

CERTAIN ASPECTS OF MOISTURE CONSERVATION IN COCONUT GARDENS

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ABSTRACT

Moisture conservation by different mulching materials has been investigated in bearing adult coconut plantations. Different mulching materials which are locally available such as coconut husks, fodder trash, coconut leaves and palmyrah leaves were tried in the rainfed coconut garden in order to find out a suitable mulching material. Burying coconut husks and leaves in trenches between the rows of palms increased the yield by 44.6% over control. The coconut husks and leaves conserved the moisture very effectively as evidenced by the highest moisture percentage recorded in the soil.

INTRODUCTION

In common with most other

agricultural crops, moisture is a great limiting factor in successful cultivation of coconut palm. Proper supply of moisture, either through well distributed rainfall, percolation water or irrigation is essential for proper growth of the coconut (John, 1952). Copeland (1931) reported that a coconut palm can absorb 24-litres of water per day. He investigated the water relationship of the palms during drought conditions. After a prolonged drought, it took the palms years to recover. Only a constant water supply can preserve the vitality of the palm. The failure of water supply may undo the gain which should be expected after two or three years of fertilizer application. The greater the need for water for normal physiological processes, the greater will be the injury which follows

if the supply of water is inadequate.

Coconut is mostly grown as a rainfed crop. Crop-weather studies on coconut have revealed a close correlation between the nut yield and rainfall [Anonymous, 1972]. Soil moisture conservation through certain agronomic practices has been found to improve the yield of coconut. Mulching the area round the base of the palm before the onset of dry weather will keep the soil moist and prevent ground from becoming hard. It will thus lessen the bad effects of drought conditions and promote better growth of the palms. However, a definite mulching material for use in a particular soil and agro-climatic condition has to be investigated so as to enable the conservation of moisture with a

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particular type of mulch. With a view to find out a suitable mulching material for use in the standing East Coast Tall plantations, the investigation was carried out with several mulching materials that are locally available.

MATERIALS AND METHODS

The experiment was started in June, 1976 with six treatments replicated four times. Each replicate consisted of four trees. The design of experiment was RBD. The treatment details are as follows:-

1. Control.
2. Mulching the area two metre radius around the base of the palms with dry coconut leaves.
3. Burying coconut husks and leaves in trenches of 40 cm deep and 150 cm broad in between rows of coconut at the rate of 1000 husks per palm.
4. Mulching the area two metre radius around the base of the palms with NB21 fodder trash.
5. Mulching the area two metre radius around the base of the palms with coconut husks.
6. Mulching the area two metre radius around the base of the palms with palmyrah leaves.

The yield of nuts and soil moisture were estimated at monthly interval.

RESULTS AND DISCUSSION

Effect of different mulches on available soil moisture

Soil moisture is estimated in all the treatments for a period of four years and the results are presented in Table-1. The conservation of moisture in the soil is significantly higher in all the treated plots during the year 1981 to 1983. During 1980, highest moisture percentage was recorded in treatment No. 2 followed by 3 and 4. The trend gets altered during 1982 where highest moisture was observed in treatment 3 followed by 5, 6 and 2. This trend continues in 1982 and 1983 where the burial of coconut husks and leaves recorded highest moisture conservation in the soil.

Effect of different mulches on nut yield :

The mean nut yield per palm is given in Table-2. The yield of nuts is significant during 1979 and the cumulative yield from 1979 to 1983 is also significant. The percentage of increase in yield due to treatments range from 6.2 to 49.6. Mulching with coconut husks two metres around the palm improved the yield by 49.6% followed by burying coconut husks and leaves in the trenches between rows of the palms by 44.6% over control. Similar results were obtained by Bhaskaran and Leela (1977) who have reported that burying of coconut husks in linear trenches between the rows of the palms or in circular trenches increased the yield by 35% over control. They also emphasised that coconut husk can store nearly three times

of water by its weight and contains about 15% K_2O . This factor may also be attributed to the increased yield of nut because potassium plays a very important role in the nutrition of the coconut palm. In Sri Lanka, it was found that the potash content of the husks was correlated to the potash status of soil from where husks have been obtained [Salgado, 1941]. It was estimated that 1,000 husks gave rise to 7-8 kg of potash. Moreover the potash content in the husk is readily soluble and available to the palms. It has been reported in arecanut gardens that mulching prevents evaporation losses, increases the humus content of soil, its water holding capacity and aeration. Erosion and run off losses are minimised by mulching and weeds are controlled and plant nutrient elements are added to soil (Anonymous, 1983]. So all these factors might have contributed to the increased nut yield in the present study.

SUMMARY AND CONCLUSIONS

1. In rainfed coconut gardens burying of coconut husks and leaves in trenches between the rows of the palms is beneficial in conserving soil moisture.
2. Burying coconut husks and leaves improved as much as 49.6% yield of nut over control.
3. Besides acting as a soil moisture conservator, coconut husks serve as source of potassium for the nutrition of the crop.

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Table - 1 :

EFFECT OF DIFFERENT MULCHING TREATMENTS ON AVAILABLE SOIL MOISTURE
(Mean Percentage)

Treatment No.	1980	1981	1982	1983
1	24.2	24.5	45.3	26.3
2	30.2	28.5	51.8	29.8
3	29.2	30.5	58.0	33.8
4	27.7	26.0	50.0	28.8
5	25.7	29.0	54.8	33.5
6	26.5	26.5	52.3	30.8
Significant or not	NS	Yes	Yes	Yes
SE	1.14	0.65	1.09	0.58
CD (P: 0.01)	—	2.71	4.54	2.42

Table - 2 :

EFFECT OF DIFFERENT MULCHING TREATMENTS ON YIELD OF NUTS
(Mean yield of nuts per palm)

Treatment No.	1979	1980	1981	1982	1983*	Cumulative yield	Per cent increase over control
1	26	60	30	31	30	177	100.0
2	15	89	43	48	40	235	132.8
3	28	85	47	53	43	256	144.6
4	19	82	45	41	47	234	132.2
5	36	84	47	52	46	265	149.6
6	17	66	37	33	35	188	106.2
Significant or not	Yes	NS	NS	NS	NS	Yes	
SE	1.05	2.89	1.40	8.20	5.20	17.21	
CD (P: 0.05)	3.16	—	—	—	—	51.89	

*Yield data relate to January-October, 1983 period.