

## Multi species Cropping System in Coconut Garden

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**Abstract :** Field experiment was conducted in Coconut Research Station, Veppankulam from 1994 to 2003 with the objective of developing a suitable multispecies cropping system in adult coconut garden with age of 25 years old. The results revealed that coconut yield increased year after year by intercropping. Based on the coconut yield, net income and B : C ratio, coconut + banana + Sirukizhangu (*Coleus parviflorus*) + Bhendi combination was found to be the best. This model registered the highest mean net income (Rs. 54,000/ha) and B:C ratio (2.77).

**Key words :** Coconut, cropping system, nut yield

### Introduction

In coconut grove with age of 25 years old, planted with spacing of 7.5 x 7.5 m, over 75% of the land is not effectively utilized. The light transmission in coconut plantations is generally over 40% (Bavappa, 1990). These two factors focused to understand mixed cropping in coconut with a variety of annual and perennial crops. Coconut provides opportunities to grow a wide range of crops in the inter space for maximizing productivity per unit area of land per unit time (Nair and Gopalsundaram, 1990). Hence, the crops will have to be selected carefully so that farmers can derive the maximum advantage with lower inputs. With the objective of developing a suitable multi storied cropping system in adult coconut garden, a field experiment was conducted during 1994-1998 at Coconut Research Station, Veppankulam, Tamil Nadu.

### Materials and methods

The field experiment in sandy loam soil was conducted during 1994-2003 at Coconut Research Station, Veppankulam. The treatments consisted of three models and a control plot. Each of the models and control plot had 40 adult East Coast Tall (ECT) palms. The palms were planted in square system

with 7.5 x 7.5 m spacing and the age of the palm was 25 years old. The whole system was irrigated based on soil field capacity and manurial schedules were followed separately for main crop and other component crops.

### Treatments

- Model I : coconut (175 palms/ha) - sole crop (control)
- Model II : coconut + nut meg (175 plants/ha) + banana (720 plants/ha) + annual moringa (350 plants/ha) + elephant foot yam (700 plants/ha) + bitter gourd (350 plants/ha)
- Model III : coconut + clove (350 plants/ha) + betel vine (175 plants/ha) + banana (350 plants/ha) + currey leaf (700 plants/ha) + colocasia (6000 plants/ha)
- Model IV : coconut + mango (175 trees/ha) + pepper 175 Nos./ha) + banana (350 plants/ha) + annual moringa (175 plants/ha) + sirukizhangu (*Coleus parviflorus*) (3500 plants/ha) + bhendi (20 cents).

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**Table 1.** Yield of component crops and economics of mixed cropping system in coconut garden

Model No and intercrops	Gross income (Rs./ha)	Cost of cultivation (Rs./ha)	Net income (Rs./ha)	B : C ratio
<b>Model I</b>	53,970	24,700	29,270	2.19
<b>Model II</b>				
a. Nut meg				
b. Banana				
c. Seedless lime	78,650	30,010	48,640	2.62
d. Elephant foot yam				
e. Bitter gourd				
<b>Model III</b>				
a. Clove				
b. Betelvine	79,199	29,372	49,827	2.70
c. Banana				
d. Curry leaf				
e. Colacasia				
<b>Model IV</b>				
a. Mango				
b. Pepper				
c. Banana	84,502	30,502	54,000	2.77
d. Seedless lime				
e. Sirukizhangu				
f. Bhendi				

## Results and Discussion

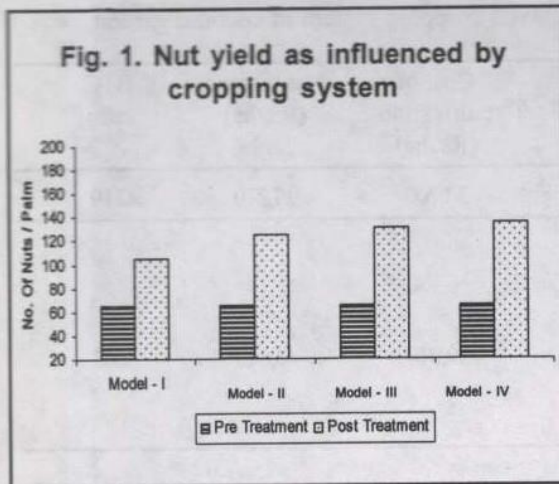
### Nut yield / palm

The results (Fig. 1) revealed that nut yield of coconut in all the 3 mixed cropping models was found to be higher than sole crop. The nut yield increment was ranging from 19.8% to 30% due to mixed cropping system compared to coconut mono cropping. The nut yield increment in mixed cropping system might be attributed to influence of micro climate, less fluctuation of day and night soil temperature, litter falls and increased microbial activity in soil apart from additional irrigation to other crops in various models. Among the three models, made IV registered highest nut yield.

### Yield of component crops (Table 1.)

Though adequate care was taken to establish all the crops planted in various models, some of the crops were not coming up well due to the shade effect, low interception of sunlight and hot temperature during summer months.

In model II, Banana (Poovan) and Elephant Foot yam were coming up well in coconut. The nut meg established well in coconut but the growth was not appreciable. The vegetable crop of bitter gourd in the model established in the initial stage but restricted spreading, flowering and fruiting. The crop was sown just one metre away from the bole in the North Eastern direction and in this region



there was shade in major time of the day and this ultimately resulted in poor yield of bitter gourd.

In model III, the crop like banana (Poovan), curry leaf and colocasia grow well in coconut. The clove established but attained limited growth. The betelvine did not establish, though it was tried thrice with heavy soil in the planting pit with rooted cuttings.

In model IV mango, banana (poovan), Bhendi and Sirukizhangu established well and the economic yield was also obtained in banana and bhendi. The rooted cutting of pepper was restricted in growth due to the temperature prevailing at this region.

In all the intercropped models (II, III and IV) some of the crops did not give economic yield since the crop not attained bearing stage. Betelvine and pepper did not establish though it was tried many times.

Raising banana, *C. perviflora* and bhendi (model IV) gave the maximum mean net income of Rs.54,000/- with B:C ratio of 2.77. It was followed by model III (Banana + curry leaf + colocasia) with net income and B : C ratio of Rs.49, 827/ha and 2.70 respectively. The coconut mono-cropping realized the net income of Rs.29,270/ha and B:C raio of 2.19.

From the results of the experiment it may be concluded that the coconut yield increased with intercropping due its companion effect such as micro climate, less soil temperature, litter falls and frequent irrigation. Based on the economics, coconut + banana (Poovan) + *C. parviflorus* (Sirukizhangu) + bhendi were found to be the best multiple cropping system for adult coconut grove of the East coast region.

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