GOVERNMENT OF KERALA

REPORT ON THE CROP CUTTING SURVEY
ON THE AUTUMN CROP OF PADDY
1965

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The Field Surveys Division,
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Trivandrum-1.

REPORT ON THE CROP CUTTING SURVE

AUTUMN CROP OF PADDY 196'

1. Introduction

This report deals with the Crop Cutting Survey conducted on Autumn Crop of Paddy 1967. The important aspects of the survey are explained in the following paragraphs.

2. Object of the Survey

The object of the survey was to obtain precise estimates of the taluk-wise mean yield of dry paddy per hectare and also the total production of Rice in the State during the Autumn season 1967.

3. Period of the Survey

The survey on Autumn Crop was conducted during the months of August to October 1967.

4. Coverage

The survey covered 51 taluks out of 55 taluks in the State.

5. Sampling Design

The method of sampling adopted for the survey was stratified multi-stage random sampling as in the case of the previous year. The taluk was taken as the stratum, a census village as the first-stage unit, a survey sub-division number as the second stage unit, a kandom as the third stage unit and a square plot of side 5 metres as the ultimate sampling unit. From each taluk six census villages were selected with equal probability. From each of these selected village, 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 for the crop cutting experiment, after 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 plot harvested was forwarded to the District Statistical Officer for conducting driage experiments for estimating loss due to driage.

6. Sampling selection

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

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7. Field work

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

Eventhough the number of experiments planned was 891 only 837 experiments could be conducted, the percentage response being 94. The loss in the number of experiments was mainly due to the failure on the part of cultivators to inform the field staff the exact time and date of the harvest. Inspections were carried out by the officers of this Department at three stages viz. pre-harvest, at harvest and post-harvest stages. During the Autumn crop 90 inspections were conducted in the pre-harvest stage, 200 at harvest stage and 55 at post-harvest stages. The percentage of inspection at the harvest stage to total experiment conducted was 24. The overall percentage of inspection came to 41..

B. Results

The analysis of data was done at the Head Office of the Bureau of Economics and Statistics, Trivandrum. The area under paddy in each taluk obtained from the L.U.S. was used to estimate the production figures. 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. Compared to the corresponding season of the previous year the average yield (pooled estimate) for the State and the total production (pooled estimate) of rice during Autumn 1967 have increased by 3.5% and 4.6% respectively. The increase in yield rate was mainly due to favourable weather conditions.

Table II

This gives district-wise estimates of mean yield in "irrigated" plots, "chemically manured" plots, "irrigated and manured" plots and "neither irrigated and nor manured" plots. 0.24% of the plots received irrigation 78.02% received chemical manure alone and 17.20% received both irrigation and chemical manure. The remaining 4.54% of plots were neither irrigated nor manured.

The frequency distribution of plot yields is given in table III. The analysis of variance of plot yields is given in table IV.

Table V gives the result of driage experiments relating to the Autumn crop 1967 viz. the number of driage experiments conducted in each taluk and the driage ratio.

The yield rate of paddy during Autumn season in each taluk for the last 5 years are given in Table VI for the purpose of comparison.

9. Procedure of estimation

(i) Mean yield

The mean yield of dry paddy and its standard error for each taluk are calculated by adopting the following formula.

n_i = number of cuts taken in the ith village
(i = 1, 2,...................k, where k is the number of villages selected in the taluk)

x_{ij} = weight of paddy taken from the jth cut in the ith village/kara (j = 1, 2, ...n_i)

$$\text{Taluk mean} = \bar{x} = \sum_{i=1}^{k} \sum_{j=1}^{n_i} x_{ij} / \sum_{i=1}^{k} n_i$$

Each cut is taken from $(\frac{1}{400})^{th}$ of the 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

$$(\sum_{i=1}^{k} n_i) \text{ in the taluk}$$

n_i = Number of experiments in the ith village/kara

Let $m = \dfrac{N^2 - \sum n_i^2}{N(k-1)}$ where k is the number of the villages selected in the taluk

Variance of the taluk mean yield = $\dfrac{A}{N} + \dfrac{B-A}{m} \times \dfrac{\sum n_i^2}{N^2}$

The standard error (S.E.) is the square foot 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 ith taluk and s_i the S.E. of the estimate in the taluk

$$\text{S.E. for the State Mean Yield} = \sqrt{\dfrac{\sum (a_i s_i)^2}{(\sum a_i)^2}}$$

10. The weight of cleaned rice is reckoned as 65.7% of dry paddy and accordingly the total production of rice during Autumn season was estimated at 516892 tonnes.

11. In Alleppey and Palghat Districts both State series and Intensive Agricultural District Programme series of experiments were conducted during the season under report. The results obtained from the two series of experiments were pooled together and the pooled mean yield of dry paddy per hectare was calculated. The pooled average yield of dry paddy during the Autumn crop 1967 in Alleppey and Palghat Districts were 1684 Kg./Hect. and 2540 Kg./Hect. respectively.

The average yield estimated from the State series of experiments alone for Alleppey and Palghat districts were 1805 Kg./Hect. and 2462 Kg./Hect. respectively. The average yield estimated from I.A.D.P. series of experiments for Alleppey and Palghat Districts were 1635 Kg./Hect. and 2592 Kg./Hect. respectively.

The production of rice during Autumn 1967 as per the pooled estimate is 25310 tonnes in Alleppey District and 193046 tonnes in Palghat District. The corresponding figures obtained through state series are 27135 tonnes in Alleppey and 187090 tonnes in Palghat. The State production as per the pooled estimate was 521023 tonnes of rice.

For the purpose of comparison of 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,
2--3--1968.   N.GOPALAKRISHNAN NAIR,
                                              Additional Director.

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Statement - A

Area, Mean Yield and Production of Rice in Kerala During 1952-63 to 1967-68

Agricultural year	Autumn (Virippu) Crop			Winter (Mundakan) Crop			Summer (Punja) Crop			Total		
	Area in Hectares	Mean yield of dry paddy in Kg./Hect.	Production of rice in tonnes	Area in Hectares	Mean yield of dry paddy in Kg./Hect.	Production of rice in tonnes	Area in Hectares	Mean yield of dry paddy in Kg./Hect.	Production of rice in tonnes	Area in Hectares	Mean Yield of dry paddy in Kg./Hect.	Production of rice in tonnes
1	2	3	4	5	6	7	8	9	10	11	12	13
1962-63	396419	1901	494985	329276	2227	481902	76982	2401	115381	802677	2073	1093268
1963-64	398061	1951*	510297*	330008	2302*	499147*	77015	2344*	118515*	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*	75438	1708*	85794*	802329	1892*	997489*
1966-67	395083	1919*	498160*	327180	2192*	471114*	77175	2264*	114788*	799438	2064*	1084062*
1967-68	398993	1987*	521023*	-	-	-	-	-	-	-	-	-

* Pooled estimate of State series and I A D P series of experiments.

TABLE I

CROP CUTTING RESULTS
Autumn crop of Paddy 1967

Taluk & District	No.of experiments	Area in Hectares	Mean yield of dry paddy in Kg./Hect	Standard error of the mean yield in Kg./Hect	Production of rice in tonnes
1	2	3	4	5	6
1 Neyyattinkara	16	6205	2362	266	9629
2 Trivandrum	18	4396	1885	304	5444
3 Nedumangad	18	4772	1749	121	5483
4 Chirayinkil	18	3593	1748	188	4127
TRIVANDRUM DISTRICT	70	18966	1981	121	24683
5 Quilon	18	3038	1913	87	3818
6 Kottarakkara	17	6331	2158	262	8976
7 Kunnathur	18	4012	2171	98	5722
8 Pathanapuram	15	4400	2440	100	7054
9 Pathanamthitta	15	1107	2033	151	1479
10 Karunagappally	18	2560	1288	121	2166
QUILON DISTRICT	101	21448	2073	85	29215
11 Karthigappally	17	5112	1555	168	5222
12 Mavelikkara	16	3630	2446	91	5834
13 Chengannur	16	2374	2246	52	3503
14 Thiruvalla	16	1944	2130	173	2721
15 Kuttanad	17	2980	2034	286	3982
16 Ambalapuzha	18	890	1698	257	993
17 Sherthalai	18	5946	1249	278	4880
ALLEPPEY DISTRICT	118	22876	1805	93	27135
18 Chenganacherry	18	1782	1999	76	2340
19 Kanjirappally	6	42	1220	143	34
20 Peermade	..	..	..	..	..
21 Kottayam	15	2414	2081	232	3301
22 Vaikom	17	1637	1513	193	1627
23 Meenachil	15	1904	1675	258	2095
24 Devikulam	3	272	2236	..	399
25 Udumbanchola	..	..	..	..	..
KOTTAYAM DISTRICT	74	8051	1852	105	9796

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1	2	3	4	5	6
26 Thodupuzha	15	3822	1837	156	4613
27 Muvattupuzha	18	7514	1720	101	8491
28 Cochin	13	3273	3006	177	6464
29 Kanayannur	14	8124	2201	284	11748
30 Kunnathunad	16	8011	1877	231	9879
31 Alwaye	17	7738	1837	250	9339
32 Parur	17	3679	1668	354	4032
ERNAKULAM DISTRICT	110	42161	1970	93	54566
33 Crangannore	17	377	826	90	204
34 Mukundapuram	17	8789	1075	126	6207
35 Trichur	17	9511	1727	144	10791
36 Thalappally	18	17025	2175	457	24328
37 Chowghat	18	3139	1475	193	3042
TRICHUR DISTRICT	87	38841	1747	206	44572
38 Chittur	18	21210	3018	121	42056
39 Alathur	18	20494	2631	169	35425
40 Palghat	18	26463	2435	115	42335
41 Ottappalam	18	18118	2513	181	29914
42 Perinthalmanna	17	17666	2442	164	28343
43 Ponnani	18	11730	1170	97	9017
PALGHAT DISTRICT	107	115681	2462	60	187090
44 Tirur	18	18753	1265	188	15586
45 Ernad	18	20858	1478	130	20254
46 Kozhikode	18	7543	1523	81	7548
47 Quilandy	14	11475	1378	122	10389
48 Badagara	15	6400	1158	131	4869
49 South Wynad	..	..	..	..	..
KOZHIKODE DISTRICT	83	65029	1373	73	58646
50 North Wynad	..	..	..	..	..
51 Tellicherry	17	9237	1774	137	10766
52 Cannanore	17	9860	1423	74	9218
53 Taliparamba	17	10238	1978	76	13305
54 Hosdurg	18	13496	2070	135	18355
55 Kasargode	18	23109	1946	72	29545
CANNANORE DISTRICT	87	65940	1874	45	81189
STATE	837	398993	1972	33	516892

Table II

AUTUMN CROP OF PADDY 1967 IN KERALA STATE

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

Sl. No.	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 in Kg./Hect.	Number of experiments	Mean yield of dry paddy in Kg./Hect.	Number of experiments	Mean yield of dry paddy in Kg./Hect.	Number of experiments	Mean yield of dry paddy in Kg./Hect.
1	2	3	4	5	6	7	8	9	10
1	Trivandrum	..	..	32	1802	38	2031	..	..
2	Quilon	..	..	98	1991	3	1782	..	..
3	Alleppey	..	..	111	1864	2	2597	5	2248
4	Kottayam	..	..	72	1804	1	1134	1	1315
5	Ernakulam	..	..	69	1828	22	1687	19	2867
6	Trichur	..	..	83	1475	1	2683	3	2066
7	Palghat	..	..	44	1868	61	2617	2	3125
8	Kozhikode	..	..	82	1314	..	..	1	1225
9	Cannanore	2	1061	62	1900	16	1863	7	1431
	STATE	2	1061	632	1756	144	2209	38	2387

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TABLE III

AUTUMN CROP OF PADDY 1967

Frequency distribution of plot yields

Sl. No.	Range of yield of paddy in Kgs./Hect.	Frequency distribution	Percentage
1	Below – 500	20	2.39
2	500 – 699	25	2.99
3	700 – 899	39	4.66
4	900 – 1099	55	6.57
5	1100 – 1299	75	8.96
6	1300 – 1499	65	7.77
7	1500 – 1699	96	11.47
8	1700 – 1899	83	9.92
9	1900 – 2099	72	8.60
10	2100 – 2299	93	11.11
11	2300 – 2499	49	5.85
12	2500 – 2699	43	5.14
13	2700 – 2899	29	3.46
14	2900 – 3099	42	5.02
15	3100 – 3299	19	2.27
16	3300 – 3499	11	1.31
17	3500 – 3699	10	1.19
18	3700 – 3899	6	0.72
19	3900 – 4099	1	0.12
20	4100 – and above	4	0.48
	ALL	837	100.00

TABLE IV

AUTUMN CROP OF PADDY 1967

Analysis of variance of plot yield pooled for the State in Kgs.^{2}/Plot of 1/400th of a hectare

Source of variation	Sum of squares	Degrees of freedom	Variance
Between taluks	1359.09	49	27.74*
Between Kara within taluk	1103.69	246	4.49*
Within Kara within taluk	1428.33	538	2.65
Total	3891.11	833	..

* Significant at 1% level

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TABLE - V

THE RESULTS OF DRIAGE EXPERIMENTS

Sl. No.	Name of taluk	Autumn crop of paddy 1967	
		No. of experiments	Driage ratio % of dry paddy to wet paddy
1	2	3	4
1	Neyyattinkara	3	91.7
2	Trivandrum.	3	87.9
3	Nedumangad	2	85.4
4	Chirayinkil	2	86.0
5	Quilon	3	89.9
6	Kottarakkara	2	90.5
7	Kunnathur	3	94.4
8	Pathanapuram	2	91.6
9	Pathanamthitta	3	89.8
10	Karunagappally	3	93.3
11	Karthikappally	2	98.2
12	Mavelikkara	2	97.2
13	Chengannur	2	95.8
14	Thiruvella	2	97.0
15	Kuttanad	2	98.0
16	Ambalapuzha	2	95.6
17	Sherthalai	2	96.4
18	Changanacherry	3	85.3
19	Kanjirappally	1	84.0
20	Kottayam	3	84.3
21	Vaikom	3	85.2
22	Meenachil	3	86.5
23	Devicolam	1	86.0
24	Thodupuzha	3	91.5
25	Muvattupuzha	3	93.5
26	Cochin	2	93.6
27	Kanayannur	2	94.4
28	Kunnathunad	2	92.2
29	Alwaye	3	93.7
30	Parur	3	93.3
31	Crangannore	3	83.3
32	Mukundapuram	3	84.0
33	Trichur	3	90.7
34	Thalappally	3	89.3
35	Chowghat	3	82.7
36	Chittur	3	92.0
37	Alathur	3	89.0
38	Palghat	2	89.0
39	Ottappalam	3	90.0
40	Perinthalmanna	3	88.3
41	Ponnani	3	90.0
42	Tirur	3	91.9
43	Ernad	3	92.9
44	Kozhikode	3	92.4
45	Quilandy	3	93.6
46	Badagara	3	91.6
47	Tellicherry	3	92.4
48	Cannanore	3	90.3
49	Taliparamba	3	91.4
50	Hosdurg	3	91.6
51	Kasargode	3	93.0

TABLE VI
Mean yield of dry paddy (Kgs./Hect.) during Autumn crop of Paddy

Sl. No.	Taluk & District	1963 Autumn Kgs./Hect.	1964 Autumn Kgs/Hec.	1965 Autumn Kgs/Hec.	1966 Autumn Kgs/Hec.	1967 Autumn Kgs/Hect
1	2	3	4	5	6	7
1.	Neyyattinkara	2275	2019	2614	2211	2362
2.	Trivandrum	1902	2225	2520	1996	1885
3.	Nedumangad	1755	1281	2180	1525	1749
4.	Chirayinkil	1860	1003	1520	1547	1748
	TRIVANDRUM DISTRICT	1978	1683	2274	1862	1981
5.	Quilon	1128	385	1609	1533	1913
6.	Kottarakkara	1799	1498	2000	1777	2158
7.	Kunnathur	1419	1368	1816	1711	2171
8.	Pathanapuram	1963	1609	2136	2153	2440
9.	Pathanamthitta	1719	1843	1943	1699	2033
10.	Karunagappally	1367	913	1806	1471	1288
	QUILON DISTRICT	1596	1277	1910	1764	2073
11.	Karthigappally	1926	1856	1847	1378	1555
12.	Mavelikara	1050	1074	1500	1774	2446
13.	Chengannur	2062	1506	2439	1960	2246
14.	Thiruvella	1763	1933	2373	2039	2130
15.	Kuttanad	2285	1150	2433	1981	2034
16.	Ambalapuzha	1637	1362	1364	1172	1698
17.	Sherthalai	1510	1097	2135	1018	1249
	ALLEPPEY DISTRICT	1681	1393	2011	1514	1805
18.	Changanacherry	2481	1803	1924	1923	1999
19.	Kanjirappally	1391	1395	1817	1467	1220
20.	Peermade	..	..	..	..	..
21.	Kottayam	2432	1834	1829	2246	2081
22.	Vaikom	1592	1218	1449	1662	1513
23.	Meenachil	1715	1494	1630	1336	1675
24.	Devicolam	..	1409	1700	2557	2236
25.	Udumbanchola	..	1409	..	..	..
	KOTTAYAM DISTRICT	2027	1568	1700	1817	1852
26.	Thodupuzha	1700	1896	1656	1644	1837
27.	Muvattupuzha	2097	1838	1700	1662	1720
28.	Cochin	2367	1942	1919	774	3006
29.	Kanayannur	1743	1636	1598	1924	2201
30.	Kunnathunad	1675	1391	1559	1795	1877
31.	Alwaye	1740	1526	1451	1337	1837
32.	Parur	2234	1232	1517	1611	1668
	ERNAKULAM DISTRICT	1880	1614	1605	1604	1970

1	2	3	4	5	6	7
33.	Cranganore	1597	1319	1049	1262	826
34.	Mukundapuram	1693	1260	1125	1199	1075
35.	Trichur	2059	1476	1626	2232	1727
36.	Thalappally	1934	2400	1676	2920	2175
27.	Chowghat	1612	1109	1418	1587	1475
38.	TRICHUR DISTRICT	1881	1804	1514	1800	1747
38.	Chittur	2666	2732	2956	2814	3018
39.	Alathur	2601	2353	2767	2781	2631
40.	Palghat	2979	2818	3013	2766	2435
41.	Ottappalam	2524	2631	2796	2386	2513
42.	Perinthalmanna	2101	2052	2428	2475	2442
43.	Ponnani	1487	1217	1525	1238	1170
	PALGHAT DISTRICT	2494	2406	2680	2517	2462
44.	Tirur	1569	1624	1397	1370	1265
45.	Ernad	1549	1328	1564	1722	1478
46.	Kozhikode	897	1653	1261	1029	1523
47.	Quilandy	1401	1222	1432	1335	1378
48.	Badagara	1724	1738	1544	1315	1158
49.	South Wynad	..	..	..	..	..
	KOZHIKODE DISTRICT	1472	1476	1455	1431	1373
50.	North Wynad	..	..	..	..	..
51.	Tellicherry	1421	1472	1737	1385	1774
52.	Cannanore	2037	1900	1882	1441	1423
53.	Taliparamba	1574	1641	1601	1688	1978
54.	Hosdurg	2057	2156	2195	1919	2070
55.	Kasargode	2076	2266	1826	2201	1946
	CANNANORE DISTRICT	1899	1985	1867	1849	1874
	S T A T E	1975	1876	2000	1920	1972