

CACAO AS A MIXED CROP WITH COCONUT PLANTATION

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IMPORTANCE

Cacao was first introduced to Sri Lanka by the Dutch, but played an insignificant role in plantation agriculture until the beginning of this century. Since then cacao has been extensively grown in several provinces, but around 1950 both the production and export started to decline. In 1980, only 974 metric tons of processed cocoa was exported as against the figure of 3019 metric tons in 1954. Kandy, Wattegama, Matale and Dumbara Valley were traditional areas for cultivation of cacao, and Kundasale, Pallekelle, Mahaberiya, Wariyapola, Bandarapola and Mariawatta estates had reputations for producing good cocoa. In fact Pallekelle was believed to have the best soil and climate in the world for cacao. However, the present day agricultural and urban development programmes implemented in this area have resulted in a decline in cacao cultivation. The overall effect of such development resulted in low rainfall, long dry periods and a decrease in area under cacao cultivation as well as poor estate management practices (Gnanaratnam, 1981). Plans were therefore made to bring new areas under cacao plantation and as an immediate measure, coconut lands in Sri Lanka are considered to be very suitable for this purpose (Jacob, 1981). Intercropping with cacao (as well as coffee and pepper) would also increase the profits obtained from coconut plantations and aid for this purpose is being provided by the Asian Development Bank.

THE FEASIBILITY OF GROWING CACAO WITH COCONUT

The morphological and cultural practices adopted with the coconut palm make the growth of intercrops in such plantations much easier than in tea or rubber plantations. It was however necessary to first determine the effect of mixed

cropping with cacao on the productivity of coconut and the results of a trial done at CRI are given below.

Crop	No. of Plants /ha	Coconut yield after the establishment of cacao nuts/ha				Increase in coconut productivity %	Cocoa Yield (Dry Beans) kg/ha	
		1YAP*	2YAP*	3YAP*	4YAP*		3YAP*	4YAP*
Coconut alone	158	5765	4129	5050	4299	-	-	-
Coconut + Cacao	158 + 1050	6267	4887	6873	7349	32	104.0	312.0

*YAP = Years after cacao planting

The results indicate that the growth of cacao has led to an increase in yield of coconut. In this connection experiments done at Central Plantation Crops Research Institute in India have shown the same results. Reasons attributed for this effect are improvement of soil fertility by increase in microflora such as *Beijerinckia* and *Aspergillus niger*, addition of organic matter, retention of soil moisture, and the improvement of cultivation practices. Being a shade loving plant cacao benefits from the coconut and this is especially important at the seedling stage of cacao.

Mixed cropping of cacao with coconut has been successful in several areas in South India, and extensive mixed-cropping of these two crops is also practised in Malaysia. In Sri Lanka cacao was cultivated with coconut for the first time in an area of 20 acres in Pallakelle Estate. With growing interest, the JEDB has embarked on an ambitious programme to underplant 500 hectares of coconut in the Mawathagama area and so far about 100 ha have been planted. The first planting of 12 ha carried out in 1978 has commenced to flower (Gnanaratnam, 1981). In addition, by 1980, 250 acres were brought under cacao as a mixed-crop in several small holders' coconut lands in Kurunegala District.

SUBSIDIES

With the aim of expanding cacao cultivation with coconut, a subsidy scheme has been recently introduced. Under this scheme, Rs.2250/= per acre is paid in three instalments of Rs.1050/=, 650/= and 550/= respectively during the first three years. On receiving the application, the Regional Coconut Development Officer of the Coconut Cultivation Board will visit the plantation and if satisfied approve payment of the subsidy. The first instalment will be payable only after the cacao is planted and maintained for a period of time as instructed. There should be a minimum of 250 plants per acre, and survival of 95% of plants and proper maintenance of these are essential to qualify for the second and third instalments. Even if the number of cacao plants as per acre is less than the specified minimum (250 plants), a subsidy could be obtained if there are more than 50 plants on the land. The subsidy also covers small scale cacao cultivators, where Rs.4.20, 2.60 and 2.20 per plant will be paid at the end of the first, second and third years after planting, respectively. This adds to a total of Rs.9.90 as subsidy for every cacao plant grown with coconut.

SELECTION OF SUITABLE COCONUT GROWING AREAS FOR CACAO MIXED-CROPPING

Areas receiving an annual rainfall exceeding 180 cm with a fairly good distribution throughout the year are normally suitable for mixed cropping of cacao and coconut. It follows that the wet and intermediate zones in the coconut triangle are favourable for its cultivation. However, if a prolonged drought period is experienced in the intermediate zone, irrigation would be required during the early stages of cacao cultivation. Despite their inclusion in the coconut triangle some dry regions of the Kurunegala and Puttalam districts are not suitable for cacao.

Cacao plants benefit from deep soil profiles because of the penetrating nature of the root system. Occurrence of a hard pan near the soil surface leads to the death of grown plants during dry weather. Sandy soils with low water retention ability and clayey soil with its hard nature and poor drainage are not suitable for cacao. Deep loamy soil with high organic matter content is the preferred soil for cacao.

SELECTION OF SUITABLE COCONUT LAND FOR CACAO MIXED-CROPPING

In selecting coconut lands for mixed cropping, the following factors should be considered.

(a) AGE OF COCONUT PLANTATION

Due to restriction in light penetration, the best period for intercropping is when the coconut palms are around 25 years age. However, cacao being a shade loving plant it could be mix-cropped with coconut plantations 10-15 years in age. The main requirement is that the palm should be sufficiently tall so that the fronds will not touch the ground. Plantations of 50-60 years age are unsuitable because such plantations should be underplanted.

(b) NUMBER OF PALMS PER ACRE

Normal spacing for coconut practised in Sri Lanka is 8 x 8 m. Here, two rows of cacao plants are recommended between two rows of coconut. Presence of more palms than the number recommended in small holders' coconut land leads to difficulties in establishing methodical cacao cultivation. Under such conditions, planting of cacao at a distance of 2.5 m from coconut palms could be recommended.

(c) LOCATION OF COCONUT LAND

Some lands in the coconut triangle have a sloping nature. Hence, the upper part of the land shows poor water retention which may lead to desiccation of cacao plants. The lower part is also unsuitable if drainage is poor. Hence, it is best to select the intermediate area, where crops like cacao which require few cultural practices would arrest soil erosion in addition to other benefits.

SUITABLE VARIETIES FOR CULTIVATION

The Minor Export Crops Department has introduced a large number of selections and hybrids to Sri Lanka. Cultivars belonging to Crillo are not recommended for coconut growing areas, as those in the Forestaro group are better suited for this purpose. Yield figures in the fourth year of the varietal trial conducted at Walpita Estate, Coconut Research

Institute are given below:

<u>Variety</u>	<u>No. of pod/tree/year</u>	<u>Processed cacao bean yield g/tree/year</u>
ICS-1	6.5	243.4
NA-32	13.1	486.0
Amilanado	6.4	183.0
Millawana	11.6	395.3

(Annual Report - 1982)

It is seen that higher yields are recorded for Millawana and NA-32. Results of another experiment at Walpita Estate indicate that the recently introduced "F - Amerson" in the Nigerian selection group grows even better.

PLANTING MATERIAL

Plants from seeds are better than vegetatively propagated cuttings, and cultivators can obtain the required planting material either from his own cultivation or from a nursery managed or approved by the Minor Export Crops Department. Reference is drawn to the advisory leaflet of MECD on special nursery techniques, which recommends seedlings with 4-5 pairs of leaves for planting in the field.

PREPARATION OF THE FIELD

(a) SPACING

Spacing presently recommended to cultivators by the Coconut Research Institute is two rows of cacao in between two rows of coconut planted at 8m x 8m. Planting is done in a triangular system with 2.5 m distance between rows and 2.5 m between plants within the same row. A similar planting pattern is followed in Malaysia. It is however, maintained by some that a single row between two rows of coconut is best suited for Sri Lanka. The reasons given for this view are that Malaysia has a fertile soil of volcanic origin and experiences a better rainfall pattern than Sri Lanka.

Results of an experiment conducted by Central Plantation Crops Research Institute (CPCRI) in India revealed non-

significant differences in growth and yield of individual plants until the fourth year in a trial which involved 350 plants of cacao in a single row and 650 plants of cacao in double row per hectare. However cacao yield per hectare was higher in double rows than in single row, due to the higher plant density in the double row system. It was shown that it is necessary to conduct more research involving longer periods of time before a more suitable method could be recommended (Nair, 1979). The present recommendation is the triangular system of planting of two cacao rows with the spacing of 2.5 x 2.5 m in between two rows of coconut. Laying of cacao rows in east-west direction enables plants to receive more sunlight.

(b) PITS FOR PLANTING

After the removal of large bushy weeds, pits are dug as required; total eradication of weeds and ploughing is not recommended before planting of cacao. The size of the pit is dependent on the nature of the soil. Pits of size 0.5 x 0.5 x 0.5 m are recommended for hard soil, and 0.3 x 0.3 x 0.3 m for sandy loam.

(c) METHOD OF PLANTING

Planting should be done with the commencement of the monsoon, i.e. April-May or September-October. Experience indicates that the yala season is better because in the coconut growing areas, the dry spell following the yala is shorter than that following the maha season.

Before planting the pits have to be filled with top soil mixed with cowdung, straw and a few coconut husks. It is advisable to add 60 g of rock phosphate at the same time to promote good root growth. Filling the pits only upto a level of 5 cm below the surface retards drying of soil and makes application of fertilizer and weed control easy. During planting it is important to remove the polythene cover and not to damage or bend the tap root.

(d) MULCHING

The newly planted cacao plants should be protected from strong sunlight by setting two coconut fronds in the east-west direction, and the soil should be covered with a suitable mulch. It is beneficial to mulch the soil with coconut

husks until the plants are 3 years old, after which the cacao plant itself covers the ground and the fallen leaves form a natural mulch. Use of coir dust as a soil mulch could be unsuitable because it provides a breeding ground for black beetle.

(e) FILLING THE VACANCIES

It is necessary to maintain extra plants in the nursery to replace those which die during the drought. Filling vacancies must be done at the same season or at the following season, because lack of such a programme will make the cacao plantation uneven.

MAINTENANCE OF CACAO WITH THE COCONUT PLANTATION

(a) PRUNING

Pruning forms part of the proper management of cacao cultivation and leads to higher yield, decrease of damage caused by pests and diseases, and easier management of the coconut plantation. Lower branches (water shoots) should be removed to keep the main trunk at 1.5m, height. The side branches (fan branches) above that height are allowed to grow while all the water shoots above that height are removed.

In addition, it is also necessary to remove branches which are dead or damaged by pests and diseases. Removal of some of the fan branches enables the plant to receive sufficient sunlight, and spreading of fan branches should be allowed only up to 2m from the coconut palm to get sufficient space for fertilizer application and plucking of coconut. Removal of branches which are broken during the plucking of coconut reduces the risk of stem borer damage.

Whenever the main trunk of the plant shows weakening at later stages of the growth, such plants must be cut at a level of 15 cm above the ground level and one water shoot allowed to grow as at the beginning. Large wounds should be covered by application of tar.

(b) WEED CONTROL

Total eradication of weeds is not necessary for cacao which is unlike pineapple in this respect. Removal of bushy weeds in the coconut plantation is advised at the commencement of the cacao planting, and only the area around the cacao plant must be free of weeds. With the onset of rainy season, a circular area of 80-100 cm radius surrounding the cacao plant must be cleaned. After fertilization coconut husks may be used as a soil mulch to give a sufficient soil cover. Grasses growing in the rest of the field have to be slashed at regular intervals depending on their growth rate. At any stage, total cleaning of the weeds in the field is never recommended. After 3-4 years weeds are naturally controlled due to the shading of the field by fan branches and fallen leaves of cacao. This is an added advantage of cacao over pepper and coffee plants.

(c) FERTILIZER APPLICATION

Cacao responds well to fertilizer applications. From a study carried out in Malaysia, it was revealed that cacao under coconut responded well to nitrogen, potassium and calcium but very little to phosphorus. Nitrogen increased the growth rapidly during young stages, but excess application of nitrogen decreased the yield possibly due to mutual shading and to the reduction of the root growth relative to the growth of aerial parts. Increase in potassium application to mature plants increased the yield. Thus fertilizer mixtures should contain a high level of potassium and a moderate amount of nitrogen. Since potassium is the most important nutrient for both cacao and coconut, application of potassium will increase the yield of both crops. Calcium is required to maintain favourable soil pH (Khoo, Chew and Chew, 1978).

Yield data in the fourth year of an experiment conducted by CRI on fertilizer requirement of cacao selections is given below. The fertilizer mixture used here is that recommended by the Dept. of Minor Export Crops.

<u>Quantity of fertilizer mixture</u>	<u>Pod number/tree/year</u>	<u>Bean yield g/tree/year</u>
½ normal	9.1	311.0
Normal	9.6	318.0
1½ normal	9.6	356.0

(Normal means the present fertilizer recommendation of the Dept. of Minor Export Crops.)

(Annual Report - 1982)

Results of the above experiment indicate that the fertilizer application increased the growth rate but did not increase the yield. However this experiment is still in progress and the results are still not conclusive. It is advisable at the present time to use the following fertilizer mixture and the rates as recommended by the Dept. of Minor Export Crops.

<u>Fertilizer Mixture</u>	<u>Parts by weight</u>
Urea (46% N)	4
Rock phosphate (28% P ₂ O ₅)	5
Muriate of potash (60% KCl)	3
Kieserite (24% MgO)	1

RATES OF FERTILIZER APPLICATION

<u>First year</u>	<u>Mixture g/plant</u>
Yala (twice in monsoon)	63 each
Maha (twice in monsoon)	63 each
<u>Second year</u>	
Yala	250
Maha	250
<u>Third year onwards</u>	
Yala	350
Maha	350

In the first year, the recommended amounts of fertilizer may be applied in four split doses spread during the two monsoons, and from the second year onwards it could be applied in two split doses at the onset of each monsoon. If possible, the amount recommended for the second year could be applied in 3 split doses, 2 in yala and one in maha season.

It is important that fertilizer be applied on wet days only, because the young cacao plants are highly susceptible to fertilizer scorch and wilt which may even lead to death of plants. Incorporation of fertilizer into soil is done around the plant at a distance of 15 cm in the first year and from second year onwards it is done in an area in between 30 cm from the trunk and half of the canopy radius. Before addition of fertilizer to mature plants, fallen leaves have to be removed, as available experimental evidence shows that this practice decreases the nitrogen losses. Soil covers are necessary after fertilization to protect the plants during the subsequent dry period.

The recommendations for cacao manuring given above are in addition to those for coconut palms. Coconut should be fertilized regularly as per CRI recommendations. (CRI leaflet No. 8.)

PESTS AND DISEASES OF CACAO

Among the several recorded diseases of cacao, three are of considerable importance when grown in association with coconut.

1. "POD ROT" OR "BLACK POD" DISEASE

Pod rot or Black pod disease is caused by fungi belonging to the genus *Phytophthora*, and of these *P. palmivora* is the most important species. Symptoms include appearance of black patches at the lower part of the pod which will then spread over the entire surface and cause rotting. Heavy losses are encountered in shaded cultivations during the rainy season. Special emphasis has to be given to this disease when cacao is intercropped with coconut because this pathogen is common to both plants. Damage caused by the capsid bug (*Heliopentis ceylanicus*) and by mechanical means facilitates the primary fungal infection.

Control of capsid bug, removal of affected pods and better aeration are useful measures to prevent the disease.

Bordeaux mixture is a good means of chemical control, and half a litre is sufficient for a fully grown plant. The amount of spraying mixture per hectare or plant will depend on the size of the plants and the kind of equipment. (For details see MECD Leaflet No. 3). The same fungus causes canker disease of the stem, when the diseased stems should be removed followed by the application of Bordeaux mixture on the wound.

2. SWOLLEN SHOOT VIRUS DISEASE

This disease which caused a high reduction in yield, is caused by a virus and is presently prevalent in Katugastota and Kundasale areas. Symptoms are swelling of tender shoots and interveinal chlorosis of leaves. So far the disease is not reported from coconut cultivation areas but it is advisable to take precautions when extensive cacao cultivation starts in the future in these areas. As a first step it is advisable to avoid obtaining planting material from areas where the disease has been reported to occur.

3. CHERELLE WILT

Losses of small sized, immature pods are the main symptom of this disease and ten fold increase in cocoa yield could be achieved if cherelle wilt could be successfully controlled (Thorold, 1975). Cherelle wilt differs from fruit shedding in other perennial crops in that it continues in spite of drastic fruit thinning. The causes of cherelle wilt may be pollination and fertilization failures or nutrition and physiological disorders. At the moment, there are no control measures.

In addition to these three diseases other potential diseases are vascular streak dieback and fungal attacks on leaves and stems.

PESTS

1. CAPSID BUG (*HELEOPENTHIS CEYLANICUS*)

The capsid bug is a mosquito like insect which sucks juices from pods making small black spots on them. When immature pods are attacked, bean production is reduced and become vulnerable to pod rot. Sucking of juices from tender shoots causes wilting. Sometimes this pest is responsible for 70% loss in yield.

Systemic insecticides with high toxicity are not suitable because they may be detrimental to insects helpful in pollination. Therefore, 5% B.H.C. powder is recommended. Application has to be done in the early morning before evaporation of dew. Application during the dry season when the pest population is minimal checks the population increase during the rainy season. Exposure of pods to sunlight also helps in controlling the pest.

2. STEM BORERS (*BUZURA SPP.*)

Stem borers cause breaking and death of branches. Attack starts on the drying branches during dry seasons and then spreads into healthy ones. Chemical control is somewhat difficult. The recommendation is application of kerosene oil into the boreholes made by the pest and killing the larve on their emergence.

3. COCKCHAFER BEETLE

Cockchafer beetle is frequently encountered in cacao plantation in the coconut triangle. The pest is more active during night than day and attacks leaf buds and young leaves leaving their veins intact thus giving a reticulate appearance to the mature leaves. The damage does not generally spread beyond limited patches. Application of systemic insecticides on leaves and nearby soil twice at 14 day intervals is a proven control measure. This pest is attracted towards light and in instances when the damage is severe the pest could be trapped by burning a few coconut fronds in the night.

4. MEALY BUG AND SCALE INSECTS

Mealy bug and scale insects suck the sap and also help to spread the swollen shoot virus disease. Hence the control of the pest is of great importance; BHC powder could be used in the control.

5. DAMAGE CAUSED BY SQUIRRELS AND RATS

Squirrels and rats eat the mature pods making large holes. Since the coconut palm offers a good shelter for squirrels, the damage to cacao could be very high. To check the damage it is necessary to either destroy the squirrel nests or kill the squirrels. There is a belief that tying of pieces of cloth dipped in a mixture of resin and coconut oil around the tree trunk reduces the approach of squirrels and rats.

HARVESTING

Time of flowering is dependent on the variety and the standard of cultivation. Experimental cacao plantations at CRI started to flower within 3 years and gave substantial yields by the fifth year. Production of one kilogramme of processed cocoa from a mature tree per year in a coconut plantation could be considered as a satisfactory yield (Jacob, 1981). However, under, good management conditions a yield of about 3-4 kg per year can be obtained from a mature tree. In Malaysia an average yield of over 1000 kg/ha has become more or less the norm for cacao under coconut.

PROCESSING OF COCOA

The method of processing is important to secure a high price in the market. Well ripened pods are plucked and split using a heavy club to obtain the beans. The Dept. of Minor Export Crops has introduced several methods of processing suitable for small holders (see MECD advisory leaflets). Beans obtained from the pods are placed in cane baskets lined with banana leaves and allowed to ferment for 3-4 days. Before the development of black fungus on the beans they are washed with water and then sun dried. However, the Dept. of Minor Export Crops proposes to set up central fermentaries to obtain cocoa of better quality.

MARKETING

A good system of marketing is important to the producer as well as to the buyer. At the present time local marketing facilities for cocoa are available in the Central Province (Kandy, Wategama, Matale etc.) which is the traditional cacao growing area in Sri Lanka. There are no proper marketing facilities in the coconut triangle because cacao is a relatively new crop in this area. The progress of the subsidy scheme of cacao growing with coconut made so far has been very much below expectation, probably due to the above reason. According to the present situation the cocoa producers outside the traditional areas will have to take their produce to the traders in the Central Province or Colombo. Consequently the profits from cocoa are very low, but development of marketing facilities for cocoa produced in the coconut triangle will enhance its development and expansion. Another possibility will be the organization of grass roots level producer associations in order to increase the bargaining power and thereby provide a better farm-gate price.

CACAO AS A CROP IN MIXED-CROPPING MODELS

Cacao plantation is economically viable only after 5 - 6 years. A substantial amount of money has to be spent at the beginning and for maintenance during the first two years. Gradually the expenditure decreases while income increases. This may be contrasted with the high expenditure and high income from semi-perennial crops like passion fruit within a very short period.

Due to these reasons many coconut planters are not interested in growing cacao as a mixed crop. As a remedy, one can utilize annual crops like chillies, gingelly and cowpea in combination with cacao in the initial stages. When selecting such a system, it is best to consider both agronomic and economic factors.

Other minor export crops like coffee and pepper could also be used as mixed crops. Experimental trials on several such mixed-cropping models are being conducted at the CRI. Layout of one such experiment is given below.

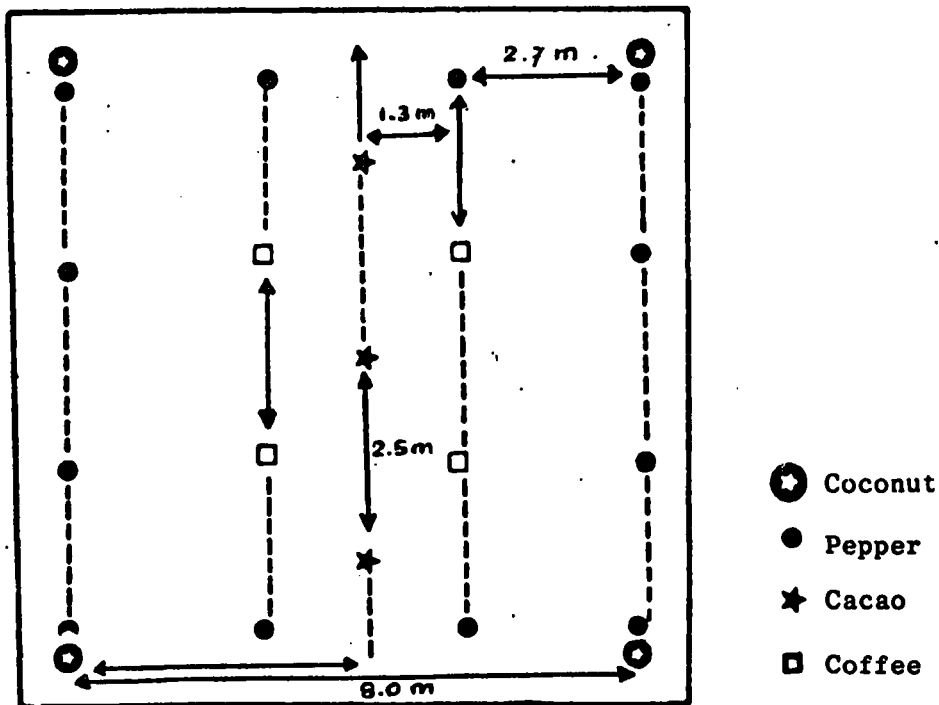


Fig. 1 - A perennial Mixed Cropping Model with Coconut.

The plan consists of three, four and five plants of cacao, coffee and pepper respectively within a coconut square which amounts to 580 plants of cacao, 640 plants of coffee and 795 plants of pepper per hectare. Some cacao plants flowered within first two years and 60% of trees had pods after four years. Pepper on gliricidia gave a higher yield than those trained onto coconut palms. The yield of coffee was reduced in the fourth year due to their close proximity to cacao trees. Hence, a dwarf variety of coffee like San Ramon would be more suitable for this model. Yield of cacao coffee, and pepper in the fourth year were 142, 12 and 475 kg/ha, respectively. However, there was no difference in nut yields of coconut palms of this model when compared to others in the same estate (CRI Annual Report - 1982).

The Department of Minor Export Crops had introduced several mixed-cropping models of coffee, cacao, pepper and several fruit plants with coconut. These models seem to be well adapted to coconut small holders. When selecting the suitable crops for such mixed cropping, feasibility studies should consider factors such as consent and capability of the owner, extent of the land, and average means of mainte-

nance of the coconut plantation.

IMPROVEMENT OF MIXED CROPPING OF CACAO WITH COCONUT

The Coconut Research Institute started its research on cacao as a mixed crop with coconut in 1975. Malaysia has pioneered research in this aspect and has gained more experience. Since both coconut and cacao are perennial crops, recommendations could only be given after a long period of experimentation. A large number of varieties and selections of cacao have been introduced to Sri Lanka by the Minor Export Crops Research Institute in Matale, but very little varietal evaluations have been conducted as a mixed crop in coconut. Factors such as shade tolerance, competition with coconut, and resistance to diseases and pests are important in such evaluations. More research is necessary on spacing, planting patterns, nutrient requirements, method of pruning and other suitable intercrops and cropping models before cacao is grown with coconut as a mixed crop.

BUDGET (FOR A COCONUT HECTARE)

The expense-income budget for the first five years after planting cacao as a mixed crop in a 35 year old coconut plantation at CRI is given below. The figures are arrived at on the basis of present labour and material costs and the current price for cocoa.

It should be noted that transport cost and government subsidy are not included in the budget. The data show that cacao as an intercrop yielded profit from the fifth year of planting.

	1st Year	2nd Year	3rd Year	4th Year	5th Year
A) Labour (lab. units)					
Peg marking	4	-	-	-	-
Pit preparation	35	-	-	-	-
Planting	10	-	-	-	-
Temporary shading	10	-	-	-	-
Filling vacancies	3	1	-	-	-
Mulching	8	8	10	-	-
Watering	25	15	10	-	-
Pruning	4	8	8	6	10
Spraying	4	2	2	2	2
Weeding	35	35	20	15	15
Fertilizing	8	10	10	10	10
Harvesting	-	-	2	10	10
Processing	-	-	3	5	10
Total lab. units	146	79	65	48	63
Total lab cost (Ps.)	3650.00	1975.00	1625.00	1200.00	1575.00
B) Material Cost (Rs.)					
Cacao seedlings	1050.00	100.00	-	-	-
Cattle manure	300.00	100.00	-	-	-
Inorganic fertilizers (subsidised)	460.00	915.00	1375.00	1375.00	1375.00
Insecticides	200.00	300.00	300.00	350.00	350.00
Fuel (for watering)	300.00	250.00	250.00	-	-
Total material cost	2310.00	1665.00	1925.00	1725.00	1725.00
C) Yield (kg/coconut/ha)	-	-	65.00	227.50	525.00
D) Annual Income (Rs.) (Rs.50/= per lkg of cocoa beans)	-	-	3250.00	11375.00	26250.00
Cumulative income (Rs.)	-	-	3250.00	14625.00	40875.00
E) Annual total expenditure (Rs.)	5960.00	3640.00	3550.00	2925.00	3300.00
Cumulative expenditure (Rs.)	5960.00	9600.00	13150.00	16075.00	19375.00
F) Margin (Rs.)	-5960.00	-9600.00	-9900.00	-1450.00	+6875.00

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