PERFORMANCE OF COCONUT CULTIVAR 'BENAULIM' IN GOA—A CASE STUDY

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ABSTRACT

'Benaulim', a local tall coconut cultivar of Goa is potentially a high yielder, but the productivity of coconut in Goa, in general, is low, because of lack of irrigation, non-application of fertilizers and very close spacing. In a well-managed farmer's field, the variability in yield of individual palms was recorded, based on the previous thirteen years' production performance. The response to fertilizers and beneficial use of irrigation for increasing yield has been observed, and the economics of coconut cultivation worked out.

INTRODUCTION

Coconut palm shows wide variability in yield depending upon its genetic make up, agro-ecological situations under which it is cultivated, and the management practices adopted. Under improved management practices, the genetic potential of palms becomes fully manifest, compared to the palms of the same variety under neglected conditions.

In Goa, the coconut palms do not receive adequate fertilization, and hardly 5 per cent of the growers adopt balanced manuring. The general practice among growers is to apply a limited quantity of organic manure and common salt every year before the onset of south-west monsoon. Of late, some farmers are using limited quantity of mixed fertilizers. It is found that the continuous cultivation of coconut for a long period without application of fertilizers and adopting suitable agronomic practices, has caused the exhaustion of soil, resulting in low productivity. Adoption of better management practices including optimal fertilizer use, timely irrigation and other cultural practices like weed control, and interculture would

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improve nut production. A case-study illustrating the above, is presented on the performance of the indigenous tall coconut cultivar 'Benaulim' of Goa.

Materials and Methods

The material of 'Benaulim' cultivar was planted in 1951 at 'Vancor' farm Sanguem, 25 km from the Goa coast, situated close to the perennial 'Kushavati' river. The soil of the farm is of two different types, namely, clay-loam in upper plots and sandy-loam in the lower areas, with a pH of about 5.5. The palms planted at a spacing of 7m × 7m have been receiving uniform cultural and manurial practices and were under regular irrigation during December to May. The irrigation was started from 1971 onwards. Prophylactic measures were taken from time to time to control rhinoceros beetle, by filling the leaf axils with a mixture of 5% BHC dust and sand in equal proportions.

Results and Discussion

Distribution of palms in yield groups

Considerable variation in yield among the palms has been observed in the plantation. The distribution of palms in 'Vancor' farm among various yield groups is presented in Table 1.

Table 1. Distribution of palms in different yield groups

Yield group (nuts/palm/yr)	No. of palms	Percentage
35– 50	46	8.8
51– 70	84	16.0
71– 90	138	26.3
91–110	98	18.7
111–130	57	11.0
131–150	57	11.0
151–170	29	5.5
>170	14	2.7

The Table reveals that in this well-managed plantation, the high and medium yielding groups (51-130 nuts) together constitute more than two-thirds of the total population.

Influence of agro-climatic factors on nut yield:

In Goa, the annual rainfall ranges between 3000 to 4000 mm and the dry period extends to over 4 to 5 months in a year (Table-2). Both the heavy downpour during the short rainy season (June to mid-Sept.) and the long dry spell (Nov. to May) might be causing the fluctuations in nut yield.

Table 2. Rainfall distribution pattern at the farm (Av. of 9 years: 1973–81)

	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
Rainfall (mm)	58	1030	1080	688	292	116	45	3309
No. of rainy days	4	22	30	29	17	9	5	116

Lack of irrigation during the long dry spell from Nov. to May is a major factor limiting the productivity of coconut palms in Goa. The varying number of nuts harvested at different periods of the year are clearly indicative of the seasonal variability due to rainfall pattern (Table 3).

Table 3. Average No. of nuts harvested at different periods of the year (mean yield/palm over 5 years)

Harvest group	I Jan.-Feb.	II March	III Apr.-May	IV June	V Aug.-Sept.	VI Oct.-	VII Nov.-Dec.	Total	Mean
35–50	6.8	10.8	8.4	5.4	4.4	5.6	1.2	46.8	6.7
51–70	12.1	12.0	12.6	6.8	6.8	5.6	7.2	62.1	8.9
71–90	12.8	14.8	18.0	11.1	10.2	6.8	4.4	78.2	11.2
91–100	18.0	25.5	26.0	14.1	7.9	3.9	5.3	100.7	14.4
111–130	22.8	26.4	27.3	19.8	12.9	8.2	6.4	123.8	17.7
131–150	22.6	30.0	33.7	23.1	20.1	9.7	5.5	145.7	20.8
>150	34.5	54.4	46.5	21.0	15.4	10.5	7.9	190.2	27.2
Total	126.6	173.9	172.5	101.3	77.8	50.3	37.9	747.5	
Mean	18.5	24.8	24.7	14.5	11.1	7.2	5.4	106.8	

During the last 10 years, high yields have been observed from January to May harvests, and low yields during September to December. Hence in dry months, frequent irrigation and improved soil moisture conservation practices, would immensely help in maintaining stability of production.

Effect of manuring and irrigation on coconut yield

The yield data recorded upto 1971 on a rainfed crop, and thereafter on an irrigated crop, has shown significant differences in growth and yield. Further, the effect of irrigation has become more pronounced at this farm in combination with balanced fertilization (Table 4).

Table 4. Yield trends during pre-and post-irrigation periods (planted 1951)

Pre-irrigation		Post-irrigation		Irrigation & Fertilizer appln.	
Year	Nuts/ha	Year	Nuts/ha	Year	Nuts/ha
1969	5683	1972	11,009	1977	17,308
1970	5013	1973	12,943	1978	16,667
1971	5867	1974	10,076	1979	20,987
		1975	13,000	1980	22,003
		1976	14,950	1981	16,333
Mean	5408		12,396		18,666

Elite palms

At this farm, the average yield of palms was 18,666 nuts/ha during the last 5 years; hence this could be considered as a high yielding plantation. Amongst the population, 27 palms yielded 155 to 200 nuts per palm per year for 5 consequetive years (1977 to 1981). Six other palms which recorded 200 to 300 nuts consistently, may be considered as elite palms.

Production Economics:

Attempts have also been made to work out the production economics based on total nut production, sale proceeds realized, and the expenditure incurred during the last 13 years. The nuts after harvest were sorted into two marketable grades, and disposed off at the wholesale rate. The item-wise expenditure incurred during the last 5 years indicated that about 23.4 per cent was spent for supervision, 31.2 per cent for labour including plucking and dehusking; 31.3 per cent for fertilization; 7.0 per cent for irrigation; 5.3 per cent for transportation, and 1.8 per cent for pesticide application. Since the cost of irrigation is relatively small compared to the realized benefits, the farmers should be educated to irrigate their coconut plantations wherever irrigation sources exist.

The net income per ha during pre-irrigation period of 3 years, post-irrigation period for 5 years, and integrated use of manuring, irrigation and other cultural care for 5 years, is estimated at Rs. 774, Rs. 5800, and Rs. 14,120 respectively (Table 5).

Table 5. Production economics/ha/year

	Pre-irrigation (av. of 3 yrs)	Post-irrigation (av. of 5 yrs)	Irrig.+manuring (av. of 5 yrs)
Nuts produced/ha	5,408	12.396	18,666
Rate of nuts/1000 (Rs)	617	782	1,110
Gross income/ha (Rs)	3,361	9,693	20,719
Expenditure incurred/ha (Rs)	2,587	3,793	6,598
Net income/ha (Rs)	774	5,800	14,120
%increase in net income			
over pre-irrig. period	—	688	1,724
over post-irrig. period	—	—	143

CONCLUSIONS

The study reveals that irrigation alone increases the yield/ha by 6988 nuts (129%), and irrigation-cum-manuring by 13,258 nuts (24.5%) over no manuring and no irrigation. Further, irrigation-cum-manuring could increase the yield/ha by 6270 nuts (50.5%) over irrigation alone. It may thus be concluded that coconut cultivation adopting proper management practices would be a very profitable proposition in Goa region, using the local cultivar 'Benaulim'.