

## Farmer's experience and feasibility of mixed cropping of arecanut in coconut garden

(Manuscript Received : 21-08-2001; Revised : 18-09-2001; Accepted : 28-09-2001)

Coconut is basically a small holders crop in Kerala and from time immemorial, it is grown along with other crops. However, in Tamil Nadu, Karnataka and Andhra Pradesh even today coconut is grown as mon. crop where the land holding is comparatively larger. This may be attributed due to lack of knowledge about scientific cultivation of component crops and a wrong notion that the coconut yield will get reduced due to the competition. But considering the small holdings in Kerala, fragmentation of holdings in all states, unemployment problems, the price fluctuation of coconut, and also to meet the increasing demand due to population explosion, it is necessary to cultivate inter/mixed crops in coconut garden. This in turn will generate more income from unit area and provide labour for many unemployed youths. Other than these favourable aspects if there is a failure of one crop, atleast the companion crop will provide some income. In addition, it also utilizes the maximum extent of the available vertical (air space) and horizontal spaces (soil).

Coconut and arecanut mixed cropping is not generally recommended since there are few common pests, diseases, and both the palms compete with each other for light and soil moisture. However, since farmers get more income from arecanut, because of the remunerative price for last few years, most of the farmers are going for this crop combination. The objective of the study is to document, the farmer's experiences in mixed cropping of arecanut in coconut gardens. This study also aims to analyse the technical feasibility of coconut-arecanut mixed cropping and the required agronomic practices for obtaining maximum benefits from the same.

Locale of the study : Kasaragod district having the largest area under arecanut in Kerala State was purposely selected for conducting this study.

Respondents : 35 farmers who cultivate arecanut as mixed crop in their coconut garden, who registered

their names for best coconut garden competition connection with the Kisan Mela celebration. CPCRI were the respondents of the study.

Data collection : Personal interview method was used in an interview schedule.

### 1. Farmer's practices related to coconut mixed cropping

Based on the survey conducted in Kasaragod district during October and November, 1999 it was found that arecanut has been planted in the various phases of coconut. Some farmers have planted arecanut and coconut simultaneously; some have planted arecanut in second phase after 8 years or so, others after 10 years so without thinking about the consequence of such returns. In many arecanut gardens, coconut is planted on the border in a single row. The coconut is under irrigation (Table 1).

Farmer's experience is that when arecanut is planted (at a spacing of 3.75 M x 2.5 M, 3750 plants/ha) along with coconut palms (at a spacing of 3.75 M x 3.75 M, 690 plants/ha) the yield of coconut goes down by 20 to 25%. The reduction in yield is due to the number of arecanut palms planted along with coconut. However, the arecanut yield will not go down if proper management practice is followed.

**Table 1. Effect of coconut + arecanut mixed cropping**

Existing pattern	No of farmers	% of total
Simultaneous planting	2	6
Planting areca after 5 to 20 years in coconut garden	19	54
Planting areca after 20 years in coconut garden	4	11
Coconut planted in border row	10	29
Total	35	100

the case of planting arecanut as a mixed crop in garden having palms of age 4-8 years, the yield was only 30 to 40% of the normal yield. The arecanut is lanky, and there was every chance for the arecanut to drop down if heavy wind prevails. Further, there was no flowering. This is mainly because of the low light availability for arecanut growth.

Farmers opine that if the arecanut is planted at a later age i.e. after 20 years, the coconut yield will be low but the arecanut yield is expected to go up to 15% (Table 2)

Effect of coconut + arecanut mixed cropping on yield

	Coconut yield nut/palm/year	Arecanut yield nut/palm/year	Deviation from Coconut	normal yield Arecanut
Planting in 100	60-75	300	(-) 20-25% Flowering will be delayed	-
Planting in 90-120	102	180-240 (300)	-	(-) 60-70% Flowering is delayed
Planting in 90-120	105	255-270 (300)	-	(-) 10-15%
Planting in 90	90	300 (300)	-	-

(Parentheses indicate the normal yield obtained by farmers)

Reduction in yield

Reduction from normal yield again depends upon number of arecanut palms which has been given for one row arecanut planting at a spacing of

**Opinions about the advantages of mixed cropping of arecanut in coconut garden**

Traditionally, mixed cropping was followed in coconut gardens mainly for additional income from small crops which included the crops which were useful to meet the farmer's needs. Of late, since there is lot of fluctuation in coconut market, farmers want to reduce the loss by growing more remunerative cash crops like arecanut prices rule high and the crop is of a perennial nature requiring less labour for management (as compared to annuals and biennials) farmers go for arecanut as a mixed crop in coconut garden rather than other crops in the major area of their holdings.

The common diseases and pests due to which the coconut production is discouraged is discussed below.

**Anthracnose wilt :** This is caused by a fungus *Colletotrichum lucidum*. Decay of root system, flaccidity

of spindle leaves, browning of outer leaves, arrested fruit set and appearance of bleeding patches on the stem are the salient features of the malady. The bracket of fungus is seen on stems of the diseased palms in very advanced stages. Better drainage and clean cultivation are the important factors. Apply calixin @ 2m/100 ml of water through root feeding at quarterly interval for one year. Soil drenching @ 25 litres of Calixin 0.1% solution/palm/year is also useful.

Though bud-rot and mahali diseases are common in arecanut and coconut, the causal organisms are of different species, and there is no report of cross infection.

**Scale insect : (*Aonidiella orientalis*)**

The scale insects damage the leaves, buttons and rachillae in coconut, and in arecanut, leaves, spathe, leaf sheaths and bunches gets affected. When the infestation is severe, button shedding is observed. Continuous feeding results in premature yellowing of nuts in arecanut. The infestation will be severe during summer and October-February, in arecanut gardens. In severe case of infestation, spraying with 0.1% fenthion/malathion will control the insect.

**Economic aspects of coconut-arecanut mixed cropping**

As pointed out earlier, one of the major advantages of any perennial crop based farming system is to increase the economic efficiency of fixed resources like land. Das (1991) stated that the success of any farming system in terms of net returns depends on the choice of component species, which is in-turn based on several factors, such as soil condition, weather, availability of water for irrigation, shade level, hazards of diseases and pests, varieties, time of planting, level of management etc. In addition, other socio-economic factors such as size of holding, availability of labour resources, management skill, access to capital and credit, market outlet, price behaviour, theft problem, farmer's attitudes and goals also highly influence the choice of the component crops in the farming system. For example, when most of the work is done by the farm family without mechanical help, the number, age and sex composition of the family are the crucial factors, which change slowly over time, necessitating periodic adjustments in the farming system. In short, the socio-economic conditions of the farmer and the constraints actually faced by them are the prime factors that would decide the small holder's choice of crops and/or livestock components of the farming system.

Another major factor responsible for farm intensification in the case of small and marginal farmers

is the prevalence of high degree of production and price risks. Production risks exists in the form of major diseases like root (wilt) in Southern Kerala, stem bleeding and bud rot in Northern Kerala pose serious problems to the coconut farmers (Annual Reports, CPCRI, Kasaragod). The yield loss due to the recent infestation of the eriophyid mite is to the tune of 40 per cent (Survey on crop loss due to eriophyid mite, CPCRI, Kasaragod).

Coconut cultivators also face major challenges in the form of price risks, since the price levels of coconut and its products often exhibit high degree of variation. Under this situation, it is advisable to include compatible crops/animal components in the farming system. The survey conducted in Kasaragod district indicated that farmers are adopting coconut-arecanut mixed cropping system, and the economics of the same are discussed as follows.

The average gross cost of the system was Rs. 25000/ha in the case of coconut monocrop and Rs. 75500/ha in the case of arecanut monocrop. The same was to the tune of Rs. 43900/ha for different coconut-arecanut models and Rs. 82500/ha in the case of coconut planted as border crop in arecanut garden. The economic analysis were performed under three levels of out-put prices as described in the Table.

Under Situation 1 (representing the average output prices of 1999-2000), the returns above coconut monocrop for different coconut-arecanut mixed cropping models was Rs. 66,500/ha in the case of arecanut planted

in coconut gardens of 5-8 years, Rs. 80,100/ha in the case of simultaneous planting of coconut and arecanut and the same was Rs. 90,200/ha for arecanut planted in the adult coconut garden of above 20 years.

Under Situation 2 (when the price of coconut was well as that of arecanut was low) the respective returns were Rs. 50,350/ha, Rs. 41,650/ha and Rs. 58,525/ha in the case of Situation 3 (when the price of coconut and arecanut was low), the returns above coconut monocrop for different coconut-arecanut mixed cropping models was Rs. 12,975/ha, Rs. 13,475/ha and Rs. 22,225/ha respectively. The realized net returns from coconut planted as border crop in arecanut garden was also compared to arecanut monocrop.

It could be further inferred that the Monetary Advantage, which is defined as the ratio between net returns realized from the coconut-arecanut system to the coconut monocrop, is high in the case of arecanut planted in the adult coconut gardens for three situations. Base on economic analysis it is inferred that farmers can include arecanut as a component in adult coconut gardens. Similarly, cultivating coconut as a border crop in arecanut garden (maintaining optimum population per unit area) also fetches additional returns to the arecanut farmers.

#### Other advantageous features :

1. Other than the high income from the different combinations, if same disease/pest is present

Table 3. Economic analysis of various farming systems

Particulars	Situation 1			Situation 2			Situation 3		
	Gross Cost	Gross Return	Net Return	Gross Cost	Gross Return	Net Return	Gross Cost	Gross Return	Net Return
Coconut monocrop	25000	70000	45000	25000	52500	27500	25000	43750	18750
Arecanut monocrop	75500	405600	330100	75500	287300	211800	75500	152100	76600
Simultaneous planting of coconut and arecanut	43900	16900	125100 (278.00)	43900	121750	77850 (283.09)	43900	75625	31725 (169.00)
Arecanut planted in 5-8 years of coconut garden	43900	155400	111500 (247.77)	43900	113050	69150 (251.45)	43900	76125	32225 (171.00)
Arecanut planted in adult coconut garden	43900	179100	135200 (300.44)	43900	129925	86025 (312.81)	43900	85538	41638 (222.00)
Coconut planted in border of arecanut garden	82500	429000	346500 (104.96)	82500	304625	222125 (104.87)	82500	165375	82875 (108.00)

Situation 1 : Unit prices of coconut and arecanut was Rs. 4/nut and Rs. 120/kg respectively

Situation 2 : Unit prices of coconut and arecanut was Rs. 3/nut and Rs. 85/kg respectively

Situation 3 : Unit prices of coconut and arecanut was Rs. 2.5/nut and Rs. 45/kg respectively

Figures in parentheses indicate Monetary Advantage (ratio between net returns realised under the system to realised under the coconut monocrop)

ing of arecanut in coconut garden

same chemical spray can take care of the common disease/pest.

Coconut harvesting is generally done by climbing the tree and going to the next tree from tree to tree. This is not possible if coconut arecanut mixed cropping is practised.

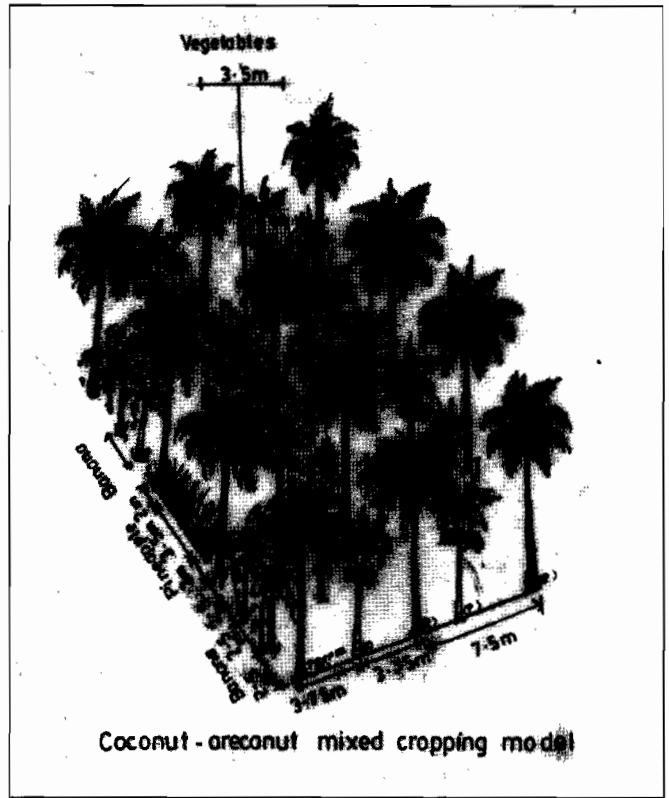
### Conclusion

The basic idea of mixed cropping is to get some income/at least some income from one crop if another crop fails in that combination. From the demand side view, the high price for the arecanut products will prolong as most of the farmers continue to plant coconut in high density and thus the arecanut production will increase. Besides this, the government policy on the arecanut products like gutka may change and scenario in future. More dependence on coconut as a monocrop may not be encouraging in the present situation because of the prevailing price of arecanut. Restructuring of existing gardens for a wider area by introducing more number of component crops and practising good management including soil recycling, will enable us to enhance the production and income from coconut and will make it more profitable.

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