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GOVERNMENT OF KERALA

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

1973 - 74



GOVERNMENT OF KERALA
1974

BUREAU OF ECONOMICS AND STATISTICS
KERALA

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REPORT ON THE CROP CUTTING SURVEY ON AUTUMN CROP OF PADDY 1973-'74

I. Introduction

As Kerala is not a reporting State as regards statistics of area under crops, the State has been adopting the method of sample surveys to assess the acreage under the various crops. For determining the average production of crops also sample surveys are conducted. The Bureau of Economics and Statistics has been conducting the sample surveys in this State with these aims in view. Due to inadequate facilities, objective yield estimation surveys are at present conducted on a regular basis only in respect of paddy and tapioca. In respect of the other crops, results of adhoc surveys and conventional estimates are being utilised for framing the production estimates.

The crop cutting survey on paddy is conducted regularly during all the three major crop seasons in the State, namely, autumn (Virippu), winter (Mundakan) and summer (Puncha). The main objective of this survey is to estimate the average yield of paddy per unit area at the State level with reasonable degree of accuracy. The survey has been helpful to provide yield rates at the State level with much precision but due to the small number of experiments conducted, the yield rates framed at the district level and taluk level are not having the desired level of accuracy or in other words the standard errors of the yield rates at the district and taluk levels are comparatively very high and therefore these results cannot be used for any administrative purpose at these levels with desired level of confidence. Due to the paucity of funds, it has not been possible to employ more Investigators for this item of work and therefore the sample size could not be so far increased to any significant extent. The normal sample size adopted for the survey had been 18 experiments per taluk to be conducted in 6 randomly selected villages at the rate of 3 experiments per village. Due to the heterogeneity in the nature of paddy cultivation obtaining in the State, this sample size is too inadequate to provide, reliable yield rates at the taluk level and even at the district level.

But recently the necessity for data of the yield rates at lower levels is being felt more and more urgent as the yield rates are being considered as a tool for stratifying the different regions for various purpose of administration. The Department of Agriculture has adopted the new strategy of identifying potential pockets of area for development and concentrating on the development of these pockets on a much quicker pace. To evaluate the benefits of this increased tempo of activities it has been necessary to assess the increase in the yield rates obtaining in these pockets. The changes that may come up in these pockets will naturally spread to the neighbouring areas and therefore reliable yield rates at least at the taluk level will provide the necessary tool to evaluate broadly the new approach of development in the agricultural sector. Further, to assess the acreage under the high yielding varieties of paddy, the present sample size does not give adequate data to

estimate the acreage at the taluk level or even at the district level. As the spread of high yielding varieties is not uniform in the various parts of the State, it is not possible to assess the extent under high yielding varieties in each of these regions with the present sample size. It has therefore been long felt that these limitations can be either removed or lessened to a very large extent by increasing the sample size to an appreciable extent.

It was under this context, that the Department of Agriculture had agreed to provide necessary funds for enabling this Bureau to implement a scheme on crop cutting survey with enlarged sample size. It was originally intended to implement the scheme during the autumn crop season of this year. But due to administrative reasons the scheme could not be implemented during the autumn season and it is now being implemented during the current winter crop season.

Meanwhile, proposal to discontinue the land utilisation survey of the Bureau from which area estimates are being framed and to introduce at the instance of the Government of India Timely Reporting Scheme in the State on a miniature form from this year onwards had been forwarded to Government of India and the sanction for implementing this scheme during this year was being awaited. Therefore the first round of the land utilisation survey usually commencing from July was not taken up anticipating sanction of Government of India for implementing the Timely Reporting Scheme in the State. The services of the Investigators attending to the L. U. S. were thus fully available for the crop cutting survey during the autumn crop season.

It was therefore possible to enhance the sample size of the crop cutting survey on the autumn crop of paddy without any additional expenditure on the staff.

2. Objectives of the survey with enhanced sample size

The main objectives of the survey conducted during the autumn crop season were—

- (1) to frame reliable estimates on the average yield rates of paddy at the district levels and taluk levels.
- (2) to assess the acreage under high yielding varieties in each district.
- (3) to assess the yield rates at the district level separately for high yielding varieties and other varieties.
- (4) As autumn crop of paddy is usually a rain-fed crop in the State estimates on yield rates separately for irrigated fields and non-irrigated fields were not aimed from the survey.

3. Sample size

The total number of experiments to be conducted in the State during the autumn crop season was fixed as 2000 spread over 400 randomly selected villages at the rate of 5 experiments per village.

4. Sampling Design

Each taluk was considered as a separate stratum. The total sample size of 400 villages was allocated among the different taluks in the joint consideration of the area under Autumn crop of paddy and the availability of Investigators.

Then the required number of sample villages in each taluk was selected at random from the list of villages in the taluk growing Autumn crop of paddy. A list of paddy growing plots in each of the sample villages was then prepared. From this list, 5 paddy growing plots were selected at random using systematic method of selection.

From each of these 5 plots in a sample village a patch of paddy was again selected at random and in the selected patch a square plot of size 5 m x 5 m was randomly located for conducting the harvesting experiment. Thus in each of these sample villages, it was programmed to conduct 5 experiments.

To work out the loss due to drriage, it was envisaged to conduct drriage experiments in respect of a fifth of the total number of experiments.

5. Staff for the field work

As the field work relating to the first round Land Utilisation Survey was not taken up, the regular Investigators attending to the L. U. S. were fully drafted for the Crop Cutting Survey and on an average each Investigator had to attend to the work connected with the Crop Cutting survey in 4 villages.

6. Supervision of the field work

The Statistical Inspectors and the District Statistical Officers provided the necessary training and guidance to the Investigators for the conduct of the survey. By conducting harvest stage inspection, these officers could ensure qualitative improvement in the field work.

7. Period of the Survey

The period from July to October 1973 was taken as the period of the Survey. Due to the late showing, harvest of Autumn crop of paddy was not over even towards the end of October. Therefore the filled-in schedules were received in the Head Office only by the end of November, 1973.

8. Analysis.

The analysis of the data collected through this survey with enhanced sample size was done by the regular staff of the Bureau.

PART II—RESULTS OF THE SURVEY

The following discussion is mainly based on the results obtained from the Crop Cutting Survey conducted under the state series of experiments. As a part of the Package Programme, a separate series of Crop Cutting

Experiments under the I. A. D. P. series is being conducted in the Alleppey and Palghat Districts. The final yield rates at the District level and state level are being framed by integrating these two series. Therefore the final yield rates for Alleppey, Palghat and the State are different from those estimates from the experiments of State series alone.

The relevant tables are given at the end of the report.

Table 1.

Estimates on the acreage under and production of rice at State level.

The area under the Autumn crop of paddy, the average yield rate of dry paddy and the production of rice separately for high yielding varieties and others at the State level are given in this table. The total area under the Autumn crop of paddy of the current year is estimated as 392765 hectares and the quantity of rice produced during the season is estimated as 585985 tonnes (unpooled).

The average yield rate of dry paddy per hectare for the Autumn crop is estimated as 2271 kg. ranging from 2779 kg. per hectare for fields with High Yielding Varieties to 2033 kg. per hectare for fields with other varieties of paddy.

The area under High Yielding Varieties in the State during the Autumn crop of paddy is estimated as 125292 hectares which comes to 31.9% of the total paddy area during the Autumn crop of paddy.

The mean yield of dry paddy per hectare and the production of rice at the State level come to 2347 kg. and 605595 tonnes respectively when the results of the two series namely State series and I. A. D. P. series are integrated. Both the yield rates and production figure for the Autumn crop of this year show increases over the corresponding figures of the Autumn crop of the previous year. The percentage increase in the yield rate of paddy comes to about 5 and that in the production of rice to 5.1.

Table 2.

District-wise break-up of the area under and production of Autumn crop of paddy.

The area under Autumn crop of paddy is estimated as 392765 hectares against the acreage of 391900 hectares during the corresponding season of the previous year.

In respect of the area under the crop there is not any significant increase or decrease in any of the Districts when compared with the acreages under the crop during the corresponding season of the previous year.

The mean yield of dry paddy from the Autumn crop of paddy is estimated as 2347 kg./hectare against the corresponding yield rate of 2237 kg./hectare for the Autumn Crop of the previous year. The average yield rate is found to range from 3241 kg./hectare in Palghat to 1161 kg./hectare in Kozhikode District. The yield rate has shown a fall from that

of the previous year in Trivandrum, Kottayam and Ernakulam Districts and this fall is very severe in the Ernakulam District. In all the other districts, there is an increase in the yield rate. The increase in the yield rate is quite significant in Quilon, Alleppey, Idikki, and Palghat Districts.

The gross production of rice from autumn crop of this year is estimated as 605590 M. tonnes as against the estimate of production of 576192 M. tonnes for the corresponding season of the previous year. This shows an increase of 5.1% in the current year's production of autumn crop of paddy.

As the increase or decrease of the area under autumn crop of this year over the corresponding figure of the previous year is not very significant, the production figure for each district has reflected the trend of the yield rate in the respective district.

Palghat District covering about 26% of the area under autumn crop of paddy in the State produces as much as 36% of the total production of rice in the State during the autumn crop season.

Table 3:

District-wise break-up of area under, mean yield of dry paddy and production of rice, separately for high yielding varieties and other varieties.

This table gives the area under high yielding varieties of paddy in each district during the autumn crop season of 1973-74. Palghat District is found to have the largest acreage under high yielding varieties with 46535 hectares followed by Trichur with 15486 hectares. Kozhikode District is found to have the minimum acreage under high yielding varieties with only 2480 hectares.

The mean yield of dry paddy per hectare from high yielding varieties is estimated as 2779 Kg. This rate is maximum for Palghat District with 3348 Kg. and is minimum for Kozhikode District with only 1358 Kg. In comparison with the yield rates of non-high yielding varieties, the yield rates obtained from high yielding varieties do not show spectacular increases mainly due to the fact that the virippu season with the excessive rain does not help to exploit the full potentialities of the high yielding varieties.

The average yield rate of paddy including both high yielding varieties and others is estimated as 2271 Kg./hectare for the State as a whole. While the rates for Alleppey, Idikki, Palghat and Malappuram are found to be higher than the State average, the rates for other districts are less than the State average. The yield rate is maximum for Palghat District with 2904 Kg./hectare and is minimum for Kozhikode District with 1161 Kg./hectare (unpooled estimates).

Table-4. 1.

Taluk wise area under, mean yield and production of rice during the autumn crop of paddy.

This table gives the information on the area under, mean yield of dry paddy and production of rice for the autumn crop of paddy. For comparative purposes the corresponding figures for the autumn crop of the previous year are also given.

The mean yield for the autumn crop is the highest for Chittur taluk with 3846 Kg./ hectare and is lowest in Quilandy taluk with only 1121 Kg./ hectare. For the previous autumn season, Alathur taluk recorded the maximum yield rate with 3691 Kg./hectare and Kozhikode taluk, the minimum with only 812 Kg./hectare.

Table—4. 2: gives the taluk wise estimates on the standard areas and tables 4. 3 shows the analysis of variance. Table 4. 4 gives the average ratio for converting wet paddy into dry paddy.

Table 5:

Information on maximum, minimum and average yield rates of paddy for each taluk.

On the basis of the experiments conducted during the autumn crop of paddy, the information on the maximum, minimum and the average yield rates of paddy (in terms of dry paddy) separately for high yielding varieties and others is given in this table. This table will help to gauge the range between the maximum and minimum yield rates obtained in a taluk and also to study the deviations from the average yield rates.

For high yielding varieties of paddy, the maximum yield rate recorded during the autumn crop season of this year was in Alathur Taluk with 6505 Kg./ hectare and minimum in Kozhikode Taluk with only 28 Kg./ hectare. The plot in the Kozhikode taluk with this low yield rate was reported to have been affected by severe pest attack. The difference between maximum and minimum yield rates in almost all taluks was found to be very significant.

In respect of other varieties also Palghat District recorded the maximum yield rate with 5432 Kg./ hectare in Chittur Taluk and minimum in Trichur District with only 123 Kg./hectare in Trichur Taluk. The difference between the maximum and minimum yield rates is quite significant in the case of non-high yielding varieties also.

Table 6:

Frequency distribution of plot yields :

In this table, the frequency distribution of the plot yields obtained from the crop cutting experiments conducted during the autumn crop season is given separately for each district and also for the State as a whole.

The average yield rate of wet paddy per hectare is found to be maximum in Idikki District with 3031 Kg. closely followed by Palghat District with 3004 Kg. The average under Autumn Crop of paddy in the Idikki District is only 4034 hectares, the high yield rate in Idikki District does not influence much on the production level of the State. Excluding Idikki District, Palghat District tops the list in respect of the average yield rates.

The rate is minimum in Calicut district with only 1441 Kg. of wet paddy per hectare.

The average yield rate of wet paddy at the State level is estimated as 2385 Kg./hectare.

The frequency table, helps to gauge the variation in the yield rates. At the State level, nearly 52% of the Cultivators are getting yield rates less than the average yield rate for the State. These variations are contributed by all the Districts except Idikki where only 16% of the fields had recorded the yield rates less than the State average and the minimum yield rate recorded was more than 1500 Kg./hectare.

At the State level nearly 1.8% of the fields are found to have recorded an yield rate less than 500 Kg./hectare. This low yield rate is shared mainly by Kozhikode, Ernakulam, Alleppey and Cannanore Districts. In Kozhikode District, it is significant to note that not even a single plot had recorded an yield rate more than 3500 Kg./hectare. Nearly 57% of the fields are found to have recorded a yield rate less than the State average yield rates.

Table 7: Distribution of High yielding Varieties fields according to the variety chosen.

This table gives the percentage of the plots grown with one or other of the recognised high yielding varieties to the total number of plots selected for harvesting experiments. This percentage is found to be highest in Idikki with 56.7. But Idikki District is having only a small percentage of the total area under autumn crop of paddy in the State. Alleppey, Kottayam, Idikki, Trichur and Palghat are all found to have more than 40% of the area under paddy grown with one or other of the high yielding varieties.

At the State level nearly 32% of the plots under Autumn paddy was found to have grown high yielding varieties of paddy.

The table helps to project the comparatively very high preference of the cultivators for the varieties Jaya and I. R. 8 followed in order by Annapurna, Thriveni and Aswathi. While I R 8, is highly accepted in all the Districts, the acceptance of Jaya is mainly confined to Quilon, Alleppey and Kottayam Districts.

The table also shows the declining demand for the variety TN-1 which was once having a significant role in the spread of high yielding varieties

in the State. The table helps to identify the particular varieties which find wide acceptance among the cultivators during the autumn crop season. As a result, the extension work to propagate high yielding varieties can be oriented in such a way as to encourage the cultivation of those high yielding varieties in the different districts, giving due recognition to the particular varieties having wider acceptance among the cultivators in the respective districts.

Table 3. The talukwise mean yield of dry paddy per hectare during the Autumn season of the last five years are given in this table for comparative purposes.

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.

$$\text{Taluk mean } \bar{X} = \sum_{i=1}^k \sum_{j=1}^{n_i} x_{ij} \left| \begin{array}{l} k \\ \sum_{i=1}^k n_i \end{array} \right.$$

Where n_i = Number of cuts taken in the i th village ($i = 1, 2, \dots, k$)

x_{ij} = Weight of paddy taken from the j th cut in the i th village/kara ($j = 1, 2, 3, \dots, n_i$)

Each cut is taken from $(1/400)$ th of a hectare. Mean yield of dry paddy in kg./hect. = $\bar{x} \times 400 \times d$ where d is the drriage ratio of dry paddy to wet paddy.

(ii) *Standard Error (S. E.) of the taluk mean yield*: Variance of the taluk mean yield = $\frac{A}{N} + \frac{B-A}{m} \times \frac{\sum n_i^2}{N^2}$

Where 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.

$$m = \frac{N^2 - \sum n_i^2}{N(k-1)}$$

k = Number of villages selected in the taluk.

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

(iii) *Standard error of the State mean yield.*—The formula used for the purpose is indicated below :—

$$\text{Standard error of the State mean yield} = \sqrt{\frac{\sum (ai si)^2}{(\sum ai)^2}}$$

Where ai = Area under the crop in the ith taluk.

si = the standard error of the estimate of mean yield in the ith taluk.

The weight of cleared rice is reckoned as 65.7% of dry paddy and accordingly the total production of rice in the state during Autumn season of 1973 was estimated to be 605595 tonnes (pooled estimate).

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 estimated as detailed below.

The following formula is used for pooling of the estimates of mean yields:

$$\text{Pooled mean yield} = \frac{V_2 X_1 + V_1 X_2}{V_1 + V_2}$$

Where X_1 and X_2 are the mean yields of the District under State series and I. A. D. P. series of experiments respectively while V_1 and V_2 are their respective sampling variances.

The standard error of the pooled mean yield of the District is given by the formula.

$$\sqrt{\frac{1}{\frac{1}{V_1} + \frac{1}{V_2}}}$$

The yield obtained through the two series and pooled estimate are given below:—

Series	Mean yield of dry paddy (Kgs./Hect.)		Production of rice Tonnes	
	Alleppey	Palghat	Alleppey	Palghat
1	2	3	4	5
State series	2304	2904	40173	193638
I. A. D. P. series	2089	3447		
Pooled	2139	3241	37300	216121

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'.

Table I

ESTIMATED AREA UNDER, MEAN YIELD AND
PRODUCTION OF RICE IN KERALA
DURING AUTUMN CROP
(VIRIPPU) OF PADDY
1973-74

Sl. No.	Name of crop	Area under Autumn Crop of Paddy (Hectare)		Mean yield of dry paddy (Kg./Hectare)		Production of Rice (Tonnes)	
		1972	1973	1972	1973	1972	1973
1	High yielding varieties of paddy	94291	125292	2339	2779	220546	228749
2	Other varieties of paddy	297609	267473	1667	2033	325896	357236
	Total Autumn crop of paddy	391900	392765	2122 (2237)	2271 (2347)	546442 (576192)	585985 (603595)

Notes—Figures given within brackets relate to the estimates framed after integrating the results of the two separate series of experiments namely state series conducted by the Bureau of Economics and Statistics, and I. A. D. P. series conducted in Palghat and Alleppey Districts by the I. A. D. P. staff.

TABLE-2

ESTIMATED AREA UNDER, MEAN YIELD AND PRODUCTION OF RICE FROM AUTUMN CROP OF PADDY 1973-74.

Sl. No.	District	Area under autumn crop of paddy (Hectares)		Mean Yield of dry paddy (Kg./Hectares)		Production of rice from Autumn Crop of Paddy (Tonnes)		Pooled estimate
		1972	1973	1972	1973	1972	1973	
1	Trivandrum	18355	18484	2330	2164	23097	26277	
2	Quilon	21185	21240	1724	2153	23998	30045	
3	Alleppey	26568	26542	1670	2304	29144	40173	
		(26568)	26542	1731	2139	30214	37300	
4	Kottayam	7845	7917	2327	2259	11992	11752	
5	Iddikki	4056	4034	2093	2713	5576	7191	
6	Ernakulam	37030	37261	2405	1927	58516	47171	
7	Trichur	34310	35028	1661	2001	37961	46054	
8	Palghat	101042	101497	2670	2904	177178	193638	
		(101042)	101497	3101	3241	205858	216121	
9	Malappuram	50508	50636	2190	2276	72663	75720	
10	Kozhikode	25342	24969	1140	1161	18973	19040	
11	Cannanore	65159	65157	1924	2077	82344	88923	
	STATE	391900	392765	2122	2271	546442	585985	
		(391900)	392765	2237	2347	576192	605590	

TABLE-3
COMPARISON OF THE ESTIMATED AREA, MEAN YIELD AND PRODUCTION OF HIGH YIELDING AND OTHER VARIETIES OF PADDY DURING AUTUMN 1973.

Sl. No.	District	H. Y. V.	Total	No. of experiments conducted		Per centage of HVV experiments to total No. of experiments.																		
				High Yielding Varieties	Other varieties	Area (Hect.)		Mean yield of dry paddy (Kg./Hect.)		Production of rice (tonnes)		Area (Hect.)		Mean yield dry paddy (kg./Hect.)		Production of rice (tonnes)		Area (Hect.)		Mean yield dry paddy (kg./Hect.)		Production of rice (tonnes)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	
1	Trivandrum	19	148	12.8	2581	2401	4071	15903	2125	22206	18484	2164	26277											
2	Quilon	69	237	29.1	6746	2289	10145	14494	2090	19900	21240	2153	30045											
3	Alleppey	111	235	47.2	13675	2961	26603	12867	1605	13570	26542	2304	40173											
4	Kottayam	103	207	49.8	4303	2356	6661	3614	2144	5091	7917	2259	11752											
5	Idikki	17	30	56.7	2497	2915	4782	1537	2385	2409	4034	2713	7191											
6	Ernakulam	58	179	32.4	13178	1938	16779	24083	1921	30392	37261	1927	47171											
7	Trichur	70	173	40.5	15486	1951	19850	19542	2041	26204	35028	2001	46054											
8	Palghat	81	193	42.0	46535	3348	102360	54962	2528	91278	101497	2904	193638											
9	Malappuram	35	148	23.6	13045	2996	25678	37531	2026	50042	50636	2276	75720											
10	Kozhikode	11	121	9.1	2480	1358	2213	22489	1139	16827	24969	1161	19040											
11	Cannanore	11	163	6.7	4766	3963	9607	60891	1999	79317	65157	2077	88924											
	STATE	585	1834	31.9	125292	2779	228749	267473	2033	357236	392765	*2271	*585985											

*unpooled estimate.

TABLE No. 4.1
AUTUMN CROP OF PADDY—1972&1973

1973

1972

Sl. No.	Taluk and District	No. of Crop Cutting expts	Area in Hect.	Mean yield of paddy Kg./Hec.	Production M. T.	No. of experiments	Area in Hec.	Mean yield Kg./Hec.	Production M. T.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.	Neyyattinkara	18	5716	2797	10504	58	5887	2273	8791
2.	Trivandrum	18	4179	2633	7229	30	4137	2530	6877
3.	Nedumangad	8	4867	1633	5222	30	4867	1645	5260
4.	Chirayinkil	17	3593	2178	5142	30	3593	2266	5349
	TRIVANDRUM DISTRICT	61	18335	2330	28097	148	18484	2164	26277
5.	Quilon	17	2859	1456	2735	25	2859	2276	4275
6.	Kottarakkara	18	6331	1130	4700	55	6331	2024	8419
7.	Kunnathur	18	3972	1628	4248	60	3972	1707	4455
8.	Pathanapuram	18	4355	2730	7813	42	4400	2537	7334
9.	Pathanamthitta	17	1107	1704	1239	25	1118	2068	1519
10.	Karunagappally	18	2560	1940	3263	30	2560	2404	4043
	QUILON DISTRICT	106	21185	1724	23998	237	21240	2153	30045
11.	Karthigappally	15	5623	1336	4935	48	5623	2382	5800
12.	Mavelikara	16	3736	1512	3711	51	3736	2474	6073
13.	Chengannur	16	1970	2882	3730	25	1990	2301	3008
14.	Thiruvalla	15	1790	2005	2358	28	1772	2562	2983
15.	Kuttanad	16	6122	2069	8322	29	6122	2907	11693
16.	Ambalapuzha	16	903	1152	684	26	941	2379	1471
17.	Sherattilay	18	6422	1231	5401	28	6353	1471	6145
	ALLEPPEY DISTRICT	112	26563	1731	30214	235	26542	2304	40173
								2139	37300

39.	Chittur	14	18560	2804	34081	27	19240	3846	48616
40.	Alathur	18	20289	3631	48400	29	20289	3371	44935
41.	Palghat	17	26463	2935	51029	49	26463	2754	47882
42.	Ottappalam	15	28490	1809	33860	56	28205	2217	41082
43.	Mannarghat	18	7300	2045	9803	30	7300	2319	11122
	PALGHAT DISTRICT	82	101042	2670	177178	191	101497	2904	193637
			3101	205858			3244	3244	216121
44.	Perinthalmanna	18	13404	2293	20193	30	13672	2613	23471
45.	Ponnani	18	7012	2200	10135	30	6872	2433	10985
46.	Tirur	18	10512	2505	17301	30	10512	2514	17363
47.	Ernad	18	19580	1946	25034	58	19580	1858	23902
	MALAPPURAM DISTRICT	72	50508	2190	72663	148	50636	2276	75720
			812	4129			7895	1209	6271
48.	Kozhikode	14	7740	812	4129	39	7895	1209	6271
49.	Quilandy	18	11119	1235	9022	54	10785	1121	7943
50.	Badagara	18	6483	1367	5822	28	6289	1168	4826
51.	South Wynad	..	..	..	..	..	..	..	..
	KOZHIKODE DISTRICT	50	25342	1140	18973	121	24969	1161	19040
			8956	8114			8956	2079	12233
52.	North Wynad	17	8956	1379	8114	30	8956	2079	12233
53.	Tellicherry	18	9860	1866	12088	30	9761	1630	10453
54.	Can. anore	15	10238	2140	14394	27	10238	2138	14381
55.	Taliparamba	12	13227	1800	15642	37	13095	2246	19323
56.	Hosdurg	18	22878	2136	32106	39	23107	2143	32534
57.	Kasargode	80	65159	1924	82344	163	65157	2078	88924
	CANNANORE DISTRICT	827	391900	2122	546442	1832	392765	2271	585985
	State		2237	576192				2347	605595

TABLE 4.2
CROP CUTTING RESULTS
Autum crop of Paddy 1973

Taluk and District	No. of experiments	Area in (Hec.)	Mean yield of dry paddy (Kg./Hec.)	S. E. of the mean yield	Production of rice in tonnes
(1)	(2)	(3)	(4)	(5)	(6)
1. Neyyattinkara	53	5887	2273	139	8791
2. Trivandrum	30	4137	2530	214	6877
3. Nedumangad	30	4867	1645	184	5260
4. Chirayinkil	30	3593	2266	121	5349
Trivandrum District	148	18484	2164	86	26277
5. Quilon	25	2859	2276	163	4275
6. Kottarakkara	55	6331	2024	155	8419
7. Kunnathur	60	3972	1707	66	4455
8. Pathanapuram	42	4400	2537	125	7334
9. Pathanamthitta	25	1118	2068	239	1519
10. Karunagappally	30	2560	2404	151	4043
Quilon District	237	21240	2153	63	30045
11. Karthigappally	48	5623	2382	149	8800
12. Mavelikkara	51	3736	2474	121	6073
13. Chengannur	25	1990	2301	336	3008
14. Thiruvalla	28	1772	2562	276	2984
15. Kuttanad	29	6122	2907	400	11692
16. Ambalappuzha	26	941	2379	523	1471
17. Sherthallay	28	6358	1471	333	6145
Alleppey District	235	26542	2304	132	40173
18. Changanacherry	58	1854	2232	120	2719
19. Kanjirappally	15	64	2093	120	88
20. Kottayam	59	2683	1849	173	3259
21. Vaikom	30	1412	2529	211	2346
22. Meenachil	45	1904	2670	143	3340
Kottayam District	207	7917	2259	83	11752
23. Peermade	Nil	Nil	Nil	..	Nil
24. Devikulam	5	238	2948	..	558
25. Udumbanchola	Nil	Nil	Nil	..	Nil
26. Thodupuzha	25	3746	2695	197	6633
Idikki District	30	4034	2713	197	7191

	(1)	(2)	(3)	(4)	(5)	(6)
27. Kothamangalam	}	27	7741	2048	135	10416
28. Muvattupuzha						
29. Cochin		23	3272	2112	222	4540
30. Kanayannur		51	8284	1836	234	9993
31. Kunnathunad		27	7534	2032	229	10058
32. Alwaye		25	6757	1768	134	7849
33. Parur		26	3673	1788	168	4315
Ernakulam District		179	37261	1927	83	47171
34. Cranganore		30	377	1337	88	331
35. Mukundapuram		30	7660	1962	75	9874
36. Trichur		28	7217	2083	192	9877
37. Thalappally		60	16174	2061	119	21901
38. Chowghat		25	3600	1721	112	4071
Trichur District		173	35028	2001	71	46054
39. Chittur		29	19240	3846	230	48616
40. Alathur		29	20289	3371	351	44935
41. Palghat		49	26463	2754	170	47882
42. Ottappalam		56	28205	2217	166	41083
43. Mannarghat		30	7300	2319	132	11122
Palghat District		193	101497	2904	105	193638
44. Perinthalmanna		30	13672	2613	200	23471
45. Ponnani		30	6872	2433	375	10985
46. Tirur		30	10512	2514	273	17363
47. Ernad		58	19580	1858	127	23901
Malappuram District		148	50636	2276	106	75720
48. Kozhikode		39	7895	1209	75	6271
49. Quilandy		54	10785	1121	93	7943
50. Badagara		28	6289	1168	163	4826
51. South Wynad Kozhikode		121	24969	1161	62	19040
52. North Wynad	}	30	8956	2079	363	12233
53. Tellicherry						
54. Cannanore		27	10238	2138	153	14381
55. Taliparamba		37	13095	2246	302	19323
56. Hosdurg		39	23107	2143	119	32534
57. Kasargode		163	65157	2077	94	88924
Cannanore District		163	65157	2077	94	88924
STATE		1834	392765	2271	37	585985

TABLE 4.3

AUTUMN CROP OF PADDY 1973

Analysis of Variance of Plot Field Pooled for the State in
Kgs. Plot of 1/400 of an Hectare

Source of variation	Sum of squares	Degrees of freedom	Variance
(1)	(2)	(3)	(4)
Between Taluk	3322.58	50	66.45**
Between kara within Taluk	3819.22	340	12.23**
Within kara within Taluk	7035.84	1438	4.89
All	14177.64	1828	

**Significant at 1% level.

TABLE 4.4

THE RESULTS OF DRIAGE EXPERIMENTS

Autumn Crop of Paddy 1973

Name of Taluk	No. of Experiments	Driage rate (Percentage)
(1)	(2)	(3)
1. Neyyattinkara	10	90.0
2. Trivandrum	6	87.7
3. Nedumangad	6	83.7
4. Chirayinkil	6	89.0
TRIVANDRUM DISTRICT	28	89.0
5. Quilon	6	84.7
6. Kottarakkara	11	92.3
7. Kunna'hur	12	85.2
8. Pathanapuram	7	93.6
9. Pathanamthitta	6	85.6
10. Karunagappally	6	85.5
QUILON DISTRICT	48	88.1
11. Karthigappally	10	89.6
12. Mavelikkara	11	90.9
13. Chengannur	5	90.8
14. Thiruvalla	4	87.2
15. Kuttanad	6	92.4
16. Ambalapuzha	4	92.4
17. Shertallay	6	89.7
ALLEPPEY DISTRICT	46	90.4
18. Changanacherry	10	90.9
19. Kanjirappally	3	92.4
20. Kottayam	11	92.8
21. Vaikom	6	92.7
22. Meenachil	9	93.2
KOTTAYAM DISTRICT	39	92.4
23. Peermade	—	—
24. Devicolam	1	94.0
25. Udubanchola	—	—
26. Thodupuzha	5	86.4
IDIKKI DISTRICT	6	89.3

(1)	(2)	(3)
27. Kothamangalam	—	—
28. Muvattupuzha	5	—
29. Cochin	5	88.8
30. Kanayannur	8	90.4
31. Kunnathunad	5	89.0
32. Alwaye	4	87.9
33. Parur	5	89.8
ERNAKULAM DISTRICT	32	88.8
34. Cranganore	6	89.1
35. Mukundapuram	5	86.7
36. Trichur	6	87.6
37. Thalappally	12	87.5
38. Chowghat	3	87.7
TRICHUR DISTRICT	32	87.7
39. Chittur	4	87.5
40. Alathur	2	90.0
41. Palghat	9	90.0
42. Ottappalam	8	76.9
43. Mannarghat	5	89.2
PALGHAT DISTRICT	28	89.2
44. Perinthalmanna	6	85.4
45. Ponnani	4	92.7
46. Tirur	6	93.2
47. Ernad	12	91.1
MALAPPURAM DISTRICT	28	91.8
48. Kozhikode	7	92.1
49. Quilandy	9	73.1
50. Badagara	6	85.5
51. South Wynad	—	84.5
KOZHIKODE DISTRICT	22	—
52. North Wynad	—	81.6
53. Tellicherry	6	—
54. Cannanore	6	90.0
55. Taliparamba	4	88.3
56. Hosdurg	7	89.0
57. Kasargode	7	92.3
CANNANORE DISTRICT	30	91.4
STATE	339	90.4
		88.9

TABLE—5

MAXIMUM AND MINIMUM YIELD RATES OF DRY PADDY
RECORDED IN THE CROP CUTTING SURVEY ON
AUTUMN CROP OF PADDY 1973-74

Taluk and District	Kg/Hectare				Average yield for the taluk
	High Yielding Varieties		Other Varieties		
	Maximum	Minimum	Maximum	Minimum	
(1)	(2)	(3)	(4)	(5)	(6)
1. Neyyattinkara	3348	1962	4284	432	2273
2. Trivandrum	4824	2778	3350	1438	2530
3. Nedumangad	1894	823	3316	642	1645
4. Chirayinkil	2905	2136	3845	534	2266
TRIVANDRUM DISTRICT	4324	823	4284	432	2164
5. Quilon	2456	1796	3488	1120	2276
6. Kottarakkara	3324	552	3732	972	2024
7. Kunnathur	2692	1396	2760	988	1707
8. Pathanapuram	3932	1272	3464	1492	2537
9. Pathanamthitta	3220	1368	3768	872	2068
10. Karunagappally	3592	684	2908	1472	2404
QUILON DISTRICT	3932	552	3768	872	2154
11. Karthigappally	5107	860	3548	491	2382
12. Mavelikara	4272	618	4581	855	2474
13. Chengannur	*4398	4398	4446	545	2301
14. Thiruvalla	*3314	3314	4726	785	2762
15. Kuttanad	5618	924	998	776	2907
16. Ambalapuzha	4583	118	1774	591	2379
17. Shertallay	*1435	1435	3911	197	1471
ALLEPPEY DISTRICT	5618	618	4726	197	2304
18. Changanacherry	4269	765	3861	854	2232
19. Kanjirappally	3234	2025	4213	887	2093
20. Kottayam	3564	687	4696	219	1849
21. Vaikom	5518	1669	3308	834	2529
22. Meenachil	4474	1547	3803	410	2670
KOTTAYAM DISTRICT	5518	687	4696	219	2259
23. Peermade	..	..	..	..	..
24. Devicolam	*2914	2914	3290	2444	2948
25. Udumbanchola	..	..	..	..	..
26. Thodupuzha	3607	1627	3324	1450	2695
IDIKKI DISTRICT	3607	1627	3324	1450	2712

	(1)	(2)	(3)	(4)	(5)	(6)
27. Kothamangalam						
28. Muvattupuzha		4369	966	2685	817	2048
29. Cochin		4809	651	2112
30. Kanayannur		3275	388	3649	285	1836
31. Kunnathunad		3516	563	3832	580	2032
32. Alwaye		3233	952	2191	808	1768
33. Parur		2753	373	2859	426	1788
ERNAKULAM DISTRICT		4369	373	4809	285	1927
34. Cranganore		2726	378	2580	933	1337
35. Mukundapuram		3469	1121	1482	1419	1962
36. Trichur		3619	861	3927	123	2083
37. Thalappally		4052	1414	3929	902	2061
38. Chowghat		2108	1000	2140	1091	1721
TRICHUR DISTRICT		4052	378	3929	123	2001
39. Chittur		6390	2218	5432	1807	3846
40. Alathur		6505	173	5011	245	3371
41. Palghat		4384	568	4000	1272	2754
42. Ottappalam		5377	457	2608	838	2217
43. Mannarghat		3661	2194	3868	995	2319
PALGHAT DISTRICT		6505	173	5432	245	2904
44. Perinthalmanna		5736	888	2988	1016	2613
45. Ponnani		4356	3512	4100	496	2433
46. Tirur		4284	692	2514
47. Ernad		3508	600	3408	460	1858
MALAPPURAM DISTRICT		5736	600	4284	460	2275
48. Kozhikode		2252	28	2520	512	1209
49. Quilandy		2100	1939	2873	222	1121
50. Badagara		1406	1082	2829	270	1168
51. South Wynad	
KOZHIKODE DISTRICT		2252	28	2873	222	1161
52. North Wynad	
53. Tellicherry		5202	1260	3546	270	2079
54. Cannanore		3126	1339	2684	283	1630
55. Taliparumba		4276	160	2138
56. Hosdurg		*4412	4412	5110	425	2246
57. Kasargode		4515	640	2143
CANNANORE DISTRICT		5202	1260	5110	160	2078
STATE		6505	28	5432	123	2271

* In each of the taluks, there was only one field with High Yielding Varieties among the fields selected for harvesting experiments

TABLE 6

AUTUMN CROP OF PADDY 1973

Frequency Distribution of Plot yields wet paddy

Sl. No.	Class Interval (Kg./Hectare)	Trivandrum	Qullon	Alleppey	Kottayam	Idikki	Ernakulam	Trichur	Palghat	Malappuram	Kozhikode	Cannanore	STATE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	Below 500	1	..	5	2	..	6	3	2	1	9	4	33
2	500-699	3	1	8	2	..	2	..	1	2	5	1	25
3	700-899	3	3	7	7	..	2	2	1	2	16	3	46
4	900-1099	6	2	12	6	..	10	6	2	2	13	4	63
5	1100-1299	2	9	8	9	..	6	10	3	7	15	8	77
6	1300-1499	1	8	16	8	..	13	9	4	14	9	13	95
7	1500-1699	7	33	8	12	1	17	18	5	20	20	18	159
8	1700-1899	7	12	10	12	1	23	21	12	3	9	12	122
9	1900-2099	19	25	9	22	3	17	33	7	9	6	17	167
10	2100-2299	18	18	14	19	..	13	18	21	9	6	14	150
11	2300-2499	14	24	20	18	2	12	11	6	3	1	11	122
12	2500-2699	11	25	12	14	3	18	9	11	10	3	11	127
13	2700-2899	14	20	16	15	2	7	7	10	6	3	7	107

TABLE 6—(Contd.)
AUTUMN CROP OF PADDY 1973

Frequency Distribution of Plot yields wet paddy

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
14	2900-3099	8	13	7	11	2	5	6	11	2	1	12	78
15	3100-3299	9	12	13	9	3	8	3	12	18	2	6	95
16	3300-3499	10	12	6	7	2	3	1	13	3	3	5	64
17	3500-3699	3	6	8	8	5	7	4	11	7	1	3	62
18	3700-3899	6	7	9	8	5	4	3	5	4	2	2	53
19	3900-4099	1	3	12	1	1	2	2	5	5	2	2	33
20	4100 and above	5	5	35	17	..	4	7	49	21	2	10	154
	All	148	237	235	207	30	179	173	191	148	121	163	1832
	X												
	(Wet Paddy Kg./Hectare)	2448	2384	2555	2433	3031	2104	2132	3004	2571	1441	2248	2385
	(Dry Paddy Kg./Hectare)	2164	2153	2304	2259	2713	1927	2001	2904	2276	1161	2077	2271

X Unpooled

TABLE 7

Distribution of Fields with High yielding varieties of Paddy according to the varieties Grown

Sl. No.	District	Total number of experiment conducted	No. of experiments on H. Y. V.	% of H. Y. V. Total	I. R. 8	Jaya	T. N. 1	Annapoorna	Aswathy	Rohini	Thiruvani	I. R. 5	I. R. 20
1	Trivandrum	148	19	12.8	1.0	4	..	1	2	..	1	..	1
2	Quilon	237	69	29.1	18	41	..	3	..	..	7	..	..
3	Alleppy	235	111	47.2	7	92	3	..	..	1	8	..	..
4	Kottayam	207	103	49.8	31	55	..	9	4	..	1	..	3
5	Idukki	30	17	56.7	11	6	..	..	..	..	..	..	..
6	Ernakulam	179	58	32.4	35	9	1	10	2	1	..	..	..
7	Trichur	173	70	40.5	35	8	..	16	..	4	7	..	..
8	Palghat	191	81	42.4	54	18	..	1	2	1	1	4	..
9	Malappuram	148	35	23.6	25	2	..	3	..	..	5	..	..
10	Kozhikode	121	11	9.1	5	2	..	3	..	1	..	..	..
11	Cannanore	163	11	6.7	4	2	..	1	3	..	1	..	..
STATE		1832	585	31.9	235	239	4	47	13	8	31	4	4

TABLE 8
MEAN YIELD OF DRY PADDY (KGS./HECT.) DURING
AUTUMN CROP OF PADDY

Taluk and District	1969 Autumn (Kg./ Hec.)	1970 Autumn (Kg./ Hec.)	1971 Autumn (Kg./ Hec.)	1972 Autumn (Kg./ Hec.)	1973 Autumn (Kg./ Hec.)
(1)	(2)	(3)	(4)	(5)	(6)
1. Neyyattinkara	2261	2471	2769	2797	2273
2. Trivandrum	1697	1840	2474	2633	2530
3. Nedumangad	1761	1721	1870	1633	1645
4. Chirayinkil	2019	2608	2711	2178	2266
Trivandrum District	1934	2158	2457	2330	2164
5. Quilon	1985	2014	1632	1456	2276
6. Kottarakkara	1886	1952	1670	1130	2024
7. Kunnathur	1298	1527	2222	1628	1707
8. Pathanapuram	1661	2017	2265	2730	2537
9. Pathanamthitta	1655	2111	2 38	1704	2068
10. Karunagappally	1932	1754	1760	1940	2404
Quilon District	1736	1878	1974	1724	2153
11. Karthigappally	1435	1775	2209	1336	2382
12. Mavelikara	2013	2079	1928	1512	2474
13. Chengannur	2383	2563	2433	2882	2301
14. Thiruvalla	1160	2419	2985	2005	2562
15. Kottanad	1990	2100	1643	2069	2907
16. Anbalapuzha	1030	1329	1267	1152	2379
17. Shertalay	1043	956	932	1281	1471
Atpep District	1943	1717	1824	1670	2304
18. Changanacherry	2391	2232	2783	2893	2232
19. Kanjirappally	2042	1915	2333	2216	2093
20. Kottayam	1762	1908	1959	1876	1849
21. Vaikom	1457	1724	1610	1973	2529
22. Meenachil	2027	1975	2902	2679	2670
Kottayam District	1922	1867	2327	2327	2259
23. Pechimada	2475	2461	2235	2932	2948
24. Devicottam	1721	2042	2524	2032	2695
25. Udumbanchola	1721	2042	2524	2032	2695
26. Thodupuzha	1721	2042	2524	2032	2695
Idukki District	1771	2070	2505	2092	2713

	(1)	(2)	(3)	(4)	(5)	(6)
27.	Kothamangalam	1562	1935	2013	2520	2048
28.	Muvattupuzha					
29.	Cochin	1711	2214	2102	1485	2112
30.	Kanayannur	1513	1635	1949	1945	1836
31.	Kunnathunad	1810	1697	1525	2969	2032
32.	Alwaye	1940	2028	2031	2477	1768
33.	Parur	2119	2440	1415	2686	1788
	Ernakulam District	1742	1912	1851	2405	1927
34.	Cranganore	1016	1236	1159	1188	1337
35.	Mukundapuram	1806	2336	2085	1889	1962
36.	Trichur	1680	1788	1693	1944	2083
37.	Thalappally	2095	2103	1776	1570	2061
38.	Chowghat	941	1712	1228	1068	1721
	Trichur District	1829	2036	1769	1661	2001
39.	Chittur	1689	2397	2504	2804	3846
40.	Alathur	2406	3232	3795	3631	3371
41.	Palghat	3184	2267	3293	2935	2754
42.	Ottappalam	2717	2429	1992	1809	2217
43.	Mannarghat	..	1667	1243	2045	2319
	Palghat District	2574	2489	2740	2670	2904
44.	Perinthalmanna	2188	2517	2023	2293	2613
45.	Ponnani	1704	1698	2205	2200	2433
46.	Tirur	1133	1698	2457	2505	2514
47.	Ernad	1748	1856	2223	1946	1858
	Malappuram District	..	1969	2217	2190	2276
48.	Kozhikode	1435	1199	1331	812	1209
49.	Quilandy	866	789	1041	1235	1121
50.	Badagara	1252	1044	1629	1367	1168
51.	South Wynad	..	..	..	..	..
	Kozhikode District	1328	984	1285	1140	1161
52.	North Wynad	..	..	..	..	..
53.	Tellicherry	2045	1001	953	1379	2079
54.	Cannanore	1425	1948	2331	1866	1630
55.	Taliparamba	2369	2104	1573	2140	2138
56.	Hosdurg	1918	2358	1167	1800	2246
57.	Kasargode	2678	2304	1826	2136	2143
	Cannanore District	2197	2045	1605	1924	2077
	STATE	2006	2044	2088	2122	2271

STATEMENT A

AREA MEAN YIELD AND PRODUCTION OF RICE IN KERALA
DURING THE PERIOD 1968-69 to 1973-74

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

Agricultural Year	Viruppu (Autumn crop)			Mundakan (Winter crop)			Punjā (Summer crop)			Total		
	Area in Hectare	Mean Yield of dry paddy (Kg./Hect.)	Production of rice in tonnes	Area in Hectare	Mean Yield of dry paddy (Kg./Hect.)	Production of rice in tonnes	Area in Hectare	Mean Yield of dry paddy (Kg./Hectare)	Production of rice in tonnes			
1968-69	394879	2009	521258	380620	2283	571748	98372	2450	158348	873871	2179	1251354
1969-70	393747	2016	521443	382171	2097	526570	9 141	2767	178400	874059	2136	1226413
1970-71	394798	2077	538886	381971	2259	566934	98061	2984	192185	874830	2259	1298005
1971-72	395298	2126	552216	381971	2378	596808	97888	3151	202684	875157	2351	1351738
1972-73	396900	2237	576192	382171	2426	609234	99623	2918	190941	873694	2527	1376367
1973-74	392765	2347	605595									

1294
8871

