



GOVERNMENT OF KERALA

**FINDINGS OF
AGRICULTURAL FIELD
EXPERIMENTS IN KERALA
(1959-60 to 1974-75)**

*BUREAU OF ECONOMICS AND STATISTICS
TRIVANDRUM
FEBRUARY, 1976*



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One of the important items of work attended to by this Bureau is the analysis of Agricultural field experiments conducted by the research stations in various parts of the State. Under the auspices of the I. C. A. R., this work was taken up by the Bureau in September 1959. The results of over 1500 experiments conducted in 40 Research Stations have so far been analysed by this Bureau and the results furnished to the I. C. A. R. etc. The findings of the analysis are sought to be presented in this monograph. This is the first attempt in this direction. This paper has been prepared by Shri R. Janardhanan, Research Officer of this Bureau. Constructive comments on the monograph will be of help to the Officers of this Bureau for effecting improvements in this type of monographs.

Bureau of Economics and Statistics,
Trivandrum,
14-2-1976

N GOPALAKRISHNAN NAIR,
Director.

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-

APPENDIX I

	<i>Agricultural Research Stations</i>	<i>Experimental Crops</i>
1	Rice Research Station, Kayamkulam	Paddy
2	Do Mannuthy	Paddy
3	Do Kottarakkara	Paddy
4	Do Moncompu	Paddy
5	Do Pattambi	Paddy
6	Agronomic Research Station, Chalakudy	Paddy
7	Do Coyalmannam	Paddy
8	Agricultural College, Vellayani	Paddy, Bhindi
9	Agricultural Research Station, Taliparamba	Paddy, Mango, Sapota Pepper
10	Agricultural Research Station, Ambalavayal/Central Horticultural Research Station, Ambalavayal	Paddy, Ginger, Sesamum, banana, Vanilla, Eucalyptus
11	Rice Research Station, Vythila	Paddy
12	Lemongrass Research Station, Odakkali	Lemongrass, Vettiver, Citronella
13	Vettiver Sub Station, Thiruvampaddy	Vettiver
14	Integrated seed Development Farm, Eruthanpatty	Groundnut, sesamum, caster
15	Oil seed Research Station, Kayamkulam	Sesamum
16	Banana & Pineapple Research, Station, Kannara/ Banana Research Station, Mannuthy/Banana Research Station, Trichur	Banana, Pineapple
17	District Agricultural farm, Neriya Mangalam	Pepper
18	Coconut Research Station, Neleswar	Coconut
19	Do Kumarakom	Coconut
20	Do Neyyattinkara	Coconut
21	Agricultural Research Station, Pilicode	Coconut
22	Cashew Research Station, Anakkayam	Cashew
23	Oil palm Research Station, Thodupuzha	Oil Palm, ginger, pepper
24	Cardamum Research Station, Pampadumpara	Cardamum
25	Pulses Research Station, Sasthamkotta	Redgram, cowpea Black gram
26	Tuber Research Station, Mannuthy	Tapioca, sweet potato
27	Tapioca Research Station, Thruvella	Tapioca
28.	Do Trivandrum	Tapioca

29	Sugarcane Research Farm, Thiruvella	Sugarcane
30	Do Travancore Sugar & Chemicals, Thiruvella	Sugarcane
31	Tobacco Research Station, Kanhangad	Tobacco
32	Pepper Research Station, Talparamba	Pepper
33	Coffee Demonstration Farm, Kalpetta	Coffee
34	Chellottee Estate, Krishna Estate and North Carolina Estate, Kalpetta	Coffee
35	Coffee Research Station, Malathottom	Coffee
36	Rubber Research Institute of India, Mundakkayam	Rubber
37	Do Malankara Estate	Rubber
38	Do Vaikundam Estate	Rubber
39	Do Udakudi, Kottayam	Rubber
40	Cultivators field trial in Ernakulam, Munkundapuram, Kanjirappally and	Rubber

APPENDIX 2

Yearly distribution of Agricultural Field Experiments Analysed

Sl No	Agricultural Research Station		59-60	60-61	61-62	62-63	63-64	64-65	65-66	66-67
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Rice Research Station	Kayamkulam	3	2	17	11	14	20	19	19
2	Do	Mannuthy	1	2	11	14	16	15	20	
3	Do	Kottarakara			1	1	10	7	9	11
4	Do	Montombu		2	2	3	1	8	6	19
5	Do	Pattambi	27	29	25	27	22	15	1	
6	Agronomic Research Station	Chalakudy						4	4	8
7	Do	Coyalmanam					3	4	5	8
8	Agricultural College	Vellayani		5	10	11		1		
9	Agricultural Research Station	Taliparamba	3	1						
10	Do	Ambalavayal	5	5	9	10	8	7		
11	Rice Research Station	Vythila				1				
12	Lemongrass Research Station	Odakkali	1	2	2	2	8	4	6	13
13	Vetiver sub station	Thuruvampaddy						2		
14	Integrated seed Development Farm	Eruthampathy						1	4	13
15	Oil seed Research Station	Kayamkulam	1					2	2	
16	Banana and Pine apple Research Station	Kannara								
	Banana & Pine apple Research Station	Mannuthy			1		8	9	3	
	Banana Research Station	Trichur								
17	District Agricultural Farm	Neriyamangalam								
18	Coconut Research Station	Neleswar								6
19	Do	Kumarakom	2	2	1	4	3	4	4	
20	Do	Neyyattinkara	1	1	1	1				
21	Agricultural Research Station	Pilcode			1	1	1	1		
22	Cashew Research Station	Anakkayam								

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APPENDIX 2 (Contd)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
23	Oil palm Research Station, Thodupuzha	4	8	4	6	6	7	6	
24	Cardamom Research Station, Pampadumpara								
25	Pulses Research Station, Sasthankotta						1	3	
26	Tuber Research Station, Mannuthy	2	3	3	2		1		
27	Tapioca Research Station Thiruvalla	1	1	1				1	
28	Do Trivandrum	1	1	1					
29	Sugarcane Research Farm Thiruvalla		3	1					
30	Do Travancore Sugar and Chemicals Thiruvella	1	1	1					
31	Tobacco Research Station, Kanhangad	2	3	3	2	1	2	2	
32	Pepper Research Station, Taliparamba			2		3	4		
33	Coffee Demonstration Farm, Kalpetta						2	2	
34	Chellotte estate, Krishnan Estate and North Carolina Estate Kalpetta		3	3					
35	Coffee Research Station, Malathottam		1	1					
36	Rubber Research Institute of India, Mundakkayam					1	1		
37	Do Malankara Estate					1	1		
38	Do Vaikundam Estate					1	1		
39	Do Udakkadi, Kottayam					1	1		
40	Cultivators Field Tribal in Ernakulam, Kanjurappally and Mukundapuram			3	3				
Total		55	75	104	99	108	125	97	97

APPENDIX 2 (Contd.)

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Sl. No	Agricultural Research Station		67-68	68-69	69-70	70-71	71-72	72-73	73-74	74-75	Total
(1)	(2)		(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1	Rice Research Station	Kayamkulam	17	23	26	32	34	27			264
2	Do.	Mannuthy			24	17	16	16	14	18	184
3	Do.	Kottarakkara	7	6	10	7	12	..			81
4	Do	Moncombu	14	27	12	7	.	.	.		101
5	Do.	Pattambi	37	51	26	.	.	.			260
6	Agronomic Research Station, Chalakudy		9	5				.			30
7	Do	Coyalmanam		.				.			20
8	Agricultural College, Vellayani						3				30
9	Agricultural Research Station, Taliparamba				.	.	.	.	.	.	4
10	Do.	Ambalavayal				.	.	.			44
11	Rice Research Station, Vythila				.	..	..	.	.		1
12	Lemongrass Research Station, Odakkali			14	19	18	25	39			153
13	Vetiver sub station, Thiruvampaddy				.	.	.	..	..		2
14	Integrated seed Development Farm, Eruthampathy			.	.	..	..	..	..	.	18
15	Oil seed Research Station, Kayamkulam				16	4	5	3			33
16	Banana and Pine apple Research Station, Kannara Banana & Pine apple Research Station, Mannuthy Banana Research Station, Trichur				15	17	4	.	.		57
17	District Agricultural Farm, Neriya Mangalam				.	.	6	4	4		14
18	Coconut Research Station, Neleswar		6			.					12
19	Do.	Kumarakom		8	6	3	.				37
20	Do.	Neyyattinkara		.			..	.			4
21	Agricultural Research Station, Pilicode			.	.	.	..	..	..		4
22	Cashew Research Station, Anakkayam		.		.	.	8	..	.		8

APPENDIX-2 (Contd)

(1)	(2)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
23	Oil palm Research Station, Thodupuzha	7		3	7	6	6			70
24	Cardamom Research Station, Pampadumpara			1	1					2
25	Pulses Research Station, Sasthankotta									4
26	Tuber Research Station, Mannuthy									11
27	Tapioca Research Station, Thruvalla									4
28	Do Trivandrum									3
29	Sugarcane Research Farm, Thruvalla									4
30	Do Travancore Sugar and Chemicals Thruvalla									3
31	Tobacco Research Station, Kanhangad									15
32	Pepper Research Station, Taliparamba									9
33	Coffee Demonstration Farm, Kalpetta									4
34	Chellotte estate, Krishnan Estate and North Carolina Estate, Kalpetta									6
35	Coffee Research Station, Malathottom									2
36	Rubber Research Institute of India Mandakkayam									2
37	Do Malankara Estate									2
38	Do Vaikundam Estate									2
39	Do Udakadi, Kottayam									2
40	Cultivators Field Trial in Ernakulam, Kanjurappally and Mukundapuram									6
	Total	97	134	158	113	119	95	18	18	1512

APPENDIX 3

[No. of Agricultural field experiments analysed according to crops and types during 59-60 to 74-75

Sl No	Crops	Varietal Man- urial	Cultural	Varietal cum cultural	Manu- rial	Cultural cum manu- rial	Varietal cum seed rate	Weeds- control	Control of pests and diseases	Irriga- tional	Irriga- tional cum Manu- rial	Irriga- tional cum cultural	Irriga- tional cum cultural manu- rial	Manu- rial cum control of pests and diseases	Culti- vators field trial (Manu- rial)	Total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
1	Paddy	87	486	81	11	80	22	8	32	126	14	21	5	1	1	3	978
2	Lemon Grass	29	27	52	.	.	1	.	.	.	.	.	.	.	.	.	109
3	Vetiver	4	11	25	..	.	..	..	..	..	..	..	..	..	..	..	40
4	Citronella	6	..	..	..	.	..	..	..	.	.	.	.	.	.	.	6
5	Caster	1	..	..	.	.	..	..	.	..	..	..	..	..	..	..	1
6	Sesamum	16	12	8	.	.	..	..	..	..	..	..	..	..	..	..	36
7	Groundnut	6	2	6	..	.	..	.	.	.	..	..	..	..	..	..	14
8	Banana	..	18	5	.	.	6	..	.	.	4	..	..	..	..	..	39
9	Pineapple	..	13	2	..	.	10	.	.	.	..	..	..	..	..	..	25
10	Pepper	8	2	25	1	.	..	..	.	..	..	..	..	..	..	..	36
11	Coconut	..	47	10	.	.	.	.	.	.	..	..	..	..	..	..	57
12	Cashew	8	..	..	.	.	..	..	.	..	..	..	..	..	..	..	8
13	Ginger	2	18	19	..	.	4	..	..	11	1	..	..	..	..	..	55
14	Cardamom	..	..	2	..	.	..	..	.	..	..	..	..	..	..	..	2
15	Oil Palm	..	16	2	..	.	..	..	.	..	..	..	..	..	..	..	..

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
16	Red Gram	.		2	..					..				.			2
17	Cow pea			1	.					.	.		.				1
18	Bhundi					.		..		2	..		.	.	.	..	2
19	Sweet Potato	..	4	4				..	..	..	..	..	..	..	..	.	8
20	Tapioca						10	..	.	..	..		.				10
21	Sugarcane	..	7					.	..	..	..	..	..	.	..	..	7
22	Tobacco	.	9	3			3	.	..	..	..	..	..	..	..	..	15
23	Vanilla	.	2	9			.	..	..	..	..	..	4		.		15
24	Eucalyptus	.	2	3		.	..	..	..	..	..			.			5
25	Mango			1	..	.	..	..	..	..	..	..					1
26	Sapota	..	.	1	..	.	..	..	..	..	..	..		..			1
27	Coffee	.	10	2	.	.	..	..	..	..	..	..				.	12
28	Rubber	.	14		.	..	..	..	..	..	..	..					14
29	Mixed Cropping	.	.	.	..	..	1	..	..	..	..	..		..		..	1
Total		167	700	263	12	80	57	8	32	139	19	21	9	1	1	3	1512

APPENDIX-3 A.

No. of Agricultural field experiments obtained statistically significant results

	V	M	C	VC	MV	CM	VS	W	D	I	IM	IC	ICM	MD	cf(M)	Total	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(15)	(17)	(18)
1	Paddy	59	196	24	8	61	12	4	9	50	5	8	3	.	1	3	443
2	Lemongrass	9	13	19	.	..	1		..	..	..	..		..	..	..	42
3	Vetiver	2	3	10	.	..	..	..	..	..	..	..	..	..	..	.	15
4	Citronella	3	.	.	..	..	..	..	..	..	..	..	.	..	.	..	3
5	Caster	1	..	.	..	..	..	..			.						1
6	Sesamum	7	12	5		..	..				2	..	.				26
7	Groundnut	6	1	3		..	.	..									10
8	Banana		10	5		..	3	..									18
9	Pine apple		12	2		.	..										14
10	Pepper	4	2	8	1	..	..	..	.								15
11	Coconut		12	5		.	..	..	..	..	.						17
12	Cashew	4				..	..		.								4
13	Ginger	2	9	14		..	5	.	.	1	1						32
14	Cardamum	2		2			..	..	.								4
15	Oil Palm			1				..									1
16	Red gram			1	.		..	..	..	..	.	.	..	.	.		1
17	Cowpea				.	..	..	.					
18	Bhindi					..	..	..		1							1

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
19	Sweet potato			4	.		.			.							4
20	Tapioca			.	.		10										10
21	Sugarcane		2	..													2
22	Tobacco		6	..	..	..	.3										9
23	Vanilla			4									2				6
24	Eucalyptus		2	3			..	.									5
25	Mango			1		.	..										1
26	Sapota			1		..		.									1
27	Coffee		3	1			.										4
28	Rubber		10			.	.										10
29	Mixed		1	.		..	.	..									1
	Total	99	294	113	9	61	34	4	9	52	8	8	5		1	3	700

V—Varietal
M—Manurial
C—Cultural
VC—Varietal-cum Cultural
MV—Manurial-cum-Varietal

CM—Cultural-cum-Manurial
VS—Varietal-cum-seedrate
W—Weedicidal
D—Control of Pests and disease
I—Irrigational
IM—Irrigational-cum-Manurial

IC—Irrigational-cum Cultural
ICM—Irrigational-cum-Cultural-cum-Manurial
MD—Manurial-cum-control of Pests & diseases
cf(M)—Cultivator's field trial (Manurial)

APPENDIX-4

Distribution of Agricultural field experiments according to Designs adopted in each Research Station during 1959-60 to 1974-75

Sl No	Agricultural Research Stations	DESIGN				Total
		RBD	Split plot	BIBD	Factorial	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Rice Research Station, Kayamkulam	234	27	1	2	264
2	Do, Mannuthy	159	19	.	6	184
3	Do, Kottarakara	58	16	.	7	81
4	Do, Moncompu	79	17	1	4	101
5	Do, Pattambi	208	33	.	19	260
6	Agronomic Research Station, Chalakudy	2	16	.	12	30
7	Do, Coyalmannam	2	10	.	8	20
8	Agricultural College, Vellayani	29	1	.	.	30
9	Agricultural Research Station, Taliparamba	4	.	..	.	4
10	Do, Ambalavayal	41	.	.	3	44
11	Rice Research Station, Vyttila	1	..	..	.	1
12	Lemon grass Research Station, Odakkali	144	8	.	1	153
13	Vetiver sub station, Thiruvampady	2	.	.	.	2
14	Integrated Seed Development Farm, Eruthampathy	16	2	..	..	18
15	Oil Seed Research Station, Kayamkulam	31	.	.	2	33
16	Babana and Pine apple Research Station, Kannara, Mannuthy	24	19	.	14	57
17	Banana Research Station, Trichur	.	.	.	.	.
17	District Agricultural Farm Neriyaagalam	14	.	.	.	14
18	Coconut Research Station, Nilaswar	.	12	.	.	12
19	Do, Kumarakom	37	.	.	.	37
20	Do, Neyyattunkara	4	.	.	..	4

(1)	(2)	(3)	(4)	(5)	(6)	(7)
21	Agricultural Research Station, Pilcode	,	4	.		4
22	Cashew Research Station, Anakayam	8				8
23	Oil palm Research Station, Thodupuzha	58	5		7	70
24	Cardamom Research Station, Pampadumpara	2	.	.		2
25	Pulses Research Station, Sasthankotta	4	..	..	..	4
26	Tuber Research Station, Mannuthy	6	3		2	11
27	Tapioca Research Station, Thiruvalla	1	,	.	3	4
28	Do. Trivandrum	1	..	..	2	3
29	Sugar Research Farm, Thiruvalla	2	2	..	..	4
30	Do Travancore sugar and chemicals, Thiruvalla	2		.	..	3
31	Tobacco Research Station, Kanhangad	3	7	.	5	15
32	Pepper Research Station, Taliparamba	9	..	.	..	9
33	Coffee Demonstration Farm, Kalpetta	2	2	..	..	4
34	Chellote Estate, Krishna Estate and North Carolina Estate, Kalpetta		6		.	6
35	Coffee Research Station, Malathottam	.	2	..	..	2
36	Rubber Research Institute of India Mundakkayam	,	..	..	2	2
37	Do Malanakara Estate		.		2	2
38	Do Vaikundam Estate		.	.	2	2
39	Do Udakadi, Kottayam	.	.	.	2	2
40	Cultivators Field Trial in Ernakulam, Kanjirapally and Mukundapuram	6	.			6
Total		1184	221	2	105	1512

RBD—Randomised Block Design

BIBD—Balanced Incomplete Block Design.

APPENDIX 5

No. of Agricultural Field Experiments Analysed According to type from
1959-60 to 1974-75

Crop Paddy

Research Station	Varietal	Manu- rial	Cul- tural	Vari- etal cum cultural	Manu- rial cum vari- etal	Cul- tural cum Manu- rial	Vari- etal cum seed rate	Weeds- cidal	Control of pests and diseases	Irr- gational	Irr- gational cum manu- rial	Irr- gational cum cultural	Irr- gational cum control of pests and diseases	Manu- rial cum control of pests and diseases	Culti- vators field trial (manu- rial)	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1 Rice Research Station, Kayamkulam	36	137	19	4	16	1		13	36							
2 Do Mannuthy	16	79	18	1	14	12	7	9	26					1	1	264
3 Do Kottarakkara	16	30	11		14	4	1	5							2	184
4 Do Mancompu	14	49	2	6	10	1		2	17							81
5 Do Pattambi	3	159	24		26	3		3	42							102
6 Agronomic Research Station Chalakudy			2	5						8	10	5				30
7 Agronomic Research Station Coyalmannam	2									6	11		1			20
8 Agricultural College, Vellayani		22				1		5								28
9 Agricultural Research Station Ambalavayal		6	1													7
10 Rice Research Station, Vythiri																1
11 Agricultural Research Station, Taliparamba		2														2
Total	87	486	81	11	80	22	8	32	126	14	21	5	1	1	3	978

TABLE 5 A

No. of Agricultural Field Experiments obtained statistically significant results

Research Station	Crop Paddy															
	Varetal	Manurial	Cultural	Varetal cum cultural	Manurial cum varetal	Cultural cum manurial	Varetal cum seed rate	Weedcrida.	Control of pests and diseases	Irrigational	Irrigational cum manurial	Irrigational cum cultural	Irrigational cum cultural cum manurial	Manurial cum control of pests and diseases	Cultivators field trial (manurial)	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1 Rice Research Station, Kayamkulam	22	52	11	3	10	1			18					1	1	119
2 Do Mannuthy	14	35		1	12	5	4	3	7						2	83
3 Do Kottarakkara	11	12	2		10	2		3								40
4 Do Mancompu	8	13		4	7			1	10							43
5 Do Pattambi	3	71	6		22	3		2	13							120
6 Agronomic Research Station Chalakudy			1	3						2	2	3				11
7 Do. Coyalmanam	1									3	6					10
8 Agricultural College, Vellayan		8				1			2							11
9 Agricultural Research Station, Ambalavayal		4	1													5
10 Rice Research Station Vythila			1													1
11 Agricultural Research Station Taliparamba																
Total	59	196	24	8	61	12	4	9	50	5	8	3		1	3	443

TABLE 5 1
No of Agricultural Field Experiments Analysed According to type

Research Station	<i>Crop Paddy</i>															
	<i>First Crop (Vrisippu) Autumn</i>															
	<i>Varatal</i>	<i>Manurial</i>	<i>Cultural</i>	<i>Varietal cum cultural</i>	<i>Manurial cum varietal</i>	<i>Cultural cum manurial</i>	<i>Varietal cum seed rate</i>	<i>Weedicidal</i>	<i>Control of pests and diseases</i>	<i>Irrigational</i>	<i>Irrigational cum manurial</i>	<i>Irrigational cum cultural</i>	<i>Irrigational cum cultural cum manurial</i>	<i>Manurial cum control of pests and diseases</i>	<i>Cultivators field trial (manurial)</i>	<i>Total</i>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1 Rice Research Station, Kayamkulam	21	68	12	1	7			10	22					1		142
2 Do Mannuthy	16	43	11		6	6	5	5	14							106
3 Do Kottarakkott	4	12	4		5	2	1	1								29
4 Do Moncompu																
5 Do Pattamba	2	94	14		15	2		3	23							159
6 Agronomic Research Station, Chalakudy			1	2						4	5	3				15
7 Do Coyalmannam	1									3	6		1			11
8. Agricultural College Vellayani		3							1							4
9. Agricultural Research Station, Ambalavayal		5	1													6
10 Rice Research Station, Vythila			1													1
11. Agricultural Research Station, Taliparamba		2														2
Total	44	228	45	1	33	10	6	19	60	7	11	3	1	1		469

TABLE 5 I A
No of Agricultural Field Experiments Obtained Statistically Significant Results

Research Station	Crop Paddy First Crop (Virippu)															
	Varied	Manural	Cultural	Varied cum cultural	Manural cum varietal	Cultural cum manural	Varied cum seed rate	Weedicidal	Control of pests and diseases	Irrigational	Irrigational cum manural	Irrigational cum cultural	Irrigational cum cultural cum manural	Manural cum control of pests and diseases	Cultivators field trial (manural)	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1 Rice Research Station, Kayamkulam	13	25	9	1	4				10					1		63
2 Do Mannuthy	14	19			6	3	2	3	3							50
3 Do Kottarakkara	4	5	1		5											15
4 Do Moncompu																
5 Do Pattambi	2	42	5		13	2		2	8							74
6 Agronomic Research Station, Chalakudy			1	2						2	1	2				8
7 Do Coyalmannam										2	2					4
8 Agricultural college, Vellayani																3
9 Agricultural Research Station, Ambalavayal			3	1												4
10 Rice Research Station, Vythila				1												1
11 Agricultural Research Station Taliparamba																
Total	33	98	19	1	28	5	2	5	21	4	3	2		1		222

TABLE 5 2

No of Agricultural Field Experiments Analysed According to type

Crop Paddy
Second Crop (Mundakan—Winter)

Research Station	Varietal	Manurial	Cultural	Varietal cum cultural	Manurial cum varietal	Cultural cum manurial	Varietal cum seed rate	Weedcontrol	Control of pests and diseases	Irrigational	Irrigational cum manurial	Irrigational cum cultural	Irrigational cum cultural cum manurial	Manurial cum control of pests and diseases	Cultivator's field trial (Manurial)	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1 Rice Research Station Kayamkulam	15	69	7	3	9	1		3	14						1	122
2 Do Mannuthy		36	7	1	6	6	2	4	12							74
3 Do Kottarakkara	12	18	7		9	2		4								52
4 Do Mancompu	4	14		6	6	1			10							41
5 Do Pattambi	1	65	10		11	1			19							107
6 Agronomic Research Station, Chalakudy			1	3						4	5	2				15
7 Do Koyalmannam	1									3	5					9
8 Agricultural College, Vellayani		18				1			4							23
9 Agricultural Research Station, Ambalavayal		1														1
10 Rice Research Station, Vythila																
11 Agricultural Research Station, Taliparamba																
Total	93	222	34	10	41	12	2	11	59	7	10	2			1	444

TABLE 5.2 A

No. of Agricultural Field Experiments Obtained Statistically Significant results

Research Station	Varietal	Manurial	Cultural	Varietal cum cultural	Manurial cum varietal	Cultural cum manurial	Varietal cum seed rate	Weedicidal	Control of pests and diseases	Irrigational	Irrigational cum manurial	Irrigational cum cultural	Crop		Cultivators field trial (Manurial)	Total
													Second crop	Paddy (Mundakan)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1 Rice Research Station, Kayamkulam	9	27	2	2	6	1			8						1	56
2 Do Mannuthy		16		1	4	2	2		4							29
3 Do Kottarakkra	7	7	1		5	2		3								25
4 Do Mancompu	1	3		4	5				4							17
5 Do Pattambi	1	29	1		9	1			5							46
6 Agronomic Research Station, Chalakudy			1								1	1				3
7 Do Coyalmannam	1									1	4					6
8 Agricultural College, Vellayani		4				1			2							7
9 Agricultural Research Station, Ambalavayal		1														1
10 Rice Research Station, Vythila																
11 Agricultural Research Station, Taliparamba																
Total	19	87	5	7	29	7	-2	3	23	1	5	1		1	190	

TABLE 5.3

No. of Agricultural Field Experiments Analysed According to type

Research Station	Varietal	Manurial	Cultural	Manurial cum varietal	Weedicidal	Control of pests and diseases	Crop Paddy	Total
							Thrd Crop (Punya-Summer)	
							Cultivators field trial (Manurial)	
1 Rice Research Station, Mannuthy				2			2	4
2 Do Mancompu	10	35	2	4	2	7		60
3 Agricultural College, Vellayani		1						1
Total	10	36	2	6	2	7	2	65

TABLE 5 3 A

No. of Agricultural Field Experiments Obtained Statistically Significant Results

Research Station	Varietal	Manurial	Cultural	Manurial cum varietal	Weedicidal	Control of pests and diseases	Crop Paddy	Total
							Thrd Crop (Punya)	
							Cultivator's field trial (Manurial)	
Rice Research Station, Mannuthy				2			2	4
Do Mancompu	7	10		2	1	6		26
Agricultural College, Vellayani		1						1
Total	7	11		4	1	6	2	31

APPENDIX 6

No. of Agricultural Field Experiments analysed on straw

Research Station	No of Experiments analysed						Total
	Varietal	Manurial	Cultural	Manurial cum varietal	Weed- cidal	Control of pests and diseases	
1 R R Station, Kayamkulam	8	26		4	5		43
2 Do Kottarakara				2			2
3 Do Mancōmpu	2	12	1	2		3	21
4 Do Pattambi		15	1	3	1		20
Total	10	53	2	11	7	3	86

APPENDIX 7 1

RICE RESEARCH STATION, KAYAMKULAM

Details of Fertiliser trials

Category of experiment	Am of experiment	T No	Details of Treatment
A To find out the effect of continuous application of Nitrogen both as organic and inorganic as well as phosphuric acid and potash on the soil fertility and yield of rice	1	40 Kg	N/Hec. as cattle manure
	2	do	as Amo. sul
	3	do	+30 kg P ₂ O ₅
	4	do	+30 kg K ₂ O
	5	40 kg	P ₂ O ₅ +30 kg K ₂ O
	6	40 kg	N+30 kg P ₂ O ₅ +30 kg. K ₂ O
	7	40 kg	N+10 kg cattle manure + 30 kg P ₂ O ₅ + 30 kg K ₂ O

<i>Category of Experiment</i>	<i>Aim of experiment</i>	<i>T No</i>	<i>Details of treatment</i>				
			<i>Basal</i>	<i>Tillering</i>	<i>PI Stage</i>	<i>Booting</i>	<i>Heading</i>
B.	To find out the effect of split application of Nitrogen in the yield of rice	1	75%		25%		
		2	75%		12 5%	12 5%	.
		3	75%		12 5%		12 5%
		4.	75%			12 5%	12 5%
		5.	..	50%	25%	25%	.
		6.	..	50%		25%	25%
		7.	50%	..	25%	25%	.
		8.	50%	..	.	25%	25%
		9.	..	33%	33%	34%	.
		10.	..	33%	.	33%	34%
		11	33%		33%	34%	
		12.	20%	20%	20%	20%	20%

C.	To find out the effect of fractional application of lime on the yield of rice	1.	No lime
		2	100 % as basal
		3	50% basal + 50% at tillering
		4	33% basal+33% at tillery+34% at PI stage
		5.	50% basal+50% in 4 equal instalments
		6	25% basal+75% in 4 equal instalments

		<i>Basal</i>	<i>Tillering</i>	<i>PI Stage</i>	<i>Booting</i>	<i>Heading</i>	
			<i>(in percentages)</i>				
D	To find out the effect of fractional applications of Nitrogen in the growth and yield of rice	1	100				.
		2	..	100		.	
		3	..	..	100		..
		4.	50	50	..	..
		5	50	..	50	..	
		6.	50	..	..	50	..
		7	50	..	..	..	50
		8.	50	25	25	..	..
		9.	50	.	25	25	
		10.	50	..	..	25	25
		11	..	50	50	..	.
		12.	..	50	25	25	..
		13	..	50	25	..	25
		14.	..	..	50	25	25
		15.	20	20	20	20	20
		16	25	25	25	25	

T No :- Treatment No.

37/913/MC

APPENDIX 72.

RESEARCH STATION, MANNUTHY

Details of Fertiliser trials

Category of experiment	Aim of experiment	T No.	Details of Treatments				
A	To study the effects of continuous application of Nitrogen both organic and inorganic with and without phospheric and potash	1	N 80 kg/hect as Amo sul				
		2	N 80 kg/hect as Green leaf				
		3	N 80 kg/hect as Amo sul & P ₂ O ₅ , 50 kg/ha as sup ph.				
		4	N 80 kg/hect as Amo sul and K ₂ O, 50 kg/hect				
		5	P ₂ O ₅ and K ₂ O at 50 kg/hect. as sup phosphate and Mur p				
		6	N 80 kg/hect as Amo sul and P ₂ O ₅ and K ₂ O @ 50 kg as sup phos Mur p				
		7	N 80 kg/hect 1/2 as amo sul and 1/2 as green leaf and P ₂ O ₅ and K ₂ O @ 50 kg/hect as sup phos and Mur p				
B	To study the effect of split application of Nitrogen on the paddy field		<i>Planting</i>	<i>Tullering</i>	<i>PI. stage</i>	<i>Booting</i>	<i>Heading</i>
		1	75		25		
		2	75		12 5	12 5	
		3	75		12 5		12 5
		4	75			12 5	12 5
		5		50	25	25	
		6		50		25	25
		7	50		25	25	
		8	50			25	25
		9		33	33	33	
		10		33		33	33
		11	33		33	33	
12	20	20	20	20	20		
B 1	To study the effect of split application of Nitrogen on the paddy field	1	100				
		2		100			
		3			100		
		4	50	50			
		5	50		50		
		6	50			50	
		7	50				50
		8	50	25	25		
		9	50	..	25	25	
		10	50	..		25	25
		11		50	50		
		12		50	25	25	
		13		50	25		25
		14			50	25	25
		15	20	20	20	20	20
		16	25	25	25	25	..

APPENDIX 7.2 (Contd.)

Category of experiment	Aim of expenditure	T No	Details of Treatments
C	To find out the effect of fractional application of potash on paddy crops	1	No potash
		2	100 % as Basal
		3	67% as Basal + 33% at p 1 stage
		4	50% as Basal + 50% at p 1 stage
		5	50% as Basal + 25% at tillering +25% at P 1 stage
D	To find out the optimum time of application of Amo sulphate to transplanted paddy crop		(split application of 44.8 kg/ha of Nas A/S)
		1	Mo—control
		2	M1—Full dose as basal dressing
		3	M2— $\frac{1}{2}$ as Basal dressing $\frac{1}{2}$ one month before flowering
		4	M3— $\frac{1}{3}$ as Basal dressing $\frac{1}{3}$ one month before flowering
		5	M4— $\frac{1}{4}$ as Basal dressing and $\frac{3}{4}$ one month before planting
6	M5—Full dose as top dressing		
E	To study the effect of different levels of N, P, K alone and in Combination		3 Combinations
		1	3 levels of N, as A/S N1=16.8, N2=33.6, N3=50.4 kg/Ha
		2	3 levels of P ₂ O ₅ as super phos P1=16.8, P2=33.6, P3=50.4 kg/Ha
3	3 levels of K ₂ O as Muriat of Potash K1=16.8, K2=33.6, K3=50.4 kg/Ha $\frac{1}{2}$ dose of N and Full dose of P ₂ O ₅ and K ₂ O applied as basal dressing Rest $\frac{1}{2}$ dose of N was applied as top dressing before flowering		
F	To study the effect of different levels of NPK on paddy		7 Manurial Treatments
		1	T1—40 kg N/ha as A/S
		2	T2—40 kg N/ha as G L
		3	T3—T1+30 kg P ₂ O ₅ /ha as sup phos
		4	T4—T1+30 kg K ₂ O/hect as Mur p
		5	T5—30 kg P ₂ O ₅ /ha as sup phos +30 kg K ₂ O/he as Mur p
		6	T6—T1+T5
7	T7—20 kg N/ha as A/S +30 kg N/ha as GL+T5		
G	To study the effect of application of Nitrophosphate complex fertilizers on paddy	1	3 types of phosphate p1—sup phos, P ₂ Nitro-phos produced by ODDA process and P3—Nitro-phos produced by PECP
		2	3 levels of fertilizers L1—13.5 kg/Ha of N+11.8 kg/Ha of P ₂ O ₅ L2—26.9 kg/ha of N+23.8 kg of P ₂ O ₅ L3—53.8 kg/Ha of N—47.1 kg/Ha P ₂ O ₅
		3	Three methods of application M1—Broadcast M2—6.4 cm below surface M3—Pellet application N—applied as A/S when ever super is used Half the quality of N fertilizers applied as top dressing prior to flowering All other manures applied as basal dressing

APPENDIX 7 3

RICE RESEARCH STATION, MONCOMPU

Details of fertiliser trials

<i>Category of experiment</i>	<i>Aim of Experiment</i>	<i>Details of Treatment</i>
(1)	(2)	(3)
A	To find out whether phosphotic fertilizers such as fused Magnisum phosphate, Deflourite rock phosphate, multi phosphate where phosphate is citric soluble are as good as or superior to super phosphate containing p205 in water soluble form	1 Control
		2 Single super @ 30 lbs P ₂ O ₅ /acre
		3 Single super @ 60 lbs P ₂ O ₅ /acre
		4 Rock phosphate @ 30 lbs P ₂ O ₅ /acre.
		5 do 60 do
		6 Fused Mag phosphate @ 30 lbs/acre
		7 do @ 60 lbs/acre
		8 DafLOURinated phosphate @ 30 lbs/acre
		9 do @ 60 lbs/acre
		10 Multiphosphate @ 30 lbs/acre
		11 do @ 60 lbs/acre
		12 Hyper phosphate @ 30 lbs/acre
		13 do @ 60 lbs/acre
		14 Nitrophosphate @ 30 lbs/acre
		15 do @ 60 lbs/acre
		16 No phosphate
		17 No phosphate
		18 Basic slag @ 30 lbs/acre
		19 Basic slag @ 60 lbs/acre
		20 Control (No phosphate)
		21 Control (No phosphate)
B	To find out the effect of N, P ₂ O ₅ and lime alone and in their combinations and interactions	1 Levels of Nas A/S N1=33 6 N2=50 4 kg/hect
		2 Levels of P ₂ O ₅ as super P=44 8 kg/Ha P2=67 2 kg/hect
		3 Levels of lime Lo—0, L1=336, L2=672 kg/Ha
		1 N1 p1 Lo
		2 N1 P1 L1
		3 N1 P1 L2
		4 N1 P2 L0
		5 N1 P2 L1
		6 N1 P2 L2
		7 N2 P1 L0
		8 N2 P1 L1
		9 N2 P1 L2
		10 N2 P2 L0
11 N2 P2 L1		
12 N2 P2 L2		
C	To study the nutritional requirements of IR8 under Kuttanad conditions	4 levels of N
		N1—Nitrogen 60 kg/Ha
		N2 do 80 kg/Ha
		N3 do 100 kg/Ha.
		N4 do 120 kg/Ha

APPENDIX 74 (Contd.)

(1)	(3)	(3)	(4)
		6	G L @ 4000 lbs/acre and NPK to supply 20 lbs/acre each in the form of Amo sul super Phos and Mur P
		7	CM+GL each @ 2000 lbs/acre and NPK to supply 20 lbs/acre each as Amo sul sup phos and Mur P
		8	Amo sul to supply 40 lbs N and super to supply 20 lbs of P_2O_5 /acre
			<i>Note</i> Amo sul in treatments applied as top dressing one month before flowering
			44 8 kg/ha of Nitrogen
B	To study the effect of different sources and time of application of Nitrogen on paddy	1	T1—Before planting
		2	T2—2 weeks after planting
		3	T3—4 weeks after planting
		4	T4— $\frac{1}{2}$ dose as Basal dressing + $\frac{1}{2}$ dose two weeks after planting
		5	T5— $\frac{1}{2}$ dose as Basal— $\frac{1}{2}$ dose 4 weeks after planting
		6	T6— $\frac{1}{2}$ dose two weeks after planting + $\frac{1}{2}$ dose four weeks after planting
C	To find out the best combination of different levels of NP and K for paddy	1	All combinations of (1) (2) and (3) 3 levels of N1 as A/S N1=16 8, N2=33 6 N3=50 4 kg/Ha
		2	3 levels of P_2O_5 as super P1=16 8, P2=33 6 P3=50 4 kg/Ha
		3	3 levels of K_2O as Mur P K1=16 8, K2=33 6, K3=50 4 kg/Ha $\frac{1}{2}$ of N, full dose of P_2O_5 and K20 as basal dressing $\frac{1}{2}$ dose of Nitrogen one month before flowering
D	To study the effect of Nitrophosphate complex fertilizers produced by different processes and applied to previous paddy crop on the succeeding paddy crop	1	All combinations of (1) (2) and (3) 3 types of fertilizers P1—single super p2—Nitrophos produced by OD DA (20-20-20) and P3—Nitrophos produced by PEC (16-14-0) 3 levels of fertilizer L1—13 5 Kg/Ha of [N+11 8 kg/ha of P_2O_5 L2—26 9kg/ha of N+23 5kg/ha of P_2O_5 L3—53 8 kg/Ha of N+47 1 kg/Ha P_2O_5 (3) 3 Methods of application M1—Broadcast M2—6 cm below seed at planting M3—Pellet application 10 days after planting The sources of N is A/S when applied with P

APPENDIX 74 (Contd.)

(1)	(2)	(3)	(4)							
E	To study the response of new varieties to N and select the best variety of seed for double crop-wet land	6 Varieties and 3 levels of nitrogen								
		<i>Varieties</i>								
		V1—IR8	}	N1—80 kg /Ha.						
		V2—IR 262		N2—100 kg /Ha.						
		V3—Jaya		N3—120 kg /Ha.						
		V4—Cul 28								
		V5—Padma								
		V6—Ptb 9								
		<i>Treatments</i>								
		1	V1 N1	7	V3 N1	13	V5 N1			
		2	V1 N2	8	V3 N2	14	V5 N2			
		3	V1 N3	9	V3 N3	15	V5 N3			
4	V2 N1	10	V4 N1	16	V6 N1					
5	V2 N2	11	V4 N2	17	V6 N2					
6	V2 N3	12	V4 N3	18	V6 N3					
F	To study whether phosphate manuring of seedlings can serve phosphate application in the main field	P_2O_5 given in the nursery kg /Ha	<i>Nitrogen level given while Planting in the main field (kg /Ha)</i>							
			0	30	60	90	120			
				(1)	(2)	(3)	(4)	(5)		
			30	(6)	(7)	(8)	(9)	(10)		
			60	(11)	(12)	(13)	(14)	(15)		
			90	(16)	(17)	(18)	(19)	(20)		
			G	To compare the effect of soil and foliar application of Nitrogen to rice	<i>Nitrogen will be applied in the form of Urea</i>					
	<i>Basal</i>	<i>Top dressing</i>			<i>Foliar application</i>					
					1	2	3	1	2	3	4
1	30	10			10	10				
2	30				10	10	10			..
3	30					10	10			
4	30						10	10	10	.
5							10			
6							10	10		
7							10	10	10	
8					10	10	10	10		
9		No Nitrogen								
H	To determine the most appropriate time of application of Nitrogen to IR8	<i>At planting</i>	<i>At initial tillering</i>	<i>At 50% tillering</i>	<i>Maximum tillering</i>	<i>At P1 stage</i>				
		1.	20%	20%	20%	20%				
		2.	100%							
		3	50%				50%			
		4.					100%			
		5		25%	25%	25%	25%			
		6	34%		33%		33%			

(1)	(2)	(3)	(4)		
I	To study the efficient use of different levels of Nitrogen at different times of application	<i>Total N kg /Ha</i>	<i>Basal</i>	<i>At tillering</i>	<i>At A1 stage</i>
		1.	.		
		2	60	60	
		3	80	80	
		4	80	60	20
		5	80	60	20
		6	80	40	20
		7	100	100	
		8	100	80	20
		9	100	80	20
		10	100	60	20

	<i>Do</i>		<i>Basal</i>	<i>Tillering</i>	<i>P 1 stage</i>
I ₁	Do.	1			
		2	40	20	20
		3	100		
		4	75	25	
		5	75		25
		6	50	50	
		7	50		50
		8	50	25	25
		9	25	75	
		10	25	50	25
		11		100	
		12		75	25
		13		50	50
		14.		..	..

			<i>Basal</i>	<i>Tillering</i>	<i>P 1 stage</i>	<i>Booting</i>	<i>Heading</i>
I ₂	Do.	1	75			25	
		2	75			12 5	
		3	75			12 5	
		4	75			12 5	12 5
		5		50	25	25	
		6		50		25	25
		7	50		25	25	
		8.	50			25	25
		9	..	33	33	34	34
		10	..	33		33	34
		11.	33		33	34	..
		12	20	20	20	20	20



**Government of Kerala
1976**

**PRINTED BY THE S G P AT THE GOVERNMENT PRESS,
TRIVANDRUM, 1976**