



GOVERNMENT OF KERALA

REPORT ON THE CROP CUTTING SURVEY
ON THE AUTUMN CROP OF PADDY
1966

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REPORT ON THE CROP CUTTING SURVEY ON THE
CROP OF PADDY 1966.

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1. Introduction

This report deals with the crop cutting survey conducted on Autumn Crop of Paddy 1966. 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/hectare and also the total production of Rice in the State during the Autumn season.

3. Period of the Survey

The survey on Autumn Crop was conducted during the months of August to October 1966.

4. Coverage

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

5. Sampling Design

The method of sampling adopted for the survey was a 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 sample 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-clockwise.

A square plot of side 5 metres was located at random in the selected kandom. The crop in the square plot was harvested, thrashed, winnowed and weighed. A sample of grain from every 6th plot harvested was forwarded to the District Statistical Officer for conducting drriage experiments for estimating loss due to drriage.

6. Sampling 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.

7. Field work

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

Eventhough the number of experiments planned was 918, only 795 experiments could be conducted. The percentage of response being 86. The loss in the number of experiments was mainly due to the failure on the part of the 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, 73 inspections were conducted in the pre-harvest stage, 177 at harvest stage and 38 at post-harvest stage. The percentage of inspection at harvest stage to total experiment conducted was 22.

8. 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 Land Utilisation Survey 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 for the State and the total production of Rice during Autumn 1966 have decreased by 4% and 4.7% respectively. The decrease in yield rate was due to unfavourable rainfall conditions during the sowing season.

Table - II

Table II gives district-wise estimates of mean yield in "irrigated" plots, "chemically manured" plots, "irrigated and manured" plots and in "neither irrigated and nor manured" plots. 4.28% of the plots received irrigation, 55.09% received chemical manure alone and 16.60% received both irrigation and chemical manure. The remaining 24.03% 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 1966 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

(1) 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 i th village
 ($i = 1, 2, \dots, k$, where k is the number of villages selected in the taluk)

X_{ij} = Weight of paddy taken from the j th cut in the i th village/kara ($j=1, 2, \dots, n_i$)

$$\text{Taluk mean} = \bar{X} = \sum_{i=1}^k \frac{n_i}{\sum_{j=1}^{n_i} X_{ij}} / \sum_{i=1}^k n_i$$

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

Mean yield of dry paddy in Kg./Hect. = $\bar{X} \times 400 \times d$ 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 ($\sum_{i=1}^k n_i$) in the taluk.

n_i = Number of experiments in the i th village/kara.

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

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

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 S_i the S.E. of the estimate in the Taluk.

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

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 498388 tonnes.

11. In Alleppey and Palghat Districts both State series and I.A.D.P. 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/hectare was calculated. The pooled average yield of dry paddy during the Autumn crop 1966 in Alleppey and Palghat Districts were ¹⁴⁵⁴1438 Kg./Hect. and ²⁵²⁶2534 Kg./Hect. respectively. The average yield estimated from the State series of experiments alone for Alleppey and Palghat districts were 1514 Kg./Hect. and 2517 Kg./Hect. respectively.

The production of Rice during Autumn 1966 as per the pooled estimate is 20822 tonnes in Alleppey District and 191297 tonnes in Palghat District. The corresponding figures obtained through

State series are 21689 tonnes in Alleppey and 190658 tonnes in Palghat. The State production as per the pooled estimate was 498160 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 five years are given in the statement A.

Trivandrum, |
31--3--1967 |

N.GOPALAKRISHNAN NAIR,
Additional Director.

STATEMENT A

AREA, MEAN YIELD AND PRODUCTION OF RICE IN KERALA DURING 1952-53 TO 1965-67

Year	Autumn (Virip) Crop			Winter (Mundakan) Crop			Summer (Pulla) Crop			Total		
	Area in hectares	Mean yield of dry paddy in Kg./Hect.	Production 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	116381	802677	2073	1093263
1963-64	398061	1951*	510297*	330008	2302*	499147*	77015	2344*	118615*	805084	2133*	1128069*
1964-65	395189	1906*	494816*	329010	2357*	509555*	76922	2315*	117012*	801121	2130*	1121383
1965-66	398012	1996*	521350*	327879	1810*	389845*	76438	1708*	85794*	802329	1892*	997483*
1965-67	395083	1919*	498160									

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

Table - I

CROP CUTTING RESULTS
Autumn Crop of Paddy 1966

Taluk & District	No. of experiments	Area in Hect-ares	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	17	6206	2211	204	9013
2. Trivandrum	16	4396	1936	441	5766
3. Nedumangad	12	4772	1525	72	4781
4. Chirayinkil	16	3629	1547	106	3888
TRIVANDRUM DISTRICT	61	19002	1862	125	23247
5. Quilon	16	3069	1533	133	3091
6. Kottarakkara	14	6207	1777	196	7247
7. Kunnathur	15	4012	1711	122	4510
8. Pathanapuram	6	4314	2153	282	6102
9. Pathanamthitta	15	1107	1699	148	1236
10. Karunagappally	13	2612	1471	69	2524
QUILON DISTRICT	79	21321	1764	87	24710
11. Karthigappally	17	5112	1378	93	4628
12. Mavelikara	16	3630	1774	232	4231
13. Chengannur	18	2158	1960	123	2779
14. Thiruvalla	13	1736	2039	78	2326
15. Kuttanad	15	2384	1981	310	3103
16. Ambalapuzha	17	890	1172	218	685
17. Sherthalai	17	5887	1018	229	3937
ALLEPPEY DISTRICT	113	21797	1514	85	21689
18. Changanacherry	16	1188	1923	152	1501
19. Kanjirappally	5	40	1467	87	39
20. Peermade	..	..	..	..	..
21. Kottayam	14	1931	2246	198	2849
22. Vaikom	18	1559	1662	298	1702
23. Meenachil	12	1831	1336	168	1607
24. Deviculam	3	247	2557	..	415
25. Udumbanchola	..	..	..	..	..
KOTTAYAM DISTRICT	68	6796	1817	103	8112

	2	3	4	5	6
26. Thodupuzha	13	3822	1644	70	4128
27. Muvattupuzha	16	7367	1662	166	8044
28. Cochin	16	3273	774	102	1664
29. Kanayannur	18	8124	1924	159	10270
30. Kunnathunad	18	8011	1795	148	9448
31. Always	17	7586	1337	66	6663
32. Parur	18	3679	1611	365	3894
ERNAKULAM DISTRICT	116	41862	1604	62	44111
33. Cranganore	15	377	1262	256	313
34. Mukundapuram	17	8789	1199	140	6923
35. Trichur	17	9511	2232	174	13947
36. Thalappally	18	17025	1920	127	21476
37. Chowghat	17	3139	1587	198	3273
TRICHUR DISTRICT	84	38841	1800	13	45932
38. Chittur	18	21000	2814	184	38825
39. Alathur	18	20291	2781	200	37074
40. Palghat	17	26463	2766	156	48090
41. Ottappalam	18	18118	2386	51	28402
42. Perinthalmanna	17	17666	2475	124	28402
43. Ponnani	15	11730	1238	84	9541
PALGHAT DISTRICT	103	115268	2517	64	190658
44. Tirur	18	18567	1370	119	16712
45. Ernad	18	20651	1722	247	23364
46. Kozhikode	18	7543	1029	107	5100
47. Quilandy	17	11475	1335	38	10065
48. Badagara	18	6400	1315	72	5529
49. South Wynad	..	..	..	..	..
KOZHIKODE DISTRICT	87	64636	1431	87	60770
50. North Wyna	..	..	..	..	..
51. Tellicherry	16	9056	1385	112	8241
52. Cannanore	17	9762	1441	52	9242
53. Taliparamba	16	10137	1688	168	11242
54. Hosdurg	17	13496	1919	220	17016
55. Kasargod	18	23109	2201	219	33417
CANNANORE DISTRICT	84	65560	1849	95	79158
STATE	795	395083	1920	31	498388

TABLE - II

AUTUMN CROP OF PADDY 1966 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 Kgs./Hect.	Number of experiments	Mean yield of dry paddy in Kgs./Hect.	Number of experiments	Mean yield of dry paddy in Kgs./Hect.	Number of experiments	Mean yield of dry paddy in Kgs./Hect.
1	2	3	4	5	6	7	8	9	10
1.	Trivandrum	5	1690	25	1648	23	2297	8	1305
2.	Quilon	12	1593	38	1829	5	1786	24	1453
3.	Alleppey	1	1331	50	1831	14	1980	48	1306
4.	Kottayam	1	599	40	1863	..	..	27	1592
5.	Ernakulam	12	1360	18	1639	16	1974	70	1452
6.	Trichur	..	..	75	1657	9	1646	..	..
7.	Palghat	3	2796	23	2524	65	2598	12	1338
8.	Kozhikode	..	..	85	1359	..	..	2	1151
9.	Cannanore	..	..	84	1730	..	..	..	..
	STATE	34	1594	438	1711	132	2309	191	1419

Table - III

AUTUMN CROP OF PADDY 1966

Frequency Distribution of Plot yields

Sl. No.	Range of yield of paddy in Kgs./Hect.	Frequency distribution	Percentage
1.	Below 500	18	2.27
2.	500 - 699	25	3.14
3.	700 - 899	64	8.05
4.	900 - 1099	59	7.42
5.	1100 - 1299	94	11.82
6.	1300 - 1499	87	10.94
7.	1500 - 1699	85	10.69
8.	1700 - 1899	74	9.31
9.	1900 - 2099	63	7.92
10.	2100 - 2299	55	6.93
11.	2300 - 2499	38	4.78
12.	2500 - 2699	50	6.29
13.	2700 - 2899	20	2.52
14.	2900 - 3099	23	2.89
15.	3100 - 3299	12	1.51
16.	3300 - 3499	7	.88
17.	3500 - 3699	7	.88
18.	3700 - 3899	7	.88
19.	3900 - 4099	3	.38
20.	4100 & above	4	.50
	All	795	100.00

Table IV

Autumn Crop of Paddy 1966

Analysis of Variance of plot^{taluk} pooled for the
State in Kgs.²/plot of 1/400th of an hectare

Source of Variation	Sum of squares	Degree of freedom	Variance
Between taluk	1254.59	50	25.29*
Between kara within taluk	1025.51	241	4.25*
Between kara within taluk	1298.47	503	2.58
Total	3587.57	794	..

*Significant at 1% level

Table V

THE RESULTS OF DRIAGE EXPERIMENTS

Sl No.	Name of Taluk	Autumn crop of Paddy 1966	
		No. of experi- ments	Driage ratio (% of dry paddy to wet paddy)
1.	Neyyattinkara	3	86.5
2.	Trivandrum	3	87.7
3.	Nedumangad	3	89.3
4.	Chirayinkil	3	89.3
5.	Quilon	3	86.1
6.	Kottarakara	3	90.3
7.	Kunnathur	2	95.5
8.	Pathanapuram	1	90.3
9.	Pathanamthitta	2	89.8
10.	Karunagappally	2	85.1
11.	Karthigappally	3	90.4
12.	Mavelikara	2	90.5
13.	Chengannur	3	89.4
14.	Thiruvalla	2	87.6
15.	Kuttanad	3	82.7
16.	Ambalapuzha	3	89.3
17.	Sherthalai	3	81.3
18.	Changanacherry	3	84.2
19.	Kanjirappally	1	82.8
20.	Kottayam	2	95.5
21.	Vaikom	3	84.3
22.	Meenachil	2	87.0
23.	Devicoolam	1	80.0
24.	Thodupuzha	2	88.0
25.	Muvattupuzha	2	88.6
26.	Cochin	3	88.3
27.	Kanayannur	3	87.6
28.	Kunnathunad	3	88.7
29.	Alwaye	2	88.2
30.	Parur	3	88.5
31.	Crangannur	2	93.6
32.	Mukundapuram	3	93.7
33.	Trichur	3	92.4
34.	Thalappally	3	93.7
35.	Chowghat	3	92.9
36.	Chittur	3	93.2
37.	Alathur	3	93.2
38.	Palghat	3	93.2
39.	Ottapalam	3	93.2
40.	Ponnani	3	93.2
41.	Perinthalmanna	3	93.2
42.	Tirur	3	93.1
43.	Ernad	2	92.4
44.	Kozhikode	3	93.2
45.	Quilandy	3	93.5
46.	Badagara	3	93.1
47.	Tellicherry	3	87.0
48.	Cannanore	3	93.3
49.	Taliparamba	2	87.0
50.	Hosdurg	3	93.7
51.	Kasargode	2	93.6

Table VI
Mean yield of dry paddy (Kg./Hectare) during
Autumn crop of paddy

Sl. No.	Taluk & District	1962 Autumn Kgs./ Hect.	1963 Autumn Kgs./ Hect.	1964 Autumn Kgs./ Hect.	1965 Autumn Kgs./ Hect.	1966 Autumn Kgs./ Hect.
1.	Neyyattinkara	1885	2275	2019	2614	2211
2.	Trivandrum	2304	1902	2225	2520	1996
3.	Nedumangad	2603	1755	1281	2180	1525
4.	Chirayinkil	1867	1860	1003	1520	1547
	TRIVANDRUM DISTRICT	2166	1978	1683	2274	1862
5.	Quilon	1692	1128	385	1609	1533
6.	Kottarakkara	1698	1799	1498	2000	1777
7.	Kunnathur	1480	1419	1368	1816	1711
8.	Pathanapuram	1536 1536	1963	1800	2138	2153
9.	Pathanamthitta	1603	1719	11843	1943	1699
10.	Karunagappally	2004	1367	913	1806	1471
	QUILON DISTRICT	1658	1596	1277	1910	1764
11.	Karthigappally	1422	1926	1856	1847	1378
12.	Mavelikara	1825	1050	1074	1500	1774
13.	Chengannur	2563	2062	1506	2439	1960
14.	Thiruvalla	2519	1763	1933	2373	2039
15.	Kuttanad	1866	2285	1150	2433	1981
16.	Ambalapuzha	1237	1637	1362	1364	1172
17.	Sherthalai	1903	1510	1097	2135	1018
	ALLEPPEY DISTRICT	1865	1681	1393	2011	1514
18.	Changanacherry	2347	2481	1803	1924	1923
19.	Kanjirappally	1676	1391	1395	1817	1467
20.	Peermade	..	..	..	..	..
21.	Kottayam	2142	2432	1834	1829	2246
22.	Vaikom	1560	1592	1218	1449	1662
23.	Meenachil	1832	1715	1494	1630	1336
24.	Devicoolam	..	..	1409	1700	2557
25.	Udumbanchola	..	..	1409	..	..
	KOTTAYAM DISTRICT	1944	2027	1568	1700	1817

1	2	3	4	5	6	7
26.	Thodupuzha	2100	1700	1896	1656	1644
27.	Muvattupuzha	2331	2097	1838	1700	1662
28.	Cochin	2213	2367	1942	1919	774
29.	Kamayannur	1796	1743	1636	1598	1924
30.	Kunnathunad	1698	1675	1391	1559	1795
31.	Alwaye	1311	1740	1526	1451	1337
32.	Parur	1684	2234	1232	1517	1611
	ERNAKULAM DISTRICT	1844	1880	1614	1605	1604
33.	Cranganmore	1695	1597	1319	1049	1262
34.	Makundapuram	1812	1693	1260	1125	1199
35.	Trichur	1821	2059	1476	1626	2232
36.	Thalappilly	1988	1934	2400	1676	1920
37.	Chowghat	1661	1612	1109	1418	1587
	TRICHUR DISTRICT	1877	1881	1804	1514	1800
38.	Chittur	2309	2666	2732	2956	2814
39.	Alathur	2164	2601	2353	2767	2781
40.	Palghat	1900	2979	2818	3013	2766
41.	Ottapalam	2166	2524	2631	2796	2386
42.	Perinthalmanna	2672	2101	2052	2428	2475
43.	Ponnani	1276	1487	1217	1525	1238
	PALGHAT DISTRICT	2105	2494	2406	2680	2517
44.	Tirur	1897	1569	1624	1397	1370
45.	Ernad	2074	1549	1328	1564	1722
46.	Kozhikode	1485	897	1653	1261	1029
47.	Quilandy	1200	1401	1222	1432	1335
48.	Badagara	2529	1724	1735	1544	1315
49.	South Wynaad	...	...	...	...	...
	KOZHIKODE DISTRICT	1847	1472	1476	1455	1431
50.	North Wynaad	..	..	..	..	..
51.	Tellicherry	1362	1421	1472	1737	1385
52.	Cannanore	1717	2037	1900	1882	1441
53.	Taliparamba	1928	1574	1641	1601	1688
54.	Hosdurg	1689	2087	2156	2196	1919
55.	Kasargod	1583	2076	2266	1826	2201
	CANNANORE DISTRICT	1650	1899	1985	1867	1849
	STATE	1901	1975	1876	2000	1920

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