CACAO PRODUCTION

Cacao (Theobroma cacao L.) is a tree crop which is highly suitable or compatible under different production systems (monocrop, intercropping and agroforestry.)

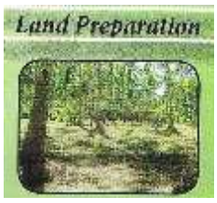
It is grown mainly for each beans, processed into cacao powder, cake and cacao butter. Largely used in the manufacture of chocolates, soaps, cosmetics, shampoo and other pharmaceutical products.

Major Varieties of Cacao

- **Criollo**: superior quality and relatively susceptible to pest and diseases
- **Forastero:** high yielding variety with round pod and thick-walled which turn yellow when ripe and has a flat, violet seed: one group of forastero is Amellonado which is more genetically uniform.
- **Trinitario**: a hybrid between Criollo and Amellonado.
- **Brazillian hybrids**: include Upper Amazon X Amenolado and Upper Amazon X Trinitario

Some recommended Hybrids

- UF 18
- BR 25
- PBC 23
- F1 Hybrid



Soil and climatic Requirements

- Malaysian hybrids – Ideal pH is 6.5, but can tolerate to pH from 5.5 to 8.0
- Type 4 climate is ideal – Grow in areas with temperatures ranging frm 19 degree C (highlands to 32 degree C (coastal areas).
- Clear – Underbrush and remove all strumps.
- Plow and harrow thoroughly
- Coconut areas could be intercropped with cacao if coconut trees are already tall.

Establishment of road and drainage Network

- In large farms, roads should be a major consideration and spaced 200 meters apart.
- Drainage is important in farm as conveyance for excess water that could uproot cacao tree and wash away topsoil.
- In sloping and hilly areas, drainage canals may not be necessary
- Spacing distance and dimension of canals and slope gradient depends on the topography of the area.

Land Preparation

Climatic Needs for Growing Cacao Under Coconut

Factor	Coconut	Cacao
Altitude (m above sea level)	Less than 600	Up to 800
Temperature ©	24-29	18-32
Light	2000 sunshine hours year	Shade tolerant crop
Total annual rainfall (mm)	1500-2500 (well distributed)	1250-2800 (w/o any drought exceeding 3 months)

Soil Requirement for cacao Under Coconut

- In a small farm or a plantation, different recommended high yielding varieties may be grown at the same period.

Soil Condition	Coconut	Cacao
Soil Depth (cm)	>75	>1500
Drainage	Moderate to well drained	Well-drained
Soil Texture	Sandy, loam, Clayey (with good structure)	Loamy, Clayey (with good structure)
Organic matter content	Medium to high	Medium to high
Soil Acidity (ph)	5.5 – 7.5	5.5 – 7.5
Major Nutrient	N,K,Cl,S,P,Ca,Mg, B+ trace elements	N,P,K,Ca,S + trace elements (Mo,Mn,B, Cu,Zn,Fe)

Under Monocropping System:

- A 3m x 3m triangular spacing (1,241 plants/ha) is desirable to be grown.

Planting System

- 1 ha, needs approx (100-135 coconut + 600 cacao trees).
- TRIANGULAR (HEXAGONAL) (2.75m x 2.38m) (1ha. Needs 1,527 cacao + 1000 cassava hills).

Planting of shade Crops

In the initial years of cacao establishment, shade crops (‘nurse crops’) like coconut cacao monocropping system, shade trees are later pruned.

Cacao Intercropping System

1. Cacao + cassava + corn under coconut.
2. Cacao+ banana + fruit trees under coconut.

Pruning

- Proper and timely pruning is required:

1. To train. Shape and achieve the economical tree height; have adequate air circulation and sunlight penetration within the crop;
2. To minimize incidences of pest and disease; and
3. To produce higher and quality yields.

Fertilization

- A separate fertilization for the stands of coconut and the cacao crop is recommended.

1. Using the combination of single fertilizers (ammonium sulfate plus common salt (for potassium-rich soils) or potassium chloride (0-0-60) for soils deficient in K; and
2. Using ready-to-apply multinutrient fertilizers (14-5-20-0.02 (B) now commercially available like COCOGRO (ATLAS Brand) in 25. Capacity bags.

- These two fertilizer recommendations are compatible with the application of appropriate organic fertilizers (compost, coco peat, commercial organic fertilizers). Organic fertilizer should be a applied about a month ahead of the application of the inorganic/mineral fertilizers.
- Organic fertilizers serve best as soil conditions and fertilizer supplements to the coconut-cacao cropping system.

Pests and Disease Management

1. Plant recommended high yielding and pest resistant varieties.
2. Early bagging of young fruits (battery-size).
3. Field sanitation and regular pruning done to clean the area and eliminate the dwelling place of the moth and other insects and disease.
4. Apply or spray with combination of insecticides and fungicides

Other Control Measures

- Frequent harvesting of ripening pods and splitting as soon as the pods are harvested.
- Shredding of pods husks – mechanically destroys/kills off the pod borer larvae and grinded and grinded husks can be used as mulching and organic fertilizer.
- Keeping of alternate host plants out of the farm – elimination of other plants that will serve as hiding or breeding places for pod borer.

Harvesting and Postharvest Operations

- Usually takes 5 to 6 months from pollination.
- Maturity period depends on the variety and climatic conditions such as rainfall distribution and temperature.
- When ripened, pods are yellow or orange in color.
- Harvesting is recommended when the pods are fully ripe to have good flavor and good quality beans.
- Fermentation is done to produce

Fermentation and Drying

Beans of good quality, meaning the color and aroma of the beans are improved.

- Beans are placed in wooden boxes or rattan baskets for 6 days. The desired temperature ranges from 100-120 degree (F) (38-48 degree C).
- This practice is required for high quality and export grade cacao beans.

Sorting, Grading and Bagging

- Sorting and grading will enhance bean quality.
- Foreign materials, clumped, infested and broken beans are removed.
- Small and partially fermented beans are set aside.
- Grading follows basing on standards set by buyers.
- Classified beans are then bagged and weighed.

Ref. PCA-DRC XI/ PCARRD/ MS Marcos Dumandan) & Simeon Fernandez (DA-SMIARC)