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A JOURNEY OF EXCELLENCE BY CCRI (1925 - 2025)

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TABLE OF CONTENT

CULTURAL PRACTICES – DECEMBER 2025

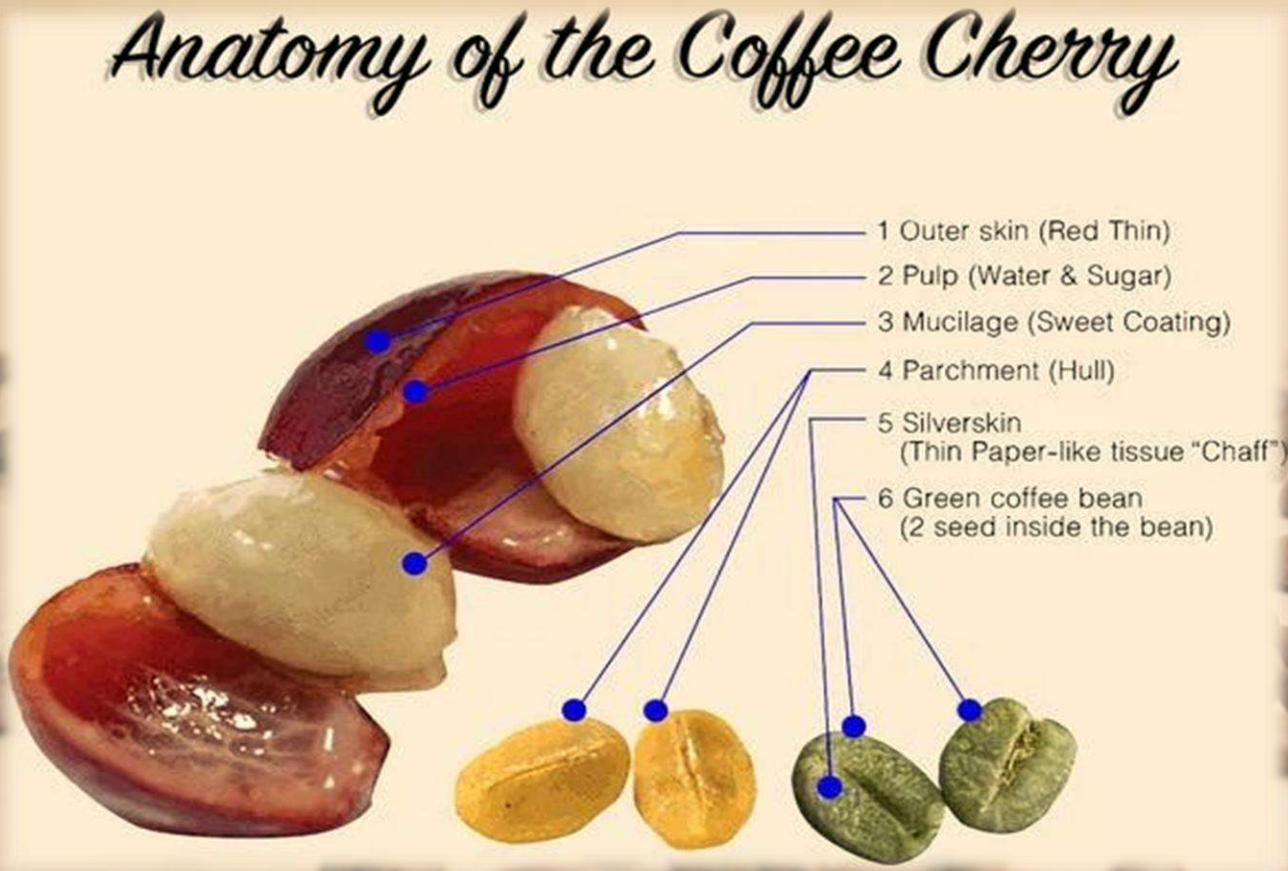
SUMMARY

Established plantations

- Apply liming material based on soil pH
- Install Broca traps around the drying yards to capture the Berry Borer adults escaping from the drying yard to the main field
- Install Xycom traps (12 per acre) in the field to trap the shot hole borer adults
- Harvest and process coffee depending on the maturity of fruits

Nursery

- Collect and dry the jungle soil, farm-yard manure and sand for nursery preparation



Soil Acidity and its Management in Coffee

Soil acidity is a common problem in many coffee farms. Coffee grows best when the soil has the right pH level. But in many coffee-growing areas of India, the soils are too acidic. When the soil becomes more acidic, plants cannot take up nutrients properly, and this leads to lower growth and reduced yield.

Coffee is one of the main crops grown in the Western Ghats of South India. In this region, the soils are mostly acidic to very acidic. This happens due to several reasons:

1. **Heavy Rainfall and Leaching:** Heavy rainfall or irrigation washes away important nutrients like calcium, magnesium, potassium, and sodium, making the soil more acidic.
2. **Decay of Organic Matter:** When leaves and plant materials rot, they release CO_2, which combines with soil moisture to form a mild acid that lowers soil pH.
3. **Use of Certain Fertilizers:** Ammonium-based nitrogen fertilizers increase soil acidity because they release hydrogen ions when they break down in the soil.
4. **Parent Material (Original Soil Material):** Soils formed from certain rocks especially those rich in aluminum or under conifer forests are naturally more acidic.
5. **Crop Harvest and Grazing:** Continuous removal of nutrients through crop harvest over the years gradually increases soil acidity.

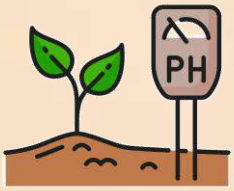
Effects of High Soil Acidity on Crops and Soil Health

Problem	What Happens in the Soil	Effect on Coffee Plants
Low availability of nutrients	N, P, K, Ca, Mg, Zn, B become unavailable	Poor growth, yellowing, low yield
Toxicity of Al, Fe, Mn	Become more soluble and harmful	Root damage, stunted plants
Root growth restricted	Aluminum affects root tips	Less water & nutrient uptake
Reduced good microbes	Nitrogen-fixing bacteria decrease	Weak plants, low nitrogen
More harmful fungi	Acidic soil favours disease fungi	Root rot & plant stress

How to measure soil acidity:

Soil acidity is checked using a pH meter, and the pH scale ranges from 0 to 14.

- ✓ pH less than 6.5 → Soil is acidic
- ✓ pH 6.5 to 7.5 → Soil is neutral
- ✓ pH above 7.5 → Soil is alkaline



For best growth of coffee plants, the soil should have a pH of around 6.1 to 6.2.

Management of Soil Acidity:

- The best way to reduce soil acidity is by adding lime as it increases the soil pH by neutralizing excess acidity caused by hydrogen and aluminum in the soil.
- Applying lime is a regular and essential practice in coffee plantations.
- It helps maintain the soil fertility, improves nutrient availability and supports better crop growth.

Common Types of Lime

- ❑ Agricultural lime (Calcium Carbonate - $CaCO_3$)
- ❑ Dolomite / Dolomitic lime (Calcium + Magnesium Carbonate - $CaMg(CO_3)_2$)
- ❑ Slaked or hydrated lime (Calcium Hydroxide - $Ca(OH)_2$)
- ❑ Burnt lime (Calcium Oxide - CaO)

Recommended for Coffee Plantations

- ○ Agricultural Lime
- ○ Dolomitic Lime

These materials are safe and effective, commonly used in coffee-growing regions on an alternate or rotational basis.

Liming Materials to Avoid

❌ Burnt Lime (CaO)

❌ Slaked / Hydrated Lime ($Ca(OH)_2$)

Why avoid?

- ✓ Too strong and works too fast
- ✓ Can burn the delicate feeder roots of coffee plants
- ✓ Can harm helpful soil microbes and soil life
- ✓ Can reduce soil health over the long term

Thus, these materials are not recommended for regular use in coffee plantations.

Time of Lime Application:

✓ Lime should be applied in coffee plantations when the soil has enough moisture (around 20% WHC) for calcium and magnesium to work and reduce acidity. For **North-East monsoon areas**, the best time is **November to March**, and for **South-West monsoon areas**, it is **November to May**.

Method of Lime Application:

✓ Apply lime or dolomite by broadcasting it evenly across the field, including the plant basin, which is usually more acidic. After spreading, mix the lime well into the soil to help it react faster.

📌 General Tip:

☞ Lime is generally applied once in 2 to 3 years, depending on soil acidity.

☞ The amount of lime or dolomite needed should be based on the soil pH, highly acidic soils need more lime, while less acidic soils need less.

☞ Apply lime only as per soil test results to avoid too much or too little application; for coffee, maintain soil pH around 6.1 - 6.2.

On-spot mobile soil testing campaigns:

To create awareness among coffee planters about the importance of soil test based nutrient management, the Coffee Board is conducting **On-Spot Mobile Soil Testing** campaigns at village and Hobli levels.

Planters can use this service to get their soil tested on a payment basis and receive lime recommendations immediately.

To bring this campaign to your area, planters may contact the nearest Extension Officer or the Divisional Head, Division of Soil Science & Agricultural Chemistry (**CCRI**).

They can also approach the Deputy Director (Research) at the regional research stations located at **Chettalli** (Karnataka), **Chundale (Kerala), Thandigudi** (Tamil Nadu), **R.V. Nagar** (Andhra Pradesh & Koraput), and **Diphu** (Assam).

SHADE MANAGEMENT

- ❑ Complete the process of pruning of small hanging branches in permanent shade trees after the harvest of the crop to provide proper light and aeration in the coffee estate.
- ❑ Collect and apply mulching material around the base of newly planted blocks. This practice helps conserve soil moisture and prevents weed growth.
- ❑ Prioritize the harvesting of Arabica coffee in open and low-shade areas to avoid exposing ripe coffee berries to high temperatures, which can cause scorching.

Selection of elite robusta mother plants for vegetative propagation in Coffee

- Vegetative propagation in Robusta coffee helps to produce superior performing, true to type clones with high degree of uniformity. This can be achieved by stem cuttings (Orthotropic suckers) from the selected elite mother plants. Therefore, the selection of elite robusta mother plants is of utmost importance and a prime step in vegetative propagation.
- The optimal season for selecting high-yielding, elite robusta mother plants is from December to January. During this period, it is important to assess not only their yield potential but also other desirable traits such as resistance to pests and diseases, tolerance to abiotic stresses (including drought, heavy rainfall, and flooded conditions), superior growth performance, and a unique and exceptional cup quality profile.
- Through the development of clonal plants, uniform yield from the heterogeneous population can be achieved and the location specific problems can be addressed.
- Coffee Board is encouraging planting community to initiate the selection of elite or trait specific robusta mother plants from their established robusta plantation during the current season. If any extraordinary superior plants are available, please bring to the notice of Head, Plant Breeding and Genetics, CCRI, Balehonnur or to the nearby extension officials of Coffee Board for further course of action.
- The planters can also propagate these elite mother plants by conventional vegetative propagation techniques to make their own estate clonal collections for the new clearings or gap filling. The planters are also cautioned to prepare mixed clonal populations instead of single clonal population to maintain sources for cross pollination.

Minimum criteria to select high yielding robusta mother plants

- Plant should be in the potential yielding age of above 10 years in C x R and 20 years in S.274 & Old robusta. The selected plant should be free from pest and diseases.
- Previous observations on consistent yield should be ascertained before selecting the plant as an ideal mother plant.
- Compact & drooping bush stature and narrow leaves is preferred for C x R selection.
- Short internodes or continuous bearing nodes
- Tight clusters with bold fruits

Apart from this, other traits of interest mentioned above may be observed for commercial exploitation.

Elite mother plant

Plant with bold fruits & tight cluster

Plants with compact & continuous bearing nodes

Plants with good bearing habit

PEST MANAGEMENT

Coffee Berry Borer on coffee berry

Management of Coffee Berry Borer (CBB)

- ✓ Install Broca traps (10 per acre) in the field to trap adult beetles
- ✓ Install Broca traps around the drying yard, if arabica harvesting and processing commenced

Broca trap

Shot Hole Borer

Management of Shot Hole Borer (SHB)

- ✓ Remove and burn SHB infested twigs (cut the twigs below the hole and burn it)
- ✓ Install Xycom traps (12 per acre) in the field to trap adult SHB

Xycom trap

Maintenance of Apiaries

Following maintenance can be carried out if Beekeeping is practiced in the plantation

- ✓ Provide feed for the colony, (one portion of sugar : one portion of clean water, or boil after adding sugar) to keep them strong and avoid wax moth and wasp attack.
- ✓ Strong colony can be divided during second fortnight of November
- ✓ Once the brood frames are filled with combs super chambers can be placed over this for honey storage

Clean bottom boards of the boxes to remove debris and developmental stages of wax moth (once in ten days) using hive tools and brush

DISEASE MANAGEMENT

- ✓ At North-East monsoon regions, for management of coffee leaf rust take up spray 0.5% Bordeaux mixture or systemic fungicide hexaconazole 5% EC @ 400 ml/200 L.
- ✓ In South-East area, if post-monsoon fungicide spray for management of leaf rust disease was skipped and the incidence of leaf rust is noticed in arabica plantations, then take up spray of systemic fungicide hexaconazole 5% EC @ 400 ml/200 L of water immediately **after the complete harvest of the crop**.

HARVESTING AND POST-HARVESTING TECHNOLOGY

- In India, coffee is largely an exported commodity with 70% to 80% of its production is pumped into the global market. Thus, it is essential to maintain the quality of coffee to upkeep the image of Indian Coffee in the global market.
- The Central Coffee Research Institute (**CCRI**) which is the Research Department of the Coffee Board has developed a set of Good Agricultural Practices (GAPs), Good Manufacturing Practices (GMPs) and Good Hygiene Practices (GHPs) for the preparation of quality parchment coffee (wet processing) and cherry coffee (dry processing). The GAPs, GMPs and GHPs are listed here-under for the benefit of the planting community:

A. Recommended Practices for Coffee Processing by Wet Method:

- ✓ In wet method, it is recommended to pick coffee cherries as and when ripe.
- ✓ The ripe cherries should be pulped as quickly as possible (within 6 hours) as prolonged storage encourages pre-fermentation of ripe fruits.

Selective picking of ripe fruits

Sorting of harvested fruits

- ✓ Inferior cherries (overripe/tree dried/diseased) if any should be separated out before feeding into the pulper through flotation/siphon tank arrangements.
- ✓ All coffee processing machineries (pulper and washer) should be kept clean and in good working condition (properly adjusted/calibrated).
- ✓ Fermentation vat and post-wash tank should kept be clean and tidy.

Post-wash soaking of wet parchment

- ✓ Fruits skin/pulp should not be present in the fermentation vat and fermenting coffee bean.
- ✓ Close monitoring of fermentation process is essential (optimal fermentation is must & should)

✓ Clean water should be used for pulping and washing of fermented coffee beans.

✓ Soaking of wet parchment under clean water for about 6 to 8 hours improves coffee quality.

✓ Wherever possible, dry the wet parchment initially on wire mesh bottom trays for 24 to 48 hours before shifting them to the drying yard.

✓ Dry the wet parchment samples on a clean cemented or tiled drying yard.

✓ Dry the wet parchment slowly by spreading 4 to 7 cm thickness for efficient and uniform drying.

✓ The wet parchment should regularly be raked to facilitate uniform drying (once an hour).

Drying of parchment

✓ The wet parchment should be covered with a clean plastic sheet during night hours to prevent rewetting of coffee samples.

Heaping of the coffee mass

Covering the coffee lots

- ✓ Dry the wet parchment to the recommenced moisture level of 10%. The forlit weight (kg/40 liter) should be 15.5 kg & 16.5 kg for Arabica Parchment and Robusta Parchment, respectively.

- ✓ In case of on-farm storage, pack the parchment coffees in clean gunny bags and stack the bags in well-ventilated godown/warehouse over the wooden dunnage.

Test weight measurement

Storing of dry parchment on wooden dunnage

- ✓ Do not store at the estate level for long duration (beyond end of May) as the wet monsoon conditions not ideal for coffee storage.

B. Recommended Practices for Coffee Processing by Dry Method:

- ✓ In dry method, it is recommended to pick the coffee cherries when about 85% to 90% of cherries are ripe.
- ✓ Avoid heaping (or) storing of fresh coffee fruits in gunny bags for longer time, as it enhances the likelihood of mould growth and subsequent spoilage of coffee quality.
- ✓ Sort out all the unripe berries (greens), over-ripe, tree-dried and damaged coffee cherries before spreading for drying.
- ✓ Over-ripe, tree-dried and damaged coffee cherries are potential source of mould contamination which results in the production of “mouldy” coffee and these mouldy coffee imparts “mouldy/musty” taste in the cup.
- ✓ After sorting, spread the coffee cherries evenly to a thickness of not more than 4 cm for the first 3 to 4 days of drying on a clean drying yard. After 3 to 4 days of drying, thickness can be increased not more than 8 cm.
- ✓ Dry the coffee cherries on a clean cemented or tiled drying yard. Do not dry coffee cherries on bare soil. Coffee cherries dried on bare soil imparts “earthy” taste in the coffee liquor besides coffee cherries getting contaminated with mould spores present on the bare soil.

- ✓ Do not mix the freshly harvested coffee cherries with the previous day's coffee cherries, as it results un-even drying of cherries.
- ✓ During the course of drying, the coffee cherries must be regularly raked/stirred (6 to 8 times per day) to facilitate uniform drying of cherries.

Manual raking for drying of cherry coffee

- ✓ After 3 to 4 days of initial drying, the coffee samples should be covered with a clean plastic sheet during night hours to avoid rewetting of coffee samples.
- ✓ Dry the coffee cherries to the recommended forlit weight/bushel weight of 18 kg (which correspondence to a moisture level of 11% to 12%). At estate level, the forlit weight of dry cherry lot should not exceed beyond the said recommended limit, to minimize risk of mould contamination.
- ✓ After completion of drying process, clean the dried cherry lots by winnowing to remove the all the extraneous matters (dried leaves, twigs, dirt etc.,) before bagging them into clean gunny bags.

Manual Winnowing of cherry coffee

Mechanical Winnowing of cherry coffee

- ✓ In case of on-farm storage, store the cherry bags in a well-ventilated godown without letting in the moisture and rain water. The cherry bags should be stored on a raised wooden platform to ensure circulation of air underneath the bags and also away from the wall to avoid to re-hydration of dried cherries & subsequent development of mould growth.
- ✓ Do not store the coffee sample at the estate level for long duration (beyond May) as the wet monsoon conditions prevailing in plantation areas during June to October are not ideal for coffee storage.

Information on Moisture Standards for coffee

Sl. No.	Sample Type	Forlit Weight (kg/40 liter container)	Moisture Standards (%)
1.	Arabica Parchment	15.5 kg	10.0 (+ 0.5)*
2.	Robusta Parchment	16.5 kg	10.0 (+ 0.5)*
3.	Arabica Cherry	17.0 kg	11.0 (+ 0.5)*
4.	Robusta Cherry	18.0 kg	11.0 (+ 0.5)*
* A tolerance limit of + 0.5% is allowed for each type of coffee			

Outturn standards prescribed by Coffee Board & International Coffee Organization

Sl. No.	Sample Type	Coffee Board's Standards (%)	ICO Standards (%)
1.	Parchment Coffee	80 - 85	80.0
2.	Cherry Coffee	50 - 54	50.0

Proximate outturn percentage of coffee samples at different stages of coffee processing

Sl. No.	Descriptions	Arabica	Robusta
Wet processing			
1.	Fruit to beans with mucilage	55 – 60	50 - 55
2.	Fruit to wet parchment	40 - 45	45 - 50
3.	Fruit to dry parchment	19 - 22	22 - 25
4.	Fruit to green coffee bean	16 - 19	19 - 21
5.	Fruit to clean coffee ratio	5.5:1 to 6:1	4.5:1 to 5:1
Dry processing			
1.	Fruit to dry cherry	35 - 40	40 - 45
2.	Fruit to green coffee bean	16 -19	19 - 21
3.	Fruit to clean coffee ratio	5.5:1 - 6:1	4.5:1 - 5:1

Calibration of Moisture Meters:

- ❑ It is a standard practice that moisture meter should be calibrated every year preferably before the onset of harvesting season (November).
- ❑ Calibration of moisture meter is done at the Analytical Laboratory, Coffee Board, Head Office Bangalore and the calibration charge is Rs. 1000/-.

INDIA COFFEE APP

- ✓ User can download the **'India Coffee App'** from the google play store and can login using your mobile number in coffee stakeholder.
- ✓ Scan for download the app,

(Android QR code)

(IOS QR code)

About the app:

- ❑ Coffee Board is extending research and development services viz., seed coffee supply, traps, lures and bio-control agents to combat the coffee pests, customized advisories, soil sample analysis and distribution of soil health cards, export facilitation, quality analysis etc., to all the stakeholders in the coffee sector.
- ❑ Besides, in order to promote the pure coffee consumption in the domestic market, Coffee Board is selling pure coffee powder/roasted beans to consumers. In this connection, taking into account various technological advances in the field of communication, Coffee Board is developing an 'Integrated Mobile App' named **'India Coffee App'** along with e-commerce facility for making one stop solution.
- ❑ **'India Coffee App'** provides various facilities to the coffee stakeholder in terms of **weather forecasting, e-shops, calendar of operations, schedule of training programs, daily coffee price,** etc. For more details you can also go through coffee board website**:** www.coffeeboard.gov.in

For Grower Registration EUDR User manual – **India Coffee App,** Please scan this **QR code**

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