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Report of the Biometry Unit-1979

1. Statistical Service

(*a*) Routine analyses of the experimental data of the Research Divisions were done and advice to Research Officers regarding experimental designs and interpretation of results was given.

(*b*) Assistance was given to a number of other Research Institutions regarding design of experiments and analysis of experimental data.

(*c*) Charts and diagrams, depicting the Coconut Industry of Sri Lanka, were prepared and displayed in the Board room of the Institute.

2. Research

2.1 Calibration Trial

The bimonthly recordings of vegetative and yield characters of the palms were carried out according to schedule.

2.2 Watering Experiment

This experiment was continued uninterrupted during the year.

The yield responses to watering in the year 1979 are shown in Table 1.

Table 1. *Yield per hectare per annum*

Treatment	*Low yielding*	*Mid yielding*	*High yielding*	*Weighted average*	*No. of waterings*
	Nuts/Hectare/Annum				
Control ...	7844	10276	16038	10476	nil
Single dose weekly ...	8806	12680	16835	12154	26
Single dose fortnightly ...	9574	12080	17079	12128	14
Double dose fortnightly ...	9929	11365	15080	11535	14

The yields have been adjusted for pre-experimental differences by means of covariance analysis.

2.3 Copra Conversion Factor Experiment (B/E and R/E)

The two experiments were carried out according to schedule. Though it was intended to conclude this experiment at the end of 1979, it was later decided to continue till the end of 1980 due to the prolonged drought period observed during two consecutive years 1978 and 1979. This may perhaps help to study the effect of prolonged droughts on yield of copra and also the copra conversion factor.

2.4 Bunch Thinning Experiments

Preliminary recordings of the two follow-up bunch thinning experiments at R/E were carried out during the year. The recordings proper will be started in 1980.

3. Surveys

During the latter half of the year, the following three surveys were carried out at the request of the Coconut Cultivation Board.

1. Survey of cyclone damage to coconut plantations in the Batticaloa district.
2. Survey of the drought affected coconut plantations in the North-Western Province of Sri Lanka.
3. Full enumeration of drought affected coconut holdings of the Wilpotha colony in the Puttalam district.

3.1 Survey of Cyclone Damage

This survey was carried out during the period July to August 1979 to assess the extent of damage to coconut plantation due to the cyclone which hit the Eastern province of Sri Lanka on 23rd Novermber 1978.

This survey revealed that the total coconut acreage in Batticaloa district prior to the cyclone was 13,417 acres, having 580,830 palms in 20,127 holdings of more or less same size whereas the Agricultural Census of 1962 gave the acreage in Batticaloa district as 15,946 acres. Table 2 shows the damage to coconut plantations in Batticaloa district by the cyclone.

Table 2. *Damage to coconut plantations in Batticaloa district*

			No.	*% of total*
Number of palms affected	Fallen	...	395,155	68.0
	Dead and Standing	...	24,972	4.3
	Slanting	...	49,268	8.5
	Broken palms	...	3,160	0.5
	Total	...	472,555	81.3
Number of palms unaffected but needing removal, being duds		...	17,360	3.0
Number of good palms remaining		...	90,915	15.7
	Total	...	580,830	100.0

As a result of the cyclone 68.0% palms were uprooted, 4.3% had the crown removed (*i.e*, dead and standing), 8.5% were slanting badly, and 0.5% had snapped at the middle of the trunk. Only a bare 15.7% of the palms (*i.e.* about 90,915) remained unaffected and these were mainly in the Mankerni-Vakarai area.

3.2 Survey of the drought affected coconut plantations in the North-Western Province of Sri Lanka

This sample survey was carried out during the period 13th October 1979 to 26th October 1979.

Due to the purposive nature of the sample survey, emphasis was laid more on ascertaining the influence of factors such as "management" and "soil types" on drought resistance than an absolute estimate of damage due to drought. This was inevitable as the information was needed urgently.

The area covered in this survey was grouped into six larger zones as follows:

Zone 1 — Chilaw, Bingiriya, Andigedera areas
Zone 2 — Arachchikattuwa, Bangadeniya, Pallama areas
Zone 3 — Battuluoya area
Zone 4 — Mundel area
Zone 5 — Mangala-Eliya, Madurankuli areas
Zone 6 — Wilpotha area

For the purpose of this survey, palms were grouped into four categories in respect of damage due to drought, namely,

(*a*) Beyond recovery
(*b*) Badly damaged
(*c*) Slightly damaged
(*d*) Not damaged

The extent of damage in the six zones is shown in Table 3

Table 3. *Extent of damage by zones*

Degree of damage	*Proportion of palms affected in*					
	Zone-1	*Zone-2*	*Zone-3*	*Zone-4*	*Zone-5*	*Zone-6*
Beyond recovery	6.3%	3.1%	5.3%	16.3%	8.6%	5.6%
Badly damaged	9.5%	9.4%	9.3%	9.0%	5.3%	12.5%
Slightly damaged	19.7%	18.5%	13.5%	12.3%	15.8%	18.4%
Unaffected palms	64.5%	69.0%	71.9%	62.4%	70.3%	63.5%
All palms	100.0	100.0	100.0	100.0	100.0	100.0

In all zones, the degree of damage is similar except in zone 4 (the Mundel area) where the damage is higher. Table 4 shows the degree classified by management level and soil type.

Table 4. *Incidence of damage influenced by management level and soil type*

Degree of damage	*Good Management*				*Poor Management*			
	Sandy	*Loamy*	*Clayey*	*Gravelly*	*Sandy*	*Loamy*	*Clayey*	*Gravelly*
Beyond recovery	0.5%	2.0%	11.9%	2.6%	4.3%	6.5%	11.3%	8.4%
Badly damaged	1.3%	7.7%	17.4%	14.5%	7.7%	10.6%	10.1%	12.3%
Slightly damaged	9.8%	18.0%	18.8%	29.4%	15.6%	14.4%	19.0%	25.2%
Unaffected	88.4%	72.3%	51.9%	53.5%	72.4%	68.5%	59.6%	54.1%
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

The clayey and gravelly soils were the worst affected while the loamy and sandy soils were relatively not so badly affected.

As for the influence of management on drought resistance, it appears that good management helps considerably in the case of sandy and loamy soils, whereas in the case of clayey and gravelly soils, the position is not so clear.

3.3 Survey of the drought affected coconut holdings of the Wilpotha colony in the Puttalam district

This survey commenced on 11th December 1979 and concluded on 31st December 1979.

The colony consisted of 610 holdings of the size of 5 acres and 65 holdings of 2½ acres.

A full enumeration of drought affected palms in all the holdings except 6 holdings of the size of 5 acres was carried out.

Table 5 shows the incidence of damage in the 5 acre and 2½ acre holdings.

Table 5. *Incidence of damage in the 5 acre and 2½ acre holdings*

Bearing Status		*5-acre holdings affected palms*		*2½-acre holdings affected palms*	
		No.	%	*No.*	%
Bearing palms	Not damaged	36,839	47%	303	70%
	Slightly damaged	12,603	16%	16	4%
	Badly damaged	9,034	12%	43	10%
	Beyond recovery	19,906	25%	69	16%
	Total	78,382	100.0	431	100.0
Non bearing palms	Not affected	29,591	91%	2,970	97%
	Affected	3,100	9%	89	3%
	Total	32,691	100.0	3,059	100.0

3.3.1 **5-acre holdings**

47% of the bearing palms was not damaged. 16% was slightly damaged 12% was badly damaged and 25% was beyond recovery.

3.3.2 **2½-acre holdings**

70% of the bearing palms was not damaged, 4% was slightly damaged, 10% was badly damaged and 16% was beyond recovery.

4. Agri-Meteorology

4.1 Meteorological Stations

The three meteorological stations at the Bandirippuwa Estate, the Ratmalagara Estate and the Isolated Seed Garden were maintained satisfactorily.

The allowance for the Met-recorders was increased to Rs. 80.00 per month with effect from 17th August, 1979.

4.2 Rainfall in 1979

Table 6 shows the rainfall in 1979 in the important coconut growing areas.

Table 6. *Rainfall in important coconut growing areas*

Station	*Total Rainfall (mm)*		*Average for 20 years*
	1979	*1978*	*(1959—1978)*
Lunuwila	1608.9	1999.2	1992.8
Madampe	1514.5	1570.1	1645.9
Chilaw	1491.7	1212.3	1573.1
Puttalam	1061.6	1499.1	1138.8
Kurunegala	1887.0	2405.4	2215.2

4.3 Drought Indices in 1979

The drought indices for some coconut growing areas are shown in table 7.

Table 7. *Drought Index in the coconut growing areas*

	Drought Index		*Drought Index for the year*		
	mean for 10 years	*Range*	*1977*	*1978*	*1979*
1. Tangalla	152.0	30.1 — 414.6	371.6	103.2	210.76
2. Kudawewa	196.0	0.0 — 457.6	451.5	608.5	418.06
3. Wariyapola	213.0	0.0 — 526.8	256.9	411.7	196.99
4. Kuliyapitiya	152.5	0.0 — 288.2	218.8	349.6	377.64
5. Madampe	320.9	0.0 — 569.1	234.1	454.7	504.60
6. Lunuwila	146.1	0.0 — 407.7	60.6	402.6	397.78
7. Rajakadaluwa	278.9	0.0 — 465.4	369.3	772.4	552.76
8. Negombo	141.6	0.0 — 305.4	73.8	545.6	165.17
9. Giriulla	60.1	0.0 — 127.3	49.5	401.6	390.53
10. Kurunegala	113.6	0.0 — 254.6	187.5	160.9	158.29
11. Polgahawela	100.0	0.0 — 217.1	210.9	129.0	283.01

5. Forecast of total production of coconut in Sri Lanka for 1979

(*a*) **Verification of forecast for 1979**

Production forecast by CRB for 1979	—	1680 million nuts
* Production actually realised for 1979	—	2442 million nuts
Error of forecast	—	45.3%

(* Production based on figures issued by the Coconut Marketing Board)

It would appear that our forecasting function is no longer efficient. To some extent this is virtually true.

We really anticipated this due mainly to two factors. The first is the reduction in internal consumption as a result of the unprecedented increase in prices, whereas in estimating total production we employed the usual rate of 130 nuts per head of population. This gave rise to this spurious increase in production. Secondly the fertilizer usage in coconut lands increased considerably since 1978. This should boost up production to a considerable degree but certainly not to offset the 28.7% decline we forecast for 1979 as a result of the 1978 drought which was the worst during the last quarter century.

We are preparing a full report on this for the Coconut Research Board.

We are now in the process of deriving a production function including the consumption as one of the variables and also the price factor.

(*b*) **Forecast for 1980**

Forecast of production for 1980 — 2623 million nuts.

This estimate is also based on the earlier formula. This should not be taken seriously. As far as the biological (*i.e.* true) production as against the estimated production is concerned we would still predict a gloomy picture for 1980 too.

6. **Production and Exports** —(based on customs returns)

The estimated production of coconuts for the year 1979 is 2418 million nuts. This is 1.0% less than that in 1978, 1.2% more than the last 5 year average and 20.5% less than the previous record production in 1964.

The nut equivalent of exports for 1979 is 537 million nuts. This is 9.6% less than that in 1978, 10.7% less than the last 5 year average and 67.0% less than the previous record in 1964.

The average value of nut products for 1000 nuts in 1979 is Rs. 2418/-. This is 47.8% more than that in 1978, 162.0% more than the last 5 year average and 47.8% more than the last record price in 1978.

7. **General**

7.1 The Biometrician continued to function as the Consultant Biometrician at the Rubber Research Institute of Sri Lanka, served on the specialist Committee on Statistics and quality control of the Bureau of Standards and continued to be a Visiting Lecturer in Biometry at the University of Sri Lanka.

8. Staff Matters

(*a*) Appointments and Promotions

(i) Mr. D. T. Mathes was promoted as Research Assistant with effect from 1st July, 1979.

(ii) Mr. Ranjith Fernando was promoted as Field Assistant Class-I with effect from 1st June, 1977.

(iii) Mr. G. I. Karunanayake was promoted as Technical Assistant with effect from 20th July, 1979.

(*b*) Retirements

Mr. V. Abeywardena retired from service on 18th December, 1979 on reaching the 60th year. However, he continued to serve as Biometrician on a contract basis as approved by the Ministry of Coconut Industries.

9. Personnel

The Staff as at the end of 1979 was as follows:

1. Biometrician	—	V. Abeywardena, FIS (London)
2. Research Assistant	—	D. T. Mathes, B.Sc. (Cey), Dip. Stat. (Vidyodaya), Dip. Biometry (Reading)
3. Technical Assistant	—	1. P. Sunderalingam, B.Sc. (Cey.) 2. I. Karunanayake
4. Senior Lab. and Field Assistant	—	G. Karunasena
5. Lab. and Field Assistants	—	1. E. Ranjith Fernando 2. D. T. Fernandopulle 3. L. G. Fernando
6. Clerk/Typist	—	Miss Princy Fernando
7. Lab. and Field Attendants		1. W. E. R. Chandrasiri Fernando 2. W. B. Protus Fernando

V. ABEYWARDENA
Biometrician