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GOVERNMENT OF KERALA

STATISTICS DEPARTMENT

Report on the Crop Cutting Survey

on

Autumn Crop of Paddy, 1968

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CROP CUTTING SURVEY ON AUTUMN CROP OF PADDY 1968.

Introduction

Au the important aspects of the crop cutting survey on sel ed in 1963. Details of sampling design, sampling estimation are given below. Taluk-wise details regarding average yield, area under paddy and production are furnished in the appended tables.

2. Object of the Survey

The main object of the survey was to estimate the taluk-wise mean yield of dry paddy per hectare and also the total production of rice in the State during the Autumn season 1968.

3. Period of the Survey

The Survey was conducted during the months of August to October 1968.

4. Coverage

The survey covered 51 out of 55 taluks in the State. In the remaining 4 taluks there was no paddy crop during the season.

5. Sampling design

The sampling method adopted for the survey was one of stratified multi-stage random sampling. The taluk was taken as the stratum, a census village as the first-stage unit, survey sub-division number as the second-stage unit, a kandom as the third stage unit and finally a square plot of 5 x 5 metres as the ultimate sampling unit. Six census Villages were selected with equal probability from each taluk. From each of these selected villages a systematic sample of 3 survey sub-division numbers was selected from a frame consisting of the cumulative number of wet land survey sub-divisions. In survey sub-divisions having more than one kandom, one kandom was selected for the survey by the method of simple random sampling, after all the kandoms in the survey number were serially numbered beginning from the south-west corner and proceeding anti-clock-wise. A square plot of side 5 metres was located at random in the selected kandom, The crop in the square plot was harvested, threshed, winnowed and weighed. A sample of grain from every 5th cut harvested was forwarded to the District Statistical Officer for conducting driage experiments for estimating loss due to driage.

6. Sample selection

The selection of villages in each taluk was done by the concerned District Statistical Officer and the list of selected villages was forwarded to the concerned Statistical Inspectors. The selection of plots was done by the Statistical Inspectors.

7. Field work

The field work was attended to by the Investigators under the supervision of the Statistical Inspectors and District Statistical Officers.

894 experiments were planned during the season. But only 779 experiments could be conducted the percentage response being 87. The loss in the number of experiments was mainly due to prior harvests. Inspections were carried out by the Officers of this Bureau at three stages viz. pre-harvest, at harvest and post-harvest stages. During the Autumn crop, 62 inspections were conducted in the pre-harvest stage, 278 at harvest stage and 20 at post-harvest stages. The percentage of inspection at the harvest stage to total experiments conducted was 36. The overall percentage of inspection came to 46.

8. Results

The analysis of data collected was done at the Headquarters of the Bureau. The final estimates are presented in the following tables.

Table I

Taluk-wise figures relating to the number of experiments conducted, the area under the crop, estimated mean yield of dry paddy per hectare, its standard error and out-turn of cleaned rice are given in this table.

Table II

This table gives district-wise estimates of man yield/Hectare of irrigated plots, chemically manured plots and neither irrigated nor manured plots. 86.1% of the plots received chemical manure alone and 13.2% received both irrigation and chemical manure. The remaining 0.7% of plots were neither irrigated nor manured.

The frequence distribution of plot yields and the analysis of variance of plot yields are given in Tables III and IV respectively. The number of driage experiments conducted in each taluk and the driage ratio calculated are furnished in Table V.

In Table VI the taluk-wise yield rates of paddy during Autumn season for the last 5 years are given.

9. Procedure of Estimation of Mean Yield & Standard error

(i) *Mean yield.*—The mean yield of dry paddy and its standard Error for each Taluk are calculated by adopting the following formula.

ni = the number of cuts taken inthe i th village

(i = 1, 2.....k, where k is the number of villages selected in the taluk)

Xij = Weight of paddy taken from the jth cut in the ith village/kara
(j = 1, 2.....ni)

$$\text{Taluk mean} = \bar{X} = \sum_{i=1}^{k} \sum_{j=1}^{ni} X_{ij} \Big| \sum_{i=1}^{k} ni$$

Each cut is taken from $(\frac{1}{400})$th of a hectare.

Mean yield of dry paddy in kg/hect. = $\bar{X}$ x 400 x d where d is the driage ratio of dry paddy to wet paddy.

(ii) *Standard Error (S. E.) of the taluk mean yield*:

A = Mean square within karas

B = Mean square between karas

N = Total number of experiments

$(\sum_{i=1}^{k} ni)$ in the taluk.

ni = Number of experiments in the i th village/kara

let $m = \frac{N^2 - \sum ni^2}{N(k-1)}$ where k is the number of the villages selected in the taluk.

Variance of the Taluk mean yield

$$= \frac{A}{N} + \frac{B-A}{m} \times \frac{\sum ni^2}{N^2}$$

The standard Error (S. E.) is the square root of this variance. The S. E. in Kg./Hect. is obtained by multiplying this root of variance with 400.

(iii) *Standard error of the State Mean yield.*—If a i is the area under the crop in the i th taluk and si th S. E. of the estimate in the taluk.

$$\text{S. E. for the State mean yield} = \frac{\sqrt{\sum (ai\ si)^2}}{\sum ai}$$

10. The weight of cleaned rice is reckoned as 65.7% of dry paddy and accordingly the total production of rice during the season was estimated at 505779 tonnes.

11. In Alleppey and Palghat District both the State and I.A.D.P. series of experiments were conducted. The results of the two series of experiments were pooled together and the pooled mean yield of dry paddy per hectare was calculated.

The State series, I.A.D.P. series and pooled estimates of mean yield in the two Districts are given below.

	Mean yield (Kgs./Hectare)		
	State series	*I.A.D.P. series*	*Pooled estimates*
Alleppey	1230	1358	1322
Palghat	2388	2587	2572

The production of rice during Autumn 1968 as per the pooled estimate was 19132 tonnes in Alleppey District and 197377 tonnes in Palghat District. The corresponding figures obtained through the State series were 17795 tonnes in Alleppey and 183235 tonnes in Palghat. The State's production as per the pooled estimate was 521258 tonnes of rice.

The pooling of the estimates is done using the following method.

1. If Y1, & Y2 denote the average yield per hectare for the I.A.D.P. and the State series with V1 and V2 as their sampling variances respectively, then the combined estimate of the average yield will be calculated as

$$Y = \frac{\frac{1}{V1} Y1 + \frac{1}{V2} Y2}{\frac{1}{V1} + \frac{1}{V2}} = \frac{V2\,Y1 + V1\,Y2}{V1 + V2}$$

2. Procedure to find out the standard error (S. E.) of the combined estimate

If V1 and V2 denote the sampling variances for the estimates of the average yield for the I.A.D.P. and State series respectively, the standard error for the combined estimate will be

$$\frac{1}{\sqrt{\frac{1}{V1} + \frac{1}{V2}}}$$

12. For the purpose of comparison the estimates of area under paddy, yield rate and production of cleaned rice during the different seasons of the past six years are given in the statement A.

Trivandrum,
26-3-1969.

N. GOPALAKRISHNAN NAIR,
Additional Director.

STATEMENT—A

Area, mean yield and production of rice in Kerala during 1963-64 to 1968-69 (Pooled estimate of State series and I. A. D. P. series of experiment)

Agricultural Year	Autumn (Viripp) crop			Winter (Mundakan) crop			Summer (Punja) crop			Total		
	Area in Hectare	Mean yield of dry paddy Kgs./Hect.	Production rice in Tonnes	Area in Hectares	Mean yield of dry paddy Kgs./Hect.	Production-rice in Tonne	Area in Hectares	Mean yield of dry paddy Kgs./Hect.	Production rice in Tonnes	Area in Hectares	Mean yield of dry paddy Kgs./Hect.	Production rice in Tonnes
1	2	3	4	5	6	7	8	9	10	11	12	13
1963-64	398011	6951	510297	330008	2302	499147	77015	2344	118615	805084	2133	1128059
1964-65	395189	1906	494816	329010	2357	509555	76922	2315	117012	801121	2130	1121383
1965-66	398012	1996	521850	327879	1810	389845	76438	1708	85794	802329	1892	997489
1966-67	395083	1919	498160	327180	2192	471114	77175	2264	114788	799438	2064	1084062
1967-68	398998	1987	521023	327409	2185	470101	83142	2431	132773	809544	2113	1123897
1968-69	394879	2009	521258	..	..	..	..	..	..	..	..	..

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TABLE 1

Autumn Crop of Paddy—1968

Taluk & District	No. of experiments conducted	Area in Hectares	Mean yield of dry paddy Kgs./Hect.	S. E. of the mean yield Kgs./Hect	Production of Rice in Tonnes
1	2	3	4	5	6
1. Neyyattinkara ..	15	6205	2253	214	9185
2. Trivandrum ..	14	4264	2390	194	6695
3. Nedumangad .	17	4772	1915	350	6004
4. Chirayinkil ..	17	3593	1833	307	4327
TRIVANDRUM DISTRICT ..	63	18834	2118	135	26211
5. Quilon ..	15	2947	2173	254	4207
6. Kottarakara ..	17	6331	1846	115	7678
7. Kunnathur ..	15	4012	1222	95	3221
8. Pathanapuram ..	13	4356	2141	375	6127
9. Pathanamthitta ..	17	1118	2351	220	1727
10. Karunagappally ..	17	2560	1836	242	3008
QUILON DISTRICT ..	94	21324	1859	98	26048
11. Karthigappally ..	12	5112	1204	131	4044
12. Mavelikara ..	13	3630	1438	188	3430
13. Chengannur ..	14	1970	1235	317	1598
14. Thiruvalla ..	14	1827	1526	184	1832

(TABLE I—*Contd.*)

1	2	3	4	5	6
15. Kuttanad ..	16	2652	~~1617~~ 1622	264	2922
16. Ambalapuzha ..	17	890	1083	178	633
17. Sherthallai ..	16	5946	854	206	3336
ALLEPPEY DISTRICT ..	102	22027	1230	89	17795
18. Changanacherry ..	17	1782	2325	240	2722
19. Kanjirappally ..	8	42	2325	604	64
20. Peermade ..	..	..	..	..	..
21. Kottayam ..	17	2366	1663	221	2585
22. Vaikom ..	14	1441	2033	282	1925
23. Meenachil ..	15	1904	1691	346	2116
24. Deviculam ..	3	272	1771	..	317
25. Udumbanchola ..	..	..	..	..	..
KOTTAYAM DISTRICT ..	74	7807	1897	117	9729
26. Thodupuzha ..	17	3822	1715	181	4307
27. Muvattupuzha ..	15	7589	1479	156	7374
28. Cochin ..	12	3273	2070	137	4451
29. Kanayannur ..	13	8043	1482	270	7831
30. Kunnathunad ..	16	7610	1504	192	7519
31. Alwaye ..	13	7042	2569	239	11886
32. Parur ..	16	3679	1741	212	4208
ERNAKULAM DISTRICT ..	102	41058	1764	87	47576

TABLE I—(*Contd.*)

1	2	3	4	5	6
33. Crangannore ..	14	377	801	170	198
34. Mukundapuram ..	14	8789	1318	284	7611
35. Trichur ..	14	9321	1968	424	12052
6. Thalappally ..	18	17025	2089	349	23366
7. Chowghat ..	12	2982	1302	288	2551
TRICHUR DISTRICT ..	72	38494	1810	157	45778
38. Chittur ..	18	20786	2852	194	38948
39. Alathur ..	18	20289	2585	196	34458
40. Palghat ..	17	26403	2621	252	45570
41. Ottappalam ..	9	17574	1972	320	22760
42. Perinthalmanna ..	15	19963	2104	285	27505
43. Ponnani ..	18	11730	1803	229	13805
PALGHAT DISTRICT ..	95	116805	2388	104	183235
44. Tirur ..	18	18190	1315	229	15715
45. Ernad ..	18	20232	1726	157	22942
46. Kozhikode ..	18	7015	1255	153	5784
47. Quilandy ..	17	11016	1512	164	10943
48. Badagara ..	17	6272	1362	230	5612
49. South Wynad ..	..	..	..	..	..
KOZHIKODE DISTRICT ..	88	62725	1480	93	60996

TABLE I—(*Concld.*)

1	2	3	4	5	6
50. North Wynad ..	..	..	..	..	..
51. Tellicherry ..	17	9237	1497	186	9085
52. Cannanore ..	18	9860	1660	129	10754
53. Taliparamba ..	18	10238	2358	162	15861
54. Hosdurg ..	18	13361	1961	217	17214
55. Kasargode ..	18	23109	2338	242	35497
CANNANORE DISTRICT ..	89	65805	2045	109	88411
STATE ..	779	394879	1949	44	505779

TABLE II

Autumn Crop of Paddy 1968 in Kerala State

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

Name of District	Irrigated plots		Chemically manured plots		Irrigated and manured plots		Neither Irrigated nor manured plots	
	Number of experiments	Mean yield of dry paddy Kgs./Hect.	Number of experiments	Mean yield of dry paddy Kgs./Hect.	Number of experiments	Mean yield of dry paddy Kgs./Hect.	Number of experiments	Mean yield of dry paddy Kgs./Hect.
1	2	3	4	5	6	7	8	9
Trivandrum	..	..	38	2134	25	2004	..	..
Quilon	..	..	94	1859	..	..	..	..
Alleppey	..	..	102	1230	..	..	..	..
Kottayam	..	..	72	1377	2	1877	..	..
Ernakulam	..	..	85	1814	16	2547	1	1496
Trichur	..	..	65	1564	4	1937	3	835
Palghat	..	..	38	1943	57	2646	..	..
Kozhikode	..	..	88	1480	..	..	..	..
Cannanore	..	..	89	2045	..	..	..	..
STATE	..	..	671	1737	104	2434	4	1000

TABLE III

Autumn Crop of Paddy—1968

Frequency distribution of plot yields

Sl. No.	Range of yield of paddy in Kgs./Hect.	Ferquency distribution	Percentage
1	2	3	4
1	Below 500	42	5.39
2	500— 699	22	2.82
3	700— 899	55	7.06
4	900—1099	46	5.91
5	1100—1299	68	8.73
6	1300—1499	83	10.66
7	1500—1699	78	10.01
8	1700—1899	78	10.01
9	1900—2099	53	6.80
10	2100—2299	59	7.58
11	2300—2499	43	5.52
12	2500—2699	43	5.52
13	2700—2899	32	4.11
14	2900—3099	19	2.44
15	3100—3299	18	2.31
16	3300—3499	10	1.28
17	3500—3699	13	1 67
18	3700—3899	6	0.77
19	3900—4099	5	0.64
20	4100 —and above	6	0.77
	ALL	779	100.00

TABLE IV

Autumn Crop of Paddy—1968

Analysis of variance of plot yield pooled for the State in Kgs[3]./Plot of 1/400th of a hectare.

Source of variation	Sum of squares	Degrees of freedom	Variance
1	2	3	4
Between taluks	1407.76	49	28.73
Between kara within taluk	1498.37	241	6.22
Within Kara within taluk	1698.95	485	3.50
TOTAL	4605.08	775	..

TABLE V

The Results of Driage Experiments

Sl No.	Name of Taluk	Autumn crop of paddy 1968	
		Number of experiments	Driage ratio % of dry paddy to wet paddy
1	2	3	4
1	Neyyatinkara	3	87.2
2	Trivandrum	2	84.4
3	Nedumangad	3	84.9
4	Chirayinkil	3	84.7
5	Quilon	3	93.5
6	Kottarakkara	3	91.4
7	Kunnathur	2	94.6
8	Pathanapuram	2	92.3
9	Pathanamthitta	3	93.6
10	Karunagappally	3	90.9
11	Karthigappally	2	86.0
12	Mevelikara	2	86.0
13	Chengannur	2	90.0
14	Thiruvalla	2	90.0
15	Kuttanad	3	87.9
16	Ambalapuzha	3	87.9
17	Sherthallai	3	87.9
18	Changanacherry	3	82.8
19	Kanjirappally	1	84.0
20	Kottayam	3	86.8
21	Vaikom	3	89.8
22	Meenachil	3	84.7
23	Devicolam	1	88.0
24	Thodupuzha	3	77.1
25	Moovattupuzha	3	80.9
26	Cochin	2	77.6
27	Kanayannore	1	84.0
28	Kunnathunad	2	76.4
29	Alwaye	2	81.2
30	Parur	3	80.9
31	Crangannore	2	85.6
32	Mukundapuram	4	90.6
33	Trichur	2	88.0

1	2	3	4
34	Thalappally	3	82.0
35	Chowghat	2	82.0
36	Chittur	3	92.0
37	Alathur	3	90.0
38	Palghat	3	94.0
39	Ottappalam	2	92.0
40	Perinthalmanna	3	91.3
41	Ponnani	3	92.0
42	Tirur	3	90.3
43	Ernad	3	91.2
44	Kozhikode	3	90.7
45	Quilandy	3	92.0
46	Badagara	3	92.3
47	Tellicherry	3	91.3
48	Cannanore	3	91.6
49	Taliparamba	3	90.7
50	Hosdurg	3	89.3
51	Kasargode	3	92.2
	Total	134	

TABLE VI

Mean Yield of dry Paddy (Kgs./Hect.)during Autumn crop of paddy

Taluk and District	1964 Autumn Kgs./ Hect.	1965 Autumn Kgs./ Hect.	1966 Autumn Kgs / Hect.	1967 Autumn Kgs./ Hect.	1968 Autumn Kgs./ Hect.
1	2	3	4	5	6
1. Neyyattinkara ..	2019	2614	2211	2362	2253
2. Trivandrum ..	2225	2520	1996	1885	2390
3. Nedumangad ..	1281	2180	1525	1749	1915
4. Chirayinkil ..	1003	1520	1547	1748	1833
TRIVANDRUM DISTRICT ..	1683	2274	1862	1981	2118
5. Quilon ..	385	1609	1533	1913	2173
6. Kottarakkara ..	1498	2000	1777	2153	1846
7. Kunnathur ..	1368	1816	1711	2171	1222
8. Pathanapuram ..	1609	2136	2153	2440	2141
9. Pathanamthitta ..	1843	1943	1699	2233	2351
10. Karunagappally ..	913	1806	1471	1288	1836
QUILON DISTRICT ..	1277	1910	1764	2073	1859
11. Karthigappally ..	1856	1847	1378	1555	1204
12. Mavelikara ..	1074	1500	1774	2446	1438

TABLE VI—(*Contd.*)

1	2	3	4	5	6
13. Chengannur ..	1506	2439	1960	2246	1235
14. Thiruvalla ..	1933	2373	2039	2130	1526
15. Kuttanad ..	1150	2433	1981	2034	1677
16. Ambalapuzha ..	1362	1364	1172	1098	1083
17. Sherthallai ..	1097	2135	1018	1249	854
ALLEPPEY DISTRICT ..	1393	2011	1514	1805	1230
18. Changanacherry ..	1803	1924	1923	1999	2325
19. Kanjirappally ..	1395	1817	1467	1220	2325
20. Peermade ..	..	..	..	..	..
21. Kottayam ..	1834	1829	2246	2081	1663
22. Vaikom ..	1218	1449	1662	1513	2033
23. Meenachil ..	1494	1630	1336	1675	1691
24. Deviculam ..	1409	1700	2557	2236	1771
25. Udumbanchola ..	1409	..	..	..	..
KOTTAYAM DISTRICT ..	1568	1700	1817	1852	1897
26. Thodupuzha ..	1896	1656	1644	1837	1715
27. Moovattupuzha ..	1838	1700	1662	1720	1479
28. Cochin ..	1942	1919	774	3006	2070
29. Kanayannur ..	1636	1598	1924	2201	1482
30. Kunnathunad ..	1391	1559	1795	1877	1504
31. Alwaye ..	1526	1451	1337	1837	2569
32. Parur ..	1232	1517	1611	1668	1741
ERNAKULAM DISTRICT ..	1614	1605	1604	1970	1764

TABLE VI—(*Contd.*)

1	2	3	4	5	6
33. Crangannore ..	1319	1049	1262	826	891
34. Mukundapuram ..	1260	1125	1199	1075	1318
35. Trichur ..	1476	1626	2232	1727	1968
36. Thalappally ..	2400	1676	1920	2175	2089
37. Chowghat ..	1109	1418	1587	1475	1302
TRICHUR DISTRICT ..	1804	1514	1800	1747	1810
38. Chittur ..	2732	2956	2814	3018	2852
39. Alathur ..	2353	2767	2781	2931	2585
40. Palghat ..	2818	3013	2766	2435	2621
41. Ottappalam ..	2631	2796	2386	2513	1972
42. Perinthalmanna ..	2052	2428	2475	2442	2104
43. Ponnani ..	1217	1525	1238	1170	1803
PALGHAT DISTRICT ..	2406	2680	2517	2462	2388
44. Tirur ..	1624	1397	1370	1265	1315
45. Ernad ..	1328	1564	1722	1478	1726
46. Kozhikode ..	1653	1261	1029	1523	1255
47. Quilandy ..	1222	1432	1335	1378	1512
48. Badagara ..	1735	1544	1315	1158	1362
49. South Wynad ..	..	..	..	..	..
KOZHIKODE DISTRICT ..	1476	1455	1431	1373	1480

TABLE VI—(*Concld.*)

1	2	3	4	5	6
50. North Wynad ..	..	..	..	..	..
51. Tellicherry ..	1472	1737	1385	1774	1497
52. Cannanore ..	1900	1882	1441	1423	1660
53. Taliparamba ..	1641	1601	1688	1978	2358
54 Hosdurg ..	2156	2195	1919	2070	1961
55. Kasargode ..	2266	1826	2201	1946	2338
CANNANORE DISTRICT ..	1985	1867	1849	1874	2045
STATE ..	1876	2000	1920	1972	1949