GROWING FOOD CROPS UNDER COCONUTS

By H. Gallasch, Formerly, Agronomist
Lowlands Agricultural Experiment Station, Keravat

INTRODUCTION

In some parts of Papua New Guinea, more of the traditional garden land around the village is being planted to coconuts every year. Food crops are no longer grown on this land.

Where there is a shortage of good garden land, or where there are a lot of people, such as on the Gazelle Peninsula of New Britain and on some of the off-shore islands, the people now do not have enough land to plant good gardens. In other places, people may have to walk many kilometres through their coconut plantations before they reach their new food gardens.

Because of this, the cash income from the coconuts has to be used to buy food. Unfortunately the food which is bought may be of lower nutritional value than that which would normally be grown in the village gardens.

GROWING FOOD CROPS

During 1969, an experiment was started at the Lowlands Agricultural Experiment Station, Keravat in which a number of food crops were planted between coconut seedlings. This was done to find out which crops could be grown with coconuts and if they affected the growth and yield of the coconuts.

In the first year, crops of sweet potatoes, maize, taro and peanuts were planted in separate blocks amongst the young coconut seedlings. In one block, the grass was allowed to grow as in village coconut plantings and in another block, a *Pueraria* cover crop was sown.

The yields of the crops were fairly normal for poor garden land. However, when the same crops were replanted, yields were much lower. This can be seen in Table 1. The lower yields were due to a decrease in the soil fertility and to an increase in the number of pests and diseases attacking the crops.

In the following years, Singapore taro *(Xanthosoma)* replaced taro 'tru' and the crops were moved around the blocks of coconuts. This helped to keep yields from dropping too far, as shown in Table 1.

By the fourth year of intercropping there was a lot of shade from the coconut palms and the maize, peanuts and sweet potato did not yield well. The following year, pineapples, bananas and ginger were planted instead. These new crops grow well in shady conditions and, because they take several years to grow, the land does not have to be cultivated each year.

This article was first published as L.A.E.S. Information Bulletin No. 12.

TABLE I. YIELDS OF SOME CROPS GROWN UNDER COCONUTS AT L.A.E.S., KERAVAT

Crop	Block No.	Planting date	Yield t/ha	Value K/ha
Sweet potato	3	25. 3.70	6.63	530
		26. 8.70	4.29	340
		11. 1.71	0.82	70
	6	13.10.71	12.71	1020
		12. 2.72	5.61	450
		10. 8.72	3.80	300
Maize	4	21.10.70	1.69	340
		1. 3.71	0.82	160
		10. 5.71	none	none
	6	16. 3.73	0.49	100
Taro	5	21. 4.70	1.59	480
		31.12.70	none	none
Singapore taro	4	27.10.71	10.75	860
		1.12.72	8.82	710
		15. 1.74	9.48	760
		27. 3.73	8.80	700
Peanuts	6	6. 4.70	1.93	1160
		2. 9.70	0.65	390
		1. 3.71	none	none
	5	21. 9.71	0.52	310
		10. 1.72	none	none
		18. 8.72	0.59	350
		18.12.72	0.28	170
Ginger	5	31. 8.73	9.98	600
	3	3.10.74	22.16	1330
		19. 9.75	23.18	1390
Pineapples*	5	25. 8.74	16.51	3050
Banana*	6	31. 4.74	9.91	1090

** Yield given to 31.12.76*

Bananas and taro growing under coconuts.

This is an advantage as regular cultivation for short term crops will damage the roots of the coconut palms. Some bananas like full sunlight so a relatively shade tolerant variety known as 'Yava' was chosen for planting under the coconuts.

Pineapples and ginger both yield very well under the coconut shade. The average weight of the pineapples was over 1.1 kg each. The yields may in fact, be better than the yields of the crop when grown in full sunlight. In addition the coconut shade reduced the grass growth around the crops which then needed less weeding.

However, the yield of bananas when grown under the coconuts was lower than the yield when grown in full sunlight. The bunch weight was also about 2 kg per bunch less.

The result of this experiment clearly show that many food crops can be grown under coconuts. To gain the best results, short term crops should be rotated and, when there is a lot of shade, only shade tolerant crops should be grown. If the food is not all required in the village it can be sold at the market. The average value of the crop produce obtained from under coconuts at Keravat was K600 per hectare every year.

EFFECT ON COCONUTS

Many trials and experiments in Papua New Guinea have shown that coconut seedlings grow more rapidly, come into bearing earlier and yield many more nuts if they are well looked after. The most important thing is to remove or control all grass growing under the palms in the area where the coconut roots are feeding.

Food crops growing in a well maintained garden under the coconuts do not take as much nutrient out of the soil as grass does. This means that more nutrient is available for the palms.

Pineapples and bananas growing under coconuts.

When food gardens are well maintained under the coconuts, there is less grass to remove nutrients which the palms need from the soil although the food crops themselves take some.

At first the palms in the blocks with food crops grew a little better than those with regularly cut grass. Later, yield records showed no difference in copra yields between various food cropping treatments and the uncropped block of coconuts. This shows that intercropping did not have a bad effect on the coconuts.

Except for several small applications of sulphur to the coconut palms, and an application of about 200 kg/ha of N.P.K. fertilizer to the ginger soon after establishment, no fertilizer was applied during the first six years. However, with continous cropping of coconuts and food crops, the reserves of nutrient minerals in the soil will soon be used up. Experimental work at Keravat has shown that fertilizers can replace the nutrients used up by the food crops so that there is no reduction in crop yields.

The costs of fertilizers will be small when compared with the increased return from the gardens and coconut palms.

RECOMMENDATION

If there is a shortage of good garden land, or the gardens are a long way away, it is possible to make greater use of land planted with coconuts by growing food crops between the palms. This has already been done in some villages with very good results. The following points must be noted:-

1. Choose the food crops carefully. If there is a lot of shade, choose plants that grow well under these conditions.

2. If large areas of one crop are planted, a different crop should be planted there next time, i.e. the crops should be rotated.

3. Take care with cultivation so that as little damage as possible is done to the roots of the coconut palms.

4. After several years, add fertilizer to the soil to keep yields high.

If these precautions are taken, large areas of village coconut plantings can be converted to produce food crops for home use or sale. In addition, the improved maintenance of the area will result in a higher yield of coconuts.

Peanuts and maize growing under coconuts.