

Response of Coconut to Fertilizer Application in the Sandy Loam Soils of Thanjavur District (Tamil Nadu)

by

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Introduction : Coconut responds to the application of NPK fertilizers, as is evident from experiments carried out in India and abroad. Certain general manurial recommendations based on experiments carried out at the Coconut Research Stations in the West Coast of India are in large scale adoption at present in Tamil Nadu. It was felt that a close up study of the responses to the major plant nutrients right under the cultivators' conditions in the tract is imperative to make more broad based and realistic recommendations for the plantations in the State. A simple manurial trial on coconut (with N, P and K alone and in certain combinations) was therefore laid out in coconut cultivators' gardens in the major coconut growing region of Thanjavur district from the year 1961 to 1968 and the results are presented in this paper.

Materials and Methods : The trials were laid out in scattered blocks in six villages round about the Regional Coconut Research Station, Veppankulam. The soil is sandy loam. The average annual rainfall received in the tract is about 1000 mm of which 65% is recorded within a short period of 2 to 3 months during the north east monsoon season (October-January). Summer rainfall is meagre and the coconut plantations are often subjected to prolonged droughty conditions.

Three types of trials involving the following treatments were repeated in each of the six selected centres, each type occurring in a separate holding.

TABLE I. *Treatments*

A type	B type	C type	Dosage per palm per year
0	0	0	$n_1=0.340$ kg of N
n_1	p_1	k_1	$n_2=0.680$ kg of N
n_1p_1	p_1k_1	n_1k_1	
$n_1p_1k_1$	$n_1p_1k_1$	$n_1p_1k_1$	$p_1=0.227$ kg of P_2O_5
$n_1p_1k_2$	$n_2p_1k_1$	$n_1p_2k_1$	$p_2=0.454$ kg of P_2O_5
n_2p_2	p_2k_2	n_2k_2	
$n_2p_2k_1$	$n_1p_2k_2$	$n_2p_1k_2$	$k_1=0.454$ kg of K_2O
$n_2p_2k_2$	$n_2p_2k_2$	$n_2p_2k_2$	$k_2=0.907$ kg of K_2O

N is applied as ammonium sulphate, P_2O_5 as super phosphate and K_2O as muriate of potash.

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In each holding, eight clusters of six contiguous trees each forming the ultimate plot were selected and the eight treatments were allocated at random, one to each cluster. The fertilizers at the scheduled dose were applied in circular trenches around each tree once a year in November–December over a basal dressing of green manure at a uniform rate of 22.68 kg per palm per year.

The number of nuts harvested from each tree was recorded for every harvest. The annual yield data for each calendar year from 1962 to 1967 were statistically analysed. A combined analysis of the pooled data for the five year period 1963–1967 was also made. The analysis of the data followed the standard method adopted for scattered block trials. The economics of the treatments were worked out.

Results: The results of analysis of the yield data for the preliminary year 1962 did not reveal any significant differences due to treatments. But the differences between treatments for individual years from 1963 to 1967 as well as the over all differences for the five year period 1963–67 were significant. The response to individual nutrients and the pooled analysis of variance are furnished in Table 2. The difference was highly significant between years, centres and between treatments. The interactions between centres \times treatments, years \times treatments, years \times centres and years \times centres \times treatments were also significant.

TABLE 2. *Response to nutrients (1963 to 1967) - Mean yield of nuts per palm*

S.No.	Response to	1963	1964	1965	1966	1967	Over all response 1963–67	
		Mean response	Mean response	Mean response	Mean response	Mean response	Mean response	S. E. of response
1.	n_1	22.44	16.64	14.5	15.32	18.04	17.38	1.55
2.	n_2	32.84	20.1	20.3	15.58	24.63	22.69	3.82
3.	Between n_2 & n_1	17.62	9.7	13.9	9.39	13.50	12.91	1.70
4.	p_1	-1.88	-1.9	0.1	1.34	2.16	-0.07	1.55
5.	p_2	-6.15	10.9	2.1	8.60	12.91	5.68	3.82
6.	Between p_2 & p_1	-5.02	-0.95	-19.0	-3.70	2.79	-2.78	1.70
7.	k_1	10.86	7.9	13.3	5.00	2.81	7.97	1.55
8.	k_2	-0.16	9.6	12.8	9.56	-2.65	3.53	3.82
9.	Between k_2 & k_1	-7.10	4.1	-4.2	0.84	-5.04	-2.28	1.7

The response to nitrogen at both the levels is positive. It is marked at the higher level. The results do not indicate any response to P_2O_5 at the lower level while the response at higher level is erratic. There is positive response to

the lower level of potash though it is of a lower order as compared to that of nitrogen.

A net profit of Rs. 10.53 per palm has been obtained under the treatment $n_3p_1k_1$. There is no considerable increase in gain as a result of increasing the dose of K while there is a depression in the gain by increasing P.

Discussion: In these trials, all possible combinations of the different levels of the three nutrients, N, P and K have not been tried. The high significance of the differences due to the treatments revealed from the analysis of the yield data for individual years as well as the pooled data for 1963 to 1967 is indicative of the response to the treatments. But it is to be pointed out that only such of the responses as are associated with a low standard error can be considered as reliable. Judged in this manner, the results only reveal a consistent over-all response to nitrogen at both the levels (n_1 and n_3) and potash at the lower level (k_1) and erratic for phosphorus at higher levels. The higher dose of nitrogen (n_3) is to be considered distinctly superior to the lower dose (n_1) as may be seen from the high value for $n_3-n_1=12.91$ and a comparatively low standard error of 1.70 (Table 1).

The analysis of variance of the pooled data for 1963-1967 show the extent of influence exerted on the experimental material by various natural factors. The seasonal effect is significant between years. There is a wide variation in the performance of the palms from centre to centre, as indicated by the high significance between centres. This could be mainly attributed to the large inherent variability of the palms in the ryots' holdings. It is also apparent that the response to various treatments have not been consistent from centre to centre (Centres \times Treatments).

The impact of the above sources of variation on the experimental material is so great that it is reasonable to expect a much higher order of response to treatments if the extraneous sources of variation had not been as pronounced as it had been in this experiment. Therefore, even taking a modest view of the responses recorded, it can be safely concluded that the application of nitrogen at 0.680 kg (n_2), phosphorous at 0.227 kg (p_1) and potash at 0.454 kg (k_1) per palm per year is worthy of recommendation in the tract.

The above findings are in broad agreement with those of earlier workers (Salgado, 1952 cited by Menon and Pandalai, 1958; Pandalai and Krishna Marar, 1964) except that in the present experiment the higher dose of nitrogen has produced a better response.

These findings are supported by economics of the treatments worked out. The treatment $n_2p_1k_1$ has given a net gain of Rs. 10.53 per palm per year over the control.

Summary: The results of a simple fertilizer trial with N, P and K in coconut cultivators' holdings in the sandy loam soils of Thanjavur district are presented. The maximum positive response to the application of N at 0.680 kg, phosphorous at 0.227 kg and potash at 0.454 kg per palm per year with a net gain of Rs. 10.53 per palm per year has been recorded.

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An Assessment of Impact of Cropping Pattern on Agricultural Output in Tamil Nadu

by

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For purposes of national policy programming agricultural development, it would perhaps be useful to understand the dynamic changes that are taking place in the cropping pattern of the country, thereby assessing the trends in production of different agricultural commodities. The problem of studying the dynamic behaviour of crop mix and therefore output mix for one country with its varying agro-climatic regions and a variety of crops being raised in different regions is complex and bristled with many difficulties such as lack of relevant region-wise data. The present study was therefore, confined to Tamil Nadu.

A study of the changes in the distribution of cropped area under different crops and land utilisation in Tamil Nadu for the period from 1956-57 to 1963-64 revealed that the net area sown had increased from 14,419,692 acres to 14,962,650 acres. This increase represented 3.7 % of the net area sown in 1956-57. Correspondingly, the gross area sown had also increased by 6,26,040 acres or by 3.6 % over 1956-57. The proportion of food crops have declined from 76.9 % to 75.8% and that of non-food crops increased from 23.1 % to

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