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KERALA COCONUT REPLANTING PROJECT

(KCRP)

NM NAYAR
PRAFULLA K DAS
JACOB MATHEW

CENTRAL PLANTATION CROPS RESEARCH INSTITUTE
KASARAGOD 670 124, KERALA, INDIA

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Dr. NM Nayar

Director

Central Plantation Crops Research Institute

Kasaragod 670 124, Kerala, India.

DR. NM NAYAR
SAC KASARAGOD
JACOB MATHEW

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Introduction

India is the third largest producer of coconut in the world. The country accounts for nearly one-eighth of the area under coconuts in the world with 1.1 million ha, and about one-sixth of the production with 5500 million nuts annually. Though data on area and production of coconut are of doubtful accuracy, recent estimates indicate that

both the production and productivity of coconuts in India in general, and in Kerala in particular, are steadily declining (Table I). Kerala accounts for 67% of the area but only 55% of the nut production in the country. Any marked improvement in coconut situation would therefore depend upon the implementation of an effective strategy for coconut development in Kerala. The causes

Table I. Production and Productivity of Coconut in India and Kerala

Year	India		Kerala		
	Production in million nuts	Productivity (nuts/ha)	Production in million nuts	% share in total production of India	Productivity (nuts/ha)
1957-58	4455	6689	3199	71.8	6832
1958-59	4539	6651	3248	71.6	6832
1959-60	4734	6621	3365	71.1	6430
1960-61	4639	6470	3220	69.4	6430
1961-62	4478	6194	3247	72.5	6130
1962-63	5017	6288	3305	65.9	5985
1963-64	4725	5920	3262	69.0	5864
1964-65	5043	5950	3273	64.9	5864
1965-66	5035	5775	3293	65.4	5617
1966-67	5192	5814	3425	66.0	5618
1967-68	5321	5760	3593	67.5	5625
1968-69	5546	5613	3834	69.1	5590
1969-70	5859	5670	3956	67.5	5589
1970-71	6075	5811	3981	65.5	5536
1971-72	6088	5626	4054	66.6	5552
1972-73	5997	5421	3921	65.4	5259
1973-74	5851	5309	3703	63.3	4972
1974-75	5961	5344	3719	62.4	4971
1975-76	6122	5437	3439	56.2	4963
1976-77	5837	5434	3443	59.0	4963
1977-78	5734	5295	3367	58.7	4815
1978-79	5471	5126	3075	56.2	4531
1979-80	5830	5439	3209	55.0	4834

of this declining trend in coconut production in Kerala may be attributed to: (1) senility of the palms; (2) poor management of coconut gardens; (3) use of poor quality planting material; (4) extension of coconut crop to areas not suitable for coconut cultivation; and (5) increasing incidence of pests and diseases.

There is a worldwide shortage of edible oils, and India too suffers from it. It imports at present about one million tonnes oil annually. In view of its better stability of yields as compared to other oil seeds, and its numerous other advantages, coconut among all the major oil yielding crops of India, offers the best prospects for India to attain self-sufficiency in vegetable oil. Coconut oil already ranks third in India in terms of production after groundnut oil and mustard oil.

With this objective in view a long term programme for increasing the productivity of coconuts, has been formulated under the name "Kerala Coconut Replanting Project" (KCRP). The main features of this project are outlined here.

The Project

The KCRP aims at planting high yielding coconut seedlings after removing uneconomic palms in the coconut holdings of the State and raising them on scientific lines. The present area under coconut in Kerala is about 0.7 million ha. It is proposed to bring 0.6 million ha under the scheme in the course of 40 years leaving a marginal area of about 0.1 million ha. This Project costing Rs. 15,300-29,250 million in 40 years is expected to double the production of coconuts in 30 years by most conservative estimates, provide direct employment to an additional 160,000 persons annually,

and generate an additional income of Rs. 5000 million per year.

Eligibility

All coconut holdings having uneconomic palms and not located in marginal lands will be brought under the KCRP. An uneconomic palm is one which gives 30 nuts or less annually.

Programme

The KCRP could be started in 1985. The replanting in an year will cover 15,000 ha of net planting area. About one-third of this area is assumed to be under irrigation. Though the KCRP does not envisage any assistance for promoting irrigation, this can be provided under one or the other of several of the ongoing programmes.

Selective replanting is proposed in this Project. For this, uneconomic yielders will be removed in a phased manner. In the initial 20 years of replanting, those giving 15 nuts or less annually (very low yielders) will only be removed, while in the latter part of 20 years palms giving 16-30 (low yielders) nuts annually will also be removed. The ratio of very low and low yielders is estimated to be about 1:1.

While the present medium and high yielders are expected to reach uneconomic stage at the latter part of the replanting programme, the seedlings planted in the initial 20 years are expected to give good stabilized yields at that stage. So, no appreciable reduction in the total production of nuts even during the initial years of replanting, is expected.

Zones/Blocks

To avoid the externalities, planting will be spread over the entire coconut belt. How-

ever, while two-thirds of the replanting will be in the root (wilt) disease affected areas, the remaining one-third will be carried out in disease free areas every year. This is on the assumption that two-thirds of the uneconomic palms are distributed in diseased areas and the rest in disease-free areas.

The State of Kerala will be divided into 20 zones, each comprising of about 35,000 ha of coconut area. From each of these zones, about 5000 ha will not be covered in this Project, as they come either under the category of young/high yielding plantations or marginal land. In the remaining 30,000 ha in each zone, replanting will be completed in the course of 40 years.

Planting materials

Replanting will be carried out both with Hybrids and high yielding Talls in irrigated areas and high yielding Talls only in unirrigated areas. Total requirements of seednuts in a year will be about 4 million (15,000 ha \times 270 seednuts/ha). Of these, about one-fifth will be Hybrids. These 4 million seednuts will give 3 million seedlings (2.4 million Talls and 0.6 million Hybrids). for replanting. Seed gardens of about 1000 ha size having a population of 1.5 lakh mother palms will be required for the purpose. This area is already available or is planned. During the initial years of replanting programme, some Hybrid seed nuts will be procured from Karnataka and Tamil Nadu to meet the requirements of the programme. Nurseries will be established in all the zones of replanting for the sake of operational convenience. Seedlings will be raised in polybags.

The cost of raising seedlings including overhead is estimated at Rs. 5 per Tall and Rs. 10 per Hybrid seedling. The seedlings will be supplied on no-profit no-loss basis.

Financial Aspects

Three alternate patterns of financing are suggested. The project implementing agency or the individual farmer will select one out of these according to suitability or his preference.

Pattern-A: This will provide a compensation @ Rs. 100 per palm for uprooting and removing the uneconomic palms giving 15 nuts or less and @ Rs. 200 per palm giving 16-30 nuts/year (yield based on the year of the removal of the palm). 25% of the compensation amount will be paid to the farmer as cash and the other 75% will be put in a Savings Bank Account opened in his name.

Pattern-B: It has the following elements: (1) Compensation: same as pattern 'A'; (2) Subsidy of 50% of input cost for six years in case of Hybrid palms and nine years in case of Talls; (3) Term loan @ 5% interest rate for the remaining 50% of investment on the initial 6/9 years age of Hybrids/Talls.

Pattern-C: It has the following elements: (1) Compensation - same as in pattern 'A'; (2) Interest holidays or a grace period on Term loan for 6/9 years in case of Hybrids/Talls; (3) Term loan @ 5% for 6/9 years in case of Hybrids/Talls on investment in operational costs.

In Pattern-A, all the planting material and fertilizers will be supplied to the farmer as per the recommended levels and the cost will be debited to his savings account as long as funds are available.

The scale of finance in pattern 'B' and 'C' has taken into account the entire expenditure on inputs required for planting

Table II The scale of finance/palm/year

Type of palms	Unit	Years									Total
		1	2	3	4	5	6	7	8	9	
Tall	Rs.	12	10	10	10	10	12	12	12	12	100
Hybrids	Rs.	22	20	22	22	22	22	—	—	—	130

seedlings and raising them for six years for Hybrids and nine years for Talls (Table II.) By this time, the palms are expected to have started yielding.

Timber and other dry matter of the felled palm may fetch a revenue of Rs. 40 to the farmer. This revenue, along with the compensation amount of Rs. 100/200, as the case may be, will be capable of generating an income through interest earnings, which will compensate the losses in income due to removal of uneconomic palms.

A Coconut Bank is proposed to be established to handle the Project funds professionally. This bank could be a subsidiary of NABARD, the proposed bank for agricultural development. Such a bank meant exclusively for coconut development will be able to give expert professional servicing and guidance to the coconut farmers.

The compensation amount will go into a savings account of the farmer in case of pattern-A and as a fixed deposit in the Bank for 12 years in case of patterns B and C.

Financing will be done at stages and

mostly in kind components. For estimating the cost involved, the plant density is assumed at 175 palms/ha for unirrigated areas and 160 palms/ha for irrigated areas. The replanting programme envisages reduction in the density of existing palm population per unit area through regulation of spacing to facilitate scientific farming. Expected yield of palm/year is given in Table III.

For maximizing the yield, it would be preferable for the project Authority to assume responsibility, or at the minimum, an effective supervision, for raising the seedlings through their juvenile phase. This may, however, need an element of compulsion. The farmer will however be free to use the interspaces for raising intercrops.

Repayment Schedule

Two repayment schedules are proposed to meet the requirement of the two patterns of financing. In case of pattern 'B' financing: (1) interest accrued to the principal at the end of the year will be recovered from the beneficiary's account through book adjustment from the beginning of the first

Table III. Expected yield of palm/year

	Age of palms in years									
	5	6	7	8	9	10	11	12	13	14
Tall (Rainfed)	—	5	10	15	20	30	40	50	50	50
Tall (Irrigated)	5	10	20	30	40	60	70	75	75	75
Hybrid	10	20	40	60	80	100	120	125	125	125

year of financing. This will reduce the burden of the beneficiary to a great extent. The interest part will be as small as Rs. 1-3 palm per year; (2) repayment of principal along with interest will start in the seventh year in the case of irrigated gardens and tenth year in unirrigated gardens. Farmers will be able to repay the loan amount with interest in the course of five years in both the irrigated and unirrigated holdings; (3) maximum repayment burden per palm per year will come to Rs. 13 in case of Tall and Rs. 16 in case of Hybrids.

In case of pattern 'C' financing: (1) no interest will be charged to the beneficiaries for 6/9 years for Hybrids/Talls. The entire interest burden for this grace period will be met by the Project; (2) repayment of principal as well as concessional interest will start in the seventh/tenth year of replanting in case of irrigated and unirrigated holdings. Repayment will be spread over five years for both Hybrids and Talls; (3) maximum repayment burden per palm/year will come to Rs. 32 in case of Hybrids and Rs. 25 in case of Talls.

Insurance Scheme

An insurance element has been added to this Project to ensure total security to the farmer. The premium rate may be Rs. 3/6 per Tall/Hybrid palms per year. This will be made compulsory for the initial period of 20 years, and thereafter, it will be optional as the risk involved in the later part of the life of the palm is less.

The insurance coverage will be limited to disease and natural calamities. In these cases, the insurance scheme will meet the replacement costs of the diseased palms in full without any further liability to the grower, till it comes to the bearing stage. In case of casualty after the tenth year of age of the palm, the farmer will be given

compensation @ Rs. 150/- per Tall and @ Rs. 300 per Hybrid palm. A productivity-linked insurance scheme could have been more ideal, but due to operational difficulties a flat rate has been suggested.

Staffing

The KCRP will be headed by a senior technical official of the rank of a Director General. He will be assisted by four Directors (Replanting), one for each unit of 0.15 million ha. The other staff required for a unit of 20,000 ha of replanted area during the first year has been worked out as: 5 Joint Directors, 25 Deputy Directors, 50 Assistant Directors, and 100 Field Assistants. One-fifth of the staff of each unit will be retained from the second year for the entire Project period for follow up measures. The total requirements of staff is about 15,000 and the cost involved is estimated at around Rs. 300 million, accounting to 10-20% of project outlay.

Project Costs

The project costs for A, B, and C patterns of financing have been worked out. The estimates are for one complete cycle of replanting which will take 55 years from the start of the project. The estimated figures are given in Table IV separately for A, B, and C patterns.

Table IV. Consolidated Statement of Project Costs (Rs. Million)

Sl. No.	Particulars	Rs. Million
(i) Pattern 'A' (Compensation)		
1.	Compensation for removal of un-economic palms @ Rs. 100 for very low yielder & Rs. 200 for low yielders	15,000
2.	Establishment and overhead cost	300
		15,300

(ii) Pattern 'B' (Subsidy on Investment+ Concessional Financing)

1. Compensation for removal of un-economic palms	15,000
2. 50% subsidy on investment on planting and maintenance (84 million Tall palms and 19 million Hybrids @ Rs. 50 and Rs. 65 respectively).	5,450
3. Concessional financing @ 5% interest (Liability of the Project @12% interest)	8,500
4. Establishment and Overhead cost	300
	29,250

(iii) Pattern 'C' (Interest Holdings+ Concessional Financing)

1. Compensation for removal of un-economic palms	15,000
2. Interest holdings for 6/9 years (Project liability @ 17% interest)	6,590
3. Concessional financing @ 5% interest (Project Liability @ 12% interest)	3,920
4. Establishment and overhead cost	300
	25,810

Though pattern 'A' is attractive from point of view of the relatively lower outlay and simplicity in operation, it lacks in respect

of psychological impact on the farmers which is available in the other two patterns, 'B' and 'C' through subsidies and concessional financing. Financial analysis of these patterns would reveal that in patterns 'B' and 'C' the maximum size of net financial burden for a year will be in the order of Rs. 230 million. However, in pattern 'B', the annual financial outlay will come down to Rs. 90 million/year from 14th year, whereas in pattern 'C' the project will be fully recycled financially from the same year (14th year).

Benefits

Like any other developmental schemes there will be both direct and indirect benefits from this replanting project. In this case the direct benefits will come from two sources, namely (1) additional production of nuts, and (2) additional generation of employment.

Direct benefits

The estimated additional yield and expected additional income from increased production through replanting in a period of 50 years are shown in Table V (A) and (B) respectively. The expected production will

Table V. (A) Estimated Coconut Production (in Million)

Year of planting	Production of nuts from			
	Retained area	Replanted area	Total yield	Net increase in yield
1	3070	—	3070	— 30
5	2950	7	2957	—143
10	2800	348	3148	+ 48
15	2650	1196	3846	746
20	2500	2066	4566	1466
25	2250	2936	5186	2086
30	2000	3806	5806	2706
35	1750	4676	6426	3326
40	1500	5546	7046	3946
45	1400	6416	7816	4716
50	1300	7286	8586	5486

Table V. (B) Estimated Income Generated at Farm Level (Rs. Million)

Year of planting	Additional income generated	Cumulative additional return
1	-45	-45
5	-215	-665
10	72	-1239
15	1119	2196
20	2199	11031
25	3129	24816
30	4059	43251
35	4989	66276
40	5919	94011
45	7074	127071
50	8229	165906

be two and half times that of the present level on the 50th year of replanting and the additional income at the farm level will be in the same order as production, assuming the present level of coconut price. Assuming that the present growth rate (3.26%) of area of coconut may not continue indefinitely as far as Kerala is concerned, we may consider a 1% growth rate for another 50 years. In this situation on 20th year of the replanting the production will be double and on the 40th year it will be enhanced by three times the present level taking into consideration of both the replanted and expanded area of coconut in Kerala.

As regards the generation of employment, it is estimated that 4 million mandays per year will be generated for uprooting the palms alone. Another 40-50 million mandays will be required for planting and maintenance of new plantations. In other words, about 160,000 additional rural labour will be needed throughout the year. The earnings of this labour force by means of wages will come to Rs. 500 million a year.

Indirect benefits

The replanting scheme will provide en-

ough scope for more intensive and scientific inter/mixed cropping and mixed farming. The average expected income to be generated on this account would amount to Rs. 3000/ha. In addition, this activity will also generate additional employment substantially. Coconut-based industries in the country will derive benefits in several forms and new avenues of urban employment will also be created due to expected requirements of additional ancillary goods and services; eg: supplies of plant protection equipments and chemicals; requirements of goods transport services, etc.,

Economic analysis of the project:

Benefit-Cost Ratio* and Internal Rate of Return** were estimated to test the economic soundness of the project. The B/C Ratio at 17% was found out to be 1.4. Internal Rate of Return was worked out as 26%. This shows that the KCRP is a viable proposition.

It is expected that the inflationary pressure will be neutralised by the rise in both the sides, i.e., cost and return simultaneously in course of replanting period. In order to make the estimates more realistic the cost components have been taken on higher side and the return on lower side of the actual situation.

Acknowledgement

Several of our friends have contributed their ideas very generously during preparation of this document. We express our sincere thanks to all of them. Particularly, we are grateful to Mr EV Nelliath, Head, Division of Agronomy, CPCRI, Kasaragod for suggesting pattern 'A' mode of financing and Prof. N. Parameswaran Nair, Director, School of Management Studies, Cochin University, Cochin for suggesting an Insurance Scheme for this

Project. However, we take full responsibility for any errors in this Project.

** Internal rate of return - $\sum_{t=1}^n \frac{B_n - C_n}{(1+i)^n} = 0$

where:

* Benefit-Cost Ratio - $\frac{\sum_{t=1}^n \frac{B_n}{(1+i)^n}}{\sum_{t=1}^n \frac{C_n}{(1+i)^n}}$

- where: B_n = Benefits in each year
- C_n = Costs in each year
- n = Number of years
- i = Discount rate

For the analysis of the project...
 The Internal Rate of Return (IRR) was found to be 17%.
 The Benefit-Cost Ratio was found to be 1.17.
 This shows that the project is profitable.

It is expected that the project will be profitable in the long run.
 The IRR of 17% is higher than the discount rate of 10%.
 This indicates that the project is a good investment.

The project is expected to generate a net present value of Rs. 100 million.
 This is a significant amount and shows that the project is worth the investment.

In conclusion, the project is profitable and has a high IRR.
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