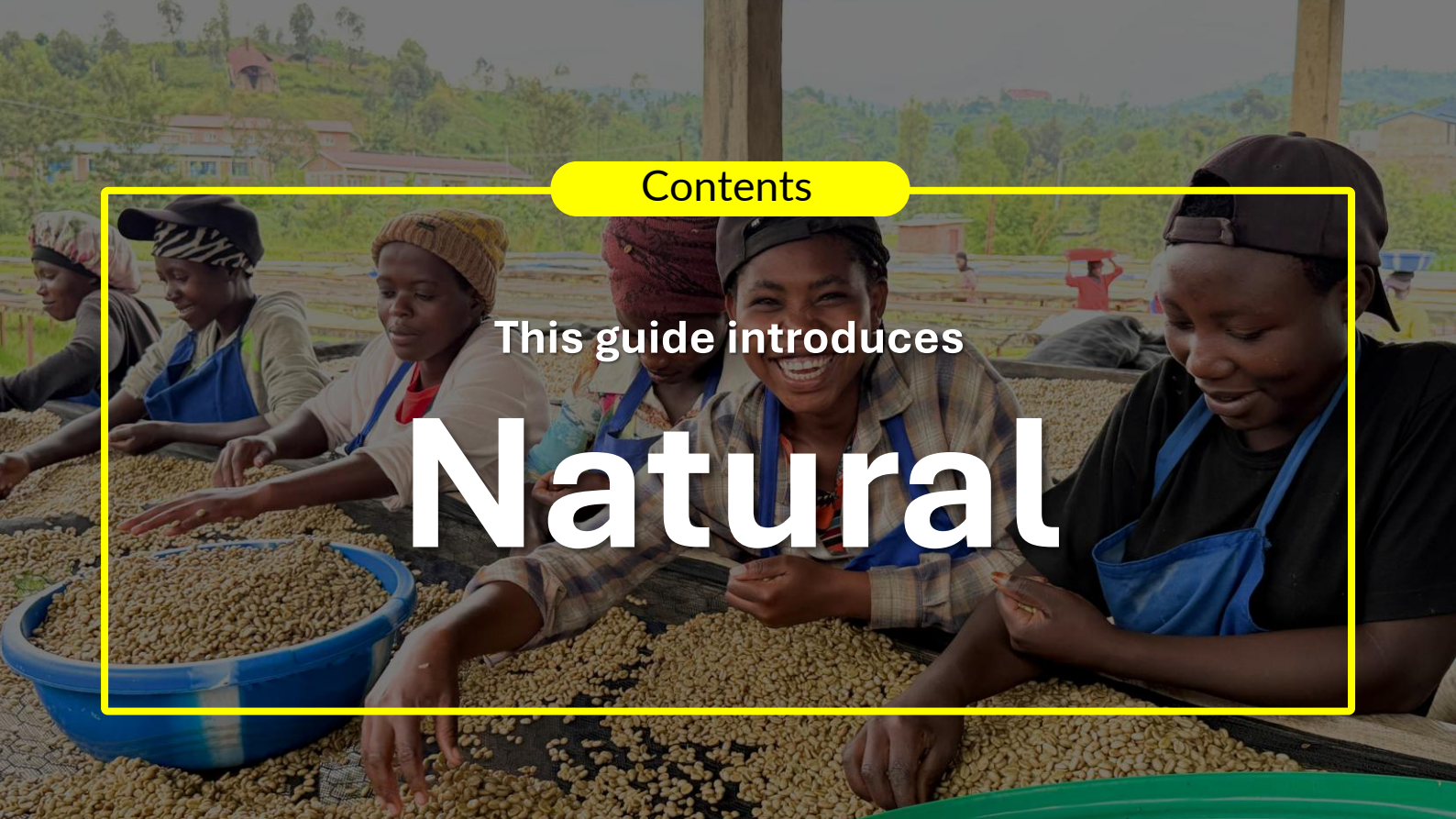


JICA CUP2 Project

PROCESSING GUIDE

Coffee Washing Station
handbook





Contents

This guide introduces

Natural

Glossary (English)

Traceability:

ability to track a coffee's journey from the farm to the final consumer, including all processing and handling steps

In-fruit fermentation:

a processing method where coffee cherries are fermented without removing the fruit skin or pulp, allowing natural microbes to act on the whole fruit.

Dry fermentation:

a method where coffee is fermented without adding water, allowing natural microbes to break down the mucilage in a dry or low-moisture environment.

Anaerobic:

without the presence of oxygen.

Aerobic:

in the presence of oxygen.

Encapsulation:

uneven drying due to direct sunlight causing the outer surface of the coffee beans to dry too quickly.

pH:

a scale that measures how acidic or basic a liquid is, ranging from 0 (acidic) to 14 (basic).

Nitrogen (N):

an essential nutrient in coffee production that supports healthy plant growth and improves yield

P (Phosphorus):

a vital nutrient in coffee production that promotes root development and flowering for better crop yield.

K (Potassium):

an important nutrient in coffee production that helps strengthen plants, improve drought resistance, and enhance bean quality.

Ventilation:

movement of air into and out of a space to ensure proper airflow, fresh air supply, and removal of heat, moisture, or contaminants.

List of tools and equipment

Cherry paddle:

a simple tool used to check the ripeness or density of coffee cherries, often by stirring cherries in water to observe their floatability during sorting.



Brix meter:

a measuring device used to determine the sugar content (°Brix) of coffee cherries, juice, or mucilage, often used to assess cherry ripeness and fermentation potential.



Moisture meter:

a measuring device used to determine the moisture content of coffee parchment or green beans, helping ensure proper drying and safe storage.



pH meter:

a handheld device used to measure the acidity or alkalinity (pH level) of coffee-related materials such as fermentation water, coffee pulp, or mucilage during processing.



Air-tight tank:

a sealed container designed to prevent air from entering, used in coffee processing to maintain anaerobic conditions and control fermentation.



GrainPro bag:

a hermetic bag used to ferment coffee cherries or parchment in an oxygen-limited environment, helping create controlled anaerobic conditions and enhance flavor development.



How and Why We Use Those Tools and Equipment

Using the right tools at each stage of coffee processing helps ensure consistent quality, better decision-making, and reduced risk of defects. The tools below are used to objectively assess cherry quality, control fermentation, and protect coffee during drying and storage.

Cherry paddle:

WHY: Used to check cherry quality during sorting.

STEP1: Randomly select 100 cherries from the bag and place them on the cherry paddle.

STEP2: Define the acceptable color range for ripe cherries.

STEP3: Count the number of ripe cherries based on this color range and calculate the percentage out of 100.

STEP4: The average percentage of ripe cherries collected from farmers must be above 70%.

STEP1



STEP2



STEP3&4



Brix meter:

WHY: Used to check cherry ripeness and fermentation potential by measuring sugar content.

STEP1: Randomly pick 3 collected coffee cherries.

STEP2: Place a few drops of the juice on the Brix meter sensor.

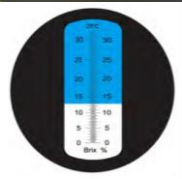
STEP3: Read and record the °Brix value.

STEP4: Use the average result to decide the processing method and fermentation time.

STEP1&2



STEP3&4



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Moisture meter:

WHY: Used to check moisture content to ensure proper drying and safe storage

STEP1: Set the mode according to what you check (parchment, dried cherry or green coffee)

STEP2: Take a small sample of parchment, dried cherry or green coffee.

STEP3: Measure the moisture content using the moisture meter.

STEP4: Read and record the moisture percentage.

STEP5: If moisture is too high, continue drying. If it is within the target range, move the coffee to storage.

STEP1



STEP2



STEP3&4&5



pH meter:

WHY: Used to monitor acidity during fermentation.

STEP1: Check if it is calibrated or not with water. It must show around pH 7.0.

STEP2: Collect a sample of fermentation water, mucilage, or juice.

STEP3: Place the pH meter probe into the sample.

STEP4: Read and record the pH value.

STEP5: If pH drops too fast or too low, stop or adjust fermentation.

STEP1



STEP2&3



STEP4&5



How and Why We Use Those Tools and Equipment

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Air-tight tank:

WHY: Used to control fermentation by limiting air exposure to create an anaerobic condition.

STEP1: Clean the tank to avoid any contamination.

STEP2: Put coffee cherries or parchment into the tank.

STEP3: Seal the tank tightly to prevent air from entering.

STEP4: Use an S-hook to check whether anaerobic fermentation is occurring.

STEP5: Allow the coffee to ferment for the planned time.

STEP6: Open the tank and check pH to see if fermentation is well done as planned.

STEP1



STEP2



STEP3&4&5



STEP6



GrainPro bag:

WHY: Used to control fermentation by limiting air and protecting coffee quality.

STEP1: Put coffee cherries or parchment into the GrainPro bag.

STEP2: Remove excess air and seal the bag tightly.

STEP3: Store the sealed bag in a clean, shaded place.

STEP4: Allow the coffee to ferment for the planned time.

STEP5: Open the bag and continue processing or check quality (smell, pH, condition).

STEP1



STEP2



STEP3&4



STEP5



Check points

Soil management

pH meter



Temperature & moisture meter



Water / hygiene



Traceability



Indicators

- **pH:** Good nutrient absorption rate (5.0-6.0)
- **N:** Essential for photosynthesis
- **P:** Healthy root systems and flowering
- **K:** Bean filling and overall cup quality

- **Colour:** clean and transparent
- **pH:** if clean, pH should be around 7.0
- **Frequency of cleaning:** Everyday machines must be cleaned before use

- Use a **check book** and **traceability tag**
 - Origin of coffee cherries
 - Processing method
 - Grade and weight
 - Collection date
 - Fermentation and drying period

Rationale



Good soil
↓
Good cherries
↓
Good flavors



Poor water
↓
Contamination
and off-flavors



No traceability
↓
Improper
processing and
marketing

Various coffee processing methods

Name	1 Fully washed (normal)	2 Fully washed (with in-fruit fermentation)	3 Honey	4 Anaerobic Honey	5 Natural	6 Anaerobic Natural
Image						
Feature	•Most common •Easy to control •Clean cup	•Easy to control •Clean cup	•Moderately sweet •Fruity note	•Anaerobic •Fruity notes like white grape	•No pulping needed •Sweet, complex •Winey	•Anaerobic •Tropical fruits
Process	Harvesting	Harvesting	Harvesting	Harvesting	Harvesting	Harvesting
	Sorting	Sorting	Sorting	Sorting	Sorting	Sorting
	Pulping	In-fruit fermentation	In-fruit fermentation	Pulping		
	Dry fermentation	Pulping	Pulping	Anaerobic fermentation		Anaerobic fermentation
	Washing & Grading	Dry fermentation				
	Pre-drying	Washing & Grading		Pre-drying	Pre-drying	Pre-drying
	Drying	Pre-drying	 Drying	 Drying	 Drying	 Drying
	Storage	Drying	Storage	Storage	Storage	Storage

5. Natural

Advantage
of the
process

- Offers high potential for complex and distinctive flavor profiles.
- Requires no water, making it suitable for regions with limited water resources.
- Minimal equipment investment is needed.

Recommen-
ded
conditions

1. Sugar contents >20.0
2. Availability of drying beds (longer drying period)
3. Clean and thorough sorting of cherries before drying



Step 1: Harvesting

Purpose: Ripe cherries have good sugars and acidity to create flavors

Recommended equipment



Use **a container** of cherries during harvesting to easily collect cherries



Use **a plastic sheet under the tree** to collect any falling cherry.



Use **clean bags** to hold cherry during harvesting

Key concept

① Harvest **only well-ripen cherries**



Because well-ripen cherries are heavier



Weight	70kg	100kg
Farmgate price	700rwf	700rwf
Total income	49,000rwf	70,000rwf



② Start to harvest in **the morning**.



③ Deliver cherries to the station **within 8 hours** after harvest



④ Do **not** pick cherries **on the ground** to avoid **contamination**



⑤ Put coffee **under shade** after harvesting to avoid rapid fermentation

Step 2: Sorting – color sorting

Purpose: Classify cherries – Ripen / unripen / overripen

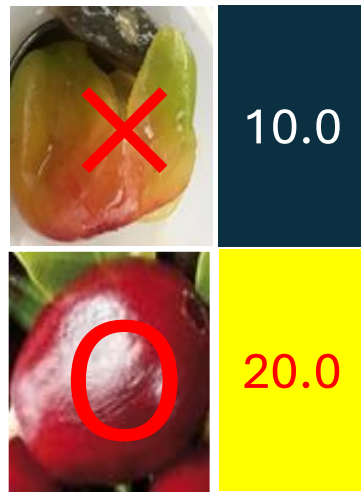
Checking point ①

95% of cherries are **well ripen**



Checking point ②

Sugar contents: above 20.0



2. Fully washed with In-fruit fermentation

Step 3: Pre-drying (36-48 hours)

Purpose: remove lower-quality beans

Equipment

Covered drying beds



Key concept

① Place cherries **under shade** to sort bad cherries (unripen/over-ripen/insect damage) before getting them dry. The layer should be **3cm**.

② Sort and rest parchments **for 36-48 hours**. Cherries must rest well before sun-dry.

③ Set the **target colors of the defects** to sort:

-Unripen

-Over-ripen



Checking point

Defects are **100% removed**



Step 4: Drying

Purpose: In-fruit fermentation to develop flavors

Equipment



A shade net to avoid strong heat



A plastic sheet to avoid rain and dew



A moisture meter to check moisture

**Moisture meter must be calibrated before use*

Key concept

- ① **Control temperature:** Use a shade net to cover from **11:00-15:00** to avoid strong heat.
- ② **Control humidity:** Cover cherries with a **plastic sheet** to avoid rain and dew.
- ③ **Resting:** 1 day in a week, **cover cherries completely for resting.**
- ④ **Uniformity:**
 - **Stirring 5-6 times a day** for first 2-3 days. After, **3 times a day.**
 - Thickness of the layer: **3cm** (first 2-3 days) -> **5-7cm** after MC gets 35%.



Checking points

- ① **Moisture contents:** Aim for **12.0%** for best condition. Use moisture meters twice a day.
- ② **Duration:** Typically, **30-35 days**. The drying process must be carefully controlled to avoid rapid or uneven drying.
- ③ **Cherry temperature:** It should be **kept below 25°C** until moisture content reaches 35%, then after, **below 40°C.**



Step 5: Storage

Purpose: stabilize beans post-drying for export or milling

Equipment

Pallets to avoid any damage



Key concept

- ① **Moisture control:** Maintain the bean moisture content at **10-12%**

**Adjust the MC if storage is either very hot or very humid*



- ② **Ventilation:** Control consistent air flow to avoid dew and high humidity



Checking point

- ① **Temperature:** Keep temperature at **15-23°C** to avoid damage



- ② **Humidity:** Keep humidity at **50-70%** to avoid mold.



- ③ **Resting:** Beans should rest for **around 2 months** to stabilize MC



Appendix A: Lot management sheet (example)

Lot management sheet	
CWS: _____ Name: _____	
-Receiving date: dd/mm/yyyy	Weight kg
-Process method: FW / HN / NR / Other (____)	
-Certificate: _____	
-Lot name: _____	
-Main area: _____	
-Fermentation: _____ hours (From ____:____ to ____:____)	
-Soaking: _____ hours (From ____:____ to ____:____)	
-Grade: A1 / A2 / A3 / Triage	
-Drying start date: dd/mm/yyyy	
-Drying end date: dd/mm/yyyy	
-Moisture content: _____%	
-Final weight: _____ kg	

CWS: the name of the coffee washing station where the coffee lot is received and processed.

Receiving date: the exact date when coffee cherries are delivered to the washing station.

Process method: the processing method applied to the lot (e.g. Fully Washed, Honey, Natural, or other specified methods).

Certificate: the certification status associated with the lot, if any (e.g. Organic, Fairtrade, Rainforest Alliance).

Lot name: the unique identification name or code assigned to the lot for traceability.

Main area: the main origin of the coffee cherries, such as the sector, cell, or village where they were harvested.

Fermentation: the total fermentation duration in hours, including the exact start and end time.

Soaking: the soaking duration in clean water after fermentation, including the start and end time.

Drying start/end date: the dates when drying begins and ends, indicating the total drying period.

Moisture content: the final moisture level (%) of the coffee after drying, measured before storage or milling.