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BUREAU OF STATISTICS

(CENTRAL RESEARCH INSTITUTE)

TRAVANCORE UNIVERSITY

REPORT ON PRELIMINARY CROP-CUTTING SURVEY ON PADDY IN THE PUNJA FIELDS OF KUTTANAD AND NEIGHBOURING AREAS

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REPORT ON PRELIMINARY CROP-CUTTING SURVEY
ON PADDY CONDUCTED IN THE PUNJA
FIELDS OF KUTTANAD AND
NEIGHBOURING AREAS

I. INTRODUCTION

A. The Government of the United State of Travancore-Cochin directed in Order No. A.8-5400/49/SD. dated 28th October 1949, the Professor of Statistics to prepare in consultation with the Food Production Commissioner and submit a scheme to assess the results of Grow More Food Campaign in the State. In the scheme submitted accordingly by the Professor of Statistics the measures of Grow More Food Campaign were discussed at length which fell broadly under the categories:

- (i) Extension of area under food crops and
- (ii) Intensification of cultivation.

The former included:

- (a) Reclamation of waste lands and clearing forests and
- (b) Conversion of cultivable area left uncultivated into cultivated area by propaganda.

The latter included:

- (a) Distribution of manures
- (b) Distribution of improved seeds and
- (c) Providing of irrigation facilities.

In order to assess the extent of food drive under (i) and (ii) information had to be collected on the population of cultivators' holdings and crop-cutting surveys had to be started. For the enumeration of cultivators' holdings Investigators had to be appointed

under the Statistical Assistants who were working in each Taluk for Collection of Agricultural Statistics. Government were requested to issue orders to the Food Production Commissioner to relieve three Production Accountants from each Taluk of Travancore to work under the Statistical Assistants in the respective Taluks, and twelve Production Accountants from North Travancore to the Taluks of Cochin. In the absence of Statistical Assistants in the Cochin area, the Production Accountants were to work under the Tahsildars. In Order No. A1-8694/49/SD. dated 3rd January 1950 the Government sanctioned the scheme.

Field work was started by the third week of January in most of the Taluks of Travancore; but for the Cochin area, no work was possible as the field staff could not be spared from the Food Production Department.

The enumeration of cultivators' holdings receiving G.M.F. Aid had to be hurried through if the harvest season for paddy was to be utilised for the crop-cutting experiment. Even with all effort on the part of the Statistical Assistants and the Food Production Accountants it was found that their field records were incomplete and that the harvesting season had commenced in most villages so that it was impossible to conduct crop-cutting on an all-State basis.

However, the Punja fields in Central Travancore, excluding Kayal (Backwater) areas, were available for crop-cutting. Government in Order A1-8694/49/SD. dated 7th March 1950 gave specific sanctions to conduct crop-cutting experiments for the Punja fields and the field work was started on 10th March 1950 and completed on 31st March 1950.

B. The present report deals with the crop-cutting survey on paddy in the Punja fields of Kuttanad and neighbouring areas. The survey has to be reckoned as exploratory in character and really marks the beginning of a wider survey on an all-State basis. The object of the survey was two-fold:

1. The estimation of the average yield of paddy in the different Pakuthies of the above area and

2. The estimation of the increase, if any, in the average yield of paddy in Pakuthies due to Grow More Food Aid.

The survey was intended to cover an area of 90,700 acres (excluding the Kayal or Backwater areas) consisting of 47 Pakuthies in the six Taluks of Ambalapuzha, Changanacherry, Kottayam, Mavelikara, Pathanamthitta and Thiruvalla. Of the 47 Pakuthies selected only 36 were available for harvest since the crops in the other Pakuthies were harvested earlier than the proposed date, on account of the damage caused by incessant, untimely rainfall.

II. PUNJA CULTIVATION

Kuttanad is one of the most important paddy growing areas of the State. The cultivation of paddy in Kuttanad is of a quite peculiar nature. The level of the field is below water level and only after constructing bunds on the boundaries of fields and pumping out water from inside, the seed could be sown. The sowing season is spread over the three months, November, December, and January, and harvesting season over the three months February, March and April.

The season was quite unfavourable for cultivation this year. The river water had become saline early in January, one and a half months earlier than usual and watering of the crop had become extremely difficult. Rain had been falling when it was least needed and there were instances of the breaking of bunds in certain places immersing the crops under water.

III. TECHNIQUE

The method adopted for selecting random plots was sampling proportional to the total area under paddy in each Pakuthy. Survey numbers of plots under paddy in each Pakuthy and their areas were ascertained through the field staff and sampling was done in the Statistical Bureau. By cumulating the areas of plots having the successive survey numbers and using random sampling numbers, survey numbers of plots were selected at random corresponding to the cumulative area equal to the random number obtained. These survey numbers were entrusted to the field staff for taking cuts of size $16\frac{1}{2}' \times 16\frac{1}{2}'$ or $1/160$ of an acre inside the plots. The

sampling fractions adopted for sampling varied from Pakuthy to Pakuthy. For Pakuthies of larger area, since the number of experiments should be within manageable limits, the sampling fractions adopted were considerably small compared to those of Pakuthies of smaller area. The number of experiments conducted in all was 1030; 280 in Pakuthies of Ambalapuzha Taluk, 359 in Changanacherry Taluk, 115 in Kottayam, 128 in Mavelikara, 59 in Pathanamthitta and 89 in Thiruvalla. However, in some of the Pakuthies all the plots selected were not available for crop-cutting as harvesting was over.

IV. FIELD WORK

The field work was carried out under the supervision of three Research Officers of the Statistics Division in the University. The field staff formed into six camps to cover viz., (1) Ambalapuzha, (2) Changanacherry, (3) Kottayam, (4) Mavelikara, (5) Pathanamthitta, and (6) Thiruvalla. (1) and (2) were under one Research Officer; (3) and (6) under another; and (4) and (5) under the third. The field staff from neighbouring Taluks were directed to work in each of the Camps. Thus the strength of each camp was as follows:

1. Two Statistical Assistants and
2. Six Accountants.

The training of the field staff for conducting the field work was imparted by the Research Officers. After instructing the staff about the location of sampling cut and the measurements to be taken, practical demonstration was made in a few fields. The field staff were supplied with copies of forms for entry, survey numbers of plots selected, random numbers, instruction sheets and other equipments before they left for field work in the respective Pakuthies allotted to them.

V. ANALYSIS AND INFERENCES

The analysis has been done mainly for the different Pakuthies where the experiments were conducted and much stress has not been laid on Taluk as a whole since some of the Pakuthies in each Taluk had to be left out of the survey due to early harvest of the crop.

Table I gives the total estimated yield in tons of dry paddy and rice as well as the acreage under paddy in the different Pakuthies.

Table II gives the estimates of the average yield in pounds per acre of dry paddy for plots receiving G. M. F. Aid and no G. M. F. Aid separately and for plots as a whole in the different Pakuthies. The respective standard errors of estimates and percentage standard errors are also given in the same Table.

Table III gives the analysis of variance of yields from plots receiving G. M. F. Aid, Table IV, the analysis of variance of yields from plots receiving no G. M. F. Aid, and Table V, the percentage reduction factor for driage for Pakuthies of different Taluks.

The estimates of average yield for Pakuthies in Pathanamthitta, Mavelikkara and Thiruvalla are on the whole superior to those of Pakuthies in Ambalapuzha, Changanacherry and Kottayam. In certain Pakuthies like Changanacherry, Thalavady, Prakkad, Koli-mukku, Thonnallur, Thazhakkara, Mavelikara, Vijayapuram B and Nattagom the average yield from plots receiving no G. M. F. Aid is greater than the average yield from plots receiving G.M.F. Aid.* However applying the 't'-test it has been found that none of these negative differences is significant. Significant effect of G. M. F. Aid has been noticed in six pakuthies: Vazhappally, Ramankari, Thirupperumthura, Pandanad, Mallappuzhasserri and Omallur. The analysis of variance (Tables III and IV) has shown that for plots receiving G. M. F. Aid, the yield differences between Pakuthies in Taluks of Kottayam, Changanacherry and Thiruvalla are negligible unlike those between Pakuthies in Ambalapuzha, Mavelikara and Pathanamthitta. But as regards plots receiving no G. M. F. Aid there are yield differences between Pakuthies in Kottayam, Changanacherry, Ambalapuzha and Mavelikara.

VI. SUMMARY

Crop-cutting experiments were conducted in 36 Pakuthies alone of the six Taluks of Ambalapuzha, Changanacherry, Kottayam,

*This characteristic is more often due to the practice of farmers to avoid putting any sort of manure in the most fertile fields. The reason they give for this practice is their fear that any manure will effect overgrowth of the paddy plant, producing intense cluster of shoots which fall to the ground during the flowering season, giving consequently very low yields.

Mavelikara, Pathanamthitta and Thiruvalla. Estimates of average yields per acre of plots receiving Grow More Food Aid and no Grow More Food Aid for each Pakuthy were obtained separately with their respective standard errors. The yields of plots as a whole also were considered and the corresponding estimates of average yield, standard error, and percentage error computed for each Pakuthy. Total out-turn of paddy and rice in each Pakuthy also have been given. No significant differences were noticed in yields between plots receiving G. M. F. Aid and no G. M. F. Aid except in six Pakuthies of a total of 36. Analysis of variance has shown differences in yield between Pakuthies in three Taluks for plot receiving G. M. F. Aid and for 4 Taluks for plots receiving no G. M. F. Aid. No estimates for Taluks have been given due to the absence of estimates for the Pakuthies left out of the survey.

VII. ACKNOWLEDGEMENTS

It is gratifying to note that in such a short time it was possible to elicit the co-operation of the owners of the fields to do the experiment. The Tahsildars of the areas and their subordinates gave whole hearted support and co-operation by actually coming to the spot and by taking active interest in conducting the experiments.

To estimate the loss of weight due to driage of raw paddy, the sample specimens were sent to the Division of Applied Chemistry in the University. The part played by the Division of Applied Chemistry in promptly drying and weighing the samples has considerably helped in assessing the final estimates with great accuracy.

TABLE I

Total outturn of dried paddy and rice of 36 Pakuthies in
Kuttanad and neighbouring areas

Pakuthy	Area under Punja cultiva- tion in acres	Total outturn of paddy in tons	Total outturn* of rice in tons
AMBALAPUZHA TALUK			
Pulinkunnoo ..	3992	1298	892
Champakulam ..	3505	827	569
Nedumudi ..	3994	1307	898
Kainakari ..	5554	2252	1548
Alleppey ..	4837	1593	1095
Ambalapuzha ..	2201	559	384
Prakkad ..	2869	1337	919
Thakazhi ..	5790	1767	1215
Kozhimukku ..	5306	2052	1410
Thalavady ..	2060	1291	888
CHANGANACHERRY TALUK			
Changanacherry ..	2786	1848	1270
Vazhappally West ..	2669	1527	1050
Kurichi ..	1160	432	297
Neelamperur ..	1697	728	501
Chennankari ..	2761	523	360
Veliyanad ..	3293	1898	1305
Ramankari ..	2474	1248	858
Muttar ..	2317	1198	824
KOTTAYAM TALUK			
Panachikkad ..	1334	601	413
Kaipuzha ..	5400	966	664
Kumarakom ..	2962	1351	929
Kottayam ..	1200	559	384
Nattakom ..	1357	649	446
Vijayapuram A ..	207	109	75
Vijayapuram B ..	1093	859	591
MAVELIKARA TALUK			
Mavelikara ..	190	180	124
Thazhakkara ..	325	294	202
Thrippermuthura ..	1339	985	677
Kannamangalam ..	75	61	42
Thonnallur ..	49	40	28
Pandalam South ..	200	215	148

* Taking rice as 0.6875 of dried paddy. This result has been obtained by actual experimentation.

TABLE I—(cont.)

Pakuthy	Area under Punja cultiva- tion in acres	Total outturn of paddy in tons	Total outturn* of rice in tons
PATHANAMTHITTA TALUK			
Mallappuzhasseri ..	278	263	180
Omallur ..	62	67	46
THIRUVALLA TALUK			
Pandanad ..	172	112	77
Thottappuzhasseri ..	144	136	94
Thiruvanvandur ..	297	260	179
Total ..	75,949	31,392	21,582

* Taking rice as 0.6875 of dried paddy This result has been obtained by actual experimentation.

TABLE II

Estimates of Average Yield in lbs. per Acre and the corresponding Standard Errors for Plots receiving G. M. F. Aid, no G. M. F. Aid, and Plots taken as a whole in 36 Pakuthies

Pakuthy	Average yield (G. M. F. Aid)	No. of experiments	S. E.	Average yield (no G. M. F. Aid)	No. of experiments	S. E.	Average yield (all plots)	No. of experiments	S. E.	Percentage S. E.
Pulinkunnu	783.4	13	110.0	548.4	4	114.3	728.3	17	87.4	12.0
Champakulam	568.1	15	60.5	410.3	5	103.8	528.8	20	53.2	10.1
Nedumudi	744.4	21	65.7	672.0	4	73.5	732.8	25	56.6	7.7
Kanankari	926.4	21	93.7	813.5	4	334.9	910.8	25	90.3	9.9
Alleppey	737.7	7	136.1	..	..	..	737.7	7	136.1	18.4
Ambalapuzha	579.5	39	52.9	530.5	..	77.0	568.7	50	44.4	7.8
Parakkad	1036.1	34	24.9	1081.4	7	136.1	1043.6	41	30.8	3.0
Thakazhi	699.6	30	89.7	587.1	5	241.0	683.6	35	83.1	12.2
Kozhukkku	830.8	37	79.2	997.4	10	200.2	866.0	47	75.0	8.7
Thalavady	1289.1	9	146.3	1662.3	4	343.5	1403.9	13	146.3	10.4
Changanachery	1439.5	68	48.7	1540.4	48	56.2	1485.5	116	36.8	2.5
Vazhappally west	1357.6	37	81.2	928.6	8	64.7	1281.4	45	71.8	5.6
Kurichi	833.7	7	119.1	..	..	..	833.7	7	119.1	14.3
Neelamperur	961.1	12	116.6	..	..	..	961.1	12	116.6	12.1
Chennankari	..	..	..	424.5	4	76.5	424.5	4	76.5	18.0
Veliyanad	1334.9	68	43.3	1096.7	16	116.6	1291.4	84	41.6	3.2
Ramankari	1257.2	26	38.5	919.8	16	32.6	1130.1	42	36.5	3.2
Muttar	1226.2	24	70.0	1093.8	25	48.0	1158.6	49	42.7	3.7

TABLE II—(cont.)

Pakuthy	Average yield (G. M. F. Aid)	No. of experiments	S. E.	Average yield (no G. M. F. Aid)	No. of experiments	S. E.	Average yield (all plots)	No. of experiments	S. E.	Percentage S. E.
Panachikkad	1098.0	11	847	914.0	12	80.6	1002.0	23	60.8	6.0
Kaipuzha	1021.4	7	222.9	401.0	9	79.4	401.0	9	79.4	19.8
Kumarakom	1074.5	25	105.6	8.4	5	218.9	1021.4	7	222.9	21.8
Kottayam	1046.1	14	141.0	1162.7	4	182.3	1043.3	30	94.6	9.1
Nattakom	1344.8	8	182.1	1064.2	12	110.2	1072.0	18	115.2	10.7
Vijayapuram A	1712.2	3	101.1	1790.7	5	155.8	1176.6	20	100.5	8.5
Vijayapuram B	1986.9	2	250.3	2215.1	3	568.4	1761.2	8	100.0	5.7
Mavelikara	2001.3	30	109.1	2084.7	11	128.1	2123.7	5	326.2	15.4
Thazhakkara	1753.8	23	81.8	1344.0	8	100.3	2023.8	41	85.5	4.2
Thrippurumthura	1830.9	6	221.5	1820.0	4	240.0	1647.9	31	72.9	4.4
Kannamangalam	1774.1	24	107.7	1847.8	9	179.8	1826.7	10	155.3	8.5
Thonnallur	2584.5	5	227.6	2125.9	3	95.1	1836.5	33	91.1	5.0
Pandalam South	2224.1	27	83.6	1645.6	6	102.9	2412.5	8	136.2	5.6
Mallappuzhasseri	2531.5	22	123.6	1690.8	4	117.9	2119.0	33	80.6	3.8
Omaller	1758.3	5	140.1	1403.3	30	80.6	2404.4	26	121.5	5.0
Pandanad	2173.1	39	67.6	1419.5	3	278.6	1454.0	35	74.2	5.1
Thottapuzhasseri	1957.3	12	161.3	...	...	...	2119.3	42	70.6	3.3
Thiruvandoor	...	...	...	...	...	...	1957.3	12	161.3	8.2

TABLE III
Analysis of Variance of Plot Yields—(Fields which received G. M. F. Aid)

Taluk	Total sum of squares	D. F.	Between Pakuthies	D. F.	Variance $\frac{1}{2}$ (lb.)	Within Pakuthies	D. F.	Variance $\frac{1}{2}$ (lb.)	F.
1. Ambalapuzha	1491.04	225	293.64	9	32.63	1197.40	216	5.54	5.89**
2. Changanacherry	1366.96	241	36.53	6	6.09	1330.43	235	5.66	1.03
3. Kottayam	655.67	67	64.63	5	12.93	591.04	62	9.53	1.36
4. Mavelikara	1027.57	89	138.16	5	27.63	889.41	84	10.59	2.61*
5. Pathanamthitta	512.08	48	44.70	1	44.70	467.38	47	9.94	4.50*
6. Thiruvalla	454.69	55	40.26	2	20.13	414.43	53	7.82	2.57

TABLE IV
Analysis of Variance of Plot Yields—(Fields which did not receive G. M. F. Aid)

Taluk	Total sum of squares	D. F.	Between Pakuthies	D. F.	Variance $\frac{1}{2}$ (lb.)	Within Pakuthies	D. F.	Variance $\frac{1}{2}$ (lb.)	F.
1. Ambalapuzha	596.18	53	235.24	8	29.41	360.94	45	8.02	3.67**
2. Changanacherry	878.62	116	397.51	5	79.50	481.11	111	4.33	18.36**
3. Kottayam	444.42	46	258.07	5	51.61	186.35	41	4.55	11.34**
4. Mavelikara	416.68	37	128.39	5	25.68	288.29	32	9.01	2.85*
5. Pathanamthitta	19.10	9	0.19	1	0.19	18.91	8	2.36	..
6. Thiruvalla	253.55	32	14.77	1	14.77	238.78	31	7.70	1.92

* Denotes significance at 5 per cent level.

** Denotes significance at 1 per cent level.

TABLE V

Percentage Reduction Factor for Driage for Taluks

Taluk	Percentage reduction factor
Amblapuzha	88.42
Changanacherry	88.44
Kottayam	86.76
Mavelikara	83.48
Pathanamthitta	84.54
Thiruvalla	85.85

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