



GOVERNMENT OF KERALA

**REPORT ON THE  
CONSOLIDATED RESULTS OF  
CROP ESTIMATION SURVEYS  
1989-90**

**DEPARTMENT OF  
ECONOMICS & STATISTICS  
THIRUVANANTHAPURAM  
1994**



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CONSOLIDATED RESULTS OF CROP ESTIMATION  
RESULTS - 1989-'90

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## P R E F A C E

This report on the consolidated Results of Crop Estimation Surveys relates to the period 1989-'90. The methodology used in the conduct of crop cutting experiments on major crops viz. Paddy, Tapioca, Coconut, Arecanut, Cashew, Pepper, Cocoa, Jack, Banana, Plantain and Sesamum and minor crops selected for the year 1989-'90 viz. Turmeric, Groundnut and Sugarcane is briefly described in this report.

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

Thiruvananthapuram,  
12.7.1993.

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**CONSOLIDATED RESULTS OF CROP ESTIMATION SURVEYS  
1989-'90**

**1. Introduction:-**

The Department of Economics and Statistics was regularly conducting crop estimation surveys in the State on paddy and Tapioca even before the introduction of the scheme "Establishment of an agency for Reporting Agricultural Statistics" (EARAS) in 1975-'76. During 1976-'77 these surveys were extended to other important crops viz. Coconut, Arecanut, Cashew and Pepper and they are conducted on a regular basis every year. Crop cutting experiments on minor crops are also being conducted from 1977-'78 onwards covering three selected crops every year.

This report which relates to the year 1989-'90 gives a brief review of the crop estimation surveys conducted in respect of the following eleven important crops for which crop cutting experiments are conducted on a regular basis as in the previous years, and on three minor crops (viz. Turmeric, groundnut and Sugarcane) chosen for the year under report.

**Names of major crops on which crop cutting experiments were conducted in 1989-'90**

- |                      |             |
|----------------------|-------------|
| 1. Paddy (3 seasons) | 7. Banana   |
| 2. Coconut           | 8. Cocoa    |
| 3. Arecanut          | 9. Plantain |
| 4. Pepper            | 10. Sesamum |
| 5. Cashew            | 11. Jack    |
| 6. Tapioca           |             |

**2. Objectives:-**

The primary objectives of the surveys are to obtain estimates of average yield per hectare of important crops at block level. The average yield obtained through these surveys are used for estimating the production of the crops in the state during the year.

**3. Coverage:-**

The yield estimation surveys were designed to cover the whole state except forest areas.

The table given below shows the number of Blocks/Municipalities/Corporations where the surveys were planned and the number of Blocks/Municipalities/Corporations where they were actually conducted and analysed during the year 1985-'90.

Sl. No.	Crop	Season	No. of Block/Municipalities/Corporations where planned/conducted in 1989-'90	
			Planned	Analysed
1	2	3	4	5
1. i.	Paddy	Autumn	195	182
ii.	"	Winter	195	190
iii.	"	Summer	195	132

(Contd.)

(Table contd.)

1	2	3	4	5
2.	Tapioca	-	195	173
3.	Coconut	-	195	195
4.	Arecanut	-	185	185
5.	Cashew	-	180	177
6.	Pepper	-	171	171
7.	Cocoa	-	162	142
8.	Jack	-	187	185
9.	Banana	-	170	170
10.	Plantain	-	190	190
11.	Sesamum	-	98	97
12.	Turmeric	-	79	79
13.	Groundnut	-	4	4
14.	Sugarcane	-	13	13

#### 4. Design:-

The survey started with locating and marking of plot of specified size in the case of paddy, tapioca, sesamum, Turmeric, Groundnut and Sugarcane and locating and marking of trees/standards/plants in the case of other crops using random sampling method. The produce at harvest was weighed or counted as the case may be, and recorded in the prescribed proforma together with other relevant details.

##### 4.1 Paddy:-

A stratified random sampling design was adopted for the survey. During each season viz. autumn, winter and summer crop cutting experiments on paddy were conducted separately in the investigator zones in each block considering block as the stratum for the survey. Investigator zones in each block are treated as substrata and the first stage unit. Paddy growing survey sub divisions in the selected clusters from the second stage unit. Wet land clusters are formed by selecting the key plots under circular systematic sampling method and four identical plots adjoining the key plots from the wet land frame. Afterwards in each zone lists of survey sub divisions of wet land plots growing paddy under (i) High yielding varieties - Irrigated, (ii) High yielding Varieties - Unirrigated, (iii) Local Varieties - Irrigated and (iv) Local Varieties - Unirrigated are prepared. The required number of plots are selected by using simple random sampling method from the above lists. If the plot contained more than one kandom, the kandoms were serially numbered anti clock-wise and one kandom each was selected by simple random for the third stage unit. A square plot of sides 5 metres forms the ultimate sampling unit. The produce of the square plot selected was harvested, threshed, winnowed and weighed correct to ten grams. Driage ratio was determined by processing sample grains taken from the sub-sample plots.

#### 4.2 Tapioca:-

The required number of plots were selected from the list of wet and dry land key plots. The plots were visited to ascertain its suitability for conducting the experiments. In certain cases, where the plots were found unsuitable for conducting crop cutting experiments, the next key plot was visited until a suitable plot was identified. If the selected plot contained more than one patch under tapioca, one patch was selected by random sampling method. An area of 2 x 2 metres square was fixed for conducting the experiments. All tapioca plants inside the square plot were harvested, the produce was cleaned by removing the solid sticking to the tubers and then the weight of the produce was recorded.

#### 4.3 Sesamum, Groundnut, Turmeric and Sugarcane:-

The required number of plots were selected from the list of wet and dry land plots in the case of groundnut and sugarcane, while for selecting the required number of plots for crop cutting on Turmeric the list of dry land plots were used. In the case of selection of plots for crop cutting on sesamum the lists of wet land plots were used as the frame. The experimental plots were of the size 5 x 5 metre square in the case of sesamum, groundnut and sugarcane and 2 x 2 metre square in the case of Turmeric.

If the selected plot had more than one patch, one of the patches would be selected at random. From the southwest corner of the selection plot/patch, size x 'towards each and side Y 'towards north perpendicular to x ' was measured in steps. Two random numbers less than or equal to x and y respectively were taken. With the help of these random numbers the south west corner of the experimental plot was located and the experimental plot marked.

The produce from the experimental plot was harvested and the cleared produce was weighed. The weights was recorded correct to half Kg. in the case of groundnut and sugarcane. In the case of Turmeric and Sesamum, weights were ascertained to the nearest 10 gms. unit.

#### 4.4 Coconut, Arecanut, Cashew, Pepper, Cocoa, Jack, Plantain and Banana:

In the case of banana, the required number of plots were selected from the list of wet and dry land key plots and in the case of remaining crops, plots were selected from the list of dry land key plots, by using simple random sampling method. If the key plots selected did not grow a particular crop for which crop cutting experiments were to be conducted. The Investigator had to look for the crop in the first or second side plots in the left. If the particular crop did not exist in these plots, he would see whether this crop was grown in the first or second side plots selected on the right side of the key plot. If the crop was not grown in the entire cluster another key plot would be selected by random sampling method. The plots were visited to ascertain its suitability for conducting the experiment i.e. to see whether it contained the required number of bearing trees/standards for the experiment. For coconut, arecanut, cashew, pepper and cocoa five trees/standards were selected. In the case of jack, two bearing trees and for plantain and banana three plants each were selected. The details of produce harvested were recorded in the prescribed proforma.

### 5. Sample size:-

The total number of crop cutting experiments planned and conducted during the year 1989-'90 are given below:-

Sl. No.	Name of crop	Season	No. of experiments	
			Planned	Analysed
1	2	3	4	5
1. i.	Paddy	Autumn	4347	4233
ii.	"	Winter	4553	4428
iii.	"	Summer	2887	2821
2.	Tapioca	-	1421	1408
3.	Coconut	-	2511	2284
4.	Arecanut	-	1584	1551
5.	Cashew	-	1564	1435
6.	Pepper	-	1515	1356
7.	Cocoa	-	1336	837
8.	Jack	-	1590	1474
9.	Banana	-	2036	2036
10.	Plantain	-	1553	1553
11.	Sesamum	-	420	385
12.	Turmeric	-	492	492
13.	Groundnut	-	38	38
14.	Sugarcane	-	31	31

### 6. Field work:-

The field work of the surveys comprising of selection of fields, identification of the selected plot location marking of selected experimental plot/trees, recording the weight/number of the nuts of the harvested produce etc. were done by the investigator of the Department under the supervision of the Statistical Inspectors/Taluk Statistical Officers and District Level Officers. The planning of the survey and statistical analysis of the data collected were done at the Headquarters of the Department.

### 7. Training:-

The training was imparted to Officers at the Taluk and District levels. The Officers from the National Sample Survey Organisation also participated in these training programmes. Taluk Level training programmes were organised by the District Level Officers.

### 8. Response:-

The number of experiments planned, analysed and the percentage response in respect of paddy during the three seasons in each district are given in Table '1' in the appendix. Details with regard to the number of experiments planned and analysed in respect of all other crops for the year 1989-'90 are shown in tables 6 to 18.

## 9. Supervision:-

The field work of Investigators was supervised by the Statistical Inspectors and Taluk Officers at the taluk level. District Level Officers also conducted inspections of field work of the Investigators. All the inspecting Officers at the district level had to conduct harvest stage inspection at the rate of one experiment in each block and the Taluk Level Officers were made responsible to inspect at least one experiment in each Investigator zone in the case of paddy. Under the scheme of crop cutting survey on Tapioca, the district level officers had to conduct inspection at the rate of three experiment in a district while the Taluk Statistical Officers/Statistical Inspectors had to inspect five experiments or 50% of the experiments planned in a block which ever is less. Apart from these, inspections were done at pre-harvest and post harvest stages by the Statistical Inspectors/Taluk Statistical Officers and District Level Officers.

## 10. Results:-

Estimates of drriage ratio of paddy based on the samples collected for drriage experiments during the three seasons of the year 1989-'90 are given in Table 2 in the Appendix.

The area, estimated yield of dry paddy the percentage sampling error and the total production of rice during the three seasons for the year 1989-'90 are shown in Table 3 in the Appendix.

The details showing the percentage area under different agricultural practices during 1989-'90 for Autumn, Winter and Summer are given in Tables 4.1, 4.2 and 4.3 respectively.

The estimated mean yield rates of Tapioca, Coconut, Arecanut, Cashew, Pepper, Cocoa, Jack, Banana, Plantain, Sesamum, Turmeric, Groundnut and Sugarcane are given in Tables 5 to 17.

## 11. Analysis:-

Autumn 1989-'90: During the year 1989-'90 the Autumn season showed the highest rate of production (viz. 2991 Kg./ha.) while during the year 1988-'89 the Autumn season had recorded the lowest yield rate of 25.31 Kg./hect. compared to the other seasons of the respective year. The percentage increase of yield rate of Autumn paddy during the year compared to the previous year was 18.2. The highest yield of 3690 Kgs./hect. was achieved by Palakkad district, while the lowest yield of 1736 Kgs./hect. was recorded in Kozhikode district. The average yield rate of dry paddy for the state was 2991 Kg./hect.

Winter 1989-'90: In the winter season the yield rate increased by 8.88% compared to the previous year. The yield rate during the present year in Winter was 2624 Kg./hect. in the State. In 1989-'90 Kottayam district reported the highest mean yield of 3623 Kg./hect. and Kozhikode district reported the lowest mean yield rate of 1842 kg./hect. during the winter season.

Summer 1989-'90: The State mean yield rate for summer paddy 1989-'90 was 3387 Kg./hect. which recorded 2.79 increase compared to the corresponding season of the previous year. During the season, Pathanamthitta district contributed the highest mean yield rate of 6203 Kg./hect. while Kollam district had the lowest mean yield rate of 1793 Kg./hect. in the State.

While the yield rates decreased in respect of cashew, cocoa and plantain the yield rates of tapioca, coconut, arecanut, pepper, jack fruits, banana, sesamum, groundnut and sugarcane showed an increase compared to the yield rates of previous year.

The highest yield rate in respect of coconut of 6825 nos/hectare was recorded in Thrissur district followed by 6371 nos./hect. in Ernakulam district and 6118 nos./hect. in Thiruvananthapuram district. The lowest yield of 1340 nos./hect. was reported from Wayanad district.

In the case of Arecanut, the highest yield rate of 241935 nos./hect. was reported from Idukki district and the lowest yield rate of 79955 nos./hect. was reported from Alappuzha district during the year under report. As regards cashewnut, Kannur district had recorded the highest yield rate of 1312 kg./hect. while Alappuzha district recorded the lowest yield rate of 309 Kg./hect. during the year. The highest yield rate obtained in 1989-'90 in the case of pepper is that reported from Idukki district viz. 484 Kg./hect. The average yield rate of pepper for the rate during 1989-'90 is 324 Kg./hect. which is 17.82% higher compared to the previous years State average of 275 Kg./hect.

As regards cocoa, the State mean yield rate showed an increase of 2.5% during the year 1989-'90 compared to the year 1988-'89. The highest yield rate of 687 Kg./hect. was reported by Alappuzha district followed by Pathanamthitta district with 561 Kg./hect. The lowest yield rate of 150 Kg./hect. during the year under report was reported from Kozhikkode district.

The highest production rate of tapioca was 31 tonnes/hect. reported by Wayanad district followed by 26 tonnes/hect reported by Idukki district, during 1989-'90. The lowest yield rate in case of Tapioca was 14 tonnes/ hect. reported by Kasaragode district. The State mean yield rate showed an increase of 2.1% during 1989-'90 compared to the previous year.

The State mean yield rate for 1989-'90 is 13.089 tonnes/hect. in the case of Banana which is 2.2% higher compares to the previous year. The highest mean yield rate of 15 tonnes/hect. was reported by Iddukki district and the lowest of 12 tonnes/hect. was reported by Malappuram and Kollam districts during the year.

The state mean yield for Plantain decreased during the year under report by 2.3% compared to the previous year. The last year's mean yield rate was 4516 Kg./hect. for the state while that during 1989-'90 it is 4410 Kg./hect. The highest mean yield of 7305 Kg./hect. is reported from Idukki district and the lowest of 2653 Kg./hect. is reported from Thrissur district.



The state mean yield of Sesamum shows an increase of 8.7% during the year. The State mean yield for 1989-'90 is recorded as 188 Kg./hect. While the corresponding figure for 1988-'89 was 173 Kg./hect. The highest yield rate of 395 Kg./hect. is recorded by Pathanamthitta district and the lowest of 78 Kg./hect. is recorded by Kasaragode district during the year under report. No area under Sesamum crop is reported during the year from Kozhikode district.

The details in respect of mean yield of all crops for the year 1988-'89 and 1989-'90 are given in Tables 18.1 and 18.2.

Crop: Paddy

Table 1: Coverage sample size and response

Year: 1989-'90

District	Autumn 1989				Winter 1989				Summer 1990				Total 1989-'90			
	No. of crop cutting experiments		% age of response		No. of crop cutting experiments		% age of response		No. of crop cutting experiments		% age of response		No. of crop cutting experiments		% age of response	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Thiruvananthapuram	360	351	97.50	354	353	99.72	148	147	99.32	862	851	98.72				
Kollam	312	312	100.00	312	310	99.36	62	62	100.00	686	684	99.71				
Pathanamthitta	221	214	96.83	222	215	96.85	159	154	96.86	602	583	96.84				
Alappuzha	260	246	94.62	264	248	93.94	140	131	93.57	664	625	94.13				
Kottayam	279	273	97.85	306	284	92.81	114	105	92.11	699	662	94.71				
Idukki	84	78	92.86	102	102	100.00	-	-	-	186	180	96.77				
Ernakulam	388	387	99.74	318	318	100.00	258	258	100.00	964	963	99.90				
Thrissur	431	419	97.22	438	432	98.63	378	375	99.21	1247	1226	98.32				
Palakkad	480	456	95.00	498	480	96.39	270	267	98.89	1248	1203	96.39				
Malappuram	486	479	98.56	486	483	99.38	436	416	96.41	1408	1378	97.87				
Kozhikode	328	300	91.46	330	317	96.06	229	213	93.01	887	830	93.57				
Wayanad	-	-	-	210	210	100.00	209	209	100.00	419	419	100.00				
Kannur	418	418	100.00	420	397	94.52	236	236	100.00	1074	1051	97.86				
Kasaragod	300	300	100.00	294	279	94.90	248	248	100.00	842	827	98.22				
<b>State</b>	<b>4347</b>	<b>4233</b>	<b>97.38</b>	<b>4554</b>	<b>4428</b>	<b>97.23</b>	<b>2887</b>	<b>2821</b>	<b>97.71</b>	<b>11788</b>	<b>11482</b>	<b>97.40</b>				

Table 2: Data on driage experiments on paddy 1989-'90

District/ State	No. of crop cutting experiments			Weight of paddy collected		
	Season	Planned for dri- age expe- riments	Anal- ysed for driage	Before driage (gms)	After driage (gms)	Driage ratio used
1	2	3	4	5	6	7
Thiruvananthapuram	Autumn	51	51	12750	11312	0.887
	Winter	55	55	13750	11880	0.864
	Summer	38	38	9500	8495	0.894
Kollam	Autumn	53	53	13250	11892	0.898
	Winter	54	54	13500	12077	0.894
	Summer	17	17	4250	3840	0.904
Pathanamthitta	Autumn	37	37	9250	8141	0.880
	Winter	37	37	9250	8379	0.906
	Summer	25	25	6250	5800	0.928
Alappuzha	Autumn	36	36	9000	7906	0.878
	Winter	44	44	11000	9990	0.905
	Summer	25	25	6250	5732	0.917
Kottayam	Autumn	37	37	9250	7858	0.850
	Winter	31	31	7750	6898	0.890
	Summer	15	15	3750	3508	0.936
Idukki	Autumn	10	10	2500	2156	0.862
	Winter	17	17	4250	3784	0.890
	Summer	-	-	-	-	-
Ernakulam	Autumn	66	66	16500	14551	0.882
	Winter	51	51	12750	11517	0.903
	Summer	31	31	7750	6927	0.894
Thrissur	Autumn	68	68	17000	14876	0.875
	Winter	69	69	17250	15847	0.918
	Summer	59	59	14750	13742	0.932
Palakkad	Autumn	48	48	12000	10711	0.893
	Winter	51	51	12750	11761	0.922
	Summer	39	39	9750	8742	0.897
Malappuram	Autumn	44	44	11000	9913	0.901
	Winter	44	44	11000	10351	0.941
	Summer	42	42	10500	9618	0.916

(Contd.)

(Table 2 contd.)

1	2	3	4	5	6	7
Kozhikode	Autumn	47	47	11750	10618	0.904
	Winter	45	45	11250	10240	0.910
	Summer	35	35	8750	7945	0.908
Wayanad	Autumn	-	-	-	-	-
	Winter	6	6	1500	1412	0.941
	Summer	17	17	4250	3683	0.867
Kannur	Autumn	61	61	15250	12989	0.852
	Winter	58	58	14500	12595	0.868
	Summer	37	37	9250	8261	0.893
Kasaragode	Autumn	15	15	3750	3335	0.889
	Winter	19	19	4750	4321	0.909
	Summer	18	18	4500	4082	0.907
S T A T E	Autumn	573	573	143250	126258	0.831
	Winter	581	581	145250	131052	0.902
	Summer	398	398	99500	90375	0.908

Table 3: Yield estimates - Rice - 1989-'90

District	Crop season	Crop area in hec.	No. of experiments			Response	Estimated yield Kg/ hect. of dry paddy	Sampling percentage of sampling error	Total production of rice in Tonnes
			Plan- ned	Analy- sed	Res- ponce				
1	2	3	4	5	6	7	8	9	
Thiruvananthapuram	Autumn	10229	360	351	97.50	3025	1.49	20328	
	Winter	10420	354	353	99.72	2674	1.53	18306	
	Summer	272	148	147	99.32	2250	4.40	402	
Kollam	Autumn	14615	312	312	100.00	2991	1.50	28722	
	Winter	16415	312	310	99.36	2811	1.28	30318	
	Summer	45	62	62	100.00	1793	6.70	53	
Pathanamthitta	Autumn	4429	221	214	96.83	2603	2.80	7574	
	Winter	5607	222	215	96.85	3061	1.70	11275	
	Summer	3913	159	154	96.86	5085	3.00	13072	
Alappuzha	Autumn	26916	260	246	94.62	2960	3.48	52343	
	Winter	21274	264	248	93.94	3355	3.70	46899	
	Summer	16344	140	131	93.57	4274	3.60	45891	
Kottayam	Autumn	12416	279	273	97.85	2985	3.38	24351	
	Winter	10390	306	284	92.81	3623	1.38	24728	
	Summer	7257	114	105	92.11	4634	2.80	22096	
Idukki	Autumn	1995	84	78	92.86	3304	1.97	4330	
	Winter	2682	102	102	100.00	3551	1.35	6258	
	Summer	237	-	-	-	6203	-	966	
Ernakulam	Autumn	24972	388	387	99.74	2627	1.87	43129	
	Winter	28810	318	318	100.00	2729	5.24	51649	
	Summer	16019	258	258	100.00	2406	1.90	25323	

(Contd.)

(Table 3 contd.)

1	2	3	4	5	6	7	8	9
Thrissur	Autumn	25575	431	419	97.22	2299	2.26	38625
	Winter	34800	438	432	98.63	2593	1.97	59279
	Summer	14076	378	375	99.21	2897	2.70	26794
Palakkad	Autumn	74670	480	456	95.00	3690	1.52	181018
	Winter	70111	498	480	96.39	3130	1.53	144160
	Summer	1958	270	267	98.89	2825	3.90	3634
Malappuram	Autumn	21883	486	479	98.56	2401	1.79	34525
	Winter	28669	486	483	99.38	2313	1.25	43559
	Summer	4152	436	416	95.41	3212	4.30	8761
Kozhikode	Autumn	3481	328	300	91.46	1736	3.46	3971
	Winter	8487	330	317	96.06	1842	2.99	10269
	Summer	2036	229	213	93.01	2051	3.20	2743
Wayanad	Autumn	-	-	-	-	-	-	-
	Winter	17509	210	210	100.00	3154	1.78	36283
	Summer	3523	209	209	100.00	2853	2.00	6604
Kannur	Autumn	12978	418	418	100.00	2631	2.20	22433
	Winter	7592	420	397	94.52	2333	1.93	11636
	Summer	412	236	236	100.00	1914	3.90	518
Kasaragod	Autumn	9452	300	300	100.00	2785	1.62	17294
	Winter	5833	294	279	94.90	2499	1.44	9578
	Summer	935	248	248	100.00	2497	1.90	1534
S T A T E	Autumn	243611	4347	4233	97.38	2991	0.87	478643
	Winter	268599	4554	4428	97.23	2857	0.67	504197
	Summer	71179	2887	2821	97.71	3387	1.30	158391

Table 4.1 - Percentage distribution of area under paddy according to variety and agricultural practices - 1989-'90

Season: Autumn

Sl. No.	District	Improved varieties	Other Varieties	Chemical fertilizers	Other manures	Not manures	Percentage of area	
							Treated with plant protection chemicals	Not treated with plant protection chemicals
1	2	3	4	5	6	7	8	9
1.	Thiruvananthapuram	37.81	62.19	99.72	0.23	-	52.14	47.86
2.	Kollam	71.32	28.68	94.87	4.49	0.64	22.12	77.88
3.	Pathanamthitta	49.22	50.78	99.07	0.93	-	62.69	31.31
4.	Alappuzha	55.00	45.00	87.40	6.50	6.10	41.46	58.54
5.	Kottayam	85.44	14.56	98.17	0.37	1.46	83.15	16.85
6.	Idukki	9.07	90.93	98.72	1.28	-	66.67	33.33
7.	Ernakulam	42.90	57.10	87.08	2.33	10.59	58.66	41.34
8.	Thrissur	15.43	84.57	80.19	9.07	10.74	49.64	50.36
9.	Palakkad	11.54	88.46	87.72	8.99	3.29	21.05	78.95
10.	Malappuram	20.62	79.38	69.73	26.10	4.17	29.02	70.92
11.	Kozhikode	28.99	71.01	62.33	30.00	7.67	17.67	72.33
12.	Wayanad	-	-	-	-	-	-	-
13.	Kannur	46.69	53.31	80.62	18.90	0.48	15.07	84.93
14.	Kasaragode	21.95	78.05	81.33	16.00	2.67	20.00	80.00
	State	32.43	67.57	84.88	10.99	4.13	38.41	61.59

Table 4.2 - Percentage distribution of area under paddy according to variety and agricultural practices - 1989-'90

Season: Winter

Sl. No.	District	Crop: Paddy								
		1	2	3	4	5	6	7	8	9
		Improved varieties	Other Varieties	Chemical fertilizers	Other manures	Not manures	Treated with plant protection chemicals	Not treated with plant protection chemicals	Percentage of area	
	Thiruvananthapuram	14.13	85.87	97.17	0.85	1.98	66.57	33.43		
	Kollam	5.98	94.02	85.06	11.20	5.65	64.11	35.89		
	Pathanamthitta	24.52	75.98	94.52	9.84	0.64	12.58	87.42		
	Alappuzha	37.01	62.99	99.53	0.47	-	81.40	18.60		
	Kottayam	78.07	21.93	98.59	1.41	-	88.38	11.62		
	Idukki	8.13	91.87	89.22	10.78	-	62.75	37.25		
	Ernakulam	9.25	90.75	90.25	6.29	3.46	70.43	29.87		
	Thrissur	15.64	84.36	81.02	13.19	5.79	58.10	41.90		
	Palakkad	2.11	97.89	94.79	4.58	0.63	43.96	56.04		
	Malappuram	9.61	90.39	76.40	21.12	2.48	58.59	41.41		
	Kozhikode	7.15	92.85	64.35	25.55	10.10	24.29	75.71		
	Wayanad	8.62	91.38	77.62	14.29	8.09	32.86	67.14		
	Kannur	21.73	78.27	89.42	8.82	1.76	46.85	53.15		
	Kasaragod	13.27	86.73	93.19	5.73	1.08	61.65	38.35		
	<b>State</b>	<b>13.74</b>	<b>86.26</b>	<b>87.40</b>	<b>9.60</b>	<b>3.00</b>	<b>54.09</b>	<b>45.91</b>		



Table 4.3 - Percentage distribution of area under paddy according to variety and agricultural practices - 1989-'90

Season: Summer

Sl. No.	District	Crop: Paddy												
		1	2	3	4	5	6	7	8	9				
		Improved varieties			Other Varieties		Chemical fertili-sers		Other manures		Not manures		Percentage of area	
		varieties			Varieties		ferti-		manures		manures		Treated with pl- ant protection tectio chemicals	
		s			sers		s		s		s		s	
	Thiruvananthapuram	54.42	45.58	96.60	2.04	1.36	70.75	29.25						
	Kollam	35.48	64.52	95.16	-	4.84	82.26	17.74						
	Pathanamthitta	61.04	38.96	68.83	31.17	-	83.77	16.23						
	Alappuzha	80.15	19.85	77.86	20.61	1.53	99.24	0.76						
	Kottayam	93.33	6.67	82.86	17.14	-	92.38	7.62						
	Idukki	-	-	-	-	-	-	-						
	Ernakulam	39.15	60.85	96.51	3.49	-	81.40	18.60						
	Thrissur	55.47	44.53	72.53	26.40	1.07	85.87	14.13						
	Palakkad	32.96	67.04	62.54	35.21	2.25	53.18	46.82						
	Malappuram	56.49	43.51	90.38	9.62	-	-	16.11						
	Kozhikode	52.11	47.89	63.38	31.46	5.16	46.95	53.03						
	Wayanad	36.36	63.64	58.37	30.15	11.48	29.67	70.33						
	Kannur	28.39	71.61	82.63	13.14	4.23	32.20	67.80						
	Kasaragod	26.21	73.79	72.18	27.82	-	46.37	53.63						
	<b>State</b>	<b>47.86</b>	<b>52.14</b>	<b>77.67</b>	<b>20.13</b>	<b>2.20</b>	<b>66.89</b>	<b>33.11</b>						

Table 5 - Yield estimates - Tapioca - 1989-'90

District	No. of experiments		Estimated mean yield (in tonnes /Hect.)
	Planned	Analysed	
1	2	3	4
Thiruvananthapuram	126	125	18.240
Kollam	120	120	18.020
Pathanamthitta	74	73	20.423
Alappuzha	58	57	18.562
Kottayam	93	93	23.351
Idukki	53	53	25.880
Ernakulam	123	123	19.472
Thrissur	122	115	16.079
Palakkad	168	167	18.842
Malappuram	157	157	16.823
Kozhikode	86	86	15.614
Wayanad	44	43	31.346
Kannur	140	140	17.824
Kasaragod	57	56	14.975
<b>State</b>	<b>1421</b>	<b>1408</b>	<b>15.070</b>

Table 6 - Yield estimates of coconut 1989-'90

District	No. of experiments		Average yield/ trees (Nos.)	Estimated menayield (No. of nuts/hect)
	Planned	Analysed		
1	2	3	4	5
Thiruvananthapuram	196	163	36	6118
Kollam	160	151	36	4986
Pathanamthitta	118	111	31	4446
Alappuzha	142	110	34	5030
Kottayam	180	161	26	4384
Idukki	116	94	37	4260
Ernakulam	209	198	41	6371
Thrissur	219	219	44	6825
Palakkad	267	260	26	3233
Malappuram	249	243	34	4746
Kozhikode	176	143	35	5595
Wayanad	108	99	29	1340
Kannur	217	198	33	4702
Kasaragod	154	134	32	4500
<b>State</b>	<b>2511</b>	<b>2284</b>	<b>34</b>	<b>5236</b>

Table 7 - Yield estimates of Arecanut 1989-'90

District	No. of experiments		Average yield/ trees (Nos.)	Estimated menayield (No. of nuts/hect
	Planned	Analysed		
1	2	3	4	5
Thiruvananthapuram	122	122	78	124303
Kollam	104	104	129	192934
Pathanamthitta	76	65	114	202922
Alappuzha	68	68	78	79955
Kottayam	116	111	87	153938
Idukki	76	70	172	241935
Ernakulam	132	129	123	194879
Thrissur	144	144	106	191656
Palakkad	159	159	64	122862
Malappuram	162	162	105	168776
Kozhikode	111	103	120	192528
Wayanad	72	72	194	194431
Kannur	142	142	179	228749
Kasaragod	100	100	186	207753
<b>State</b>	<b>1584</b>	<b>1551</b>	<b>120</b>	<b>189287</b>

Table 8 - Yield estimates of Cashew 1989-'90

District	No. of experiments		Average yield/ trees (in Kg.)	Estimated menayield Kg./hect.
	Planned	Analysed		
1	2	3	4	5
Thiruvananthapuram	119	113	3.213	786.536
Kollam	102	98	5.077	981.741
Pathanamthitta	75	66	5.127	964.986
Alappuzha	74	74	2.016	309.068
Kottayam	112	88	1.942	387.969
Idukki	74	60	3.397	612.587
Ernakulam	125	118	2.022	409.145
Thrissur	128	124	2.396	508.072
Palakkad	170	144	1.705	456.077
Malappuram	162	156	2.605	528.382
Kozhikode	110	110	2.146	525.382
Wayanad	72	46	2.017	394.910
Kannur	141	141	6.156	1311.641
Kasaragod	100	97	3.876	979.089
<b>State</b>	<b>1564</b>	<b>1435</b>	<b>3.126</b>	<b>861.172</b>

Table 9 - Yield estimates of Pepper 1989-'90

District	No. of experiments		Average yield/ trees (in Kg.)	Estimated menayield Kg./hect. Kg./hect.
	Planned	Analysed		
1	2	3	4	5
Thiruvananthapuram	130	118	1.796	268.957
Kollam	104	104	3.221	437.811
Pathanamthitta	66	54	1.852	386.196
Alappuzha	57	56	1.595	243.876
Kottayam	110	76	1.173	168.347
Idukki	74	66	2.760	484.484
Ernakulam	130	126	1.114	152.848
Thrissur	148	144	1.197	156.600
Palakkad	140	90	1.455	127.015
Malappuram	160	149	0.869	137.679
Kozhikode	76	72	0.979	159.069
Wayanad	80	80	3.340	395.328
Kannur	142	127	2.315	304.281
Kasaragod	98	85	1.677	304.361
<b>State</b>	<b>1515</b>	<b>1356</b>	<b>1.746</b>	<b>323.962</b>

Table 10 - Yield estimates of Cocoa 1989-'90

District	No. of experiments		Average yield/ trees (in Kg.)	Estimated menayield Kg./hect. Kg./hect.
	Planned	Analysed		
1	2	3	4	5
Thiruvananthapuram	108	77	5.814	331.725
Kollam	109	52	3.330	244.253
Pathanamthitta	76	63	8.223	560.928
Alappuzha	88	71	10.316	687.064
Kottayam	114	112	7.404	438.994
Idukki	66	56	6.402	371.604
Ernakulam	128	113	7.106	469.166
Thrissur	128	47	3.294	231.154
Palakkad	108	15	2.055	226.172
Malappuram	82	18	7.080	421.105
Kozhikode	44	19	2.739	149.879
Wayanad	72	52	6.203	361.708
Kannur	141	123	5.391	303.950
Kasaragod	72	19	4.223	184.596
<b>State</b>	<b>1336</b>	<b>837</b>	<b>6.324</b>	<b>411.199</b>

Table 11 - Yield estimates of Jackfruits 1989-'90

District	No. of experiments		Average yield/ trees (Nos.)	Estimated menayield Kg.hect.
	Planned	Analysed		
1	2	3	4	5
Thiruvananthapuram	116	95	11	2310
Kollam	106	88	16	3109
Pathanamthitta	80	54	15	3021
Alappuzha	88	63	8	1576
Kottayam	96	96	19	4318
Idukki	76	64	21	4610
Ernakulam	124	122	14	2831
Thrissur	146	146	17	4016
Palakkad	171	161	16	3238
Malappuram	162	162	12	2603
Kozhikode	110	110	12	2175
Wayanad	72	72	17	2702
Kannur	143	143	26	5980
Kasaragod	100	98	22	4610
<b>State</b>	<b>1590</b>	<b>1474</b>	<b>16</b>	<b>3351</b>

Table 12 - Yield estimates of Banana 1989-'90

District	No. of experiments		Average yield/ plant (in Kg.)	Estimated menayield Tonnes/ Hect.
	Planned	Analysed		
1	2	3	4	5
Thiruvananthapuram	167	167	6.257	13.516
Kollam	137	137	6.134	11.360
Pathanamthitta	94	94	6.949	13.562
Alappuzha	66	66	5.997	13.473
Kottayam	152	152	7.082	14.595
Idukki	102	102	7.249	15.153
Ernakulam	163	163	6.978	13.683
Thrissur	167	167	6.057	12.672
Palakkad	195	195	6.338	13.396
Malappuram	239	239	6.842	11.766
Kozhikode	155	155	5.797	12.094
Wayanad	107	107	6.637	13.320
Kannur	193	193	6.585	13.114
Kasaragod	99	99	6.707	13.417
<b>State</b>	<b>2036</b>	<b>2036</b>	<b>6.418</b>	<b>13.089</b>

Table 13 - Yield estimates of Plantain 1989-'90

District	No. of experiments		Average yield/ plant (in Kg.)	Estimated menayield Tonnes/ Hect.
	Planned	Analysed		
1	2	3	4	5
Thiruvananthapuram	120	120	7.671	5.270
Kollam	93	93	7.272	4.568
Pathanamthitta	69	69	9.079	6.804
Alappuzha	85	85	7.308	4.386
Kottayam	113	113	7.290	5.322
Idukki	66	66	8.180	7.305
Ernakulam	130	130	7.195	4.497
Thrissur	146	146	5.112	2.653
Palakkad	172	172	5.551	3.303
Malappuram	147	147	6.310	4.005
Kozhikode	103	103	4.896	3.091
Wayanad	72	72	7.511	6.227
Kannur	142	142	5.590	3.125
Kasaragod	95	95	5.229	4.248
<b>State</b>	<b>1553</b>	<b>1553</b>	<b>6.481</b>	<b>4.410</b>

Table 14 - Yield estimates - Sesamum - 1989-'90

District	No. of experiments		Estimated mean yield (in tonnes /Hect.)
	Planned	Analysed	
1	2	3	4
Thiruvanthapuram	2	2	0.212
Kollam	53	53	0.282
Pathanamthitta	17	17	0.395
Alappuzha	27	27	0.141
Kottayam	7	7	0.205
Idukki	12	12	0.238
Ernakulam	75	74	0.238
Thrissur	63	63	0.156
Palakkad	61	57	0.220
Malappuram	72	72	0.147
Kozhikode	-	-	-
Wayanad	19	19	0.231
Kannur	9	9	0.127
Kasaragod	3	3	0.078
<b>State</b>	<b>420</b>	<b>415</b>	<b>0.188</b>

Table 15 - Yield estimates - Turmeric - 1989-'90

District	No. of experiments		Estimated mean yield (in tonnes /Hect.)
	Planned	Analysed	
1	2	3	4
Thiruvananthapuram	-	-	3.529
Kollam	70	70	10.676
Pathanamthitta	20	20	15.553
Alappuzha	-	-	11.112
Kottayam	40	40	15.841
Idukki	45	45	13.900
Ernakulam	67	67	7.512
Thrissur	-	-	9.853
Palakkad	84	84	10.543
Malappuram	-	-	9.789
Kozhikode	42	42	8.743
Wayanad	29	29	16.051
Kannur	93	93	14.023
Kasaragod	2	2	7.109
<b>State</b>	<b>492</b>	<b>492</b>	<b>11.340</b>

Table 16 - Yield estimates - Groundnut - 1989-'90

District	No. of experiments		Estimated mean yield (in Kgs. /Hect.)
	Planned	Analysed	
1	2	3	4
Thiruvananthapuram	-	-	-
Kollam	-	-	-
Pathanamthitta	-	-	-
Alappuzha	-	-	-
Kottayam	-	-	-
Idukki	-	-	-
Ernakulam	-	-	-
Palakkad	38	38	743
Thrissur	-	-	-
Malappuram	-	-	-
Kozhikode	-	-	-
Wayanad	-	-	-
Kannur	-	-	-
Kasaragod	-	-	-
<b>State</b>	<b>38</b>	<b>38</b>	<b>743</b>

Table 17 - Yield estimates - Sugar cane - 1989-'90

District	No. of experiments		Estimated mean yield (in tonnes /Hect.) (Gur)
	Planned	Analysed	
1	2	3	4
Thiruvananthapuram	-	-	5.235
Kollam	-	-	5.277
Pathanamthitta	10	10	6.847
Alappuzha	2	2	5.300
Kottayam	3	3	5.717
Idukki	4	4	6.490
Ernakulam	-	-	6.493
Thrissur	-	-	5.200
Palakkad	12	12	7.549
Malappuram	-	-	5.222
Kozhikode	-	-	5.357
Wayanad	-	-	5.273
Kannur	-	-	5.250
Kasaragod	-	-	5.200
<b>State</b>	<b>31</b>	<b>31</b>	<b>6.739</b>



Table 18.1 - Season-wise mean yield of dry paddy 1988-'89 and 1989-'90

District	Dry paddy in Kg./hect.		Dry paddy in Kg./hect.		Dry paddy in Kg./hect.		1989-90
	Autumn		Winter		Summer		
	1988-89	1989-90	1988-89	1989-90	1988-89	1989-90	
1	2	3	4	5	6	7	
Thiruvananthapuram	2579	3025	2519	2674	2297	2250	
Kollam	2430	2991	2585	2811	1891	1793	
Pathanamthitta	2438	2603	3234	3061	4610	5085	
Alappuzha	2312	2960	2700	3355	3993	4274	
Kottayam	2802	2985	3120	3623	4098	4634	
Idukki	3115	3304	3398	3551	4439	6203	
Ernakulam	2458	2627	2633	2729	2453	2406	
Thrissur	1999	2299	2391	2593	2999	2897	
Palakkad	2985	3690	2873	3130	2572	2825	
Malappuram	1989	2401	2137	2313	3123	3212	
Kozhikode	1276	1736	1845	1842	1945	2051	
Wayanad	-	-	2981	3154	3112	2853	
Kannur	2354	2631	2172	2333	1765	1914	
Kasaragod	2704	2785	2393	2499	2439	2497	
<b>State</b>	<b>2531</b>	<b>2991</b>	<b>2624</b>	<b>2857</b>	<b>3295</b>	<b>3387</b>	

Table 18.2 - District-wise mean yield of crops 1988-'89 and 1989-'90

District	Coconut		Arecanut		Cashewnut		Pepper		Cocoa	
	Nos./ha.		Nos./ha.		Kg./ha.		Kg./ha.		Kg./ha.	
	88-89	89-90	88-89	89-90	88-89	89-90	88-89	89-90	88-89	89-90
1	2	3	4	5	6	7	8	9	10	11
Thiruvananthapuram	5820	6118	107638	124303	627	787	223	269	317	332
Kollam	4833	4986	164959	192934	977	982	300	438	223	244
Pathanamthitta	4724	4446	183144	202922	963	965	296	386	534	561
Alappuzha	4800	5050	71131	79955	309	309	186	244	670	687
Kottayam	4177	4384	129769	153938	384	388	111	169	489	439
Idukki	3762	4260	268401	241935	571	613	478	484	347	372
Ernakulam	6379	6371	188548	194879	406	409	141	153	529	469
Thrissur	6945	6825	207523	191656	522	508	122	157	226	231
Palakkad	3247	3233	115387	122862	424	456	98	127	206	226
Malappuram	5083	4746	168042	168776	612	528	96	138	447	421
Kozhikode	5236	5595	180548	192528	497	525	112	159	136	150
Wayanad	1352	1340	192141	194431	405	395	387	395	421	362
Kannur	4611	4702	216426	228749	1414	1312	211	304	311	304
Kasaragod	4612	4500	201535	207753	884	979	211	304	200	185
<b>State</b>	<b>5163</b>	<b>5236</b>	<b>183279</b>	<b>189287</b>	<b>868</b>	<b>861</b>	<b>275</b>	<b>324</b>	<b>426</b>	<b>411</b>

(Table 18.2 contd.)

District	Tapioca Tonnes/ha		Banana Tonnes/ha		Sesamum Kg./ha.		Plantain Kg./ha.	
	88-89	89-90	88-89	89-90	88-89	89-90	88-89	89-90
1	12	13	14	15	16	17	18	19
Thiruvananthapuram	16	18	12	14	184	212	5191	5270
Kollam	19	18	12	12	280	282	4998	4568
Pathanamthitta	22	20	14	14	418	395	6348	6804
Alappuzha	16	19	15	13	131	141	3966	4386
Kottayam	23	23	14	15	274	205	5881	5322
Idukki	28	26	14	15	157	238	6603	7305
Ernakulam	19	19	14	14	306	238	4459	4497
Thrissur	14	16	12	13	149	156	2776	2653
Palakkad	18	19	13	13	208	220	3481	3303
Malappuram	15	17	11	12	124	147	4450	4005
Kozhikode	15	16	12	12	-	-	2935	3091
Wayanad	33	31	15	13	202	231	6073	6227
Kannur	17	18	12	13	104	127	3488	3125
Kasaragod	13	14	13	13	70	78	4152	4248
<b>State</b>	<b>19</b>	<b>19</b>	<b>13</b>	<b>13</b>	<b>173</b>	<b>188</b>	<b>4516</b>	<b>4410</b>



## ERRATA

Sl. No.	Page No.	Line No.	Col. No.	Printed as	Read as/to be printed/to be added/inserted
1	2	3	4	5	6
1.	1	34	-	1985	1989
2.	3	22	-	Size	Side
3.	3	22	-	each	east
4.	5	31	-	25.31	2531
5.	6	38	-	Compares	Compared
6.	8	-	10	96-41	95-41
7.	10	5	2	Sinter	Winter
8.	10	13	7	831	881
9.	13	10	9	70.92	70.98
10.	14	3	6	9.84	4.84
11.	15	10	8	--	83.89
12.	15	11	9	53.03	53.05
13.	16	14	4	14.975	14.075
14.	16	15	4	15.070	19.070
15.	18	9	3	90	99



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