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REPORT
ON THE
CROP CUTTING SURVEYS ON THE
WINTER AND SUMMER CROPS OF
PADDY 1960

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Report on the Crop Cutting Surveys on the Winter
(Mundakan) and Summer (Punja) Crops of
Paddy 1960 in Kerala State

**Report on the crop cutting surveys on the winter (Mundakan)
and Summer (Punja) crops of Paddy 1960
in Kerala State.**

(1) *Introduction.*—Random Sample Crop Cutting experiments on paddy are being conducted by this Department from 1950 onwards. This report deals with the results of the crop cutting experiments conducted on the Winter (Mundakan) and Summer (Punja) crops of Paddy 1960 in the Kerala State.

(2) *Objects of the Survey.*—The objects of the survey are to estimate

- (i) The average yield per acre for each taluk,
- (ii) The Weighted mean yield per acre for the State as a whole and
- (iii) The total production during each season.

(3) *Coverage & Sampling design.*—Both the Surveys were conducted throughout the State. The harvest seasons of the Winter and Summer crops are January-March and April-May respectively. As usual a stratified three stage random sampling design was adopted for both the Surveys, the taluk being taken as the stratum. During each season six Karas/Villages were selected at random from each one of the Taluks and from each selected village a random sample of five paddy growing fields was chosen. From each selected field a 'kandom' was selected with probability proportional to area and from that, a square plot of side $16\frac{1}{2}$ feet was located at random and the crop therefrom was harvested. The harvested produce was winnowed and weighed correct to the nearest quarter of a pound. The driage factor was also determined based upon actual driage experiments.

(4) *Field Work.*—The field work of the both surveys was conducted by the Investigators of this Department and their work was supervised by the Statistical Inspectors and District Statistical Officers. Altogether 1353 experiments were conducted during the Winter and 548 during the summer season. In certain taluks the crop cutting experiments could not be conducted during the summer season. The mean yields in such taluks were estimated by careful local enquiries.

(5) *Analysis of the data and the results.*—The analysis of the data collected by the field staff was done in the office of the Director of Statistics. The results are detailed in the tables I to IV. Table I shows the estimated mean yield per acre, its standard error and the total out-turn of rice for each one of the taluks, Districts and for the State as a whole for each one of the seasons. Separate estimates for irrigated plots, chemically manured plots, irrigated and chemically manured plots and control plots are given in the table II. But since the number of experiments in certain groups are small, it may not be fair to give too much reliability to such results. The frequency distribution of the yield rates into groups of range 200 lbs/acre are presented in the table III. The analysis of variance of plot yields are given in table IV. The mean yield per acre for the Districts and the State were calculated by weighting the taluk mean yields with the corresponding acreage under paddy in the taluk. The acreage of paddy in each taluk during each one of the seasons are provisional and are obtained by an over all consideration of the area estimated from—The Land Utilisation Survey conducted by the Department and the area reported by the Statistical Inspectors. Though there are slight variations in

the acreage especially under punja crops in those of last year at the taluk level, the district-wise figures can be accepted to be correct. The standard errors of the taluk mean yields and the State mean yield are also calculated. It has to be pointed out that the dry land paddy in Devicolam, Peerumade and Udumbanchola Taluks are considered as Punja.Crop since the harvest period is more or less that of the Punja in Kuttanad Region. The yield rates for these taluks are not based upon actual crop cutting experiments, but on careful local enquiries.

(6) *Precision*. — The total production of rice for the Winter and Summer crops are 435300 tons and 106400 tons respectively. These estimates have standard errors of 31 lbs./acre and 67 lbs./acre. The weight of rice is reckoned as 65.7 per cent of the weight of paddy. For the purpose of comparison the area, yield rate and production of rice during the corresponding crop of the previous year are also given below :—

Year and Season	Acreage under paddy	Average yield of dry paddy in lbs. per acre	Standard error		Total production of rice	
			lbs.	%	Tons	%
1959 Winter	728200	1807	81	4.5	386000	100.00
1960 Winter	749400	1981	31	1.6	435300	112.8
1959 Summer	188400	1955	65	3.3	108000	100.04
1960 Summer	186100	1949	67	3.4	106400	98.5
1959 Winter and summer	916600	1837	66	3.6	494000	100.00
1960 Winter and Summer	935500	1974	34	1.7	541700	109.7

It is seen that there is a slight decrease in the area, yield rate and Production during the summer crop and increase in the Winter crop 1960. But the total production during the Winter and Summer seasons together has increased by 9.7 per cent from that of the previous year and the yield rate has increased from 1837 to 1974 lbs of paddy per acre. The comparative figures for all the 3 seasons together for the two agricultural years 1958-59 and 1959-60 are also given below :—

Agricultural Year	Acreage	Yield rate of paddy lbs/acre	Production of rice	% increase (tons)
1958-1959	1898800	1687	939500	100.00
1959-1960	1900100	1833	1021600	108.74

(Sd.)

Assistant Director-in-Charge.

TABLE I.

Winter (Mundakan) crop of paddy 1960 in Kerala State.

Statement showing the estimated mean yield per acre and the total outturn of rice in different taluks.

Sl. No.	Districts and taluks	No. of experiments	Net area harvested (acres)	Mean yield of dry paddy in lbs./acre	Standard Error lbs./acre	Total out-turn of rice (Tons)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Neyyattinkara	29	11695	1799	197	6171
2	Trivandrum	28	11020	2139	290	6914
3	Nedumangad	30	11704	2287	105	7851
4	Chirayinkil	30	11365	2023	225	6743
TRIVANDRUM DISTRICT		117	45784	2061	..	27679
5	Quilon	30	12558	1340	298	4936
6	Kottarakara	30	15373	2937	32	13243
7	Pathanapuram	30	9550	2870	48	8039
8	Pathanamthitta	30	5600	2656	252	4362
9	Kunnathur	30	12309	2203	77	7953
10	Karunagappally	30	10200	1659	93	4963
QUILON DISTRICT		180	65590	2261	..	43496
11	Karthikappally	30	14701	1979	94	8533
12	Mavelikara	30	6560	1975	84	3800
13	Chengannore	28	2598	2333	156	1778
14	Thiruvalla	30	3360	2230	219	2158
15	Amibalapuzha	26	1360	1562	185	623
16	Shertalai	30	9100	1411	192	3766
17	Kuttanadu	..	..	..	..	..
ALLEPPEY DISTRICT		174	37619	1872	..	20658
18	Changanacherry	13	3560	1941	279	2027
19	Kottayam	19	15630	2230	149	10223
20	Kanjirapally	20	11	2019	130	7
21	Devicolum	..	..	..	..	..
22	Peerumade	..	..	..	..	..
23	Udumbanchola	..	..	..	..	..
24	Meenachil	28	4785	1543	106	2166
25	Vaikom	30	18982	1875	252	10439
KOTTAYAM DISTRICT		110	42968	1973	..	24862

TABLE II—(contd.)

Sl. No.	Districts and taluks	No. of experiments	Net area harvested (acres)	Mean yield of dry paddy in lbs./acre	Standard Error lbs./acre	Total out-turn of rice (Tons)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
26	Thodupuzha	..	30	9050	1798	220	4773
27	Moovattupuzha	..	28	18350	2099	165	11297
28	Alwaye	..	27	17980	2099	42	11069
29	Kunnathunadu	..	30	24412	2131	143	15258
30	Cochin	..	..	..	..	..	..
31	Kanayannore	..	27	8989	2112	157	5568
32	Parur	..	21	5064	1704	130	2531
	ERNAKULAM DISTRICT	..	163	83845	2053	..	50496
33	Cranganore	..	26	4260	2145	215	2680
34	Mukundapuram	..	26	41105	1845	74	22243
35	Trichur	..	26	43070	1534	171	19378
36	Talappally	..	23	32114	1619	222	15249
37	Chowghat	..	25	22017	1646	140	10629
	TRICHUR DISTRICT	..	126	142566	1678	..	70179
	T. C. REGION	..	870	418372	1934	..	237370
38	Chittur	..	30	37971	2680	100	29847
39	Alathur	..	30	33700	3982	172	39359
40	Palghat	..	22	33363	2159	353	21127
41	Ottapalam	..	30	27600	1387	61	11228
42	Perinthalmanna	..	21	25640	1785	93	13424
43	Ponnani	..	21	10065	1697	223	5010
	PALGHAT DISTRICT	..	154	168339	2430	..	119995
44	Tirur	..	30	18565	2345	177	12769
45	Ernad	..	14	29368	2210	278	19036
46	Kozhikode	..	30	10674	1051	100	3290
47	Quilandy	..	30	3785	715	56	794
48	Badagara	..	30	1948	1070	92	612
49	South Wynad	..	20	32426	1572	60	14950
	KOZHIKODE DISTRICT	..	154	96766	1813	..	51451

TABLE I—(concl'd.)

Sl. No.	Districts and taluks	No. of experiments	Net area harvested (acres)	Mean yield of dry paddy in lbs./acre	Stand-ard Error lbs./acres	Total out-turn of rice (Tons)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
50	North Wynad	30	17371	1111	136	5660
51	Tellicherry	30	7400	1296	152	2813
52	Cannanore	30	4552	789	40	1053
53	Taliparamba	29	15527	1467	106	6681
54	Hosdurg	30	9427	1414	110	3910
55	Kasargode	26	11640	1876	186	6405
	KANNANORE DISTRICT	175	65917	1372	..	26522
	MALABAR REGION	483	331022	2039	..	197968
	KERALA STATE	1353	749394	1981	31	435338
	Rounded to hundred		749400	1981	31	435300

TABLE—II.

WINTER (MUNDAKAN) CROP OF PADDY 1960 IN KERALA STATE
Estimated District-wise area and yield rate from irrigated, chemically manured, combined and control plots.

Districts	Irrigated Plots				Chemically manured plots.			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	% of Total area	Area (acre)	No. of experiments	Mean yield of dry paddy lbs./acre	% of Total area	Area (acre)	No. of experiments	Mean yield of dry paddy lbs./acre.
Trivandrum	..	4.993	2245	6	1658	25007	62	1913
Quilon	..	2.547	1670	5	2371	24459	71	2483
Alleppey	29887	132	1958
Kottayam	..	4.573	1965	6	1927	10102	43	2027
Ernakulam	..	19.014	15942	27	1972	9804	19	2018
Trichur	..	30.170	43012	41	1576	5731	10	2481
Palghat	..	5.78	9730	19	2746	38465	46	2035
Kozhikode	..	12.92	12502	24	2088	40400	17	1206
Cannanore	..	6.24	4113	13	1429	22715	61	1503
Kerala State	91179	141	1943	206570	461	1853

TABLE—II—(contd.)

WINTER (MUNDAKAN) CROP OF PADDY 1960 IN KERALA STATE

Estimated District-wise area and yield rate from irrigated, chemically manured, combined and control plots.

Districts	Irrigated and manured plots				Neither irrigated nor manured plots.			
	% of Total area	Area (acre)	No. of experiments	Mean yield of dry paddy lbs./acre	% of Total area	Area (acre)	No. of experiments.	Mean yield of dry paddy lbs./acre.
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Trivandrum	..	29.032	13292	30	1983	5220	19	2998
Quilon	..	29.125	19103	45	2828	20358	59	1462
Alleppey	..	0.825	310	1	3283	7422	41	1747
Kottayam	..	14.480	6222	28	2129	24679	33	1488
Ernakulam	..	22.132	18640	46	2029	39458	71	1885
Trichur	..	8.20	11690	8	2129	82133	67	1671
Palghat	..	52.52	88412	65	3052	31732	24	1823
Kozhikode	..	14.27	13809	27	1076	30055	86	1226
Cannanore	..	25.73	16961	24	1731	22128	77	1506
Kerala State	188439	274	2502	263206	477	1596

TABLE—III

Winter (Mundakan) Crop of Paddy 1960 in Kerala State

Range of yield of dry paddy in lb/acre		Frequency Distribution	Percentage
Below	500	15	1.11
	500—699	45	3.43
	700—899	95	7.04
	900—1099	64	4.74
	1100—1299	110	8.23
	1300—1499	119	8.79
	1500—1699	120	8.86
	1700—1899	138	10.20
	1900—2099	105	7.76
	2100—2299	143	11.00
	2300—2499	119	8.78
	2500—2699	91	6.74
	2700—2899	82	6.06
	2900—3099	32	2.37
	3100—3299	28	2.07
	3300—3499	16	1.18
	3500—3699	4	0.04
	3700—3899	2	0.01
	3900—4000	4	0.04
	4100 and above	21	1.55
	Total	1353	100.00

TABLE—IV

Winter (Mundakan) Crop of Paddy 1960 in Kerala State

Analysis of variance of plot yields pooled for the State in (lb.)² per plot of 1/160 of an acre

Source	Sum of Squares	Degrees of Freedom	Variance
Between Taluks	20782	49	424.1 x
Between Karas within Taluks	7800	236	33.1 x
Within Karas within Taluk	8306	1067	7.8
Total	36888	1352	...

*Denotes Significance at 1 per cent level

TABLE-I

Summer (Punja) Crop of Paddy 1960 in Kerala State

Statement showing the estimated mean yield per acre and the total
outturn of Rice in different taluks

Sl. No.	Districts and Taluks	Number of Experiments	Net area harvested (Acres)	Mean yield of dry paddy (lb/acre)	Standard error (lb/acres)	Total outturn of Rice (tons)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Karthikapally	27	11109	2391	163	7790
2	Mavelikara	29	8357	2728	200	6687
3	Chengannoore	26	4990	2590	170	3791
4	Thiruvella	30	7850	1959	133	4510
5	Ambalapuzha	30	10947	1746	144	5606
6	Kuttanad	27	55685	1706	197	27863
	ALLEPPEY DISTRICT	169	98938	1938	..	56247
7	Changanacherry	29	8710	2168	126	5538
8	Kottayam	28	27369	2247	125	18037
9	Meenachil	10	285	1884	59	157
10	Vaikom	30	1850	1737	181	943
11	Devicolam, Peermade and Udumbanchola	..	2500	1876	..	1376
	KOTTAYAM DISTRICT	97	40714	2182	..	26051
12	Moovattupuzha	24	575	2092	80	353
13	Alwaye	29	1554	1596	65	727
14	Kunnathunadu	30	2000	1669	86	979
15	Parur	9	9200	1558	68	4204
	ERNAKULAM DISTRICT	92	13329	1602	..	6263

TABLE—I

Summer (Punja) Crop of Paddy 1960 in Kerala State
Statement showing the estimated mean yield per acre and the total
outturn of Rice in different taluks

Sl. No.	Districts and Taluks	Number of Experiments	Net area harvested (Acres)	Mean yield of dry paddy (lb./acre)	Standard error (lb./acre)	Total out-turn of Rice (tons)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
16	Crangannoor	10	80	2351	241	55
17	Mukundapuram	27	4713	2121	252	2932
18	Trichur	21	11000	2136	229	6891
19	Talapally	23	1873	1720	91	945
20	Chowghat	21	2740	2101	162	1688
	TRICHUR DISTRICT	102	20406	2090	..	12511
	T. C. REGION	460	173387	1987	..	101072
21	Ponani	..	7000	1211	..	2486
	PALGHAT DISTRICT	..	7000	1211	..	2486
22	Tirur	20	3000	1924	126	1693
	KOZHIKODE DISTRICT	20	3000	1924	126	1693
23	North Wynad	10	1044	1516	151	464
24	Hosdurg	30	1020	1587	208	475
25	Kasargode	28	650	1266	74	241
	CANNANORE DISTRICT	68	2714	1482	..	1180
	MALABAR REGION	88	12714	1439	..	5359
	KERALA STATE	548	186101	1949	67	106431
	Rounded to hundred	..	186100	1949	67	106400

TABLE—II

Summer (Punja) Crop of Paddy 1960 in Kerala State

Estimated District-wise area & yield rate from irrigated, Chemically manured, combined and control plots.

Districts	Irrigated plots				Chemically manured plots				
	Per cent of Total area	Area (acre)	No. of experiments	Mean yield of dry paddy in lbs./acre	Per cent of Total area	Area (acres)	No. of experiments	Mean yield of dry paddy in lbs./acre	(9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Alleppey	21.47	21242	24	2399	44.53	44057	87	2555	
Kottayam	8.13	3107	10	1789	27.43	10482	9	2112	
Ernakulam	17.77	2369	25	1887	1.85	247	2	2108	
Trichur	64.50	13162	69	2095	5.56	1135	10	2611	
Palghat	..	..	..	..	..	..	..	..
Kozhikode	100.00	3000	20	1924	..	..	..	..
Cannanore	20.85	566	29	1633	1.91	32	4	1186	
KERALA STATE	..	43446	177	2193	..	55973	112	2470	

TABLE II—(contd.)

Districts	Irrigated & manured plots				Neither irrigated nor manured plots			
	Per cent of Total area	Area (acres)	No. of experiments	Mean yield of dry paddy in lbs./acre	Per cent of Total area	Area (acres)	No. of experiments	Mean yield of dry paddy in lbs./acre
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Alleppey	33.50	33144	56	2636	0.50	495	2	1832
Kottayam	40.75	15572	58	2174	23.69	9053	20	1699
Ernakulam	67.22	8959	51	1575	13.16	1754	14	2114
Trichur	..	..	..	..	29.94	6109	23	1730
Palghat	..	..	..	..	..	..	..	..
Kozhikode	..	..	..	..	..	..	..	..
Cannanore	77.24	2096	35	1390	..	..	..	..
KERALA STATE	..	59771	200	2313	..	17411	59	1755

TABLE—III

Summer (Punja) Crop of Paddy 1960 in Kerala State

No.	Range of yield of paddy in lb/acre	Frequency Distribution	Percentage
1	Below 500	..	..
2	500—699	6	1.09
3	700—899	11	2.00
4	900—1099	16	2.90
5	1100—1299	34	6.20
6	1300—1499	59	10.76
7	1500—1699	59	10.76
8	1700—1899	77	14.04
9	1900—2099	82	14.95
10	2100—2299	59	10.76
11	2300—2499	45	8.20
12	2500—2699	41	7.46
13	2700—2899	28	5.10
14	2900—3099	15	2.90
15	3100—3299	6	1.09
16	3300—3499	3	0.54
17	3500—3699	3	0.54
18	3700—3899	1	0.18
19	3900—4099	1	0.18
20	4100 and above	2	0.35
	Total	548	100.00

TABLE—IV

Summer crop (Punja) of Paddy 1960 in Kerala State

Analysis of variance of plot yields pooled for the State in (lbs.)²
per plot of 1/160 of an acre

Source	Sum of Squares	Degrees of Freedom	Variance
Between Taluks	3110.16	22	141.37*
Between Karas within Taluks	2687.01	95	28.28*
Within karas within Taluks	3186.84	430	7.41
Total	8984.01	547	..

* Denotes Significance at 1 per cent level

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