Ceylon Cocon. Quart. (1968) 20,—145-160

THE COCONUT INDUSTRY AND PLANTING PROGRESS

By W. R. N. NATHANAEL,

Coconut Research Institute, Lunuwila, Ceylon.

The systematic cultivation of coconut as a plantation crop in Ceylon followed the birth of the soap industry in Europe in the middle of the nineteenth century.

It is reckoned that in 1860 there were about 250,000 acres of coconut land in Ceylon, and according to Census figures this had reached 1,152,418 acres in 1962. There has been no recent expansion in the form of large scale new plantations. Census data further reveal that at present 73.2 per cent of the total acreage consist of holdings under 50 acres in extent, so that coconut growing in Ceylon is now predominantly the small man's investment almost entirely in Ceylonese hands.

A Replanting Scheme for the supply of selected seedlings at subsidised rates was inaugurated in 1949 with the establishment of the Planting Division at the Coconut Research Institute. Since the inception of this scheme an estimated acreage totalling about 250,000 have been planted. At the rate of 75 palms to the acre, the planting material issued during the past 12 years would be equivalent to an acreage of 18,000 replanted annually. The distribution of this has been roughly 50 : 50 for new planting and under planting.

An estimate has been made that about 7,000 acres of coconut land pass the period of peak production every year. In effect, the Replanting Scheme would compensate for this besides renewing an extra 10,000 acres every year.

A recent survey has shown that, if at all, only another 50,000 acres of suitable uncultivated land is yet available for coconut planting. This confirms the opinion that no substantial increase in the Island's coconut production could be achieved through the medium of planting new land under coconut. The only other way open for increasing production is by systematic replanting coupled with intensified farming methods.

On the basis of available evidence it could be assumed that the coconut palm has been growing in Ceylon for at least a period of 2,200 years. The possibility exists that the first seed-coconuts were carried to the shores of Ceylon on the surface of the sea and were self-planted. It is however more probable that ancient merchant-explorers who carried coconuts with them to provide food, fuel and drink, during their long voyages, planted some of those nuts that had sprouted *en-route*, in Ceylon.

EARLY PLANTING

According to the *Mahavamsa*, the coconut palm was well known and recognized as a useful and ornamental plant as far back as 137 B.C., and the early Sinhalese monarchs extended its cultivation owing to its great usefulness as a food crop. (Pieris 1941).

Among the Europeans who occupied the Island, the Portuguese (1505-1658) did not devote much attention to coconut cultivation. The crop however acquired economic importance after the arrival of the Dutch (1658-1796). Coconut cultivation was extended during their rule, and large gardens were established and farmed out in the maritime districts of Ceylon.

According to Bertolacci, when the British (1796-1948) took over power, the entire coastal plain between Chilaw and Matara was a continuous grove of coconut palms, indicative of the progress made under the Dutch. At this time, it has been roughly estimated that Ceylon had 10 million coconut palms (i.e. about 142,000 acres)—mostly in village holdings. The crop however remained purely a commodity of local importance even at the end of the eighteenth century.

SYSTEMATIC CULTIVATION

Regarding the systematic cultivation of coconut as a plantation crop, it really followed the birth of the soap-industry in Europe in the middle of the nineteenth century. European enterprise first laid down commercial plantations (mainly in the Jaffna and Batticaloa districts) during the eighteen forties. Rapid development followed thereafter, consequent on the release of

thousands of acres of low country reserves of Crown Land, by the British Government. Mostly due to Ceylonese enterprise, large plantations, estates and small-holdings were established under coconut in the Western, and North-Western Provinces. Cultivation gradually extended into other Parts of Ceylon as well, so that the palm was successfully established as a plantation crop even at 2,000 feet elevation in areas remote from the sea.

Ferguson has reckoned that in 1860 there were about 250,000 acres of coconut land in Ceylon, and the following estimates for subsequent periods indicate that there has been no recent expansion in the form of large scale new plantations. (Department of Census and Statistics 1956).

Year	*Acres*
1800	142,000
1860	250,000
1893	650,000
1921	820,000
1929	1,076,000
1946	1,071,000

According to Census figures the acreage was 1,152,418 in 1962 (Sastry 1967).

With the passage of time, these lands have suffered fragmentation through processes of inheritance, transfer and sale mostly to small estates or small-holdings less than 50 acres in extent. TABLE — 1, summarises the present distribution of area under coconut cultivation by size class of holdings.

TABLE — 1 *

Distribution of Area under Coconut Cultivation by size Class of holdings (1962).

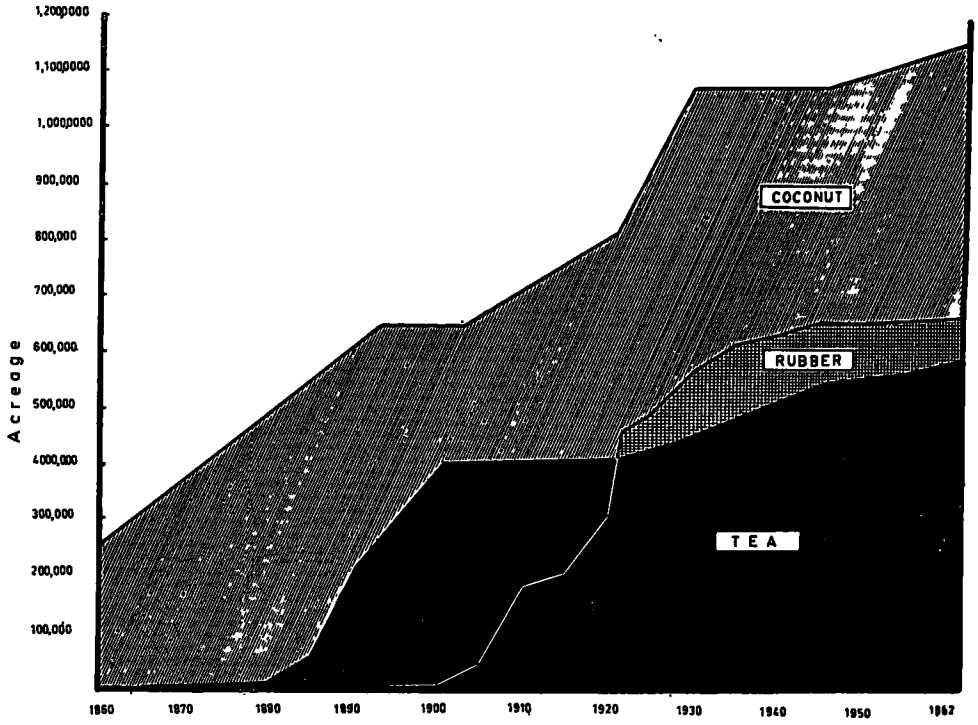
1	2		3	
Size Class of Holding (acres)	*EXTENT OF HOLDINGS*		*HOLDINGS*	
	Acres	*As % of Total*	*Number*	*As % of Total*
Under 0.25 ...	6,114	0.5	53,245	6.3
0.25 to under 0.5 ...	18,322	1.6	92,191	10.9
0.5 to under 1.0 ...	42,205	3.7	126,960	15.1
1.0 to under 2.5 ...	158,637	13.8	247,518	29.4
2.5 to under 5.0 ...	177,807	15.4	168,533	20.0
5.0 to under 10.0 ...	176,541	15.3	110,246	13.1
10.0 to under 25.0 ...	161,603	14.0	32,943	3.9
25.0 to under 50.0 ...	102,397	8.9	7,377	0.9
50.0 and over ...	308,792	26.8	3,097	0.4
Total ...	1,152,418	100.0	842,110	100.0

* *Source : Department of Census & Statistics : Ceylon.*

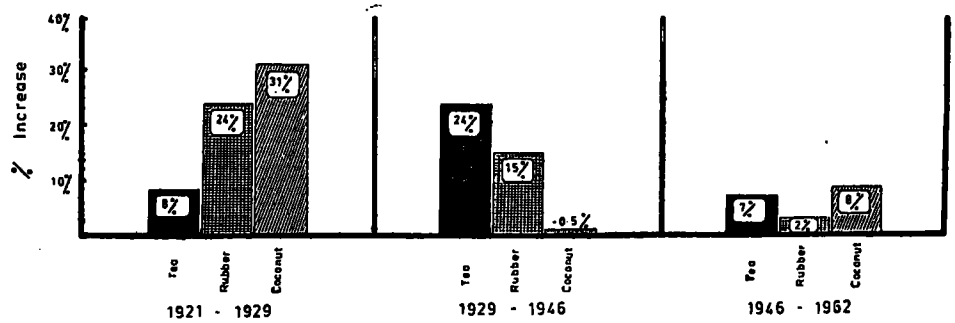
A Planting Division Nursery

Progressive Increase in Acreages

(Tea, Rubber & Coconut)



Relative Rates of Increase in Acreages



FIGURE—1 Progressive Increase in Acreages

(Tea, Rubber & Coconut.)

It will be seen from the figures that at present over 70 per cent of the total acreage consist of small-holdings (under 50 acres in extent), so that coconut growing in Ceylon is now predominantly the small man's investment almost entirely in Ceylonese hands.

As it exists today, the centre of coconut cultivation lies within a triangle whose corners are Colombo, Chilaw and Kandy. This area reaches far inland and includes a great deal of hilly and even mountainous country. Coconut is also found growing extensively within a narrow coastal strip 5 to 10 miles in width from Colombo to Matara, and in small scattered areas elsewhere, notably in the Mannar Peninsula and in the neighbourhood of Batticaloa, Trincomalee, Puttalam and Jaffna.

A recent survey has shown that not more than 50,000 acres of suitable uncultivated land is yet available for coconut planting. (Land Utilization Committee 1968).

NATIONAL AND GLOBAL ASPECTS

A significant feature of Ceylon's economy is that about 67 per cent of our agricultural output is produced for export. Further the export earnings from the three major agricultural crops, viz., tea, rubber and coconut, account for over 95 per cent of the total foreign exchange earnings of the country. As far as coconut is concerned, although only 50 per cent of the total production is exported, its annual export earnings represent 16% of Ceylon's foreign exchange earnings. The curves in FIGURE — I illustrate the progressive relative expansions in the acreages under the three crops over the years. It will be seen that coconut is the most extensively cultivated of the plantation crops and almost corresponds in area to the combined acreage cultivated in tea and rubber. A further point is that the present coconut acreage (1.15 m.) comprises about a third of the total cultivated land (3.5 m.) in Ceylon.

Though the acreage under coconut has remained fairly static for some time around 1.1 million acres, the coconut industry still continues to be one of the massive pillars of economic security for the people. With 73.2% of the total acreage found in holdings under 50 acres in extent, coconut cultivation is obviously the broadest based of Ceylon's plantation industries.

If coconut statistics are analysed by countries, it will be found that the world acreage is about 10.3 million acres with six large producing areas—the Philippines (2.5 m.), Indonesia (2.5 m.), India (1.6 m.), Ceylon (1.1 m.), Malaysia (0.6 m.), and Oceania (0.6 m.). The present Ceylon acreage thus constitutes 10.7 per cent of the world total. As far as production figures are concerned, the world figure has been estimated at 27,900 million nuts per year. Ceylon's annual production of 2,800 m. nuts is therefore 10 per cent of this, and is equivalent to a yield of 2,500 nuts per acre per annum. The corresponding global average has been estimated at 2,700 nuts per acre per annum.

REGENERATION OF COCONUT PLANTATIONS

In its widest possible sense the term ' regeneration ' would mean the restoration of coconut plantations, which for various reasons have become less productive than they ought to be, to a state of maximum economic productivity. There are various means by which such regeneration could be achieved. Yields could be increased by suitable manuring and cultivation ; by maintaining an optimum planting density; by reducing the losses due to pests and diseases and ultimately through replanting with high-yielding material.

Though the coconut palm is generally allowed an economic life span of 70 years, in actual fact, all plantations over 60 years of age, that show a progressive decline in yield (in spite of agronomical practices being maintained at satisfactory levels) or where palms have dwindling crowns and tapering stems, should really be regarded as totally senile and therefore due for replanting.

Up till now, it has been made out that each year about 15,000 acres of coconut land are actually going out of production. The basis for this figure is that with an economic life of 70 years, one-seventieth of the total acreage (i.e. about 15,000) would become senile each year. The sweeping assumption in this calculation is of course that the age-groups of the palms in Ceylon's coconut lands have uniform distribution, which undoubtedly is a fallacious premise.

A recent 'life table', computation made by the CRI Biometrician shows that only about 6,000 acres pass 60 years, each year and approximately 8,000 acres pass the 70th year. Accordingly it would be plausible to infer that on an average only about 7,000 acres would become unproductive on grounds of true senility.

THE REPLANTING SCHEME

Based on some preliminary information gathered in connection with the 1946 Census the C.R.I., urged that a reasonable replanting target for a start would be 10-15,000 acres per year.

A Replanting Scheme for the supply of selected seedlings at subsidised rates was inaugurated in 1949 with the establishment of the Planting Division at the C.R.I. The scheme was first financed from a special vote from the Department of Agriculture with the proceeds from the sale of seedlings reverting to revenue. Up to the end of 1954, the production and issue of seedlings depended on the annual fluctuating votes from this source. The figures in Table 2 indicate the somewhat slow progress made during the six formative years of the project. In calculating the acreage equivalent to the seedlings issued, a planting density of 75 (instead of 64) has been used in order to allow for seedlings that would have failed to get established in the field.

TABLE — 2

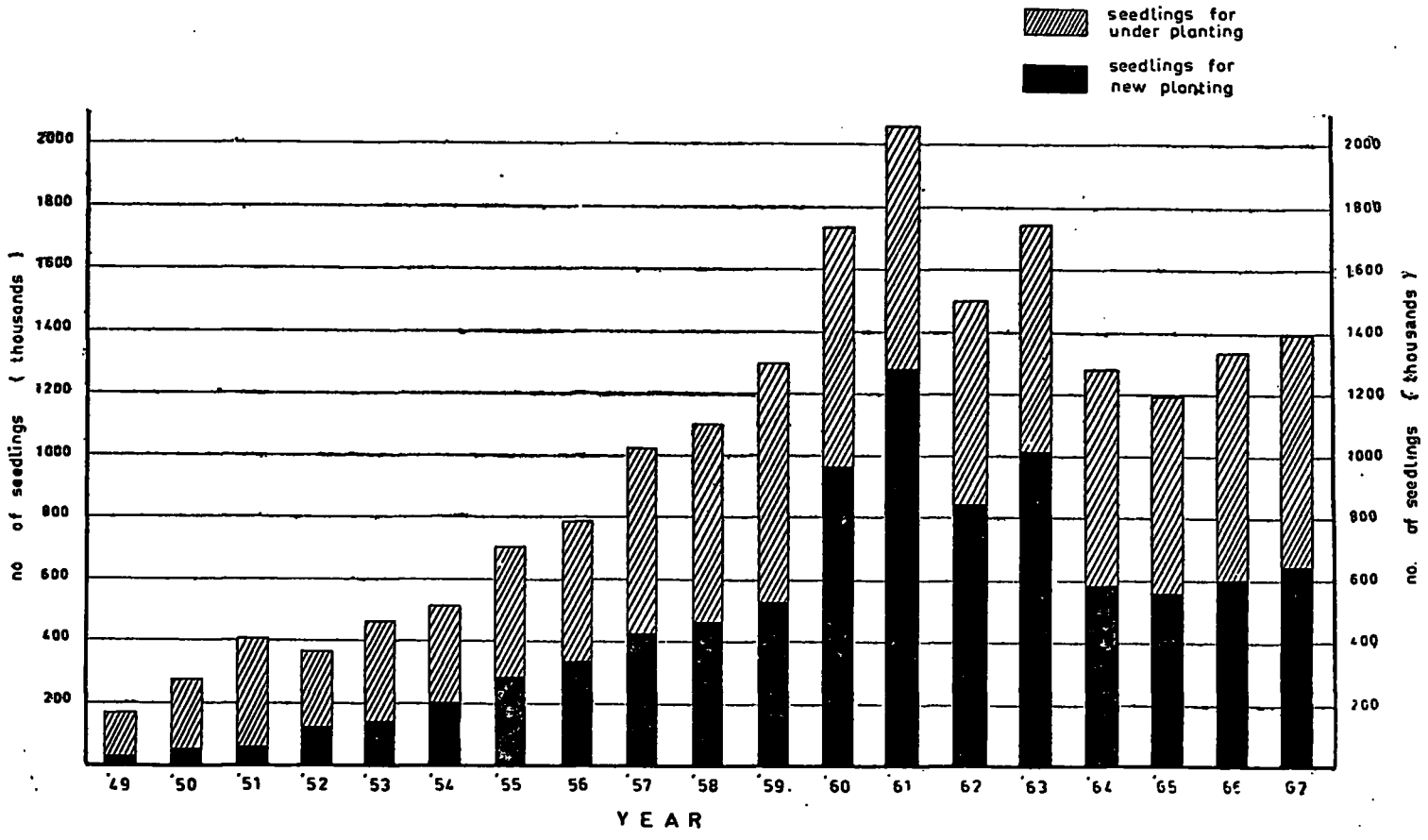
Planting Progress for the Period (1949-54)

(Seedlings grown from BLOCK NUTS)

YEAR	No. of SEEDLINGS ISSUED			ACREAGE PLANTED (75 palms/acre)		
	Replanting	New Planting	Total	Replanting	New Planting	Total
1949	157,489	7,196	164,685	2,100	96	2,196
1950	223,575	27,975	251,550	2,981	373	3,354
1951	360,928	36,129	397,057	4,812	482	5,294
1952	261,322	107,483	368,805	3,484	1,433	4,917
1953	327,823	135,194	463,017	4,371	1,803	6,174
1954	320,547	192,513	513,060	4,274	2,567	6,841
TOTAL (First 6 yrs.)	1,651,684	506,490	2,158,174	22,022	6,754	28,776
AVERAGE ...				3,670	1,126	4,796
PERCENT ...				76.5	23.5	100.0

REPLANTING PROGRESS

SEEDLING ISSUES *

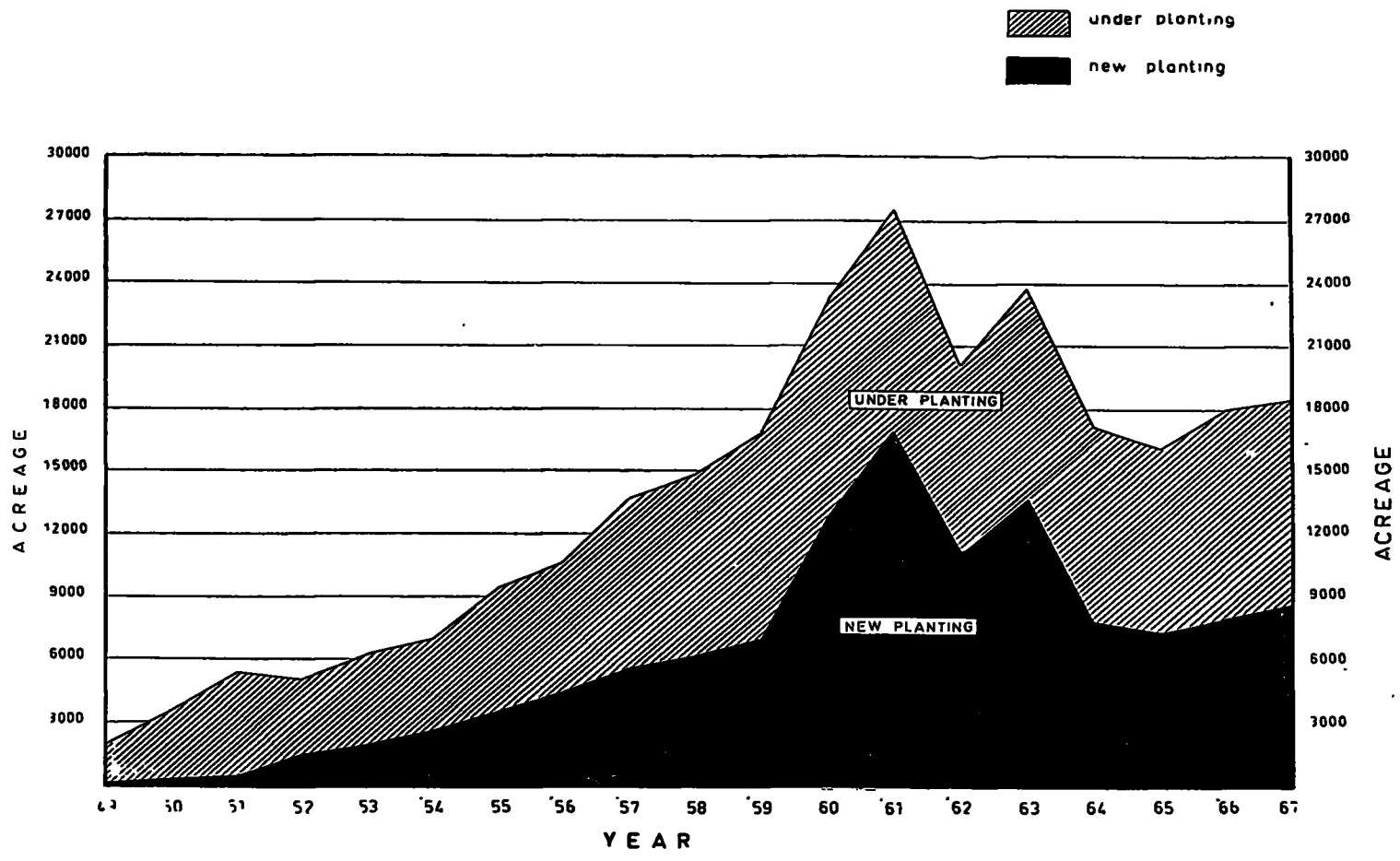


* Issued by the Coconut Research Institute

FIGURE—II Seedling Issues

REPLANTING PROGRESS

2 ACREAGE PLANTED *



* Planted with C. R. I Seedlings

FIGURE—III Acreage Planted

The first Nursery was established at Ratmalagara Estate, Madampe, in March 1949, and the number of nurseries was gradually increased from year to year to cover practically all the coconut growing areas. Apart from 17 nurseries maintained by the Planting Division during this period, 13 were also established for Co-operative Societies and 11 for the Department of Agriculture.

From 1955 onwards Government approved a Ten-Year Replanting Programme with adequate financial provision to replant on an average 15,000 acres per annum. From then on it was decided to centralise the production of seedlings in 18 large nurseries to enable better supervision, to improve efficiency, and to lower the cost of production. The data in TABLE — 3 indicate the planting progress made during the 12 year period 1955-66. The complete data available for the 18 year period 1949-66 are illustrated by diagrams in FIGURES — II & III.

TABLE — 3

Planting Progress for the Period (1955-66)

YEAR	ACREAGE PLANTED (75 palms/acre)		
	Replanting	*New Planting*	*Total*
1955	5,799	3,603	9,402
1956	6,157	4,363	10,520
1957	8,101	5,572	13,673
1958	8,741	6,019	14,760
1959	10,499	6,932	17,431
1960	10,571	12,746	23,317
1961	10,644	17,046	27,690
1962	8,996	11,103	20,099
1963	10,151	13,564	23,715
1964	9,497	7,743	17,240
1965	8,756	7,250	16,006
1966	10,017	7,986	18,003
TOTAL (12 Years)	107,929	103,927	211,856
AVERAGE	8,994	8,661	17,655
PERCENT ...	50.9	49.1	100.0

As regards the figures for 1967 the records show that in all 1,384,359 seedlings were issued, out of which 752,503 (≡10,033 acres) were utilized for replanting and 631,856(≡8,425 acres) for new planting.

Distribution by Provinces

It has been mentioned already that the Planting Division Nurseries have been suitably located to serve all the coconut growing areas. Coconut is grown in all nine provinces of the Island, and an indication is given in FIGURE — IV of the provincial acreages. The extent of replanting (province-wise) is illustrated graphically by expressing the respective acreages planted annually as percentages of the whole. It will be seen that with the exception of the Central, Western and Sabaragamuwa Provinces, there has been a fair distribution of replanting activity in all the others over the years.

Supply and Demand

Extensive propaganda and publicity were found to be essential during the early years of the Replanting Scheme, in order to stimulate a demand for coconut seedlings. This was particularly so in the Southern Province. However, with the reduction in the price of seedlings from -/50 cents to -/30 cents, in 1953, coupled with an improvement in the market price of copra, the situation steadily improved until it was not possible to meet the ever-increasing demand which has persisted todate. The supply/demand position during the 10-year period 1958/67 is illustrated in FIGURES — V & VI.

On account of the fact that the Replanting Programme was operated on fixed annual recurrent votes, it has not been possible to maintain a proportional increase in the supply position *vis-a-vis* the demand. The period of peak production was 1960-63 when special funds were provided for planting up 24,000 acres of abandoned citronella lands with coconut. In other words, if funds had been made available, there would have been no difficulty in producing (' blocknut ') seedlings even in excess of the demand.

Prior to 1964, ' BLOCK SEEDNUTS ' have been utilized for the production of seedlings under the Replanting Scheme. Since then however there has been an advance, in that the-entire requirements of seednuts have been produced from ' MOTHER PALMS '—now totalling about 50,000. In this connection, a point to remember is that owing to paucity of field staff for the selection of such palms, and the recent heavy loss of mother palms, consequent on the cyclone that ravaged the Chilaw District in October 1967, the Institute is likely to experience some difficulty in maintaining the present supply position during the next few years.

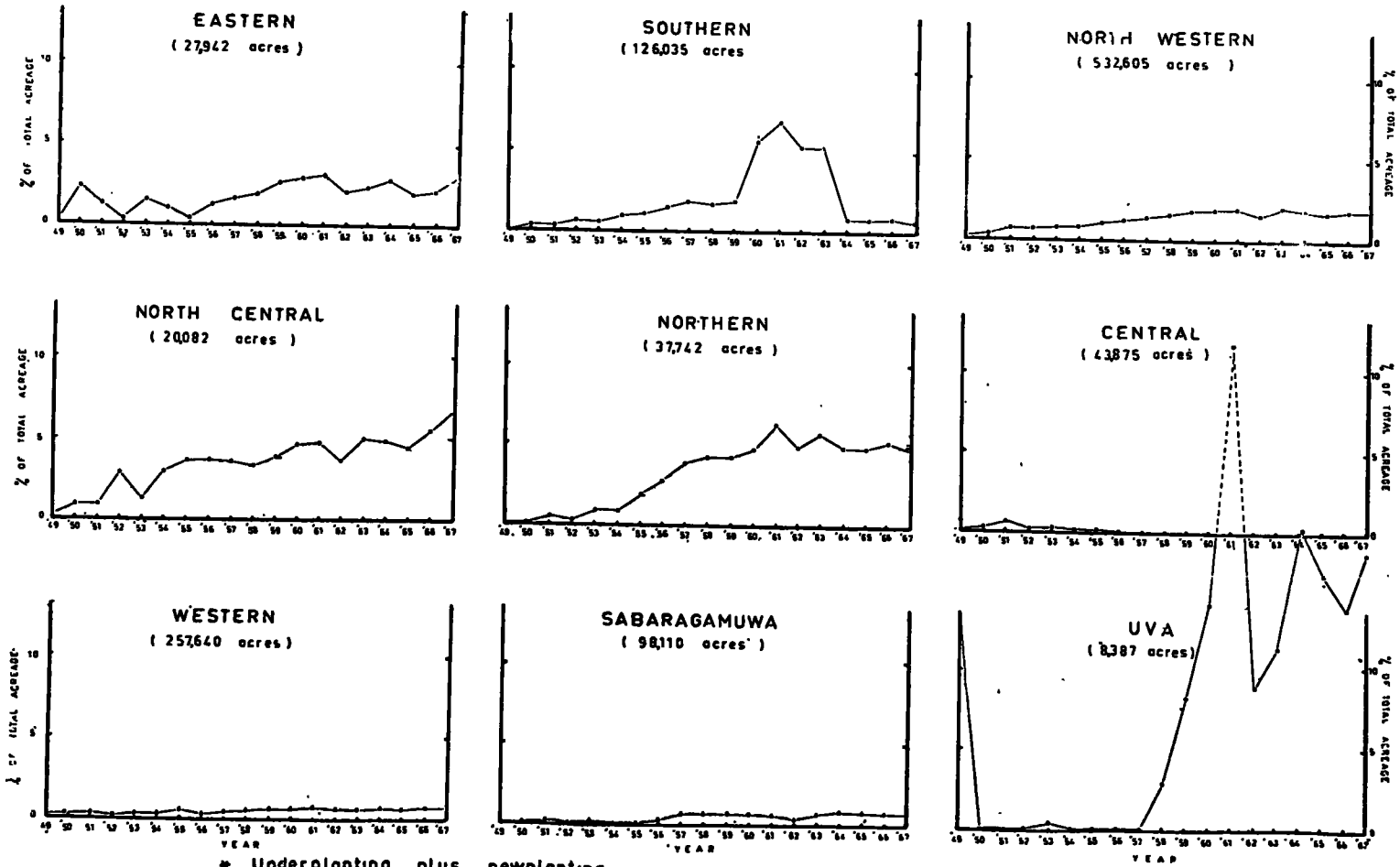
FIGURE — VII illustrates the actual distribution of CRI seedlings by Provinces and Districts during the period 1958 to 1967.

Hand Pollinated Seedlings

Brief mention should be made of the fact that the Botany Division of the C.R.I. has been issuing since 1961, small quantities of superior Hand Pollinated coconut seedlings to the industry. The figures in TABLE —4 give the total issues of these seedlings up to end of 1967. Calculating on the same planting density as before (viz. 75 palms to the acre) it will be seen that about 886 acres have so far been planted up with these high yielding hand pollinated seedlings. Based on advice and training provided by the Institute, some of the larger estates too are now engaged in the production of these seedlings. The Island's annual requirements of seedlings cannot of course be produced by hand-pollination. The present programme for the issue of these seedlings will eventually be superseded by the Isolated Seed Garden Project which has already been established by the C.R.I. for the mass production and dissemination of elite seedlings of high yielding capacity to the industry.

REPLANTING PROGRESS

3. Percentage of Total Acreage Planted by Provinces *

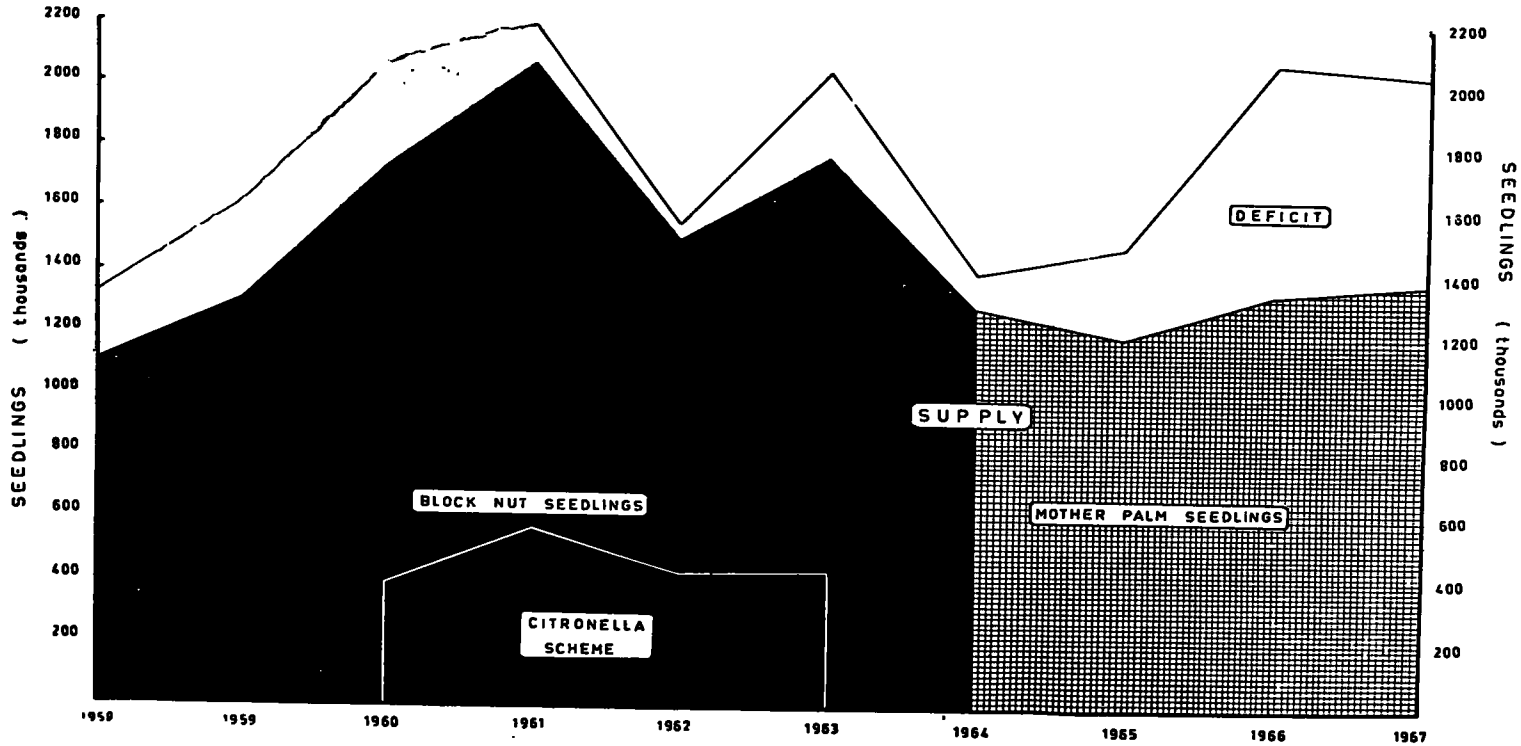


* Underplanting plus newplanting

FIGURE—IV Planting Progress by Provinces

REPLANTING PROGRESS

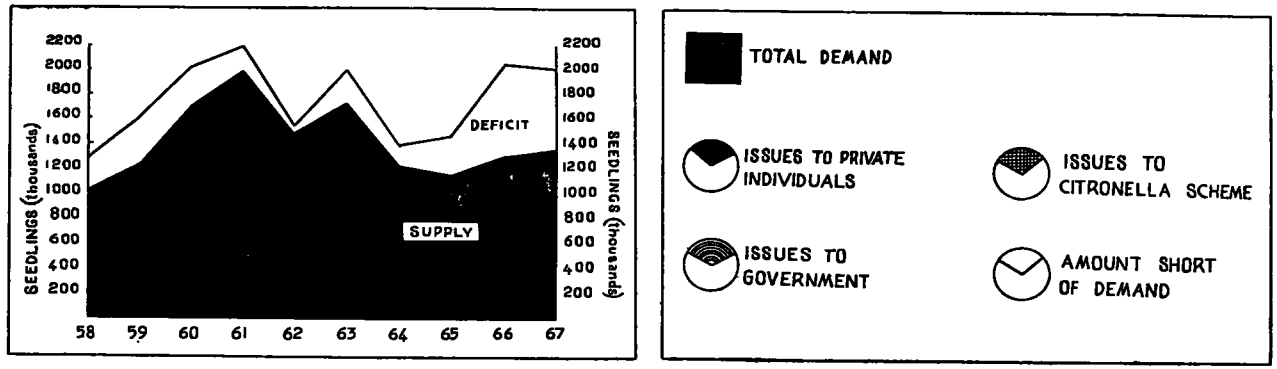
4. Supply and Demand of Seedlings

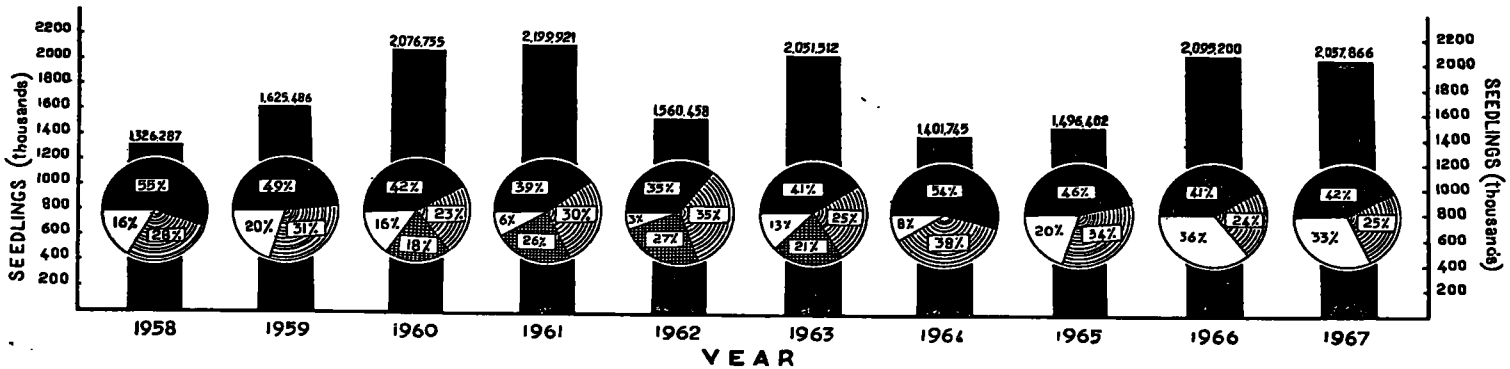


FIGURE—V Supply Position and Demand for Seedlings

REPLANTING PROGRESS

4. Supply and Demand of Seedlings





FIGURE—VI Issues of Seedlings by Categories

TABLE — 4

Issues of Hand-Pollinated Seedlings by the C.R.I.

YEAR	Tall & Tall	Tall × Dwarf	Dwarf × Tall	Total	Acreage Planted (75 palms/acre)
1961	3,375	3,451	—	6,826	91
1962	3,131	1,889	—	5,020	67
1963	7,242	3,381	—	10,623	142
1964	8,100	3,565	—	11,665	156
1965	4,727	3,174	—	7,901	105
1966	3,601	3,174	—	6,775	90
1967	7,040	9,603	969	17,612	235
TOTAL ...	27,216	28,237	969	66,422	886

CONCLUSION

Within the intended objects, the Coconut Replanting Scheme that was inaugurated in 1949 and administered by the C.R.I., should be reckoned a success. The targets that were set over the 18-year period have been consistently reached and a sustained and increasing demand for planting material has been created in all the coconut growing areas. The complete switch over from the issue of ' Block-nut ' seedlings to ' Mother-Palm ' seedlings in 1964 also constitutes an advance in the quality of planting material that has been supplied to the industry.

Since the inception of the Replanting Scheme in 1949, an estimated acreage totalling about 250,000 acres have been planted. At the rate of 75 palms to the acre, the planting material issued during the past 12 years has been equivalent to an annual average of 18,000 acres. The distribution of this has been roughly 50 : 50 for new Planting and under-planting. The position therefore is that the Scheme as it functions provides planting material to cover the acreage (7,000) that goes out of production each year on account of true senility, and material over and above this sufficient for planting up 10,000 acres every year.

A recent survey has shown that, if at all, only another 50,000 acres of suitable uncultivated land is yet available for coconut planting. This confirms the opinion that no substantial increase in the Island's coconut production could be achieved through the medium of planting new land under coconut. The only other way open for increasing production is to increase the yield from existing coconut lands, by systematic replanting coupled with intensified farming methods.

A decision has been taken recently by Government to launch a Coconut Replanting Subsidy Scheme. If a systematic programme is drawn up for its effective implementation there is no doubt it would be a substantial contribution towards the long range rehabilitation of Ceylon's aging coconut industry.

ACKNOWLEDGMENT

Thanks are due to Mr. E. Ranjith Fernando of the Biometrics Unit and Mr. D. B. Hettiarachchi, Technical Assistant Photography for their assistance in preparing the drawings for this article.

REFERENCES

Department of Census and Statistics. 1956 *Census of agriculture 1952, Part III—Coconut.* p. 5. Colombo : Government Publications Bureau.

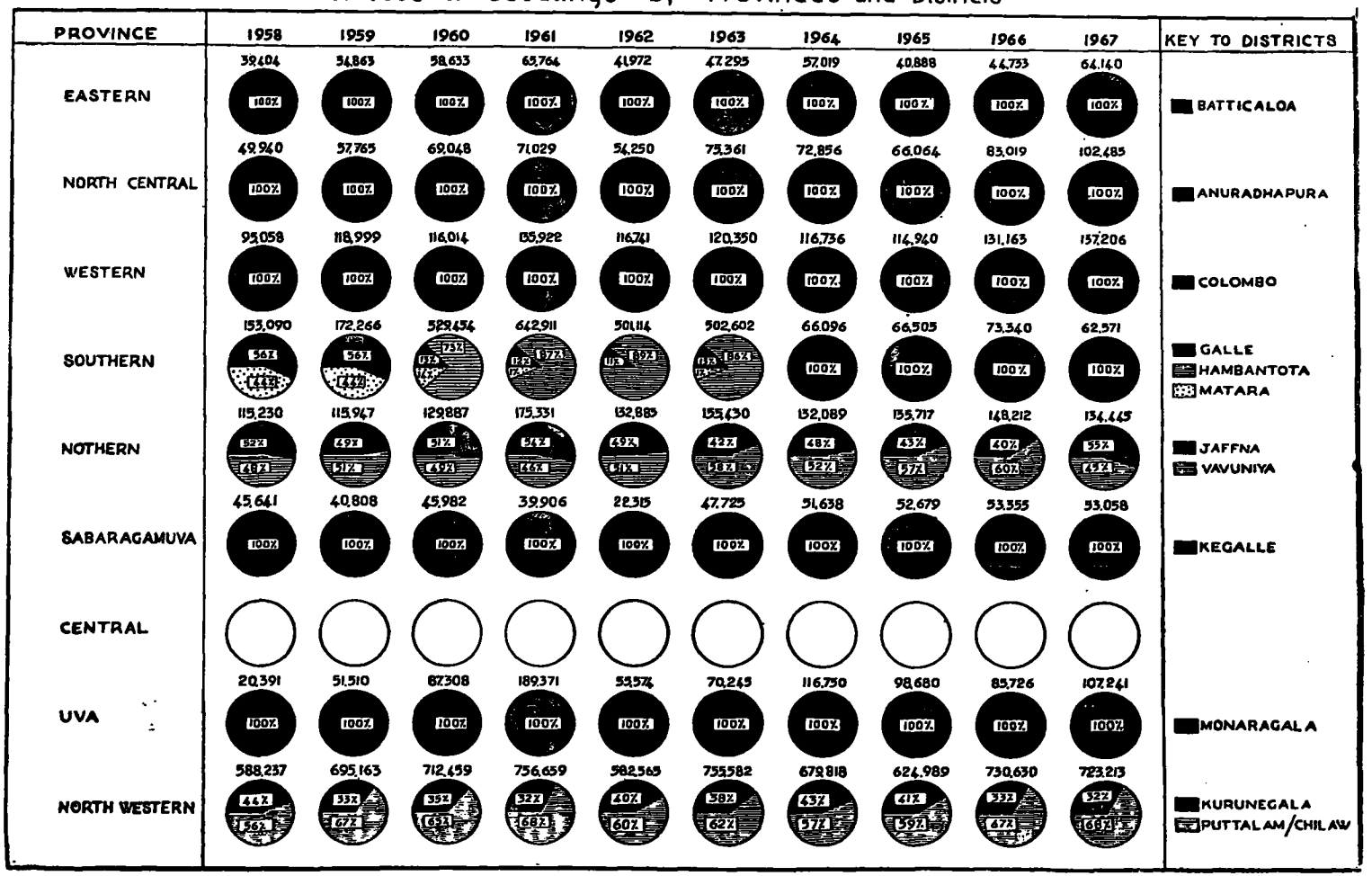
Land Utilization Committee. 1968 *Report of the Land Utilization Committee—August 1967, Sessional Paper No. II—1968.* Colombo : Government Publications Bureau.

PIERIS, W. V. D. 1341 *Young Ceylon Cocon. annual* 10, No. 4.

SASTRY, K. 1967 *Report of the project on the improvement of coconut statistics in countries of Asia and the Far East* (1960-65). PP. 35-54. Rome : Food and Agriculture Organisation.

REPLANTING PROGRESS

5. Issue of Seedlings by Provinces and Districts



FIGURE—VII Issue of Seedlings by Provinces and Districts