ACTIVITIES OF THE COCONUT RESEARCH INSTITUTE DURING 1966 (Summary)

Dr. W. R. N. Nathanael

General

Dr. W. R. N. Nathanael was appointed Acting Director of the Institute from 10th January on Mr. A. T. Mahiuda Silva's transfer to Anuradhapura as Government Agent.

The Coconut Research Board released Dr. D. A. Nethsinghe. Soil Chemist for a two-year period (commencing from 1st October 1966) to take up an appoinment under the International Atomic Energy Agency (IAEA) in Vienna. Mr. T. S. Balakrishnamurti, Research Assistant was appointed to act for the Soil Chemist during his absence.

Mrs. N. Rajaratnam, Research Assistant to the Agrostologist, was granted study leave from 27th September 1966 to follow a three-year post-graduate course in crop-ecology at the University of Reading, England.

Mr. M. A. P. Manthriratne, Research Assistant to the Botanist, was granted study leave from 4th October 1966, to follow a three-year post-graduate course of training in Plant Breeding at the Welsh Plant Breeding Station, Aberystwyth, Wales.

A summary of the activities of the Institute is as follows:—

I. Chemistry Division

(i) *Desiccated Coconut*

(*a*) Laboratory investigations were carried out on batches of good and poor samples of desiccated coconut to determine whether the pH values of aqueous extracts could be used as an index of deterioration consequent on delays in processing time. In spite of the claim that a method based on this principle is being employed in the Philippines for testing commercial samples, the results obtained were in general found to be inconclusive. (*b*) In connection with a request from the Bureau of Ceylon Standards investigations were carried out to determine the range of composition of Ceylon and Philippine desiccated coconut in respect of protein and sugar contents.

(ii) *The Standard Ceylon Copra Kiln*

Work in connection with the Standard Ceylon Kiln was continued during the year. Contraptions for maximising fuel economy and minimising fire-chamber disturbances have been incorporated in the improved design. A kiln plan suitable for water-logged sites has also been prepared.

(iii) *Studies on the Coconut Endosperm*

(*a*) Chemical studies on the coconut kernel were continued during the year. Changes in the oil content of the distal and embryo ends of the kernel from the four final stages (XI to XIV) of the Germination Experiment were determined. The oil-free extracted meals prepared from all the samples of this experiment were examined for mineral constituents.

(iv) *Arrack*

Twelve palms were continued to be tapped for toddy during the year. The samples collected were used for laboratory studies on fermentation efficiencies and the preparation and examination of experimental samples of arrack.

(v) *Vinegar*

The vinegar generator installed at the new factory at Nainamadama, continued to operate satisfactorily during the year. Tests done in the control laboratory of the factory revealed that the acid strength of the finished vinegar was consistently over 5.0%.

(vi) *Pot Culture Experiment*

The chemical examination of plant samples prepared from the previous pot culture experiments was continued.

With a view to determining errors (if any) in using leaf punch samples as against the entire laminae (of different ranks) for foliar diagnosis some comparative studies were made (using different analytical techniques) for the estimation of the two elements potassium and phosphorus.

II. Botany Division

(i) Controlled pollination work for the production of Tall × Tall and Tall × Dwarf seed-material was conducted at Bandirippuwa, Ratmalagara, Marandawila and Achchithotam Estates. Production of Dwarf × Tall seed-nuts initiated in 1964 at the Isolated Seed Garden was continued during the year.

In all 8091 Tall × Tall and 28,449 Dwarf × Tall seed-nuts were harvested from Bandirippuwa, Ratmalagara, Marandawila and Kirimetiyana Estates and the Isolated Seed Garden. 11,853 Tall × Tall (open pollinated), Tall × Dwarf and Dwarf × Tall seedlings were issued to the Industry. Prolonged dry weather hampered pollination work at the Seed Garden for a short period. 12 private estates were assisted in carrying out their own controlled pollination. 269 Tall and 328 Dwarf pollen tubes were supplied to these estates.

(ii) A 10 acre block at Pothukulama was planted with Tall × Tall seedlings raised from 248 palms in the Seed Garden.

(iii) 25 acres were planted at the Isolated Seed Garden with alternate rows of Tall × Tall and Dwarfs to produce Dwarf × Tall Hybrids through natural pollination following emasculation of the dwarf parent.

(iv) Field trials on planting techniques and progeny trials were maintained throughout the year.

(v) 1,484,776 seed-nuts were supplied to the Planting Division. Though 7,000 mother palms were selected at Palugaswewa Estate, it was not possible to purchase any seed-nuts as the management did not comply with the method of harvesting stipulated by the Botanist.

III. Soil Chemistry Division

(a) *Field Experiments*

(i) The eight long term field experiments on the NPK requirements of young and adult palms, fertilizer placement, frequency of manuring, liming acid soils, ploughing, and the efficiency of different sources of nitrogen and phosphorus were continued in 1966. The observation trials on the problems of leaf scorch, immature nut-fall and yellowing palms were maintained.

(ii) Pre-manurial yield recording was commenced for the N.P.K. Mg., experiments at Marandawila and Monrovia and S, B, Zn. experiment at Monrovia.

(iii) Field experimental results of particular practical interest are as follows:

(a) All experiments at Bandirippuwa, Ratmalagara and Pothukulama continued to show significant responses to each of the nutrients N, P and K.

(b) At Pothukulama, about 80% of the young palms treated with complete NPK mixture were in flower at the end of the sixth year whereas only 44% of the untreated palms were in flower.

(c) At Nattandiya, the pH of the sub-soil continued to remain low even after applying lime at the rate of 15 cwt. per acre for the last three years.

(d) At Ratmalagara, the infestation of *Helminthosporium* in the original N_2P_0 plot is disappearing since the change to N_2P_1.

(b) *Laboratory Investigations*

(iv) Studies on nitrification of Bandirippuwa and Iranaville soils by the incubation method revealed no discernible pattern. There was little nitrification in the soils receiving cattle and inorganic manures at Iranaville.

(v) Analysis of nut water samples from the liming experiment at Walahapitiya showed no definite relationship between the composition of nut water and yield response.

(vi) Estimation of available phosphate in soil samples from the 3^2 NPK experiment at Bandirippuwa by the Olsen's bicarbonate method indicated that the method is suitable for determining soil phosphate availability.

(vii) Analyses of leaf samples from yellowing palms at Iranaville Estate have given indications of sulphur deficiency. A field trial to find out means of improving the efficiency of N and S uptake has been initiated. Estimations of ammoniacal and total nitrogen of soil samples from different treatment plots are being carried out at three-monthly intervals.

(viii) In connection with advisory work on special problems, analyses of leaf samples for N,P,K, Ca, Mg and B were carried out during the year.

(c) *Soil Survey*

(a) Surveys of the Galle and Ambalantota 1″ sheets were completed during 1966.

(b) Chemical and mineralogical analyses of soil samples taken from the Matara and Ambalantota soil surveys were carried out.

(c) Hydrological studies on the Vanathavillu soils were continued.

(d) Some special surveys were conducted in Naula, Matale, and Kaduwela at the request of planters.

IV. Agrostology Division

(i) *Soil Fertility Studies*

(a) Preliminary studies on three soil types were completed. The response to added phosphate in all soils so far studied (22 in number) were examined and were related to the amount of phosphatic fertilizers applied in the past.

(b) In continuation of previous work, change in soil pH consequent on the use of urea and sulphate of ammonia on coconut soils were studied and on the basis of the results time curves have now been prepared.

(ii) *Pasture Studies*

(a) Studies on the interaction of light and nitrogen on herbage yield were continued during the year.

(b) Comprehensive information has been accumulated on the management of pure and mixed swards of *Brachiaria miliiformis* and legumes. Parallel information has also been accumulated on the establishment and management of *Panicum maximum* as a fodder grass.

(c) A feature of interest has been the establishment of a trial with a large number of varieties and species of *Brachiaria* for the evaluation of dry matter yield, palatability and intake by animals.

(iii) *Studies on Inter-Crops*

Considerable attention was focussed on the possibility of growing food crops such as paddy, maize, sorghum, cowpea, ground-nuts, chillies and pineapples under coconut.

(a) Nearly 300 varieties of paddy (including the four-month H_4), are being tested out. Apart from studies on weed control, a comprehensive series of pot experiments are in progress to study the effects of light, water regime, lime and forms of nitrogen on the growth of paddy.

(b) On the basis of relative performance it has been possible to select varieties of cow-pea and groundnut that would be suitable for growing as intercrops. The agronomy pertaining to the cultivation of these crops under coconut is now known.

(c) The trials on the growing of chillies under coconut have yielded promising results.

(iv) *Cattle*

(a) Analyses of data collected on *Sinhala* cattle were continued and it has been generally concluded that the *Jersey* would be the most suitable animal for crossing with the *Sinhala*.

(b) With the gift of two *Jersey* studs by the Department of Agriculture, the artificial insemination trials were discontinued.

(c) A trial on the substitution of coconut poonac with urea in the context of feeding trials on Sinhala cattle was completed.

V. Crop Protection Division

(i) *Pests*

(a) The Red Weevil (*Rhyncophorus ferrugineus*)

Studies were conducted on the ecology of this pest. In some plantations, infestation was found to range between 0.6 to 3.0% with an average mortality of 13% of the affected palms. About 23% of the palms had to be destroyed as deterioration had set in beyond the point of recovery.

Although this pest is the most destructive, the observation has been made that it could be kept under control by phytosanitary methods and/or metasystox injections.

(b) The Coconut Caterpillar (*Nephantis serinopa*)

The project for biological control initiated in 1960 was continued during the year.

The number of infestations reported during the year did not exceed 30. A preliminary study of the liberations of parasites and their recoveries has indicated that they are not truly effective in the control of the pest. The indications have been that the two exotic parasites (introduced from India) have not colonized.

In general, the records indicate that caterpillar infestations are not extensive or serious enough to warrant explorations for fresh parasites.

(c) The Coconut Scale (*Aspidiotus destructor*)

14 coconut scale infestations were reported during the year. Eleven of these were brought under control by spraying kerosene oil emulsion. Three occurred towards the beginning of the N. E. Monsoon, so that the rains affected natural control.

(ii) *Diseases*

(a) *Leaf Scorch Decline*

The annual survey conducted in the Galle District revealed that the incidence of the disease was lower than in previous years.

In collaboration with the Pathologist of the Rubber Research Institute certain soil microbiological studies were initiated in connection with the problem of Leaf Scorch.

The trial with 'Tillex' was continued during the year.

(*b*) *Bud Rot*

The fungicidal trials with mercurial sprays commenced in 1963 were continued during the year. Though the trials have not been comprehensive enough to evaluate the efficiency of the treatments, the indications are that there has been a decline in the rate of incidence.

VI. Biometry

(i) *Statistical Service*

As usual, the unit continued to assist all the Research Divisions of the Institute, in the design of experiments, statistical analyses and interpretation of experimental data.

A series of experimental designs were drawn up for the Soil Chemist for multi-factor fertilizer experiments.

(ii) *Biometrical Research*

(*a*) The studies on the calibration of experimental plots with adult coconut commenced about 3 years ago were completed.

(*b*) The recordings in connection with the calibration trial at Ratmalagara estate were maintained according to Schedule.

(iii) *Agri-Meteorology*

The meteorological stations at Bandirippuwa, Ratmalagara, and the Isolated Seed Garden at Ambakelle were maintained satisfactorily during the year.

(iv) *Honorary Work*

The Biometrician was consulted by Research Officers in other Institutions in Ceylon and abroad in connection with some of their statistical problems.

Some Planters and Estate Agencies were given advice regarding certain problems relating to crop fluctuations.

VII. Advisory Division

(i) *Advisory Visits*

(*a*) During the year 13,691 visits have been made by the field staff to coconut lands for advice and demonstrations on planting, soil conservation, draining, manuring, cultivation, pests and diseases control, and for inspections under the Fertilizer Subsidy Scheme.

(*b*) 6,395 holdings in all were visited in connection with general advisory work. 262 holdings were inspected under the Fertilizer Subsidy Scheme and 2,152 manure application forms were distributed. 3,053 holdings were visited for advice and demonstrations in connection with pests and diseases. 1,417 holdings were visited in connection with Preplanting and Follow-up Services. 2,766 holdings were visited in connection with the Crop Improvement Service.

(*c*) The field staff attended 124 meetings during the year and delivered 96 talks.

(ii) *Demonstration Centres*

(*a*) The routine work associated with the maintenance of the Demonstration Centres at Pallai, Alampil, Mylambavelly, Mundel and Koggala were carried out during the year. At Mylambavelly an additional 15 acres of jungle were cleared for planting.

(*b*) The Koggala Demonstration Centre was handed over to the Planting Division in November 1966.

(iii) *Citronella Subsidy Scheme*

The main items of work for the year under this Scheme comprised inspection of lands for the payment of cash subsidy and the issue of free fertilizer. The actual fertilizer distribution was as follows:—

(*a*) 2,465 applicants who had obtained seedlings during May/June 1960, May/June 1963 and October/November 1963, were issued 575 tons. 10 cwts 28 lbs. of fertilizer in May/June 1966.

(*b*) 2,930 applicants who had obtained seedlings during October/November 1960, May/June 1961, October/November 1961, and October/November 1963, were issued 1,378 tons 3 cwts 28 lbs. of fertilizer in October/November 1966.

VIII. Planting Division

(i) *Seed Nuts*

The Planting Division maintained 12 nurseries during the year. A total of 2,044,451 seednuts were planted for issue of seedlings in May/June and October/December seasons. 566,120 seednuts were planted for issue of seedlings in May/June and 1,478,331 seednuts for October/December.

(ii) *Seedlings*

A total of 1,333,945 seedlings were booked for the two planting seasons as follows:—

	Number
May/June 1966	418,160
October/December 1966	915,785
Total	1,333,945

PRICES TRENDS AND SALES OF COCONUT PRODUCTS

J. K. T. Fernando

Average Prices of Coconut Products for the second half of 1966

TABLE 1

Month	*Week*	*Estate copra market price per candy* Rs. cts.	*Oil price per ton* Rs. cts.	*Poonac price/ ton* Rs. cts.	*Desiccated coconut price/ pound* Rs. cts.
July ..	1st	186.15	1,214.00	237.00	.43½
	2nd	182.85	1,180.00	195.00	.43
	3rd	181.70	1,178.00	200.00	.42½
	4th	174.20	1,143.00	200.00	.42
August ..	1st	171.80	1,108.00	200.00	.42
	2nd	167.83	1,085.00	200.00	.41
	3rd	172.00	1,107.00	209.00	.42½
	4th	178.00	1,126.00	203.00	.44
September ..	1st	181.75	1,132.00	203.00	.44½
	2nd	179.75	1,110.00	218.00	.44
	3rd	171.50	1,059.00	223.00	.43
	4th	169.35	1,020.00	225.00	.43
October ..	1st	160.45	975.00	240.00	.41
	2nd	170.67	940.00	255.00	.40
	3rd	168.75	965.00	293.00	.39
	4th	172.00	997.00	321.00	.40
November ..	1st	172.42	992.00	331.00	.39
	2nd	167.92	975.00	310.00	.37
	3rd	163.83	980.00	298.00	.36½
	4th	135.50	997.00	300.00	.38½
December ..	1st	184.13	1,035.00	311.00	.43
	2nd	193.17	1,109.00	324.00	.45
	3rd	197.00	1,143.00	326.00	.44½
	4th	197.00	1,139.00	321.00	.45

TABLE 2

Monthly Sales of Coconut Products for the second half of 1966

Month	*Copra in tons*	*Oil in tons*	*D.C. in pounds*
July	14,015	9,639	10,439,917
August	13,520	7,372	9,778,540
September ..	18,009	5,628	12,864,210
October	13,212	5,970	11,768,590
November ..	14,875	7,705	9,533,562
December	13,556	5,287	8,645,330

(Figures obtained from the Ceylon Coconut Board).

CROP INTELLIGENCE

J. K. T. Fernando

TABLE 1

3rd, 4th, 5th and 6th Crops of 1966 in different localities

Locality	Crop	Nuts per palm			Copra Outturn		
		Average	This crop	% departure from average	Average	This crop	% departure from average
Gonawila ..	3rd Crop (May-June '66)	12.9	10.1	- 22	1167	1264	+ 8
	4th Crop (July-Aug. '66)	15.5	13.8	- 11	1222	1272	+ 4
	5th Crop (Sept.-Oct. '66)	14.1	10.0	- 29	1256	1293	+ 3
	6th Crop (Nov.-Dec. '66)	9.0	6.3	- 30	1280	1258	- 2
Giriulla ..	3rd Crop (May-June '66)	14.2	11.5	- 19	1254	1241	- 1
	4th Crop (July-Aug. '66)	15.6	13.6	- 13	1311	1294	- 1
	5th Crop (Sept.-Oct. '66)	13.0	16.6	+ 28	1389	1361	- 2
	6th Crop (Nov.-Dec. '66)	7.8	5.2	- 32	1310	1316	+0.5
Kurunegala (1) ..	3rd Crop (May-June '66)	12.2	11.4	- 7	1409	1434	+ 2
	4th Crop (July-Aug. '66)	12.6	14.1	+ 12	1442	1421	- 1
	5th Crop (Sept.-Oct. '66)	10.6	9.2	- 13	1445	1373	- 5
	6th Crop (Nov.-Dec. '66)	7.4	4.9	- 34	1434	1400	- 2
Kurunegala (2) ..	3rd Crop (May-June '66)	11.1	12.1	+ 9	1271	1176	- 7
	4th Crop (July-Aug. '66)	13.7	12.1	- 12	1282	1276	-0.5
	5th Crop (Sept.-Oct. '66)	12.3	14.4	+ 17	1283	1265	- 1
	6th Crop (Nov.-Dec. '66)	9.3	8.8	- 5	1280	1310	+ 2
Lunuwila ..	3rd Crop (May-June '66)	15.3	13.7	- 10	1267	1276	+0.7
	4th Crop (July-Aug. '66)	13.4	13.3	-0.7	1337	1305	- 2
	5th Crop (Sept.-Oct. '66)	8.7	7.4	- 15	1354	1275	- 6
	6th Crop (Nov.-Dec. '66)	6.4	5.1	- 20	1315	1214	- 8

Nattandiya	..	3rd Crop	(May-June | '66)	15.7	8.1	- 48	1289	1293	+0.3
		4th Crop	(July-Aug. | '66)	14.0	7.9	- 44	1344	1686	+25
		5th Crop	(Sept.-Oct. | '66)	9.2	4.2	- 54	1394	1533	+10
		6th Crop	(Nov.-Dec. | '66)	6.1	2.6	- 57	1287	1433	+11
Kudawewa	..	3rd Crop	(May-June | '66)	17.1	16.8	- 2	1051	1103	+ 5
		4th Crop	(July-Aug. | '66)	14.8	16.8	+ 14	1105	1160	+ 5
		5th Crop	(Sept.-Oct. | '66)	10.3	13.7	+ 33	1086	1108	+ 2
		6th Crop	(Nov.-Dec. | '66)	8.2	8.4	+ 2	1021	1114	+ 9
Chilaw	..	3rd Crop	(May-June | '66)	12.5	13.5	+ 8	—	—	—
		4th Crop	(July-Aug. | '66)	14.8	8.0	- 46	—	—	—
		5th Crop	(Sept.-Oct. | '66)	13.5	8.0	- 41	—	—	—
		6th Crop	(Nov.-Dec. | '66)	9.3	8.0	- 14	—	—	—
Bingiriya (1)	..	3rd Crop	(May-June | '66)	17.3	16.8	- 3	—	—	—
		4th Crop	(July-Aug. | '66)	14.9	15.5	+ 4	—	—	—
		5th Crop	(Sept.-Oct. | '66)	13.0	13.0	0	—	—	—
		6th Crop	(Nov.-Dec. | '66)	8.7	7.2	- 17	—	—	—
Bingiriya (2)	..	3rd Crop	(May-June | '66)	14.8	15.4	+ 4	1365	1204	- 12
		4th Crop	(July-Aug. | '66)	13.3	12.9	- 3	1367	1337	- 2
		5th Crop	(Sept.-Oct. | '66)	8.7	5.7	- 34	1472	1411	- 4
		6th Crop	(Nov.-Dec. | '66)	6.4	4.9	- 23	1416	1508	+ 6
Rajakadaluwa	..	3rd Crop	(May-June | '66)	17.1	17.7	+ 4	1182	1265	+ 7
		4th Crop	(July-Aug. | '66)	15.7	17.3	+ 10	1214	1247	+ 3
		5th Crop	(Sept.-Oct. | '66)	14.4	9.2	- 36	1219	1270	+ 4
		6th Crop	(Nov.-Dec. | '66)	11.5	9.1	- 21	1188	1313	+10
Madurankuli	..	3rd Crop	(May-June | '66)	13.2	15.1	+ 14	1119	1350	+21
		4th Crop	(July-Aug. | '66)	11.7	14.1	+ 21	1127	1186	+ 5
		5th Crop	(Sept.-Oct. | '66)	10.4	12.0	+ 15	1102	1164	+ 6
		6th Crop	(Nov.-Dec. | '66)	10.7	9.3	- 13	1102	1150	+ 4

TABLE 2

Rainfall of different localities in 1966

Month	*Gonawila*	*Giriulla*	*Kurunegala*	*Lunuwila*	*Nattandiya & Kudawewa*	*Chilaw*	*Bingiriya*	*Rajakadaluwa*	*Madurankuli*	*Negombo*
JANUARY ..	3.61	2.10	1.21	2.04	9.58	0.44	0.75	1.35	0.26	3.17
FEBRUARY	2.50	3.28	0.62	3.70	0.51	0.45	2.80	0.15	0.00	2.66
MARCH ..	4.75	8.32	11.57	2.73	8.80	4.93	2.94	4.81	1.03	6.80
APRIL ..	15.15	21.18	16.17	11.91	8.84	10.32	11.77	8.64	5.72	14.05
MAY ..	1.31	2.58	1.10	2.15	1.19	0.38	—	—	—	1.02
JUNE ..	3.40	3.85	3.52	2.94	3.68	1.83	2.85	1.75	—	2.69
JULY ..	2.51	2.21	1.90	2.52	1.46	1.15	—	2.31	1.67	2.16
AUGUST ..	1.37	2.27	2.87	0.33	0.16	0.08	0.63	0.59	0.00	—
SEPTEMBER	15.56	17.43	14.90	16.52	10.22	—	9.06	5.96	2.69	—
OCTOBER ..	12.79	12.68	6.35	9.84	12.54	8.48	—	—	16.57	10.63
NOVEMBER	5.04	—	16.85	6.25	4.50	7.36	5.42	7.84	8.37	4.01
DECEMBER	3.21	6.89	9.04	4.68	4.39	7.31	5.19	—	8.02	5.10
TOTAL	71.20	82.82	85.50	65.68	65.87	42.73	41.44	33.40	44.30	52.23

news

At a meeting of the Presidential Economic Staff, Philippines, a proposal for the establishment of a International Coconut Research Institute has been considered. A committee has been set up to consider—

(*a*) The need for a International Coconut Research Agency.

(*b*) The form and magnitude of the Research Agency contemplated.

(*c*) The necessity for locating it in the Philippines.

The proposed International Research Institute for cocoonut will be patterned after the existing International Rice Research Institute in Philippines.

The Philippine Coconut Board has decided to send a team of two to Ceylon, India, Pakistan, Thailand, Malaysia, Singapore and Indonesia to survey and report on coconut research and improvement activities in these countries. The data collected would serve as a guide in the formation of the new Institute. (*The Coco. News—Vol. XII No.* 2. 1967).

* * *

The Philippine National Bank has decided to extend better credit facilities for coconut land owners, by the upgrading of cocoonut land values for purposes of securing agricultural time loans from the Bank. A similar change is contemplated by the Development Bank of Philippines.

According to Director of Philippine Bank, the purpose of the loan is to enable coconut farmers to obtain loans for replanting because a large percentage of trees in Philippines have aged considerably (*The Coco. News—Vol. XVII No.* 2. 1967).

* * *

The Applied Research Corporation of Thailand reports that some progress has been made in the production of a stabilized Coconut milk with acceptable flavour capable of storage without refrigeration for several days. (*News Letter No.* 5. 1967).

* * *

On the basis of prevailing recommendations in India, the cost of manuring cocoonut during 1960-64 has been Rs. 2.54 (Indian currency) per tree per year. Details of expenditure are indicated below.