CEYLON COCONUT QUARTERLY

Volume XXXIII | January-June, 1982 | Nos. 1/2

ANNUAL REPORT FOR 1981

CONTENTS

Price:

Local: Rs. 20.00
Overseas £ 2.00/US$ 5.00

Annual Subscriptions:

Local: Rs. 40.00
Overseas: £ 4.00/US$ 10

Ceylon Cocon. Q., (1982) 33. 01—05
Printed in Sri Lanka

Report of the Acting Director-1981

This report deals with the activities of the Coconut Research Board during the period 1st January, 1981 to 31st December, 1981.

1. The Coconut Research Board

(i) Fourteen meetings of the Coconut Research Board were held during the year. Membership and attendance at meetings were as follows:

Prof. B. A. Abeywickrama (*Chairman, attendance 14/14*)
Mr. N. S. Dias (*from 01-09-1981; attendance 4/4*)
Mr. S. C. Kahawita (*attendance 14/14*)
Dr. D. V. Liyanage (*attendance 7/14*)
Mr. K. F. J. Perera (*attendance 11/14*)
Dr. O. S. Peries (*attendance 6/14*)
Mr. D. S. Senanayake (*attendance 13/14*)

(ii) Mr. D. S. Senanayake continued to function as the Working Director attending to matters concerning the management of Estates and Nurseries of the Institute.

(iii) Dr. D. V. Liyanage was appointed Consultant in Plant Breeding to the Coconut Development Authority. He was charged with the responsibility of examining the programme of plant breeding at the Institute and recommending appropriate measures for its improvement.

2. Research Divisions

2.1. Agronomy Division

Several greenhouse trials to study the soil nutrient status of soil were undertaken during the period under review. An important study was undertaken on the nutrient status of certain soils at Bandirippuwa, which proved to be extremely poor in major nutrients.

Several field trials to evaluate the performance of grasses were satisfactorily completed. The performance of a mixed sword of *Brachiaria milliformis* and *Centrosema pubescens* was also field-tested at two localities.

On the yields obtained, a preliminary evaluation of the mixed planting trial of coffee, cocoa and pepper was carried out. A cost-benefit analysis indicated a generous return on this mixed cropping model. The intercropping trial at Walpita with cloves, nutmeg and cinnamon was conducted satisfactorily. The trial at Sirikandura Estate, Dodanduwa to study the effect of intercropping perennial crops and a rotation of annual crops indicated a beneficial effect for coconut.

The rotational cross breeding programme to upgrade the Sinhala cattle was closely reviewed by the Board. A decision on this programme would be taken soon.

An unidentified disease, which caused 15 deaths, was reported among the milking herd at Lunuwila. The general symptoms were swollen vulva and udder, abnormal temperature, constipation and drop in milk yield.

A coconut land of about 80 acres in extent (Ebbawatte Estate at Maspotha) was purchased to continue the animal husbandry programme.

2.2 Biometry and Agricultural Economics Unit

The unit continued to discharge its major service function of assisting other divisions in the planning, designing and analysis of their experiments. During the year, 20 experiments were designed for divisions.

The calibration trials were conducted satisfactorily.

The experiment on irrigation was continued, and this provided very useful information on the beneficial effects of watering. Also, a nursery trial was conducted at Attavillu to study the general performance of seedlings under different irrigation regimes.

A preliminary study was undertaken to study the Cost of production of seedlings and on Resource utilization in the Fibre Milling Industry.

2.3 Botany and Plant Breeding Division

The newly created Divisions of Genetics, Plant Breeding and Propagation, and Plant Biology were amalgamated to form the Division of Botany and Plant Breeding with effect from 1st July, 1981. The management of commercial nurseries which had been the responsibility of the Division of Genetics, Plant Breeding and Propagation became a function of the Estate Management Division.

During the year under review, several nursery trials were completed. A new trial on the use of a germinating bed was initiated.

A total of 25 field experiments were satisfactorily maintained during the year.

The yield from the Isolated Seed Garden at Ambakele showed an increase of over 300% compared to the yield of 1980. The gradual improvement in the climatic conditions during 1980 and the improved management practices in relation to weed control and moisture conservation appear to be the main reasons for this increase in yield.

The demand for pollen increased during the year as a result of other organizations embarking on hand pollination programmes. Arrangements were made to identify more pre-potent palms. During the year, about 4.1 million ordinary seednuts were issued.

2.4 Coconut Processing Research Division

Although the division was established in 1980, organized research was undertaken only in 1981.

Several analytical studies were undertaken on the composition of coconut kernel. Research work was also undertaken to study the efficiency of extraction of coconut

milk with a view to fabricate a simple machine for household use. This work was undertaken in collaboration with the National Engineering Research and Development Centre.

Trials were carried out in a standard copra kiln with a view to determine the optimum period of firing.

Trials were successfully completed on the use of coconut water to dilute toddy in the production of vinegar.

The use of unseasoned nuts for desiccated coconut production was investigated with promising results. The keeping quality of desiccated coconut prepared from fresh nuts needs careful examination. An added advantage of this process, if acceptable, would be the use of husks for white fibre industry.

A collaborative project with the National Engineering Research and Development Centre on the use of coconut oil as a fuel for internal combustion engines was started.

2.5 Crop Protection Division

The assistance of this Division was provided to the general public to attend to pest and disease problems of coconut. The spraying unit continued to provide assistance as and when necessary. The insectaries at Lunuwila and Mylambavely provided parasite insects for the biological control programme.

The Coconut Caterpillar pest reached outbreak proportions in several areas of the country. It made a reappearance in plantations on the East Coast. The Coconut leaf miner pest remained at very insignificant levels.

Field experiments on the use of repellents against the black beetle were concluded. Based on the results of these experiments, new recommendations were made on the use of 2% Aldrex or 10% B.H.C. (mixed with saw dust or sand) as a repellent as well as an insecticide.

Coconut Scale pest was kept under control by the naturally-occurring parasites.

In collaboration with the International Atomic Energy Agency, a series of field experiments was started to evaluate the efficacy of the predatory insect, *Parauchaetes pseudoinsulata* (*Ammalo insulata*) on the control of the pernicious weed, *Chromolaena odorata* (*Eupatorium odoratum*)

A long-term experiment on the effects of defoliation on the yield of coconut was managed satisfactorily. In collaboration with the Agronomy Division, several field trials were conducted to study the effect of planting time on the insect pests and yield components of some commonly intercropped legumes.

2.6 Soils and Plant Nutrition Division

Routine long-term experiments on the major nutrient elements, nitrogen, phosphorus, potassium and magnesium were satisfactorily conducted.

The field experiment to study the usefulness of chlorine in the nutrition of coconut was maintained. Arrangements were made to commence another experiment on this aspect at Pothukulama.

Increased attention was diverted to the problems of soil moisture conservation.

Laboratory experiments were conducted to study the sulphur status of coconut soils. A separate programme of studies has been initiated in this aspect.

The Division participated in a joint project with the Food and Agriculture Organization and the Coconut Cultivation Board to promote the use of fertilizer and other related inputs at small farmer level with a view to increase yields. During the latter half of the year, 39 neglected sites in different parts of the country were identified and soils and leaf analyses carried out to determine the nutrient status. These sites will serve as demonstration sites.

Soil survey and mapping of a number of estates, farm sites and nurseries were completed.

2.7 Estate Management Division

The Estate Management Division was created during the year and charged with the responsibility of managing the activities of nurseries and estates.

Routine field operations such as manuring, weeding, husk burying etc. were satisfactorily carried out, and every attempt was made to maintain the estates at a high standard of management. Special emphasis was laid on underplanting and filling of vacancies.

A general increase in yield was observed in all the estates, which can be attributed mainly to the favourable weather conditions and the implementation of better management practices.

APPOINTMENTS

Mr. R. M. G. D. Rajapakse, Chief Accountant,
Mr. P. S. Liyanagama, Manager (Estates),
Dr. Miss M. R. T. Wickramaratne, Head, Botany & Plant Breeding Division,
Dr. S. Mohanadas, Head, Coconut Processing Research Division,
Dr. R. Mahindapala, Deputy Director (Research),
Mr. M. Jeganathan, Head, Soils & Plant Nutrition Division,
Mr. D. E. F. Ferdinandez, Head, Agronomy Division,
Miss M. B. M. Dias, Research Assistant,
Mr. W. M. I. S. Gunasekera, Research Assistant,
Mr. J. A. D. S. Jayasinghe, Research Assistant,
Mr. K. R. R. A. Peiris, Research Assistant,
Mr. H. A. J. Gunatilaka, Research Assistant,
Miss B. Gowri, Research Assistant,
Mr. D. N. S. Fernando, Research Assistant,
Mr. U. L. P. A. Perera, Manager (Farms),
Mr. K. E. Abeysinghe, Engineering Assistant

RETIREMENTS

Mr. T. S. Balakrishnamurti, Research Officer, Soils & Plant Nutrition Division.

RESIGNATIONS

Dr. U. Pethiyagoda, Director on 21.09.1981.
Dr. P. Loganathan, Soil Chemist on 31.03.1981.
Mr. W. M. I. S. Gunasekera, Research Assistant on 30.09.1981.

STAFF MATTERS

Visits Abroad

Dr. R. Mahindapala undertook a short consultancy on a FAO Project in the Republic of Maldives for about 10 days in October.

Dr. R. Mahindapala represented Sri Lanka at the consultation among coconut growing countries in Asia and the Pacific Region in Bangkok in December.

Mr. M. J. C. Perera attended a workshop in Singapore in July in Finance and Administration of projects supported by the International Development and Research Centre (Canada).

Mr. P. A. C. R. Perera attended a research co-ordination meeting of IAEA, held in Indonesia, in August.

Returned From Postgraduate Training

Mr. M. N. M. Ibrahim, Research Assistant, Agronomy, having completed a Ph. D. programme.

Mrs. S. M. Karunaratne, Research Assistant, Botany, having completed a M.Sc. programme.

Away On Postgraduate Training

Mr. S. L. Talagala, Research Assistant, Coconut Processing Research Division.
Mr. V. U. de S. Jayasuriya, Research Assistant, Botany & Plant Breeding Division.
Mr. R. T. Shanmuganathan, Research Assistant, Soils and Plant Nutrition Division.
Mrs. C. Jayasekera, Research Assistant, Botany & Plant Breeding Division.
Mr. T. S. G. Peiris, Research Assistant, Biometry & Agricultural Economics Unit.

FOREIGN-AIDED PROGRAMMES

(*a*) The East Coast Rehabilitation Project

Most of the buildings at the Passekudah Farm were completed. Work on the construction of a Laboratory cum office buildings is progressing satisfactorily. Coconuts were planted in two blocks of about 35 acres for field experiments on a fertilizer trial and for a varietal evaluation.

Construction work of buildings at the Minneriya Farm site is progressing. The location of the Uhana Farm Site is yet uncertain.

(*b*) The Coconut Information Centre

This Centre was established with the financial assistance of the International Development and Research Centre (Canada). During the year under review, serveral publications, including an International Directory of Coconut Research Workers and an annotated Bibliography on Coconut (1975-78) were issued. Work on a thesaurus and a retrospective Bibliography on coconut pest was started.

R. MAHINDAPALA
Acting Director

Ceylon Cocon. Q. (1982) 33. 06—22
Printed in Sri Lanka

Report of the Agronomy Division–1981

A. SOIL NUTRIENT STATUS STUDIES

1. Optimum levels of deficient nutrients in Rathupasa soil series at Walpita

Trials conducted earlier (Agronomy Division Annual Report, 1980) showed that the Rathupasa soil series at Walpita was deficient in N,P and K. A pot trial was therefore set up to study the optimum requirements of these deficient nutrients for grasses. The trial was harvested on 4 occasions and the total dry matter yield of 4 harvests are given in Table 1. Progressive increase in yield with increase in the level of the tested nutrients were noted at all harvests. Data indicates that the optimum plant growth of *Paspulum commersonii* occurred at the application of a fertilizer mixture consisting of sulphate of ammonia, saphos phosphate and muriate of potash each at the rate of 570 kg/ha (4½ cwt/ac).

Table 1. *Yield (g/pot) of Paspalum commersonii grown in soil from Rathupasa series, Walpita*

Treatment		K_0	K_3	$K_{4\frac{1}{2}}$	K_6
N_0	P_0	3.13	4.00	3.46	3.76
	$P_{1\frac{1}{2}}$	4.21	5.71	5.64	5.20
	P_3	4.30	5.95	5.27	5.49
	$P_{4\frac{1}{2}}$	5.05	6.01	6.01	5.75
$N_{1\frac{1}{2}}$	P_0	3.66	7.51	7.24	8.84
	$P_{1\frac{1}{2}}$	6.62	13.37	14.84	14.07
	P_3	6.21	14.47	14.51	14.63
	$P_{4\frac{1}{2}}$	7.96	15.64	16.54	16.35
N_3	P_0	3.62	7.39	4.71	7.26
	$P_{1\frac{1}{2}}$	6.65	18.59	20.55	20.85
	P_3	6.67	17.79	23.91	26.06
	$P_{4\frac{1}{2}}$	6.19	21.12	24.74	27.75
$N_{4\frac{1}{2}}$	P_0	2.12	1.26	2.09	0.89
	$P_{1\frac{1}{2}}$	5.79	18.91	19.75	23.96
	P_3	7.94	24.72	21.39	27.66
	$P_{4\frac{1}{2}}$	7.29	27.36	29.79	29.65

N_0, P_0, K_0 — 0 kg/ha $N_{1\frac{1}{2}}, P_{1\frac{1}{2}}$ — 190 kg/ha
N_3, P_3, K_3 — 380 kg/ha $N_{4\frac{1}{2}}, P_{4\frac{1}{2}}, K_{4\frac{1}{2}}$ — 570 kg/ha K_6 — 760 kg/ha

2. **Preliminary studies of the nutrient status of sandy soil from Bandirippuwa Estate (BE) where coconuts are showing symptoms of acute Mg deficiency**

Hybrid coconuts planted in certain sandy tracts of Bandirippuwa Estate are showing symptoms of acute magnesium deficiency. Kieserite applications to these palms have had no permanent curative effects. In an effort to get a better understanding of the behaviour of added nutrients in this soil a pot trial was set up with the top soil (0-25 cm) to study the effects of N,P,K, Ca and Mg on the growth of the indicator plant *P. commersonii*. The design was a 2^5 factorial with 2 replicates. The trial was harvested on 3 occasions and the total dry matter yield per pot for the 3 harvests is shown in Table 2. All tested nutrients gave a significant increase in yield. Both Calcium and Magnesium showed a positive interaction with Nitrogen. Potassium showed a positive interaction with Calcium, and Phosphorus with Magnesium. The data indicate that the soil is poor in the major nutrients and for successful plant growth in the soil a complete mixture incorporating N,P,K,Ca and Mg would be required.

Table 2. *Cumulative yield (g/pot) of P. commersonii for the 3 harvests with the sandy soil from Bandirippuwa Estate.*

Treatment			Ca_0		Ca_{10}	
			Mg_0	$Mg_{1\frac{1}{2}}$	Mg_0	$Mg_{1\frac{1}{2}}$
K_0	P_0	N_0	1.25	1.45	1.46	1.56
		N_3	0.57	1.45	1.75	2.87
	P_3	N_0	1.56	1.65	1.81	2.10
		N_3	1.26	1.90	1.71	1.83
K_3	P_0	N_0	1.71	1.66	2.25	2.34
		N_3	2.77	3.10	6.12	6.86
	P_3	N_0	2.84	3.09	2.67	3.00
		N_3	9.75	11.84	12.34	20.24

N_0,P_0,K_0,Ca_0 — 0 kg/ha $Mg_{1\frac{1}{2}}$ — 190 kg/ha
N_3,P_3,K_3 — 380 kg/ha Ca_{10} — 1270 kg/ha

The sub soil (25-45 cm) was also sampled from this area to determine whether the fertilizer applied to the soil in this area has leached down and got accumulated in the lower layers. Two pot trials were set up with this towards the latter part of the year and they are in progress. The preliminary date indicate that the sub soil is poorer than the top soil in N, P, K, Ca and Mg.

B. INTERCROPPING WITH PASTURE

1. **Experiment P_{95} (Bandirippuwa Estate)**

This experiment was initiated in 1979 to study the effect of four levels of nitrogen and three frequencies of cutting on the dry matter production and persistence of *Brachiaria ruziziensis* under a stand of mature coconut. The design is a randomised block with 4 replicates. Each plot is the area within 4 coconut palms. Defoliations were done with a motor scythe at 7 cm above ground level. Nitrogen was

added in the form of urea in equal split doses after every cut. During the year under review 2 cycles of defoliations were completed as against one cycle in 1980 due to the more favourable weather conditions experienced in 1981. The dry matter yields obtained are given in Table 3

Table 3. *Dry matter yield (kg/ha) of Brachiaria ruziziensis at different levels of nitrogen application and frequencies of cutting when grown under coconut at Lunuwila*

Levels of N (kg/ha/cycle)	*Cut every 3 weeks*	*Cut every 4 weeks*	*Cut every 6 weeks*	*Total*
N_0	4 750	4 070	4 310	13 130
N_{25}	5 900	5 600	6 020	17 520
N_{50}	6 870	7 740	7 160	21 770
N_{100}	9 280	9 210	8 050	26 540
Total	26 800	26 620	25 540	

N_0 — 0 kg N/ha/cycle
N_{25} — 25 kg N/ha/cycle
N_{50} — 50 kg N/ha/cycle
N_{100} — 100 kg N/ha/cycle

A progressive increase in dry matter yield due to increase in the level of nitrogen application has been recorded. The trend is similar to that observed last year. However, there was no consistent trend in dry matter production due to cutting frequencies. This was observed in 1979 and 1980 too and is difficult to explain and may be peculiar to the grass. However, to study this under more controlled conditions the treatments in this trial were repeated in a pot experiment using 30 cm diameter clay pots. Three cycles of defoliation were done with the pot trial during the year and the dry matter yields obtained are given in Table 4. It is seen from the data that while the trend in the response to added nitrogen is similar to that obtain in the field trial a clear trend in the response to cutting frequencies is evident *viz.* a decreasing response to increasing frequencies of cutting. Thus it has to be inferred that the irregular response observed in dry matter production due to frequencies in cutting in the field trial is probably due to the methods used in cutting the grass and not due to an inherent character in the grass tested.

Table 4. *Dry matter yield (g/pot) of B. ruziziensis due to different levels of nitrogen application and frequencies of cutting when grown in pots*

Levels of N (kg/ha/cycle)	*Cut every 3 weeks*	*Cut every 4 weeks*	*Cut every 6 weeks*	*Total*
N_0	48.03	48.93	42.48	139.44
N_{25}	73.55	83.90	89.38	246.83
N_{50}	109.68	104.65	121.60	335.93
N_{100}	142.10	171.63	189.10	502.83
Total	373.36	403.11	442.56	

N_0 — 0 kg N/ha/cycle
N_{25} — 25 kg N/ha/cycle
N_{50} — 50 kg N/ha/cycle
N_{100} — 100 kg N/ha/cycle

2. **Experiment P_{79} (Bandirippuwa Estate)**

To study the yield and persistence of a virus resistant strain of *Digitaria decumbens* (Pangola grass) under coconut at four levels of nigtrogen application.

Seven harvests were taken during the year. Dry matter yield data are given in Table 5. 29%, 48% and 104% increase in yield respectively were obtained at 25, 50 and 100 kg/ha nitrogen application compared to the control treatment. There was no incidence of the stunting virus disease during the year. Thus this strain of Pangola grass can be recommended as a suitable cultivar for growing under coconut.

Table 5. *Dry matter yield (kg/ha) of Pangola grass (virus resistant strain) at different levels of nitrogen application when grown under a mature stand of coconut at Lunuwila*

Levels of N (kg/ha)	*Dry matter production*
N_0	5 566
N_{25}	7 199
N_{50}	8 262
N_{100}	11 357

N_0 — 0 kg N/ha/cycle
N_{25} — 25 kg N/ha/cycle
N_{50} — 50 kg N/ha/cycle
N_{100} — 100 kg N/ha/cycle

3. **Experiment P_{98} (Sirikandura Estate, Dodanduwa)**

To study the dry matter production and persistence of *Brachiaria dictyoneura* at different levels of nitrogen application and frequencies of cutting when grown under coconut in the wet zone. The design is a randomised block with three replicates. Each plot is a coconut square. The experiment was planted in 1980. Four cycles of defoliation were completed during 1981 and the dry matter yield data are presented in Table 6. Dry matter production increased progressively with increase in the level of nitrogen application both when cut at 30 day and 45 day intervals. Dry matter production increased when the pasture was cut at 45 day intervals compared to 30 day intervals (29%).

Table 6. *Dry matter yields kg/ha of B. dictyoneura at different levels of nitrogen application and frequencies of cutting when grown under coconut at Dodanduwa*

Levels of N (kg/ha)	*Cut every 30 days*	*Cut every 45 days*
N_0	8 330	11 830
N_{25}	11 780	14 800
N_{50}	12 940	16 500
N_{100}	15 950	20 410

N_0 — 0 kg N/ha/cycle
N_{25} — 25 kg N/ha/cycle
N_{50} — 50 kg N/ha/cycle
N_{100} — 100 kg N/ha/cycle

4. **Experiment P_{99} (Walpita Estate)**

To determine the dry matter production of five pasture grasses and four fodder grasses at 2 levels of nitrogen application at Walpita which lies on the Wet zone/ Intermediate zone border.

The trial was harvested on four occasions during the year. Nitrogen applied in split doses after every cut. The dry matter production data are given in Table 7.

Table 7. *Dry matter yield (kg/ha) of the different pasture and fodder species at 2 levels of fertilizer application when grown under coconut at Walpita*

Grass variety	*25 kg N/ha*	*50 kg N/ha*
Pangola grass	2 560	3 280
B. brizantha	5 320	4 600
B. miliformis	3 010	4 050
B. ruziziensis	4 560	3 310
B. dictyoneura	7 420	7 300
Green panic	3 650	3 190
Setaria anceps	3 290	3 040
Guinea grass	4 180	3 940
Pusa Giant Napier	1 110	1 050

The poor yields and the lack of positive response to the higher level of added nitrogen by most of the pasture and fodder grasses may be due to the low buffering capacity of the sandy soil at Walpita.

5. **Experiment P_{104} (Ratmalagara Estate)**

To study the herbage dry matter production and persistence of Green panic growing under coconut at Ratmalagara estate, Madampe at four levels of nitrogen application and two frequencies of cutting.

Green panic has a reputation for drought resistance and has been observed to perform satisfactorily in the drier areas. This trial was set up to study some aspects of its management under coconut in a semi-dry area. Two cycles of defoliations were completed during the year. The dry matter yields obtained are presented in Table 8. The data show that cutting at the closer frequency increased yields by 31%. The response to increasing levels of nitrogen was linear when the grass was cut at the closer frequency.

Table 8. *Dry matter yield (kg/ha) of Green panic growing under coconut at Ratmalagara due to different levels of nitrogen application and frequencies of cutting*

Treatment	*O kgN/ ha/cycle*	*25 kgN/ ha/cycle*	*50 kgN/ ha/cycle*	*100 kgN/ ha/cycle*
Cut every 30 days ...	4 795	5 488	6 358	7 116
Cut every 45 days ...	4 042	4 249	4 509	5 485

The differences in yield due to frequencies of defoliation and levels of nitrogen application were statistically significant.

6. Experiment P_{103} (Ratmalagara Estate)

To study the effect of four levels of nitrogen application on the growth and persistence of a virus resistant cultivar of Pangola grass grown under coconut under semi-dry rainfall conditions as found at Ratmalagara Estate, Madampe.

The experiment was harvested on five occasions during the year and the dry matter production data are presented in Table 9. Nitrogen was applied as urea in split doses after every harvest.

Table 9. *Herbage dry matter production (kg/ha) of Pangola grass grown under coconut at Ratmalagara Estate, Madampe, at four levels of nitrogen application.*

Levels of N (kg/ha)	*Dry matter production*
N_0	4 805
N_{25}	6 259
N_{50}	7 529
N_{100}	8 527

Much higher dry matter production was recorded this year as compared to the last year. The response to added levels of nitrogen was linear up to the highest level tested. There was no incidence of the stunting virus in the trial and it may be concluded that the cultivar is resistant to stunting virus.

7. Experiment P_{102} (Ratmalagara Estate)

To study the performance of five pasture and four fodder grasses at two levels of nitrogen application when grown under coconut under semi-dry conditions as found at Ratmalagara Estate, Madampe.

The trial was harvested on four occasions during the year and the herbage dry matter production is given in Table 10.

Table 10. *Herbage dry matter yield of different pasture and fodder grasses due to two levels of nitrogen application when grown under coconut at Ratmalagara Estate, Madampe*

Grass variety	*25 kg N/ha*	*50 kg N/ha*
Pangola grass	2 560	3 280
B. miliiformis	3 010	4 050
B. brizantha	5 320	4 600
B. ruziziensis	4 560	3 310
B. dictyoneura	7 420	7 300
Green panic	3 650	3 190
Setaria anceps	3 290	3 040
Guinea grass	4 180	3 940
Pusa Giant Napier	1 110	1 050

The yield data indicate that the fodder grasses except Guinea grass have performed badly during the year. Even the pasture grasses have not shown a significant response to added nitrogen. *B. dictyoneura* has given satisfactory yields as in the previous year.

8. In addition to these the following field trials were commenced during the year:

   (*a*) To study the response to liming in a mixed sward of *B. miliiformis* and *Centrosema pubescens* growing under coconut in an acid soil at Lunuwila.

   (*b*) To asses the performance of three Ipil-Ipil cultivars under coconut at Lunuwila.

   (*c*) To study the effect of time of planting and level of nitrogen on the establishment and performance of *B. miliiformis* and *Centrosema pubescens* alone and in mixture.

   (*d*) To study the effect of methods of establishment on the performance of a mixed sward of *B. miliiformis* and *Centrosema pubescens* growing under coconut at Madampe.

   (*e*) To study the control of Illuk by chemical, mechanical and cultural methods.

C. INTERCROPPING WITH CROPS OTHER THAN PASTURE

1. **To study the effect of three levels of fertilizer application on the yield of 10 coffee selections grown under coconut at Lunuwila.**

This trial was planted at Lunuwila in 1978. The early growth and survival indicated that Arabica selections were unsuitable for cultivation at Lunuwila (Annual report, 1980). In 1981 most of the varieties flowered and produced beans. The yield data obtained are presented in Table 11. Of the selections G.C.R. (Gold Coast Robusta) was outstanding at this stage. Other satisfactory selections were C 36, C.C. 1, C 111 and S 274. The irregular nature of the response to levels of fertilizer is due to the variation in the number of plants that flowered during the year. A proper assessment of the selections is possible only when plants have come into full production.

Table 11. *Yield of coffee (kg/ha) from 10 selections grown under coconut at Lunuwila at three levels of fertilizer application*

Coffee selection	*Fertilizer 340 g/plant/ year*	*Fertilizer 680 g/plant/ year*	*Fertilizer 1020 g/plant/ year*
G.C.R.	94.1	108.6	133.2
I.M.Y.	12.3	29.4	10.3
C 36	107.6	75.4	84.7
K 7	14.6	11.1	3.1
C.C.1	60.3	133.7	72.0
C 111	32.7	58.0	54.9
S 5	0.0	2.5	1.9
S 274	51.9	60.2	33.7
C 96	16.1	42.3	35.9
Bo 72	0.5	4.3	5.4

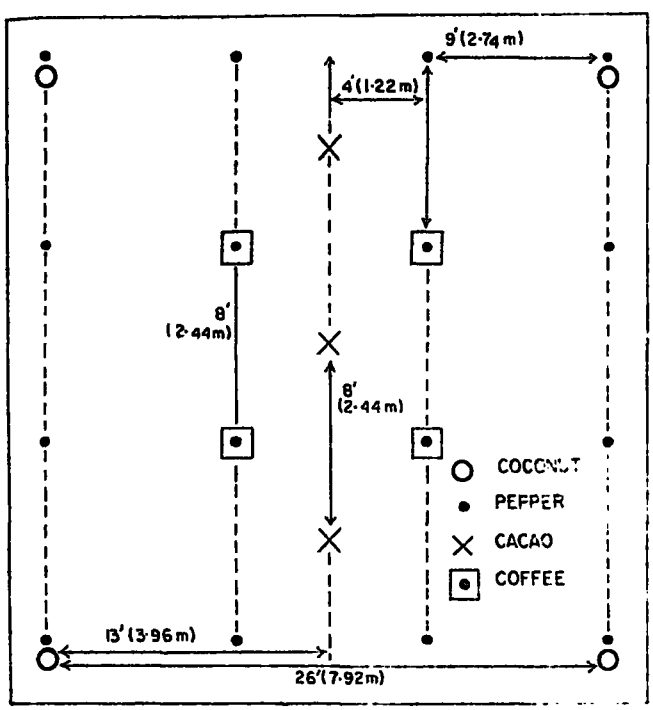
2. Mixed planting trial of coffee, cocoa and pepper

To study the agronomic and economic feasibility of growing coffee, cocoa and pepper as a mixed intercrop under coconut.

The trial was planted in December 1977 and the pattern of mixing the crops was as follows:

A single row of cocoa plants (with plants 240cm. apart in the row) between 2 rows of coconut. On either side of the cocoa row is a row of coffee with plants 240cm apart and 120cm away from the cocoa row. Pepper is trained on to the coconut palms and also on to gliricidia plants placed along the coconut rows in both directions with 2 plants between 2 coconut palms. This pattern is illustrated in Fig. 1.

Fig. 1. Showing the pattern of mixing coffee, cocoa and pepper in a coconut square.



Thus in each coconut square there are 3 cocoa plants, 4 coffee plants and 5 pepper plants amounting to a density of 640 coffee, 590 cocoa and 795 pepper plants per hectare.

Majority of the component plants flowered and produced satisfactory yields during the year (4th year after planting).

In the above crop model the coffee plants were adversely affected by their proximity to the cocoa plants. Although all the coffee plants flowered the production of beans was greatly reduced. In the cocoa only about 60% of the plants were in production during the year.

The pepper vines on gliricidia plants were better than those trained on to coconut palms. The yield per plant and the number of plants in production during the year are given in Table 12.

Table 12. *Yield and production data from the mixed cropping model at Walpita in its 4th year*

Crop	*No. of plants planted*	*No. of plants in production*	*Total yield kg*	*Yield per plant g*
Coffee ...	44	44	1.2	27.27
Cocoa ...	48	29	14.2	489.66
Pepper ...	106	84	47.5	565.48

Thus it is clear that the production and profits would be much higher when all the plants in the model start yielding.

3. **To study the effect of three planting densities and three levels of fertilizer application on the growth and yield of coffee and the effect of coffee on the production of coconut.**

This trial was planted in 1978 at Walpita. The densities of planting coffee are 240 x 180 cm 240 x 240 cm and 240 x 300 cm and the levels of fertilizer are ½ normal, normal and 1½ normal (normal = 680g/plant of a NPK mixture). Coconut palms were given 4 kg of CRI 'C' fertilizer mixture per palm per year. The yields of coffee and coconut due to the different treatments are given in Table 13.

Table 13. *The yield per plant of coffee due to different levels of fertilizer and densities of planting under coconut and the yields of coconut (nuts/palm) due to those treatments*

Treatment	*Coffee planted at 240cm × 180cm*		*Coffee planted at 240cm × 240cm*		*Coffee planted at 240cm × 300cm*	
	Coffee yield /plant (g)	*Nut yield /palm*	*Coffee yield /plant (g)*	*Nut yield /palm*	*Coffee yield /plant (g)*	*Nut yield /palm*
½ normal fertilizer for coffee	55.6	48	64.8	55	41.0	50
Normal fertilizer for coffee	97.9	57	89.9	48	127.2	52
1½ normal fertilizer for coffee	50.4	57	114.1	50	76.5	47

4. **To study the effect of three levels of fertilizer on 4 cocoa selections grown under coconut at Walpita.**

The experiment was planted in 1978. The levels of fertilizer are ½ normal, normal and 1½ times normal of a NPK mixture (normal = 680g/plant). The four cocoa selections are NA 32, ICS 1, Amelanado and Millawana. Production is still very uneven due to the uneven nature of the stand resulting from vacancies being filled after the commencement of the experiment. This should even out when all plants reach maturity and start producing. The yield data for the year are presented in Table 14.

Table 14. *Yield of four cocoa selections due to three different levels of fertilizer application when intercropped with coconut at Walpita*

Variety	*ICS 1*		*NA 32*		*Amelanado*		*Millawana*	
Level of fertilizer	*No.of pods/ plant*	*Bean yield/ plant (g)*	*No. of pods/ plant*	*Bean yield/ plant (g)*	*No. of pods/ plant*	*Bean yield/ plant (g)*	*No. of pods/ plant*	*Bean yield/ plant (g)*
½ normal	5.68	180.7	12.98	533.4	3.78	158.0	13.98	372.3
Normal	5.73	243.0	15.20	500.2	10.50	230.0	6.78	297.8
1½ times normal	8.05	306.5	11.18	424.6	5.00	177.0	14.00	515.7

Normal : 680g/plant/year of a NPK mixture applied in 4 split doses.

5. **Cloves, nutmeg and cinnamon planted in observation plots at Walpita in 1979 continued to grow satisfactorily during the year.**

The clove plants grew to an average height of 2.71m with a spread of 1.84m and a stem girth of 3.52cm. One plant came into bearing during the year. The growth rate of nutmeg was slow compared to the cloves. The plants attained an average height of 1.10m with a spread of 1.17m and a stem girth of 2.37cm. Cinnamon was harvested for the first time during the year. Out of the total of 972 plants planted at a spacing of 120 cm 60cm 739 plants were harvested and peeled yielding 13.5kg. of No. 1 quills.

6. **To study the effect of intercropping perennial crops and a rotation of annual crops on the yield of coconut at Sirikandura Estate, Dodanduwa, in the wet zone.**

The design is a randomised block with 3 replicates. The perennial crops studied are pepper, coffee, cocoa, cloves and cinnamon during the year under review the annual crop planted was diascorea yam. All the perennial crops are well established. The nut yield data recorded during the year are given in Table 15. The mean nut yield for the years 1978, 1979 and 1980 is also given for comparison. In the cinnamon plots the coconut fronds showed signs of yellowing indicating severe competition for plant nutrients. The leaves are being analysed to determine the deficient nutrients.

Table 15. *Yield of coconut due to different intercropping treatments at Sirikandura Estate, Dodanduwa*

Treatment	*Average yield of nuts /ha 1978, 79 & 80.*	*Yield of nuts /ha (1981)*
Cloves	5 485	5 740
Pepper	5 390	5 692
Cocoa	6 551	7 298
Control	5 470	4 277
Crop rotation (annuals) ...	6 408	8 077
Cinnamon	7 155	6 853
Coffee	7 425	6 974

7. **To compare two varieties of winged bean and two varieties of long bean at 3 levels of nitrogen for green pod production under coconut and study the economics of intercropping these crops under coconut.**

This trial was planted in late Maha at B/E, Lunuwila. The varieties of winged bean were UPS 121 and UPS 122 and long bean were Polong ma and Bushitao. The levels of nitrogen were zero, 30 and 60 kg N/ha. The winged beans and Polong ma were spaced at 80 x 80 cm while Bushitao was spaced at 60 x 15 cm. The trial was planted in late Maha. The design was a randomised block with 3 replicates. Each plot was 4.8 m^2. The winged beans and Polong ma were trained on to 2.5 m. stakes. Flowering and time to first harvest were shortened in Bushitao with increase in the level of added nitrogen. The other varieties were unaffected. The green pod yield data and the calculated monetary values for the different varieties are given in Table 16. The monetary value was based on the market value prevailing at the time of harvest. From the data it is seen that Bushitao has out yielded all the varieties tested.

Table 16. *The yield of green pods per ha of 2 winged bean and 2 long bean varieties grown under a mature stand of coconut at 3 levels of nitrogen at Lunuwila. The calculated monetary value for each variety is also given.*

Variety	*Polong ma*		*Bushitao*		*UPS 121*		*UPS 122*	
Level of nitrogen	*Yield/ha kg*	*Monetary value Rs. 1000/ha*	*Yield/ha kg*	*Monetary value Rs. 1000/ha*	*Yield/ha kg*	*Monetary value Rs. 1000/ha*	*Yield/ha kg*	*Monetary value Rs. 1000/ha*
N_0 zero	3 280.2	23.70	6 585.2	49.39	1 096.0	1.09	887.9	0.88
N_0 30kg/ha	4 888.4	36.66	9 720.2	72.90	1 256.4	1.25	1 034.9	1.02
N_0 60kg/ha	3 730.0	29.97	11 545.4	86.59	1 093.8	1.08	1 213.8	1.21

The market prices prevailing (at Wennappuwa) at the time of harvests were,—

Winged bean ... Rs. 10.40 /kg
Long bean ... Rs. 7.00 /kg

The yields obtained for winged bean were rather low. This may be probably due to the fact that at late planting they were at a disadvantage compared to the short age crops Bushitao and Polong ma. Bird damage was observed to be high for Polong ma while Bushitao was affected by fungal infections. This trial will be repeated in both Yala and Maha 1982.

8. **To study the development and yield of three varieties of winged bean planted at two different spacings under coconut at Lunuwila.**

This trial was planted in Yala and completed during the year. The design was a fully randomised block with three replicates of all treatments. In the two spacings the distance between rows was kept constant at 1.2m and the distance between plants in the row was either 1.2 m or 0.6 m. The varieties tested were as follows:

V_1 = TPT 2

V_2 = SLS 47

V_3 = UPS 121

The morphological and reproductive characters gathered during the course of the experiment are given in Table 17.

Table 17. *Morphological and reproductive characteristics of three different winged bean varieties mean values of three replicates*

Treatment combinations	*Days to first anthesis (days)*	*Flowering period (days)*	*Days to first mature pod (days)*	*Pods/plant (No.)*	*Seeds/pod (No.)*	*100 seed weight (g)*	*Weight of green pods plant (g)*	*Seed yield (kg/ha)*
V_1S_1	85.3	26.0	141.0	8.2	10.5	32.1	49.1	476.93
V_2S_1	84.0	40.3	146.0	12.0	11.2	33.9	87.3	1 229.42
V_3S_1	93.0	22.3	138.0	7.2	12.5	25.2	153.1	580.92
V_1S_2	85.3	26.7	136.7	6.7	11.4	29.5	41.4	304.10
V_2S_2	89.0	37.0	142.0	15.5	10.7	34.6	48.9	1 619.14
V_3S_2	94.3	21.3	136.7	6.6	12.9	27.6	71.9	320.15

The data indicate that green pod production per plant increases at closer in row spacings. Variety UPS 121 produced the highest green pod yield per plant at both spacings. The yield of seeds produced was highest in the variety SLS 47 at both spacings and is probably due to the low pod shattering exhibited by SLS 47 compared to the other two varieties.

9. **To evaluate the performance of 16 varieties of winged bean under coconut.**

This trial was planted at Ratmalagara Estate, Madampe, during the Yala rainy season. The design was a randomised block with three replicates of all treatments. The morphological and reproductive data collected for the different varieties during the course of the experiment are given in Table 18.

Table 18. *Morphological and reproductive characters of 16 varieties of winged bean grown under coconut at Madampe*

Strain	Germination %	Leaf numbr per plant					Shoot number per plant				Height of the vine (cm)				No. of days from planting to 1st and 50% flowering		No. of days from planting to 1st immature pod/ harvest and % of damage		Average pod length and No. of seeds per pod		No. of pods per plant and immature pod yield	
		2 WAP	4 WAP	6 WAP	8 WAP	10 WAP	4 WAP	6 WAP	8 WAP	10 WAP	2 WAP	4 WAP	6 WAP	8 WAP	First Flowering	50% Flowering	Days	%	Pod length (cm)	Seeds per pod	No. of pods per plant	Immature pod yield kg/* Coconut ha.
UPS-31	64.42	4.8	13.2	31.8	72.4	82.7	2.2	3.8	5.9	9.0	38.0	81.7	114.8	245.4	54.0	68.6	78.0	5.0	9.36	8.33	65.33	4310
UPS-32	61.25	4.3	11.0	24.0	35.0	41.8	1.7	1.7	3.1	4.7	23.0	63.4	170.5	242.5	55.0	62.0	70.0	7.5	13.72	12.33	21.53	2321
UPS-45	78.75	4.4	11.1	21.2	30.8	43.6	1.3	1.2	3.0	5.3	58.0	88.1	154.7	237.5	57.3	65.3	78.0	5.0	13.97	14.33	24.43	2950
UPS-46	69.17	4.7	10.4	21.1	35.6	56.2	1.6	2.2	4.1	6.0	19.2	72.6	190.6	275.1	51.3	61.0	75.33	5.0	9.67	6.33	39.30	2247
UPS-47	62.12	3.5	7.1	18.7	22.4	28.3	0.6	0.9	2.4	3.4	14.8	50.2	142.5	203.8	46.3	58.6	72.66	10.0	13.47	12.0	24.70	2246
UPS-59	45.42	4.0	8.0	16.7	26.9	38.2	1.6	2.0	3.4	5.2	48.3	82.5	119.5	238.2	60.3	72.6	75.33	8.33	12.34	9.67	26.90	2724
UPS-62	70.42	4.9	11.6	27.7	43.7	48.5	1.5	2.5	3.6	4.9	37.4	74.2	181.1	254.1	50.0	58.0	70.0	10.0	10.48	10.67	42.43	3372
UPS-66	74.17	5.0	11.8	27.9	46.3	51.6	2.0	2.4	3.8	5.7	34.3	67.3	167.9	273.2	53.3	64.0	75.33	6.66	10.56	10.67	35.33	2948
UPS-99	51.67	4.0	10.8	22.8	42.7	47.6	1.0	2.0	4.0	5.0	44.7	66.3	160.2	283.9	48.0	60.0	72.66	12.5	12.86	12.0	48.66	5743
UPS-102	51.25	4.4	11.2	33.9	54.0	60.9	1.7	3.3	6.7	6.3	29.1	78.1	124.6	205.2	52.6	58.3	75.33	5.0	8.26	8.0	46.70	2281
UPS-121	40.84	3.1	9.3	14.8	24.7	32.5	1.5	0.8	1.4	4.9	5.0	46.2	86.6	166.1	70.6	81.3	99.66	7.5	18.38	15.33	28.46	4534
UPS-122	40.42	3.9	9.8	20.3	36.4	49.7	1.5	1.9	3.7	6.7	9.0	74.4	148.2	231.3	56.3	65.3	80.0	10.0	19.61	15.33	28.93	5401
UPS-139	65.25	5.1	11.0	25.5	43.7	49.2	2.0	2.9	3.6	5.0	42.7	79.2	113.1	245.0	56.3	65.3	78.0	7.5	8.18	6.67	59.83	3481
Thailand-D	30.34	4.6	11.6	32.0	55.7	71.5	1.3	4.3	4.9	5.4	8.1	52.5	108.9	192.3	55.6	88.0	78.0	5.0	13.16	12.0	37.60	4142
TPT-2	43.75	3.9	10.1	25.9	40.8	51.7	1.3	2.0	4.1	6.3	6.3	70.9	112.6	200.6	69.0	82.0	98.33	10.0	18.05	12.0	39.73	6682
SLS-47	37.09	4.1	12.1	31.6	50.7	71.8	1.3	2.8	5.0	6.9	9.5	50.9	95.0	211.9	76.6	91.6	94.66	5.0	14.37	13.33	24.50	3405
LSD(P=0.05)	22.82	1.10	3.36	11.03	25.57	25.65	1.51	1.87	2.45	3.61	29.61	38.86	80.03	68.60	6.62	7.07	9.46	4.06	2.51	2.40	21.54	2249
CV%	24.71	15.6	18.89	26.81	37.19	30.88	72.18	50.15	35.06	39.49	66.51	33.98	35.10	17.78	6.97	6.13	7.15	32.8	11.73	12.92	34.81	3711

WAP — Weeks after planting

* *Leaving allowance for manure circle, calculation based on land area 2/3rd that of the open field.*

The presence of a high biological variation among the different varieties is seen from the data collected. The UPS varieties exhibited faster initial growth. The local strain SLS 47 and the Thailand variety produced excessive vegetative growth.

10. **Mungbean evaluation trial under coconut**

This trial evaluates the performance of Asian Vegetable Research and Development Centre mungbean selections and compares them with local varieties when grown under coconut at Lunuwila.

The design was a randomised block with four replicates of all treatments. The trial was planted in Yala and completed during the year.

The morphological and reproductive data collected are given in Table 19.

Table 19. *Morphological and reproductive data of Mungbean selections under coconut at Lunuwila*

	Variety	*Plants/m*	*Plant height(cm)*	*Days to 1st flowering*	*Days 1st mature pod*	*Pods/ plant*	*Seeds/ pod*	*1000 seed weight (g)*	*Seed yield (kg/ha)*
1.	V_c 1973A	10.7	40.2	34.0	81.2	14.5	11.9	57.0	532.00
2.	V_c 1974A	10.0	30.0	36.3	81.5	13.4	10.4	59.6	415.75
3.	V_c 1177B	10.7	26.2	38.0	82.5	11.4	10.9	58.7	347.00
4.	V_c 1482C	10.0	29.6	33.5	80.5	18.0	11.1	55.5	499.75
5.	V 2773	9.4	31.5	35.0	80.7	15.7	11.5	44.1	328.50
6.	V 3476	9.0	27.8	35.7	81.5	13.5	10.7	54.6	477.50
7.	V 2184	11.0	37.5	34.5	79.7	14.9	10.2	67.4	477.25
8.	V 3484	9.0	30.0	35.0	80.7	14.2	12.3	41.2	365.75
9.	T 51	11.5	30.4	35.0	80.7	19.1	10.9	42.0	415.75
10.	MI 4	9.5	26.8	34.5	81.2	14.1	10.0	47.0	308.75

V_c — AVRDC, Taiwan crosses
V — AVRDC, Taiwan selections
T51, MI4 — Local varieties

The data indicate that AVRDC selections V 1973A and V_c 1482C were superior to the other AVRDC selections. All other AVRDC selections were superior to the local selection MI 4.

D. ANIMAL HUSBANDRY

1. Rotational cross breeding programme

The rotational cross breeding programme to upgrade the Sinhala cattle was continued during the year. Most of the animals in the 1st phase (Jersey x Sinhala F_1) of the breeding programme completed 5 lactations, and a scientific paper entitled "Lactation characteristics of Jersey x Sinhala cattle under coconut" was prepared by Mr. D. E. F. Ferdinandez. Summary of the findings reported in this paper are given below.

The average yield per lactation of the F_1 was nearly twice compared to that of Sinhala parent (1006 litres vs 577 litres). Compared to the Sinhala parent, the F_1 produced higher milk yield per day. The total yield per lactation was controlled both by yield per day and the length of lactation. The yield per lactation increased with age reaching a peak at the 4th lactation while the length of lactation decreased with age. The lactation curve reached a peak between the 5th and 6th weeks and then declined progressively to about the 40th week. The length of lactation and calving intervals of the F_1 were comparable to Temperate breeds.

2. Milk production and herd strength

A total of 139,455 litres of milk was produced at the 2 stations (BE—136, 747 litres, RE—2708 litres). The herd strength as at 31st December, 1981 is given below:-

	Bandirippuwa	*Ratmalagara*	*Kirimetiyana*	*Ebewatta*	*Total*
No. of animals	137	94	82	47	360
No. of cows	69	06	27	—	102
No. of heifer calves	35	80	47	—	162
No. of bull calves	31	07	08	47	93
Stud bulls	02	01	—	—	03
Births	47	11	43	—	101
Deaths	53	01	—	03	57

A serious disease outbreak occurred among the milking herd at Bandirippuwa during the latter part of the year, and assistance had to be sought from Veterinary Research Institute, Peradeniya to control the epidemic. Seventy-seven animals were affected of which 15 animals died. General symptoms were; swollen vulva and udder, abnormal temperature, constipation and sudden drop in milk yield. It was suspected to be Ephemeral fever.

General comments

The amount of land available for animal production at Kirimetiyana Estate further decreased and at the end of the year only about 60 acres were available for pasture production. Eighty acres of coconut land from the Kurunegala District (Ebbewatta Estate) was purchased by C.R.I. to continue the animal husbandry programme.

Acknowledgements

I wish to express my thanks to Mr. D.E.F. Ferdinandez for the assistance in the preparation of this report.

L. V. K. LIYANAGE
Officer-in-charge

Ceylon Cocon. Q., (1982) 33, 23—37
Printed in Sri Lanka

Report of the Biometry and Agricultural Economics Unit-1981

1. STATISTICAL WORK

The primary functions of this unit are to give a consultant service in the design of experiments, analysis and interpretation of data. This was attended to. Designs for the following new experiments were prepared for the respective Divisions.

1.1. Division of Agronomy

1.1.1. To study the performance of pasture and legume in three different planting systems.

1.1.2. To study the performance of a grass in the presence of a legume at different levels of applied Nitrogen.

1.1.3. To study the effect of application of Nitrogen on legume based pasture and planting time.

1.1.4. To study the effect of watering and light intensity on growth of three varieties of legumes.

1.1.5. To study the influence of two soil types and N, P mixture on growth of a winged bean variety.

1.1.6. To study the performance of sixteen strains of winged bean under coconut during yala season.

1.1.7. To study the performance of twenty-strains of winged bean under coconut during Maha season.

1.2. Division of Botany and Plant Breeding

1.2.1. To study the stomatal behaviour of Dwarf x Tall and Tall variety.

1.2.2. To study the effect of husking and fertilizer on the germination and performance of seedlings of Dwarf x Tall and Tall x Tall crosses.

1.2.3. To study the effect of fertilizer x frequency of application, on the performance of seedlings of Dwarf x Tall crosses.

1.2.4. To study on the characters that could indentify the crosses Dwarf x Dwarf, Dwarf x Tall, Tall x Dwarf and Tall x Tall at the nursery stage.

1.3. Division of Crop Protection

1.3.1. To study the distribution of fungus infected coffee leaf scale under coconut at Bandirippuwa Estate.

1.3.2. To study on the insect damage and the yield of five legumes planted at three different intervals during the monsoon.

1.4. Division of Coconut Processing

1.4.1. To study the effect of storage and maturity on the kernel.

1.5. Division of Soils and Plant Nutrition

1.5.1. To study the effect of Saphos-phosphate and Triple Super phosphate on growth of seedlings.

1.5.2. To study the effect of forms of Magnesium on the performance of seedlings planted in the dry zone.

1.5.3. To study the effect of burying husk and coir dust on coconut yield.

1.5.4. To study the effect of application of Boron on growth of coconut seedlings.

1.5.5. To study the sulphur status in coconut palms.

1.5.6. To study the effect of forms of Magnesium on coconut yield.

2 RESEARCH

2.1. Calibration Trial (Ratmalagara Estate)

The bimonthly recordings of vegetative and yield characters of the palms in this experiment were carried out without interruption. Variation of yield characters within the six picks and during the last five years are as given below.

2.1.1. No. of bunches per hectare per pick over the last five years are shown in Table 1.

Table 1. *No. of bunches per hectare*

Year	*1st pick*	*2nd pick*	*3rd pick*	*4th pick*	*5th pick*	*6th pick*
1977	311	230	315	331	369	322
1978	216	329	334	336	377	247
1979	293	326	361	377	335	279
1980	282	348	372	286	217	204
1981	280	339	331	305	298	303

2.1.2. No. of nuts per hectare per pick over the last five years are shown in Table 2

Table 2. *No. of nuts per hectare*

Year	*1st pick*	*2nd pick*	*3rd pick*	*4th pick*	*5th pick*	*6th pick*
1977	1153	1186	1732	1714	1409	1154
1978	996	1431	1952	1618	1430	819
1979	1216	1898	2466	1953	1177	922
1980	1009	1017	1063	500	509	702
1981	988	1513	1700	1291	1273	1128

2.1.3. No. of nuts per bunch per pick over the last five years are shown in Table 3.

Table 3. *No. of nuts per bunch*

Year	*1st pick*	*2nd pick*	*3rd pick*	*4th pick*	*5th pick*	*6th pick*
1977	3.71	5.16	5.50	5.18	3.81	3.58
1978	4.62	4.34	5.85	4.81	3.79	3.31
1979	4.15	5.81	6.83	5.19	3.51	3.30
1980	3.58	2.92	2.85	1.75	2.34	3.44
1981	3.52	4.46	5.14	4.24	4.28	3.72

2.1.4. No. of nuts per palm per pick over the last five years are shown in Table 4.

Table 4. *No. of nuts per palm*

Year	*1st pick*	*2nd pick*	*3rd pick*	*4th pick*	*5th pick*	*6th pick*
1977	7.29	7.50	10.95	10.84	8.91	7.30
1978	6.30	9.05	12.34	10.23	9.04	5.18
1979	7.69	12.00	15.59	12.35	7.44	5.83
1980	6.38	6.43	6.72	3.16	3.22	4.44
1981	6.25	9.57	10.75	8.16	8.05	7.13

2.1.5. Percentage increase or decrease in yield components over the previous year for the last five years are as given in Table 5.

Table 5. *Percentage change in yield characters over the previous year*

Year	*No. of bunches/ hectare*	*No. of nuts/ hectare*	*No. of nuts/ bunch*	*No. of nuts/ palm*
1981	+ 8.6	+64.4	+51.2	+64.4
1980	—13.3	—50.2	—42.5	—48.8
1979	+ 7.2	+16.8	+ 9.2	+16.8
1978	— 2.1	— 1.2	+ 0.6	— 1.2

There is an overall increase of yield characters during the year 1981 over that of 1980. Compared to the rest of years 1980 indicates a poor crop year.

2.2. Calibration Trial (Walpita)

Initial records (vegetative and yield characters) of 100 palms were taken during the latter part of the year, and recording of data (bimonthly) will commence in 1982.

Given in Table 6. are the vegetative and yield characters of the selected palms.

Table 6. *Vegetative and yield characters*

Character	*Mean*	*Observed range*	*Coeff. of variation (%)*
No. of leaves	27.97	21.00 to 39.00	11.0
Length of last leaf (metres)	3.76	3.21 to 4.42	6.4
No. of leaflets in the last leaf	236.00	204.00 to 268.00	5.5
Height of the palm (metres)	13.10	5.54 to 15.47	12.3
Girth at the top (cm)	70.00	53.30 to 94.70	8.7
Girth at 30 cm below the top (cm)	71.60	56.60 to 97.30	9.6
No. of bunches present	12.69	9.00 to 16.00	9.8
No. of nuts per bunch	9.48	2.90 to 26.70	33.9

Number of nuts per bunch show a high variability (Coeff. of Var. 33.9%) compared to law variability in the other characters which ranges from 5.5% to 12.3%. It is intended to carry out a Principal Component analysis to study the components which contribute most to the production.

2.3. Watering experiment

This experiment was continued uninterrupted during the year. The response to treatments in the year 1981 are shown in Table 7.

Table 7. *Yield per hectare per annum*

Treatment	*Nuts/Hectare/Annum*				
	L Yielding	*M Yielding*	*H Yielding*	*Weighted Average*	*No. of Waterings*
Control	7 346	8 030	13 275	8 695	nil
Single dose weekly	9 070	10 855	17 327	11 378	27
Single dose fortnightly	6 646	11 739	18 127	11 203	13
Double dose fortnightly	8 094	10 116	14 562	10 224	13

L = Low M = Medium H = High

The yields have been adjusted for pre-experimental differences by means of covariance analysis. A significant ($p=0.05$) difference in treatments was shown by the mid yielding palms.

2.4. Bunch Thinning Trial

Monthly recordings were carried out according to the experimental design and to the schedule.

2.5. Nursery Trial at Attavillu

A nursery trial to study the performance of coconut seedlings under irrigated and non-irrigated conditions were commenced at the end of the year.

The objective of the trial is to study the general performance of seedlings and the percentage of issues that could be made under different irrigated systems.

The experiment consists of the following treatments.

Treatments — T_1 Planting in November (irrigation and rainfall)

T_2 Planting in November (only rainfall)

T_3 Planting in February (irrigation and rainfall)

T_4 Planting in February (only rainfall)

T_5 Planting in November (irrigating only after the 3rd month of planting and rainfall)

T_6 Planting in February (irrigating only after the 3rd month of planting and rainfall)

(watering will be done once in two weeks)

The design used was a fully randomized design with three replications

2.6. Studies in Agricultural Economics

Work on few research projects were commenced during the year upon the recruitment of the Research Assistant in September 1980.

2.6.1. Cost of Production of Seedlings

A preliminary study was undertaken to ascertain the cost of production of seedlings produced at different nurseries managed by the Institute.

The data collected for the year 1979/80 revealed that on an average, a seedling issued had cost Rs. 4.89, ranging from Rs. 3.41 to Rs. 9.55 (Table 8).

The cost of seedlings produced in dry zone and intermediate zone nurseries are respectively 73.1% and 30.5% more than the seedlings produced in wet zone nurseries.

Based on the figures of 79/80 a projection was made of the cost of production for 1980/1981, 1981/1982. The average cost was Rs. 5.95 and Rs. 7.61 respectively. A detailed report was submitted to the Board. The actual data for the year 1980/1981 has been collected and a report will be made available in early 1982.

Table 8. *Cost of Production of Seedlings 1979/80*

Nursery	*Location*	*Cost of Production Rs.*	*Zonal Average Rs.* (*weighted Avg.*)	*% increase over the wet zone*	*Average (over all nurseries)*
Handapangala		9.95	6.64	74.13	
Attavillu	Dry Zone	4.39			
Alampil		5.06			
Kirimetiyana		5.35			4.89
Ibbagamuwa	Interm. Zone	3.90	4.96	30.52	
Ratmalagara		7.95			
Wilpotha		4.48			
Koggala		3.41			
Walpita		4.17	3.80		
Pallekelle	Wet Zone	3.80			
Eraminigolla		3.94			

2.6.2. **Resource Utilization in the Fibre Milling Industry**

The relevant data for the fibre mills registered with the Coconut Development Authority were collected. A detail report will be made available in early 1982.

An interim report prepared on "Distribution of Fibre Mills in the major coconut growing areas of Sri Lanka" was submitted to the Board. It was indicated that there is a shortage of husks for fibre mills in the three major coconut growing Districts, *viz.*, Puttalam, Kurunegala and Colombo. Table (9) shows the distribution pattern of the fibre mills and the utilization of the coconut husks.

Table 9. *Estimated coconut yields and availability of husks for fibre milling*

District	*Estimated yield (m. nuts) (Estimated husk)*	*Husk availability for coir milling industry (m. husks) (40% available husks)*	*Apx. husk consumption (m. husks)***	*Balance (m. husks)*
Kurunegala	906.4	362.5*	399.8	— 37.3
Chilaw	224.0			
Puttalam	74.3	119.3*	279.3	—160.0
Colombo	429.5	171.8*	235.4	— 63.6
Galle	54.8	21.9*	23.5	— 1.6
Kalutara	65.4	26.2	17.2	+ 9.0
Hambantota	65.3	26.1	2.6	+ 23.5
Matara	48.5	19.4	5.9	+ 13.5
		747.2	963.7	—216.5

**Source adopted from Coconut Development Authority.

*Districts with probable shortage.

2.6.3. (*a*) **Resource use pattern in the coconut sector (cost of production)**

(i) To determine the cost of production of coconut under different conditions of management.

(ii) To maintain input, out-put data as a base for the economic evaluation of cultural practices.

(*b*) Agro-Economic norm for the coconut small holder.

To identify the basic Agro-economic characteristics of the different size units of holdings and the people working on these small holdings.

Five areas from the Kurunegala district, *viz.* Udubaddawa, Hettipola, Wariyapola, Narammala and Pothuhera were selected for the above studies.

The data collected from the above areas revealed the following size-class distribution of the number of holdings and the acreage. (Table 10, 11).

Work on these two projects were temporarily withheld since the Ministry of Coconut Industries has identified "Cost of Production" as a priority, for which a committee has been appointed. The data collected from this study will be made use in the study of Agro-economic norm for the coconut small holder.

Table 10. *Distribution of Coconut Holdings in the Four Agrarian Service Ranges - Kurunegala District*

Size of holding (ac)	*Wariyapola Range*				*Hettipola Range*				*Udubaddawa Range*				*Narammala Range*			
	Banunakotuwa		*Panawa*		*Moragolla*		*Girithalana*		*Udadeniya*		*Dunakadeniya*		*Ranmuthugala*		*Madagoda*	
	No.	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*
0 — 0.5	132	15.77	210	20.35	219	22.03	182	27.16	120	14.77	105	12.99	195	20.24	85	12.80
0.5 — 1	232	27.72	423	40.99	375	37.73	231	34.48	233	28.69	260	32.18	486	50.46	170	25.60
1 — 2.5	341	40.74	333	32.27	311	31.29	195	29.10	299	36.82	285	35.27	226	23.46	306	46.20
2.5 — 5	68	8.12	45	4.36	65	5.54	47	7.01	78	9.61	89	11.01	32	3.32	61	9.20
5 — 10	38	4.54	13	1.26	14	1.41	9	1.34	41	5.05	33	4.08	14	1.45	17	2.56
10 — 20	15	1.79	7	0.68	7	0.70	3	0.45	20	2.46	26	3.22	2	0.20	9	1.35
20 and above	11	1.31	1	0.09	3	0.30	3	0.45	21	2.59	10	1.24	8	0.83	14	2.11

Table 11. *Distribution of Coconut Acreage in the Four Agrarian Service Ranges-Kurunegala District*

Size of holding (ac)	Wariyapola Range				Hettipola Range				Udubaddawa Range				Narammala Range			
	Bamunakotuwa		Panawa		Moragolla		Girathalana		Udadeniya		Dunakadeniya		Rammuthugala		Mudagoda	
	Acrge.	%	Acrge.	%	Acrge.	%	Acrge.	%	Acrge.	%	Acrge.	%	Acrge.	%	Acrge.	%
0 — 0.5	27.00	1.62	46.00	4.22	49.75	4.45	44.00	5.89	29.25	1.34	25.75	1.46	45.25	3.17	22.75	1.33
0.5 — 1	133.25	7.99	235.50	21.59	204.25	18.27	129.00	17.27	135.50	6.21	149.25	8.45	304.00	21.30	98.50	5.74
1 — 2.5	474.25	28.47	448.00	41.06	401.50	35.90	254.25	34.05	408.25	18.72	385.25	21.80	272.25	19.08	428.25	24.90
2.5 — 5	229.50	13.79	147.50	13.52	201.75	18.04	152.50	20.42	249.75	13.51	279.50	15.82	98.50	6.90	180.25	10.50
5 — 10	253.75	15.23	90.50	8.29	90.50	8.09	55.50	7.43	272.25	12.48	204.75	11.59	96.75	6.78	111.50	6.50
10 — 20	192.50	11.56	96.00	8.79	71.50	6.39	34.50	4.62	257.50	11.81	352.50	19.95	23.00	1.61	112.50	6.60
20 and above	355.50	21.31	28.00	2.57	99.00	8.85	77.00	10.31	828.50	37.99	370.00	20.94	587.50	41.14	763.00	44.40

Table 12. *Rainfall (mm) for the last 10 years and during the year at Bandirippuwa Estate*

Month	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*(71-80) Ave.*	*1981*
January	137.4	0.0	0.0	0.0	4.8	8.1	0.0	0.0	0.5	0.0	15.1	50.8
February	120.1	0.0	102.6	19.8	30.2	0.0	99.8	3.0	146.8	0.0	52.2	66.0
March	95.0	70.9	183.4	77.2	104.6	143.2	146.0	204.2	17.5	68.8	111.1	16.5
April	199.6	156.0	239.8	329.9	386.6	119.6	131.6	145.8	70.9	206.0	198.6	100.6
May	142.5	499.1	169.2	270.8	319.0	56.9	700.0	590.0	174.5	54.2	297.6	333.5
June	250.2	112.8	242.3	103.1	178.8	60.2	130.6	64.0	231.4	308.1	168.2	107.4
July	148.6	60.1	117.9	183.4	202.7	51.8	14.2	1.3	22.4	21.8	82.4	38.6
August	54.6	12.7	66.3	83.1	39.9	84.8	66.6	20.8	20.1	78.2	52.7	41.4
September	287.5	194.8	20.8	208.3	152.9	80.8	74.7	84.1	194.8	182.3	148.1	124.2
October	270.3	541.8	246.1	104.4	150.1	310.4	656.1	260.3	203.2	364.4	310.7	298.4
November	59.2	236.5	475.2	148.3	466.6	522.5	322.3	455.9	364.5	184.9	323.6	197.2
December	165.1	114.8	205.7	144.0	184.9	166.9	12.4	169.7	162.3	102.3	142.8	12.9
Total	1930.1	1999.5	2069.3	1672.3	2221.1	1605.2	2354.3	1999.1	1608.9	1571.0	1903.1	1487.5

3. AGRI-METEOROLOGY

3.1. The three meteorological stations at Bandirippuwa Estate, Ratmalagara Estate and Isolated Seed Garden were maintained satisfactorily. Data from these stations were provided to number of outside Institutions on request.

3.2. **Weather conditions during the year**

3.2.1. **Bandirippuwa Estate**

Table 12. shows the rainfall of the area for the last 10 years and during the year 1981.

There had been a good distribution of rainfall over the whole year. This will be reflected on the coconut production of 1982 in this area. It could be expected that there will be an increase in coconut production in 1982 over that of the past few years.

Meteorological observations during the year 1981 are given in Table 13.

Table 13. *Summary of meteorological observations during the year*

Month	*Mean per day*					
	Temperature (C)		*Evaporation*	*Sunshine*	*Relative humidity(%)*	
	Max.	*Min.*	*(mm)*	*(hrs.)*	*a.m.*	*p.m.*
Jan.	31.7	21.2	4.5	8.5	81	58
Feb.	32.3	21.3	4.6	8.7	78	65
Mar.	34.2	24.0	5.4	8.9	75	64
Apr.	32.6	25.2	4.1	6.6	80	75
May	32.0	25.8	3.5	5.6	84	77
June	30.6	25.9	4.1	5.4	83	79
July	30.8	26.1	3.7	5.4	81	75
Aug.	31.3	25.8	4.3	7.0	79	74
Sep.	30.4	25.1	3.2	5.4	83	78
Oct.	30.9	23.5	3.6	5.5	83	77
Nov.	31.0	23.9	3.6	6.5	80	75
Dec.	31.7	22.3	3.9	7.8	81	71

3.2.2. Ratmalagara Estate

Table 14. shows the rainfall of the area for the last 10 years and during the year 1981.

Table 14. *Rainfall (mm) for the last 10 years and during the year 1981*

Month	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*(71-80)Ave.*	*1981*
January	88.1	9.4	0.0	0.0	14.0	18.3	1.0	0.0	0.0	0.0	13.1	78.7
February	93.5	0.0	34.5	99.1	23.6	0.0	49.5	0.0	167.3	0.0	46.8	11.3
March	24.1	43.2	85.6	13.7	142.7	139.7	186.7	89.3	16.9	16.7	75.9	38.4
April	159.0	187.7	170.4	512.1	285.0	161.5	157.5	69.7	70.6	208.2	198.2	52.5
May	126.5	286.2	126.2	397.5	111.8	134.9	625.8	410.0	46.9	74.0	234.0	290.8
June	215.6	16.0	161.3	67.3	149.6	61.2	67.3	15.1	46.1	246.1	104.9	87.4
July	24.6	16.2	31.0	141.7	174.8	30.5	23.3	6.5	28.8	14.3	49.2	55.1
August	61.5	9.6	11.7	105.9	17.5	30.2	35.4	27.5	46.1	31.2	37.7	80.4
September	144.8	204.2	14.5	134.6	160.8	36.1	58.3	54.0	125.6	149.0	108.2	121.6
October	355.1	338.6	273.6	57.2	221.2	215.1	565.9	302.0	316.3	239.6	288.5	168.9
November	17.8	125.2	233.9	147.6	535.9	418.1	166.4	540.3	377.3	273.2	283.6	304.0
December	66.3	117.3	264.9	53.3	84.3	114.6	73.8	55.7	272.6	126.4	122.9	24.2
Total	1376.9	1353.6	1407.6	1730.0	1921.2	1360.2	2010.9	1570.1	1514.5	1378.7	1563.0	1313.3

As at Bandirippuwa Estate the rainfall has shown a good distribution throughout this year indicating a good crop prospect for coconut during the year 1982.

Meteorological observations during the year 1981 are given in Table 15.

Table 15. *Summary of meteorological observations during the year*

Month	*Temperature (C)*		*Relative humidity (%)*	
	Max.	*Min.*	*a.m.*	*p.m.*
January ...	31.4	20.9	88	66
February ...	33.6	20.4	88	59
March ...	35.1	23.7	88	*
April ...	33.5	24.8	85	72
May ...	31.4	25.4	88	78
June ...	30.0	25.4	85	77
July ...	30.8	25.4	85	75
August ...	30.7	25.4	86	79
September ...	29.7	24.6	84	80
October ...	30.2	23.0	87	76
November ...	30.5	23.2	84	70
December ...	30.7	21.8	87	72

* not available.

3.2.3. Isolated Seed Garden

Table 16. shows the rainfall of the area for the last 10 years and during the year 1981.

Table 16. *Rainfall (mm) for the last 10 years and during the year 1981*

Month	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*1980*	*(71-80)Ave.*	*1981*
January	102.4	3.6	0.0	0.0	24.4	10.9	0.0	0.0	13.1	0.5	15.5	36.9
February	49.8	0.0	15.2	88.4	89.1	0.0	27.4	0.0	60.0	0.0	33.0	11.5
March	76.5	18.0	198.9	17.0	170.4	112.3	168.7	23.3	17.6	23.7	82.6	93.5
April	175.8	98.3	275.8	352.5	84.3	130.6	110.2	158.7	59.8	164.5	161.0	48.4
May	123.4	558.8	66.8	109.5	214.4	64.5	451.1	405.1	11.4	87.8	209.3	147.8
June	117.9	3.8	134.6	40.1	80.0	18.8	21.6	11.1	34.8	147.9	61.1	148.9
July	25.1	9.9	54.6	104.9	127.0	9.1	25.0	16.4	19.4	5.8	39.7	72.5
August	46.7	2.8	13.5	17.3	6.3	16.0	19.7	10.1	10.6	10.0	15.3	54.3
September	141.7	224.3	18.8	76.2	79.0	10.7	31.7	32.9	197.8	106.9	92.0	68.4
October	219.2	455.2	213.4	34.8	64.8	205.2	759.9	521.6	160.6	272.1	290.7	280.3
November	75.4	259.1	235.2	94.2	339.9	271.3	247.2	282.9	356.6	251.0	271.3	295.9
December	90.7	194.0	281.9	55.4	94.2	108.2	34.0	97.6	172.1	82.7	121.1	54.3
Total	1244.6	1827.8	1508.7	990.3	1373.8	957.6	1896.5	1859.7	1113.8	1152.9	1392.6	1312.7

This area too had experienced a well distributed rainfall over the whole year indicating a good prospects for coconut during the year 1982.

Meteorological observation during the year 1981 are given in Table 17.

Table 17. *Summary of meteorological observations during the year*

Month	*Temperature (C)*		*Relative humidity (%)*	
	Max.	*Min.*	*a.m.*	*p.m.*
January ...	31.6	20.0	93	57
February ...	33.3	20.3	87	56
March ...	35.2	23.4	86	55
April ...	32.8	24.4	88	67
May ...	32.8	25.0	84	69
June ...	30.5	25.8	81	75
July ...	30.9	25.2	85	75
August ...	30.8	25.0	84	72
September ...	30.6	24.6	85	75
October ...	31.0	22.9	*	*
November ...	30.8	23.2	*	*
December ...	31.1	21.4	*	*

* not available

4. GENERAL

4.1. On a request made from Sri Lanka Sugar Corporation, Mr. D. T. Mathes gave a short training to their statistician on application of Statistics in Sugar cane research.

4.2. Mr. D. T. Mathes was associated with the committee appointed by the Ministry of Coconut Industries — To report on the construction of tube wells to irrigate coconut lands.

4.3. Lectures were conducted to officers of a number of outside Institutions during the year.

4.4. The work of the unit was greatly handicapped due to the resignations of number of experienced assistants.

D. T. MATHES
Officer-in-charge

Ceylon Cocon. Q., (1982) 33, 38—47
Printed in Sri Lanka

Report of the Botany and Plant Breeding Division - 1981

The two separate divisions of Genetics, Plant Breeding and Propagation and Plant Biology which were created in 1980 were amalgamated into a single division of Botany and Plant Breeding from 1 July, 1981. The management of nurseries which had been the responsibility of the Division of Genetics, Plant Breeding and Propagation was handed over to the Estates Management Division. However, the research nurseries at Bandirippuwa Estate and Ambakelle continue to be managed by the Division of Botany and Plant Breeding. Administration of Isolated Seed Garden at Ambakelle was once again made the responsibility of the Head, Botany and Plant Breeding Division from November 1981, prior to which it had been the responsibility of the Manager (Estates).

A. POLLEN AND POLLINATION

1. Pollen collection and issues

With the Janatha Estate Development Board (JEDB) embarking on hand pollination for the production of tall x tall seedlings the demand for pollen increased. Since only a few of the originally identified pre-potent palms are available as a proven source of pollen, it will be difficult to meet the demand for pollen in the coming years. Identification of additional prepotent palms from a study of the existing progeny trials, and the use of more sophisticated equipment for collection, storage and viability testing of pollen is envisaged.

The quantity of pollen issued to private and public sector estates for their controlled pollination programmes is as follows:

		Ampoules sealed	*Ampoules issued*
Tall (Typica) prepotent	...	1 177	1 019
Dwarf (Nana)	...	197	121

2. Controlled pollination

Controlled pollination was carried out on a limited scale for the production of seedlings to be planted in the proposed variety block at Bandirippuwa. Dwarf palms were self-pollinated at Ambakelle Isolated Seed Garden with a view to producing planting material for the proposed third seed garden.

B. MOTHER PALM AND SEED NUT SELECTION

Mother palm selection which was temporarily suspended in 1980 was resumed in the second half of 1981. A total of 4 182 new mother palms were identified from the following estates.

Mother palm selection — 1981

Estate	*No. of palms selected*
Moorock Estate	1 477
Kiniyama Estate	2 305
Moralanda Division (Marandawila) ...	400
	4 182

On re-evaluation 1 017 mother palms were rejected during the last quarter. This roguing will continue in 1982 with a view to eliminating the low yielding and senile palms from the mother palms pool. The number of mother palms at the end of 1981 stands at 62 203.

Seednuts were supplied to the Coconut Research Board (CRB) and Coconut Cultivation Board (CCB) nurseries as follows:

Nurseries		*Planting Season*			*Total*
		Oct/Nov. 81	*May/June 82*	*Oct/Nov. 82*	
CRB	...	418 925	497 687	443 450	1 360 062
CCB	...	1 519 604	576 559	576 420	2 672 583
			Total		4 032 645

In addition, the Department of Agriculture was supplied with 40 000 selected seednuts while the Cashew Corporation was supplied with 10 000. This brings the total number of seednuts selected during the year to 4 082 645.

C. SEED GARDENS

1. Isolated Seed Garden, Ambakelle

(Report submitted by Mr. G. Karunasena, Superintendent, ISG, Ambakelle).

(a) Extent, census of palms and details of planting

Field No.	*Extent (acres)*	*Planting material Typica (tall)*	*Nana (dwarf)*	*No. of palms in bearing*	*Vacancies*	*Planting distance and system**	*Planting Date*
1	4.5	325	—	263	5	26 x 26 S	Dec. 1955
2	4	281	—	281	135	26 x 18 H	Nov. 1956
3	4	335	—	271	6	26 x 22 R	Nov. 1956
4	34	2 164	—	1 909	398	26 x 26 T	Nov. 1956/57
5	7	—	148	148	602	22 x 18 T	Nov. 1959
6	20	912	—	907	467	25 x 25 T	Nov. 1960
7	20	740	—	715	676	24 x 18 H	Nov. 1961
8A	10						
8B	5	933	—	926	622	25 x 25 S	June 1962
8C	5					32 x 12 H	Nov. 1962
							May 1963
9	25	642	345	948	754	Between rows 26 within rows tall 26 dwarf 22	Oct. 1966
10A	25	204	1 517	1 155	150	22 x 22 S	Nov. 1972
10B	25	149	1 081	837	124	22 x 22 S	May 1973
11A	30	349	1 699	812	430	22 x 22 S	Oct. 1973
11B	30	277	1 258	780	424	22 x 22 S	Nov. 1973
12	22	194	346	333	1 307	22 x 22 S	May 1974
13	37	310	637	586	2 165	22 x 22 S	Oct. 1974
14	37	382	1 209	1 165	1 517	22 x 22 S	Nov. 1974
Total	344.5	8 197	8 240	12 036	9 782		

*Planting distance is given in feet. Systems of planting are as follows:

S=square planting; R=rectangular planting; T=triangular planting
H=hedge planting

(*b*) **Emasculation of dwarf palms for the production of nana x typica (CRIC 65) hybrid seednuts**

Field No.	*No. of dwarf palms in bearing*		*No. of inflorescences emasculated*	*No. of buttons at emasculation*	*No. of nuts harvested*	*No. of selected seednuts*
	pumila (green)	*eburnea (yellow)*				
05	148	—	2 199	58 876	15 223	13 226
09	314	—	3 681	112 715	18 464	15 769
10A	135	858	11 782	270 423	19 018	15 788
10B	389	332	8 705	211 030	23 434	19 762
11A	530	107	5 899	118 372	9 096	7 620
11B	274	347	6 519	141 493	3 405	2 719
12	264	08	649	15 254	825	712
13	497	—	1 594	31 536	2 111	1 718
14	1 076	—	6 954	240 610	3 000	2 345
Total	3 627	1 652	47 982	1 200 309	94 576	79 659

The nuts harvested from dwarf palms constituted 14% of the total crop from this seed garden. 84% of these were selected as CRIC 65 seednuts and laid in the nurseries at Bandirippuwa, Ratmalagara, Walpita and Koggala.

(*c*) **Production of typica seednuts**

Of a total of 6 748 tall palms in bearing, 989 had been categorised as 'elite' palms on the basis of visual selection for yield and agronomic characters. Nuts from these palms were selected as *tall* x *tall* (CRIC 60) seednuts and a total of 42 210 laid in the nurseries at Ambakelle and Bandirippuwa.

The remaining 5 759 tall palms yielded 124 510 selected seednuts which were distributed amongst the CRB nurseries for issue in 1982.

(*d*) **Crops. Total crop figures from 1977 - 1981 are given below**

Pick No.	*Year*					*5 year average*
	1977	*1978*	*1979*	*1980*	*1981*	
1	46 436	88 395	89 394	26 009	86 152	67 277
2	65 806	130 828	135 791	26 357	128 187	97 394
3	42 317	126 451	157 149	22 149	167 807	103 175
4	34 164	160 375	97 407	23 707	95 029	82 136
5	36 851	174 995	44 394	23 183	103 628	76 610
6	49 171	113 094	37 123	44 214	94 127	67 546
Total	274 745	794 138	561 258	165 619	674 930	494 138
No. of bearing palms	8 166	10 381	9 854	11 544	12 036	10 396
Average No. of nuts per palm	33.6	76.5	57.0	14.3	56.1	47.5

The total crop of 1981 was more than four times that of the previous year and 34.2% more than the last 5 year average (1976—1980) of 502 792 nuts.

(*e*) **Crop disposal**

Method of disposal	*No. of nuts*	*Percentage*	
Selected as seednuts;			
(1) dwarf green x tall (CRIC 65)	55 089	9.61	38.59
(2) dwarf yellow x tall (CRIC 65)	16 303	2.81	
(3) tall x tall (CRIC 60)	38 320	6.60	
(4) tall	113 660	19.57	
Self pollinated nuts	231	0.04	
Allowance to staff	15 015	2.58	
Sold on contract	232 920	40.10	
Cured into copra	75 753	13.04	
Rejections	32 792	5.65	
Total	580 803	100.00	

Crop disposal figures are for the first five picks only. After seednut selection, the balance was sold on contract or cured at the estate kiln. Self-pollinated nuts, produced by hand pollinations under the direction of the Staff of the Botany and Plant Breeding Division, were used by them for experimental purposes.

(f) Rainfall

Monthly rainfall and number of rainy days for the last 5 years

Month	1977		1978		1979		1980		1981		Average for 5 years (1977-1981)	
	Intensity mm	Rainy days	Intensity mm	Rainy days	Intensity mm	Rainy days	Intensity mm	Rainy days	Intensity mm	Rainy days	Intensity mm	Rainy days
January	—	—	—	—	13.01	2	0.50	1	42.10	4	11.20	1.4
February	27.43	2	—	—	60.00	6	—	—	11.50	2	19.79	2.0
March	168.66	8	23.03	5	17.06	5	—	—	93.50	6	60.45	4.8
April	110.24	5	158.07	7	59.08	7	187.09	16	48.40	10	112.58	9.0
May	451.10	20	388.02	15	11.04	4	81.01	6	147.30	13	215.69	11.6
June	21.59	5	22.03	3	32.06	5	154.06	11	148.90	15	75.73	7.8
July	24.98	4	1.06	1	21.06	4	5.08	2	72.50	9	24.94	4.0
August	19.70	4	8.09	2	10.06	3	10.00	3	54.30	5	20.43	3.4
September	31.70	3	25.05	5	197.07	12	97.08	6	68.40	14	83.86	8.0
October	759.90	22	510.08	16	160.06	13	281.02	13	280.30	15	398.27	15.8
November	247.20	12	562.05	15	356.06	21	251.02	19	295.90	19	342.45	17.2
December	34.00	2	97.06	12	177.01	12	77.05	13	54.30	7	87.88	9.2
Total	1 896.50	87	1 794.54	81	1 113.57	94	1 143.89	90	1 317.40	119	1 453.19	94.2

Although there was no marked increase in the intensity of rainfall over the previous year, the distribution of rainfall in 1981 was good.

(g) Field operations and maintenance

(i) **Manuring:** The whole seed garden was manured as advised by the Soil Chemist. Fields Nos. 1, 2, 3, 4, 6 and 7 were manured with 4.5 kg per palm per year of CA 3 mixture and the remainder with CU 1 mixture at a dosage of 5 kg per tall palm and 3 kg per dwarf palm per year.

(ii) **Husk burying:** Husk burying was carried out in field No. 4 and part of the earth dugout was used to cover the base of the palms as advised by the Crop Protection Division.

(iii) **Drains:** The drains in fields Nos. 1, 2, 3, 4, 5, 8, 9, 10A and 10B were cleared and maintained. New drains (3306 fathoms) were opened in fields Nos. 13 and 14. The drains on either side of the main road leading to the seed garden were reopened in order to prevent soil erosion of the road.

(iv) **Weeding:** Although weeding and harrowing were done in all fields, illuk and mana continue to be a problem. The Division of Agronomy has begun two trials on weed control.

(v) **Cover crops:** *Calopogonium*, *Centrosema* and *Pueraria spp.* have been established as cover crops in several fields.

(vi) **Pest and disease control:** Twelve labourers are employed daily in beetle catching. This is especially necessary in the dwarf plantations. An increase in black beetle and red weevil damage in fields 10A and 10B was found to be due to the coir dust mulch used during the severe drought of 1980 and portions of inflorescences cut away during emasculations and buried in pits in these fields serving as a breeding ground for these pests. On the advice of the Crop Protection Division, these breeding places were drenched with Aldrex solution and the affected palms sprinkled with a mixture of BHC powder and sand. Arrangements have been made to transport daily all floral parts removed during emasculation to a vacant area (Welipelessa) within the jungle barrier where they are collected, sundried and burnt to prevent the breeding of pests in decaying coconut tissue.

A slight yellowing of palms in fields Nos. 4 and 8 caused some concern but disappeared after manuring and the Maha rains.

(vii) **Uprooting of palms:** Dud palms and dwarf palms which were badly affected by drought or red weevil infestations were uprooted.

(viii) **Filling of vacancies:** Dwarf palm vacancies in fields Nos. 10A, 10B, 11A and 11B were filled with yellow and a few green dwarf seedlings raised at Ambakelle nursery from seednuts obtained from Ratmalagara and Pothukulama Estates. Vacancies in field No. 4 were filled with tall seedlings supplied by the Botany and Plant Breeding Division but this could not be completed due to insufficient planting material.

(ix) **Fences:** Fences were installed and maintained around the jungle barrier inspite of frequent damage by villagers and their cattle.

(x) **Roads and paths:** Roads and field paths were repaired using gravel and sand and maintained in good condition.

(xi) **Buildings:** Some residential quarters were repaired, colour washed and provided with electricity. The circuit bungalow was renovated and will start functioning in January 1982. Protective sheds for water pumps were built near two main wells, using estate labour. Tank bunds were well maintained and action taken to preserve larger quantities of water in them.

(*h*) **Intercropping and Animal husbandry:** 200 banana plants were planted in vacant areas, 20 hybrid mango plants were established along the main road leading to the estate office. Steps were taken to fill vacancies in the cashew plantation within the jungle barrier at Welipelessa and to breed edible fresh water fish in the two tanks within the estate. Two small paddy fields, about 0.80 acres in extent, in fields Nos. 7 and 13 were cultivated with paddy of the H4 variety during the Maha season.

A herd of cattle comprising 9 cows, 18 bull calves and 6 heifer calves was maintained and the milk produced was sold to residents of the estate.

(*i*) **Jungle barrier:** The 782 acres of jungle barrier surrounding the seed garden were maintained satisfactorily. This barrier serves to isolate the seed garden from other coconut plantations, thus preventing contamination with foreign pollen. 47 acres of this barrier consists of a teak plantation. Watchers kept a constant vigil to check the illicit felling of timber in the barrier.

(*j*) **Irrigation:** An irrigation system was negotiated with the Asian Development Bank (ADB) and a consultation took place for the design of a suitable system.

(*k*) **Agro-Meteorological station:** The Biometry Division continues to maintain an Agro-Meteorological Station within the Seed Garden, using Staff of the seed garden.

2. **Second Seed Garden, Horakelle**

(Report submitted by Mr. U.T.G. Fernando, Field Assistant and Officer-in-Charge, Second Seed Garden, Horakelle).

(*a*) **Extent and census of palms and details of planting**

Field No.	*Extent (acres)*	*Type of dwarf*	*No. of dwarf palms*		*Vacancies*	*Total dwarf palm seed holes*
			bearing	*young*		
1	12	green	7	249	494	750
1_2	5	green	0	76	184	260
1_2	5	red	0	250	0	250
3	9	green	18	372	0	390
4	22	green	25	525	496	1 046
5	6	green	8	371	0	379
5	24	red	0	1 282	35	1 317
Total	83		58	3 125	1 209	4 392

The weak tall palms were rogued in 1975 and interplanted with dwarf material (forms *pumila* and *regia*) from the Isolated Seed Garden, Ambakelle and Pothukulama, Bandirippuwa and Andigama estates. Of 5500 seedlings planted in 1975 only 11 are standing but none are in bearing. Filling of vacancies was continued from 1976 to 1981. The 58 palms in bearing were all planted in 1976 and are of the form *pumila*. Vacancies were filled with 577 dwarf green (form *pumila*) and 1189 dwarf red (form *regia*) seedlings during the year.

(*b*) **Emasculation of dwarf palms for the production of nana x typica CRIC 65 hybrid seednuts:** A total of 131 dwarf green palms were emasculated regularly and systematically, out of which 58 were in bearing. A total of 124 nuts was harvested during the year, from which 93 seednuts were selected and laid at the Bandirippuwa Estate Research Nursery for issue as CRIC 65 hybrids.

(*c*) **Produce from Typica palms**

The tall palms belong to Horakelle Farm (NLDB) and the crops are collected by them.

(*d*) **Rainfall**

The station received a total of 1 436 mm of rainfall during the year.

D. RESEARCH NURSERIES

The research nursery at Ambakelle which was closed down in 1980 due to the non-availability of irrigation facilities was reopened in early 1981. Both nurseries at Bandirippuwa and Ambakelle were successfully maintained throughout the year. Table 1 summarises the seednuts laid and seedlings issued from these nurseries during the year.

Table 1. *Summary of seednuts laid and seedlings issued at the research nurseries*

Varieties	*Bandirippuwa*		*Ambakelle*		
	laid	*issued*	*laid*	*issued*	
typica × *typica*	16 949	8 599	15 080	4 695	
pumila × *typica*	38 489	4 556	—	—	
King coconut	6 255	711	—	—	
dwarf green (*pumila*)	—	—	248	367	(to ISG)
dwarf red (*regia*)	—	—	—	—	
dwarf yellow (*eburnea*)	—	—	14 176	1 194	(to ISG)
San Ramon	579	174	—	—	
Ordinary (*typica*)	—	6 608	—	—	

Nursery trials. The collection of data from the following nursery trials reported in 1980 were completed this year and analysis of this data will be done in 1982.

1. The use of different mulches for moisture conservation in the nursery.
2. Performance of coconut seedlings under different light intensities.
3. Effect of densities of sowing on the dry matter production of seedlings.

The following experiments are in progress in 1982.

(*a*) Effect of shearing of husk and soaking on germination.
(*b*) Germination rates in unhusked and husked seednuts.

Two nursery trials were initiated in 1981.

(i) Comparison of direct sowing of seednuts vs. the use of a germinating seed bed.

Traditionally direct sowing is practised in all the coconut nurseries in Sri Lanka, This experiment was done with a view to studying the advantages and disadvantages of the two systems.

There was no apparent difference in the rates of germination in the two systems. The experiment was conducted at Ratmalagara and Walpita, which experience two different rainfall patterns.

Preliminary observations point to the necessity of adhering to a time schedule in nursery management depending on the rainfall and availability of irrigation facilities.

The final analysis of this experiment which includes an economic evaluation of the two systems will be done in 1982.

(ii) Study of the rates of dry matter production in economically important varieties of coconut.

The experiment is in progress, and due to end in early 1982. Varieties Nana, Typica and Nana x Typica hybrids were used in this study.

E. FIELD EXPERIMENTS

A total of twenty-nine field experiments were handled by the Division. They are located as follows:

Bandirippuwa Estate	12
Rathmalagara Estate	4
Pothukulama Research Station	9
Marandawila	1
Kirimetiyana	1
Maha illuppalama	1
Passekudah	1

Experiment at Passekudah

An experiment consisting of 5 acres, comparing the performance of *pumila* x *typica* hybrids with open-pollinated talls under dry zone conditions was planted in field D of the Coconut Research Board demonstration farm at Kalkudah in Passekudah. The *pumila* x *typica* seedlings for this experiment came from seednuts obtained from the isolated seed garden, Ambakelle and raised at Bandirippuwa nursery. The open-pollinated talls came from block nuts selected and raised at Kirimetiyana nursery. For purposes of statistical analysis a fully randomised block design has been used.

Experiment at Kirimetiyana

The ten acre plantation of F_2 progeny of F_1 hybrids at Kirimetiyana was satisfactorily maintained. Ninety-eight seedlings were raised to fill the existing vacancies.

F. CONSULTANCY IN BREEDING

Negotiations were in progress since mid 1981 for the appointment of Dr. D. V. Liyanage, Board Member CRB and formerly Botanist at CRI, as a Consultant in Breeding.

G. PERSONNEL

1. Mrs. C. W. Jayasekera, Research Assistant, was OIC, Plant Biology and Mr. R. R. A. Peries, Research Assistant, was OIC, Genetics, Plant Breeding and Propagation at the start of the year. When the two divisions were amalgamated in July 1981, Mrs. Jayasekera functioned as OIC of the Division of Botany and Plant Breeding until her departure to Australia on study leave in September 1981 when Mr. Peries took over as OIC.

2. Dr. M. R. T. Wickramaratne, Ph.D. DIC assumed duties as Head, Botany and Plant Breeding on 19 October, 1981.

3. Mrs. S. M. Karunaratne, Research Assistant, resumed duties in December 1981 after completing post-graduate studies in Australia.

4. Miss B. Gowri, B.Sc. (Hons) was recruited as a Research Assistant in April 1982.

5. Mr. G. Karunasena, OIC, Isolated Seed Garden, Ambakelle was promoted to the post of Superintendent since February, 1981.

6. Mr. H. P. P. H. Pathirana, Technical Assistant, was transferred to Ambakelle as Technical Assistant in charge of the Emasculation Unit from 2 February 1981.

7. At the isolated seed garden, Ambakelle, five emasculation labourers were promoted as Field Attendants in Class II of the Minor Staff Grade. Ten labourers were upgraded to monthly paid emasculation labourers and three others promoted to posts of gardener, power house mechanic and kangany.

H. ACKNOWLEDGEMENTS

The assistance of Mr. R. R. A. Peries, Research Assistant, in the preparation of this report is gratefully acknowledged.

M. R. T. WICKRAMARATNE
Head

Ceylon Cocon. Q., (1982) 33, 48—56
Printed in Sri Lanka

Report of the Coconut Processing Division (1980/81)

The Coconut Processing Division was established on 1st January 1980 when the Coconut Processing Board ceased to function and it's research activities handed over to Coconut Research Institute. Processing Research carried out previously at the Chemistry Division of the Coconut Research Institute were also handed over to this new Coconut Processing Division. During 1980 only a limited amount of work could be undertaken with the skeletal staff available. These activities were reported in the Chemistry Division's report for 1980 under the section Coconut Kernel, sap and nut water. In 1981, as a consequence of reorganization, the Chemistry Division also ceased to function, and work other than processing was transferred to the newly established Division of Soils and Plant Nutrition. This Report will therefore contain, a full statement of activities of the Coconut Processing Research Division for the period 1980/81.

(1) KERNEL STUDIES

(*a*) Accumulation of N, P, K, Ca, Mg and sugars in the nut water and kernel during development of drupe

The experiment was commenced in 1979 and a part of the findings was reported in the Annual Report of the Chemistry Division for 1979 (*Ceylon Cocon. Q.* (1980) **31**, 40-44). Nine stages of development could be identified from the button nut with water cavity (36th stage) to the development of the mature green ripe nut, 44th stage (*Ceylon. Cocon. Q.* (1966) **17**, 1-41). The drupes from three palms were studied and from each palm two drupes were analysed for the constituents separately. Typical analytical data obtained in the study are presented in Tables 1 and 2.

(*b*) Extraction of coconut milk

The efficiency of extraction of coconut milk by the following household methods was examined.

(*a*) Extraction of milk from grated (shredded) coconut by hand squeezing.

(*b*) Extraction by grinding the grated coconut on a stone (traditional stone grinder having a flat surface and a pestle) followed by hand squeezing.

(*c*) Extraction by blending the grated coconut in a liquidizer followed by hand squeezing.

The content of oil, sugars and proteins in the extracted milk are presented in Table 3. The efficiency of extraction of oil by traditional household procedure (method (a)) was about 80% and the results were not altered when a liquidizer was used (method (c)) when the stone grinder was used (method (b)) a 10% increase in the extraction was obtained (*i.e* about 90% extraction).

Table 1. *Analytical data of the Coconut kernel during the progressive stages of development of the drupe*

	Development Stages (Bunch Nos.)		*38(4)*	*40(5)*	*41(6)*	*42(7)*	*43(8)*	*44(9)*
Weight	Total weight of the kernel per nut (g)	...	80	180	224	262	278	300
	% Moisture in the kernel	...	88.22	77.08	66.78	59.14	56.25	45.96
	Total dry weight of the kernel per nut (g)	...	9.42	41.25	74.41	107.05	152.25	162.12
	Total dry weight of the kernel less oil per nut	...	6.34	16.74	25.74	34.30	42.28	42.75
Sugars	Total weight reducing sugars in the kernel per nut(g)	...	1.23	1.46	1.39	1.44	1.20	1.02
	% reducing sugars in the kernel (wet basis)	...	1.54	0.81	0.62	0.55	0.43	0.34
	% reducing sugars in the kernel (dry basis)	...	13.05	3.53	1.86	1.34	0.99	0.62
	Total weight of both reducing and non reducing sugars in the kernel per nut (g)	...	4.94	6.77	7.46	7.34	7.28	7.38
	% Total sugars in the kernel (wet basis)	...	6.17	3.76	3.33	2.80	2.62	2.46
	% Total sugars in the kernel (dry basis)	...	52.44	16.14	10.02	6.85	5.99	4.55
	% Reducing sugars in oil & moisture free kernel	...	19.40	8.72	5.40	4.20	2.84	2.39
	% Total sugars in the oil & moisture free kernel	...	77.92	40.44	28.98	21.40	17.22	17.26
Oil	% Oil in the kernel (wet basis)	...	3.85	13.62	21.73	27.77	31.60	39.79
	% Oil in the kernel (dry basis)	...	32.64	59.41	65.41	67.96	72.23	73.66
N	Total weight of N in the kernel per nut (g)	...	0.306	0.735	1.103	1.636	1.937	2.342
	% N in the kernel (wet basis)	...	0.348	0.408	0.493	0.625	0.697	0.781
	% N in the kernel (dry basis)	...	3.24	1.78	1.48	1.52	1.44	1.44
	% N in the kernel (oil & moisture free basis)	...	4.82	4.39	4.29	4.77	5.08	5.48
P	Weight of total P in the kernel per nut (g)	...	0.0392	0.0883	0.1769	0.2386	0.2385	0.3270
	% P in the kernel (wet basis)	...	0.0491	0.0491	0.0790	0.0911	0.0916	0.1090
	% P in the kernel (dry basis)	...	0.41	0.21	0.23	0.22	0.21	0.20
	% P in the kernel (oil & moisture free basis)	...	0.618	0.527	0.687	0.696	0.698	0.765
K	Weight of total K in the kernel per nut (g)	...	0.300	0.945	0.896	0.310	1.270	1.275
	% K in the kernel (wet basis)	...	0.375	0.525	0.400	0.500	0.400	0.425
	% K in the kernel (dry basis)	...	3.18	2.29	1.20	1.22	0.82	0.78
	% K in the kernel (oil & moisture free basis)	...	4.73	5.65	3.48	3.82	3.40	2.98
Ca	Weight of total Ca in the kernel per nut (g)	...	0.027	0.0392	0.0730	0.0427	0.0427	0.0570
	% Ca in the kernel (wet basis)	...	0.022	0.0218	0.0326	0.0163	0.0163	0.0190
	% Ca in the kernel (dry basis)	...	0.23	0.09	0.03	0.03	0.03	0.03
	% Ca in the kernel (oil & moisture free basis)	...	0.34	0.23	0.28	0.12	0.12	0.13
Mg	Weight of total Mg in the kernel per nut (g)	...	0.0521	0.0821	0.1314	0.1451	0.1721	0.1809
	% Mg in the kernel (wet basis)	...	0.0651	0.0456	0.0587	0.0554	0.0603	0.0603
	% Mg in the kernel (dry basis)	...	0.55	0.19	0.17	0.13	0.13	0.11
	% Mg in the kernel (oil & moisture free basis)	...	0.82	0.48	0.51	0.42	0.42	0.42

Table 2. *Analytical data of the nut water during the progressive stages of development of the drupe*

Development Stages (Bunch Nos.)	36(1)	37(2)	38(3)	39(4)	40(5)	41(6)	42(7)	43(8)	44(9)
Total volume of nut water per nut (ml)	49	210	440	540	515	460	350	310	254
Total weight of solids in nut water per nut (g)	1.55	9.40	23.49	33.06	33.80	29.91	21.94	17.57	13.32
% Total solids in nut water	3.17	4.48	5.34	6.12	6.56	6.50	6.26	5.66	5.24
Total weight of reducing sugars in nut water per nut (g)	0.89	5.64	13.81	20.36	22.40	21.67	15.23	7.04	3.98
% of reducing sugars in nut water	1.82	2.69	3.14	3.77	4.35	4.71	4.35	2.27	1.55
Total weight of reducing & non reducing sugars in nut water per nut (g)	0.902	6.594	17.16	23.92	27.71	23.64	16.84	10.01	7.21
% of total sugars in nut water	1.84	3.14	3.90	4.43	5.38	5.14	4.81	3.23	2.84
Total weight of N in nut water per nut (g)	0.007	0.048	0.093	0.145	0.159	0.142	0.096	0.077	0.062
% of N in the nut water	0.014	0.023	0.021	0.026	0.031	0.031	0.027	0.025	0.024
Total weight of P in nut water (g)	0.003	0.024	0.066	0.081	0.087	0.089	0.060	0.046	0.038
% of P in nut water	0.006	0.012	0.0150	0.0150	0.0169	0.0197	0.0172	0.0150	0.0150
Total weight of K in nut water per nut water (g)	0.176	0.546	0.100	1.296	1.185	0.803	0.700	0.589	0.483
% of K in nut water	0.0360	0.260	0.250	0.240	0.230	0.220	0.200	0.190	0.190
Total weight of Ca in nut water per nut (g)	0.0370	0.0897	0.1663	0.1663	0.1503	0.1343	0.1094	0.0793	0.0597
% of Ca in nut water	0.0756	0.0427	0.0378	0.0308	0.0292	0.0292	0.0270	0.0256	0.0235
Total weight of Mg in nut water per nut	0.007	0.028	0.057	0.052	0.049	0.042	0.023	0.023	0.014
% of Mg in nut water	0.015	0.013	0.013	0.096	0.096	0.009	0.007	0.007	0.006

Table 3. *Extraction of Coconut Milk by Different Household Methods*

Composition of ripe coconut kernel

	*Weight per average nut(g)	% in fresh kernel	% in dry kernel
Fresh kernel	300		
Dry kernel	158.48	52.83	
Moisture	141.52	47.17	
Oil	111.49	37.17	70.35
Total sugars	17.4	5.80	10.98
Crude Protein	14.25	4.75	9.00
Minerals	2.02	0.67	1.27
Cellulose etc.	13.32	4.44	8.40

The above figures were taken from a series of chemical studies done on grated fresh coconut samples.

Calculated assuming the wet weight of the kernel in an average coconut is 300 g

Milk extracted by the Traditional Household Method
Composition of the refuse after extraction

	Wt. per av. nut(g)°	% in wet refuse	% in dry refuse
Wet refuse	172		
Dry refuse	53.85	31.31	
Moisture	118.15	68.70	
Oil	28.59	16.60	53.10
Total sugars	5.68	3.30	10.54
Crude Protein	3.7	2.19	6.87

Efficiency of extraction

Weight of oil extracted (per average nut)	-	83.03g
Efficiency of extraction of oil	=	74.39%
Wt. of oil retained in the refuse (per ave. nut) (25.61% of the total oil content)	=	28.59g

In this trial a person with experience on manual extraction of coconut milk for culinary purposes was instructed to add enough water into 150 g of fresh grated coconut for 1st extraction. The volume of water so added was determined to be 120 ml. Similarly for 2nd and 3rd extractions too the volumes of water used was found to be 100 ml per extraction.

Method

Into 150 g fresh grated coconut 120 ml. of water was added and mixed thoroughly. After mixing the milk was extracted by squeezing the mixture by hand. Then aliquots of 100 ml. water was added in to the refuse and the milk was extracted for the 2nd time and 3rd time respectively. Total volume of milk extracted and the total weight of refuse were measured. Refuse was analysed for crude proteins, oil, moisture. Sugar was determined in milk.

Milk extracted after grinding on the household grinding stone
Composition of the refuse after extraction

	Wt. per av. nut (g)°	% in wet refuse	% in dry refuse
	132.40		
	34.40	25.98	
	97.90	74.0	
	13.68	9.97	36.98
	1.20	10.90	3.50
	2.23	1.69	6.48

Efficiency of extraction

Weight of oil extracted (per ave. nut)	=	97.81g
Efficiency of extraction of oil	=	87.73%
Wt. of oil retained in the refuse (13.72% of the total oil content)	=	13.68g

Note

After extracting milk manually from 150 g grated coconut using 120 ml water, the refuse was ground on the household grinding stone. After grinding, 100 ml water is added and milk was extracted manually. Resulting refuse was again ground and the process was repeated as in second extraction. Milk from three extractions was mixed together, volume was measured. Refuse was weighed. It was used for oil, moisture and crude protein, estimations. Milk was analysed for total sugars.

Milk extracted using the liquidiser
Composition of the refuse after extraction

	Wt. per° ave. nut (g)	% in wet refuse	% in dry refuse
	185		
	51.65	27.92	
	133.3	72.08	
	23.49	12.67	46.94
	2.04	1.10	3.95
	2.88	1.56	5.58

Efficiency of extraction

Weight of oil extracted (per ave. nut)	=	87.25g
Efficiency of extraction	-	78.26%
Wt. of oil retained in the refuse (21.02% of the total oil content)	:	23.49g

Note

150 g of fresh coconut kernel was placed inside the vessel of the liquidiser with a suitable quality of water *i.e.* 320 ml of water. Then the vessel was fitted to liquidiser and liquidiser was allowed to run for about 15 minutes in separate 15 runs of one minute each. The liquidised sample was taken out and milk was squeezed out manually. Total sugar estimation was done on milk. Moisture. oil, proteins were estimated in the refuse.

(*c*) **Kernel paste for curry making**

A paste from grated coconut kernel is made by grinding on a stone grinder without using water. This well ground paste was used in making curries (instead of the extracted coconut kernel milk) and found to be satisfactory in respect of flavour and consistency. In using this paste 50% of the kernel could be saved *i.e.* for example if one cup of kernel be normally used for making a curry after extraction of milk, now the paste made out of $\frac{1}{2}$ cup of kernel could be used very satisfactorily.

The paste samples have been submitted to the National Engineering Research and Development Centre, Ja-Ela with an idea to fabricate a simple, mechanically and electrically operated machine for making the kernel paste. Work on this machine is under way.

(*d*) **Storage of copra and oil milling**

The Coconut Development Authority has requested the Coconut Research Institute to prepare a leaflet on 'making good quality copra' for their distribution to copra manufacturers. Deterioration of copra is mainly due to moisture content exceeding 6%. In order to test the moisture content of copra, by varying the extent of firing by the coconut shells, trials were done using the standard copra kiln at Ratmalagara Estate. Results (Table IV) indicated that firing by 4 two double row of shells followed by 3 one double row of shells gave the required amount of moisture *i.e.* 6%. A recommendation based on the above results being made to the Coconut Development Authority for their observation.

(*e*) **Vinegar from nut water and coconut toddy**

Large scale production of vinegar (320 litres capacity) in traditional wooden vinegar vats by storing 25% nut water together with coconut toddy has been successfully completed. The toddy - nut water vinegar contained 5.6% acetic acid and the flavour was agreeable. This amount of acetic acid is reached with toddy only, in the current industrial plants. The minimum requirement of acetic acid in vinegar (as laid down by the Ceylon Standard) is 4% (v/v). The process of manufacture of vinegar from toddy and nut water appears promising, could now be handed over to a manufacturer.

(*f*) **Vitamin C in nut water**

Nut water from two varieties of coconut popularly used as beverage in Sri Lanka, *viz*; king coconut and ordinary tall at various stages of development of drupes was analysed for content of vit. C (ascorbic acid). Preliminary investigations revealed that the 'thambili' or 'kurumba' water which are popularly used as a beverage when the drupe is about 6-7 months old, (stages 38 and 39), contained 30-36 mg ascorbic acid per ml. Further work is in progress.

(2) SUBSTITUTION OF CHEAPER OIL IN SOAP MANUFACTURE

Manufacture of soap using coconut oil and caustic soda is very well understood. The use of Tallow, Parings oil and other cheaper oil for the preparation of various types of soaps was investigated.

Decolouration of parings oil was done using various chemicals and satisfactory results were obtained when oil was boiled with activated carbon followed by boiling with H_2O_2.

By varying the amount of tallow and the concentration and volume of caustic soda solution, pieces of laundry soap were prepared by following the hot process of making soap. It was observed that the addition of tallow resulted in soap with a tallow smell. However, soap with 15% tallow gave no tallow smell and it's texture, lathering effect, and colour were comparable with that of other soaps available in the market. Further studies are being continued.

(3) DESICCATED COCONUT FROM UNSEASONED COCONUT

Generally coconut is allowed to season for 4-6 weeks after picking prior to use in the desiccated coconut and copra industries as the seasoning improves the quality of the final product and also makes the processing easier.

However, some of the disadvantages of seasoning are,

(*a*) green husk turns into brown preventing their use for the manufacture of white fibre which has a better market (green husk gives white fibre whereas brown husk gives brown fibre).

(*b*) fresh, clear and sweet nut water turns into a turbid and unpalatable liquid after seasoning. The fresh nut water could be utilized as a raw material for the manufacture of beverages.

(*c*) germination and related changes occur depending on the environment and the period of seasoning, and result in the waste of kernel, inferior end products of desiccated coconut or copra and low out-turn of end product.

In order to prevent the above shortcomings and also with a view to make white fibre and nut water beverages, experiments were carried out to make desiccated coconut from unseasoned coconuts. Preliminary trials carried out on desiccated coconut making using fresh nuts at Benaton desiccated coconut mill Katana indicated the following :

(1) Husking of fresh nuts was easier, 2500 nuts/person/ day compared to about 2000 seasoned nuts/person/day.

(2) Deshelling of fresh nuts takes double the time than seasoned nuts *i.e* 1000 nuts/person/day.

(3) Peeling is easier than seasoned nuts *viz* 2500 nuts/ person/day for fresh nuts and 2000 nuts/person/day for seasoned nuts.

(4) Time involved in the process of chopping, disintegration and drying do not vary from that of seasoned nuts.

(5) Out-turn for 1000 freshly plucked coconuts:

fine	103	kg
medium	43	kg
coarse	5	kg
Total	151	kg

Out-turn for 1000 seasoned nuts varies between 125-150 kg.

(6) The colour, taste, odour, appearance and texture were very satisfactory soon after the manufacture. Laboratory experiments are being continued for quality, assessment and for studying the keeping quality.

(4) RATGAMA WHITE FIBRE PROJECT

The fibre station at Ratgama was fenced. The engine was out of order, and arrangements were made to repair the same.

(5) COCONUT OIL AS A FUEL FOR ENGINES

No work could be undertaken. The project was handed over to the N.E.R.D. Centre, Ja-Ela.

(6) MISCELLANEOUS

(1) Since the Coconut Processing Board ceased to function from 1st January, 1980, the research on coconut processing has been handed over to Coconut Research Institute.

(2) Mrs. K. Vitharana, the then General Manager of the Coconut Processing Board became the first Head of the new division. She resigned her job in August, 1980.

(3) Dr. S. Mohanadas, Research Officer, Chemistry Division was appointed Officer-in-Charge of the Processing Research Division with effect from 15th September, 1980 and then Head of the Coconut Processing Division with effect from 8th February, 1981.

(4) Dr. S. Mohanadas was appointed as Consultant to the Palmyrah Development Board with effect from 1st April, 1980.

(5) Mr. Norman Hewage, Officer-in-Charge, Ratgama White Fibre station was transfered to the Coconut Research Institute from Coconut Processing Board.

Table IV. *Percentage moisture in the copra*

Total firing		*Chambers* 1	2	3	4
4		1 t.d.r. 3 o.d.r.	2 t.d.r. 2 o.d.r.	3 t.d.r. 1 o.d.r.	4 t.d.r.
	% Moisture	14.7	13.0	7.7	6.7
5		1 t.d.r. 4 o.d.r.	2 t.d.r. 3 o.d.r.	3 t.d.r. 2 o.d.r.	4 t.d.r. 1 o.d.r.
	% Moisture	12.9	11.6	7.5	6.5
6		1 t.d.r. 5 o.d.r.	2 t.d.r. 4 o.d.r.	3 t.d.r. 3 o.d.r.	4 t.d.r. 2 o.d.r.
	% Moisture	10.6	8.1	7.4	6.3
7		1 t.d.r. 6 o.d.r.	2 t.d.r. 5 o.d.r.	3 t.d.r. 4 o.d.r.	4 t.d.r. 3 o.d.r.
	% Moisture	8.7	7.0	6.6	6.0

t.d.r. for two double rows
o.d.r. for one double row
% Moisture in copra after 4th, 5th 6th & 7th firings respectively.

The fire pit of the Ceylon copra kiln is divided in the chambers of dimensions 12' x 5' (366cm x 152.5cm). On the section of the platform over a chamber about 2000 nuts could be dried. Four such chambers were selected for the trial. Four batches of 2000 nuts were dried over the four chambers in the following manner.

(*a*) 1st chamber: One fire with two double rows followed by six fires of one double row as indicated above on the 1st vertical column of the table.

(*b*) 2nd chamber: Two fires with two double rows of shells followed by five fires of one double row as indicated in the second vertical column of the table.

(*c*) 3rd chamber: Three fires with two double rows of shells followed by four fires of one double rows as indicated in the third vertical column of the Table.

(*d*) 4th chamber: Four fires with two double rows of shells followed by three fires of one double row as indicated in the fourth vertical column of the table.

Eight cups were removed from each chamber after each firing and analysed for moisture in duplicates. Two such trials were done and the average of the results are presented in the table.

S. MOHANADAS
Head

Ceylon Cocon. Q., (1982) 33, 57—60
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Report of the Crop Protection Division-1981

1. Coconut Caterpillar, *Nephantis serinopa*

A number of fresh infestations of the coconut caterpillar were reported from Southern, Eastern, Western and North Western Provinces. Prompt advice was given to bring the pest under successful control. The measures advocated were on an integrated control approach. The land owners were advised to first lop and burn all the affected fronds to bring down the existing pest population. Under heavy infestations, insecticide spraying had to be resorted to as a means of bringing down the pest numbers. Spraying was decided upon after a through examination of the samples collected from the field. The laboratory bred parasites were then released in the affected areas. Major frond lopping campaigns in *Nephantis* control were carried out at plantations in Katunayake, Ambalangoda and Thirukkovil. At Udappuwa and Ja-ela the pest populations remained under control with the action of the parasites, *Perisierola nephantidis, Eriborus trochanteratus, Bracon brevicornis* and *Trichospilus pupivora.* Monitoring studies of the pest status in Udappuwa, Katunayake, Ja-ela, Ambalangoda and Batticaloa were continued.

Spraying of insecticides against this pest was carried out at Veheragoda Estate in Tangalle by the spraying unit of the Crop Protection Division.

Studies on the population dynamics of the pest and the parasites were continued at five selected localities in the North Western and Southern Provinces and at some estate in the Eastern Province.

Work on the development of an artificial diet for the coconut caterpillar was continued during the year. The relative efficacy of a carbamate and a pyrethroid insecticide in controlling *Nephantis serinopa* was examined. The analysed results will be available in due course.

The biological control programme for *Nephantis serinopa* was continued satisfactorily throughout the year. The details of the parasite breeding in the two insectaries at Bandirippuwa Estate and at Mylambavelly are given in Table 1. Parasites to distant places were sent by post, prior to emergence, in P.V.C. tubes instead of glass tubes used previously. This prevented accidental breakages of parasite tubes in transit.

Table 1. *Release of parasites against Nephantis serinopa*

	North Western Province	*Western Province*	*Southern Province*	*Eastern Province*	*Total*
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Total	10 200	143 950	278 800	273 950	706 900

2. **Coconut leaf-miner,** *Promecotheca cumingi*

The pest remained at very insignificant levels. No studies in population ecology were possible during the year.

3. **Black Beetle,** *Oryctes rhinoceros*

Black beetle damage was reported from Eastern, Southern, Western, North Western and Central Provinces. In the Eastern Province, coconut palm trunks fallen during the 1978 cyclone were offering excellent breeding grounds for the beetle. Though the disposal of the trunks, was the most effective control measure of this pest, most growers in the region remained indifferent to the CRI advices on the control of this pest causing outbreaks of the pest. A localised infestation of the black beetle was reported at the Isolated Seed Garden, Ambakelle. Investigations revealed that decaying emasculated inflorescences and the fibre dust mulch round the palms were harbouring a large larval population.

The virus *Baculovirus oryctes* was found in some localities of the North Western Province. This was multiplied in the laboratory and was released in some selected areas to follow up the spread. Satisfactory recoveries of the virus infestation was observed.

The repellent action of several common insecticides, Aldrex 25, Aldrin 2½% dust and B.H.C. 10% dust in the prevention of the attack to the palms by the Black Beetle was examined in an experiment carried out in the North Western Province. This experiment is being repeated in the Eastern Province. The results of the composite experiment will be available in due course.

As advisory material for the East Coast Rehabilitation Project, a film on the Black Beetle damage and its control was completed by the STA (Photography). The film is awaiting dubbing of sound.

4. **Red Weevil,** *Rhynchophorus ferrugineus*

Infestations of the Red Weevil were recorded from several areas of the country, and appropriate control measures were recommended.

A proposal for the control of the Red Weevil by the sterile male technique, submitted to the International Atomic Energy Agency, was accepted for funding.

Studies on laboratory mass rearing of this pest on an artificial diet described by Rahalkar *et al.* (1978) were carried out. The pest larvae were introduced into glass jars containing the food medium.

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6. **Minor Pests**

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7. **Diseases**

Several reports of stem bleeding disease (*Ceratocystis paradoxa*), Leaf blight (*Pestalotiopsis palmarum*) and bud rot (*Phytopthora palmivora*) were recorded. Prompt advice was given on the control measures. Mapping of the bud rot infected zone at Nalawalana was continued.

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10. **Other Experiments**

The long term experiment on the effects of defoliation on the yield of coconut was continued. Here, the insect damage was simulated by artificial defoliation.

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Perera, P.A.C.R. and Pinto, J.L.J.G. Infestation patterns of the coconut caterpillar *Nephantis serinopa* Meyr.

Perera, P.A.C.R., Mahindapala, R., and Pethiyagoda, U. A technique for the application of systemic insecticides through petiolar wells in coconut.

Read at the 32nd Annual Sessions of the New Zealand Weed and Pest Control Conference.

Penman, D.R., Rohitha, B.H., White, J.G.H. and Smallfield, B.M. Control of blue-green lucerne aphid by grazing management. (Conference Proceedings : pp. 186-191).

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Kanagaratnam, P. Laboratory studies on growth and preservation of *Verticillium lecanii*.

Kanagaratnam, P. Bioassay of *Bacillus thuringiensis* isolates with the grater wax moth *Galleria mellonella*.

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Read at the 32nd Annual Sessions of the New Zealand Weed and Pest Control Conference.

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B. H. ROHITHA
Officer-in-Charge

Ceylon Cocon. Q., (1982) 33, 61—75
Printed in Sri Lanka

Report of the Soils and Plant Nutrition Division-1981

A. FIELD EXPERIMENTS

1. 4 x 4 x 4 NPK Experiment on Adult Palms - Bandirippuwa Estate (commenced November 1960)

This long term fertilizer response curve experiment concluded in 1979 was modified (retaining 8 of the original 64 plots) to follow (a) deterioration after fertilizer stoppage and (b) recovery after restoration of fertilizer on the performance of the palms.

The treatment combination has been reported in the Annual Report for 1979.

The third year of manuring according to the modified treatment was done in September 1981.

2. 3 x 3 x 3 NPK Experiment on Young Palms - Ratmalagara Estate (commenced December 1948)

As at Bandirippuwa Estate this long term experiment was discontinued in 1978, retaining 8 of the plots, to study the effect of fertilizer stoppage and restoration on palm performance.

Regular yield records were maintained and the third year of fertilization according to the modified treatment was done in September 1981.

3. Magnesium Experiment on Young Palms - Bandirippuwa Estate, Lunuwila (commenced October 1972)

Application of fertilizers (N, P, K & Mg) were done in September 1981.

The percentage of palms in flower by the end of December 1981 is tabulated below.

		Mg_0	Mg_1	Mg_2
T x T	...	75.0	92.0	83.0
T x D	...	80.5	86.0	97.0
D x T	...	78.0	100.0	91.6
OP	...	58.0	72.0	97.0

4. Fertilizer Experiment on Young Hybrid Palms - Bandirippuwa Estate (commenced December 1973)

This experiment has completed eight years. The annual application of fertilizer was completed in September 1981. The composition of the fertilizer mixture was 113.5 kg ammonium sulphate, 34 kg saphos phosphate and 56.8 kg muriate of potash (60% K_2O). The rates of application were

Levels	*kg/palm/year*
0	NK
1	2.724 kg
2	5.448 kg
3	8.172 kg

454 g of kieserite was incorporated into the NPK fertilizer mixture.

The data on flowering at the end of 1981 for the different treatments are presented in Table 1.

Table 1. *Palms in Flower*

Replicates	*Level 0 (control)*	*Level 1*	*Level 2*	*Level 3*
1	11	12	12	0
2 ...	12	12	3	8
3 ...	12	11	6	12
4 ...	12	12	9	4
5 ...	9	12	12	12
Total ...	56	59	42	36
% Palms in flower ...	93.3	98.3	70.0	60.0

There is considerable variation in the flowering data with the control and level 1 reaching more than 90%. The control has caught up with the treated level 1. Levels 2 and especially 3 show poor performance. This has been due to poor drainage in a few plots of the experiment. Hence the data on flowering are not statistically analysed. However the data on flowering was re-examined for the different treatments from plots under well drained conditions showed that the 2nd level of treatment performed better than the rest and reached full flowering at the end of the third year.

Table 2. *Flowering data based on plots in unaffected area (as percent)*

	Treatment			
Year	L_0	L_1	L_2	L_3
1976 ...	0.0	4.2	4.2	4.2
1977 ...	0.0	31.3	41.7	41.7
1978 ...	44.4	58.3	100.0	79.2
1979 ...	58.3	75.0	100.0	87.5
1980 ...	94.4	97.9	100.0	91.6
1981 ...	100.0	100.0	100.0	100.0

5. **Fertilizer Experiment on Hybrid (D x T) Palms at Bandirippuwa Estate (commenced August 1979)**

This experiment to study the application of inorganic fertilizer mixture at different rates of increment with age of palms has completed its second year.

Three average size seedlings from this experiment was destructively sampled to study the dry matter distribution and nutrient content. Analysis of samples are in progress.

Leaf counts, height and girth measurements were taken biannually.

6. **Chlorine Experiment at Ratmalagara Research Station, Madampe (commenced June 1977)**

The annual manuring (5th manuring) was done in August 1981.

The yield data (nut and copra) for the period November 1980 to October 1981 are shown in Table 3. Statistical analysis of the data showed no significant difference between the treatments.

Table 3. *Effect of Sodium chloride and Potassium chloride on yield (Nuts/Plot)*

Source / *Level*	*Sodium Chloride* *Plots**			*Total*	*Potassium Chloride* *Plots**			*Total*
0	803	878	464	2145	900	843	799	2542
1	833	839	907	2572	771	825	543	2139
2	844	958	471	2273	958	793	644	2395
3	772	912	575	2259	801	876	937	2614
				(Copra kg/Plot)				
0	160	163	81	404	170	152	152	474
1	156	163	177	496	150	158	93	401
2	151	180	98	429	193	155	125	473
3	152	176	100	428	147	174	169	490

* 12 palms per plot.

Basal application — Urea — 0.627 kg/palm/year
Saphos Phosphate — 0.800 kg/palm/year
Sulphate of Potash — 1.375 kg/palm/year

Level	*Treatment* *Sodium chloride*	*Potassium chloride*
0	Nil	Nil
1	0.6 kg	0.75 kg
2	1.2 kg	1.50 kg
3	1.8 kg	2.25 kg

7. **3 x 3 NK Experiment at Kobeigana Estate, Hettipola (commenced December 1978)**

The annual manuring (third application) was done in December 1981. For the second successive year a significant response to N at P = 0.001 was obtained. The yield data for 1981 is shown in Table 4.

Table 4 : *Effects of N and K on nut yield (nuts/ha/yr - 160 palms/ha)*

Sulphate of ammonia kg/palm/year	*Muriate of potash (60% KO) kg/palm/year*		
	0	1	2
0	13 040	12 080	12 860
1	13 680	13 200	13 300
2	15 010	14 440	14 430

8. **Experiment on Ammonium chloride, Ammonium sulphate and Urea at Manakkulama Estate, Kakkapalliya (commenced July 1976)**

The fifth annual manuring was done in October 1981.

A significant linear response to nitrogen was observed; but there was no significant difference between the three sources of nitrogen.

Comparison of Saphos Phosphate and Concentrated Superphosphate at Pallai (commenced July 1977)

The annual manuring was done in January 1981.

The yield data (nuts/ha/yr) for the period May 1980 to April 1981 are as follows :

Treatment	*Block I (Square planting)*	*Block II (Triangular planting)*
Control	10253	9634
Saphos phosphate (0.83 kg/palm/yr)	11559	10164
Concentrated Superphosphate (0.54 kg/palm/yr)	12671	10778

A basal treatment of sulphate of ammonia and muriate of potash was given to all palms.

9. **Comparison of Eppawela Rock Phosphate with Saphosphosphate - Mahayaya Estate, Makandura and Andigedara Estate, Bingiriya. (commenced June 1975)**

Application of fertilizer for both experiments were completed in November/December 1981.

For the first time (June 1980-May 1981) since the commencement of these experiments in 1975 a significant response to Eppawela Rock Phosphate at P — 0.01 was obtained at Mahayaya Estate.

10. **Effect of husk burial on soil moisture conservation at Ratmalagara Estate, Madampe (commenced August 1978)**

The data on preliminary studies on the effect of husk burial on soil moisture conservation commenced in August 1978 was examined.

The experimental layout was husks buried in 2.5 m x 1.5m x 0.5m pits covered with soil midway between two adjacent coconut palms and alternating along a row. Four such husk pits and controls (without huskpits) were utilized for the study.

Tensiometers were inserted at 0.15 m, 0.30 m and 0.45 m depths about 0.60 m away from the husk pits. Tensiometers were also inserted at similar positions in plots having no husk pits.

Soil moisture tension readings were recorded daily during the dry period immediately following the rainy seasons. Data showed that the soil around the husk pits took about 2 to 5 weeks longer to dry and to reach soil moisture tension of 700 millibars compared to the controls. The difference in drying days of soils between the husk pits and bare sites appear to be higher at the surface than at depths of 0.45 m.

11. **Effect of husk and coir dust burial (media of moisture conservation) on yield of coconut, Ratmalagara Estate, Madampe. (commenced March 1981)**

From the abandoned response curve experiment at Ratmalagara Estate, Madampe, fourteen blocks which received identical treatments were chosen for this study.

The Estate is situated in the Intermediate Rainfall Zone with a lateritic gravel soil type having a 34 year old stand.

The treatment consists of control, husk and coir dust pits with each treatment having 7 plots (7 replicates) and each plot having 6 effective experimental palms. Husk ard coir dust are buried in 2.5 m x 1.5 m x 0.5 m pits along the rows. There are 124 husk pits and 118 fibre dust pits.

Yield records are being maintained. A similar experiment is to be commenced in the Dry Zone and Santil Estate, Pallama has been selected for this purpose.

12. **Boron deficiency in coconut, Pujapitiya, Kandy**

The field study on Boron deficiency in seedlings commenced in 1979 was continued with observations made on the performance of seedlings treated with sodium tetraborate (0, 28 and 56 g/seedling) as against untreated. Both rates of sodium tetraborate improved the conditions of the seedlings in 4-6 months and normalcy was restored in 8 months. The symptoms of the untreated seedlings worsened with time and eventually succumbed within 6-8 months.

13. **Single palm analysis**

Destructive sampling of a single healthy palm (30 years) in its full productive phase for dry matter and nutrient distribution was done. The dry matter distribution is as follows:

Component		*Weight (kg)*
Roots	...	144
Trunk	...	550
Fronds	...	123
Composite sample of immature leaves	...	5
Cabbage	...	7
Nuts	...	91
Bunch-components	...	18
Spathes (unopened)	...	3
Spathes (dry)	...	3
Total		944

Chemical analysis of the components are in progress.

B. LABORATORY STUDIES

Sulphur status of coconut soils

In order to study the sulphur status sixty-one soil samples (surface and subsurface) collected from soil types covering the coconut growing areas are being analysed for water soluble, available and total sulphur.

Sources of variation in leaf sampling of coconut for micronutrients

A study on sources of variation in leaf analysis for micronutrient status was done covering between frond variation and within and between leaflet variation. The study also incorporated the sampling density required to minimise inherent sampling error.

C. JOINT FAO/CRB/CCB PROJECT ON YIELD INCREASE AT SMALL FARMER LEVEL THROUGH THE USE OF FERTILIZER AND RELATED INPUTS.

Selection of sites, soil and leaf sampling and distribution of fertilizer to 39 sites were done. Fertilizer application were not commenced due to the prevailing drought.

D. SOIL SURVEYS 1980 (K.S.O. PERERA)

The following projects were included in the Soil Survey Programme :

1. **Soil Surveys for field experiments**

   (*a*) **Giriulla Estate**

   The area is developed on the alluvial plain of the Maha Oya, laid down on a quartzitic basement - Area of uniform soil depth was demarcated.

   (*b*) **Santhill Estate, Pothukulama**

   The land is a marine plain. The summit area with a uniform water table was demarcated for a husk burial trial.

2. **Soil surveys for demonstration farms and other extension projects**

   (*a*) **Naiwala College of Adaptive Technology**

   Several soil depth phases were identified on a lateritic landscape of the Boralu Series.

   (*b*) **Uhana, Amparai**

   The landscape consists of a gravelly ridge and a sand plain probably of alluvial origins.

   (*c*) **Dambuwa Mukalana, Nattandiya**

   The landscape is a narrow valley on the foot slopes of a lateritic landscape, which had undergone marine sedimentation. The lower valley areas were water logged (Fig. I)

   (*d*) **Ebbewatta, Kurunegala**

   The land is a river plain bounded by the Maguru Oya and the Sita Ela. The upper terrace is a dissected clay plain.

   (*e*) **Isolated Seed Garden Project - Daisy Valley Mawatagama**

   The landform consists of a folded ridge, and on the footslope plain fluvial sedimentation had taken place in two phases, forming a central older river plain, and on outer recent plain - soils of the ridge and the clay river terrace had unsuitable soils - (Fig. 2)

Figure 1

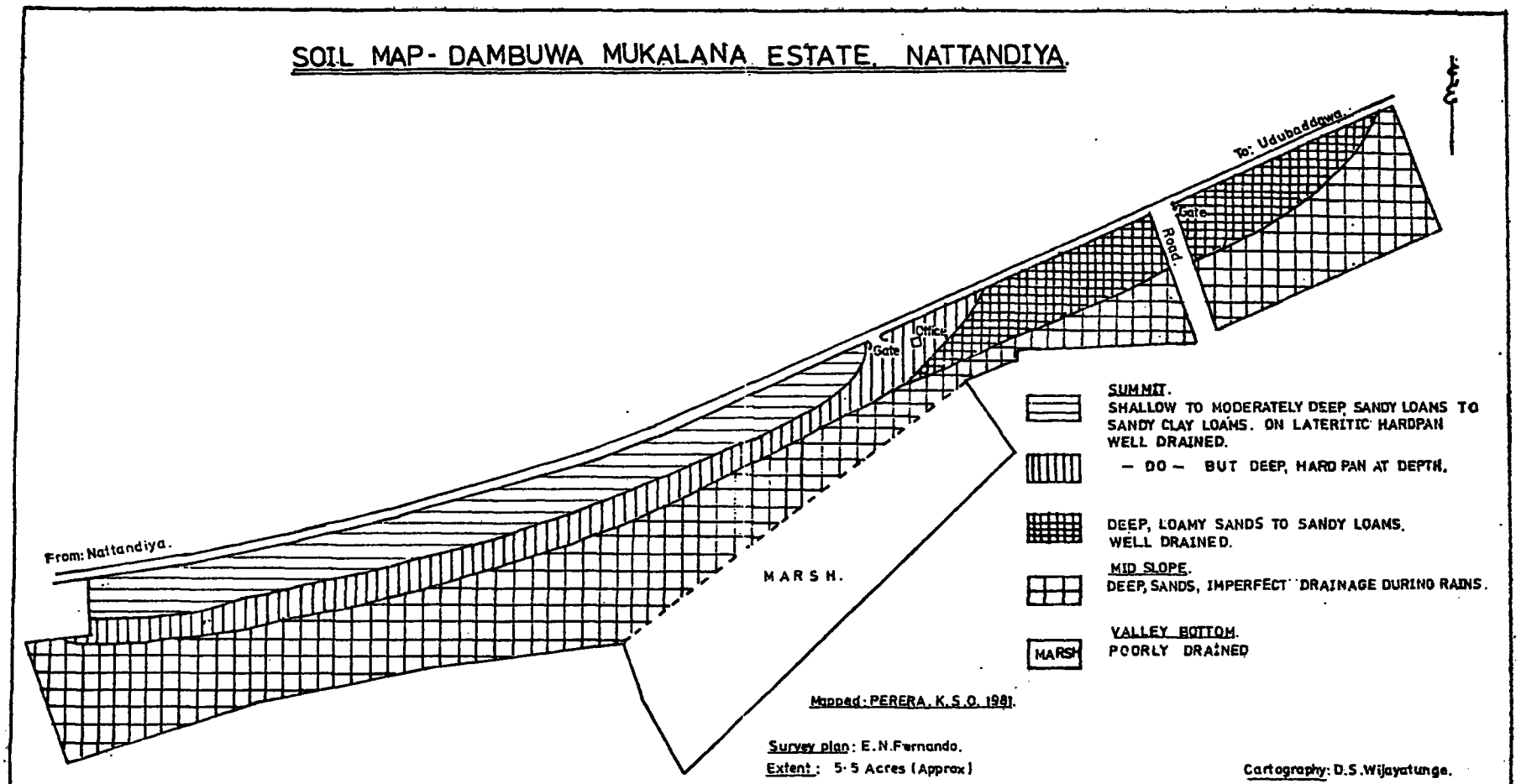
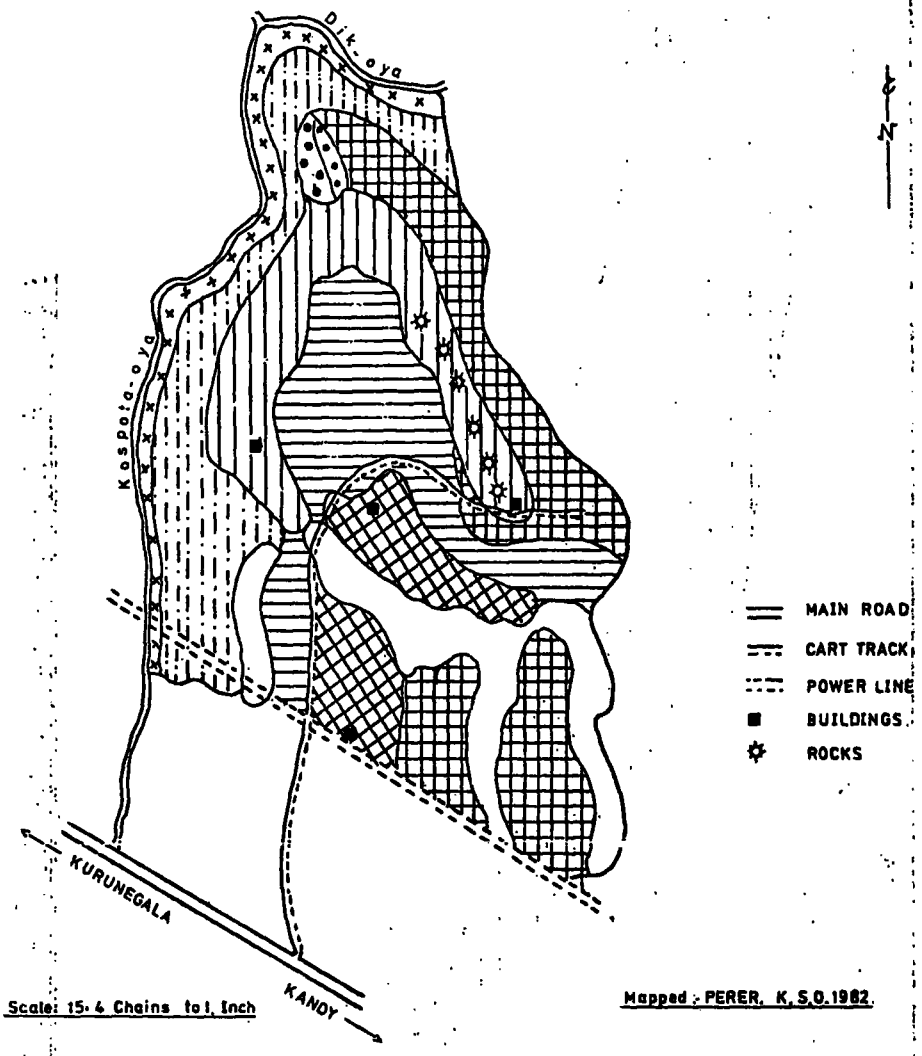

SOIL MAP- DAMBUWA MUKALANA ESTATE, NATTANDIYA.
To: Udubaddawa.
Gate
Road.
Gate
Office
From: Nattandiya.
MARSH.
SUMMIT.
SHALLOW TO MODERATELY DEEP SANDY LOAMS TO SANDY CLAY LOAMS. ON LATERITIC HARDPAN WELL DRAINED.
— DO — BUT DEEP, HARD PAN AT DEPTH.
DEEP, LOAMY SANDS TO SANDY LOAMS. WELL DRAINED.
MID SLOPE.
DEEP, SANDS, IMPERFECT DRAINAGE DURING RAINS.
VALLEY BOTTOM.
MARSH
POORLY DRAINED
Mapped: PERERA, K.S.O. 1981.
Survey plan: E.N.Fernando.
Extent: 5·5 Acres (Approx)
Cartography: D.S.Wijayatunge.

Figure 2

SOIL MAP - DAISY VALLEY, MAWATAGAMA.



Scale: 15·4 Chains to 1 Inch

Mapped : PERER, K, S.O. 1962.

RIDGE
SUMMIT :- VERY SHALLOW TO SHALLOW SANDY CLAY LOAM ON GRAVEL HARDPAN.

SLOPE AND DESSECTED SLOPES :- -DO- BUT SHALLOW TO MODERATELY DEEP.

BASIN :- DEEP, SANDY CLAY LOAM, WELL DRAINED.

DEEP SANDS, MODERATELY WELL DRAINED.

RIVER PLAIN:
UPPER TERRACE :- SHALLOW TO MODERATELY DEEP, SANDY CLAY, IMPERFECTLY TO WELL DRAINED.

LOWER-TERRACE :- DEEP SANDS, WELL TO MODERATELY WELL DRAINED.

OLD RIVER PLAIN:-
DEEP SANDS TO LOAMY SANDS, WELL TO MODERATELY WELL DRAINED.

DEEP SANDY LOAM TO SANDY CLAY LOAM, WELL DRAINED.

PADDY.

Cartography: D.S.WIJAYATUNGE.

(*f*) **Ruwaneliya Estate (JEDB)**

Soils were developed on the clay plain of the Deduru Oya Terrace—The lands were unsuitable for coconut cultivation.

(*g*) **St. Joachim's Estate, TRI**

Limited areas on footslopes of ridges and valleys were suitable.

(*h*) **Hambantota District**

The project was carried out to find suitable lands for coconut cultivation. The compact clays of the Ranna Association, and the silty clays of the Ranna Oya —Kirama Oya system were unsuitable.

The marine sands of the Khandamodara area, and the sand plains of stream valleys were suitable.

Nurseries programmes

A detailed soil survey was carried out in the following nurseries:

(*a*) Bandirippuwa	(*e*) Eraminigolla	(*i*) Wellawaya
(*b*) Ratmalagara (Fig. 3)	(*f*) Kalawewa	(*j*) Hettipola
(*c*) Walpita (Fig. 4)	(*g*) Pallekelle (Fig. 6)	
(*d*) Wilpotha (Fig. 5)	(*h*) Attavillu	

It was observed that shallow gravelly soils, sands with a low water table, and heavy clays were not favourable for seedling performance.

Leaf Scorch programme

Detailed soil surveys indicated the soil morphological environment for a probable iron toxicity, in areas subject to low pH by continuous application of ammonium sulphate. Observation trials to induce symptoms, and curative measures such as lime application was carried out at Walpita, Pothukulama and Bandirippuwa.

E. MISCELLANEOUS

Publications and Communications

The following communications were presented in scientific meetings during 1981.

(1) Jayasekere, K.S. and Loganathan, P. (1981). Effect of husk-burial in coconut lands on soil moisture conservation-tensiometer approach. Paper presented at the 37th Annual Sessions of the Sri Lanka Association for the Advancement of Science, Dec., 14th 1981.

(2) Jayasekere, K.S., Anthonypillai, G.M. and Loganathan, P. (1981). Boron deficiency in young coconuts (Cocos nucifera *L.*) in Sri Lanka — symptoms and corrective measures. Paper presented at the 37th Annual Sessions of the Sri Lanka Association for the Advancement of Science, Dec., 14th 1981.

Figure 3

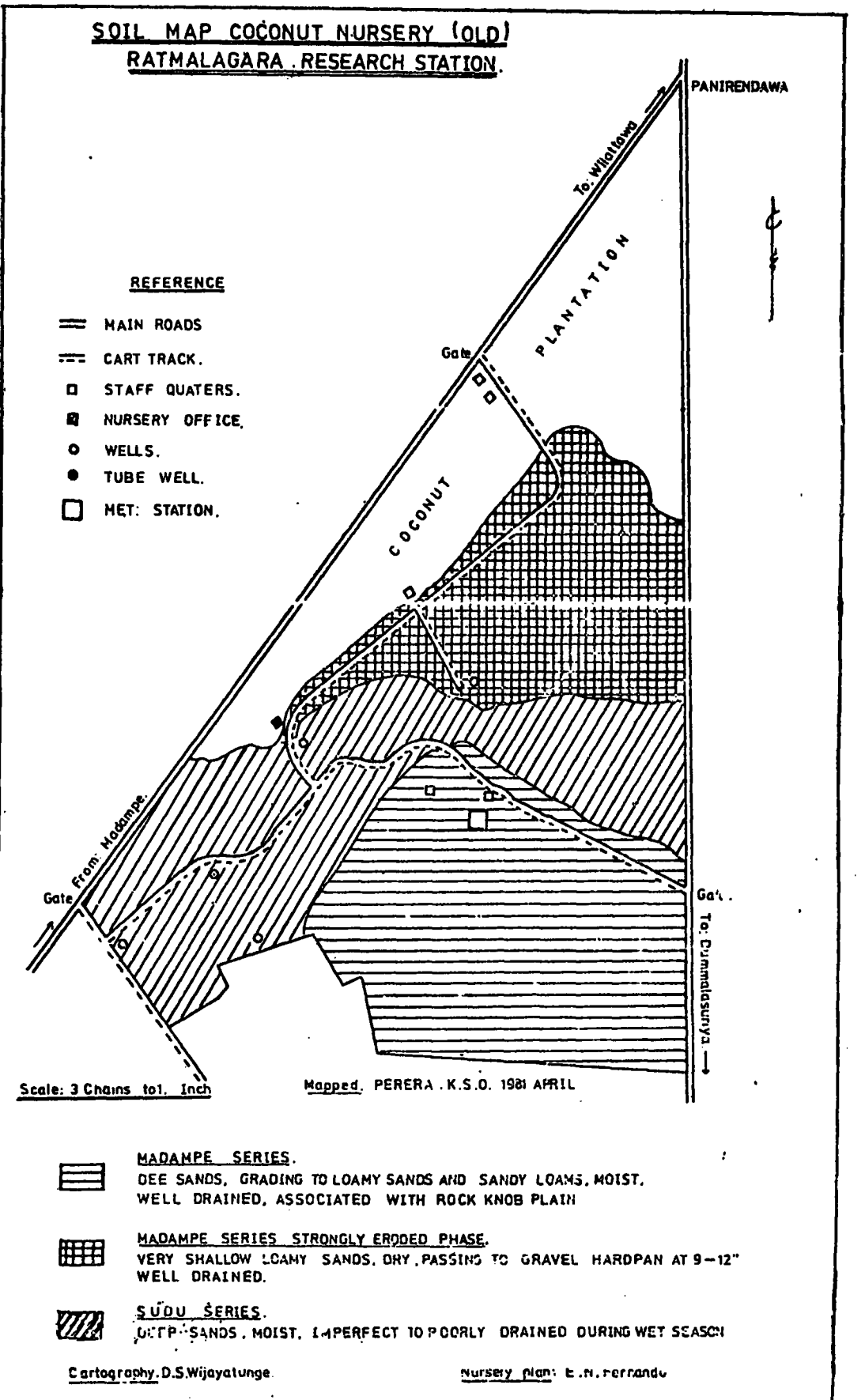
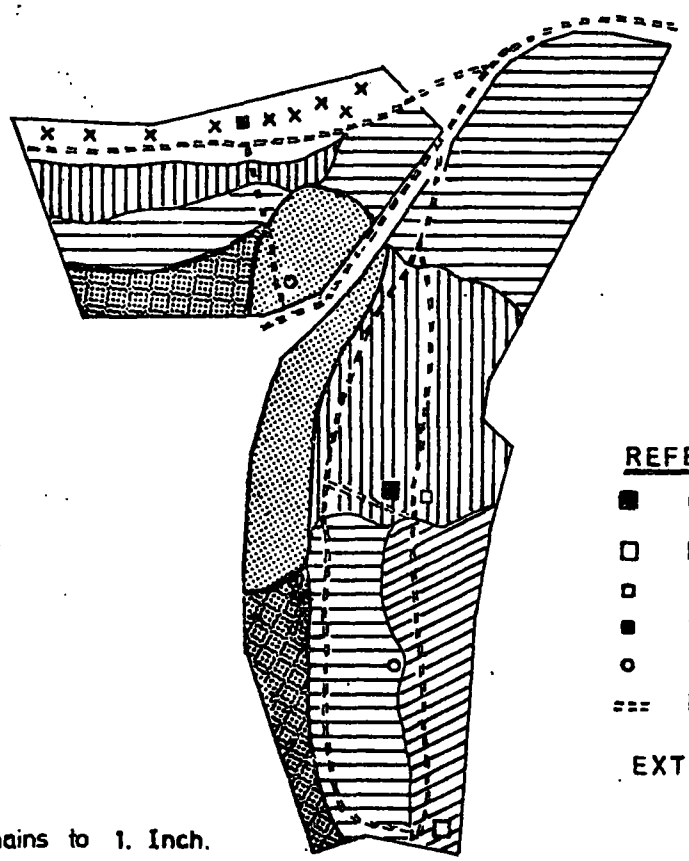

SOIL MAP COCONUT NURSERY (OLD)
RATMALAGARA . RESEARCH STATION.
PANIRENDAWA
To: Wilgitowa
PLANTATION
REFERENCE
MAIN ROADS
CART TRACK.
STAFF QUATERS.
NURSERY OFFICE.
WELLS.
TUBE WELL.
MET: STATION.
Gate
COCONUT
From: Madampe
Gate
Ga'e
To: Dummalasuriya
Scale: 3 Chains to1. Inch
Mapped. PERERA . K.S.O. 1981 APRIL
MADAMPE SERIES.
DEE SANDS, GRADING TO LOAMY SANDS AND SANDY LOAMS, MOIST.
WELL DRAINED, ASSOCIATED WITH ROCK KNOB PLAIN
MADAMPE SERIES STRONGLY ERODED PHASE.
VERY SHALLOW LOAMY SANDS, DRY, PASSING TO GRAVEL HARDPAN AT 9—12"
WELL DRAINED.
SUDU SERIES.
DEEP SANDS, MOIST, IMPERFECT TO POORLY DRAINED DURING WET SEASON
Cartography. D.S.Wijayatunge
Nursery plan: E.N. Fernando

Figure 4.

SOIL MAP COCONUT NURSERY-WALPITA.



REFERENCE.

- OFFICE.
- BUNGALOW.
- REST ROOM.
- WATCHER HUT.
- WELLS.
- PATH.

EXTENT: A. 6 . R. 0 . P. 0.

Scale: 3 Chains to 1. Inch.

Mapped: PERERA.K.S.O.1981

BORALU SERIES

VERY SHALLOW PHASE — Sandy clay loam, passing to lateritic gravel pan at 7"- 10"

SHALLOW PHASE — Do — Hard pan at 11"- 18"

MODERATELY DEEP PHASE. — Do — Moist, hard pan below 20"- 30"

PALLAMA SERIES.

DEEP PHASE. — Do — Moist, hard pan below 30"

KATUNAYAKA SERIES. — Dry, deep, coarse sands.

ARUVI SERIES — Moist, sandy clays.

Cartography: D.S.Wijayatunge.

Figure 5

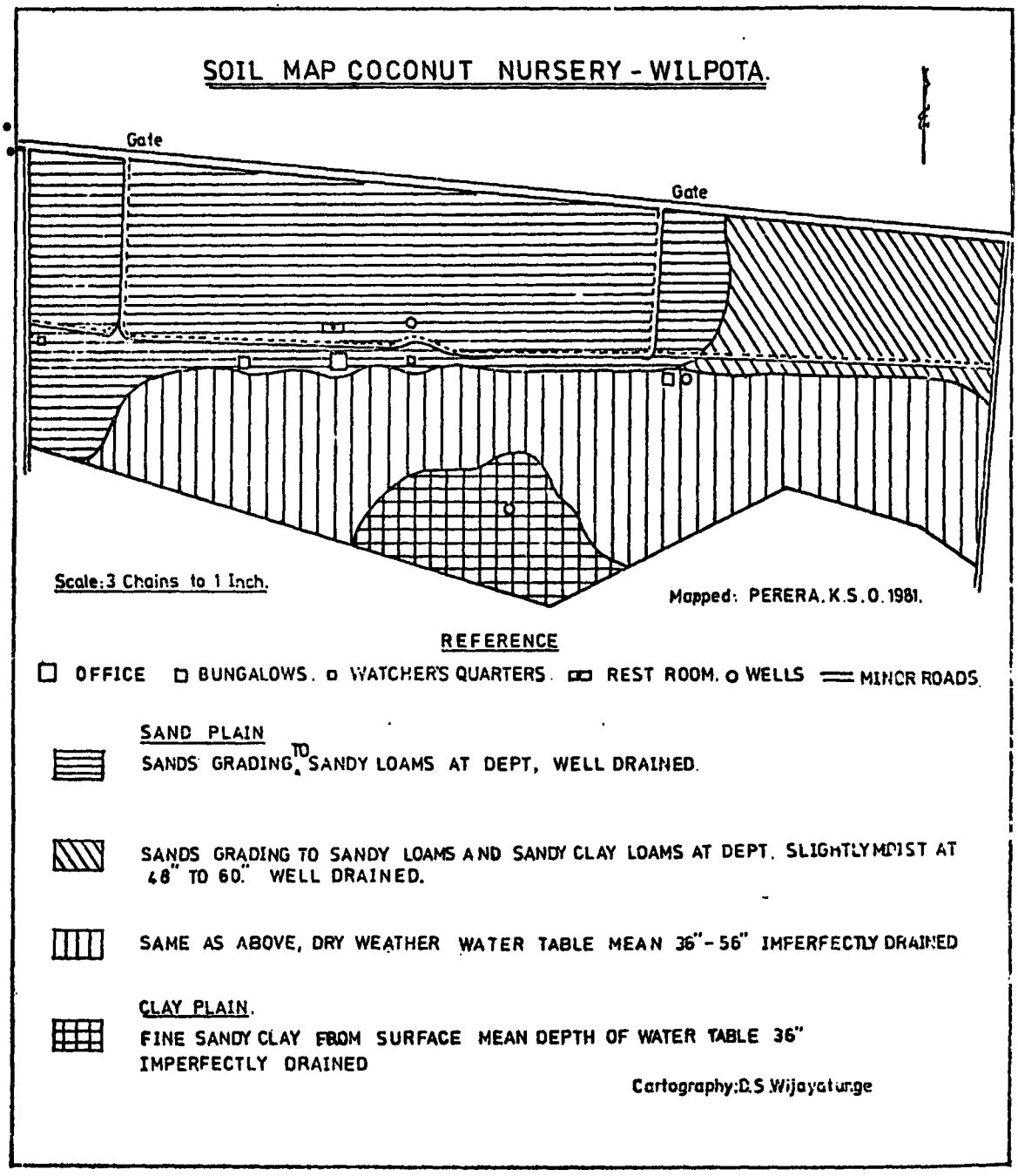
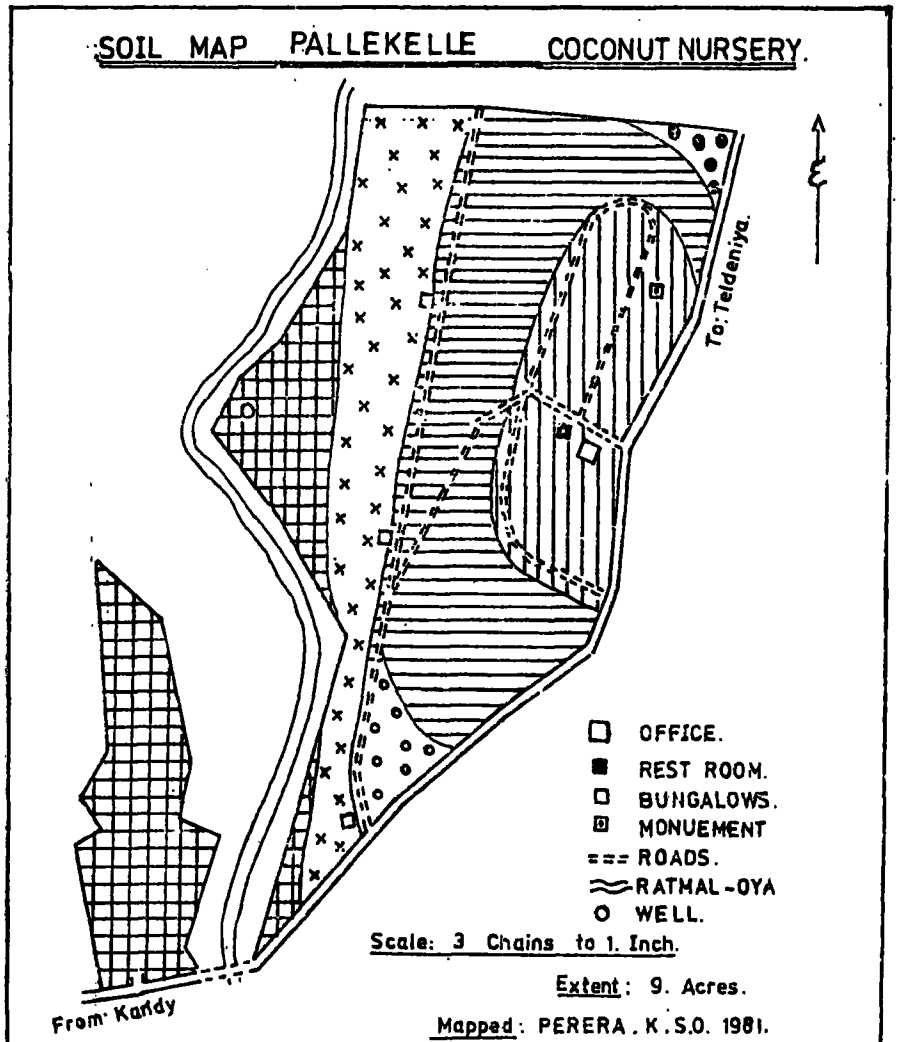

SOIL MAP COCONUT NURSERY - WILPOTA.
Gate
Gate
Scale: 3 Chains to 1 Inch.
Mapped: PERERA. K.S.O. 1981.
REFERENCE
OFFICE
BUNGALOWS.
WATCHER'S QUARTERS.
REST ROOM.
WELLS
MINOR ROADS.
SAND PLAIN
SANDS GRADING TO SANDY LOAMS AT DEPT, WELL DRAINED.
SANDS GRADING TO SANDY LOAMS AND SANDY CLAY LOAMS AT DEPT. SLIGHTLY MOIST AT 48" TO 60." WELL DRAINED.
SAME AS ABOVE, DRY WEATHER WATER TABLE MEAN 36"-56" IMPERFECTLY DRAINED
CLAY PLAIN.
FINE SANDY CLAY FROM SURFACE MEAN DEPTH OF WATER TABLE 36" IMPERFECTLY DRAINED
Cartography: D.S Wijayaturge

Figure 6



SOILS OF THE RIDGE

SUMMIT PHASE:— SANDY CLAY LOAM WITH GRAVEL, PASSING TO DECOMPOSING ROCK, DRY, WELL DRAINED, ROOTING DEPTH - SHALLOW.

SLOPING PHASE:— -DO-
ROOTING DEPTH - MODERATELY DEEP.

BOTTOM PHASE:— -DO-
ROOTING DEPTH - DEEP.

SOILS OF THE RIVER PLAIN.

UPPER TERRACE:- SANDY CLAY LOAMS, PASSING TO SANDY-CLAYS, SLIGHTLY MOIST, MODERATELY WELL DRAINED.
ROOTING DEPTH MODERATELY DEEP.

MEDIUM TERRACE:— SANDY CLAY LOAMS ON SANDY CLAY. MOIST, IMPERFECTLY DRAINED, ROOTING DEPT - SHALLOW.

LOWER TERRACE:- SANDY CLAY LOAMS ON SILTY CLAY PASSING TO SILTY CLAY LOAMS.
ROOTING DEPTH - MODERATELY DEEP.

Cartography: D.S. Wijayatunge.

PERSONNEL

Recruitments

Miss M. N. Dias — Research Assistant from 1981-03-16.

Mr. W. M. I. S. Gunasekere — Research Assistant from 1981-03-16.

Mr. Sri Kantha — Experimental Officer from 1981-11-17.

Mr. D. P. Panditharatne — Technical Assistant from 1981-06-12.

Resignations

Dr. P. Loganathan (Soil Chemist) 1981-03-31.

Mr. W. M. I. S. Gunasekere (Research Assistant) 1981-09-30.

Mr. Sri Kantha (Experimental Officer) 1981-12-31.

Mr. W. P. B. A. S. Fernando (Technical Assistant) 1981-03-01.

Mr. W. C. K. Fernando (Technical Assistant) 1981-12-14.

Promotions

Mr. N. P. Ranaweera as Laboratory and Field Assistant from 1981-12-01.

Mr. B. C. E. Perera as Laboratory and Field Assistant from 1981-12-01.

Mr. R. P. Ranbanda as Laboratory and Field Attendent from 1981-06-01.

Academic Achievements

Miss G. M. Anthonypillai, Technical Assistant was awarded the M. Phil. Degree in Soil Chemistry by the University of Peradeniya, Sri Lanka in April 1981.

Mr. T. W. Fernando has passed Part I of the Graduateship of the Institute of Chemistry, Sri Lanka.

Messrs. B. J. E. Mendis and T. W. Fernando completed a month's (July 1981) training in maintenance and use of Nuclear Instruments in Radioisotopes and Radiation Techniques organised by the Atomic Energy Authority of Sri Lanka.

Reorganisation

A major reorganisation of the Research Divisions of the Institute resulted in the amalgamation of the Division of Soils and part of the Chemistry Division (dealing with plant approach to the nutrition of coconut) to form the Division of Soils and Plant Nutrition.

Appropriate changes in the staff were effected and the reorganised Division became operative from 8th August 1981.

With these changes, Mr. K. S. Jayasekere who was Officer-in-Charge of the Division of Soils with effect from 1st April 1981 reverted to his substantive post of Research Assistant (Soil Physics).

M. JEGANATHAN
Head

Ceylon Cocon Q., (1982) 33. 76—79
Printed in Sri Lanka

Report of the Publications, Documentation and Library Unit-1981

With effect from 01-07-1981 the name of "the Division of Advisory and Extension Services and Documentation" was changed to the "Publications, Documentation and Library Unit."

This year too the Library and the Coconut Information Centre, set up in the Library as a project of the IDRC, Canada, functioned together.

Although according to the original agreement concluded by the governments of Canada and Sri Lanka period of operation of this Centre supported by the IDRC was up to 1981 it has been extended up to 1983.

1. Publications

1.1 The following Coconut Research Institute publications were published during the year.

1.1.1 **Ceylon Coconut Planters' Review**

Vol. VII No. 3

Ceylon Coconut Quarterly

Vol. XXX No. 3/4

1.1.2 **Advisory Leaflets**

Reprinting of Advisory Leaflets with revisions where required was carried out as and when found necessary in order to update the subject matter and maintain the stock position.

The Leaflets thus reprinted were as follows:—
In Sinhala:- No. 5, 16, 21, 29, 34, 35, 37.

1.2 During the year the Coconut Information Centre issued the following publications.

1.2.1 **Coconis Newsletter:- No. 3—6**

1.2.2 **International Directory of Coconut Research Workers**

1.2.3 **Literature Alert Service for the Year 1979**

1.2.4 **Bibliographical Series on Coconut No. 8—11**

2. Printing

The Coconut Information Centre handled a large portion of printing. Publications mentioned under 1.1.2, 1.2.1, 1.2.3 and 1.2.4 as well as leave slips and letters of appointment were printed by the Centre.

3. Contacts

The Coconut Information Centre was very successful in strengthening the contacts already built up with individual research workers and national and international organisations. As a result of these contacts the Centre was successful in getting copies of publications to build up its literature collection. The number of inquiries received at the Centre increased during the year. Eighteen foreign inquiries and 10 local inquiries were responded to by supplying bibliographic references and photocopies of articles.

4. Acquisitions and Inter Library Loans

116 new books were added bringing the total number of books to 4019. The total number of journals acquired on subscription and on exchange increased from 176 to 183. The Library continued to give and receive materials on inter-library loans.

5. Training Programmes

During the year 248 persons participated in the Training Programmes conducted by the Institute. The main Training Programmes were as follows.

1. Training programme for two students from the Hardy Agricultural Institute (1980-11-03 — 1981-03-04).
2. Training programme for 12 officers from the Janatha Estate Development Board, Chilaw (1981-01-12 — 1981-01-13).
3. Training programme for 38 Coconut Development Officers of the Coconut Cultivation Board (1981-01-12 — 1981-01-30).
4. Training programme for a visitor from Mauritius (1981-02-19 — 1981-03-11).
5. Training programme for a visitor from Mauritius (1981-02-19 — 1981-08-21).
6. Training programme for field officers at Hiriyala (1981-02-20 — 1981-02-21).
7. Training programme for two students from the Hardy Agricultural Institute (1981-03-05 — 1981-07-05).
8. Training programme for 33 Superintendents, Officers in Charge of Estate and nurseries of the Coconut Research Board (1981-03-09 — 1981-03-11).
9. Training programme for 12 photographers of the Division of Education and Training of the Department of Agriculture (1981-05-25 — 1981-05-29).
10. Training programme for 30 Superintendents, Assistant Superintendents and field officers of the Janatha Estate Development Board in the Katugampola area (81-04-30).
11. Training programme for the first batch of 9 subject-matter officers of the Department of Agriculture (1981-05-04 — 1981-05-08).
12. Training programme for the second batch of 13 subject-matter officers of the Department of Agriculture (1981-05-11 — 1981-05-15).
13. Training programme for 33 Cultivation Officers of the Nattandiya electorate (1981-10-20 — 1981-01-22).

14. Training programme for 40 field officers of the Coconut Cultivation Board (1981-07-06 — 1981-07-10).

15. Training programme for two students from the Hardy Agricultural Institute (1981-07-06 — 1981-11-04).

16. Training programme for 20 Agricultural Instructors and Krushikarama Viyapti Sevakas (K.V.S.) of the Agrarian Service Centre at Madampe (1981-09-15).

17. Training programme for Coconut Development Officers in Kurunegala region (1981-12-18).

6.1 Visitors

During the year the Institute received 2906 local students from 36 Schools and other educational institutions and foreign visitors.

6.2 Consultancy to the Coconut Information Centre Designation

Miss Olga Sendvey visited the Centre in July 1981 and stayed for a period of five weeks as consultant to the Coconut Information Centre Project. During her stay she looked into all the problems that inhibited the progress of the Centre.

7. Film Shows on Coconut

During the year 16 film shows were given according to requests from schools, societies, temples and churches.

8. Exhibitions on Coconut

The Institute participated in nine exhibitions on coconut. In seven of these the institute's participation consisted in supplying models, specimens and other exhibits mainly to the Coconut Cultivation Board. Besides these, the Institute set up its own stalls at two exhibitions, namely, the exhibition at the Madina Mahavidyalaya, Pahamune and the Exhibition of the Rajarata Agricultural Carnival, Anuradhapura.

9. Charts, Posters, Graphs etc.

The total number of visual aids in the form of charts, posters, graphs, name boards, over illustrations etc. drawn by the Institute's artist was 72. The total number of models made by him was 5.

10. Photographs, slides, movies

Under the technical responsibility of the Senior Technical Assistant (Photography) 1781 photographs and 439 slides were processed and the work on one 16 m.m. movie based on the Jubilee Nights Carnival and exhibition referred to in our report for 1980, was completed.

11. Research

A postal survey was carried out to ascertain the current practices and conditions connected with coconut cultivation, intercropping in coconut lands, pasture and animal husbandry and contact with field staff by coconut growers in the different districts. Out of 200 questionnaires sent 91 were responded to.

A feedback survey to find out the impact of the Advisory Leaflets was also carried out.

12. **Personnel**

Mr. M. S. S. Fernandopulle, the Publications/Publicity Officer, continued to offer his services as a Visiting Lecturer in the Department of Mass Communication at the University of Kelaniya.

Mr. M. J. C. Perera, the Librarian and Project Leader, Coconut Information Centre, attended the Development in Finance and Administration (DEVRIAD) Workshop of the IDRC Supported Projects held in Singapore in July 1981.

Mrs. H. R. N. Perera attended the training course for Agricultural Library Staff organized by the FAO and held ir Wales from 8th August to 5th September 1981.

The new recruits, Miss B. Sulosana, the Tamil Clerk/Typist cum Proofreader, Mr. H. P. Asoka Kumara, Office Attendant, Miss T. I. I. Peiris, Library Assistant, Miss P. A. S. F. Caldera, Documentation Officer and Mr. W. G. L. Rodrigo, Machine Operator assumed duties on 01-01-81,01-06-81,27-10-81, 02-11-81 and 01-12-81 respectively.

M. S. S. FERNANDOPULLE
Publications/Publicity Officer

Ceylon Cocon. Q., (1982) 33. 80—86
Printed in Sri Lanka

Report of the Estate Management Division-1981

The Division of Estate Management was created during the year under review amalgamating the activities of Estates, Nurseries and Seed Selection Scheme of the Coconut Research Institute and consequent upon the reorganization effected 1st July, 1981 this Division is responsible for ensuring the most efficient management of the Estates and Nurseries of the Institute. Accordingly the management of 3 Estates and 15 Nurseries were undertaken by this Division.

A. REPORT ON ESTATES

(*a*) BANDIRIPPUWA ESTATE, LUNUWILA

(1) Area Statement

Classification		*Hectares*	*A.*	*R.*	*P.*
Bandirippuwa Estate (1)	...	61.92	153	0	00
Bandirippuwa Estate (7)	...	47.84	118	0	38
Bandirippuwa Estate (8)	...	24.25	59	3	26
Bandirippuwa Estate (9)	...	14.08	34	3	07
Total	...	148.09	365	3	31
Research	...	58.68	145	0	00
Estate	...	82.19	203	0	17
Buildings Etc.,	...	6.88	17	0	00
Paddy Etc.,	...	0.34	000	3	14
Total	...	148.09	365	3	31

(2) Distribution of area by blocks

Block	*Field*	*Research*				*Estate*				*Total*			
		Hectares	*A.*	*R.*	*P.*	*Hectares*	*A.*	*R.*	*P.*	*Hectares*	*A.*	*R.*	*P.*
1	1	1.22	3	0	00	10.52	26	0	00	11.74	29	0	00
	2	—	—	—	—	5.67	14	0	00	5.67	14	0	00
	3	4.86	12	0	00	4.45	11	0	00	9.31	23	0	00
	4	2.02	5	0	00	15.02	37	0	17	17.04	42	0	17
	5	3.64	9	0	00	5.26	13	0	00	8.90	22	0	00
	6	2.43	6	0	00	2.02	5	0	00	4.45	11	0	00
2	7	26.71	66	0	00	20.23	50	0	00	46.94	116	0	00
3	8	10.52	26	0	00	12.55	31	0	00	23.07	57	0	00
4	9	7.28	18	0	00	6.48	16	0	00	13.76	34	0	00
Total		58.68	145	0	00	82.19	203	0	17	140.87	348	0	17
Buildings		—	—	—	—	6.88	17	0	00	6.88	17	0	00
paddy		—	—	—	—	0.34	0	3	14	0.34	0	3	14
Grand Total		58.68	145	0	00	89.41	220	3	31	148.09	365	3	31

3. Census of palms as at end 1981 classified under different blocks

Field	1	2	3	4	5	6	7	8	9	*Total*
Bearing	1 508	137	1 157	1 578	788	358	4 261	2 649	1 801	14 237
Tapping	—	—	—	31	—	—	—	—	—	31
Duds	20	—	49	79	3	12	72	12	129	376
In flower	—	—	—	—	—	—	209	36	—	245
Established	—	—	—	—	—	—	448	86	—	534
Seedlings	275	560	—	15	23	167	2 182	101	—	3 323
Vacancies	149	76	180	526	355	102	764	701	241	3 094
Total	1 952	773	1 386	2 229	1 169	639	7 936	3 585	2 171	21 840

4. Crop figures from 1977 to 1981

Pick	*1977*	*1978*	*1979*	*1980*	*1981*	*5-year*	
						Average	*Percentage*
1st	50 943	84 015	99 957	83 066	69 654	72 527	13.8
2nd	108 876	91 549	150 166	87 271	139 433	115 459	20.5
3rd	115 968	128 339	149 830	117 550	139 805	130 299	23.1
4th	118 944	84 601	105 428	105 820	105 157	103 990	18.5
5th	90 024	81 320	54 710	51 977	73 577	70 322	12.5
6th	59 365	84 082	74 902	43 458	64 675	85 297	11.6
Total	544 120	553 906	634 993	489 142	592 301	562 894	100.0
No. of bearing palms	14 452	13 843	15 060	15 617	14 237	14 642	—
Effective acreage in bearing	22.8	216.2	235.3	244.0	222.4	222.8	—
Av. nuts per acre	2 410	2 562	2 699	2 005	2 663	2 460	—
No. of nuts per palm	37.6	40.0	42.2	31.3	41.6	38.4	—

The total crop for 1981 was 592 301. This indicates an increase of 21.1% over the previous year's crop of 489 142 nuts and 5.2% increase over the previous five year's average.

5. Disposal of crops

As the nuts of the 6th pick are yet to be disposed off only the disposal upto the 5th pick is given below.

		No. of nuts	*Percentage*
Sold to contractors	...	427 181	10.96
Converted into copra	...	38 180	7.24
Gratis to staff	...	39 121	7.42
Sold as seednuts	...	5 796	1.09
Sold to research	...	3 809	0.73
Sold to CRB canteen	...	435	0.08
Sold to CRB Staff	...	222	0.04
Empties	...	12 791	2.42
Missing	...	89	0.02
Total	...	527 626	100.00

(2) POTTHUKULAMA RESEARCH STATION, PALLAMA

1. Area statement

		Hectares	*A.*	*R.*	*P.*
Coconut planted	...	57.81	142	3	17
Paddy field	...	1.80	4	1	31
Banana Plantation	...	0.46	1	0	22
Forest	...	25.76	63	0	24
Total	...	85.83	212	0	14
Research-Botany Division	...	19.02	47	0	00
Soil chemistry Division		28.73	71	0	00
Estate	...	10.06	24	3	17
Total coconut planted	...	57.81	142	3	17

2. Census of palms as at end 1981

Bearing palms	...	7 187
Dud palms	...	245
Seedlings	...	1 001
Vacancies	...	1 158
Total	...	9 591

3. Crop figures from 1977 to 1981

Pick	*1977*	*1978*	*1979*	*1980*	*1981*	*5 - year*	
						Average	*Percentage*
1st	35 105	71 583	70 835	53 944	76 127	61 127	13.1
2nd	52 371	106 696	118 303	57 003	104 609	87 796	18.9
3rd	47 842	171 911	106 881	52 417	88 790	93 568	20.2
4th	35 194	113 337	71 027	43 892	96 614	72 013	15.5
5th	42 690	138 513	61 807	73 586	82 909	79 901	17.2
6th	58 774	90 694	48 875	64 157	92 874	71 075	15.2
Total	271 976	692 734	477 728	344 999	541 923	465 480	100.0
No. of Bearing palms	7 903	7 903	7 903	7 903	7 903	7 187	—
Effective acreage in bearing	124	124	124	124	124	112	—
Av. nuts per acre	2 193	5 587	3 853	2 782	4 749		—
Av. nuts per palm	34.4	87.7	60.5	43.7	74.0		—

Total crop for 1981 was 531 917 nuts. There is an increase of 54.2% over the previous year's crop of 344 999 nuts and 14.7% increase over the previous 5 - years' average.

3. RATMALAGARA ESTATE, MADAMPE

1. Area Statement

		Hectares	*A.*	*R.*	*P.*
Research Section	...	31.16	77	0	00
Estate Section	...	64.35	159	0	00
Nurseries	...	5.26	13	0	00
Roads and Buildings	...	2.02	5	0	00
Jungle and wastelands	...	7.69	19	0	00
		110.48	273	0	00
Research Section					
Botany	...	12.95	32	0	00
Soil Science Division	...	10.12	25	0	00
Agrostology Division	...	7.28	18	0	00
Biometry Unit	...	0.81	2	0	00
		31.16	77	0	00

2 Census of palms as at end 1981

Field	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*Hedge plantation*	*Total*
Bearing	1 480	374	451	1 372	1 077	1 881	3 762	460	570	11 415
Young palms	16	—	—	6	—	379	6	11	—	418
Dud palms	78	16	35	69	83	80	83	11	4	459
Vacancies	91	26	67	209	130	299	200	19	167	1 206
Total	1 665	416	553	1 654	1 290	2 619	4 058	501	742	13 198

3. Crop figures from 1976 to 1981

Pick	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*	*Previous 5 years' Average*	*Percentage*
1st	55 246	81 584	102 898	10 522	54 144	92 803	72 879	11.4
2nd	109 755	136 050	119 322	88 362	78 827	122 889	106 463	16.7
3rd	142 305	138 365	128 867	160 199	93 213	148 786	132 590	20.8
4th	163 944	171 919	150 027	143 041	84 513	153 030	142 689	22.4
5th	147 414	149 312	98 838	86 422	66 913	140 566	109 780	17.3
6th	78 444	75 885	86 177	56 902	64 232	121 302	72 316	11.4
Total	697 102	753 115	686 129	605 448	441 842	779 376	636 717	100.0
No. of bearing palms	12 145	12 145	11 850	11 850	11 415		—	
Effective acreage in bearing	190	190	185	185	1 784		—	
Av. Yield/acre	3 964	3 612	3 273	2 388	4 369		—	
Av. Yield/palm	62.0	56.4	51.1	37.3	68.4		—	

Percentage increase of crop over last year = 76.4%
Percentage increase over previous 5 years' average = 22.4%

4. **Disposal of crops**

Nuts of the 6th pick are not disposed off yet and the disposal of nuts only upto the 5th pick is given below.

		No. of nuts	*Percentage*
Sold to contractors	...	272 130	41.4
Converted into copra	...	305 260	46.4
Issued for research	...	24 863	3.8
Issued as seednuts	...	34 935	5.3
Gratis to staff	...	11 162	1.7
Empties and rejections	...	9 724	1.4
Total of 5 picks	...	658 074	100.0

5. **Copra**

Yield of copra out of 305 260 nuts converted is given below

		kg	*Percentage*
Grade 1 copra	...	46 825	95
Grade 2 copra	...	2 526	5
Total	...	49 351	100

Out-turn of copra = 624 nuts per 100kg (1574 nuts per candy)
Percentage rejections = 1.5%

Dwarf palm nuts and buyers' rejections were included in the nuts converted into copra. Hence the high figures in out - turn.

Routine field operations such as manuring, weeding, husk burying etc. were satisfactorily carried out as recommended in all these estates and every attempt was made to maintain them at a high standard of management.

Special emphasis was laid on underplanting and filling vacancies and this work will be continued in the following year without interruption.

A general increase in yield was observed in all the estates which can be attributed mainly to the favourable weather prevailed and effective control of thieving. Average yields per acre are quite satisfactory excepting for that of Bandirippuwa Estate which is earmarked for extensive rehabilitation in the succeeding year.

B. REPORT ON MOTHER PALM AND SEED SELECTION SCHEME

1. **Deliveries of seed nuts**

	No. of Seednuts
To Coconut Research Institute nurseries ...	1 360 062
To Coconut Cultivation Board nurseries ...	2 672 583
To Dept. of Agriculture	40 000
To Sri Lanka Cashew Corporation	10 000
Total	4 082 645

Of the above quantity 635 110 *i.e.* 15.6% have been mother palm nuts.

2. **Statement of Mother Palms**

Selected during the year

		No. of Palms
(i)	Moorock Estate, Mawathagama	1 477
(ii)	Deniyama Estate, Weerapokuna	2 305
(iii)	Moralande Estate, Bingiriya	400
	Total Selected	4 182
	Previously	58 021
	Total	62 203

The demand for seednuts had successfully been met and there was no shortfall in targets. However deliveries were curtailed as requested by the Coconut Cultivation Board and the Coconut Research Institute.

C. REPORT ON NURSERIES

1. *Statement of Seed Coconuts Planted for issue of Seedlings in May/June 1981 and Oct./Nov. 1981*

Name of the nursery		*Seed coconuts planted*		
		May/June 1981	*Oct./Nov. 1981*	*Total*
1. Alampil Nursery	...	—	149 315	149 315
2. Attavillu Nursery	...	—	139 650	139 650
3. Eraminigolla Nursery	...	23 375	51 850	75 225
4. Handapangala Nursery	...	—	220 037	220 037
5. Hettipola Nursery	...	23 720	—	23 720
6. Ibbagamuwa Nursery	...	149 550	212 225	361 775
7. Kalawewa Nursery	...	—	137 440	137 440
8. Kilinochchi Nursery	...	—	143 431	143 431
9. Kirimetiyana Nursery	...	100 052	146 052	246 104
10. Koggala Nursery	...	44 968	117 125	162 093
11. Pallekelle Nursery	...	75 000	121 210	196 210
12. Rathmalagara Nursery	...	150 000	198 425	348 425
13. Walpita Nursery	...	50 065	58 005	108 070
14. Wilpotha Nursery	...	100 000	199 500	299 500
TOTAL	...	716 730	1 894 265	2 610 995

The above seednuts planted were all selected Block nuts and Mother palm nuts. No hybrid nuts were planted in any of these nurseries.

2. **Seedling Bookings**

As from Oct./Nov. 1978 Season the distribution of seedlings was effected by the Coconut Cultivation Board.

3. **Seedlings Issued**

A total of 1 477 774 seedlings were issued during the year 1981 and the distribution of same in nurseries is as follows:—

	Nursery			*Total*
1.	Alampil	...	...	7 439
2.	Attavillu	...	...	112 574
3.	Eraminigolla	...	...	42 106
4.	Handapangala	...	...	158 057
5.	Hettipola	...	...	990
6.	Ibbagamuwa	...	...	80 096
7.	Kalawewa	...	...	128 929
8.	Kilinochchi	...	...	98 826
9.	Kirimetiyana	...	...	173 154
10.	Koggala	...	...	116 089
11.	Pallekelle	...	...	112 819
12.	Rathmalagara	...	...	184 334
13.	Walpita	...	...	53 847
14.	Wilpotha	...	...	208 514
	Total	...	...	1 477 774

During the year under review three nurseries of the Coconut Research Board were handed over to Coconut Cultivation Board as detailed below:—

	Name of the Nursery		*Date hunded over*
1.	Hettipola Nursery	...	14-02-1981
2.	Ibbagamuwa Nursery	...	16-06-1981
3.	Alampil Nursery	...	24-06-1981

4. The Nursery situated at Agrarian Research and Training Institute premises at Wijerama Mawatha, Colombo which was established to cater to home - garden cultivators in the metropolice and the suburbs issued the following seedlings.

	Variety		*Issued*
1.	Ordinary Seedlings	...	1 610
2.	Open pollinated Tall	...	597
3.	Dwarf Green x Tall	...	2 975
4.	Dwarf Yellow x Tall	...	05
5.	Thambili	...	1 060
	Total	...	6 247

P. S. LIYANAGAMA
Manager (Estates)

Ceylon Cocon. Q., (1982) 33, 87—92
Printed in Sri Lanka

Report of the Administration Division - 1981

The Staff of the Coconut Research Board at the end of 1981 were as follows:

Grade	*On contract*	*Special Class*	*Class I*	*Class II*	*Class III*	*Class IV*	*Total*
Executive ...	1	1	5	7	25	12	51
Technical ...	—	7	12	34	—	—	53
Intermediate ...	—	1	1	3	—	—	5
Clerical & Allied ...	—	4	13	34	—	—	51
Operative ...	—	4	15	49	—	—	68
Minor ...	—	34	108	147	—	—	289
	1	51	154	274	25	12	517

Board of Directors

Prof. B. A. Abeywickrama (*Chairman*)
Dr. O. S. Peries
Mr. S. C. Kahawita
Mr. K. F. J. Perera
Mr. D. S. Senanayake, (*Working Director*)
Dr. D. V. Liyanage, with effect from 1st September, 1981
Mr. Naomal S. Dias, with effect from 1st September, 1981

Staff Appointments and Promotions

The following internal and external appointments and promotions were made during the year.

On Contract

Mr. T. S. Balakrishnamurti, Research Officer who retired from the Coconut Research Board with effect from 19.10.1981 was re-employed in the same capacity on contract basis for a period of 6 months.

Executive Grade Special Class

External appointment

Mr. R. M. G. D. Rajapakse	Chief Accountant	01.09.1981

Executive Grade Class I

External appointments

Mr. P. S. Liyanagama	Manager (Estates)	81.02.13
Dr. Miss M. R. T. Wickramaratne	Head, Div. of Botany and Plant Breeding	81.03.02

Internal appointments

Dr. S. Mohanadas	Head, Division of Coconut Processing	81.02.13
Dr. R. Mahindapala	Deputy Director (Research)	81.10.16

Executive Grade Class II

Internal appointments

Mr. M. Jeganathan	Head, Division of Soils and Plant Nutrition	81.12.01
Mr. D. E. F. Ferdinandez	Head, Division of Agronomy	81.12.21

Promotions

Mrs. L. V. K. Liyanage	Research Officer	81.02.03

Executive Grade Class III

External appointments

Miss M. B. M. Dias	Research Assistant	81.03.16
Mr. W. M. I. S. Gunasekara	Research Assistant	81.03.16
Mr. J. A. D. S. Jayasinghe	Research Assistant	81.02.13
Mr. K. R. R. A. Peiris	Research Assistant	81.03.16
Mr. H. A. J. Gunatilake	Research Assistant	81.03.16
Miss B. Gowri	Research Assistant	81.04.15
Mr. D. N. S. Fernando	Research Assistant	81.04.15
Mr. U. L. P. A. Perera	Manager (Farms)	81.09.01

Internal appointments

Mr. K. E. Abeysinghe	Engineering Assistant	81.09.01

Executive Grade Class IV.

Mr. Thavaratnarajah	Assistant Manager (Farms)	81.07.15
Mr. K. P. De Silva	Assistant Manager (Farms)	81.10.01
Miss. P. A. S. F. Caldera	Documentation Officer	81.11.02
Mr. G. M. R. Karunasekara	Experimental Officer	81.11.09
Mr. S. Sri Kantha	Experimental Officer (Instrumentation)	81.11.17

Internal promotion

Mr. O. D. J. Wanasinghe	Personal Assistant	81.11.13

Technical Grade Special Class

Internal appointments

Mr. G. Richard	Accounting Assistant	81.09.01

Technical Grade Class II

External appointments

Mr. D. P. Panditharatne	Technical Assistant	81.06.12
Mr. B. M. Jayatilake Banda	Book-Keeper	81.10.15
Mr. A. S. Nanayakkara	Book-Keeper	81.10.15
Miss W. A. Chandrawathie	Book-Keeper	81.10.15

Internal appointments

Mrs. K. M. A. Nonis	Book-Keeper	81.10.16

Intermediate Grade Class II

External appointments

Miss T. I. I. Peiris	Library Assistant	81.12.27

Clerical and Allied Grade Class II

External appointments

Miss B. Sulosana	Clerk/Typist (Tamil)	81.01.01
Miss M. M. J. R. Fernando	Internal Audit Clerk	81.03.02
Miss R. D. Indrawathie	Internal Audit Clerk	81.03.02
Mr. A. N. Dolawatte	Internal Audit Clerk	81.03.02
Mr. M. R. U. Attanayake	Internal Audit Clerk	81.03.02
Mr. R. M. Dissanayake	Transport Clerk,	81.11.16
Mr. W. G. L. Rodrigo	Machine Operator (Printing)	81.12.01

Operative Grade Class II

External appointments

Mr. B. G. W. Bandaranayake	Lab/Field Assistant	81.12.01

Internal appointments

Mr. N. P. Ranaweera	Lab/Field Assistant	81.12.01
Mr. B. C. E. Perera	Lab/Field Assistant	81.12.01
Mr. W. E. J. Tissera	Lab/Field Assistant	81.12.01
Mr. L. D. M. Fernando	Senior Mechanic	81.10.01

Minor Grade Class I

Internal appointments

Mr. Newton Gamage	Lab/Field Attendant	81.06.01
Mr. K. G. Dhanapala	Lab/Field Attendant	81.06.01
Mr. J. M. A. Uparatne	Lab/Field Attendant	81.06.01
Mr. N. G. Premasiri	Lab/Field Attendant	81.06.01
Mr. M. T. Siridasa	Lab/Field Attendant	81.06.01
Mr. M. Premadasa	Lab/Field Attendant	81.06.01
Mr. U. V. Marcus Fernando	Lab/Field Attendant	81.06.01
Mr. R. P. Ranbanda	Lab/Field Attendant	81.06.01
Mr. R. M. Tennakoon	Lab/Field Attendant	81.06.01
Mr. G. D. Benjamin	Calf Keeper	81.06.01

Minor Grade Class II

Mrs. D. M. Subaethana	Garden Labourer	81.06.01
Mrs. R. A. Luihamy	Garden Labourer	81.06.01
Mrs. R. M. Kumarihamy	Garden Labourer	81.06.01
Mrs. K. L. Engalthinahamy	Garden Labourer	81.06.01
Mr. D. M. Rathnayake	Garden Labourer	81.06.01
Mr. W. P. Wensus Fernando	Garden Labourer	81.06.01
Mr. Juse Fernando	Garden Labourer	81.06.01

Mr. J. N. Joseph Appuhamy	Garden Labourer	81.06.01
Mrs. M. P. Isabel Margret	Garden Labourer	81.06.01
Mr. M. A. Percy Rohitha	Lorry Cleaner	81.06.01
Mr. W. M. Ariyadasa	Lorry Cleaner	81.06.01
Mr. E. M. Nimal Chandrasiri	Lorry Cleaner	81.06.01
Mr. S. A. Lionel Antony	Lorry Cleaner	81.06.01
Mr. R. P. Somasiri	Mechanical Helper	81.06.01
Mr. K. W. Piyadasa	Tinker	81.06.01
Mr. H. P. Asoka Kumara	Office Attendant	81.06.01
Mr. I. Joseph Antony Fernando	Lorry Cleaner	81.09.15
Mr. S. Marasinghe	Pollination Labourer	81.06.01
Mr. W. L. S. Shanthi Fernando	Pollination Labourer	81.06.01
Mr. H. A. Paul B. Fernando	Pollination Labourer	81.06.01
Mr. M. A. Sunil Fernando	Pollination Labourer	81.06.01
Mr. T. M. Rodrigo	Pollination Labourer	81.06.01
Mr. J. M. Ratnayake	Pollination Labourer	81.06.01
Mr. H. Edward Percy	Pollination Labourer	81.06.01
Mr. B. Calistus Mendis	Pollination Labourer	81.06.01
Mr. S. H. A. M. Ruparatne	Pollination Labourer	81.06.01
Mr. W. Gunasena	Pollination Labourer	81.06.01
Mr. W. H. M. Senaratne	Pollination Labourer	81.06.01
Mr. N. Ramasamy	Pollination Labourer	81.06.01
Mr. J. A. D. Nimal Stanley	Pollination Labourer	81.06.01
Mr. H. Somasiri	Office Attendant	81.06.01
Mr. S. M. Podiappuhamy	Kangany	81.06.01

Resignations

Dr. U. Pethiyagoda	Director/CRI	81.09.21
Mr. W. M. I. S. Gunasekara	Research Assistant	81.09.30
Mr. L. Premasiri	Research Assistant	81.10.09
Mr. Lesley Perera	Asst. Manager (Farms)	81.06.25
Mr. A. A. A. Attanapola	Personnel Officer	81.11.04
Mr. M. C. P. Wijeratne	Technical Assistant	81.11.30
Mrs. N. G. Wijeratne	Stenographer (English)	81.11.30
Mrs. J. D. Athputharajah	Technical Assistant	81.09.09
Mr. W. P. B. A. S. Fernando	Technical Assistant	81.03.01
Miss G. N. G. Perera	Technical Assistant	81.04.07
Mr. W. C. K. Fernando	Technical Assistant	81.12.14
Mr. H. D. L. Canecius	Technical Assistant	81.10.08
Mr. K. N. Rodney Fernando	Clerk/Typist	81.06.25
Mrs. M. F. C. G. Perera	Clerk/Typist	81.11.07
Mr. O. A. Wijesiri	Lab/Field Assistant	81.09.18
Mr. E. M. Sirisena	Garden Labourer	81.07.01
Mr. S. Rasiah	Cons: Labourer	81.09.25
Dr. P. Loganathan	Soil Chemist	81.03.31

Retirements

Mr. T. S. Balakrishnamurthy	Research Officer	81.10.19

Deaths

Mr. D. A. P. Hettiarachchi	Clerk/Typist	81.06.19

Financial Aid

Provident Fund, Distress and Transport loans and advances were paid during the year as were paid in the previous years.

Welfare

Grants approved by the Board were paid to the Recreation Club, Multi purpose Co-operative Society, and Kalakawaya to assist them in the welfare activities of members.

Training Abroad

Mrs. C. Jayasekara, Research Assistant was granted 3 years study leave with effect from 81.09.03.

Financial C.R B.

A.

(i) **Local**

The Budget allocation for the year under review was Rs. 18 540 000. The actual expenditure was Rs. 17 243 000 whilst the commitments in respect of work in progress and orders placed as at 31st December, 1981 amounted to Rs. 1 004 000.

Capital expenditure during the year amounted to Rs. 2 393 000 made up as follows:

		Rs.
1.	Purchase of land	532 000
2.	Improvements to estates ...	134 000
3.	Buildings	694 000
4.	Vehicles	30 000
5.	Electricity and Water supply ...	131 000
6.	Bungalow furniture	214 000
7.	Office equipment	265 000
8.	Photographic equipment ...	12 000
9.	Lab equipment	272 000
10.	Field equipment	12 000
11.	Office furniture	77 000
12.	Tools	3 000
13.	Machinery	17 000
		2 393 000

(ii) **Foreign Aid**

Foreign Aid equivalent to Canadian $ 10800 was received from the International Development Research Centre for the development of the Coconut Information Centre.

B. East Coast Rehabilitation Project

The Budget allocation for the year under review was Rs. 3 038 000 provided to meet the Capital expenditure of this Project. The actual expenditure was Rs. 1 206 000 whilst commitments in respect of work in progress and contracts entered amounted to Rs. 1 200 000. A sum of Rs. 1 500 000 was relased by the Coconut Development Authority to meet this expenditure,

The above figures are provisional and subject to finalisation of accounts and audit.

General

The employer, employee relation during the year under review was very cordial and problems were solved out by discussions.

B. E. PEIRIS
Deputy Director (Administration & Finance)

Ceylon Cocon. Q., (1982) 33, 93—94
Printed in Sri Lanka

Report of the Demonstration Farm-Passekudah, Kalkudah-1981

The Farm was established under the East Coast Rehabilitation Project which was launched to rehabilitate the eastern region divastated by the cyclone in 1978. The Project is funded by the European Economic Community.

The land for this farm was released from the cyclone affected Passekudah Estate managed by the Coconut Cultivation Board in August 1980.

Acreage Statement

	Acs.	*Roods*	*Perches*
Extent of the land	115	01	05

+Distribution of Acreage

	Acs.	*Roods*	*Perches*
Fertilizer and Irrigation Trials ...	30	00	00
Genetical Trials	6	02	00
*Coconut below 4 years	4	02	00
*Coconut between 4 to 8 years ...	3	00	00
Bldgs. Roads and waste land etc. ...	5	00	00
Area under development	66	01	05
Total	115	01	05

*These areas were planted prior to take over of the land by the Coconut Research Board.

+The above acreages were ascertained approximately.

Census of Palms

Particulars	*Irrigation and Fert. Trials*	*Genetic Trials*	*Field B*	*Field C*	*Total*
Bearing Palms ...	—	—	—	18	18
Young Palms ...	—	—	273	115	388
Young palms below 1 year ...	1 818	412	—	—	2 230
Vacancies ...	—	—	15	72	87
Total	1 818	412	288	205	2 723

Comparative Rainfall Figures For 1980/1981

(Obtained from the adjoining Passekudah Estate)

	Jan.	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sep.*	*Oct.*	*Nov.*	*Dec.*	*Total*
1980	5.9	—	—	144.5	114.1	—	26.7	—	1.5	190.7	194.4	307.3	677.8
1981	227.1	83.2	17.4	64.0	96.9	3.6	96.6	9.1	166.7	217.1	300.3	244.9	1282.0

Progress of Work 1981

Land clearing (i) Uprooting of jungle tree roots and coconut stumps and levelling of ant hills were completed.

(ii) Entire 115 acres of the land was ploughed after clearing.

Planting

(i) Planting of 30 acres coconut for fertilizer and irrigation trials were completed in early October 1981.

(ii) Planting of 6½ acres coconut for genetical trials were completed in early November 1981.

(iii) 3 plots of herbeceous crops, horticultural crops and pastures for feasibility studies were opened during Maha Season 1981.

Field Notes General

(i) All experiment blocks were fertilized in accordance with the recommendations.

(ii) Monthly weeding rounds were carried out round the coconut seedlings planted newly.

(iii) Repeated ploughing and harrowing was done in fields, "B" "C" "D" and part of field "A" with the view of erradicating Illuk.

(iv) Coconut seedling areas were watered during the dry periods.

(v) Previously planted Field "B" Young palms were given a dose of cattle manure and young palm mixture.

(vi) Planted 800 Ipil-Ipil plants along the boundaries.

(vii) 3000 meteres of perimeter fencing was done in 1981.

Buildings

(i) Construction of following grade officers' quarters were completed by the end of the year:

Grade	4	2 units
Grade	3	3 units
Grade	2	2 units

(ii) Construction of office and lab building was commenced in November 1981.

(iii) One existing old building was renovated to use as office and stores temporarily.

Staff

Co-ordinator, E. C. R. P. Farms	Mr. N. Narendra
Manager, Passekudah Farm	Mr. U. L. P. A. Perera
Asst. Manager ,, ,,	Mr. A. Thavaratnarajah
Technical Assistant	Mr. K. A. S. Chandrasiri

Work force of the farm stands at 23 in the check-roll and 25 in the casual list. This includes 3 watchers, 2 Tractor Drivers, 1 Jeep Driver, 1 Kangany and 1 Field Supervisor.

U. L. P. A. PERERA
Manager (Farm)