GROWING BANANA AS AN INTERCROP UNDER COCONUT

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Introduction

In intercropping, growing banana under coconut is one of the most popular farming practice among growers, as described in the diagnostic survey report of the CRI 1993. Banana is grown mostly in the wet and the intermediate zones, and reasons attributed to its popularity being the free availability of the planting material, its quick growth and ready markets.

Effects on the Coconut Yield

The ten year trials conducted by the Coconut Research Institute on the effect of banana growth on coconut yields affirmed a 20% increase, confirming the results obtained in similar adaptive trials conducted in the intermediate and the dry zones. The beneficial effects being the increase in soil moisture holding capacity, increase in soil fertility, good management and the reduction in soil erosion.

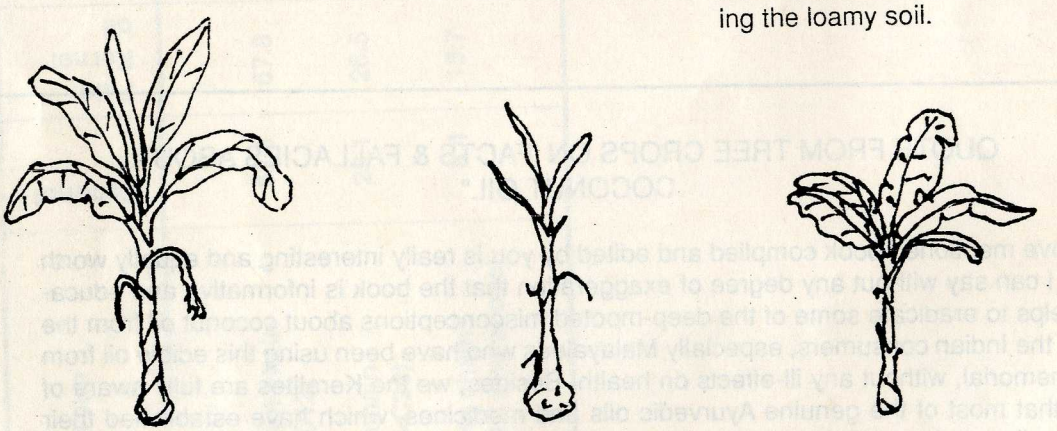
Selection of Suitable Lands

a. Age of the coconut stand: In normal plantings (26' X 26'), the suitable age of the coconut stand should be up to 05 and above 30 years.

b. Sloping lands: Upper portion of the slope is not suitable as banana will be subjected to moistures stress during dry periods. Also lands subjected to water logging are unsuitable. If planting is contemplated in such lands proper drains will have to be opened and banana should be planted on bunds.

c. Lands where the coconut production exceeds 5000 nuts per acre per year too are unsuitable as banana plants will be deprived of sufficient sunlight.

d. Very sandy and hard gravelly soils are also unsuitable. The most suitable being the loamy soil.



"Kanya" Suckers

"Kadupath" Suckers

"Diya" Suckers

Fig. 1 - Different types of Suckers

Suitable Varieties

Coconut lands in the wet zone are suitable for planting Ambul, Ambun and Anamalu varieties, while for the dry zone soils Kolikuttu is recommended. Ash Plantains, Mondam, and Atemaru are popular for cooking purposes and out of these only Ash Plantain is not recommended for the wet zone.

Suitable Planting Material

Of the three types, Kadupath, Kanya and Diya,'Kadupath' suckers are most suitable. Although 'Kanya' is somewhat suitable type 'Diya' is not recommended (Fig. 1).

Planting Systems

1. **Mature coconut lands (palms over 25 yrs)**

In Sri Lanka most coconut plantings are at 8.5 m X 8.5 m (26' X 26') distances. The growth in 'Ambul' is more vigorous than in 'Kolikuttu'. In consideration of the above it is recommended to plant two rows of 'Kolikuttu' in one row of coconut, and only one row of 'Ambul' in one row of coconut (Fig. 2)

Where coconut has been planted at distances below 8.5m X 8.5 m between two palms, if sunlight is limiting and to obviate damages while picking coconuts and due to other management difficulties in Estates, it is recommended that planting banana of all types be limited to one row method as shown in Fig. 2

2. **New/Re- plantings (up to 5 years)**

The method detailed out in Fig.2 (a) can be adopted but the avenue planting system detailed out in Fig. 3 is the most suitable, where more number of banana plants could be accommodated although the period unsuitable for intercropping under coconut ranges between 5-24 years. In the avenue system banana or any other suitable intercrop could be successfully planted (Fig 3).

Depending upon the growth of coconut seedlings, banana plants in close proximity may be removed if necessary at a later stage.

Planting

Planting holes of size 0.6m X 0.6m X 0.6m (2'X2'X2') will be sufficient. The holes should be filled with a mixture of top soil and organic manure before planting the suckers. In addition 500g of saphosphospate and 1kg of dolomite should also be incorporated into the soil.

Usually lopping of the banana leaves is done prior to planting. However it is not advisable at all to cut off the trunk before planting.

Fertilizer Application

Application of fertilizer is important for healthy growth of banana. The following fertilizer mixture recommended by the Department of Agriculture should be applied after two months from planting and afterwards at four monthly intervals, per clump (see the table).

Fig.2

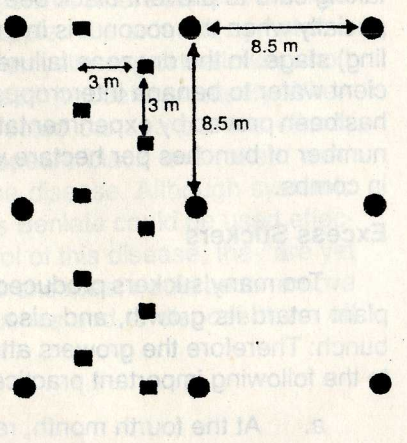


Fig. 2 (A) For Kolikuttu, Mondom and Ash plantains.

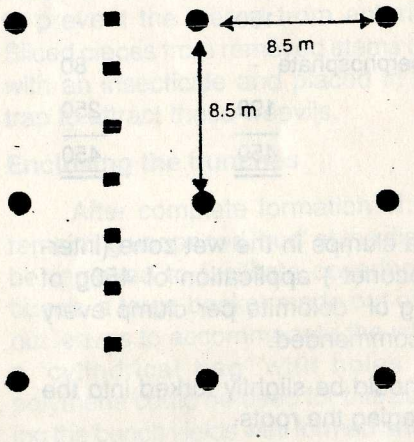


Fig. 2 (B) For Ambul types.

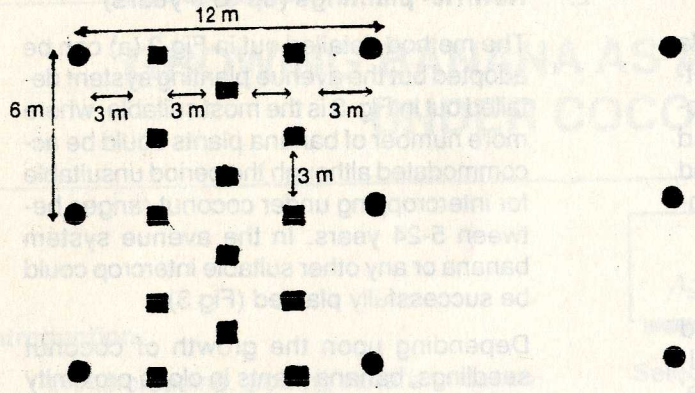


Fig.3 Coconut and Banana in the avenue system

Table

	Wet Zone (g)	Intermediate & Dry Zones (g)
Urea	110	120
Rockphosphate	150	-
Concentrated Superphosphate	-	80
Muriate of Potash	190	250
Total	450	450

For banana clumps in the wet zone (intercropped with coconut) application of 450g of Keiserite or 600g of dolomite per clump every six months is recommended.

Fertilizer should be slightly forked into the soil without damaging the roots.

Water Supply

Banana grows vigorously if watered during the dry months. Moisture requirements for this crop in the wet zone is minimal. In the intermediate zone when water becomes scarce it is advisable to use a mulching material such as fibre dust, taking care to prevent black beetle breeding especially when the coconut is in the young (seedling) stage. In the dry zone failure to supply sufficient water to banana intercropped with coconut has been proved by experimentation to yield less number of bunches per hectare with fewer fruits in combs.

Excess Suckers

Too many suckers produced by the banana plant retard its growth, and also the size of the bunch: Therefore the growers attention is drawn to the following important practices.

a. At the fourth month, remove all suckers leaving only one healthy sucker.

b. At the time of flowering, allow another sucker to develop

c. When the bunch is mature and is ready for harvesting allow another additional sucker to develop.

d. Afterwards off the first sucker, retain at the rate of one sucker between the period of flowering and harvesting etc.

To avoid injury to the main corm during removal of excess suckers, always use an iron lance with a sharp blade.

Weed Control

Weed growth is less in well managed coconut lands intercropped with banana, and slashing the weeds will be sufficient. In addition the application of the weedicide 'Paraquat' may be employed taking care that this, weedicide does not get into the developing suckers. Mulching banana bases with coconut fronds, dry banana leaves, prevents weed growth.

Pests and Diseases

Diseases

1. **Bunchy Top Disease**

This is caused by a virus. The best remedy would be to prevent the disease. All affected banana bushes should be uprooted and destroyed.

2. **Panama Disease**

It has been observed that this disease is fast spreading in coconut estates in the Wet Intermediate zone (eg. Nattandiya, Dankotuwa). Kolikuttu being the most susceptible. This is especially shown in systems where banana is mixed cropped with pineapple. The external symptoms of this disease are fast yellowing of the lower whorl and drying of the bunch just before maturity. When the stem of an affected banana plant is sliced, the mid portion appears black and rotten, confirming the panama disease. Although systemic fungicides such as Benlate could be used effectively for the control of this disease, they are yet expensive, and the cheapest would be to remove all the affected bushes and to dispose them off the farm.

As a measure to minimize the spread of the panama disease, the use of fibre dust has to be limited. The basal portion of the corm should not be covered with fibre dust, and also the application of fertilizer components with a high content of nitrogen such as urea should be lowered to the recommended level.

Knives and implements used to cut the diseased plants should never be used instantly to harvest bunches or to lop leaves in healthy plants as this would act as a mode of 'disease carrier' from the affected to the healthy plants. It is also equally important to identify the diseased plants.

3. **Anthraxnose Disease**

The symptoms of this disease are the drying of young bunches, partially drying of the combs thus reducing the fruit numbers, ash plantains being the most susceptible.

If the disease prevails incessantly a suitable fungicide should be applied at the early bearing stage.

Pests

Banana Weevil

This is a black weevil about 2.0 cm long which burrows into the stem causing retardation and at times breaking the stem. In order to prevent the ravages of this pest especially at the bearing stage, application of a match box full of Carbofuran granules to the soil around the clump is popular among growers. Taking into consideration the toxicity of the agrochemicals and dangers encountered in handling, it is recommended to immerse the young banana plant (sucker) in a suitable insecticide solution before field planting, to prevent the weevil from entering the stem. Sliced pieces from removed stems can be treated with an insecticide and placed in the field as a trap to attract these weevils.

Enclosing the bunches

After complete formation of the fruits, the remaining unopened 'bud' at the distal end should be removed to facilitate covering of the entire bunch, a large basket made out of plaited coconut leaves to accommodate the whole bunch, or a 'cylindrical bag' with holes made out of polythene could be used for this purpose. Covering the bunch yields well formed and healthy fruits,

and if the date is marked, the harvesting could be done in time. Trials conducted have shown that covering the bunches with baskets made of coconut leaves are more advantageous and cooling as against ploythene bags.

Bearing and Harvesting

Generally banana commences flowering 7-8 months after planting. The period taken for maturity depends on the type of banana. For example Ambul takes 13 weeks for maturity while in Kolikuttu the period extends upto 16 weeks. Accordingly it will be possible to harvest banana in the first year after planting. In these types Ambul and Kolikuttu, the fruit changes from green to light green while reaching maturity. It is advisable to cover the harvested bunches using banana leaves to avoid damage during transport.

The Harvest

In Banana, the period taken for flowering, and subsequently for yield depend mainly on the agroclimatic zone. Trials conducted by us have indicated 80% success in the first year in banana grown in the wet zone whereas the percentage dropped to 65 and 33 respectively in the intermediate and the dry zones.

It was further recorded that Kolikuttu grown in the wet zone without water supply yielded 115 fruits in a bunch, whereas this number dropped to 80 and to 45 respectively in the intermediate and the dry zone.

Therefore, a supplementary irrigation system is required for Kolikuttu in the dry zone

A banana stand could be maintained satisfactorily for a period of 4-5 years, and is not advisable to continue further. All new stands should be planted with new planting materials.

Mixed Cropping

It is easy to plant banana mixed with other intercrops. Mostly banana is grown in this manner. The reasons being:

a. Banana grows well when mixed cropped (eg. Banana and Pineapple as against monoculture).

b. Growers receive quick returns by intercropping banana with perennials (eg. Pepper) as income from banana could be obtained within a year.

c. Returns from banana is spread throughout the year.

d. Availability of shade where necessary (eg. ginger)

e. Easy management

f. Easy to gain knowledge and experience when compared to other intercrops.

g. Grows satisfactorily on various soil types.

h. Easily marketable.

A number of planting models have been introduced when banana has to be mixed cropped with others. Some of these models are explained below:

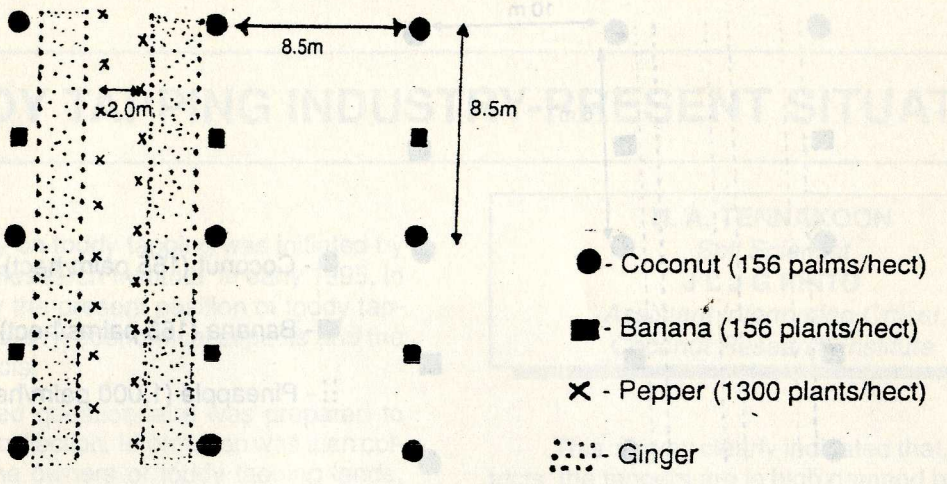
Model 1: Banana grows well within tall coconut stands. Pepper, Coffee and Cocoa also ideally suit this model. Banana is easy to plant with short term crops such as ginger and tumeric.

Model 2: When banana is mixcropped with pineapple, such lands appear unsystematic, as banana is generallyplanted unsystematically. Excessive shade promotes incidence of pests and diseases. If advice as explained above, is carefully followed much damage from pests and diseases could be avoided. Income from banana spreads throughout the year, and is advantages to farmers.

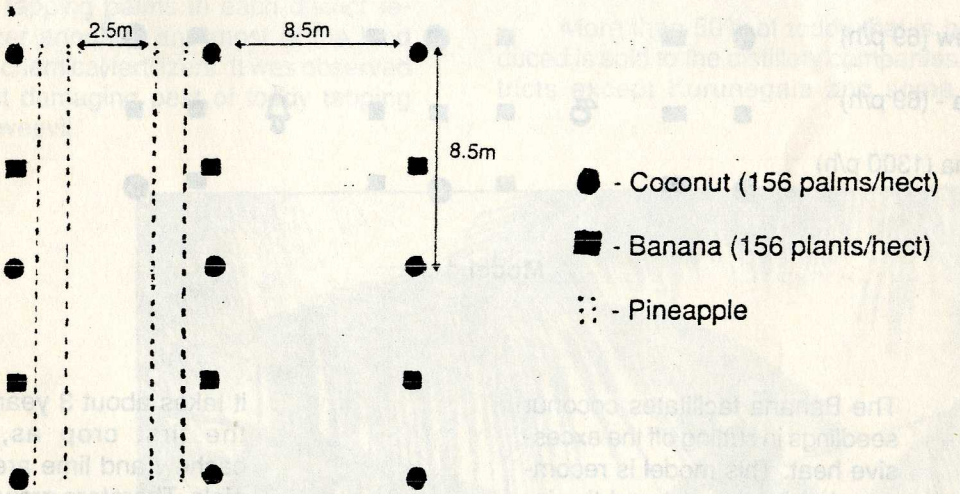
The space available between rows of pineapple could be utilized to grow ginger or 'kiriala' or vegetable during the first year.

Model 3: Coconut (seedlings/ha)
Banana (plants/ha)
Pineapple (suckers/ha)

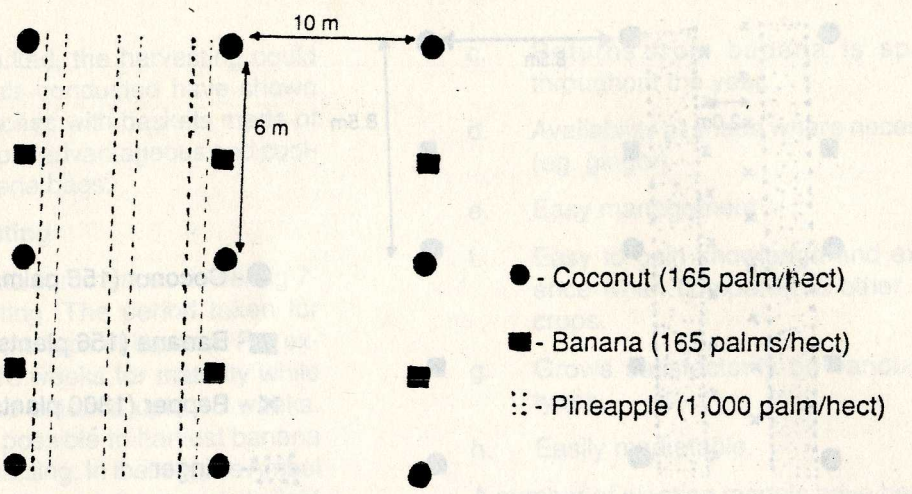
This is suitable for adoption in the coconut avenue planting system, as more pineapple could be accommodated under this system.



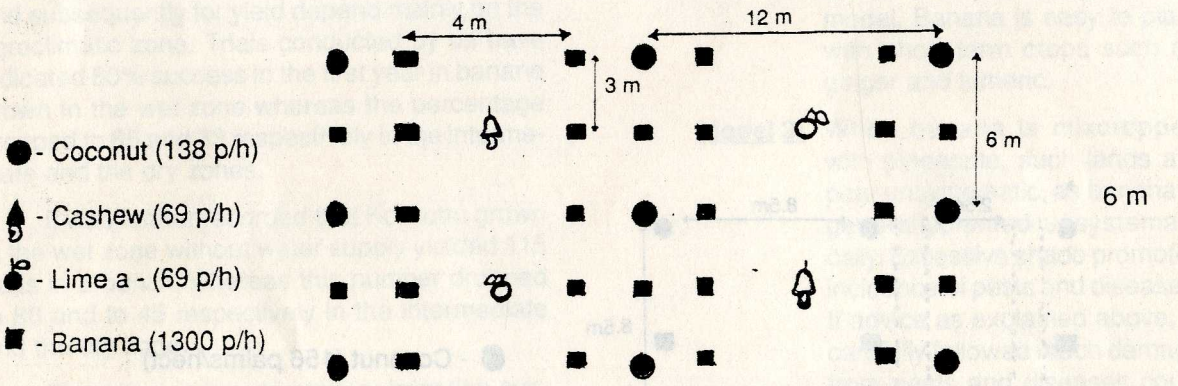
Model 1



Model 2



Model 3



Model 4

The Banana facilitates coconut seedlings in cutting off the excessive heat. This model is recommended for the wet and the intermediate zones.

Model 4: Coconut (seedlings/ha)
Cashew (seedlings/ha)
Lime (seedlings/ha)
Banana (plants/ha)

The above model is more suitable for the intermediate zone as it takes about 3 years to obtain the first crop as, coconut, cashew and lime are all perennials. Therefore growing banana in such lands become beneficial with the growth of the cashew stand, after 2-3 years. The number of banana plants has to be reduced systematically and the available land area should be utilized for planting suitable short term crops.