

STUDY ON ARECANUT IN INDIA



COMMITTEE ON NATURAL RESOURCES
PLANNING COMMISSION
NEW DELHI

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FOREWORD

Arecanut is one of the important commercial crops of the country and is the source of livelihood for nearly 3 million people. Its cultivation is confined to western Peninsular Coast extending from Bombay to Kanyakumari, Mysore, Madras and in North Eastern States of Assam, West Bengal and parts of Andhra Pradesh and Orissa. Though India is the main producing country, it is not self-sufficient. Until 1957-58, substantial quantities were being imported from Ceylon, Malaya and Singapore. The present production amounts to 95,000 metric tonnes from an area of 1.17 lakh hectares. Our requirements are estimated at 115,000 metric tonnes per annum. The country is thus short of about 20,000 metric tonnes of the commodity. It is, therefore, imperative that efforts are made to make the country self-sufficient in arecanut.

The present study indicates that there is much scope of increasing production of this crop by intensifying its cultivation.

M. S. THACKER

Member (Natural Resources)
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NEW DELHI
April 10, 1964.

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PREFACE

Arecanut grows in humid, tropical climate and needs a very well-distributed rainfall or profuse irrigation. The major producing States are Kerala, Mysore and Assam and the average yield of cured produce per acre is 9 standard maunds. Hardly any work was done on this crop before 1949 when the Indian Central Arecanut Committee was established. Till the end of the First Plan period, its activities were mostly confined to the setting up of nurseries, exploring the possibilities of developing arecanut in new areas, undertaking plant protection measures and the organisation of cooperative marketing. The activities during the Second Plan included the establishment of one Central and five Regional Research Centres, establishment of new nurseries, laying demonstration plots, giving financial assistance for setting up irrigation units, supply of fertilisers and manures and subsidising distribution of plant protection equipment and chemicals. During the Third Plan, besides continuing the development programmes measures have been suggested for increase in area from 2.8 lakh acres to 3 lakh acres and production from 25.73 lakh standard maunds to 28.28 lakh standard maunds.

The preparation of the draft report on the study was entrusted to Shri T. S. Krishnamurti, Chief Development and Liaison Officer, Coconut, Arecanut, Spices and Cashewnut, Ministry of Food and Agriculture. The draft report was considered at a meeting of the Working Group on Arecanut at Madras on 5th—9th February, 1964. The final draft was considered at a meeting in the Planning Commission on 6th April, 1964 presided over by Professor M. S. Thacker, Member (Natural Resources) at which the representatives of the Ministry of Food and Agriculture as well as the Indian Central Arecanut Committee were present.

The Indian Central Arecanut Committee gave valuable cooperation in this study. I am thankful to all the members of the Study Team for their contribution to this study.

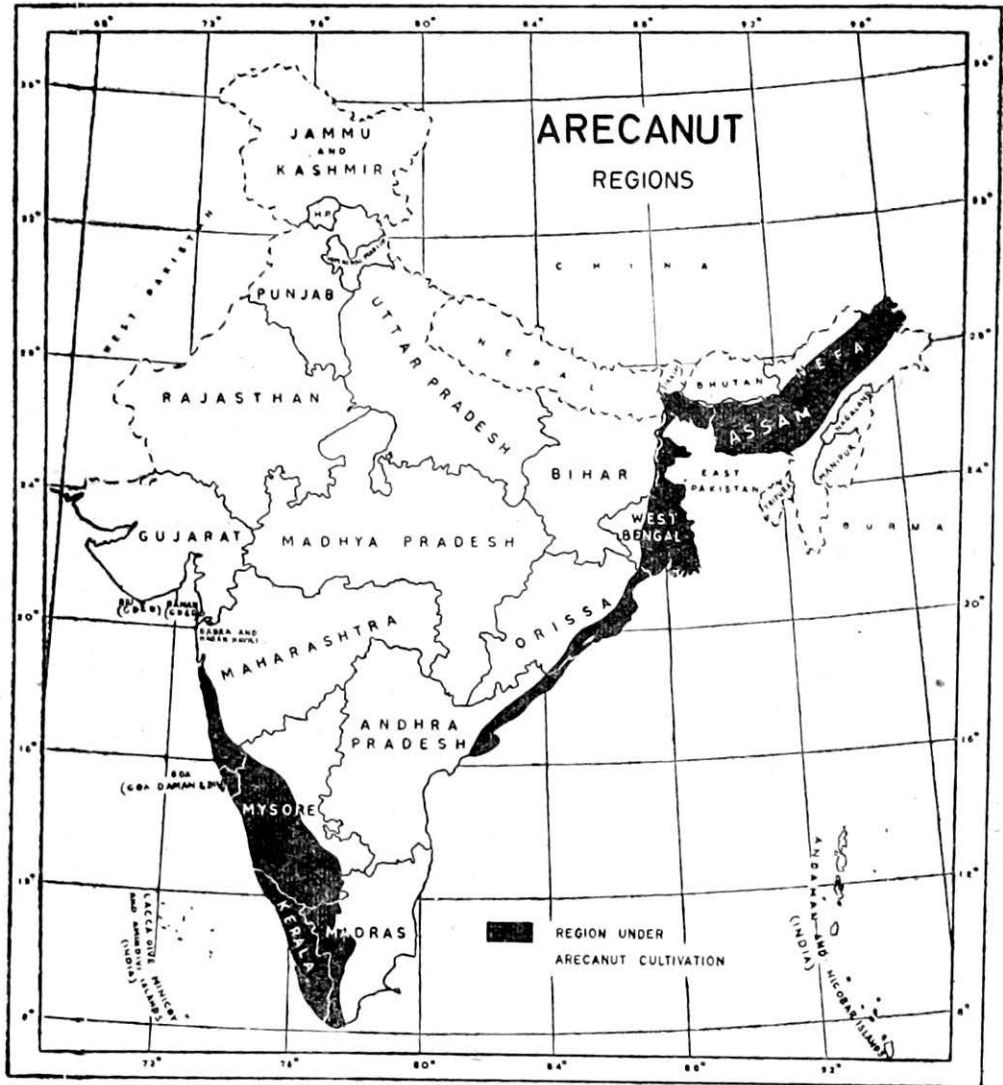
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NEW DELHI
April 10, 1964

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**ARECANUT
REGIONS**

REGION UNDER
ARECANUT CULTIVATION

CHAPTER I

GENERAL

Introduction

Areca nut, is an article of common use in chewing. All classes of people use it, but it is most popular among industrial, plantation and agricultural labourers as a masticatory. Among the Hindus, it is an important requisite at ceremonial and religious functions. It is said to have medicinal, astringent, narcotic and anthelmintic properties due to the presence of alkaloids. The powdered nut is a good dentrifice and in veterinary pharmacopeia it is noted as a vermifuge for the expulsion of worms in animals. It is also used in small quantities in dyeing and as a tanning material. Like the coconut, every part of the areca nut palm can be used. The stem is used for various purposes such as posts, rafters, beams etc. for semi-permanent constructions. The leaf sheaths are used in certain places as substitutes for plantain leaves; for caps, as wrappers for transporting vegetables and as buckets for drawing water from wells. The leaves are used for thatching huts. The inflorescence being scented is worn by women in certain parts of the country in their hair and is also used in social and religious functions. The husk of the nut is used as fuel. Experimental work shows that it can be used in the production of home-made paper, hard board, etc.

Small quantities of areca nut are exported from India to the Middle Eastern and other nearby countries.

Areca nut is a tropical plant which is grown mainly in India, Ceylon, Indonesia, Philippines and other tropical countries of South East Asia. In India, it is grown on the west coast of the Peninsula from Bombay south to Kanyakumari, in parts of Mysore, Madras and Andhra and the Eastern States of Assam, West Bengal and Orissa. Rainfall and temperature have considerable influence on areca nut cultivation. It generally grows in areas where rainfall ranges between 1500 and 4500 mm; but can also grow in areas with lower rainfall of up to 1000 mm, if its distribution is favourable. The plant grows in altitudes of up to 900 metres. It cannot withstand extremes of temperature or very wide diurnal variations in temperature. The range of temperature in which it flourishes is between 15° and 35° centigrade. When the temperature rises above the latter figure during summer the palm requires protection from the scorching sun and irrigation also becomes essential. Unlike coconut, the areca nut palm is delicate and requires a cooler atmosphere.

Soils

Areca nut is found to grow in a variety of soils, e.g., the lateritic soils of the West Coast, the red loamy soils of the Mettupalayam area of Madras, the alluvial soils of Assam and West Bengal and the loamy soils of Orissa. It will, however, thrive only if the soil is well drained and is able to retain optimum moisture. In lateritic soils of relatively low fertility the palm does well with heavy manuring. Light and sandy soils are not suitable for it, unless very heavy manuring and copious irrigation are provided. Dampness

of the soil and shade favour growth of the palm, while drought and strong winds have adverse effects on its growth and yield.

Varieties

Thirtysix species of arecanut are known to exist, of which ten are found in the Philippines. In Ceylon two edible species are reported to be cultivated. In India, there are no markedly different species and the trees growing in different parts of the country are described as different varieties, of the same species, distinguished on basis of the size and shape of the fruits and nuts and their taste.

Cultivation

Although there are some pure plantations of arecanut in certain parts of the country as in Mettupalayam area of Madras and parts of Mysore and Kerala, the general practice is to plant it as a mixed crop along with coconuts, plantains and other trees. It is also grown as an ornamental tree in homesteads and along the borders of fields and tanks. Generally speaking, it is a crop of small farmers and is planted by them on homesteads and their small holdings.

The common method of raising the palms is through seedlings, though in certain areas the practice of sowing nuts is also in vogue. Seedlings are transplanted, after a period of 1 to 4 years in the nursery. The number of trees per hectare ranges from 900 to about 4,000; the normal average being about 2,000.

The sowing period for raising nurseries is from January to June. Under the best conditions, the palm said to flower in about four years after planting, though normally it takes about eight years. The actual time of flowering depends upon a number of factors such as age of the seedlings, the type of soil, the manures applied, irrigation and inter-cultivation, density of planting, etc. In several parts of South India, flowering starts from December and continues till May or June. In the eastern States of West Bengal and Assam, it starts from June and goes on up to September-October.

Harvesting

The fruit takes 9—11 months to mature. The time of gathering the fruit depends upon the kind and quality of nuts required by the grower. In certain areas, as in northern parts of Central Kerala, the southern part of South Kanara District of Mysore, Assam and West Bengal, the practice is to pluck only ripe fruits whereas in parts of South Malabar area of Kerala, the Mettupalayam area of Coimbatore District of Madras and Maidan part of Mysore, the practice is to harvest somewhat tender nuts for processing. Harvesting of tender nuts starts from July and continues up to December, while in case of ripe nuts, it starts from October and goes on up to April in most places, except parts of West Bengal and Assam where maturity is late and the harvest is done between May and July.

Yield

The yield of the crop depends upon various factors like the nature of the soil, cultural and manurial practices, density of planting, age of trees, irrigation, drainage, the quantity and distribution of rainfall and the stage at which harvesting is done. In the Mattupalayam area, the annual yield is about 900

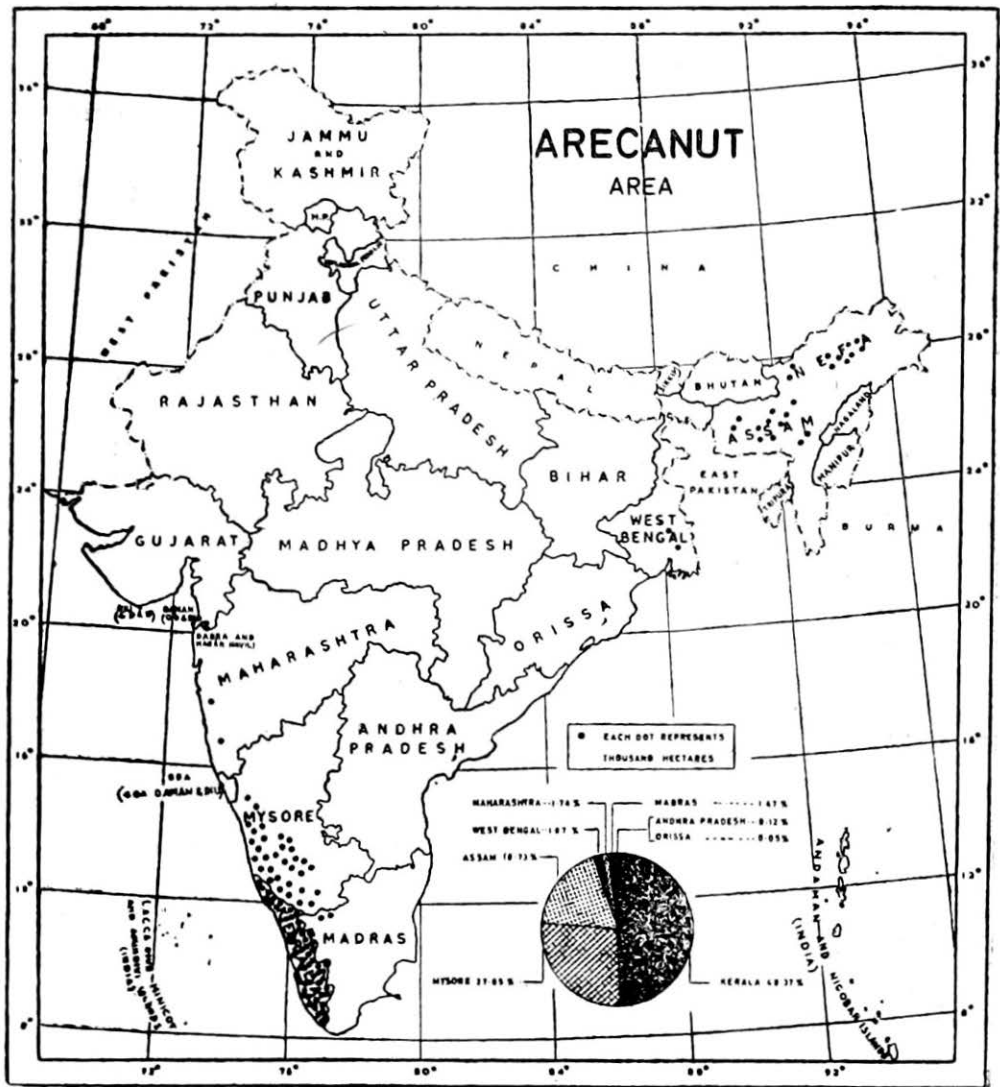
kg. per hectare; in central and northern Kerala where the crop is raised under irrigation conditions, it is about 700 kg. of cured produce per hectare. Among the major producing States the highest yield of 8.79 quintals per hectare is reported from Mysore, followed by Kerala with 7.96 quintals per hectare. Among the minor producing States, the highest yields are reported from Maharashtra followed by West Bengal. The average yields in different States are shown in Table—1 below.

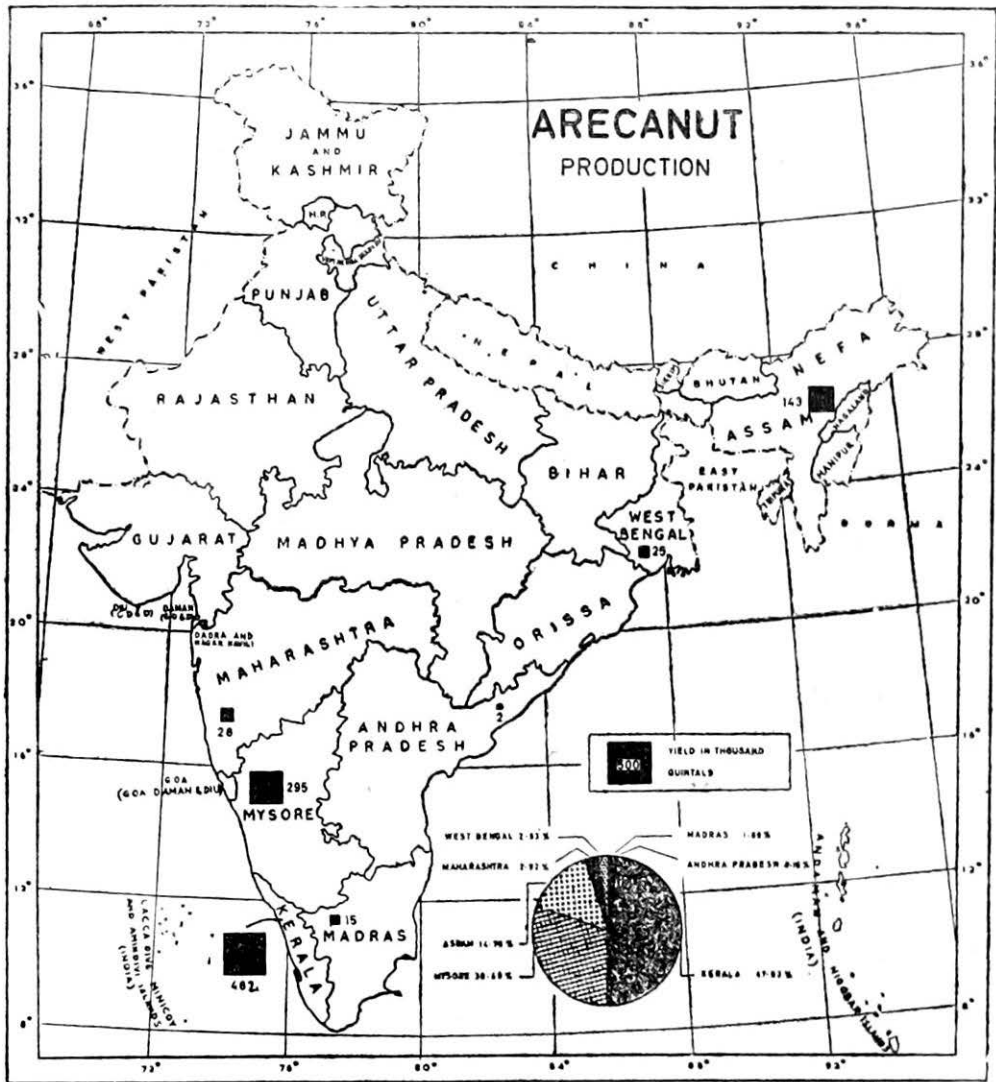
TABLE 1

Average yields of arecanut crop in term of cured betelnuts in different States in India

Assam	Yield per hectare (in quintals)
Assam	7.86
Mysore	8.79
Kerala	7.96
Maharashtra	13.04
West Bengal	10.55
Madras	7.12
Andhra Pradesh	5.92
ALL-INDIA	8.33

Arecanut is marketed both in the raw as well as in the cured stage, depending upon the taste of the people. In Central and Northern India, sun-dried and whole-boiled nuts are in use. On the West Coast and in Assam on the other hand, only ripe nuts which are not sun-dried are consumed. In Andhra and Madras, tender sliced boiled and coloured nuts are preferred. Different types of processing are done to suit the tastes of consumers in different areas and the processed produce is available in the market under quite a few names like *chalia*, *kalipak*, *brasel*, *kottapak* etc. It is not considered necessary here to go into the different methods of processing and curing of the nuts. But it may be mentioned that in Mysore and the Mettupalayam area of Madras, curing is done by the growers themselves, while in Kerala it is done entirely by the merchants. As a result the growers in the former areas get a much better return for their crop than those in the latter, where the merchants take quite a substantial share of the price paid by the consumer.





CHAPTER II

PRODUCTION

Although reliable information about the area and production of arecanut in the principal producing countries of South East Asia, is not available, it is reported that the area under it in Malaya is about 20,000 hectares and in Ceylon about 28,000 hectares.

Statistics on area and production in India which are based on departmental reports received from the State Governments, are also not very reliable. Recently, the Indian Central Arecanut Committee has undertaken a project for estimating the area and production and its results are expected to become available by the end of 1963-64.

Data on acreage and production in the principal producing States in two years, 1957-58 and 1962-63 are given in Table 2 below. District-wise figures are given in Appendix I.

TABLE 2
Area and production of arecanut

State	1957-58		1962-63	
	Area (hectares)	Production (quintals)	Area (hectares)	Production (quintals)
Kerala	58,582	466,923	56,740	462,300
Mysore	30,861	268,109	32,427	295,000
Assam	10,346	98,909	21,968	143,240
West Bengal ..	1,882	19,200	2,198	24,600
Maharashtra ..	2,042	19,416	2,045	28,360
Madras	1,341	10,753	1,724	15,550
Orissa	92	N.A.	51	N.A.
Andhra Pradesh	156	370	139	1,500
TOTAL ..	105,302	883,680	117,292	970,550

It will be seen from the above figures that about half of the production comes from Kerala. Mysore and Assam are the other important producing States; production in other States is small. Production in Kerala was somewhat lower in 1962-63 than in 1957-58; but in all other States, production in 1962-63 was higher, that in case of Assam and Madras being considerably higher than production in 1957-58.

The Indian production has never been adequate to meet the requirements of the country. Even though reliable estimates of consumption and deficit are not available, the quantities of arecanut imported from year to year give some indication of the latter. Data on imports of arecanut since 1947-48 are given in the following table.

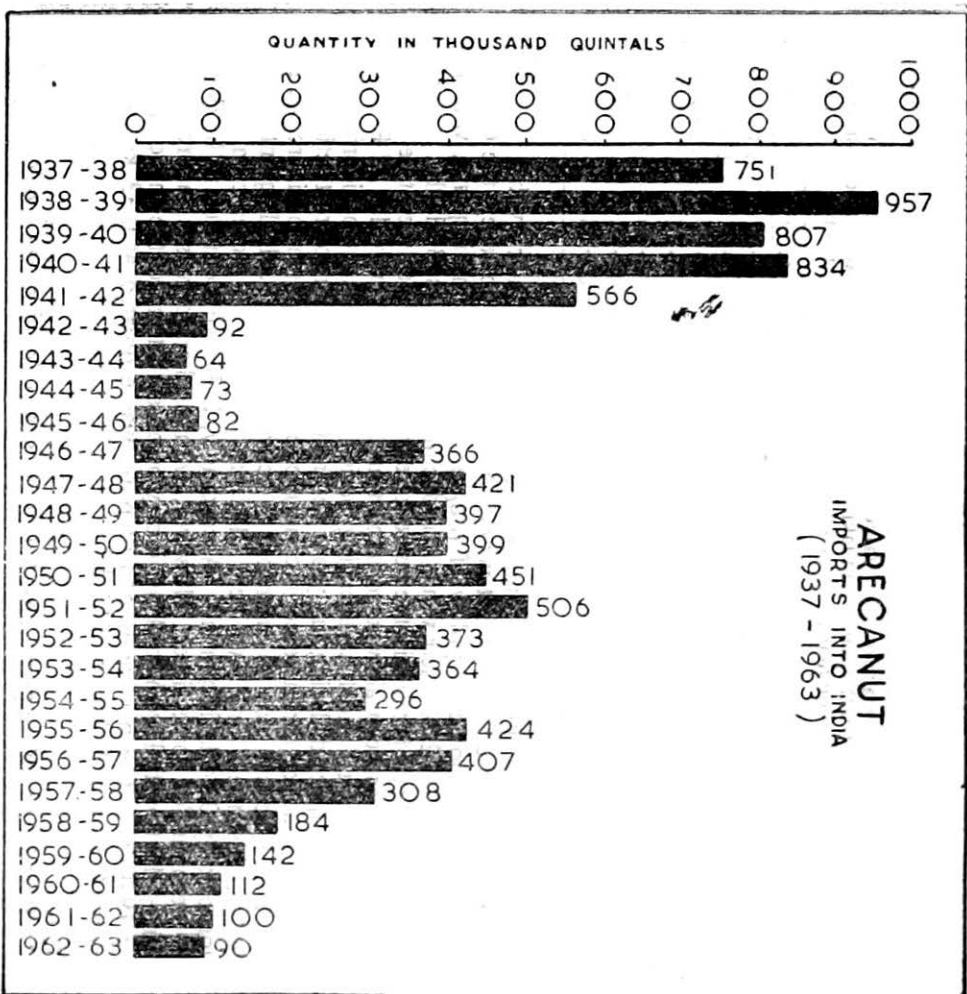
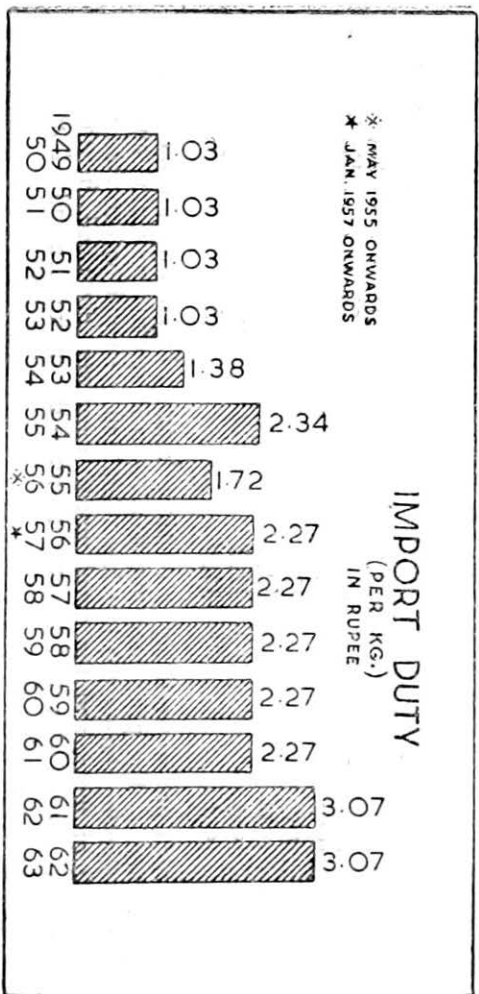


TABLE 3
Imports of arecanut into India

Year (April—March)	Quantity (In thousand of quintals)	Value (In lakh of Rs.)	Year (April—March)	Quantity (In thousand of quintals)	Value (In lakh of Rs.)
1947-48	.. 420.66	284.79	1955-56	.. 424.47	435.98
1948-49	.. 396.97	245.00	1956-57	.. 407.17	544.66
1949-50	.. 399.12	239.80	1957-58	.. 308.38	297.66
1950-51	.. 451.19	342.60	1958-59	.. 183.63	83.57
1951-52	.. 506.00	557.35	1959-60	.. 141.75	71.86
1952-53	.. 372.66	345.03	1960-61	.. 111.70	64.63
1953-54	.. 364.46	304.82	1961-62	.. 100.41	45.32
1954-55	.. 296.46	216.61	1962-63	.. 89.78	34.61

Imports were quite substantial up to 1957-58, their value ranging between 3 and 5 crores in most years. After this year however, the Government of India adopted a policy of progressively restricting imports, with the result that by 1962-63 their value had declined to only Rs. 35 lakhs. Imports are being reduced further in the current year (1963-64), as the State Trading Corporation has been allowed to import arecanut up to the value of Rs. 10.5 lakhs only during the first licencing period of the year. Considering the quantities imported during the years before the imposition of restrictions and making allowance for increase in consumption due to population increase, the deficit of arecanut may be estimated at between 2.0 to 2.5 lakh quintals. As against this, the Third Five Year Plan has proposed an increase in production of only 0.94 lakh quintals. Accordingly, India will continue to be deficit in arecanut for some time. However, with further increases in production during the Fourth Five Year Plan, it may be possible to meet the entire demand by 1970-71. The per capita consumption was estimated at 0.33 kg. on the basis of the population in 1957-58.

Prices

Restriction of imports has led to a sharp increase in prices as the following figures show:—

TABLE 4
Economic Adviser's Index number of Betelnuts

(1952-53=100)			
1950	107.2	1957	158.4
1951	108.2	1958	213.4
1952	97.9	1959	215.7
1953	127.8	1960	229.7
1954	130.9	1961	257.4
1955	122.2	1962	251.6
1956	134.6	1963	250.2

These high prices are likely to continue because imports have been stopped altogether. The price incentive has led to increased production and additional planting during the last few years and it should be expected that as a result of these, and the development measures described in the next Chapter, the country will be able to meet the entire demand of arecanut from internal production.

CHAPTER III

REVIEW OF DEVELOPMENT MEASURES

The cost of imported arecanut being appreciably less than that of the local produce, heavy imports up to 1957-58, resulted in prices of arecanut remaining low. This affected the economic conditions of arecanut growers in the country. They also suffered as a result of the ravages of 'Mahali' and other diseases of the crop. A protective import duty in arecanut which had been imposed in 1946, was gradually raised from 1.03 per kg. to Rs. 2.27 per kg. But this was not sufficient to meet the difficulties of arecanut producers. Production of arecanut in the country has received a fillip only after the progressive restriction of imports after 1957-58.

(i) The Indian Central Arecanut Committee

With a view to assisting development of arecanut cultivation in the country through programmes of research, development and improvement of marketing, the Indian Central Arecanut Committee was established by the Government of India in 1949. Until then, little attention had been paid to development of this crop or scientific study of its problems, except for isolated efforts to control diseases which were undertaken from time to time.

(ii) The First Five Year Plan

In the first few years its establishment *i.e.*, till the end of the First Plan period, the activities of the Committee were confined to setting up of nurseries in important potential regions like Assam, West Bengal and the northern part of Kerala; carrying out surveys to determine the possibility of introducing arecanut in other regions, undertaking plant protection measures in certain parts of Kerala and Mysore. This activity was given up after two years—and organisation of cooperative marketing societies was also taken up. A review of the work done during the First Plan period showed that the nursery scheme had not resulted in any appreciable extension of the area under the crop, because most of the seedlings produced were used for under-planting in the existing gardens.

(iii) The Second Five Year Plan

It was only during the period of the Second Five Year Plan, that the Committee undertook a regular programme of research and development. A target of extending the area under the crop by 3,723 hectares and increasing production by 1.89 lakh quintals to reach a total of 10.15 lakh quintals by 1960-61, was fixed. The development measures included in the Plan were :—

- (a) establishment of new nurseries;
- (b) laying out demonstration plots;
- (c) grant of loans for pump sets, tube wells, etc. for irrigation;
- (d) supply of fertilizers and manures on credit/subsidy;
- (e) subsidy for sprayers and chemicals for plant protection measures;
and
- (f) publicity and propaganda.

The State-wise distribution of targets of additional area and production are given in the following Table.

TABLE 5
Targets for the Second Five Year Plan

State	1956-57		1960-61	
	Area (hectares)	Production (quintals)	Area (hectares)	Production (quintals)
Kerala	60,460	452,852	61,108	473,828
Mysore	29,583	212,747	31,120	351,032
Assam	10,319	97,042	10,967	114,025
West Bengal ..	1,821	19,222	2,469	24,447
Bombay	2,023	26,127	2,185	31,352
Madras	1,214	18,662	1,295	21,275
TOTAL	105,420	826,652	109,144	1,015,959

A review of the work done during the Plan period is given below.

Nurseries and bringing additional area under arecanut.—The nursery programme did not make good progress in the early years of the Plan but gathered momentum later. By the end of the Plan period, 959 nurseries had been established as against a target of 1,297. The target for production of seedlings had been fixed at 17.5 million in the Plan. However, actual production was only 6.3 million and only 3.6 million seedlings were distributed. The additional area covered was 1,841 hectares as against the target of 3,723 hectares. But, at the end of the Plan period, the State Governments had enough stock for covering an additional area of 1,330 hectares.

Irrigation.—No irrigation programme meant specifically for arecanut was undertaken in any State, though in Madras the general facilities available for minor irrigation were extended to arecanut also.

Distribution of fertilizers.—The Plan programme of fertilizer distribution also could not make progress. The Kerala Government wanted medium term loans instead of short-term loans but could not get these. The Mysore Government sanctioned loans but the amounts were subsequently withdrawn. In Madras, the loans sanctioned for purchase of fertilizers for arecanut were diverted for utilisation on the coconut crop.

Plant protection.—Both in Kerala and Mysore States, facilities for supply of sprayers and fungicides were offered through the depots maintained by the State Departments of Agriculture. Besides commercial agencies and some of the progressive cooperative marketing societies also distributed these. But no data on quantities distributed are available. The scheme for spraying against the yellow leaf disease of arecanut in Kerala State was started during the latter part of 1959-60 and was continued during 1960-61 and about 50,000 trees were sprayed. But no material benefits were reported to have been achieved due to adverse weather conditions. Plant protection measures against 'mahali' were also undertaken in certain parts of the State. In Mysore, 'mahali', 'anabe' etc. were kept under check wherever these were reported.

The entire area in the districts of Kanyakumari, Salem and Coimbatore where *mahali* and *wilt* disease were prevalent, was treated with Bordeaux mixture.

A brief review of the work done in the States is as follows :—

Kerala.—As explained earlier, schemes for grant of loans for irrigation and distribution of fertilizers and manures could not be implemented. As regards seedlings, actual production was 18.01 lakh seedlings against a target of 28.8 lakhs. Under plant protection, 50,000 plants were treated in each of the two years 1959-60 and 1960-61. The total expenditure incurred during the Plan period was Rs. 2.98 lakhs as against an allotment of Rs. 3.61 lakhs.

Mysore.—The State's plan provided for establishment of four nurseries with an annual target of production of 50,000 quality seedlings per nursery to bring in an additional area of 1,537 hectares during the Plan period and to increase production by 1,40,000 quintals. The estimated expenditure was Rs. 3,38,700. Against this target of raising 12 lakh seedlings, the number actually raised was 13.38 lakhs. Similarly, the target for the additional area was also exceeded and 1,619 hectares were brought under arecanut. Among other measures undertaken in the State were issue of loans to arecanut growers, construction of minor channels, issue of chemical fertilizers, pesticides and plant protection equipments.

Assam.—The Assam plan provided for an increase in area under arecanut by 650 hectares and in production by 70,000 quintals. The schemes included in the Plan were extension of cheap credit facilities for intensifying cultivation, technical guidance to growers for raising plantations and for processing the nuts, and grant of subsidy for manuring and plant protection. According to periodical reports received from the State Government, a total of 6.24 lakhs seedlings were distributed. No report has been furnished regarding increase in production achieved as a result of this. Progress of expenditure was also not satisfactory, because against an allotment of Rs. 3.8 lakhs, actual expenditure was only Rs. 2.06 lakhs.

West Bengal.—The West Bengal Plan provided for an increase in area of 648 hectares and in production of 5,225 quintals. The schemes included in the Plan were distribution of quality seedlings, helping growers in rejuvenation of existing gardens, selection of new sites for and laying out of new plantations, preparation and distribution of propaganda leaflets etc. Three nurseries with an annual production of 90,000 seedlings were proposed to be established. However, progress on this programme was very slow and the total number of seedlings distributed from all nurseries was only 3.7 lakhs. Progress of expenditure was also not too satisfactory, because against an allotment of Rs. 2.63 lakhs, actual utilisation was only Rs. 1.30 lakhs.

Madras.—Madras also had a small programme of increasing the area by 81 hectares and production by 2,600 quintals. No separate scheme for development of arecanut was taken up in the State and whatever work was done, was undertaken as part of the normal agricultural development programme.

Maharashtra.—The Plan had fixed a target of increase in area by 162 hectares and in production by 5,225 quintals. No separate scheme for arecanut development was in operation in the State. But incentives by way of loans and subsidies were offered to the arecanut growers under the agricultural development programme of the State. Figures on achievement have not been reported,

Orissa.—Production of arecanut in the State is very small and the Plan did not fix any target for increasing the area or production. However considering the potentialities of developing arecanut cultivation in the State, a scheme for setting up 3 nurseries with a total annual production of 50,000 seedlings was sanctioned. However, a number of difficulties were experienced in implementing the scheme and by the end of the Plan only about 97,500 seedlings were produced, out of which 21,400 seedlings were actually distributed.

Research

The research programmes undertaken during the Second Plan period included setting up of a Central Research Station at Pittal in Mysore State directly under the Indian Central Arecanut Committee, and 5 regional research stations—2 in Kerala and 1 each in Mysore, Assam and West Bengal. The Central Research Station undertakes fundamental research on all aspects of arecanut and coordinates the activities of the regional stations, the latter are concerned primarily with research on problems of regional interest.

The investigations carried out at the Central Research Station related mainly to standardisation of nursery practices including working out criteria for selection of seed nuts, study of effects of spacing and methods of aligning rows on incidence of sun-scorch on the palm and of optimum manurial requirements. Trials to determine the methods of controlling premature seedling of nuts and the incidence of mites and the '*mahali*' and '*band*' diseases were also conducted. The etiology of the pathogen was under study and investigations on forecasting the occurrence of the disease every year were taken in hand. These investigations are still in progress. However, based on the experience of progressive growers and with the background of the preliminary results obtained at the research stations, some recommendations were made for the benefit of the growers. These related to adoption of improved nursery techniques; methods of laying out and planting; adoption of improved cultivation practices including irrigation, drainage, manuring and inter-cropping, measures for protecting the crop from pests and diseases like mites, '*mahali*' and '*anabe roga*', '*stem-breaking*'; proper methods of harvesting, curing, processing, etc. The recommendations were widely publicised through the State Governments and the Committee's own staff located at the research centres. But no quantitative assessment of the results of the improved measures could be made, mainly because unlike food crops, no yardsticks of additional production resulting from such improved methods have so far been evolved. However, efforts are being made to evolve such yardsticks.

Work at the Regional Research Stations was largely confined to standardisation of nursery practices and working out manurial requirements, spacing, inter-cropping, green manuring, etc., suitable for their respective regions. Trials were also conducted on the use of copper fungicides for control of the '*koleroga*' disease.

Besides these research activities, the Committee also financed *ad hoc* research schemes in some States like investigation of the effect of pre-treatment of arecanut with specific enzymes on germination at the Gauhati University in Assam; investigations on the '*band*' disease of the palm in Maharashtra and Mysore and research on the new yellow leaf disease and control of '*anaberoga*' in Mysore.

The Committee also established a Central Technological Unit at the Central Food Technological Research Institute in Mysore. Under this project, the Arecanut Technologist of the Committee undertook a rapid survey of the arecanut growing regions and prepared a comprehensive technical programme consisting of :

- (a) standardisation of curing and drying processes and products;
- (b) developmental processes which can be directly applied in industry;
- (c) utilisation of wastes;
- (d) fundamental investigations into the role of chewing in human metabolism.

A boiler-cum-drier was designed and fabricated and field trials initiated. Studies on the storage of ripe and green arecanuts as well as processed and dried fruits, and analytical work on the composition of different varieties and trade types of arecanut were carried out, besides standardisation of techniques for the routine determination of chemical constituents of arecanut. The Committee also financed advanced technological research at certain Universities, e.g., study of the physiological constituents of arecanut in relation to their effect on mucus membranes at the Calcutta University; fundamental work on Polyphenols at the Delhi University; trials on methods of preservation of arecanut at the Kerala University and studies on the role of phenolic constituents at the Gauhati University.

A scheme for conducting a *Pilot Sample Survey* for the correct estimation of area and production of arecanut and coconut, was jointly launched by the Indian Central Arecanut Committee and the Indian Central Coconut Committee in the important arecanut and coconut growing States of Kerala, Mysore, Assam, Maharashtra, Andhra Pradesh, Orissa, Madras and West Bengal. This scheme also provided for collection of information on cultural practices like manuring; plant protection measures; requirement and availability of seedling and disposal of produce. Work under this scheme was started in 1958-59 in all States except West Bengal. But progress on the scheme has been slow. Although it was expected that the scheme would be completed with three rounds of survey by the end of the Second Plan period, it is now expected to be completed only during 1963.

Marketing

In the field of marketing, the Committee undertook a programme of promotion of cooperative marketing societies. Financial assistance was granted to 14 existing societies, and 9 additional societies were set up, raising the total number to 23. Of these, 9 societies each are located in Kerala and Mysore, 4 are in Maharashtra and one is in Madras. These societies provide loans to their members for production purposes on the security of the arecanut gardens or of the standing crops or of the produce stored in their custody. They arrange for marketing of the stocks pledged with them in the important markets to enable the growers to obtain better prices. Some progressive societies also undertake supply of chemical fertilisers, insecticides, sprayers, agricultural implements and articles of domestic use. A marketing survey on arecanut was conducted under the aegis of the Directorate of Marketing, Government of India, and data on production, demand and marketing of different types and grades of arecanut were collected.

(iv) The Third Five Year Plan

Research development, marketing and other activities relating to arecanut started during the Second Plan have been continued during the Third Five Year Plan. The Plan envisages an increase in the area under arecanut from 1.1 lakh hectares (1960-61) to 1.2 lakh hectares (in 1965-66) with an increase in production from 9.7 lakh quintals to 10.55 quintals. The increases in production are indicated in Table 6 below,

TABLE 6

Plan for increasing the production of arecanut during the Third Five Year Plan

STATE	Production in quintals						
	At the close of						
	2nd Plan 1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	Increase
Kerala	466,930	470,820	471,270	477,320	483,360	492,070	25,140
Mysore	250,160	253,320	253,490	258,230	262,970	275,160	25,000
Assam	175,440	176,340	176,900	179,520	182,140	212,760	37,320
West Bengal	24,600	24,940	24,990	25,590	26,200	27,020	2,420
Maharashtra	28,360	28,360	28,360	28,360	29,060	29,900	1,540
Madras	13,900	14,050	14,540	15,020	15,510	17,480	3,580
Orissa	—	—	—	—	150	300	300
Andhra Pradesh	920	940	950	970	980	1,000	80
TOTAL	960,310	968,770	970,500	985,010	1,000,370	1,055,690	95,380

Development schemes

The Plan includes a provision of Rs. 53.53 lakhs for development schemes, which are more or less of the same type as those included in the Second Plan. State-wise allocation of funds on these schemes is given in the following table, and a list of the schemes included in State Plans is given in Appendix II :—

TABLE 7

Allocation of funds for development schemes in Third Five Year Plan

	Rs. in lakhs
Kerala	15.08
Mysore	12.06
Assam	5.00
West Bengal	2.41
Maharashtra	10.41
Madras	4.00
Andhra Pradesh	0.95
Orissa	1.62
Tripura	1.06
Andamans	0.94
TOTAL ..	53.53

It will be seen from Appendix II that the Plan places considerable emphasis on the nurseries programme. It provides for establishment of 53 State nurseries, 125 certified nurseries and 7 nurseries attached to research stations with an aggregate capacity of about 50 lakh seedlings per year.

A review of the work actually done during the first two years of the Plan shows that progress has not been satisfactory in some States. Thus in Assam, the schemes of development have not been even finalised so far. But, the tempo of work is expected to be stepped up in the remaining three years of the Plan.

Research

The Plan includes a provision of Rs. 15 lakhs for expansion of the research activities at the Central and Regional research stations. The important experiments to be undertaken include assessment of water requirements of arecanut in different regions; evolution of disease resistant varieties suited to different soil and climatic conditions and the determination of nutritional requirements of the crop. Fundamental research on the botany, chemistry and entomology of arecanut is also being undertaken.

Similarly, the Plan provides for continuation of the Arccanut Committee's activities in the technological field.

Under the programme of development of cooperative marketing, provision has been made for financial assistance to existing cooperative marketing societies. As mentioned earlier, there were 23 such societies (including a State Federation) in 1961-62, located in the States of Kerala, Mysore, Maharashtra and Madras. A recent study of these societies indicates that these have been making steady progress with increases in membership, share capital, quantity of produce handled and profits. The Indian

Central Arecanut Committee has also in view extension of the scheme of regulated markets to areas where these do not exist at present. A scheme for introduction of experimental grading stations in different States, with a view to determining the feasibility of introducing grade standards for arecanut is also under consideration.

(v) **Need for further work**

The fore-going review indicates that production of arecanut in India is not sufficient to meet the requirements of the country. And, as the policy of progressively reducing imports which has been followed by the Government after 1957-58 is likely to continue, it is essential that adequate efforts are made to increase indigenous production so as to meet the existing deficit and also the increase in demand resulting from the growth of population. The above review indicates that the development work on arecanut started late and progress on it has been rather slow during the last few years. Increasing production of arecanut has its own problems. Firstly, as arecanut is a tree crop, results of efforts to increase production and especially of fresh plantations are not visible for several years. Secondly, arecanut is predominantly the crop of the small farmer who has a small area under it or who has a few arecanut trees growing on his holding along with various other trees. Consequently his interest in arecanut cultivation is only subsidiary, and acceptance of improvements which would increase production tends to be slow. Arecanut plantations of substantial size are found only in Mysore and the Mettupalayam area of Madras. The physical and growth characteristics of the crop encourage its cultivation as a subsidiary crop especially in coconut plantations. The plant thrives well under the same soil and climatic conditions as coconut, and its cultivation in coconut gardens is advantageous in as much as the coconut trees provide shade which is essential for arecanut especially in the earlier stages of its growth. Further, the two palms are susceptible to a number of common pests and diseases so that from the point of view of control of these diseases also, their cultivation side by side is preferable.

There is considerable scope for further work in all directions—research, development, processing and industrial uses of the arecanut and palm and improved arrangements for marketing.

Research work on arecanut is still in its initial stages, and the various studies which have been started will have to be continued and intensified. The research programmes undertaken so far relate mainly to improved agricultural practices and combating the major diseases of the plant. No research on the fundamental botanical, pathological or agronomic aspects of the crop has so far been carried out anywhere. Such fundamental work will also have to be started in future.

The cultural practices followed by arecanut growers vary from region to region and within the same region from locality to locality. There is considerable scope for improving the existing practice of raising nurseries. Under existing practices the palms do not yield uniformly and it has been estimated that between 5 to 20 per cent of the trees in any garden are not profitable. Similarly, proper use of manures and fertilizers can also result in considerable increase in production. Data obtained from manurial trials conducted by the Indian Central Arecanut Committee have indicated that yields could be stepped up by as much as 50 to 100 per cent by intensive application of fertilizers. The existing practice regarding use of manures and

fertilizers varies very greatly in different arecanut producing areas. While in some areas farmyard and green manures are extensively used, in others manuring receives no attention. Even in areas where manuring is practised, farmers experience difficulties in getting their requirements of manures and fertilizers. Irrigation and drainage also need attention. It has been estimated that only 25 per cent of the area receives irrigation. The crop is susceptible to many diseases and suffers badly due to scorching by the sun. Pests like mites are also known to cause considerable damage. Further physiological disorders are known to exist in different regions. Research work on combating diseases and systematic plant protection measures are obviously necessary to reduce damage from these.

A great deal of work also needs to be done in improving processing of arecanut and utilisation of its by-products. As explained earlier, the nut is consumed both in the processed and unprocessed forms and the type of processing done in different areas depends upon the tastes of the consumers. The present methods of curing and processing, many of which have been in existence for centuries are wasteful, and can be improved with considerable advantage.

The by-products, particularly the husk, are just waste at present. Experimental work has shown that the husk can be profitably utilised in industry; but this work has to be followed up by pilot plant trials. Chemical constituents like alkaloids and tannin present in the kernel can also be used in pharmaceutical and other industries, but in their case systematic investigations have yet to be undertaken.

Improvement in marketing is another field which requires further attention. The fact that arecanut is produced mainly by small farmers scattered in different areas makes the present systems of collection and marketing rather wasteful. The Indian Central Arecanut Committee has, from its inception, been giving attention to improvement of marketing and even though a good deal of work has been done and promising results obtained, much remains to be done in most of the arecanut growing areas. Cooperative marketing in particular needs intensive development. It has been estimated that while in Mysore, 34 per cent of the total crop is marketed by the cooperative societies, in a number of other States, cooperative marketing has not made any progress. Mysore has an advantage in that most of the growers have plantations of comparatively large size and undertake curing and processing themselves. The only other area with similar advantages is the Mettupalayam area of Madras. In the other States, marketing and processing is entirely in the hands of the merchants who take a large share of the price paid by the consumer. Introduction of scientific methods of collection and processing and of marketing through cooperative societies which would give an adequate return to the grower are most important for the development of arecanut cultivation.

CHAPTER IV
RECOMMENDATIONS

<i>Recommendations</i>	<i>Action to be taken by</i>
<p>1. Nurseries : On account of high prices which have been ruling due to stoppage of imports in recent years sufficient incentive has been provided to the growers who are planting more trees on their own. But, as arecanut is a tree crop, nursery schemes have great importance for it. In the Second Five Year Plan, 959 nurseries were started from which 36 lakh quality seedlings were distributed. In the Third Five Year Plan, production from Central, Regional and State nurseries is expected to be of the order of 250 lakh seedlings. For the Fourth Five Year Plan, it is proposed to have 16 State nurseries and 420 certified nurseries with a target of 167 lakh quality seedlings. All these trees are likely to bear after six years and, assuming 75% survival, are likely to give an additional production of 14,000 metric tonnes. It is felt that the measures proposed are adequate.</p>	<p>Ministry of Food & Agriculture, Indian Central Arecanut Committee, and State Governments.</p>
<p>2. Plant Protection : During the Second Five Year Plan period, intensive spraying against <i>yellow leaf</i> disease was done in Kerala and against <i>mahali</i> in Kerala and Mysore. This work has to be extended to other areas where the disease is prevalent. During the Third Plan period, sprayers, fungicides and pesticides are being distributed and the same need to be continued during the Fourth Plan also. Research work on diseases and pests of arecanut has been initiated from the Second Five Year Plan but it requires to be intensified and pursued till conclusive results are obtained.</p>	<p>Do.</p>
<p>3. Irrigation and Manuring : Trials to determine the water requirements of arecanut have been laid out during the Third Plan and work on this aspect need to be further intensified. Distribution of pumping sets to growers also, taken up during this period, should be continued in the Fourth and subsequent Plans.</p>	<p>Ministry of Food & Agriculture, Indian Central Arecanut Committee, and State Governments.</p>
<p>As regards manuring, the trends of trials laid out during the Second Five Year Plan, for determining the nutrient requirements have indicated that the yield can be stepped up by 50 to 100 per cent by intensive application of fertilisers. These investigations should be intensified and the results</p>	

RECOMMENDATIONS—*contd.*

<i>Recommendations</i>	<i>Action to be taken by</i>
<p>already obtained should be passed on to the extension workers. Fertilisers should be made available on credit.</p> <p>These measures are necessary to get the maximum output from the existing plantations.</p>	<p>Indian Central Arecanut Committee and Indian Council of Medical Research.</p>
<p>4. Need of a pharmacological scheme : There is an urgent necessity of pharmacological research on the effects of betelnut, betel leaf and other constituents of <i>pan</i> on the human system. Though there is a general belief that chewing of betelnuts strengthens the gums and helps digestion, it must be scientifically established by undertaking investigations under a joint scheme sponsored by the Indian Central Arecanut Committee and the Indian Council of Medical Research.</p>	

APPENDIX I

State and district-wise area and production of arecanut in the principal growing States in India (1962-63)

State	District	Area (hectares)	Production (quintals)	
1. Kerala ..	Trivandrum	3,690	30,054	
	Quilon	4,127	33,597	
	Alleppey	2,572	20,970	
	Kottayam	4,554	37,139	
	Ernakulam	4,614	37,597	
	Trichur	4,545	37,082	
	Palghat	5,833	47,481	
	Kozhikode	18,225	148,500	
	Cannanore	8,580	69,880	
	TOTAL ..	56,740	462,300	
2. Mysore ..	Bangalore	379	327	
	Kolar	95	113	
	Tumkur	2,913	27,260	
	Mysore	631	1,159	
	Mandya	258	1,365	
	Hassan	1,239	5,051	
	Shimoga	6,394	82,889	
	Chickmagalur	5,192	19,072	
	Chitaldrug	1,611	6,116	
	Dharwar	110	93	
	North Kanara	6,904	91,249	
	South Kanara	6,368	59,570	
	Coorg	333	736	
		TOTAL ..	32,427	295,000
3- Assam	Cachar	1,437	18,747	
	Goalpara	2,884	9,659	
	Kamrup	2,817	11,955	
	Darrang	2,632	26,445	
	Nowgong	1,699	9,350	
	Sibsagar	2,347	20,288	
	Lakhimpur	2,388	17,900	
	United Mikkir & North Cachar Hills	134	—	
	United K. & J. Hills	5,464	28,896	
	Garo Hills	166	—	
		TOTAL ..	21,968	143,240

State	District	Area (hectares)	Production (quintals)
4. West Bengal	Calcutta	5	94
	24-Parganas	324	3,284
	Nadia	5	35
	Murshidabad	10	2
	Burdwan	7	44
	Bhirbhum	—	—
	Bankura	—	—
	Midnapore	113	779
	Hooghly	25	171
	Howrah	36	810
	Jalpaiguri	744	6,517
	Darjeeling	11	134
	Malda	7	402
West Dinajpur	32	536	
Cooch Behar	879	11,792	
	TOTAL	2,198	24,600
5. Maharashtra	Kolaba	507	7,115
	Ratnagiri	1,538	21,245
	TOTAL	2,045	28,360
6. Madras	Salem	445	3,354
	Coimbatore	708	6,707
	Tanjavur	21	102
	Madurai	8	—
	Tirunelveli	194	1,932
	Nilgiris	4	—
Kanyakumari	344	3,456	
	TOTAL	1,724	15,550
7. Orissa	Puri	4	—
	Cuttack	45	—
	Balasore	2	—
	TOTAL	51	N.A.
8. Andhra Pradesh	Srikakulam	—	1
	East Godavari	9	132
	Anantapur	130	1,367
	TOTAL	139	1,500
TOTAL ALL INDIA		117,292	970-550

APPENDIX II

Areca nut Development Programme of States for the Third Plan

Name of State	Schemes included in the programme
I. Kerala	<ol style="list-style-type: none"> 1. Nurseries 2. Scheme for control of pests and diseases 3. Publicity 4. Demonstration for package treatments 5. Long-term loan for extension of area 6. Fertiliser scheme 7. Scheme for issue of loan/subsidy for irrigation 8. Elite gardens.
II. Mysore	<ol style="list-style-type: none"> 1. Nurseries 2. Demonstration plots 3. Publicity 4. Loans to areca growers for raising new gardens and for rejuvenation of existing gardens. 5. Plant protection scheme 6. Fertiliser distribution scheme 7. Irrigation.
III. West Bengal ..	<ol style="list-style-type: none"> 1. Nurseries 2. Demonstration plots 3. Distribution of fertilisers and manures 4. Supply of green manure 5. Irrigation loans 6. Plant protection.
VI. Madras	<ol style="list-style-type: none"> 1. Nurseries 2. Plant protection scheme 3. Scheme for conducting simple manurial trials and study of control measures for pests and diseases. 4. Fertiliser distribution.
V. Maharashtra ..	<ol style="list-style-type: none"> 1. Distribution of seedlings 2. Rejuvenation of existing gardens.
VI. Orissa	<ol style="list-style-type: none"> 1. Nurseries 2. Demonstration plots.
VII Andhra Pradesh ..	<ol style="list-style-type: none"> 1. Scheme for encouragement of areca nut cultivation in Andhra Pradesh. 2. Scheme for introduction of areca nut cultivation in Telengana region. 3. Scheme for development of areca nut in Andhra Pradesh.
VIII. Andamans	<ol style="list-style-type: none"> 1. Nurseries.
IX. Tripura	<ol style="list-style-type: none"> 1. Nurseries. —

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