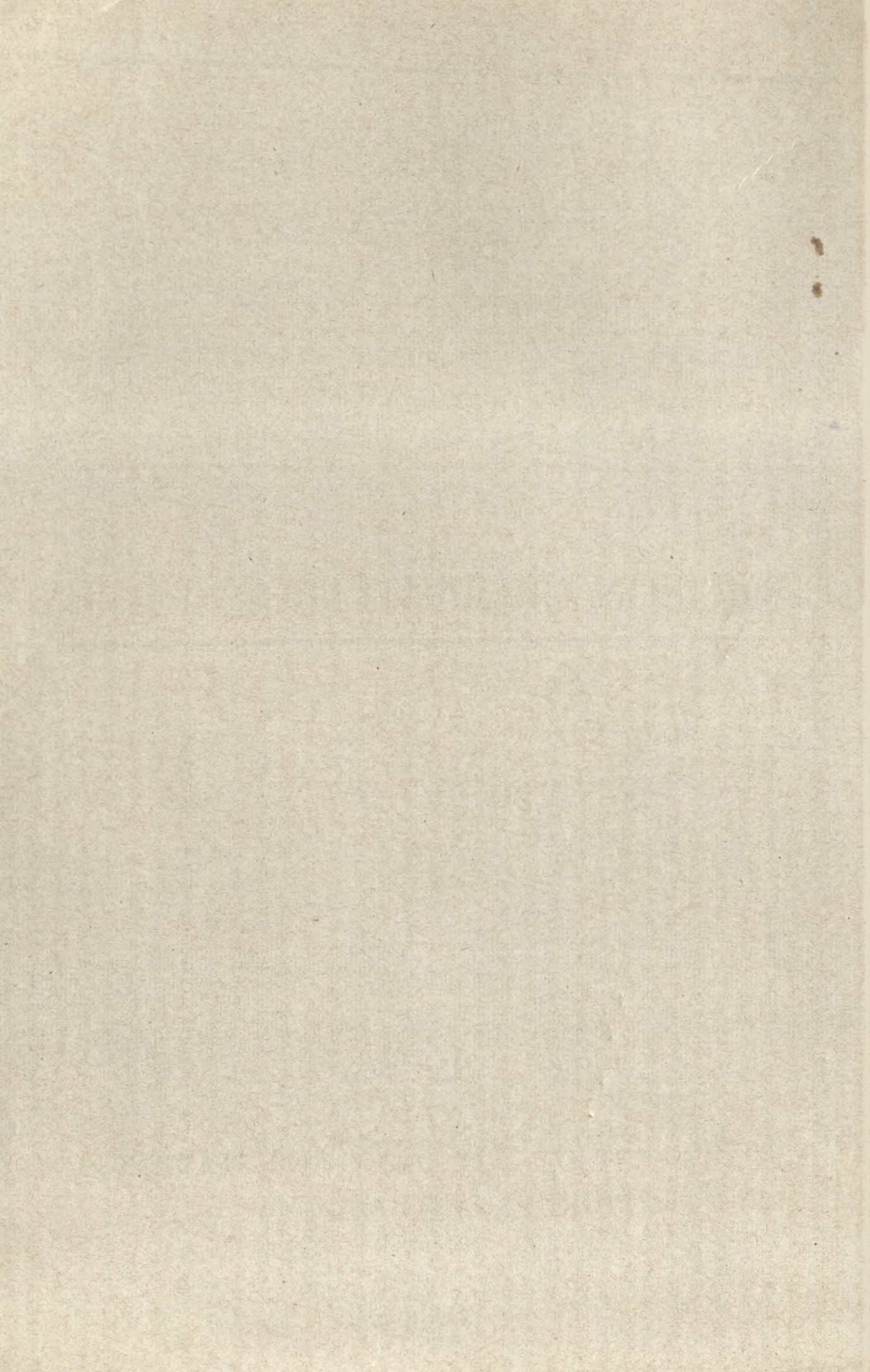




GOVERNMENT OF KERALA

REPORT ON CROPCUTTING SURVEY
ON
PADDY—AUTUMN
1989-90

DEPARTMENT OF ECONOMICS AND STATISTICS
THIRUVANANTHAPURAM



GOVERNMENT OF KERALA

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**REPORT ON CROP CUTTING SURVEY
AUTUMN PADDY CROP
1989-'90**

DEPARTMENT OF ECONOMICS AND STATISTICS
THIRUVANANTHAPURAM
1991

FOREWORD

The Department of Economics and Statistics is conducting crop estimation surveys on paddy, separately for each of the three crop seasons Viz. Autumn, Winter and Summer. The reports on the surveys are being published separately for Autumn Crop (Khariff) and a combined one for the Winter and Summer (Rabi) Crops. This report deals with the crop estimation survey conducted by the Department on Autumn Crop of Paddy 1989-'90.

This report was prepared in the Agricultural Statistics Division of this Department.

Suggestions for the improvement of the report are warmly welcome.

Thiruvananthapuram,
26.2.1992.

S. Retna Bai Ammal,
DIRECTOR,

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REPORT ON CROP CUTTING SURVEY ON AUTUMN CROP OF PADDY

1989-'90.

1. Introduction

The Department of Economics and Statistics has been conducting crop cutting survey on paddy every year. The survey is conducted during the each of the three crop seasons of Autumn (Virippu), Winter (Mundakan) and Summer (Punja). The results of the survey are published in two separate volumes; one for Autumn (Khariff) Crop and the other for the Winter and Summer (Rabi) Crops taken together. This report pertains to the survey conducted by the Department during the Autumn (Virippu) season of the Agricultural Year 1989-'90.

2. Objectives of the survey

The main objectives of the survey are:-

1. to estimate the mean yield per hectares of dry paddy at the Block, District and the State level for each season.
2. to estimate the mean yield per hectare of high yielding varieties of paddy at the district level.
3. to study the difference in yield of paddy according to various cultivation practices.

3. Period of the survey.

The period of the survey was from July 1989 to October 1989. The field work for the survey was conducted during the period in all the Blocks where the crop was raised during the season.

4. Coverage

The survey covered the whole state except the forest area.

5. Sampling design

The Survey was conducted on a stratified sampling design. Since 1987-'88, the sampling design followed was changed slightly for framing block level estimates under the scheme "Establishment of an Agency for Reporting Agricultural Statistics". Prior to that, the sampling design followed was for estimating Taluk-wise estimates.

Under the new system, Blocks are considered as Strata and Investigator Zones in each Block forming sub-strata and the first stage unit. Paddy growing survey sub-divisions in the selected cluster from the second stage unit. In each zone, a list of survey sub-divisions of wet land plots growing paddy under HYV irrigated, HYV un-irrigated, Local-irrigated and Local-un-irrigated are prepared. The required number of plots are selected by using circular systematic sampling method from the list. One Kandom each is chosen by simple random method after serially numbering them anti-clock-wise starting from the south west corner of the survey sub-division. This selected kandom will be third stage unit. A square plot of side 5 metres located in the selected kandom forms the ultimate sample unit and the crop in the demarcated plot is harvested, threshed, winnowed

and weighted. The weight of the cleaned grains and other relevant details such as irrigation status, application of fertilizers manures, insecticides, pesticides etc. were recorded in the prescribed schedule. In each investigator zone, 6 crop cutting experiments per season are conducted. However, in corporations and Municipal areas, the number of experiments to be conducted is restricted to 5 and 10 respectively per investigator zone; per season.

Blocks in rural areas and municipalities and corporations in urban areas in each district were treated as stratum. The Blocks were again divided into a number of investigator zones depending on the area of the block, nature of land etc. Corporation area was divided into 3 investigator zones and municipality with an area of 10 sq. km. and above were treated as one investigator zone. These investigator zones formed for the EARAS survey were treated as sub-stratum for the survey. The remaining small municipalities were grouped with the adjoining blocks.

In each investigator zone, 100 clusters of 5 survey sub-divisions were selected for the survey. These 100 clusters were allocated among the wet and dry lands in proportion to the area under the categories in the zone.

In each investigator zone, lists of wet land survey sub-divisions and dry land sub-divisions as per the basic tax register were prepared separately in an orderly manner (one village after the other). The required number of key plots (survey sub-divisions) were selected from each list in proportion to the wet land and dry land area for forming the cluster using circular systematic sampling method. These key plots together with the two other adjacent plots on other side (left and right in the horizontal direction) formed the cluster. The wet land clusters of five survey sub-divisions each were visited in each paddy growing season in the agricultural year in the investigator zone for collection of details of area under paddy during the season. From these paddy growing plots 6 survey sub-divisions from each category of paddy High Yielding irrigated, High Yielding un-irrigated, local irrigated and local un-irrigated were selected, for the conduct of crop cutting survey in each investigator zone in every paddy season.

From every block, three samples each weighing 250 grams of wet paddy collected at the time of harvest for conducting drirage experiments. The first sample was taken at the beginning, the second towards the middle and the third towards the end of the harvest season. These samples were dried and weighed untill the weights on two consecutive days agree. The drirage ratio thus obtained was utilised for the estimation of dry weight.

6. Field work

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

The Deputy Directors of the Districts were in overall charge for the proper conduct of the survey. He was assisted by the District Officer and Additional District Officers.

A total number of 4347 crop cutting experiments were planned during Autumn season 1989-'90 in the State, of which 4233 experiments (97.4%) were conducted, and their results analysed. The number of crop cutting experiments planned and analysed in the each block during Autumn 1989-'90 are furnished in Table - 1 in the Appendix.

7. Supervision

The yield estimation survey was inspected at three stages, viz. preharvest, harvest and post harvest, by the Taluk level and district level Officers. The Statistical Inspectors and Taluk Statistical Officers were made responsible to inspect atleast one experiment in each investigator zone and Deputy Director, District Officer and Additional District Officer atleast one experiment each in a block at the harvest stage. The Statistical Inspector/Additional Statistical Inspectors had to conduct atleast one harvest stage inspection in each investigator zone subject to a minimum of 5 experiments in a block. Harvest stage inspections were conducted during Autumn 1989 to the extent of 20.03% of the experiments analysed. The percentage inspection at the pre-harvest stage during the season was 5.79% and that at the post harvest stage was 0.94%.

8. Analysis

On the completion of the surveys, the data collected were transmitted to the concerned district office of the Department and the consolidated data were forwarded to the headquarters by the Deputy Directors. Tabulation and analysis of the data so collected were done in the Agricultural Statistics Division of the Directorate. The procedure adopted for estimation of various parameters at Block, Districts and State level is described in the ensuing paragraphs.

9. Estimation

Meanyield of paddy, its standard error and production of rice were estimated from the data collected through the surveys and estimation of meanyield has been done separately for the following categories of paddy and weighted average is computed to obtain the meanyield of all varieties together.

- | | |
|----------------------------------|--------------------------|
| 1. Paddy High Yielding Varieties | - Irrigated (HYV-I) |
| 2. -do- | - Un-irrigation (HYV-UI) |
| 3. Paddy Local Varieties | - Irrigated (L-I) |
| 4. -do- | - Un-irrigated (L-UI) |

1. Mean yield of paddy at Block Level:-

Where up

number of crop cutting experiments conducted on the pth category paddy in the block.
 x_{pj} = weight of paddy (in Kg.) obtained from the jth experiment on the pth category paddy of the block.

$p = 1, 2, 3, 4$ represents HYV-I, HYV-UI, Local-I and Local UI respectively.

d = the weight of dry paddy per kg. of the harvested produce obtained through drirage experiments.

The experimental plot is $\frac{1}{400}$ th of a hectare and hence x_p gives the meanyield of dry paddy per hectare of the p^{th} category at Block level.

Meanyield of dry paddy of the block for all categories taken together is obtained by computing the weighted average of the meanyield of all the four categories, weights being the proportion of area under paddy of the respective classification. This meanyield of dry paddy (all categories together) in Kg. per hectare of the block is given by:

$$\bar{X} = \frac{\sum_{p=1}^4 a_p \bar{x}_p}{\sum_{p=1}^4 a_p}$$

a_p is the area under the p^{th} category paddy in the block. Meanyield of paddy for the district is obtained as the weighted average of the meanyield of the blocks in the District, weights being the proportion of area under the crop in the respective blocks. So also meanyield of paddy for the state is computed as the weighted average meanyield of the districts, weights being the proportion of the area under the crop in the respective districts.

11. Standard error of block meanyield:-

Standard error of meanyield per hectare of the p^{th} category of the block is computed using the following formula:-

$$S_p = \sqrt{\frac{M.S.S.}{np}} \times 400 \times d \quad \text{where}$$

np = number of crop cutting experiments conducted on p^{th} category paddy of the block.

$$M.S.S. = \frac{T.S.S.}{np - 1}$$

$$T.S.S. = \frac{\sum_{j=1}^{np} x_{pj}^2 - \left(\sum_{j=1}^{np} x_{pj} \right)^2}{np}$$

where,

x_{pj} = the weight of harvested produce obtained from j^{th} out on the p^{th} category paddy of the block.

Then standard error of the block meanyield is given by

$$S = \frac{\sqrt{\sum_{p=1}^4 (a_p s_p)^2}}{\sqrt{\left(\sum_{p=1}^4 a_p \right)^2}} = \frac{1}{\sum_{p=1}^4 a_p} \sqrt{\sum_{p=1}^4 (a_p s_p)^2}$$

Where a_p represents the area of p^{th} category paddy in the block.

The standard error of the District meanyield is obtained similarly which is given by

n = number of blocks in the District

a_i = Area under paddy in the i^{th} Block of the District

s_i = Standard error of the i^{th} Block meanyield.

Computation of the standard error of state meanyield is also done utilising the same formula where ' n ', will represent the number of districts in the state; ' a_i ' area under paddy in the i^{th} districts and ' s_i ' the standard error of meanyield of i^{th} district.

11. Production of rice:-

The estimates on meanyield obtained from crop cutting survey and that on area obtained from area enumeration under EARAS were utilised for computation of estimates on production of rice. The weight of clean rice is recorded as 65.7% of dry paddy.

10. Results of the survey

1. General:-

The total production of rice in the state during Autumn 1989 was estimated to be 478643 tonnes as against 387804 tonnes in Autumn 1988. The area under cultivation during Autumn 1989 was 243611 hectares while the corresponding figure for the previous year was 233172 hectares. This shows that the rice production in the state was increased during the Autumn season 1989 compared to the previous year by 90839 tonnes (ie. 23.43%) while the area under cultivation during Autumn 1989 has increased by 10439 hectares (ie. 4.48%) compared to the corresponding season of the previous year. The high percentage increase of production of rice may be attributed to the higher rate of increase to meanyield of 2991 Kg./hect. over the corresponding figures of 2482 Kg./hect. of the previous year. The above increase in the meanyield is worked out to be 20.5% over the corresponding season of the previous year.

Estimates on area, meanyield its standard error and production of rice together with the number of crop cutting experiments analysed in each block during Autumn 1989 are given in Table - 1 in the appendix.

The data on area meanyield and production of rice during Autumn season of 1988 and 1989 are furnished below for a State level comparison:

Year	Crop season	Area under paddy (hect.)	Meanyield (Kg./hect.)	Production of rice (tonnes)
1988	Autumn	233172	2482	387804
1989	Autumn	243611	2991	478643

During the season under report, the lowest meanyield of dry paddy was 432 Kg./hect. recorded in Sherthala Municipality and the highest meanyield was 4982 Kg./hect. in Chittoor Thathamangalam Municipality.

Out of 4233 number of experiments conducted during the season 16 experiments (0.38%) recorded 'zero' yield; while 9 experiments recorded the highest meanyield of 7001 Kg./hect. and above.

The scheme for block-wise estimation of meanyield and production of rice has been implemented from 1987-'88. The block-wise estimates on meanyield of dry paddy in respect of Autumn season for the years 1987-'88, 1988-'89 and 1989-'90 are furnished in Table No.2 of appendix for a comparative study.

11. High Yielding Varieties:-

Table 3 in the appendix gives the district-wise estimates on area, meanyield and production of rice of High Yielding Varieties and other varieties of paddy during Autumn 1989.

Of the total area put under paddy cultivation during Autumn 1989, 32% of it was brought under High Yielding Varieties. The contribution of the HYV crops towards production of rice in Autumn season was 33% of the total.

The average yield of the High yielding varieties in the state showed an increased yield rate of 3.8% only over the other varieties. The district-wise yield rates of HYV varied from 2181 Kg./hect. in Kozhikode district to 3646 Kg./hect in Palakkad district.

Out of 4233 crop cutting experiments conducted for the survey, 1751 number (41%) of experimental plots were grown with high yielding varieties of paddy during the seasons. High Yielding Varieties of seeds used in the order of cultivators preference for paddy cultivation were Jyothi, Jaya and Pavizham.

The names of HYV of paddy corresponding to the highest district average together with the highest meanyield and the number of experimental plots where the crop was raised in each districts during Autumn 1989 are furnished in the table given below.

High yielding varieties with highest average yield - Autumn 1989-'90

Sl. No.	District	HYV corresponding to the highest district average	Highest average yield of dry paddy (Kg./Hect.)	No. of experimental plots where HYV in column 3 is raised
1	2	3	4	5
1.	Thiruvananthapuram	Jyothi	5109	73
2.	Kollam	Sabari	5999	28
3.	Pathanamthitta	Jyothi	5245	105
4.	Alapuzha	Pavizham	5900	13
5.	Kottayam	"	6137	26
6.	Idukki	Jyothi	5213	11
7.	Ernakulam	"	5839	74
8.	Thrissur	Pavizham	5040	10
9.	Palakkad	Jaya	6151	17
10.	Malappuram	"	5748	11
11.	Kozhikode	"	4393	26
12.	Wayanad	No Autumn Paddy	-	-
13.	Kanpur	Arnapoorna	4601	6
14.	Kasaragod	Jaya	6596	44

The highest yield rate of 6596 Kg./hectare has been recorded in Kasaragode district for Jaya variety followed by the yield rate 6151 Kg./hect. recorded for the same variety in Palakkad district, and 6137 Kg./hect. for Pavizham in Kottayam district.

111. Cultural practices:-

Even though Autumn crop of paddy is considered to be a rainfed crop irrigation was resorted to, for the pre-sowing field operations of Autumn crop, in certain parts of the state depending upon the availability of the rain.

It was reported that about 10% of the experimental plots were irrigated during autumn 1989. Chemical fertilizers were applied to about 99% of irrigated plots and other manures were used in the rest (1%) of irrigated plots during the season.

As regards the unirrigated experimental plots, 83% of the plots were chemically manured, 12% of the plots received only other types of manures and the remaining 5% of the plots were not manured at all, during the season under report.

Of the total number of 4233 experimental plots covered by the survey during the season, about 38% of the plots were treated with insecticides and pesticides and in the case of the remaining 62% plots no plant protection measures were adopted.

In the case of plots where high yielding varieties were grown, it was found that 12% of them received irrigation and in 99% of the irrigated plots with HYV varieties chemical

fertilizers were applied. About 95.6% of the unirrigated plots with HYV were covered with chemical fertilizers application, 3.6% of them were organically manured and the remaining 0.8% of the unirrigated plots received no manuring during the season.

Though there was no report of disease or pest attack of considerable nature on the HYV crops in the state, about 53% of the plots, grown with HYV were reported to have brought under plant protection measures during the season under report.

The district-wise details of mean yield and number of crop cutting experiments analysed in respect of Autumn paddy 1989-'90, grown under the various cultural practices are given in table 4 in the appendix.

APPENDIX

Table: 4 - Block-wise estimates of area mean yield and production of rice - Autumn 1989-'90

Sl. No.	Block/Municipality/ Corporation/District	No. of experiments		Area (Hect)	Mean yield of dry paddy Kg./hect.	Standard error	Production of rice (in tonnes)
		Planned	Analysed				
1	2	3	4	5	6	7	8
1.	Athiyannoor	18	18	450	2726	222	806
2.	Nemom	30	28	460	2723	109	823
3.	Parassala	24	22	787	3071	160	1588
4.	Perimkadavila	30	27	996	3272	123	2141
5.	Kazhakuttom	36	35	978	3186	148	2047
6.	Thiruvananthapuram (rural)	18	18	177	3612	148	420
7.	Nedumangad	30	30	441	3338	164	967
8.	Vellanad	30	29	752	3103	159	1533
9.	Vamanapuram	30	30	1260	3321	184	2749
10.	Chirayinkil	18	18	662	3109	190	1352
11.	Varkala	24	24	924	2436	100	1479
12.	Killimanoor	36	36	1843	2711	141	3283
Municipalities							
13.	Attingal	6	6	154	4210	261	426
14.	Nedumangad	6	6	179	2976	378	350
15.	Varkala	6	6	62	2609	262	106
Corporation							
16.	Thiruvananthapuram	18	18	104	3776	223	258
Thiruvananthapuram Dist.		360	351	10229	3025	45	20328
17.	Anchalumoodu	12	12	129	3540	338	300
18.	Chittumala	18	18	466	2626	126	804
19.	Ithikkara	30	30	1397	3691	112	3388
20.	Mukhathala	18	18	726	2698	213	1287
21.	Karunagappally	18	18	719	2144	166	1013
22.	Chavara	18	18	215	2195	206	310
23.	Ochira (Portion)	12	12	394	2380	247	616

(Contd.)

(Table I contd.)

1	2	3	4	5	6	7	8
24.	Sasthamcotta (Portion)	24	24	1870	2255	157	2771
25.	Kottarakkara	30	30	1527	2816	159	2825
26.	Vettikkavala	30	30	1875	3122	97	3846
27.	Chadayamangalam	30	30	1842	3031	127	3668
28.	Anchal	30	30	1661	3360	185	3667
29.	Pathanapuram	30	30	1474	3655	175	3540
	Municipalities						
30.	Punalur	6	6	315	3269	192	677
31.	Kollam	6	6	5	3154	229	10
	Kollam Dist.	312	312	14615	2991	45	28722
32.	Parakkode	24	24	1484	2908	169	2835
33.	Pandalam (Portion)	18	18	405	1808	175	481
34.	Sasthamcotta (Portion)	6	6	440	2788	160	806
35.	Kulanada (Portion)	18	18	204	2887	264	387
36.	Konni	24	22	662	2727	173	1186
37.	Elanthoor	24	23	479	2838	174	893
38.	Ranni	23	21	52	2107	195	72
39.	Mallappally	24	24	213	2394	236	335
40.	Koipunam	24	24	79	1811	172	94
41.	Pulikeezhu	24	22	204	1067	268	143
	Municipalities						
42.	Pathanamthitta	6	6	159	3126	437	327
43.	Thiruvalla	6	6	48	476	362	15
	Pathanamthitta Dist.	221	214	4429	2603	73	7574
44.	Thycattusery	18	18	312	1171	128	240
45.	Pattanakadu	18	17	1144	1667	247	1253
46.	Kanjikuzhy	16	16	739	719	134	349
47.	Aryad	18	18	381	1338	301	335
48.	Ambalapuzha	17	16	1792	3479	358	4096
49.	Haripad	18	14	2094	2772	399	3814
50.	Muthukulam	18	18	840	3152	228	1740
50.	Mothukulam	18	18	840	3152	228	1740
51.	Ochiga (Portion)	6	6	286	2171	277	408
52.	Chengannur	180	18	930	2520	130	1540
53.	Kulanada (portion)	6	6	170	2489	163	278
54.	Mavelikkara	18	17	1505	2634	334	2604
55.	Bharanikavu	18	18	1635	2580	172	2771
56.	Pandalam (Portion)	5	5	289	2680	127	655
57.	Veliyanad	18	14	5123	3171	162	10672
58.	Champakulam	18	15	8799	3482	433	20128
	Municipalities						
59.	Alappuzha	6	6	365	3791	438	909
60.	Chengannur	6	6	63	1981	158	82
61.	Kayamkulam	6	6	207	2661	184	362
62.	Mavelikara	6	6	30	2289	399	45
63.	Sherthala	6	6	112	432	135	32
	Alappuzha Dist.	260	246	26916	2960	193	52343

(Contd.)

(Table I contd.)

1	2	3	4	5	6	7	8
64.	Madappally	30	30	571	2495	202	936
65.	Vazhoor	20	20	25	1396	198	22
66.	Kanjirappally	-	-	-	-	-	-
67.	Pampady	26	26	128	2771	134	233
68.	Ettumanoor	30	27	3317	3579	247	7800
69.	Pallom	30	28	1673	1639	241	1802
70.	Uzhavoor	30	30	1192	3277	200	2566
71.	Lalam	36	36	445	3041	162	889
72.	Erattupettah	13	13	3	1976	164	4
73.	Vaikom	30	29	2168	3144	298	4478
74.	Kaduthuruthy	30	30	2823	2996	174	5556
	Municipalities						
75.	Changanacherry	4	4	71	1393	158	65
76.	Kottayam	-	-	-	-	-	-
77.	Palai	-	-	-	-	-	-
	Kottayam Dist.	279	273	12416	2985	101	24351
78.	Thodupuzha	30	28	636	3449	129	1441
79.	Elamdesom	30	29	1001	3366	79	2213
80.	Idukki	12	10	26	3161	110	54
81.	Arudai	-	-	-	-	-	-
82.	Adimali	6	5	95	2900	106	181
83.	Devicoolam	-	-	-	-	-	-
84.	Kattappana	-	-	-	-	-	-
85.	Nedunkantom	-	-	-	-	-	-
	Municipalities						
86.	Thodupuzha	6	6	237	2832	254	441
	Idukki Dist.	84	78	1995	3304	65	4330
87.	Alangad	12	12	1562	2594	129	2662
88.	Angamali	30	30	2645	2435	95	4232
89.	Edappally	12	12	1047	1518	189	1044
90.	Koovappady	30	30	2869	2835	127	5343
91.	Kothamangalam	36	36	2480	2833	106	4616
92.	Kulamthuruthy	24	23	1430	2557	214	2402
93.	Muvattupuzha	30	30	1520	3501	156	3496
94.	Paluruthy	12	12	393	2151	190	553
95.	Pampakuda	36	36	1247	3443	146	2821
96.	Parakadavu	18	18	2151	2278	393	3219
97.	Parur	12	12	166	1586	168	173
98.	Vadavucode	30	30	2453	2625	108	4230
99.	Vazhekulam	30	30	2750	2461	111	4446
100.	Vypeen	18	18	1126	2675	233	1979
101.	Vyttila	12	12	117	2395	294	184
	Municipalities						
102.	Angamali	6	6	294	2946	94	569
103.	Kothamangalam	6	6	357	2660	103	624

(Contd.)

1	2	3	4	5	6	7	8
104.	Muvattupuzha	6	6	66	2845	199	123
105.	Perumbavoor	6	6	151	2187	187	217
106.	Thripunithura Corporation	6	6	29	2126	101	41
107.	Kochi Ernakulam Dist.	16 388	16 387	119 24972	1983 2627	215 49	155 43129
108.	Anthicad	24	24	256	2509	103	422
109.	Cherpu	24	23	775	2325	180	1184
110.	Ollukkara	30	28	2512	2001	286	3302
111.	Puzhkkal	36	36	1384	1996	125	1815
112.	Chowannur	24	23	2798	2210	158	4063
113.	Pazhayannur	30	28	4592	3352	153	10113
114.	Wadakkancherry	36	36	4852	1993	121	6353
115.	Chavakkad	24	24	170	1835	295	205
116.	Mullasserry	18	18	482	1860	91	589
117.	Thalikulam	18	18	52	1112	135	38
118.	Chalakydy	30	24	1380	2378	125	2156
119.	Iringalakuda	23	23	564	1792	211	664
120.	Kodakara	24	24	1421	2271	136	2120
121.	Mala	30	30	2016	2189	130	2899
122.	Vellangallur	24	24	1367	1630	141	1464
123.	Kodungallur	6	6	19	544	135	7
124.	Mathilakom Municipalities	18	18	3	629	90	1
125.	Chavakkad	-	-	137	1878	-	169
126.	Chalakydy	6	6	382	2335	360	586
127.	Iringalakuda	-	-	257	1623	-	274
128.	Kodungallur	6	6	27	1635	248	29
129.	Thrissur Thrissur Dist.	- 431	- 419	129 25575	2029 2299	- 53	172 38625
130.	Alathur	48	48	10727	4219	330	29735
131.	Kuzhalmannam	48	48	9957	3965	144	25937
132.	Kollengode	48	48	12840	4755	266	40114
133.	Palakkad	42	42	9587	3196	67	20133
134.	Nenmara	18	18	2659	4552	231	7952
135.	Chittur	42	42	5038	4784	297	15836
136.	Mannanghat	54	52	4760	2422	136	7574
137.	Attappadi	-	-	-	-	-	-
138.	Shrikrishnapuram	42	36	4210	2317	130	6410
139.	Pattambi	48	44	4529	2199	135	6542
140.	Ottappalam	36	32	4659	3148	188	9637
141.	Thrithala Municipalities	36	29	2707	1638	156	2913
142.	Chittur-Thathamangalam	6	6	1555	4982	459	5090
143.	Palakkad	6 ⁰	6	836	4189	624	2301
144.	Shornur Palakkad Dist.	6 ⁰ 480	5 456	606 74670	2120 3690	410 56	844 181018

(Contd.)

1	2	3	4	5	6	7	8
145. Malappuram		36	36	1283	2406	80	2028
146. Manjeri		30	30	1263	2638	177	2189
147. Kondotty		42	42	1393	2068	89	1893
148. Vandoor		48	45	2625	2315	116	3992
149. Nilamur		24	24	1948	2619	194	3352
150. Andathode		30	29	362	2043	168	486
151. Ponnani		30	30	1724	2633	200	2982
152. Perinthalmanna		42	42	2647	2426	123	4219
153. Mankada		30	30	2412	2636	143	4177
154. Thirurangadi		30	29	721	2160	169	1023
155. Vengara		36	36	632	1866	76	775
156. Tirur		30	30	1713	2716	231	3057
157. Kuttipuram		30	29	1324	2235	151	1944
158. Thanur		30	29	1041	1702	106	1164
Municipalities							
159. Manjeri		6	6	522	2432	92	834
160. Malappuram		6	6	94	3287	12	203
161. Tirur		6	6	179	1760	244	207
Malappuram Dist.		486	479	21883	2401	43	34525
162. Balusserry		30	26	318	1714	192	358
163. Perambra		24	23	298	1946	194	380
164. Meladi		24	24	187	1408	133	173
165. Pandalayini		18	17	148	1162	122	113
166. Kozhikode		24	22	278	1796	171	328
167. Chelanur		24	22	166	1247	94	136
168. Koduvally		30	29	499	2147	115	704
169. Kunnamangalam		40	26	1026	1756	163	1184
170. Badagara		18	16	141	2278	256	211
171. Thuner		30	30	220	1273	94	184
172. Kunnumel		30	30	78	1483	95	76
173. Thodannur		18	18	41	1819	167	49
Municipality							
174. Badagara Corporation		6	6	12	1760	157	14
175. Kozhikode		12	11	69	1346	171	61
Kozhikode Dist.		328	300	3481	1736	60	3971
176. Kalpetta		-	-	-	-	-	-
177. Manathavady		-	No Autumn Crops		-	-	-
178. Sulthan Battery		-	-	-	-	-	-
Wayanad Dist		-	-	-	-	-	-
179. Kuthuparambu		42	42	593	2156	125	840
180. Peravoor		48	48	592	2427	142	944
181. Iritty		54	54	1165	2589	109	1982
182. Tellicherry		30	30	504	2540	152	841

(Contd.)

(Table contd.)

1	2	3	4	5	6	7	8
183.	Kannur	15	15	312	2322	193	476
184.	Edakkad	36	36	868	2416	101	1378
185.	Thaliparambu	66	66	3177	2720	88	5677
186.	Payyannur	73	73	4254	2868	113	8016
187.	Irikkur	54	54	1513	2293	123	2279
	Municipalities						
188.	Tellicherry	-	-	-	-	-	-
189.	Kannur	-	-	-	-	-	-
	Kannur Dist.	418	418	12978	2631	58	22433
190.	Kanlgangad	72	72	1390	2832	91	2586
191.	Neeleswaram	72	72	2389	2779	56	4346
192.	Majeswar	72	72	3186	2635	64	5515
193.	Kasaragod	72	72	1687	3372	106	3737
	Municipalities						
194.	Kasaragod	6	6	564	988	31	366
195.	Kanhangad	6	6	245	4622	482	744
	Kasaragod Dist.	300	300	9452	2785	45	17294
	KERALA STATE	4347	4233	243611	2991	26	478643

Table 2 - Block/Municipality/Corporation-wise estimates of mean-yield of dry paddy (kg./hect.) during autumn season from 1987 to 1989

S1.	Block/Municipality	1987	1988	1989
No.	Corporation & District			
1	2	3	4	5
1.	Athiyannur	2989	2069	2726
2.	Nemom	2577	1989	2723
3.	Parassala	3294	2268	3071
4.	Perumkadavilla	3546	2935	3272
5.	Kazhakkuttom	1819	2656	3186
6.	Thiruvananthapuram (Rural)	2121	3181	3612
7.	Nedumangad	2774	2233	3338
8.	Vellanad	2584	2606	3103
9.	Vamanapuram	2643	2531	3321
10.	Chiryinkil	2665	2616	3109
11.	Varkala	2239	2410	2436
12.	Kilimanoor	2785	2707	2711
	Municipalities			
13.	Attingal	-	3961	4210
14.	Nedumangad	2594	2576	2976
15.	Varkala	-	2228	2609

(Contd.)

14
Table contd.)

1	2	3	4	5
	Corporation			
16.	Thiruvananthapuram	2821	3809	3776
	Thiruvananthapuram Dist.	2735	2579	3025
17.	Anchalummoodu	2913	1841	3540
18.	Chittumala	2104	2237	2626
19.	Ithikkara	2673	2860	3691
20.	Mukhathala	2638	1479	2698
21.	Karunagappally	1706	1659	2144
22.	Chayara	2903	1556	2195
23.	Ochira (Portion)	2070	1421	2380
24.	Sasthamcotta (Portion)	2847	1814	2255
25.	Kottarakkara	2921	2987	2816
26.	Vettikkavala	3362	2835	3122
27.	Chadayamangalam	3703	2689	3031
28.	Anchal	3342	2464	3360
29.	Pathanapuram	3498	2951	3655
	Municipalities			
30.	Punalur	3704	2163	3269
31.	Kollam	1370	-	3154
	Kollam Dist.	2987	2430	2991
32.	Parakkode	3429	2666	2908
33.	Pandalam (Portion)	3224	1689	1808
34.	Sasthamcotta (Portion)	2847	2212	2788
35.	Kulanad (Portion)	3104	2738	2887
36.	Konni	3796	2517	2727
37.	Elanthoor	3345	2771	2838
38.	Ranni	2865	2342	2107
39.	Mallappally	3465	2322	2394
40.	Koipuram	2315	2684	1811
41.	Pulikeezhu	2132	1381	1067
	Municipalities			
42.	Pathanamthitta	3075	2317	3126
43.	Thiruvalla	3630	1087	476
	Pathanamthitta Dist.	3245	2438	2603
44.	Thycattusserry	1486	1049	1171
45.	Pattanakkad	1448	1286	1667
46.	Kanjikuzhy	883	787	719
47.	Ariyad	1122	929	1338
48.	Ambalapuzha	3698	2348	3479
49.	Haripad	2831	2254	2772
50.	Muthukulam	1852	1350	3152
51.	Ochira (Portion)	2070	1294	2171
52.	Chengannur	3273	2669	2520
53.	Kulanad (Portion)	3104	3034	2489
54.	Mavelikkara	2930	1562	2634
55.	Bharanikavu	2402	1204	2580

(Contd.)

(Table contd.)

1	2	3	4	5
56.	Pandalam (Portion)	3224	1952	2680
57.	Vellayanad	4020	2947	3171
58.	Champakulam	4033	2848	3482
	Municipalities			
59.	Alappuzha	1313	2702	3791
60.	Chengannur	2014	2294	1981
61.	Kayamkulam	2207	897	2661
62.	Mavilikkara	2264	1122	2289
63.	Sherthala	504	493	432
	Alappuzha Dist.	2923	2312	2960
64.	Madappally	2674	2120	2495
65.	Vazhoor	2132	2282	1396
66.	Kanjirappally	-	-	-
67.	Pampady	3561	2401	2771
68.	Ettumanoor	4092	3263	3579
69.	Pallom	3733	2909	1639
70.	Uzhavoor	3188	2805	3277
71.	Lalam	2919	2952	3041
72.	Erattupettah	-	2827	1976
73.	Vaikom	3080	2297	3144
74.	Kaduthuruthy	3317	2625	2996
	Municipalities			
75.	Changanacherry	-	2814	1393
76.	Kottayam	-	-	-
77.	Pala	3805	2718	-
	Kottayam Dist	3473	2802	2985
78.	Thodupuzha	3400	3214	3449
79.	Elamdesam	3555	2975	3366
80.	Idukki	3759	3678	3161
81.	Aruda	-	3661	-
82.	Adimali	2741	4518	2900
83.	Devicollam	-	-	-
84.	Kattappana	-	-	-
85.	Nedumkondom	-	-	-
	Municipalities			
86.	Thodupuzha	3659	2857	2832
	Idukki Dist.	3462	3115	3304
87.	Alangad	2487	2281	2594
88.	Angamali	2517	2349	2435
89.	Edappally	1916	1747	1518
90.	Koovappady	2345	2495	2835
91.	Kothamangalam	3037	2919	2833
92.	Mulanthuruthy	1937	2002	2557

(Contd.)

(Table contd.)

1	2	3	4	5
93.	Muvattupuzha	3111	3248	3501
94.	Palluruthy	1674	2105	2151
95.	Pampakuda	2974	3223	2443
96.	Parakadavu	2478	2462	2278
97.	Parur	1922	1558	1586
98.	Vavucode	2477	2341	2625
99.	Vazhakulam	2221	2349	2461
100.	Vypeen	1009	2773	2675
101.	Vythala	1936	2126	2395
	Municipalities			
102.	Angamali	2473	2560	2946
103.	Kothamangalam	2477	1989	2660
104.	Muvattupuzha	2696	3105	2845
105.	Perumbavoor	1941	2322	2187
106.	Thripunithura	1681	1994	2126
	Corporation			
107.	Kochin	1235	1534	1983
	Ernakulam Dist.	2372	2458	2627
108.	Anthicad	4091	2239	2509
109.	Cherpu	2685	1935	2325
110.	Ollukkara	2292	1963	2001
111.	Puzhakkal	2321	2450	1996
112.	Chowannur	2183	1995	2210
113.	Pazhannur	2394	2048	3352
115.	Wadakkancherry	1928	2047	1993
115.	Chavakkad	2249	1285	1835
116.	Mullasserry	2181	1512	1860
117.	Thalikulam	1645	1416	1112
118.	Chalakydy	2046	2097	2378
119.	Irinjalakuda	2181	1691	1792
120.	Kodakara	1903	2275	2271
121.	Mala	1566	1874	2189
122.	Vellangallur	2119	1494	1630
123.	Kodungallur	1613	357	544
124.	Mathilakom	698	678	629
	Municipalities			
125.	Chavakkad	2633	1750	1878
126.	Chalakydy	2033	2060	2335
127.	Irinjalakuda	2489	1687	1623
128.	Kodungallur	1776	1201	1635
129.	Thrissur	2252	1967	2029
	Thrissur Dist.	2140	1999	2299
130.	Alathur	4352	3151	4219
131.	Kuzhalmannam	2896	3092	3965
132.	Palakkad	2896	2897	3196
133.	Kollengode	2988	3794	4755
134.	Nenmara	4503	3521	4552
135.	Chittur	4288	3634	4784
136.	Mannarghat	1799	2371	2422

(Contd.)

(Table contd.)

1	2	3	4	5
137.	Attappadi	-	-	-
138.	Sreekrishnapuram	1935	1968	2317
139.	Pattambi	1876	2051	2199
140.	Ottappalam	1956	2360	3148
141.	Thrithala	1869	1587	1638
	Municipalities			
142.	Chittur-Thathamangalam	5727	3867	4982
143.	Palakkad	2909	3548	4189
144.	Shornur	2241	1611	2120
	Palakkad Dist	3032	2985	3690
145.	Malappuram	1822	2065	2406
146.	Manjeri	2562	1892	2635
147.	Kondotty	1744	1665	2068
148.	Vandur	1932	1951	2315
149.	Nilambur	1489	2593	2619
150.	Andathode	2021	2182	2043
151.	Ponnanf	2233	1872	2633
152.	Perunthaimanna	1816	2042	2426
153.	Mankada	2501	2373	2636
154.	Thirurangadi	1741	1408	2160
155.	Vengara	1855	1824	1866
156.	Tirur	1572	1604	2716
157.	Kuttiapuram	2055	1843	2235
158.	Thanur	1250	1313	1702
	Municipalities			
159.	Majerf	3330	2369	2432
160.	Malappuram	2073	2984	3287
161.	Tirur	1524	1381	1760
	Malappuram Dist.	1935	1989	2401
162.	Balusserf	1120	928	1714
163.	Perambra	1731	1401	1946
164.	Meladi	1272	832	1408
165.	Pandlayinf	1202	658	1162
166.	Kozhikode	2097	1539	1796
167.	Cheianuur	1267	933	1247
168.	Koduvally	1967	1635	2147
169.	Kunnamangalam	1271	1362	1756
170.	Badagara	2242	1501	2278
171.	Thunerf	1592	1225	1273
172.	Kunnummel	1793	1339	1483
173.	Thodannur	1399	1084	1819
	Municipalities			
174.	Badagara Corporation	2029	1305	1760
175.	Kozhikode Kozhikode Dist.	1052 1536	1136 1276	1346 1736

(Contd.)

(Table contd.)

1	2	3	4	5
			No Autumn paddy	-
176. Kalpetta		-	-do-	-
177. Mananthavady		-	-do-	-
178. Sulthan Battery Wayanad Dist.		-	-	-
179. Kuthuparambu	2579		2223	2156
180. Peravoor	2199		1913	2477
181. Iritty	2419		1957	2589
182. Tellicherry	2394		1793	2540
183. Kannur	1675		2805	2322
184. Edakkad	2875		2887	2416
185. Thaliparamba	2245		2471	2720
186. Payyanur	2263		2451	2668
187. Irikkur	2237		2234	2293
Municipalities				
188. Tellicherry	4210		1881	-
189. Kannur	1218		-	-
Kannur Dist.	2321		2354	2631
190. Kanhangad	3026		2817	2832
191. Neeleswar	2403		2390	2779
192. Manjeswar	2579		2832	2635
193. Kasaragod	3062		2829	3372
Municipalities				
194. Kasaragode	3452		2713	988
195. Kanhangad	1931		2812	4622
Kasaragode Dist.	2655		2704	2785
KERALA STATE	2675		2531	2991

Table 3 - District-wise estimated area, mean-yield and production of higher yielding and other varieties of paddy (autumn 1989-'90)

Sl. District/ No. State	High yielding varieties					Other varieties			All varieties		
	Area (Hect.)	Meanyield of dry paddy (Kg./ha.)	Production of rice (in tonnes)	Area (Hect.)	Meanyield of dry paddy (Kg./ha.)	Production of rice (in tonnes)	Area (Hect.)	Meanyield of dry paddy (Kg./ha.)	Production of rice (in tonnes)	Area (Hect.)	Meanyield of dry paddy (Kg./ha.)
1	2	3	4	5	6	7	8	9	10	11	
1. Thiruvananthapuram	3868	3314	8423	6361	2849	11905	10229	3025	20328		
2. Kollam	10424	3193	21865	4191	2490	6857	14615	2991	28722		
3. Pathanamthitt	2180	2611	3739	2249	2595	3835	4429	2603	7574		
4. Alappuzha	14804	3085	30009	12112	2807	22334	26916	2960	52343		
5. Kottayam	10608	2997	20885	1808	2918	3466	12416	2985	24351		
6. Idukki	181	3549	422	1814	3280	3908	1995	3304	4330		
7. Ernakulam	10713	2922	20577	14259	2406	22552	24972	2627	43129		
8. Thrissur	3946	2588	6710	21629	2246	31915	25575	2299	38625		
9. Palakkad	8617	3646	20639	66053	3696	160379	74670	3690	181018		
10. Malappuram	4512	2826	8377	17371	2291	26148	21883	2401	34525		
11. Kozhikode	1009	2181	1445	2472	1555	2526	3481	1736	3971		
12. Wayanad	-	-	-	-	-	No Autumn paddy	-	-	-		
13. Kannur	6060	2872	11435	6918	2420	10998	12978	2631	22433		
14. Kasaragode	2075	3374	4600	7377	2619	12694	9452	2785	17294		
Kerala State	78997	3066	159126	164614	2954	319517	243611	2991	478643		

Table 4 - District-wise number of experiments and mean yield of paddy (kg./hect.) according to various cultivation practices - Autumn 1989-'90

Name of District	Irrigated										Un-irrigated										
	Chemical manure used	Other manure used	Not manured	Total	Chemical manure used	Other manured	Not manured	Total	Treated with plant protection chemicals	Not treated with plant protection chemicals	Total	Chemical manure used	Other manured	Not manured	Total	Treated with plant protection chemicals	Not treated with plant protection chemicals	Total			
	No. of exp-td	Mean yield	No. of exp-td	Mean yield	No. of exp-td	Mean yield	No. of exp-td	Mean yield	No. of exp-td	Mean yield	No. of exp-td	Mean yield	No. of exp-td	Mean yield	No. of exp-td	Mean yield	No. of exp-td	Mean yield	No. of exp-td	Mean yield	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Thiruvananthapuram	39	3251	-	-	-	-	-	39	3251	100	3542	-	-	-	-	100	3542	98	3672	41	2953
Local	90	2936	1	3299	-	-	-	91	2940	121	2795	-	-	-	-	121	2795	85	3059	127	2722
Total	129	3031	1	3299	-	-	-	131	3033	221	3133	-	-	-	-	221	3133	183	3387	168	2778
Kollam	-	-	-	-	-	-	-	-	-	224	3129	2	3444	1	1078	227	3123	47	3139	180	3119
Local	-	-	-	-	-	-	-	-	-	72	2677	12	2402	1	1994	83	2630	22	2877	63	2543
Total	-	-	-	-	-	-	-	-	-	296	3019	14	2551	2	1536	312	2989	69	3053	243	2970
Pathanamthitta	9	3469	-	-	-	-	-	9	3469	115	2353	1	1478	-	-	116	2337	108	2571	17	1446
Local	-	-	-	-	-	-	-	-	-	88	2065	1	1936	-	-	89	2064	39	2296	50	1882
Total	9	3469	-	-	-	-	-	9	3469	203	2228	2	1179	-	-	205	2218	147	2498	67	1771
Alappuzha	-	-	-	-	-	-	-	-	-	132	2587	-	-	-	-	132	2587	82	2920	50	2039
Local	-	-	-	-	-	-	-	-	-	83	2038	16	785	15	1465	114	1787	20	2012	94	1738
Total	-	-	-	-	-	-	-	-	-	215	2375	16	785	15	1465	246	2216	102	2742	144	1843
Kottayam...	18	3153	-	-	-	-	-	18	3153	161	2852	1	1105	1	381	163	2826	163	2952	18	2009
Local	20	3546	-	-	-	-	-	20	3546	69	2711	-	-	3	742	72	2629	64	3087	28	2235
Total	38	3360	-	-	-	-	-	38	3360	230	2810	1	1105	4	652	235	2766	227	2990	46	2146

(Contd.)

(Table contd.)

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Idukki	HVV	-	-	-	-	-	-	-	-	18	3536	-	-	-	-	18	3536	14	3568	4	3422
	Local	2	3819	-	-	-	-	2	3819	57	3296	-	-	1	2620	58	3285	38	3342	22	3232
	Total	2	3819	-	-	-	-	2	3819	75	3354	-	-	1	2620	76	3344	52	3403	26	3261
Ernakulam	HVV	108	3158	2	2150	-	-	110	3139	61	2707	-	-	-	-	61	2707	108	3166	63	2673
	Local	34	2527	-	-	-	-	34	2527	134	2474	7	1754	41	1996	182	2338	119	2828	97	1803
	Total	142	3007	2	2150	-	-	144	2527	195	2547	7	1754	41	1996	243	2430	227	2989	160	2146
Thrissur	HVV	3	1995	-	-	-	-	3	1995	113	2534	6	2017	7	1221	126	2437	79	2326	50	2585
	Local	10	2678	-	-	-	-	10	2678	211	2083	31	1715	38	1007	280	1896	129	2757	161	1256
	Total	13	2520	-	-	-	-	13	2520	324	2241	37	1764	45	1040	406	2064	208	2593	211	1571
Palakkad	HVV	13	3627	-	-	-	-	13	3627	50	3405	5	2304	-	-	55	3305	38	3367	30	3366
	Local	51	4616	1	2647	-	-	52	4578	286	4069	35	2128	15	1797	336	3766	58	4223	330	3813
	Total	64	4415	1	2647	-	-	65	4388	336	3970	40	2150	15	1797	391	3701	96	3984	360	3775
Malappuram	HVV	9	3277	-	-	-	-	9	3277	102	2728	3	2132	1	1658	106	2701	67	3205	48	2105
	Local	3	1904	-	-	-	-	3	1904	220	2350	122	1947	19	978	361	2142	72	3764	292	1738
	Total	12	2934	-	-	-	-	12	2934	322	2469	125	1952	20	1012	467	2268	139	3494	340	1790
Kozhikode	HVV	2	1967	-	-	-	-	2	1967	81	2197	9	2018	1	814	91	2164	37	3321	56	1393
	Local	-	-	-	-	-	-	-	-	104	1610	81	1295	22	1265	207	1450	16	2987	191	1321
	Total	2	1967	-	-	-	-	2	1967	185	1867	90	1368	23	1245	298	1668	53	3220	247	1337
Wayanad	HY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Local	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kannur	HVV	4	1804	-	-	-	-	4	1804	193	2783	18	2071	-	-	211	2722	41	3362	174	2550
	Local	2	1908	-	-	-	-	2	1908	138	2469	61	1978	2	1479	201	2310	22	2873	181	2237
	Total	6	1838	-	-	-	-	6	1838	331	2652	79	1999	2	1479	412	2521	63	3191	355	2391

(Contd.)

(Table contd.)

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Kasaragode																						
HYV		-	-	-	-	-	-	-	-	86	3576	9	2797	1	2005	96	3432	32	3520	64	3389	
Local		-	-	-	-	-	-	-	-	158	2710	39	2446	7	2912	204	2666	28	3067	176	2602	
Total		-	-	-	-	-	-	-	-	244	2994	48	2512	8	2799	300	2911	60	3309	240	2812	
STATE																						
HYV	205	3167	2	2147	-	-	-	207	3157	1436	2866	54	2209	12	1204	1502	2829	914	3071	795	2636	
Local	212	3294	2	2944	-	-	-	214	3290	1741	2659	405	1817	164	1490	2310	2428	712	3066	1812	2280	
Total	417	3231	4	2546	-	-	-	421	3225	3177	2752	459	1863	176	1470	3812	2586	1626	3069	2607	2388	

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ERRATA

Sl. No.	Page No.	Line No.	Printed as	Read as/to be printed/to be added/inserted
1	1	13	hectares	hectare
2.	2	16	the	these
3.	2	22	other	either
4.	3	29	up	np
5.	3	29	(ommission)	$\bar{X}_p = \frac{\sum_{j=1}^{np} X_{pj} \times 400 \times d}{J=1}$
6.	4	6	fapr	for
7.	5	3	(omission)	$S = \frac{\sum_{i=1}^n (a_i s_i)^2}{\left(\sum_{i=1}^n a_i\right)^2}$
8.	5	23	to	in
9.	7	21	hihest	highest
10.	9	40	col.5 289	389
11.	9	40	col.8 655	685
12.	13	11	col.5 2389	2380
13.	17	14	col.5 2635	2638
14.	20	18	col.17 83 Kollam Dist. (Table 4)	85

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