

CACAO AS AN INTERCROP IN COCONUT LANDS

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Cacao as an intercrop was recently introduced to coconut growing areas. But in other coconut growing countries such as Malaysia, Papua, New Guinea and India, cacao is grown on a large scale as an intercrop with coconut. In Sri Lanka, traditional cacao growing areas in the central region are Gampola, Wattegama, Katugastota and Matale. Cacao could be grown easily and profitably in coconut lands in the wet zone. Intercropping with cacao increases coconut yields through the accumulation of organic matter in the soil, conservation of soil moisture, weed control and better soil microbial activity.

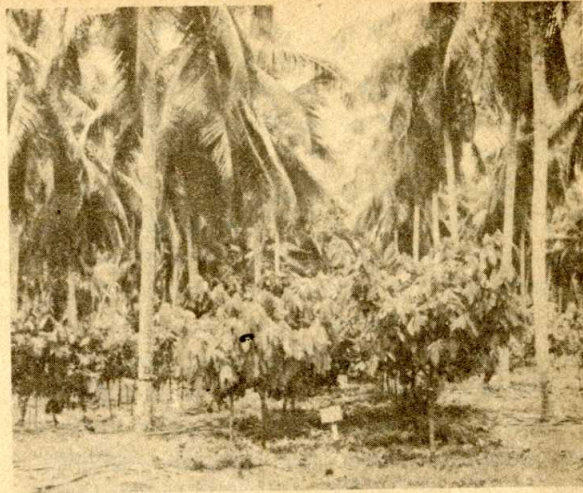
From an adult cacao plant grown as an intercrop about one kilogram of processed cacao beans could be obtained. An acre of coconut can accommodate 300 cacao plants, which would bring in an income of Rs. 15,000/- per annum.

Subsidy for growing cacao

For growing cacao in an acre of coconut land, Rs. 2,250/- is given as a subsidy by the Coconut Cultivation Board. This is paid in three instalments after planting cacao. In order to get the subsidy, Coconut Development Officer of your area should be consulted. If the number of cacao plants is less than 250 per acre, then the subsidy is paid at the rate of Rs. 9.90 per plant.

Coconut growing areas suitable for cacao

Coconut lands in the districts of Colombo, Gampaha, Kegalle, Kalutara, Galle and Matara in wet zone as well as in areas such as Giriulla, Polgahawela, Potuhera, Ibbagamuwa and Mel-



siripura in Kurunegala District are suitable for growing cacao.

Selection of suitable coconut lands

Soil

Entirely sandy or clayey lands are not suitable. Loamy soil with organic matter is very suitable. The soil should be able to hold moisture. Lands with poor drainage during rainy season are not suitable. Since cacao is deep rooted, the depth of soil should be 1.3 m. (3-4 ft.) without cabook or any other hard soil layer.

Slope of the Land

Slopy coconut lands are suitable for growing cacao as soil erosion could be reduced with this crop. If the drainage is poor in the lower most section and if the upper most section is subject to drought, both these sections should be avoided.

Condition of the coconut plantation

Coconut should be 15-45 years of age. Young coconut plantations and senile coconut plantations are not suitable.

Suitable varieties and planting material

Criollo varieties with red or violet coloured pods are susceptible to drought. Hence these are not suitable for the coconut triangle.

Forestaro varieties with green coloured spherical pods are drought tolerant. This is more suitable for coconut growing areas.

N.A. 32 variety of Forestaro group is suitable for coconut lands with better soil moisture level and fertile soil.

The drought tolerant variety, Millavana is suitable for other coconut lands.

Planting material can be obtained from nurseries managed by the Minor Export Crops Department.

At present, cacao seedlings are sold at Rs. 1.00 per seedling. A limited amount of cacao seeds is available at the Coconut Research Institute stations at Walpita Estate and Sirikandura Estate.

Mattamagoda nursery in Kegalle, managed by the Coconut Cultivation Board, also supplies seedlings.

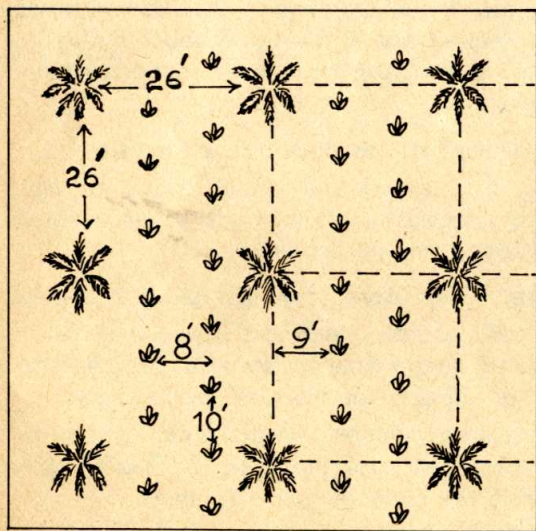
In addition, there are private nurseries approved by Minor Export Crops Department for supply of planting material.

Seedlings should be selected when they have 8–10 leaves. Over grown seedlings are not suitable for planting.

Transplanting in the field

(a) Lining and preparation of planting holes

Two rows of cacao could be planted between two rows of coconut. Cacao rows should be 2.5 m. (8 ft.) apart and cacao plants should be 3 m. (10 ft.) apart, planted in a triangular system. Planting in the triangular system, 325 cacao seedlings will be required per acre (800 seedlings per hectare). (vide diagram).



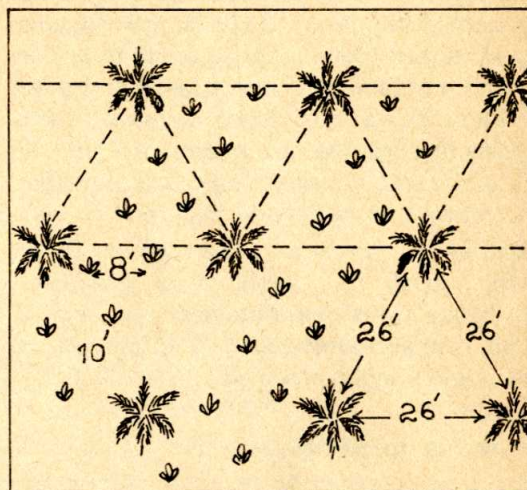
In coconut square planting

If the coconut plantation is irregular, each cacao plant should have at least a distance of 2.4 m. (8 ft.) from the coconut palm while the spacing between two cacao plants should be 3 m. (10 ft.).

If cacao interferes with other operations, it is recommended that only one row of cacao is planted between two rows of coconut. The spacing between two cacao plants in a row is 2.4 m. (8 ft.). Accordingly, there will be 200 cacao plants per acre (500 plants per hectare).

The cacao rows should be aligned in the East West direction for maximum sunlight utilization.

The size of the planting hole will depend on the type of soil. In hard soils such as gravel, the size of the planting hole is 0.6 m. × 0.6 m. × 0.6 m. (2 ft. × 2 ft. × 2 ft.) while for light loamy soil it should be 0.4 m. × 0.4 m. × 0.4 m. (1½ ft. × 1½ ft.).



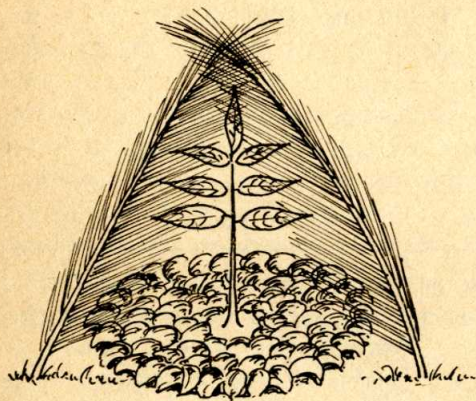
In coconut triangular planting

(b) Planting:

Planting is done with the commencement of April–May or September–October monsoons. April–May rainy season is preferred. A layer of coconut husks is placed at the bottom of the planting hole which is then filled with a mixture of cowdung and top soil. Mixing 60 g. (2 oz.) of rock phosphate will enhance root development. The polythene bag of the seedlings should be removed before planting, and care should be taken to avoid damage to the tap root.

(c) Mulching

After planting the seedlings should be shaded from direct sunlight by fixing pieces of coconut fronds in the East-West direction. Seedlings should be mulched with coconut husks or dry grass or straw to conserve soil moisture.



Provide shade after planting.

(d) Filling vacancies

While planting it is advisable to have some additional planting material to be used later for filling vacancies.

After care,

(a) Application of fertilizers

Cowdung, compost manure and inorganic fertilizer could be used as fertilizers. The in-organic fertilizer mixture (Urea-4 parts by weight, Rock phosphate-5 parts, Muriate of potash-3 parts and Kieserite-1 part) recommended by the Minor Export Crops Department could be applied as follows:

Table

In the first year fertilizer is applied during the two monsoonal rains in four split doses while from the second year onward, fertilizer is applied with the onset of both monsoons.

Fertilizer required for 100 three year old plants could be prepared as follows:

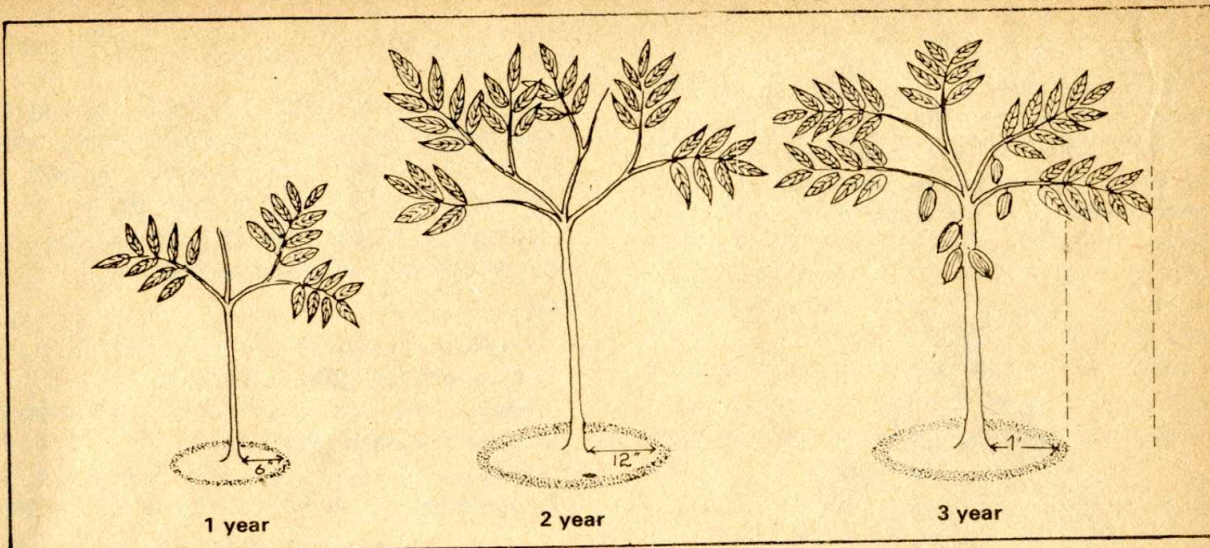
	kg.	lb.
Urea (Nitrogen-46%)	11.0	24.2
Rock phosphate (Phosphorus-28%)	13.0	28.0
Muriate of potash (Potassium-60%)	8.0	17.5
Kieserite (Magnesium-24%)	2.7	6.0

Fertilizer should be applied on a moderately rainy day to avoid any toxicity to plants. Improper application of fertilizer could cause leaf shedding, leaf scorch or even the death of plants. In the first year, fertilizer should be applied in a circle at a distance 15 cm. (6 ins.) away from the cacao plant. From second year onwards, it should be applied 30 cm. (1 ft.) away from the cacao plant in a circular area up to the distance of the spread of branches. After application, the fertilizer should be incorporated by forking it into the soil and the area mulched.

The necessary fertilizer could be obtained from Agrarian Services Centres. The Coconut Development Officer of the area would also be able to arrange your fertilizer requirements.

In addition, the coconut palms should be fertilized.

	1st Year	2nd Year	3rd Year and thereafter
Yala Season	Dose per plant, 63 g. (2.2 oz.) Twice, during each monsoon.	Does per plant, 250 g. (8.8 oz.)	Dose per plant, 350 g. (12.3 oz.)
Maha Season	63 g. (2.2 oz.) Twice, during each monsoon.	250 g. (8.8 oz.)	350 g. (12.3 oz.)



(b) Weed Control

Mechanical weed control is more popular than chemical methods. A circular area up to a distance of 1 m. (3 ft.) from the plants should be clean weeded with mammoties. The rest of the area should be slashed. Clean weeding the entire area is not recommended. After 3-4 years weeds will be naturally controlled due to restricted sunlight.

(c) Pruning

Pruning is important in order to have a systematic plantation and to facilitate the cultural operations in the plantation. The main objects of pruning are to get a 1.6 m. (5 ft.) tall main trunk, to get maximum sunlight to the

trunk, to control diseases and pests, to remove diseased stems and to get a good canopy for the tree. While pruning water shoots should be removed and the side branches preserved. Pruning of cacao is particularly important in a coconut plantation to encourage branching at a height of about 1.6-2.0 m. (5-6 ft.) so as to facilitate coconut picking. Side branches should not be allowed to grow closer than 2 m. from the palm. The distal ends of such branches should be removed. This operation facilitates picking of nuts and application of fertilizer to the palms. At the same time cacao branches damaged by falling nuts and coconut fronds should be removed and a wound dressing such as coal tar applied to prevent stem borer attack through wounds.



Diseases and pests

Diseases

1. Pod rot disease

This disease is caused by the fungus *Phytophthora*. Black spots starting from the upper end of the pod gradually spread over the entire pod resulting in pod rot. The disease is particularly severe during heavy rainy season. Injury to pods, too much shade and attack by the capsid bug are the predisposing factors for this disease.

Affected pods should be removed to control the disease. Ventilation in the plantation should be improved and the capsid bug damage should be prevented. Bordeaux mixture or a copper fungicide should be sprayed when the disease is prevalent.

2. Swollen Shoot Disease

This is caused by a virus. Unusual swelling of tender shoots, yellowing in between veins in the leaves, severe decline in yield are the symptoms. This disease has so far not been reported from the coconut growing areas. Since this disease is prevalent in Katugastota and Kundasale areas planting material from these areas should be avoided.

3. Chirella pod wilt

Drying of 1-2 inch in size small pods is the symptom of this disease. This is a physiological condition. When there is excessive bearing in cacao trees, this is the natural method by which excess pods are removed. However, when this condition is severe, planting material should not be obtained from such trees.

Pests

1. Capsid bug damage

This bug is similar to a mosquito. It sucks sap from pods resulting in small black spots. The pod rotting fungus establishes itself through such wounds. Adequate sunlight falling on the trunk will reduce damage by this pest. Application of 5% B.H.C. dust, in the morning, is recommended.

2. Stem borer damage

This pest bores into the stem and branches causing them to break. The grubs can be made to come out by pouring kerosene oil to the holes or else a common insecticide could be poured into the holes.

3. Cockchafer beetle damage

The pest is active during the night. The insect eats imature leaves leaving only the veins presenting a reticulate appearance. A systemic insecticide such as Tamaron should be sprayed on leaves and the soil around the tree and repeated after 21 days. These insects are attracted to light and therefore night fires will be useful to control the pest.

4. Mealy bug damage

Mealy bugs suck sap from pods. Dusting B.H.C. dust could control this pest.

5. Squirrel damage

Squirrels make holes in the pods but do not damage cacao beans. The fallen beans should be collected regularly. The damage could be reduced by destroying squirrels nests in coconut palms. The squirrel menace can be prevented if the pods are harvested soon after ripening.

Harvesting

Flowering in cacao depends on the variety and other management practices. Generally, the first harvest could be obtained three years after planting. In about six years, the cacao tree reaches the full bearing stage. From an adult cacao tree 1 kg. of cacao beans could be obtained annually.

Processing

Processed beans fetch a higher price. After harvesting, the pods are split with a club and beans removed. A knife is not recommended for this purpose as it could damage beans. The beans are then put in rattan baskets lined with banana leaves and are allowed to ferment for 2-3 days. Thereafter the beans are washed well with water to remove mucilage. The beans are then sun dried.