest leaves are affected first; plants are easily damaged by excess application
Molybdenum (Mo)	Very rarely Mo deficiency occurs. Interveinal chlorosis on older leaves; twisted leaves (whiptail); marginal scorching and rolling or cupping of leaves; symptoms similar to N deficiency may develop.	Intense yellow or purple color in leaves; rarely observed

Deficiency Chart of Micronutrients

Boron: Discoloration of leaf buds. Breaking and dropping of buds

Calcium: Plant dark green. Tender leaves pale. Drying starts from the tips. Eventually leaf buds die.

Sulphur: Leaves light green. Veins pale green. No spots.

Iron: Leaves pale. No spots. Major veins green.

Manganese: Leaves pale in color. Veins and venules dark green and reticulated

Copper: Pale pink between the veins. Wilt and drop.

Zinc: Leaves pale, narrow and short. Veins dark green. Dark spots on leaves and edges.

Molybdenum: Leaves light green/ lemon yellow/orange. Spots on whole leaf except veins. Sticky secretions from under the leaf.

Magnesium: Paleness from leaf edges. No spots. Edges have cup shaped folds. Leaves die and drop in extreme deficiency.

Potassium: Small spots on the tips, edges of pale leaves. Spots turn rusty. Folds at tips.

Phosphorus: Plant short and dark green. In extreme deficiencies turn brown or black. Bronze colour under the leaf.

Nitrogen: Stunted growth. Extremely pale color. Upright leaves with light green/yellowish. Appear burnt in extreme deficiency.



Another form of fertilization is through regenerative agriculture using soil amendments called “Bio-solution”.

What Is Bio-solution?

Bio-solution is a product, process or technology that uses natural biological systems and organisms to solve a problem. It is a broad term that often refers to sustainable and natural alternatives to chemical or synthetic methods.

Solution/Brewing materials for 1 drum of water:

1. Fermented fruit Juice 300 ml
2. Fish Amino Acid 300 ml
3. Molasses 300 ml
4. 1 pc Yakult 65 ml or fresh milk
5. Compost 2 kilos

Note: In the process of brewing the bio-solution, pour all the materials listed above into a drum with water and aerate or brew for 48 hours straight.

Composting Mechanics

Compost

- Compost is organic matter that has been decomposed in a process called composting.
- Fully aerobic, full food web, with all the benefits, nutrient retention, nutrient cycling, structure building, water retaining, no diseases, pests or parasites

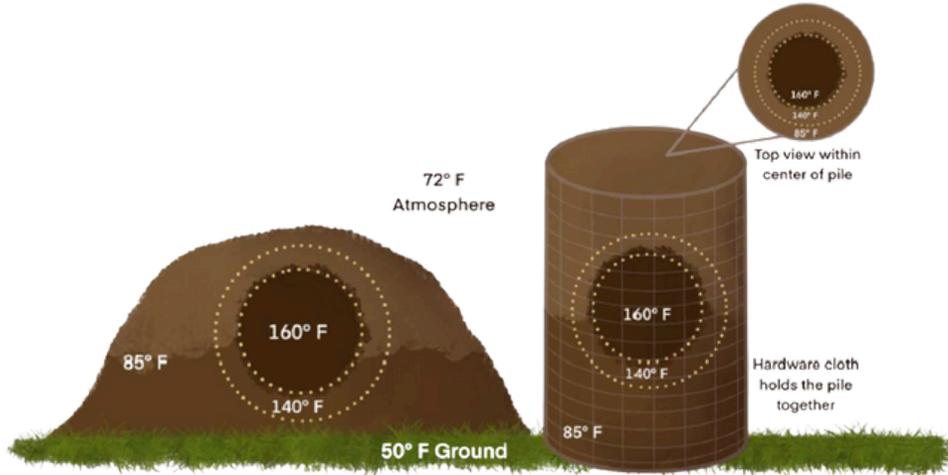
Materials Needed

Type of Starting Material	Main Functions in the Composting Process
High Nitrogen	- Rapidly increases temperature but does not maintain temperature for a sustained period as it is consumed very quickly.
Green	- Maintains temperature for extended periods of time as it is consumed relatively slowly. - Bacterial food.
Brown/Woody	- Provides structure facilitating the diffusion of oxygen into the pile. - Fungal food, consumed very slowly.

- Each pile of compost should have at least 40 buckets consisting of 10% animal manure, 30% green and 60% brown.
- 3 piles of compost is recommended.
- Each material should have gone through the mother solution and be properly mixed and submerged so that all the microbes from the solution can spread to the raw materials of compost.

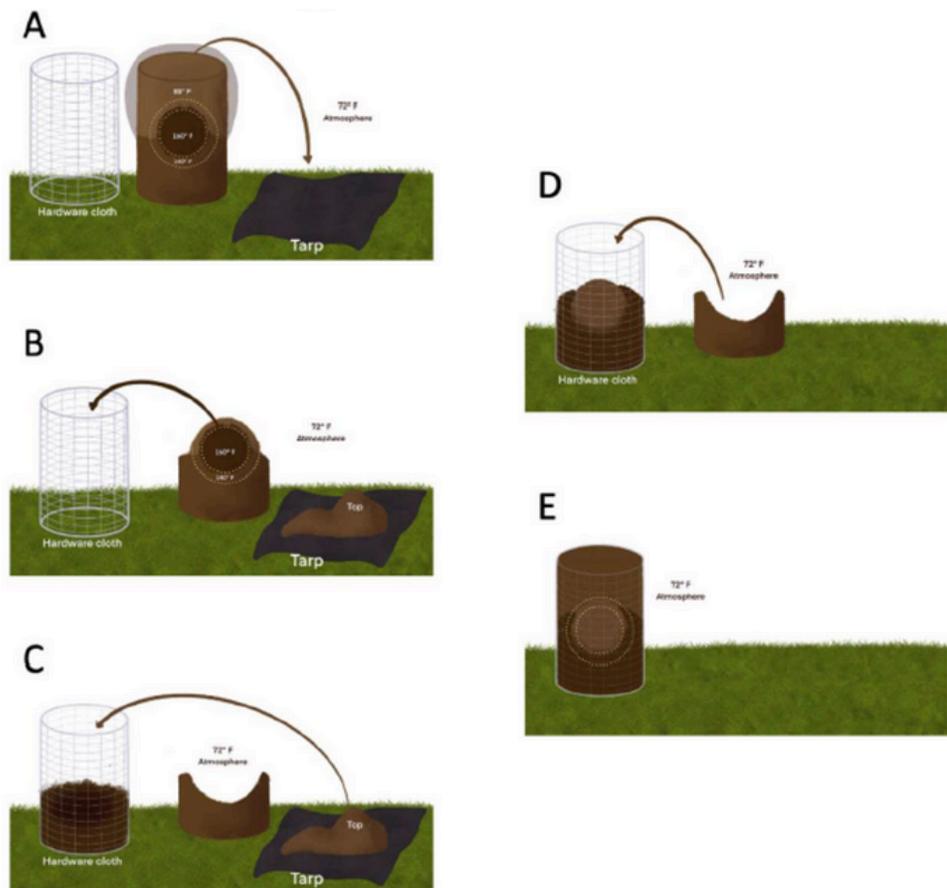
Aerobic Composting Mechanics

How to Turn A Pile



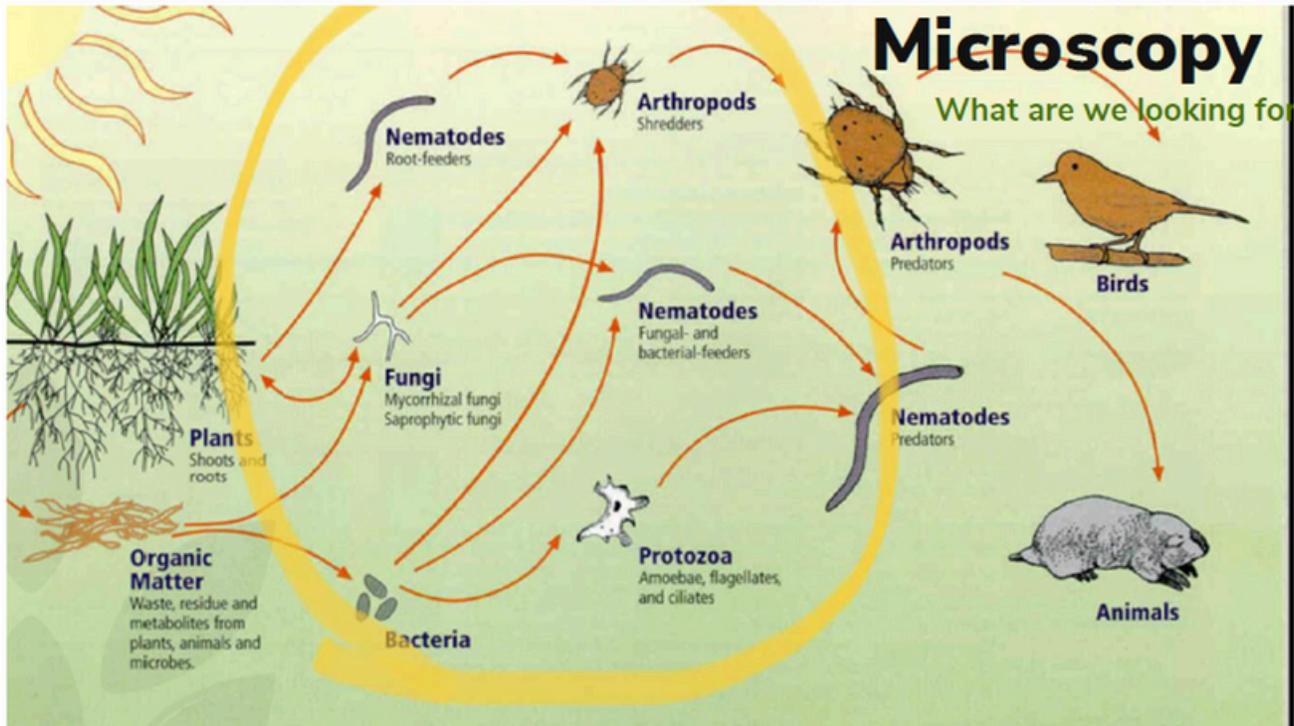
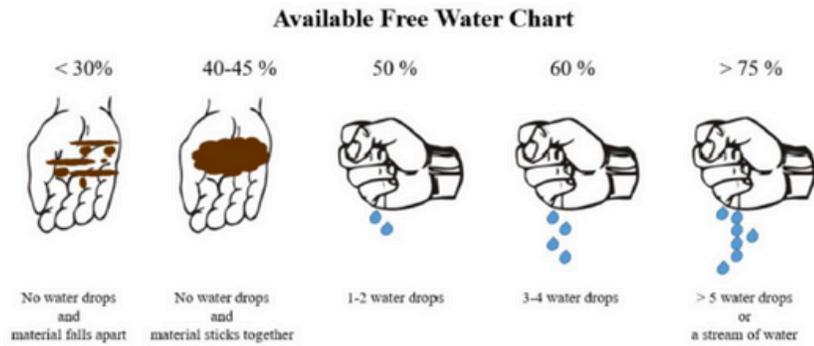
Aerobic Composting Mechanics

- Above 55°C for 3 days (72 hours) or more
- Above 65°C for two days (48 hours) or more
- Above 74°C for one day (24 hours) or more



Aerobic Composting Mechanics

Determining Moisture Content



Minimum Biological Requirements

Organism	Minimum Biological Requirements for BioComplete™ Compost
Bacterial Biomass	135 µg/g compost
Fungal biomass	135 µg/g compost
F:B ratio	Equal to or greater than 0.3:1
Protozoa	10,000/g compost
Beneficial Nematodes	100/g compost
Ciliates must be less than	5/drop at 1:5 dilution

Spraying of bio-solution to the coffee farm:

1. Mix 1 liter from the main solution in the 10 Liters of water. After the land preparation, apply Bio-solution and make sure not to apply pesticide, herbicide, or synthetic fertilizer so that the microbes will not die.
2. Apply again the Bio Solution after 15 days and observe the result.
3. For old coffee trees, spray directly into the soil surrounding the canopy of the trees and apply again after 15 days.

The function of microbes in the soil:

- Defender against harmful microbes on and below the ground.
- Nitrogen fixer from the air to the ground
- Processor of organic matter into plant food
- Prepares food for plants
- Source food for plants
- Our workers below the ground



A nursery for Arabica seedlings. Arabica is suited to elevations of 1,000-2,000 masl with a cool climate, e.g., in the areas surrounding Mt. Kitanglad Range and Mt. Kalatungan Range in northwest Bukidnon. HMC Mordeno



Coffee has become a good source of income for Eugene and fellow farmers in Kaatuan. HMC Mordeno

Kaatuan: Coffee Is Here to Stay

Eugene Sumaya relies on producing high-value vegetables as the family's main source of income, although he has been growing coffee for around 20 years already.

His coffee farm lies just next to his house in Block 2, Barangay Kaatuan in Lantapan, Bukidnon. "But oftentimes, I could not attend to it, I could not even do weeding," he said.

The same thing is true among other farmers in the area, where vegetable-growing is the chief economic activity. Most, if not all, of Block 2's 80 households have small-scale coffee farms but did not give much thought to making it a major livelihood.

Eugene surmised that while growing coffee may be less tedious and not costly compared to vegetable production, it was the low prices of the crop then that made the farmers unenthusiastic about it.

But things began to change for Eugene and his neighbors after coffee prices shot up in the market. They took renewed interest in the crop. In fact, 20 of around 40 members of Bukidnon Government Employees Multi-Purpose Cooperative (Bugemco) in Block 2, including Eugene, attended the coffee production training organized by NATCCO in 2024.

(Bugemco started as a cooperative exclusively for government employees but later opened its membership to the public.)

After the training, Eugene decided to plant more coffee. He lamented though that some of the juvenile plants sometimes got entangled with his plow. He currently maintains around 400 mature trees of Arabica's Sweet Coffee variety and around 200 Robusta trees.

He observed that Robusta doesn't thrive well in Kaatuan due to its elevation (roughly 1,100 meters above sea level), which is more suited to Arabica. The place lies in the buffer zone of the Mt. Kitanglad Range Natural Park, giving it a relatively cooler climate all year round.

Nonetheless, last season, Eugene netted 120 kilos of Robusta beans and 300 kilos of Sweet Coffee beans after sorting. The Sweet Coffee beans were sold for P500 per kilo and Robusta beans for P300 per kilo. This translated to P186,000 in gross sales. Besides, the rejects from sorting, which reached 30 kilos, were also sold.

He said Nestle is the regular buyer of coffee beans from Kaatan. The company fetches the beans in the barangay, so there's no need for the farmers to go to its plant in Cagayan de Oro City. "I guess there's no problem in terms of market, it's the supply that's lacking," he observed.

"Sometimes I sell to the monastery," he said, referring to the Monastery of Transfiguration in Malaybalay City, which sells ground, roasted coffee that is a mixture of Arabica and Robusta. There are also random buyers, he added.

"The sales from coffee helped me to settle some of my debts," he remarked in jest.

He noticed too that his harvest has improved compared to when he still lacked knowledge about the proper ways to raise the crop. He attributed the improvement to the application of fertilizer and pruning to rejuvenate the trees, which were among the techniques he learned from the training.

"In the past, I didn't mind my coffee farm, I would go there only during harvest. Now, I'm really taking care of it. I didn't practice pruning and left the trees to grow tall. I thought it was such a waste to cut some branches and stems because they were bearing fruit.

"The height of the trees has been reduced to around six feet after pruning. It's now easier to pick the cherries," he said.

Eugene also shared that he has changed his drying method. Before, he said, he would just place the fruits on a canvas on the ground. Now, he has built an elevated dryer – about seven feet high – with bamboo as flooring and thick, transparent plastic sheets as roofing.

"I can leave the beans there even for a longer time without having to worry about pebbles and soil getting mixed with it. The quality of the beans has improved with the use of that dryer," he said, pointing to the makeshift facility that stands beside his house.

There's another good thing going for Eugene – his two children have opted to follow his path as a coffee grower.



**MAJOR COFFEE
PESTS
AND DISEASES
AND CONTROL**

What Is a Pest?

A pest is a destructive insect or any animal that attacks crops, food, livestock, and others. An agricultural pest is any organism or infectious agent that causes stress or damage to a desired plant or plant product.

Pests can be insects, diseases, weeds, animals, and even humans. It must be made clear though that not all insects are pests. There are beneficial insects that perform valuable services such as pollination and pest control. These include the praying mantis, damsel fly, lacewing, spiders, and ladybug.

Borers are considered the major pests that infest coffee plants. There are three kinds of borers – Coffee Berry Borer, Coffee Red Steam Borer, and Coffee White Stem Borer. Minor pests include the Coffee Black Twig Borer, Scale Insects (green and brown), Coffee Mealybug, and Coffee Leaf Miner.

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Coffee Berry Borers cause young berries to fall prematurely. They also make infested ripe berries increasingly vulnerable to fungus or bacterial infection, as well as reduce the quality and yield of coffee, resulting in decreased income for farmers.

Control

Sanitation. Remove all coffee fruits, those that are still on the tree as well as those that have fallen on the ground. Transporting and handling infected beans contribute to the spread of the insect.

Create a CBB trap. This can be a homemade device effective in trapping the insect during flight periods.

- a. Cut open used water bottles.
- b. Equip with a lure filled with a 1:1 ratio of ethyl alcohol and methyl alcohol.
- c. Deploy 20 to 30 traps per hectare.

Biological control. During the flight periods of the insect's life cycle, use the naturally-occurring (non-toxic) fungus *Beauveria bassiana*.

- a. Dilute the fungus with water.
- b. Spray it on a regular basis (about every two weeks) as the residual action does not last long. The insect (along with Stem Borer larvae, if any) will be killed once it comes into contact with the fungus.

Beauveria bassiana is an entomopathogenic fungus also known as mycopesticide that causes white muscadine disease in a range of insects, including whiteflies, aphids, thrips, grasshoppers, and certain types of beetles.

Chemical control. Chemicals can be effective but they should be used as a last resort. Follow the directions on the label when using chemical sprays. Alternate application of other fungicide brands so as not to build resistance.



Red Stem Borer

Red Stem Borer (*Zeusea coffeae*) caterpillars bore into the bark of the stem and make a tunnel inside it. If the larvae reach up to the roots, which usually occurs in young plants, the plants as a whole die.

Control

The pest can be controlled by removing and destroying the affected branches of the host plant, and by using *Beauveria bassiana* as an entomopathogen.

White Stem Borer

White Stem Borer (*Xylotrechus quadripes*) is a serious pest of Arabica coffee, causing a yield loss of up to 40% in all coffee-growing areas of India. Its larvae damage the plant while being hidden inside the woody stems, and is extremely difficult to control.

Control

Prune or stump/uproot infested plants. Burn the infested plants if the borer has burrowed up to the roots. Building a good shade, scrubbing, and using pheromone traps can also help. Spraying with *Beauveria bassiana* solution late in the afternoon may also be done.



If the measures mentioned above fail to control the pest, spray systemic insecticide as a last resort. Follow the instructions indicated on the label.

Coffee Black Twig Borer (*Xylosandrus compactus*)

This borer completes its life cycle at 28.5 days. Only adult females cause damage to plants, while males are flightless. It is known as the ambrosia beetle, which refers to the species that feeds exclusively on fungi (ambrosia fungi) cultivated inside galleries built into the wood by the adult females. The females can reproduce without mating, in which case the offspring are all males.



Control

Cultural control includes providing good shade, pruning and burning of beetle-infested plants as an essential measure. Good tree care will promote vigor and help in resisting infestation or recovering from it. In addition, adequate fertilizer and irrigation will ensure speedy recovery of vigorous plants from injury caused by pruning.

The entomopathogen fungi *Beauveria bassiana* and *Metarhizium anisopale* can be used as biological control as they will infect the Coffee Black Twig borer in all of its life stages.

Chemical control involves spraying the whole plant with systemic and contact insecticides. Mix according to the manufacturer's instructions on the label.

Green Scale Insect (*Coccus viridis*)

They are generally pale green in color. The nymphs, however, are oval, flat and yellowish green. They suck the plant, resulting in reduced growth and crop yield. Sooty mold often develops on leaves. It grows on the sweet exudates from the scales (honeydew) that also attract ants.

Brown Scale Insect (*Saissetia coffeae*)

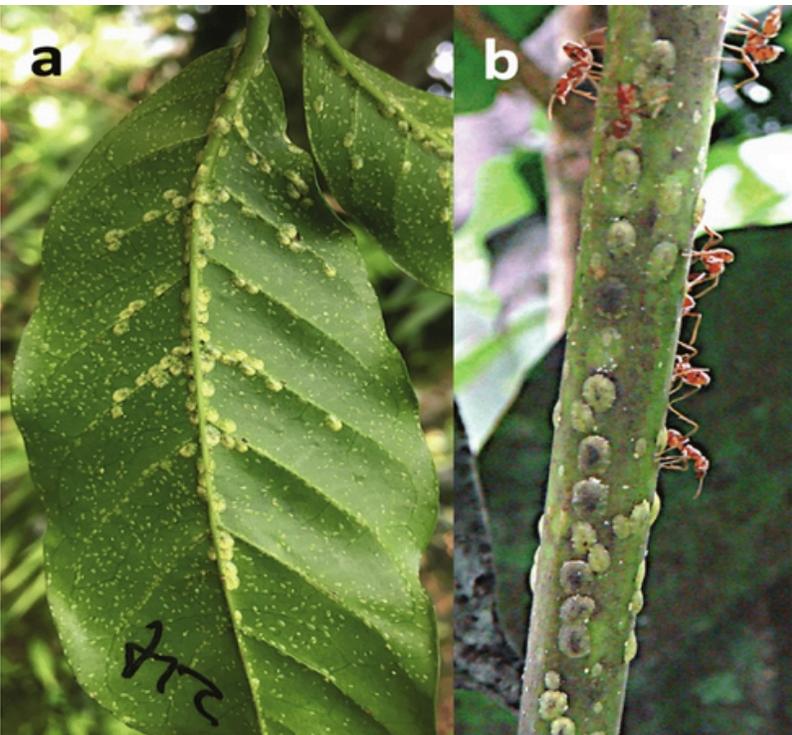
Females do not mate, and males have not been found. About 500 eggs are laid under the body of the female, so they are protected. They are said to prefer hot, dry conditions.

After hatching, the first immature stage, the crawlers walk about to find a place to feed. Crawlers can spread on the wind, as well as on planting materials and even animals, including human beings.

Control for both green and brown scale insects

- Prune infested stems, branches and fruits and burn them. For trees, prune low branches and remove weeds to stop ants from reaching leaves and fruits.
- Destroy ant nests with boiling water without damaging the plants infested with the scale insects. Without the ants, parasitoids and predators will bring about natural control of the scale insects.
- Apply mulch, manure or synthetic fertilizers to assist plant vigor.

- White oil may also be used. Mix three tablespoons (1/3 cup) of cooking oil and ½ teaspoon of detergent soap in four liters of water, shake well, and apply. Another option is mixing five tablespoons of pure non-detergent soap or two tablespoons of dishwashing liquid in four liters of water.



Green Scale Insects



Brown Scale Insects

Ants

Ants collect sweet secretions from aphids or suckers. The secretions that are left behind will accumulate on the leaves and black “sooty mold” will cover the fruit, branch and leaf.

Controlling both scale insects, suckers and ants will prevent the growth of black mold.

Use ant baits that will kill the hive by making the queen sterile.

Plant Diseases

The Encyclopedia of Microbiology defines plant disease as the state of local or systemic abnormal physiological functioning of a plant, resulting from the continuous, prolonged “irritation” caused by phytopathogenic organisms (infectious or biotic disease agents).

Organisms that cause infectious disease include fungi, oomycetes, bacteria, viruses, viroids, virus-like organisms, phytoplasmas, protozoa, nematodes and parasitic plants.

Major coffee plant diseases

Coffee leaf rust

This is a devastating foliar disease caused by the fungus *Hemileia vastatrix* that can reduce coffee production from 30% to 50%. Plants with rust have irregularly shaped spots on upper leaf surfaces connected with yellow to orange powdery lesions (diseased tissue) on the lower leaf surfaces where the spores are located. The spores are cells of the disease that can reproduce.



Coffee rust thrives under high humidity. This is why plantations in some areas have been moved to higher elevations, which are cooler and at which the rust fungus has difficulty reproducing.

Catimor is rust-resistant but Typica and many other Arabica varieties are susceptible under poorly shaded conditions and at altitudes of below 1,000 masl. Using rust-resistant cultivars, plant varieties produced by selective breeding, is considered the best method of managing this disease.

Control

Aside from planting resistant varieties, the following preventive measures are recommended:

- Maintaining healthy plants and good sanitation practices.
- Removing weeds that may compete with the coffee plant for nutrients or stress the coffee plants. This also contributes to maintaining tree health.
- Pruning, which increases air flow through the trees and reduces humidity.
- Removing plants that are weak, old, or already affected by other diseases or pests.
- Checking with your local agricultural advisory (extension) agent for recommended practices. Do this before applying any plant protection products.
- Planting pure Arabica on high elevation and using good shade.

- Spraying copper-based fungicide, two sprays per year in higher altitudes, and, depending on the weather, three to four sprays in lower areas where the temperature is warmer but with high humidity and plenty of rainfall.

However, while spraying copper-based fungicides (e.g., copper sulfate and triadimefon) can help control the disease, it translates to additional cost. Prolonged use of chemical fungicides may also cause harm to the environment and humans. Systemic fungicides, for instance, leave residues in the plant, which are harmful to human health and may prevent growers from getting premium price for their produce

Damping Off (Nursery Disease)



Damping off occurs on young coffee seedlings in the germination bed, after germination and before transplanting. It is caused by several genera of fungi, including *Pythium*, *Phytophthora* and *Rhizoctonia*. The symptoms are patches of coffee dying quickly and coffee stems that are soft, brown and rotten.

This disease occurs when the soil is too wet, there is too much shade that causes insufficient drying of soil, and there are too many plants in a small area (high planting density).

Control

- Do not use old soil from nursery beds or bags as disease is soil-borne and can be carried over. Use new soil for nursery beds and potting-up.
- Avoid overwatering.
- Observe regular drenching of the nursery pots.
- Do not plant seeds too close; seeds should be 25 mm apart in rows 100 mm apart.
- Soil drenches of either Benlate (Benomyl) or Captan (Follow label directions as formulations differ).

Cercospora



Cercospora leaf spot (a.k.a. brown eyespot) and berry blotch are two phases of a common disease caused by the plant-pathogenic fungus *Cercospora coffeicola*. It is also a nursery disease. Infested leaves have small yellow eye-like spots, the outer portion of which later turns brown while the center becomes gray-white. Infested cherries are dried and blackened, with almost circular scars on the pulp that makes de-pulping difficult.

Control

- Protective spraying with copper-based fungicide before disease develops and repeated spraying to protect any new leaf growth.
- Alternate application of other fungicide brands so as not to build resistance.

At the coffee plantation:

- Maintain adequate plant nutrition. Plants that are deficient in nutrients such as nitrogen and potassium are susceptible to this disease.
- Practice sanitation and crop debris management. Debris left in the field can harbor the pathogen and initiate further cycles of *Cercospora*.
- Choose the planting location. Avoid very high elevations and rainy locations where the disease tends to occur.
- Select a reasonable planting density (number of plants per hectare).
- Prune coffee trees to increase air circulation in the canopy.
- Harvest cherries on time, before the disease progresses too fast.
- Avoid injuring coffee plants with herbicides, especially glyphosate.

For seedlings in the nursery:

- Avoid overwatering.
- Maintain 50% shade cover.
- Space plants to allow air movement.
- Proper fertilizer application.



Coffee Berry Disease/Anthracnose

This disease is caused by *Colltotrichum gloeosporioides*. It causes the green berries of the coffee to rot and drop prematurely. Pink powder (spores of fungus) may be visible on the lesions. *Colltotrichum kahawae* may also infect flowers under very wet conditions, causing brown lesions on petals.

Control

Remove diseased berries from the plant. It can also be controlled through good practices like pruning, sanitation, proper plant nutrition, planting resistant varieties, and using approved fungicide applications.

Members of Imdalsa Agrarian Reform Cooperative at their coffee farm in Barangay Dalwangan, Malaybalay City. NATCCO photo





Imdalsa's nursery in Barangay Dalwangan, Malaybalay City that can house 60,000 seedlings. HMC Mordeno

Imdalsa ARC: A Lesson from Fallen Cherries

After the 170-hectare land owned by Luis Guingona in Impasugong, Bukidnon was placed under the Comprehensive Agrarian Reform Program, it was subdivided among the 50 beneficiaries, all former workers of his, through the Support to Parcelization of Lands for Individual Titling Project of the Department of Agrarian Reform.

In 2012, the beneficiaries formed a cooperative, the Impalutao Dalwangan Sawaga Agrarian Reform Cooperative (Imdalsa ARC). Later, in 2014, their children, realizing that their parents were not getting any younger, decided to assume the task of running it. A primary, open-type cooperative, Imdalsa has since expanded its membership to 146 individuals as of mid-2025. For a person to qualify as member, he or she must have at least 50 existing coffee trees.

(Impalutao is a barangay in Impasugong that lies next to Dalwangan, a barangay in Malaybalay City, while Sawaga is a river whose headwater is in the upper portion of Dalwangan, near the Kitanglad Mountain Range.)

However, aside from lending amounts to qualified loanees (read good payors), they were clueless about what other enterprise they would embark on.

Corazon M. Llauderer, who served as chair of Imdalsa ARC for eight years, said the decision to engage in coffee business was more serendipitous than planned. She recalled that during a visit to Guingona's five-hectare coffee farm in Barangay Kibenton, Impasugong, she and her companions noticed that it was already abandoned, the cherries left to fall to the ground.

Seeing an opportunity, they harvested the Arabica cherries, which they then dried, roasted by hand, and ground into powder form.

“We brewed the coffee during [our] meetings and sold it for five pesos per sachet. We earned 500 to 600 pesos during each meeting,” Corazon said.

Seeing the potential of coffee as a business enterprise, Imdalsa approached the Department of Trade and Industry (DTI) in 2017 for possible assistance in processing. The agency responded by giving them training through the Davao-based Coffee for Peace, enabling the members to learn techniques in nursery management, harvesting, post-harvest handling, and value-adding.

In 2019, Imdalsa sent ground coffee to a trade fair in Manila organized by DTI. “We only packaged it using masking tape, yet, we were so glad because we earned P10,000,” Corazon narrated.

“The DTI provided additional trainings until we improved our product. They also gave us facilities worth P1.2 million – huller, de-pulper, working table, vacuum sealer. Private organizations gave us trainings and assistance, too,” she added.

Around 50 members of Imdalsa attended the series of training organized by NATCCO under the CAFÉ-DAIRY project.

Some of them had the opportunity to visit other coffee-producing areas like Baguio City and La Trinidad in Benguet to learn more technologies.

In addition, foreign entities infused assistance through projects. The Agricultural Cooperative Development International-Volunteers in Overseas Cooperative Assistance (ACDI/VOCA), for instance, included Imdalsa as a direct beneficiary under its Philippine Coffee Advancement and Farm Enterprise or PhilCAFE project. The US-based development organization also brought them to the 1st Philippine Coffee Expo, held in Davao City in 2022.

Still, the real denominator of success for a cooperative should be how viable its business component has been and how productive the members are.

During the latest harvest season, the cooperative, as a consolidation point for the farmers’ produce, purchased 16 tons of cherries and eight tons of green coffee beans from them. For the beans, the main buyers are Gourmet Farm in Manila, Linear (a roaster company) and Triad Coffeeshop in Cagayan de Oro City, and Don Narciso Café in Claveria, Misamis Oriental, although Linear and Triad are now buying directly from the farmers. At times, there are walk-in buyers from Malaybalay City and Valencia City in Bukidnon.

Nonetheless, Corazon, who is now the cooperative’s general manager, said she sees nothing wrong with buyers directly transacting with the farmers. In fact, she is thankful to Linear in particular for helping them ensure the quality of their product and providing cash advances to their members.

But aside from buying and selling coffee cherries and beans, Imdalsa has found that selling seedlings can also be lucrative. Corazon said that after the Covid-19 pandemic struck in 2020, they built a nursery in Dalwangan that can house 60,000 seedlings. There they grew seedlings of Bourbon, Catimor and Typica, all varieties of Arabica, which have netted P72,000 so far. However, only Bourbon and Catimor were sold out; Typica was hardly a preference.

“More orders [for the seedlings] came until we were able to build an office. In fact, there were more sales from seedlings than coffee,” she said.

One shining moment for Imdalsa was when Corazon was chosen to represent the Philippines in the three-day Specialty Coffee Expo 2018 on April 19 to 22 in Seattle, Washington in the US, along with the late Datu Rio Besto, chair of Miarayon-Lapok-Lirongan-Tinaytayan Tribal Association (Talakag, Bukidnon), and Marivic Dubria, manager of the Balutakay Coffee Farmers Farmers Association in Davao del Sur. Imdalsa also received the Experimental Coffee Citation (Arabica) in the 2025 edition of the Philippine Coffee Quality Competition.

For Corazon, however, she is simply glad that the hardest part is over like when they would hold their meetings under a tree because they had no office yet. She also found satisfaction in the fact that students who are children of members and taking up agriculture have made coffee the focus of their study. This made her realize that the cooperative needs to make youth program a focus of policy to ensure that there will be successors.



PRUNING AND REJUVENATION



Pruning

Pruning is trimming a tree, bush, or shrub by cutting away dead or overgrown stems and branches to improve the tree structure, increase fruiting and promote healthy growth. Along with other measures such as fertilization, it is used to rejuvenate old, unproductive coffee trees.

Coffee follows a two-year cycle. During the first year of the fruiting cycle buds emerge and form flowers by the beginning of the second year. If fertilized, these flowers will form mature fruits by the end of the cycle.

However, coffee trees become less productive over time if no interventions are made. In addition to adequate nutrients, they need to be rejuvenated to sustain their vegetative growth that will lead to future buds, the source of future crops. Pruning is one way to stimulate the growth of new stems and branches for the next harvest season.

Benefits of Pruning

- Avoids unnecessary competition for nutrients by removing unproductive branches.
- Stimulates new branch growth.
- Decreases the risk of damage to the coffee trees during heavy rains or strong winds.
- Regulates the height of the plants for easy harvesting.
- Controls the spread of pests and diseases.

Coffee cherry production decreases due to age and phytosanitary problems, but pruning can help to maintain or boost productivity throughout the years. Without this kind of maintenance, harvest will be reduced even if the quality remains the same.

Pruning can also help to prevent biennial bearing, or the tendency of crops to bear heavily in one year and lightly or not at all in the next. This can leave the farmers uncertain of their yield.

General Reminders in Coffee Rejuvenation

1. Clear the farm prior to rejuvenation.
2. Use pruning saw or hand saw.
3. Cutting should be done in a slanting manner.
4. Apply paint or oil on freshly cut coffee trunks to protect the trees from pests and diseases and from rotting.
5. Maintain three to four healthy sprouts.
6. The cut should face toward the east or northeast to prevent sun scorching.

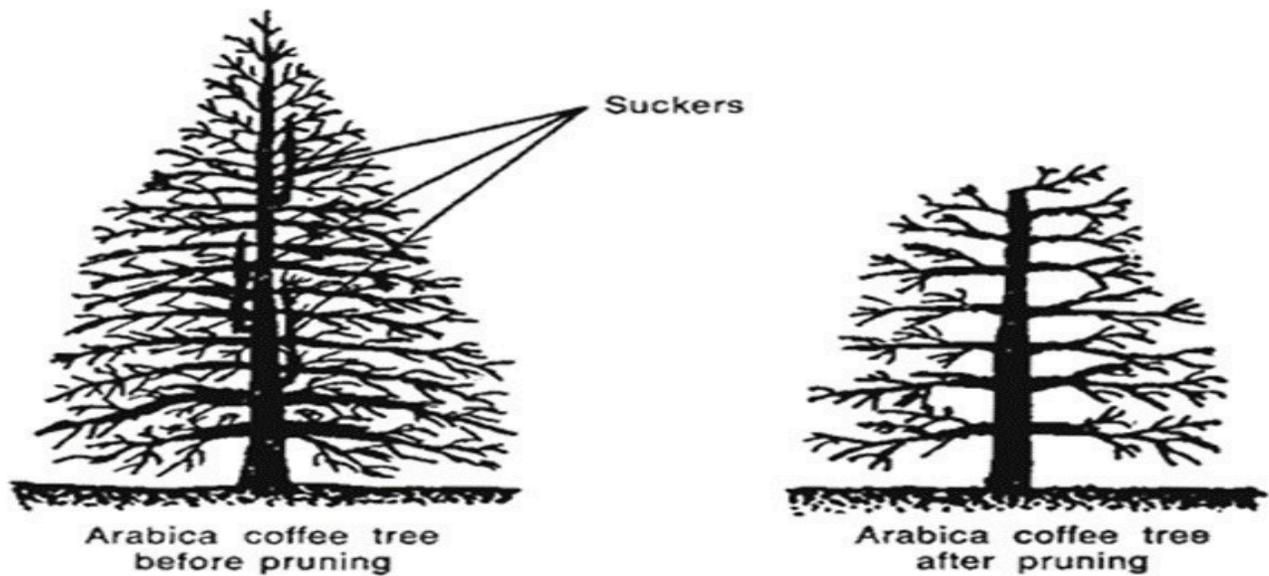
Types of Pruning and Rejuvenation

Side Pruning

This is done by trimming lightly on the outer side of the tree, either annually or bi-annually. The process involves three steps: removal of one side of the tree; training a new sucker; and removal of the other side of the tree two years later.

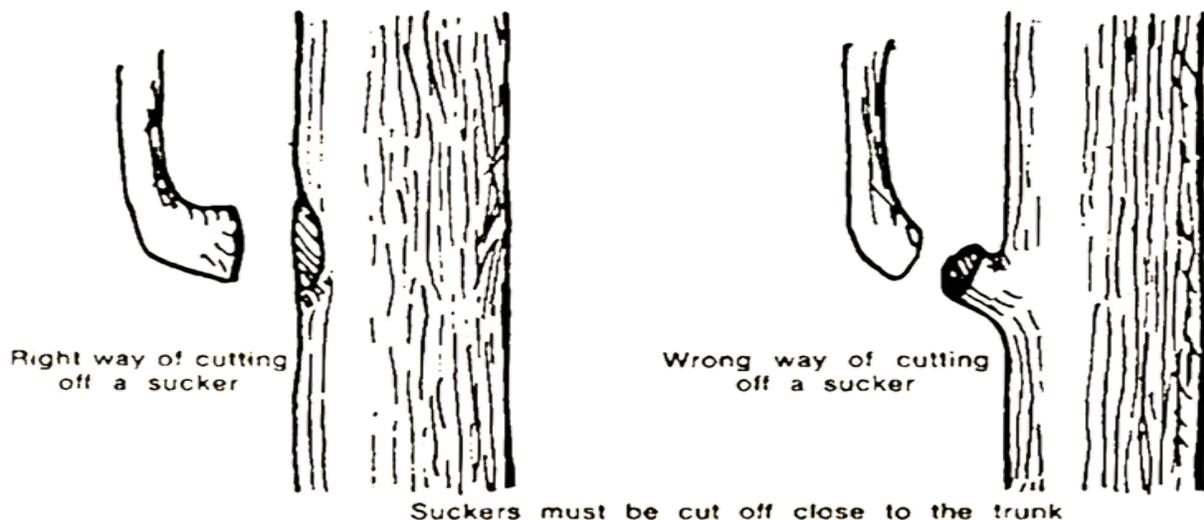
Capping

Capping, or topping, entails cutting the main orthotropic (vertical) stem toward the top of the tree. This is done to restrict the plant height and facilitate tasks like spraying and harvesting. It stimulates further branch growth if done along with side pruning. But doing it too often leads to the formation of many lateral branches, which may cause overshadowing and diseases.



Desuckering

Cut away suckers. A sucker, or water sprout, is a twig that grows upward out of a main stem and is unproductive or never bears fruit.



Stumping

Stumping is recommended for old or overgrown coffee trees to allow the plants to grow a new set of wood. This is done by cutting the main orthotropic stem or stems at the bottom part of the tree skirt (40 – 50 cm). Cut below all existing branches.

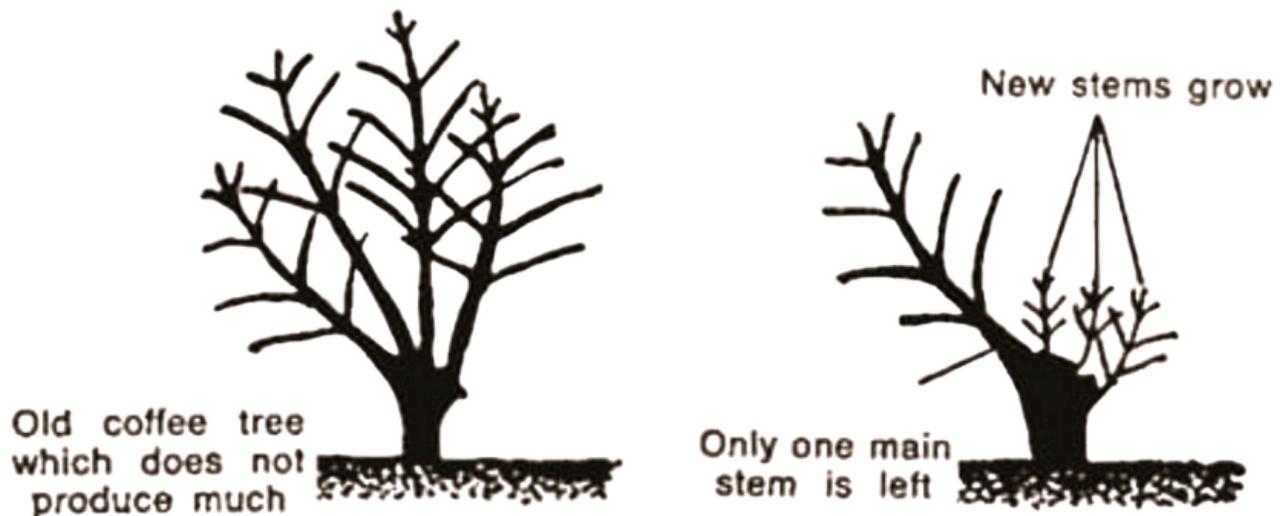
Pruning should be done after harvest for maintenance. When there are still live branches in the upper part and the plant looks relatively healthy, this should be enough.

On the other hand, stumping, which is more aggressive than pruning, is usually done when the plant has very little foliage, or when it has a lot of dead branches (especially in the upper part, from the middle to the top). All tools must be sharp to ensure even cuts and avoid tearing.

Farmers may also opt for block-stumping, which is not only a rejuvenation method but a way to control, if not eliminate, coffee berry borers. As the name implies, this entails stumping coffee trees by blocks over a large area to deny food or shelter for the borers. Stump pruning by rows, i.e., the Beaumont-Fukunaga style of pruning as explained below, will not control the borers.

Avoid stump-pruning during drought, as trees need rainfall and nutrition to recover. But if it must be done during drought, retain a “nurse vertical” to reduce tree shock. The nurse vertical can be removed after the emergence of new shoots, which should be reduced to three or four main verticals.

Illustration of a nurse vertical



The Beaumont-Fukunaga System

Beaumont-Fukunaga is a rejuvenation method that entails cutting all the wood from a plant on the third year of a three-year cycle. The plant is then allowed to regrow three shoots that will carry the crops in the next two years. This system enables the plant to grow new wood with high yields.

Follow these steps:

1. Measure 40 – 50 cm from the ground to the trunk of the tree.
2. Cut in an angled manner using a sharp tool, preferably a handsaw.
3. Paint the angled cut of the tree to prevent dieback disease.
4. Select three shoots for regrowth of new orthotropic stems.

The conventional pruning system requires paying attention to which vertical or verticals should be removed. The Beaumont-Fukunaga system simply requires removing all of the verticals from those trees in the appropriate rows. This method allows a lot of extra light into the rows, allowing the trees to be spaced significantly closer together, which means more trees can be planted per hectare.

Studies showed that coffee production significantly decreases on verticals older than three years. This means removing those verticals and replacing them with younger ones will increase coffee production over time because, even though one-third of the crop is pruned each year, there are significantly more trees per hectare with healthy and productive verticals.

The pruned trees grow and remain straight, keeping the rows open. This makes it easier for the farmer to pick and fertilize, and gives the plant a break from producing fruit once every three years and a period to focus on growing healthy verticals.



The Bayanihan Millennium Multipurpose Cooperative in Pangantucan, Bukidnon has named their processed coffee after Lake Napalit, a popular destination below the Kalatungan Mountain Range. HMC Mordeno





Alma says the benefits from growing coffee has changed the values of the farmers – for good. HMC Mordeno

Brewing Success in Pangantucan’s Coffee Farms

Tucked a few hundred meters from Lake Napalit, a waterbody in Barangay Pigtauranan, Pangantucan, Bukidnon, is the office of the Bayanihan Millennium Multipurpose Cooperative. Around 20 people, mostly women, had gathered outside the rectangular building, waiting for the office to open at 1:00 p.m. so they could process their loans with the cooperative.

Beneath a shed on the other side of the road, at least 15 women were sorting dried coffee beans, their hands deftly moving with the pace of practice. On the paved area beside the shed a male worker was examining the beans that were being dried under the sun, while others were unloading sacks of fertilizer from a truck.

Coffee – coffee production to be exact – has breathed life into Pigtauranan and other villages of Pangantucan, giving farmers a sustainable livelihood. But that’s going too fast with our story.

Bayanihan chair Alma F. Hewe recalled how the cooperative went through rough times in the years following its registration in 1990 with 25 male members, to avail of assistance through a Land Bank program. However, for some reason, the group became inactive, although the members did receive loans from the bank. In 2005, a group of women decided to revive it, using a P30,000 capital that was loaned to the members for their cane, corn and coffee production. The members shelled out another P30,000 which was placed in time deposit. They also opened an eight-hectare communal farm planted to coffee.

“We started with corn, cane, coffee...We engaged in pahina (communal labor). Lending was our first business using the P60,000 that we had. Our workers rendered service on a voluntary basis. For now, coffee consolidation and microlending are our main enterprises,” Alma said.

Consolidation means Bayanihan will serve as the collection point of coffee beans from the farmers and sell them to Nestle Philippines, a multinational coffee processing firm based in Cagayan de Oro City, as well as other buyers. The cooperative earns by deducting seven to 10 pesos per kilo from the buying price as management fee. For example, if the buying price is P300 per kilo, the farmer receives P290 to P293 per kilo. In effect, the cooperative is acting as a trader, a link between the farmers and the buyers.

Bayanihan currently has over 900 members, around 75 percent of them Menuvu Lumads, with a combined area of at least 500 hectares planted to coffee. Aside from Pigtauranan, they have members in at least 12 of Pangantucan's 19 barangays and in neighboring Barangay Dominorog in Talakag town.

Alma estimated that in the previous harvest season Bayanihan purchased a total of 261 tons of beans – Arabica and Robusta – from the member-farmers. The farmers are growing three types of Arabica – Typica, Bourbon and Catimor.

Nestle Philippines is currently the biggest buyer of their Robusta coffee beans.

“But Robusta is cheaper compared to Arabica. Robusta is only P300 per kilo while Arabica is bought at P500, P800 to P900, sometimes P1,000 or more per kilo, depending on quality,” Alma said.

She explained that “all-in” beans, or those considered to be of lesser quality because the ripe and unripe cherries are mixed during harvest, are sold to Nestle for its instant coffee brand. On the other hand, beans from purely ripe cherries go to an establishment that produces specialty coffee.

Changing values

One thing that struck Alma is that the rise of the coffee industry in Pangantucan has somehow become a bane to the sugar cane growers. “Owners of sugar cane farms are now finding it difficult to find enough cutters (manapasay in the vernacular) because the people are already content with the income they get from coffee. Why would they toil under the heat when it's easier to work in their coffee farms?”

The sugar milling season in Bukidnon, which is from November until May or June, happens to overlap with the harvest season for coffee.

“On average, farmers are earning P300,000 to P400,000 each in one season, the least is P100,000. They are now buying vehicles, building or repairing their houses,” she said. She recalled that one member who has been in the industry for several years grossed one million pesos last season.

Non-members are also selling their coffee to Bayanihan as the cooperative is already known as a buyer. Many of them were eventually convinced to join the cooperative upon learning of the benefits they could get such as dividends. Hewe said that this year (2025) they received so many unexpected deliveries that they found some difficulty in adjusting the capital allotted for it.

Alma also noticed that the economic benefits from coffee farming has changed the values of farmers – for good. “It has minimized drunkenness. Before, after selling their crops like corn, you could often see them drunk. But now they are becoming preoccupied [with their coffee farms].”

Loans with the cooperative are paid not in cash but with coffee beans. The amount of a loan that may be granted is based on a member’s capital build-up and the quantity of beans he or she can deliver, which is based on his or her track record. “All their deliveries are recorded...we disapprove the loan applications of those who we deem to have no capacity to pay,” she said

Bayanihan’s coffee business has given employment to locals, many of them women. HMC Mordeno



Adopting better practices

Members are also active in training and other activities. Bayanihan’s board of directors is a mix of Indigenous Peoples, senior citizens, and young farmers, according to Alma.

She considered the presence of Indigenous Peoples as an advantage. “They can easily avail of projects because they have CADT (Certificate of Ancestral Domain Title) areas, and many of the projects are prioritizing them.”

Alma, however, acknowledged that only those who have undergone training have delivered specialty coffee, the quality of which must pass the standard set by the buyers. One of these buyers is Equilibrium Intertrade Corp., a roasting company that also supplies machines to coffee shops and provides training.

For Bayanihan, over 400 of its members have attended training activities organized by NATCCO. Alma said the training resulted in the delivery of more premium beans, which command higher prices. “They (farmers) are no longer indiscriminate in harvesting their coffee, they would pick just the ripe ones, and they no longer dry them on the ground. They also knew that green beans are lighter compared to the ripe ones. Now we rarely see green beans [in their deliveries].”

“At first, it was hard for them to adopt new practices but their mindset gradually changed upon realizing the difference in prices. Imagine a price difference of P80 per kilo between premium and all-in beans. If you have 1,000 kilos, that’s P80,000,” she said. “Now they’re sorting. We are delivering more beans now to Equilibrium.”

The farmers have also widely adopted rejuvenation, which mainly involves pruning unproductive branches, resulting in better harvest.

Aside from the training, the cooperative built a nursery with a grant from the Philippine Coffee Advancement and Farm Enterprise (Philcafe). Alma said the income from the sale of seedlings has provided them funds that they can use as equity for other projects offered to them.

The partnership with Philcafe, from 2019 to 2023, opened new opportunities like engagement with more buyers. This overlapped with NATCCO’s intervention through the CAFE-DAIRY Project, which started in 2022.

It was mainly the incentives from these interventions that reshaped the farmers’ mindset. “Before, they (farmers) were just laborers. However, as the projects offered free seedlings, training and inputs, what would be their excuse not to go into coffee farming?” Alma said. Apparently, it was a rhetorical question.



HARVESTING, POST-HARVEST HANDLING, AND PROCESSING



What is specialty coffee?

Specialty coffee refers to the highest quality of coffee beans, scoring at least 80 points on a 100-point scale and specific guidelines set by the Specialty Coffee Association. So-called Q-graders sift through, taste and evaluate the beans based on the aroma, taste, acidity, body, cleanliness, aftertaste, balance and sweetness. It encompasses the stages from cultivation to the final brew, with the growing conditions, harvesting and processing methods, as well as roasting and brewing playing a role.

It is the presence of organic acids that form during the growing stage of the tree up to the development of cherries, and remain in the roasted beans that strongly affect the final cup quality. They comprise as much as 11 percent of the mass of green and 6 percent of roasted beans, and from a sensory perspective, are considered one of the most important components in coffee.

In addition, there is natural process specialty coffee, which is obtained by carefully picking ripe coffee cherries and laying them out to dry naturally under the sun. This process allows the beans to absorb the sweetness and unique characteristics of the fruit, infusing the beans with a burst of flavors and aromas.

In the Philippines, where coffeeshops have increased in number in both urban and sub-urban areas, there is a growing trend among farmers to aim for specialty coffee. For one thing, it fetches prices that are much higher than those for premium and commercial types. Take a look, for example, at the auction results for quality coffee during the 2024 Philippine Coffee Quality Competition:

PCQC 2024 ARABICA AUCTION RESULTS							
Rank	Lot Code	Producer & Lot Details	Grade	Bidder	Lot Size (kg)	Closing Price	Total Value
1	FA4	Arnel Morales: Davao del Sur, Catimor, Natural	84.95	H Proper Coffee Roasters	173	\$ 25.68	\$4,442.64
2	FA2	Domingo Lawagey: Mountain Province, Catimor, Natural	84.8	The Library Café by Coop Cups	113	\$ 20.50	\$2,316.50
3	FA3	Manolito Garces: Bukidnon, Ethiopian Landrace, Natural	84.7	The Good Cup Coffee Company	353	\$ 21.80	\$7,695.40
4	FA10	Rogelio Gonzales: Davao del Sur, Natural	84.18	ISFUN Food Service	113	\$ 21.68	\$2,449.84
5	FA8	Josephine Libres: Davao del Sur, Catimor, Natural	84.07	ISFUN Food Service	113	\$ 21.68	\$2,449.84
6	FA12	Yaine Joyce Gianan: North Cotabato, Bourbon	83.94	Equilibrium Intertrade Corporation	113	\$ 21.00	\$2,373.00
7	FA6	Ronald Diccican: Davao del Sur, Natural	83.63	The Library Café by Coop Cups	113	\$ 20.00	\$2,260.00
8	FA7	Sergio Loon: Davao del Sur, Catimor/Typica, Natural	83.6	H Proper Coffee Roasters	113	\$ 22.21	\$2,509.73
9	FA5	Dione Ellaga: Davao del Sur, Yellow Bourbon, Natural	83.39	ISFUN Food Service	113	\$ 21.68	\$2,449.84
10	FA11	George Daplayan: Mountain Province, Typica Bourbon, Washed	82.86	H Proper Coffee Roasters	113	\$ 21.58	\$2,438.54
11	FA9	Chud Wesson Bumakil: Benguet, Typica Bourbon, Natural	82.78	<i>Failed to Bid</i>	114		\$0.00
12	FA1	Analyn Bunal: Davao del Sur, Catimor, Natural	82.7	H Proper Coffee Roasters	114	\$ 23.86	\$2,720.04

PCQC 2024 ROBUSTA AUCTION RESULTS							
Rank	Lot Code	Producer & Lot Details	Grade	Bidder Name	Lot Size (kg)	Closing Price	Total Value
1	FR10	Reyjohn Basco: Sultan Kudarat, Robusta	86.45	Equilibrium Intertrade Corporation	113	\$ 66.00	\$ 7,458.00
2	FR13	Roan Basco: Sultan Kudarat, Robusta	86.43	ISFUN Food Service	113	\$ 18.68	\$ 2,110.84
3	FR6	Ginalyn Gonzalo: Ilocos Sur, Robusta	85.35	ISFUN Food Service	113	\$ 15.01	\$ 1,696.13
4	FR5	Byron Daplayan: Ilocos Sur, Robusta	85	No Bid	173		\$ -
5	FR12	Metecia Wandas: Ilocos Sur, Robusta	84.85	Ilocos Coffee Plus Coffee Trading	113	\$ 15.00	\$ 1,695.00
	FR9	Denz Bert Deramos: Sultan Kudarat, Robusta	84.85	La Roasteria	113	\$ 15.00	\$ 1,695.00
	FR4	Marieta Lidem: Ilocos Sur, Robusta	84.85	No Bid	113		\$ -
6	FR2	Orlando bayudan: Sultan Kudarat, Robusta	84.68	No Bid	113		\$ -
7	FR14	Mabini Ubuán: Ilocos Sur, Robusta	84.6	Equilibrium Intertrade Corporation	173	\$ 61.00	\$ 10,553.00
	FR8	Jean Apalet: Ilocos Sur, Robusta	84.6	La Roasteria	113	\$ 15.00	\$ 1,695.00
	FR3	Dexter Daplayan: Ilocos Sur, Robusta	84.6	No Bid	113		\$ -
8	FR1	Sherwin Sabloden: Ilocos Sur, Robusta	84.58	Ilocos Coffee Plus Coffee Trading	113	\$ 16.00	\$ 1,808.00
9	FR7	Jeomar Abaoag: Ilocos Sur, Robusta	84.25	No Bid	113		\$ -
10	FR11	William Lorenzo: Ilocos Sur, Robusta	83.9	No Bid	113		\$ -

However, growing high-quality coffee requires not just following best farming practices. It also entails correct harvesting, sorting, and processing methods.



Harvesting

Coffee cherries ripen usually six to eight months for Arabica and nine to 11 months for Robusta after flowering, but maturity varies depending on the plant variety and environmental conditions.

Pick coffee cherries at the most optimal stage of ripeness and uniformity, with a higher percentage of ripe fruits, or red cherries. The recommended percentage of fully ripe cherries is 95% - 98% per batch of harvest for specialty grade coffee.

Frequent harvesting will improve the quality of each harvest. This is particularly important for farmers who want to enter the specialty coffee market.

Pick one cherry at a time. Do not strip the stem to avoid damaging leaves and unripe coffee beans. Leave the green berries on the tree. After picking, remove the damaged, green and overripe cherries. Green cherries have a lighter weight and an astringent taste, while overripe ones may have a fermented flavor.

Remember: Final bean quality cannot be improved once the cherry has been picked. It is essential that a very high standard of picking is maintained.

Within four hours after harvest, the cherries can begin to ferment, affecting the coffee cup quality. Immediately take the cherries to the postharvest facility for processing.

Cherry maturity

Color. Pickers should be familiar with the color of ripe cherries. They can use photographs or other visual guides of how the cherries of the same coffee variety look in all stages of maturity.

Maturity rainbow of Robusta

	Under ripe greenish	Under ripe yellowish	Under ripe reddish	Semi-ripe	Optimal ripe
Fresh weight (g/cherry)	Very low -50/-30%	Low -30/-20%	Medium -20/-10%	High -10/+5%	High -5/+10%
Average bitterness (caffeine and CAG)	Highest	High	Medium	Low	Low
Average sugar concentration (Brix)	Lowest 6-8	Low 8-12	Medium 12-16	High 16-20	Very high 18-22

Cherry ripening stages

Unripe berry	Yellow-green ripening berry	Orange-red ripening berry	Bright red ripe cherry	Dark red overripe cherry	Overripe/raisin cherry
					

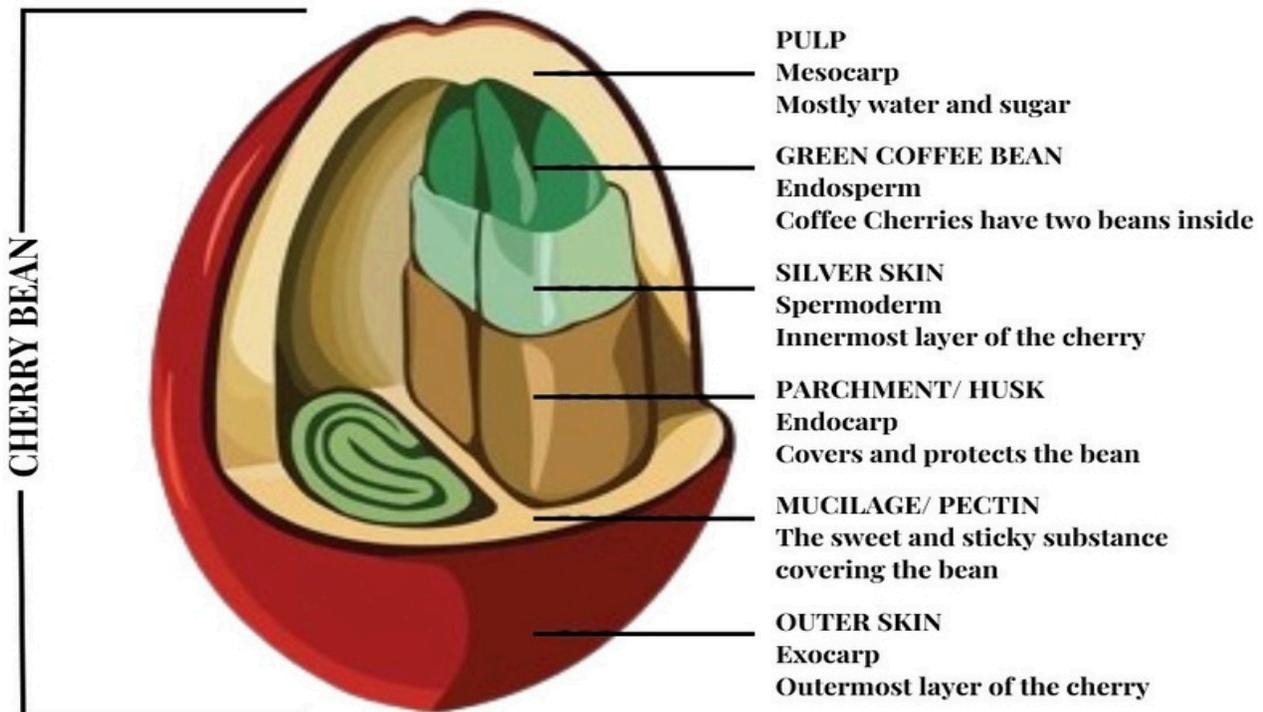
Measuring sugar content. Perfectly ripe coffee cherries contain sucrose (sugar) and other carbohydrates, which contribute to the sweetness of good coffee.

A portable refractometer can be used in measuring the sugar content in coffee cherries. This instrument measures sugar in degrees Brix (⁰Bx).

One degree Brix equals one gram of sugar in 100 grams of liquid. The ideal sugar content in coffee cherries is at least 16⁰Bx.



Parts of a coffee cherry



Coffee Processing Methods

There are three main processing methods: natural, honey (pulped natural) and fully washed (wet process). Regardless of the method, processing should begin as soon as possible – but not exceeding 12 hours – after harvest to prevent deterioration of quality.

Pre-cleaning

Pre-cleaning involves removing unwanted materials such as twigs and leaves and sorting the cherries by ripeness and density using flotation, which can be done manually or mechanically.

1. Sorting of cherries – Sort the cherries according to ripeness before processing, by hand or by using equipment like a color sorting machine.
2. Flotation – Put the cherries into a water tank. The ripe and unripe cherries will sink, while the overripe (dry) ones, as well as the unripe ones that did not fully develop due to pests or diseases, and foreign matter will float. Remove the floating cherries. They can be sold as commercial coffee.

Removing the floaters helps in avoiding uneven fermentation, while rinsing the cherries with clean water reduces the microbial load and temperature, which helps control fermentation.

Natural Processing Method



This method entails drying the cherries with the entire pericarp (skin, mucilage/pulp and parchment) intact in the sun or in industrial tumblers, right after being harvested. The presence of mucilage or higher moisture content requires a longer drying period.

1. After pre-cleaning, spread the cherries on the drying surface in a single layer. This is about 10-12 kg of fruit per square meter.
2. Within 24-48 hours the cherries will begin to harden. Make sure to turn the fruits every hour during the daytime but be careful not to damage them.
3. Starting on the second or third day, pile and cover the cherries at night to ensure homogenous drying, as well as prevent the reabsorption of moisture that diminishes bean quality. Cover the coffee when it rains. This process may last for several weeks or until the moisture content drops to 11%.
4. As the coffee dries, the thickness of the layer can be increased, depending on the desired rate of drying and the available patio space.

One disadvantage of natural processing is that there is not much room to improve bean quality; the only variables you can control are how ripe the cherries are when harvested, and the overall time to dry.

Fully Washed (Wet) Process

This method involves mechanically pulping coffee after harvesting and removing the remaining mucilage using controlled fermentation (12 – 48 hours) in large tanks of water so that the bean is dried with only the clean parchment intact. Immediately transfer the parchment coffee to the fermentation area after pulping.



Fermentation

Coffee fermentation is a process where different bacteria, yeasts and fungi break down the sugars and other compounds in the mucilage. This process is vital for removing the mucilage, reducing water content, and influencing the final flavor and aroma of the coffee. Different fermentation methods, such as wet, dry, and semi-dry, are used, each impacting the bean's characteristics. Lowering the water content of the beans helps prevent spoilage.

Fermentation Methods:

- Wet – Pour the parchment beans into tanks and pour fresh water enough to cover about 2-3 cm above the parchment.
- Dry – Drain all the water and leave the parchment in the tanks. The fermentation time is shorter for this method.

Fermentation time may vary from 14 to 36 hours depending on factors such as altitude, temperature, relative humidity, and the amount and geometry of the mass of pulped coffee being fermented. The cooler the area, the longer the fermentation time will be. Larger amounts of beans in the fermentation tank reduce the fermentation time needed. Never over-ferment coffee because it produces defects in taste and smell.

One practice gaining recognition is **anaerobic fermentation**, or fermenting coffee in a low-oxygen environment for some period of time.

In this method, fresh coffee is loaded into a container that is then sealed. The carbon dioxide released from the fermenting fruit builds up and concentrates in the space, pushing out whatever oxygen was in the tank at the start. This leads to the development of different microbial species that are more than those common in oxygen-rich environments, resulting in unique flavor profiles.

End of Fermentation

- Rub a sample of beans in your hands. If it feels rough and makes a crunching sound, it is ready for rinsing and drying.
- Put a stick into the coffee and pull it out. If a hole remains where the stick was inserted, the coffee is ready for drying.
- After fermentation is complete, wash the coffee several times until there is no mucilage left on the parchment.
 - First wash – Add water to the fermentation tank and then drain the residue.
 - Second and third washes – Cover the parchment with water and vigorously stir, then drain the water.
 - Fourth wash – Pour water up to five centimeters above the coffee. Stir to remove floater parchment and drain the water.

NOTE: It is not correct to use the words “fermentation” and “processing” interchangeably. They are related but they mean different things. Fermentation is a natural process carried out by microorganisms seeking sources of energy, while processing is a series of mechanical and technical steps to prepare coffee beans for the market. Fermentation can be considered as part of processing, but it is important to know the distinction.

Honey Processing Method

Honey processing stands between the natural and washed processing methods. In this method, the fruits are pulped just like in the wet process, and then sun-dried with all or some mucilage still on the parchment. The sweetness and stickiness of the mucilage during drying earned these beans the name honey coffee, which are also called pulped naturals due to their flavor profile.



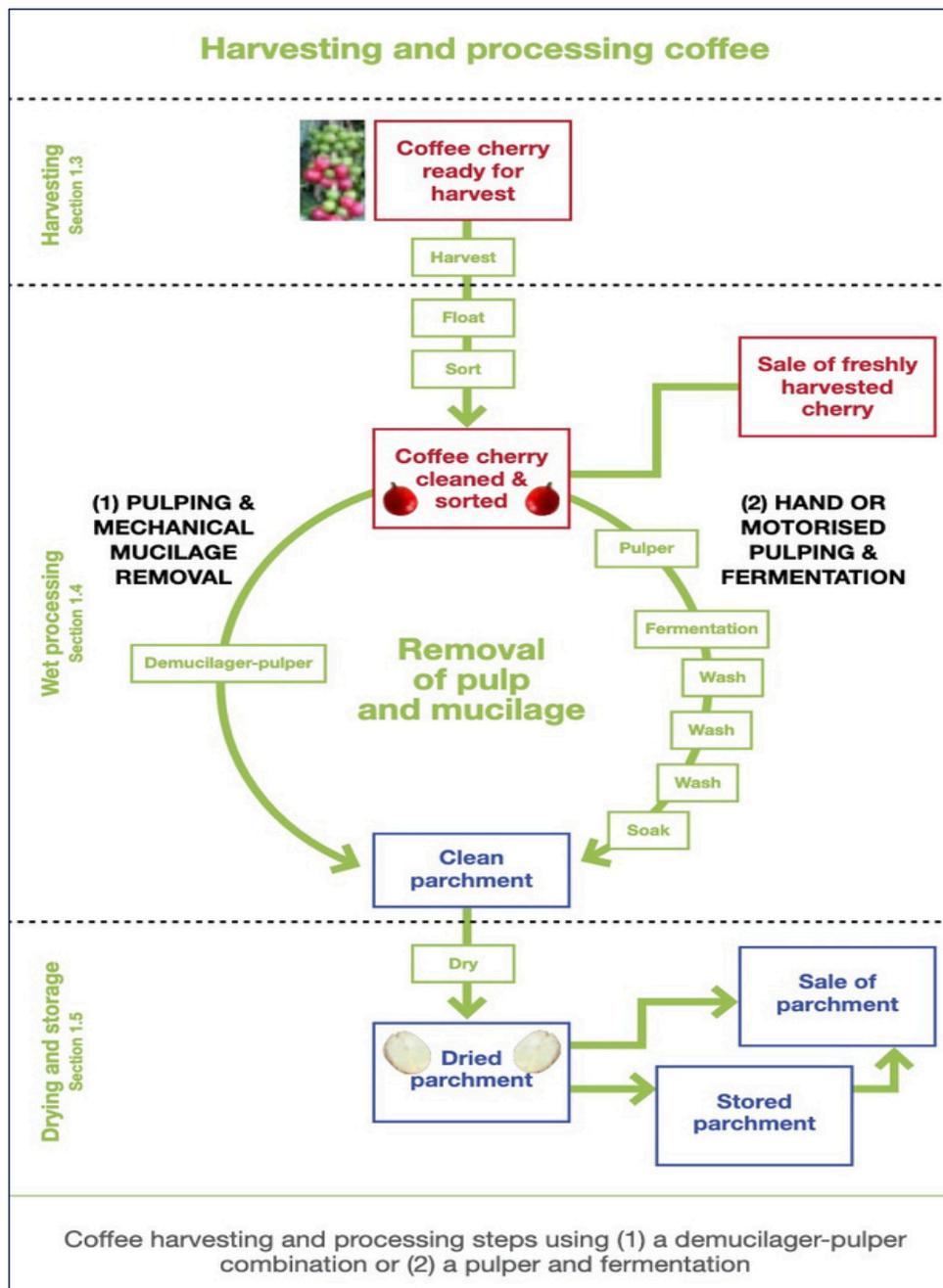
Little or no water is used in pulping so that more mucilage adheres to the parchment. After pulping, the parchment coffee is immediately taken to the drying area.

The amount of mucilage left on the beans before drying determines the degrees of honey processing:

1. Yellow Honey – A good portion of mucilage is removed with mechanical equipment and then sun-dried for 8 to 10 days.
2. Red Honey – 25-50% of mucilage is removed with mechanical equipment and then sun-dried for 12 to 15 days
3. Black Honey – The beans are dried with all the mucilage for up to 30 days.

Recommendation

- In general, for the cup to be improved by fermentation:
 - Hot weather means fermentation needs to be slowed down.
 - Cold weather means the heat produced during fermentation should be preserved, and fermentation should take off from a warmer temperature.
 - Generally, when coffee has little sugar, preserve precious sugar.
 - Reducing oxygen availability lowers risk.
 - For the cup quality, keep the average coffee mass temperature lower under 20°C setting for 24 hours as a good initial goal for fermentation.





Drying area of Bayanihan Millennium Multi-Purpose Cooperative. HMC Mordeno

Proper Drying Practices

Coffee moisture content must be from 10 – 11% to preserve its quality during storage and transport. A moisture content of 12% or higher means metabolism is still active inside the seed, while a moisture content of 9% or lower makes the beans brittle during hulling. The most accurate way to measure moisture content is using calibrated moisture meters.

Drying time will vary depending on the environment. The following is just a general guide:

- 20 – 30 days for natural (dry) processed coffee
- 15 – 20 days for honey and fully washed parchment coffee
- Begin the drying process immediately after the previous steps.
- Initially dry the coffee in thin layers. The layers may be thickened as the coffee dries. Thick layers may be used to slow down the drying if shade is not an option.
- Turn the parchment using a wooden or bamboo rake (not a metal rake) several times during the day to ensure uniform drying.
- Ensure full drying but not over-drying. Coffee that is not fully dried is at higher risk of getting mold, and will become mottled and ages more quickly. On the other hand, over-drying will cause the parchment to come off and crack, leading to additional losses in the dry mill.
- In hot climates, avoid exposing the coffee parchment to the midday sun.

Coffee drying guidelines:

- Pre-drying - drain excess water
- Fast dry up to 35%, then let the coffee rest for 24 hours.
- Dry up to 25%, then rest for 3 days.
- Dry 15-11.5%, then a rest for a week or two and check again

- Dry during daytime and wrap at night.
- Moisture content should be stable.
- Wet coffee should be spread thin and turned up 8-10 times a day with a flat rake.
- Raking needs to be gentler with parchment.
- Coffee temperature should not exceed 40°C for parchments and 45°C for cherries.
- Distribute the hot air evenly to every bean.
- Stop drying when you reach the final point.
- Avoid contamination.

Patio Drying for Naturals

- Spread the cherries in a single layer. After several days, the layers may be thickened up to five cm to slow down the drying or to maximize patio space.
- Once its moisture content dips to 30%, the coffee should be piled and covered at night to maintain heat, allow for more uniform moisture distribution, and prevent rewetting.

Patio Drying for Parchment Coffee

- Spread out in a thin one-bean high layer.
- Constantly rotate with tools that are flat and light to avoid breaking the parchment.
- Once its moisture content reaches 25% (for washed or semi-washed), pile and cover the coffee at night.
- After the endosperm has detached from the inside of the parchment, the layer thickness should be progressively increased for five days and maintained until the coffee has dried.

Covered Raised Tables (Solar Dryers)

This is recommended for areas that experience frequent rains to avoid contamination and reduce labor cost.

Materials Needed:

- Wooden or bamboo frame built at a height of 90 cm to 1 meter.
- Drying surface made of plastic or galvanized mesh, which is good for aeration from above and below.
- Removable plastic covering with sufficient openings on either end and at the sides to allow for good air circulation without exposing the coffee to rain.

Hulling

Hulling involves removing the outer layers of the coffee cherry, including the pulp, mucilage, and parchment, to reveal the coffee bean inside. It is usually preceded by de-stoning to ensure that stones do not pass through the huller. Hulling away the parchment, the naturally occurring, papery substance that surrounds the coffee bean, is optional because some coffee beans are sold "in parchment."

This process is usually followed by winnowing or by density sorting (blowing air to ensure that both parchment and silver skin are removed).

- Beans can break when overdried or when the huller has not been correctly calibrated, while bruising can occur in those with high moisture content.
- Excessive temperatures in friction hullers can produce whitish or discolored beans.

Polishing

Polishing or removing the silver skin that remains on the beans after hulling is an optional process. It is done to give the beans a better appearance. Some may consider polished beans to be superior.

Polishing, however, is generally not required for specialty coffee. It leads to a slight loss of weight and a shorter shelf life, and does not improve the flavor. It is the friction and heating of the beans during the process that may reduce the quality and shelf life.

Size Grading

During the hulling process the beans are checked for impurities or stones before the final parchment layer is removed. Afterwards, they are sorted into sizes through the use of hole-punched screens. They are passed through screens of varying sizes that are layered on top of each other. Bean size is expressed in 1/64 of an inch and is represented on a scale of 10-20. For example, a number 10 bean passes through an 11/64-inch screen, but is retained by a 10/64-inch hole.

Sorting



Sorting coffee beans at Bayanihan Millennium Multi-Purpose Cooperative, HMC Morden

After size grading, the beans are sorted and differentiated by color and density. Air jet or gravity tables are used to sort density. Color sorting entails removing the discolored beans using equipment or the hand. Uniformity determines the speed and consistency of a roast.

Storage

Coffee quality will quickly degrade if not properly stored starting from the time it is harvested all the way to the cup. Quality can be affected by several factors, including humidity and temperature.

It is thus important to observe the following during storage:

- Moisture content should be 11%.
- Warehouse temperature should not exceed 25°C, and relative humidity should be under 60%.
- The storage area must be dry and ventilated.
- Store the coffee in parchment or dried cherries, to be hulled only when it is sold or is otherwise necessary.
- Keep the coffee in clean jute bags, or for very high-quality coffee, in hermetic storage bags.
- Store coffee away from direct sunlight, as it will fade and deteriorate faster.
- The storage area should be exclusively used for coffee to avoid contaminating the taste and odor.
- Do not allow animals inside the area.
- Avoid moisture getting into the storage area. Make sure there are no water leaks and rain cannot reach the openings.
- Stack the coffee on wooden or plastic pallets and not directly on the ground.
- Store the coffee bags 30 cm away from the walls.

Why is GCB storage important?

- It maintains freshness, aroma, and flavor.
- It prevents rapid degradation of volatile compounds.
- It protects against other factors that can negatively impact the quality.

Recommended GCB containers and bags:

- Airtight containers
- Dark, cool and dry storage
- No other odor-causing materials in the same storage



Transporting Coffee

- The number one goal when shipping coffee is to avoid oxygen getting to the beans as much as possible, so do not grind the beans prior to placing them in the coffee bag.
- A highly recommended way of packaging coffee for transport is the use of hermetically sealed bags like GrainPro bags. These bags protect the coffee from odors from the environment and also from moisture, so they work much better than jute bags. The best method – though the most expensive – is vacuum packing.
- Transferring coffee from processing centers to ports for delivery to other areas or for export must be done carefully, avoiding contamination and ensuring that its quality and food safety are maintained.
- Never ship coffee with a moisture content of above 12.5% due to the high risk of condensation, mold growth, and increased respiration.

5 Mindanawon coffee growers to represent PH in Seattle expo

By MindaNews | April 4, 2018 - 4:37 pm

DAVAO CITY (MindaNews / 04 April) – Five Robusta and Arabica coffee growers from Mindanao will represent the Philippines in the three-day Specialty Coffee Expo 2018 on April 19 to 22 in Seattle, Washington in the US.



Coffee farmers in Barangay Kaato-an, Lantapan, Bukidnon. MindaNews file photo by H. MARCOS C. MORDENO

Thelonious Trimmell, chief of party for the Mindanao Productivity in Agricultural Commerce and Trade, said in an interview on Tuesday that the Philippines will get a booth for the first time during the three-day expo.

The event will allow the country to showcase its specialty coffee and build a network with potential international high-value buyers.

The Arabica growers are Davao del Sur's Marivic Dubria, manager of the Balutakay Coffee Farmers Association (BACOFA); Rio Besto, chair of Miarayon-Lapok-Lirongan-Tinaytayan Tribal Association in Bukidnon; and Corazon Mercedes Lauderer, manager of Imdalsa Coffee, also from Bukidnon.

The Robusta coffee growers are South Cotabato's Fred Fredeluces, owner of Green Tropics, and Bukidnon's Leonila Secadron, manager of Bayanihan Millennium and producer of Kape Napalit.

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Frencie Carreon | October 15, 2025 7:47 am | 7:47 am



Bukidnon coffees win in PHL's first ever 'cupping' competition

By MindaNews | March 5, 2017 - 9:17 pm

ILIGAN CITY (MindaNews / 5 March) – Bukidnon coffees topped the country's first ever "cupping" competition held at the Cavite State University from March 1 to 4, according to the Philippine Coffee Board, Inc. (PCBI).

The Inhandig Tribal Multi Purpose Cooperative (ITMPC) of Malaybalay City won this year's Kape Pilipino Green Coffee Quality Competition in the Arabica category while Kape Maramag won in the Robusta category.



Although there are more than 100 coffee species, the most popular are Arabica (*Coffea Arabica*) and Robusta (*Coffea Canephora*). Arabica, usually grown in the highlands and more prone to diseases and thus needs more attention from farmers, has generally been regarded as the best coffee; whereas Robusta, which can grow in the lowland with little care, is popular among

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Frencie Carreon | October 14, 2025 8:16 pm | 8:16 pm

Coffee farmers in Mindanao, including those in Bukidnon, have carved their names in competitions in the country and abroad. Screenshots from the MindaNews website (www.mindanews.com)

Miarayon Coffee: The secret is in the Process

It's either siblings Datu Rio D. Besto and Belinda D. Besto were made for coffee, or Nature made coffee for them.

In 2018, the late Datu Rio, chair of Miarayon-Lapok-Lirongan-Tinaytayan Tribal Association (Milalittra), holder of a Certificate of Ancestral Domain Title in Talakag, Bukidnon, was among the Filipino farmers chosen to represent the Philippines in the three-day Specialty Coffee Expo 2018 on April 19 to 22 in Seattle, Washington in the US.

Datu Rio, who was also a chieftain of the Talaandig tribe in Talakag, was selected after their entry bagged the fourth place in that year's Philippine Quality Coffee Competition (PCQC). The Agricultural Cooperative Development International-Volunteers in Overseas Cooperative Assistance (ACDI-VOCA) sponsored the US trip of the farmers.

ACDI-VOCA was then implementing the four-year US Department of Agriculture-funded Mindanao Productivity in Agricultural Commerce and Trade project, designed "to increase the income of the 10,600 smallholder cacao, coconut, and coffee farm families in Southern and Western Mindanao."



The honors at the 2018 PCQC and the subsequent trip to the Seattle Expo was just the beginning. Milalittra under Datu Rio would win a second time in the PCQC.

Later, the indigenous group formed the Milalittra Farmers Agriculture Cooperative (Milfac), which took charge of the group's coffee business and subsequently won more awards at PCQC.

Milfac placed fourth in the 2022 and 2023 editions of PCQC. They didn't participate in the contest in 2024. In the 2025 edition of the competition the group bagged the eighth, ninth and tenth spots out of over 100 entries to the Arabica smallholder farms category. Moreover, they won the Best Honey Process Award, the first time they were able to do so.

The farmers deserve praise for producing quality Arabica coffee beans that have been recognized both in the country and abroad for their distinctive taste. But credit also goes to Belinda, Rio's sister and the woman in charge of preparing and processing the beans that would be sent to the connoisseurs at PCQC for their grading and verdict. She would prepare 120 kilos of coffee every competition.

Belinda acknowledged that the training and seminars she attended have contributed to her skills in processing coffee, Arabica in particular, the only variety produced by Milfaco members as it is suitable to the area's topography and temperature. Miarayon and its neighboring villages are hemmed in by Mount Kalatungan Range and Mount Kitanglad Range, giving the area a cool climate – aside from a high elevation – exactly the conditions required for growing Arabica.

For now, some 80 farmers are selling to Milfaco. The ones with smaller farms deliver at least 100 kilos, while those with bigger areas haul around 1,000 kilos per season.

The farmers, members, as well as nonmembers of the cooperative, sell fresh cherries at 60 to 65 pesos per kilo. She said they only accept the ripe ones to ensure quality. The processed Arabica beans would fetch a price of P1,300 per kilo.

“Sometimes a few green beans would get entangled with the baskets during harvest, but it's not intentional on the part of the farmers,” she said, adding she has explained to them that unripe beans weigh less and produce an unpleasant smell in ground coffee.

But Belinda added that in the past seven years that she has been processing coffee she learned not just from training but also through experiment – and, at times, instinct. She said she'd feel the wind with her hand to know how cold or hot the temperature is, so she could estimate the time needed for each stage. “I guess different techniques should be applied for each type of environment.”

“Once the beans arrive, I weigh and float them, then do either the washed process or the honey process,” she said.



Milalitra's drying facility in Barangay Miarayon, Talakag, Bukidnon. HMC Mordeno

Honey process refers to the process of not washing the beans after depulping. This allows the retention of mucilage, the layer that surrounds the coffee seeds with a sticky, sugary substance and gives the honey process its name. Compared to the washed and natural/dried in the fruit beans processes, coffees from the honey process have significantly less acidity due to the short amount of time it takes for the mucilage to dry, resulting in less fermentation.

Belinda said that in the honey process it's necessary to constantly stir the beans until they are dry so they won't stick together. The mucilage gives the coffee a brownish color when dry.

"Others really studied to learn processing. I learned on my own based on local environmental conditions like temperature that affect the process. No tools, just my hands to test the coffee and weather, and no additional ingredients. Others said they're adding cinnamon, but where will I get cinnamon?" she asked with a chuckle.

"Good processing will bring out the best results. I have no [written] record [of my techniques], it's all here," she said, pointing to her right temple. "Treat the coffee as a baby that needs care and attention."

"Winning is not a fluke, quality and processing is the key," she said matter-of-factly.

Processing, her specialty, is just one of Belinda's jobs at the Milfacó's center in Mirayon. She is also in charge of the nursery and receiving coffee being sold by the farmers to the cooperative as consolidation point.

These mainly voluntary tasks have meant leaving her own garden and around 1,000 coffee trees unattended. Nonetheless, she appeared not to mind, seemingly content with helping the cooperative and its members sustain the recognition they have achieved as one of the country's best producers of Arabica coffee.

Asked if she has shared her self-taught techniques to anybody, Belinda said, "No, I'm keeping them a secret." It turned out to be just a joke because she would later say there's already somebody she's willing to pass her "secret" to, ensuring a continuity of her tribe's outstanding coffee culture.

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CAFE-DAIRY PROJECT

OBJECTIVE

To promote peace through agriculture development using the value chain approach in dairy and coffee industry in Region 9 and 10 to benefit 1,800 farmers including Indigenous Peoples, women and youth.

PROJECT COMPONENTS AND ACTIVITIES

- Improving Business Services
- Industry Sector Development

DURATION

36 months (Nov 2022 – Oct 2025)

 **Maribel G. Isidro**
Project Manager

A PROJECT OF



ABOUT THE PROJECT

CAFÉ-DAIRY Project is part of the project 'Strengthening the Implementation of Regional and Local Peace and Development Agendas' (SPADe).

The project SPADe is a collaborative effort by the Philippine Government, financed by the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development (BMZ) through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

Cooperative Assistance and Farm Extension to Develop Agri- entrepreneurs, Indigenous Peoples and Rural Youth

AREA OF COVERAGE

Region 9 - Zamboanga del Sur
Region 10 - Bukidnon, Misamis Oriental and Misamis Occidental
2 Regions, 3 Provinces, 8 Municipalities, 3 Cities, and 26 Barangays



PROJECT PARTNERS

National Dairy Authority (NDA), Philippine Carabao Center (PCC), Department of Trade and Industry (DTI), Department of Science and Technology (DOST), Department of Agriculture (DA), Central Mindanao Universities, ACDI/VOCA, Peace and Equity Foundation (PEF), CLIMBS and CISP, Asian Farmers Association (CA), and Collectif Stratégies Alimentaires (CSA)

PROJECT BENEFICIARIES, INTERVENTION AREA, AND VALUE CHAINS



Target Group
1,800 farmers
• 68% IPs
• 38% Women
• 10% Youth



7,200 indirect beneficiaries
11 Primary Cooperatives
1 Secondary Coop Federation



Supported Value Chains
• Coffee and Dairy

COOPERATIVE PARTNERS



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