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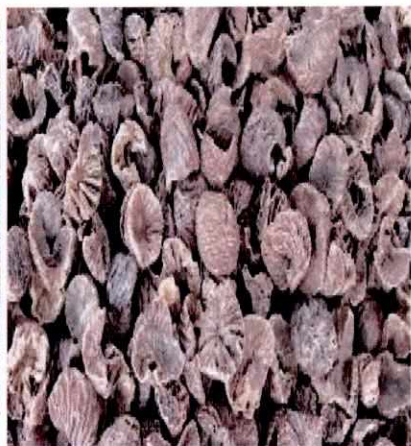
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REPORT ON COCONUT AND ARECANUT

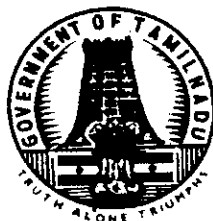
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(2015 - 2016)



**DEPARTMENT OF ECONOMICS AND STATISTICS
CHENNAI-600 006**

R.No.2 /2017



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SURVEY REPORT ON COCONUT AND ARECANUT

TAMIL NADU 2015-16

Department of Economics and Statistics
Chennai – 600 006.

PREFACE

The Department of Economics and Statistics is conducting sample survey every year for estimating yield and production of Coconut and Arecanut in Tamil Nadu. Apart from yield and production total number of Coconut , Arecanut Palms average number of bearing and non – bearing palms per hectare are estimated. The report contains the results of the survey conducted during the year 2015-16.

This report is classified into four parts. Part I deals with the objectives coverage, sampling design and sample size, survey period. data collection and supervision, Part –II covers the Concepts and definitions, Part III incorporates the Survey results and finally Part IV comprises Comparative statement on the findings of survey for the years 2015-16 and 2014-15.

Tthis report is expected to be useful to the Administrators, Planners and Research Scholars for evolving new policies and programmes for augmenting the production of Coconut and Arecanut in Tamil Nadu.

Place: Chennai-6 .
Date: 31.03.2017

(Sd)V.Iraianbu,
Principal Secretary/Commissioner.

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PART - I

1.1 INTRODUCTION

Farming Guide for Coconut Plantation:

Scientific name : *Cocos nucifera* Family: Arecaceae (palm family)

The Coconut palm is a very useful palm variety. Every part of the tree is useful to human life in one form or the other. Hence, the coconut palm is endearingly called 'kalpavriksha' meaning the tree of heaven. The copra obtained by drying the kernel of coconut is the richest source of vegetable oil containing 65 to 70 per cent oil.

Coconut tree, a tree of greatest importance to all, play a vital role in the rural economy considering the multiple uses of coconut products, for building houses, decors and even medicine that can be produced from its roots or coconut water. Products of coconut tree from its parts are detailed below:

- Raw nut and edible oil;
- Oil extracted from desiccated or copra in cooking and manufacturing of soaps and other cosmetics;
- Tender coconuts to quench the thirst; of human beings
- Husk used in coir matting;
- Thatched and kutcha houses made of matured trunks;
- Conversion of coconut shell into charcoal for cooking
- Making leaves as thatches for houses;
- Conversion of coconut shell and husks into valuable articles in cottage industry.
- Coconut roots can be used for beverage, dye stuff, and medicine purposes.

Currently, Tamilnadu is the second largest coconut producing State in India next only to Kerala and shares one-fourth of the total production in the country. Cultivation of coconut registered a significant growth during the last decade in Tamilnadu. There were an estimated 892.63 lakh coconut (garden) palms in Tamil Nadu during 2015-16.

'Arecanut crop' is known as 'Areca catechu' in botanical terminology. Coconut and arecanut trees are hydrophilic perennial trees. They are being cultivated both under irrigated and rain fed conditions. In the wake of the new thrust given under various horticultural schemes, new coconut trees are being raised under rain fed conditions using micro irrigation facilities such as drip and sprinkler irrigation system to a great degree.

In view of the multiple uses of coconut trees and significant contribution to the GSDP there is an urgent need to have precise measure of area production and yield on coconut. These pieces of information are critical for location specific planning and formulation of scheme and programmes.

1.2. Funding Pattern

A Scheme for the Estimation of Area and Yield of Coconut and Arecanut was launched in 1959-60 and is being continued since then. Originally, the scheme was introduced to cater to the needs of the Central Coconut Committee and the Indian Central Arecanut Committee upto 1963-64 and the expenditure towards this scheme was shared by the above two bodies on 50:50 basis. Subsequently, upto the end of the Third Five Year Plan, the expenditure under the scheme was borne by the Government of India and the State Government on 50:50 basis. Currently, the expenditure towards the scheme is being fully borne by the State Government and it has become a regular scheme of the State Government.

1.3 Objectives

The objectives of the survey are:

- i. To estimate the total number of palms of coconut and arecanut for the districts and for the State;
- ii. To estimate the average number of bearing and non-bearing palms of coconut/arecanut per hectare for the districts and State;
- iii. To estimate the average yield per palm of coconut/arecanut and total production per year for the districts and State; and
- iv. To collect additional information on agricultural practices like manuring, pest control irrigation, disposal of produce etc., of the crops.

1.4. Coverage

During 2015-16, 380 villages from 31 districts were covered for conducting the Survey.

1.5. Sampling design

The broad plan for the survey was determined by the Statistical Adviser, Indian Agricultural Statistics Research Institute, New Delhi. The sampling design adopted was a stratified random sampling technique.

1.6. Stratifications

The villages were stratified into the following three strata.

- i. Villages reported to be growing coconut only.
- ii. Villages reported to be growing both coconut and arecanut.
- iii. Villages reported to be growing arecanut only.

1.7. Area Enumeration

In the selected village, the fields wherein coconut is being raised are numbered Survey/Sub-division number wise. Then it is being categorized into two, each consists of 50 per cent arranged by sub division number.

If the village is newly selected one, the two fields have been selected from the first category and if old one, the fields are selected from the second category by applying the random sampling technique.

1.8. Yield Estimation

In the selected village, two coconut / arecanut gardens are selected at random. The selected gardens must have a minimum of 25 trees in 3 rows atleast one bearing trees in the sampling garden. The total number of bearing trees and its yield are taken for estimation.

1.9. Sample size

The sample size for stratum I in case of villages growing coconut only is fixed at the rate of one village in each of the developmental blocks in the State except the following 5 blocks where neither coconut nor Arecanut garden as per specification is not available.

1. Kollimalai in Namakkal district.
2. Ooty in The Nilgiris district.
3. Kothagiri in The Nilgiris district
4. Yercaud in Salem district.
5. Kodaikanal in Dindigul District

Hence 380 villages at the rate of one village per block are selected for the survey on coconut. Out of these 380 villages, arecanut survey is also being carried out along with coconut survey wherever the crop is available.

1.10. Period of the Survey

The period of the survey is one full Fasli Year starting from July 2015 to June 2016.

1.11. Collection of Data

Data for the survey were collected by the field workers viz. Block Statistical Inspectors and recorded in the pre-designed schedule. Soon after the receipt of the list of the selected villages, the field staff visit selected villages and choose two coconut/arecanut gardens from the selected villages and undertake enumeration.

The field staff visit the selected village on the dates of harvest record the number of nuts actually harvested in the selected garden. If the harvest was carried out without intimation, yield is ascertained through personal enquiry and recorded in the respective schedules. Besides yield estimation, data on cultivation practices and other peripheral information are also collected

1.12. Supervision

The Principal Secretary and Commissioner of Economics and Statistics, Tamil Nadu is in charge of the overall organization and conduct of the survey. Planning of the survey monitoring, receipt of schedules, scrutiny and analysis of the data collected and preparation of the report of the survey are undertaken at the Headquarters. The field staff are imparted trained properly in the conduct of the survey before the commencement of the field work. The field staff are under the control of the Deputy Director of Statistics of the districts concerned. The Village Administrative Officer of the selected villages render necessary assistance in securing the co-operation of the cultivators. The field work is supervised at various levels by the respective Regional Joint Director, Deputy Director of Statistics and Divisional Assistant Directors.

1.13. Response

The survey was conducted in all the 380 villages selected for 2015-16. The results of the survey implies that yield rate per tree has subsequently increased over the years. The yield per tree is 78 coconut during 2015-16 compared to 63 coconuts per tree during 2014-15.

PART - II

CONCEPTS AND DEFINITIONS

2.1. Garden

For the purpose of the survey, a coconut / arecanut garden is defined as a distinct patch or portion of land growing a minimum of twenty five and above in 3 or more rows which is demarcated on all sides by means of a bund or a channel of a narrow strip of uncultivated land or by means of a crop different from coconut / arecanut. Generally, coconut or arecanut palms are grown in gardens along with other perennial crops like mango, guava, etc. In certain villages, crops like paddy, groundnuts are raised in the space between the palms in coconut / arecanut gardens. When the coconut / arecanut palms are grown in gardens along with perennial crops, these gardens should be classified as pure or mixed garden.

Pure Garden

A coconut / arecanut garden is considered as a pure garden if 90% or more of the garden is grown with coconut / arecanut palms.

Mixed Garden

A coconut / arecanut garden is considered as mixed if more than 10% but less than 90% of the garden is grown with other perennial crops in the same garden.

Bearing Palms

All Coconut palms which shows flowers and nuts at the time of enumeration are classified as bearing palms.

Non-Bearing Palms

Young Coconut palms which do not show flowers and nuts or those which have reached bearing stage but not bearing due to reasons like sterility, disease, old age etc. are classified as non-bearing palms.

PART III
RESULTS OF THE SURVEY
SECTION A – COCONUT

Estimated Number of Coconut Palms

It is estimated that there were 892.63 lakh coconut (garden) palms in TamilNadu during 2015-16 against 871.23 lakh in 2014-15 showing a increase of 2.5 percent over the previous year. Out of the total of 892.63 lakh palms, 762.74 lakh (85%) palms are bearing and 129.89 lakh (15%) are non- bearing palms. The ratio between bearing and non-bearing palms for 2015-16 is 85:15 as against 87:13 during 2014-15.

District-wise number of bearing and non-bearing palms estimated for the year 2015-16 is presented below.

Table - 1
Estimated Number of Coconut (Garden) palms (in '000)

Sl. No.	District	Estimated number of Palms 2015-16			Sampling Error %	Estimated No. of palms 2014-15	% Variation over last year
		Bearing	Non- Bearing	Total			
1	2	3	4	5	6	7	8
1.	Kancheepuram	583	86	669	0.13	482	38.80
2.	Thiruvallur	91	5	96	0.08	143	-32.87
3.	Cuddalore	353	70	423	0.05	287	47.39
4.	Villupuram	316	28	344	0.08	330	4.24
5.	Vellore	3806	459	4265	0.07	3127	36.39
6.	Thiruvannamalai	64	7	71	0.13	75	-5.33
7.	Salem	2308	277	2585	0.11	2694	-4.05
8.	Namakkal	1352	179	1531	0.10	2210	-30.72
9.	Dharmapuri	1358	94	1452	0.26	817	77.72
10.	Coimbatore	13837	2313	16150	0.14	16900	-4.44
11.	Erode	2151	734	2885	0.21	2289	26.04
12.	Tiruchirappalli	1196	210	1406	0.06	1294	8.66
13.	Karur	1098	110	1208	0.25	1070	12.90
14.	Perambalur	97	35	132	0.46	92	43.48
15.	Thanjavur	8929	2457	11386	0.02	8159	39.55
16.	Thiruvarur	770	229	999	0.06	1109	-9.92
17.	Nagapattinam	453	85	538	0.04	1175	-54.21
18.	Pudukottai	1680	256	1936	0.06	1379	40.39
19.	Madurai	1927	242	2169	0.06	2703	-19.76
20.	Theni	4508	445	4953	0.11	4972	-0.38
21.	Dindigul	5105	709	5814	0.16	6845	-15.06
22.	Ramanathapuram	1561	138	1699	0.14	1836	-7.46
23.	Virudhunagar	1862	106	1968	0.07	1857	5.98
24.	Sivagangai	1053	631	1684	0.09	1277	31.87
25.	Tirunelveli	2574	381	2955	0.06	3114	-5.11
26.	Thoothukudi	1443	232	1675	0.13	1228	36.40
27.	Kanyakumari	5523	595	6118	0.25	7295	-16.13
28.	The Nilgiris	14	2	16	0.00	12	33.33
29.	Krishnagiri	2253	96	2349	0.05	2571	-8.63
30.	Ariyalur	90	7	97	0.10	84	15.48
31.	Tirupur	7919	1771	9690	0.32	9397	3.12
	TOTAL	76274	12989	89263	0.12	87123	2.46

As per the estimates of 2015-16, Coimbatore district stood first with 138.37 lakh coconut bearing palms, followed by Thanjavur district with 89.29 lakh palms. The Nilgiris district had the least number with 0.14 lakh palms.

The time series data from 2006 - 2007 to 2015-2016 on estimated number of coconut palms in the State with details of bearing and non-bearing are presented below.

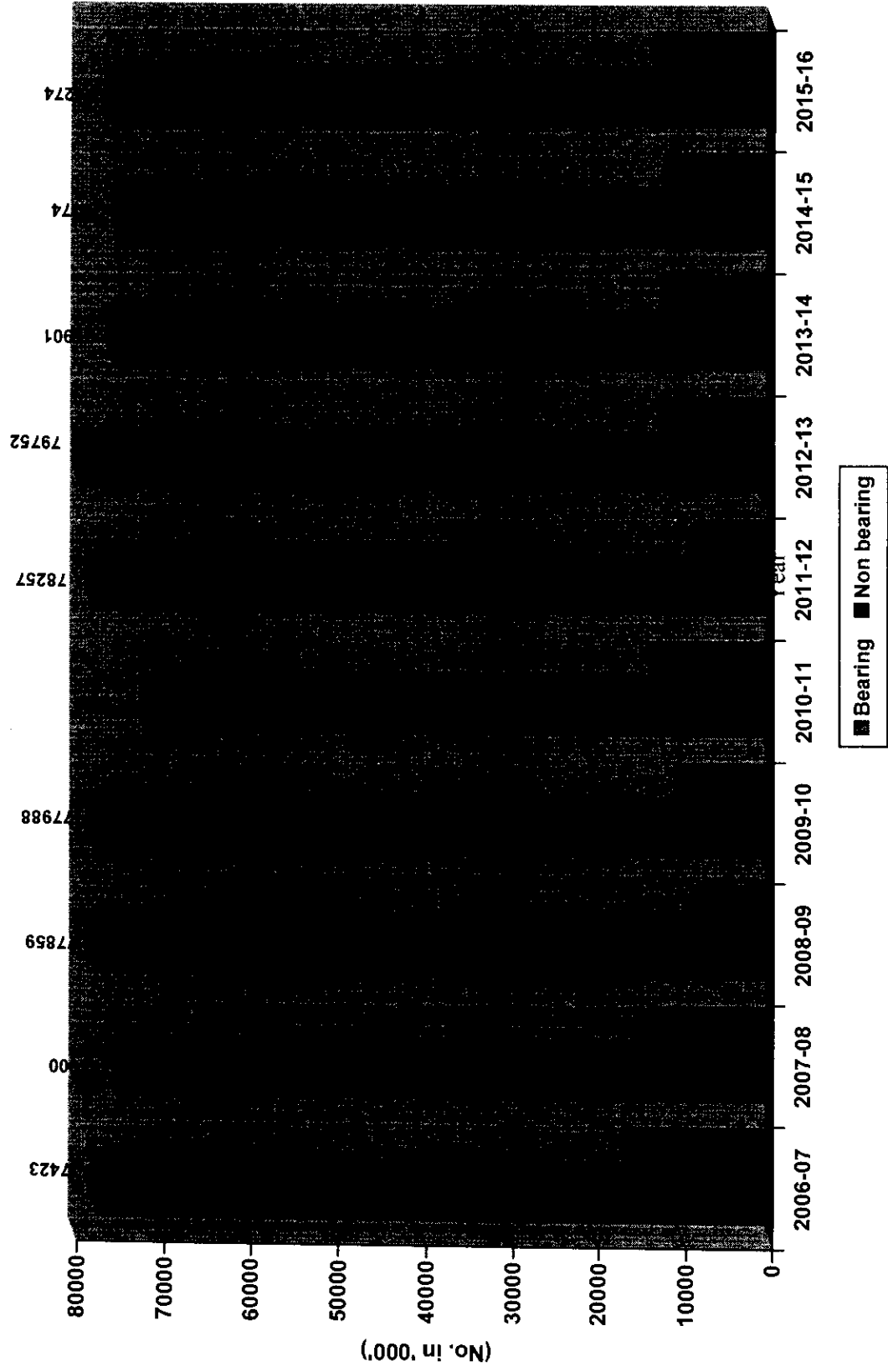
Table - 2
Estimated Number of Coconut Palms

(in '000')

Year	Bearing	Non-Bearing	Total
2006-07	77423	16286	93709
2007-08	75000	13355	88355
2008-09	77859	8548	86407
2009-10	77988	9927	87915
2010-11	72002	13381	85383
2011-12	78257	8159	86416
2012-13	79752	11982	91734
2013-14	75901	12135	88036
2014-15	75374	11749	87123
2015-16	76274	12989	89263

The total number of coconut palms decreased from 937.00 lakh in 2006-07 to 892.63 lakhs in 2015-16, showing an decrease of -4.7 per cent. The total number of bearing palms for 2015-16 is 762.74 lakhs as against 774.23 lakhs during 2006-07. The total number of non-bearing went down from 162.86 during 2006-07 to 129.89 during 2015-2016. The bearing coconut palms rose by -1.5 per cent and non bearing palms decreased by -20 per cent.

No. of Bearing and Non-Bearing Coconut Garden Palms from 2006-07 to 2015-16 (in "000")



The details of estimated number of coconut palms and average number of palms per hectare derived from the survey results are shown below.

Table – 3

Estimated Average Number of Coconut Palms per Hec – 2015-16

Sl. No.	District	Area under Coconut Palms as per Season and Crop Report (in hec.)	Estimated No. of Coconut palms in 'Lakh'	Average no. of Coconut Palms per hec
1	2	3	4	5
1.	Kancheepuram	3097	6.69	216
2.	Thiruvallur	804	0.96	119
3.	Cuddalore	1732	4.23	244
4.	Villupuram	1701	3.44	202
5.	Vellore	20805	42.65	205
6.	Thiruvannamalai	479	0.71	149
7.	Salem	13749	25.85	179
8.	Namakkal	8059	15.31	190
9.	Dharmapuri	8392	14.52	231
10.	Coimbatore	85448	161.50	189
11.	Erode	13234	28.85	218
12.	Tiruchirappalli	6249	14.06	225
13.	Karur	6564	12.08	184
14.	Perambalur	701	1.32	188
15.	Thanjavur	37210	113.86	354
16.	Thiruvarur	4710	9.99	212
17.	Nagapattinam	3898	5.38	138
18.	Pudukottai	9584	19.36	202
19.	Madurai	11121	21.69	195
20.	Theni	20466	49.53	242
21.	Dindigul	30762	58.14	189
22.	Ramanathapuram	8207	16.99	207
23.	Virudhunagar	9989	19.68	197
24.	Sivagangai	6928	16.84	243
25.	Tirunelveli	16507	29.55	189
26.	Thoothukudi	5961	16.75	281
27.	Kanyakumari	24182	61.18	253
28.	The Nilgiris	94	0.16	151
29.	Krishnagiri	15558	23.49	314
30.	Ariyalur	310	0.97	428
31.	Tiruppur	58374	96.90	166
	TOTAL	434875	892.63	216

On an average, there were 216 coconut palms per ha. at the State level. Ariyalur district recorded the maximum of 428 coconut palms per hectare, followed by 354 palms in Thanjavur district. Thiruvallur district had the least number of 119 palms per hectare as against the State average of 216 palms per hectare.

4.2. Area under Coconut

The area under coconut was 434875 ha. during 2015-16 as against 427842 ha. during 2014-15 showing a decrease of 1.6 per cent. The district wise estimated average yield per palm and production of coconut are presented below.

Table - 4
Estimated yield Rate and Production – 2015-16

Sl. No.	District	Estimated yield rate per ha. (in nos.)		%Variation	Estimated Production (Nuts in Lakhs)		%Variation	Average no. of nuts per tree		%Variation
		2015-16	2014-15		2015-16	2014-15		2015-16	2014-15	
1	Kancheepuram	8552	5728	49.30	265	170	55.88	45	39	15.38
2	Thiruvallur	7207	6874	4.84	58	64	-9.38	64	47	36.17
3	Cuddalore	11041	8634	27.88	191	153	24.84	54	78	-30.77
4	Villupuram	10213	9879	3.38	174	171	1.75	55	57	-3.51
5	Vellore	11764	9017	30.46	2448	1923	27.30	64	68	-5.88
6	Thiruvannamalai	6386	10407	-38.64	31	46	-32.61	48	66	-27.27
7	Salem	12349	9534	29.53	1698	1328	27.86	74	52	42.31
8	Namakkal	17227	15843	8.74	1388	1305	6.36	103	71	45.07
9	Dharmapuri	11587	8946	29.52	972	606	60.40	72	80	-10.00
10	Coimbatore	16400	10261	59.83	14014	8598	62.99	101	57	77.19
11	Erode	14380	10345	39.00	1903	1325	43.62	88	68	29.41
12	Thiruchy	13244	14613	-9.37	828	912	-9.21	69	77	-10.39
13	Karur	10936	6207	76.19	718	407	76.41	65	47	38.30
14	Perambalur	8984	10074	-10.82	63	68	-7.35	65	80	-18.75
15	Thanjavur	22824	17542	30.11	8493	6267	35.52	95	96	-1.04
16	Thiruvarur	16271	17096	-4.83	766	816	-6.13	99	91	8.79
17	Nagapattanam	5932	10309	-42.46	231	404	-42.82	51	47	8.51
18	Pudukkottai	12640	9813	28.81	1211	925	30.92	72	73	-1.37
19	Madurai	14700	15019	-2.12	1635	1673	-2.27	85	72	18.06
20	Theni	18378	9637	90.70	3761	1934	94.47	83	47	76.60
21	Dindigul	7910	9297	-14.92	2433	2837	-14.24	48	48	0.00
22	Ramanathapuram	10548	9229	14.29	866	763	13.50	55	46	19.57
23	Virudhunagar	11404	15889	-28.23	1139	1593	-28.50	61	96	-36.46
24	Sivagangai	11813	6042	95.51	818	422	93.84	78	48	62.50
25	Thirunelveli	11407	10344	10.28	1883	1630	15.52	73	60	21.67
26	Thoothukudi	10886	8110	34.23	649	493	31.64	45	55	-18.18
27	Kanniyakumari	21323	23213	-8.14	5156	5625	-8.34	93	88	5.68
28	The Nilgiris	2397	1205	98.92	2	1	100.00	14	9	55.56
29	Krishnagiri	11497	13861	-17.06	1789	2152	-16.87	79	93	-15.05
30	Ariyalur	12117	9970	21.53	38	33	15.15	42	45	-6.67
31	Tiruppur	6861	9191	-25.35	4005	5221	-23.29	51	61	-16.39
	STATE	13711	11655	17.64	59625	49865	19.57	78	63	23.81

Ten years trend

The area under coconut estimated yield rate per tree / ha. and production for the past 10 years are furnished below.

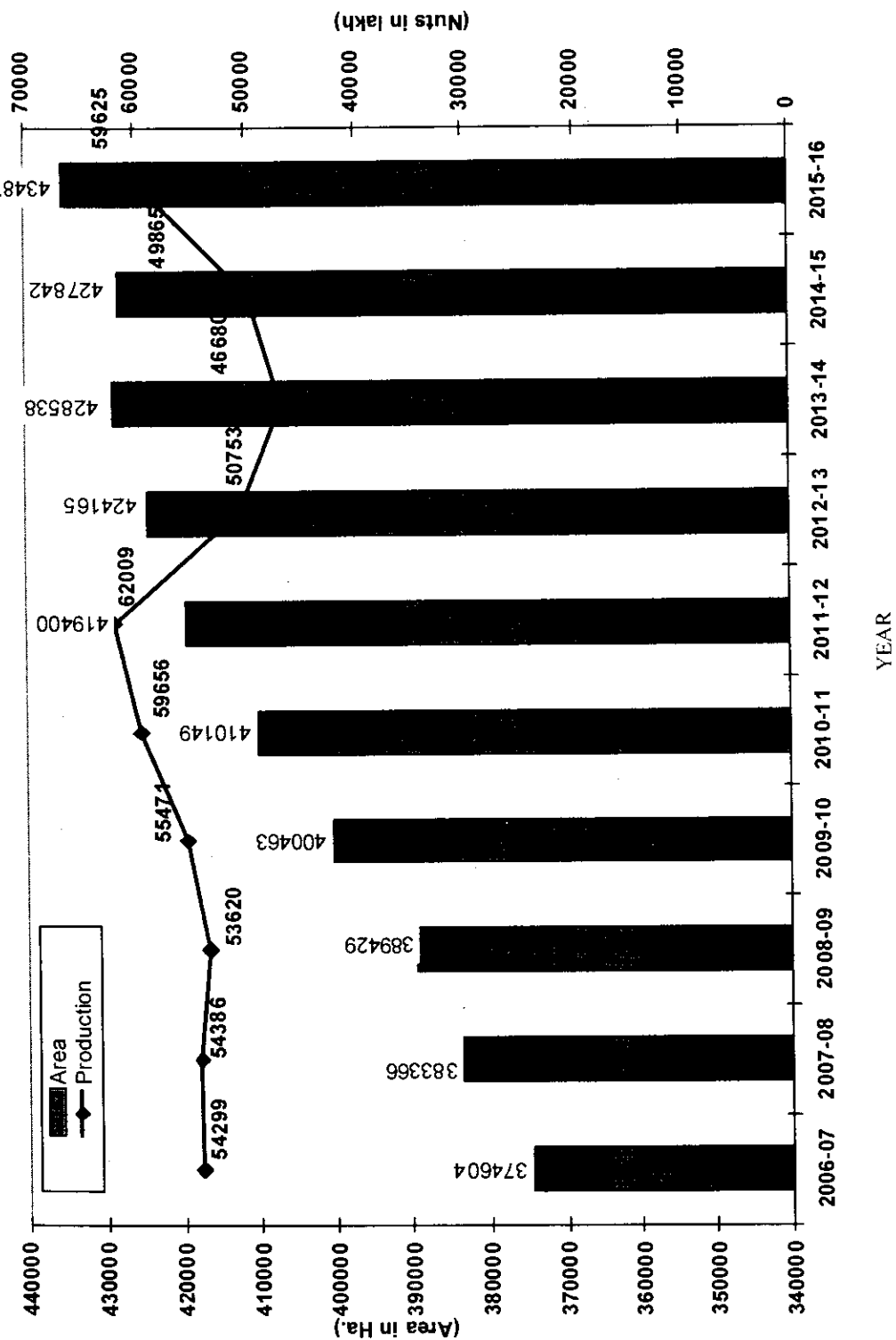
Table – 5

Yearwise Area and Estimated Yield rate and Production

Year	Area under Coconut (in ha.)	Yield rate per hectare Nuts (in Nos)	Production (nuts in lakh)
2006 - 07	374604	14495	54299
2007 - 08	383366	14186	54386
2008 - 09	389429	13769	53620
2009 -10	400463	13851	55471
2010 -11	410149	14545	59656
2011-12	419400	14799	62009
2012-13	424165	10833	50753
2013-14	428538	9634	46680
2014-15	427842	11655	49865
2015-16	434875	13711	59625

It is gratifying to note that the yield rate (nuts) comes down from 14495 in 2006-07 to 13711 (nuts) showing a decrease of -5.4 percent. in yield rate during 2015-16. The increase was 16 per cent with respect to area and 10 percent In regard to production between 2006-07 and 2015-16. Coconut production is moving in tandem with rising population and changing consumption pattern.

AREA AND PRODUCTION OF COCONUT (2006-07 TO 2015-16)



Coconut harvested

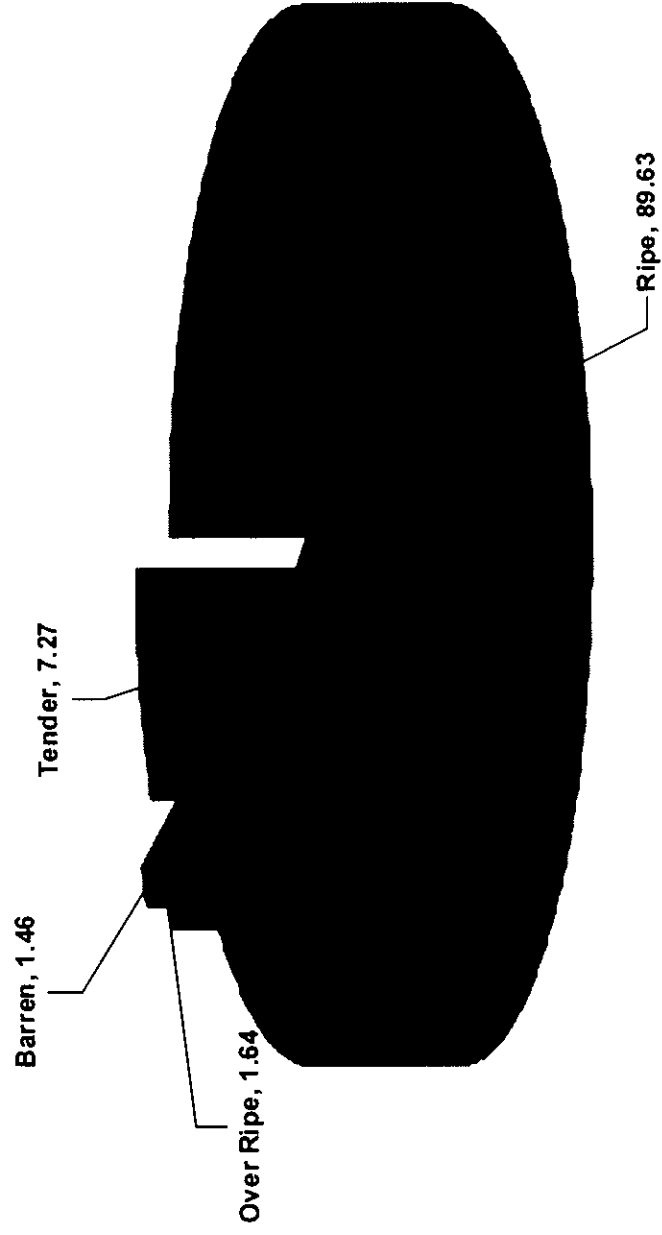
The nuts harvested are classified into four categories viz., tender, ripe, over-ripe and barren. The following table shows the district wise details of the pattern of harvest in terms of percentage.

Table – 6
Coconut Harvested at various Stages - 2015-16

Sl. No.	District	Percentage of Nuts Harvested			
		Tender	Ripe	Over Ripe	Barren
1.	Kancheepuram	45.41	49.07	2.38	3.14
2.	Thiruvallur	46.26	52.09	0.94	0.71
3.	Cuddalore	27.02	70.75	0	2.23
4.	Villupuram	24.48	73.06	1.22	1.24
5.	Vellore	7.33	90.22	0.16	2.29
6.	Thiruvannamalai	17.25	79.6	1.1	2.05
7.	Salem	11.05	87.24	0.55	1.16
8.	Namakkal	3.53	95.76	0	0.71
9.	Dharmapuri	0.8	98.67	0	0.53
10.	Coimbatore	0.32	98.87	0	0.81
11.	Erode	9.9	80.18	9.3	0.62
12.	Tiruchirappalli	1.23	96.97	0	1.8
13.	Karur	3.74	94.28	0	1.98
14.	Perambalur	0.81	88.56	6.73	3.9
15.	Thanjavur	0.48	94.13	2.99	2.4
16.	Thiruvarur	2.16	96.44	0	1.4
17.	Nagapattinam	2.11	95.33	0	2.56
18.	Pudukottai	1.58	95.72	0.6	2.1
19.	Madurai	3.61	95.49	0	0.9
20.	Theni	4.5	93.70	0	1.8
21.	Dindigul	0.99	97.77	0	1.24
22.	Ramanathapuram	8.02	88.36	0	3.62
23.	Virudhunagar	1.39	97.53	0	1.08
24.	Sivagangai	2.05	89.01	7.36	1.58
25.	Thirunelveli	1.09	98.15	0	0.76
26.	Thoothukudi	2.17	96.86	0	0.97
27.	Kanyakumari	0.15	99.16	0	0.69
28.	The Nilgiris	0	82.18	17.82	0
29.	Krishnagiri	15.08	81.45	0.92	2.55
30.	Ariyalur	11.97	83.36	0	4.67
31.	Tiruppur	0.68	94.00	0.70	4.62
	TOTAL	7.27	89.63	1.64	1.46

Coconut harvest usually takes place at irregular intervals. The number of harvests varied from four to six harvests in a year, from district to district and also from palm to palm due to the fertility of the soil, variety of seedlings, application of manures and farm practices adopted by the cultivators. Generally, January-June is the peak season and July to December is the lean season for harvest.

HARVESTING OF COCONUT BY STAGES



About 7.27 per cent of the nuts had been harvested during 2015-16 as tender Coconut. The percentage of nuts harvested in tender stage is more in Kancheepuram, Thiruvallur, Cuddalore districts where the need for tender coconut for consumption is high particularly during summer season and it also fetches higher price in Chennai and its surrounding areas.

Nuts harvested as ripe nuts during the year 2015-16 worked out to 89.63 per cent. More than 90% of the nuts have been harvested as ripe in 18 districts. The ripe nuts are mainly used for domestic consumption and for extraction of oil 1.46 per cent of nuts are found to be barren which is mainly due to inadequate water, pest attack, soil condition etc. Only 1.64 per cent of nuts have been harvested at the over-ripe stage.

Size of Coconut Gardens

The frequency distribution of coconut gardens according to size is shown in the table below.

Table - 7
Frequency Distribution of size of Coconut Gardens to the sampled Village 2015-16

Sl. No.	Size of Gardens (In hec.)	No. of Gardens	Area	% to Total Area
1	Less than 0.25	106	17.26	4.81
2	0.25 To 0.50	89	33.77	9.40
3	0.50 To 0.75	42	26.7	7.44
4	0.75 To 1.0	42	36.62	10.20
5	1.0 To 1.25	21	23.43	6.53
6	1.25 To 1.50	20	27.92	7.78
7	1.50 To 1.75	15	24.75	6.89
8	1.75 To 2.0	8	14.93	4.16
9	2.0 To 2.25	4	8.59	2.39
10	2.25 To 2.50	7	16.49	4.59
11	2.50 To 2.75	4	10.41	2.90
12	2.75 To 3.0	6	17.11	4.76
13	3.0 To 3.25	2	6.24	1.74
14	3.25 To 3.50 Above	14	94.86	26.41
	TOTAL	380	359.08	100.00

Irrigation

Coconut is grown both under Irrigated and un-irrigated conditions. However, availability of water is the determining factor in the production of nuts. The source of irrigation is detailed below in percentage. According to the survey, about 91.71 per cent of garden palms are irrigated by wells.

Table - 8
Percentage of Garden Palms by Source of Irrigation

Sl. No.	District	Percentage of Area Irrigated by			
		Wells	Canals	Tanks	Other Source
1	2	3	4	5	6
1.	Kancheepuram	80.77	0.00	0.00	19.23
2.	Thiruvallur	78.57	0.00	0.00	21.43
3.	Cuddalore	73.08	0.00	0.00	26.92
4.	Villupuram	100.00	0.00	0.00	0.00
5.	Vellore	95.00	0.00	0.00	5.00
6.	Thiruvannamalai	100.00	0.00	0.00	0.00
7.	Salem	100.00	0.00	0.00	0.00
8.	Namakkal	100.00	0.00	0.00	0.00
9.	Dharmapuri	100.00	0.00	0.00	0.00
10.	Coimbatore	100.00	0.00	0.00	0.00
11.	Erode	100.00	0.00	0.00	0.00
12.	Tiruchirappalli	60.71	0.01	7.14	32.14
13.	Karur	100.00	0.00	0.00	0.00
14.	Perambalur	87.50	0.00	0.00	12.50
15.	Thanjavur	64.29	0.00	0.00	35.71
16.	Thiruvarur	100.00	0.00	0.00	0.00
17.	Nagapattinam	72.73	0.00	9.09	18.18
18.	Pudukottai	76.92	0.00	0.00	23.08
19.	Madurai	92.31	0.00	0.00	7.69
20.	Theni	100.00	0.00	0.00	0.00
21.	Dindigul	92.31	0.00	0.00	7.69
22.	Ramanathapuram	90.91	0.00	0.00	9.09
23.	Virudhunagar	100.00	0.00	0.00	0.00
24.	Sivagangai	100.00	0.00	0.00	0.00
25.	Tirunelveli	100.00	0.00	0.00	0.00
26.	Thoothukudi	100.00	0.00	0.00	0.00
27.	Kanyakumari	100.00	0.00	0.00	0.00
28.	The Nilgiris	50.00	0.00	0.00	50.00
29.	Krishnagiri	95.00	5.00	0.00	0.00
30.	Ariyalur	100.00	0.00	0.00	0.00
31.	Tiruppur	100.00	0.00	0.00	0.00
	TOTAL	91.71	0.13	0.53	7.63

Consumption Pattern

With a view to have an idea on the pattern of consumption of coconut, data on number of nuts consumed by coconut growers and their dependents, number of nuts sold etc., presented below.

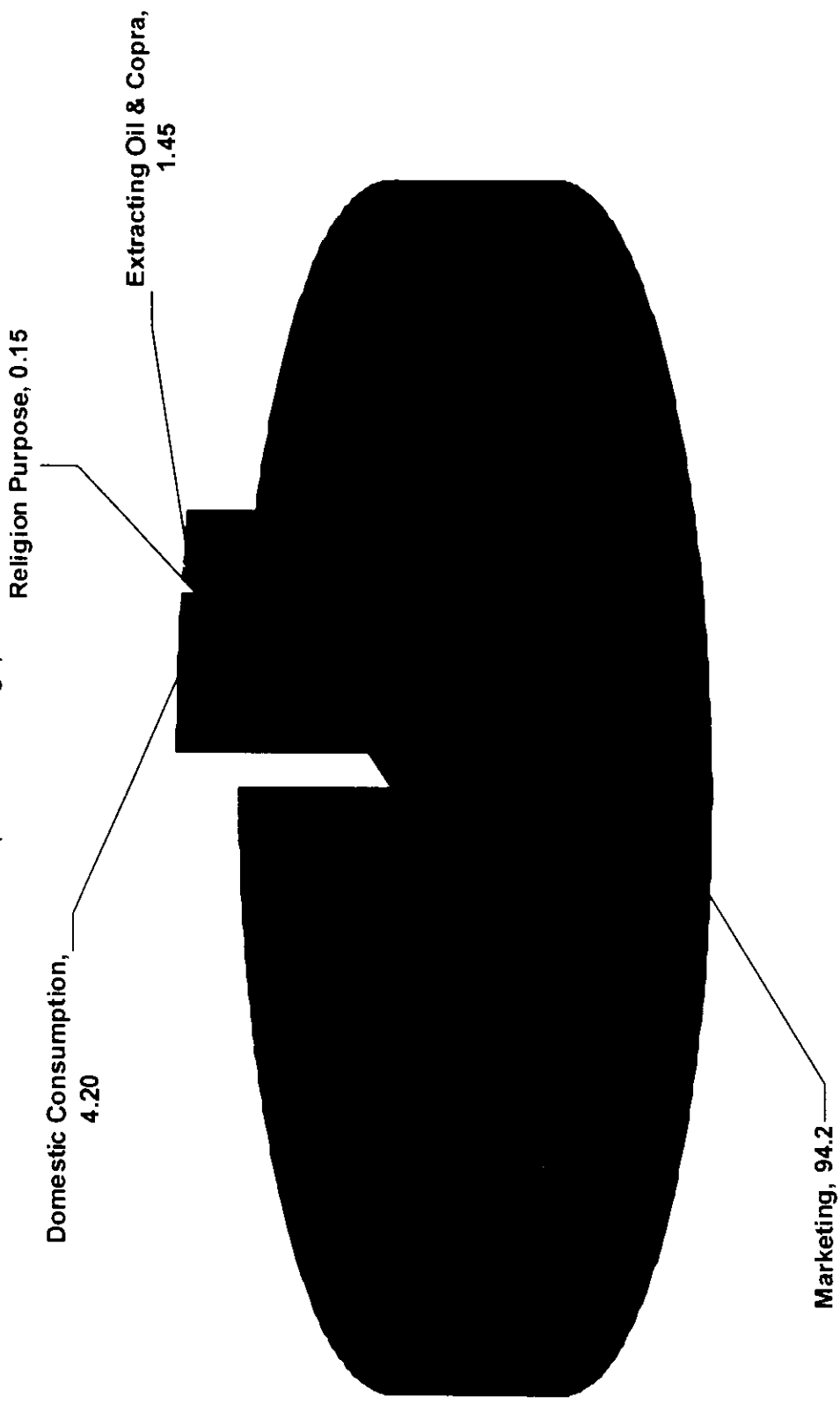
Table – 9

Percentage of Consumption of Coconut – 2015-16

Sl. No.	District	Domestic Consumption	Religious purpose	Extracting Oil	Marketing
1	2	3	4	5	6
1.	Kancheepuram	2.10	0.40	1.50	96.00
2.	Thiruvallur	3.64	0.27	0.82	95.27
3.	Cuddalore	2.29	0.42	2.61	94.68
4.	Villupuram	3.71	0.57	3.42	92.30
5.	Vellore	2.56	0.71	0.62	96.11
6.	Thiruvannamalai	2.36	0.75	9.70	87.19
7.	Salem	1.42	0.41	0.50	97.67
8.	Namakkal	0.76	0.21	1.06	97.97
9.	Dharmapuri	0.86	0.29	0.28	98.57
10.	Coimbatore	1.32	0.09	0.07	98.52
11.	Erode	40.25	0.12	0.41	59.22
12.	Thiruchirappalli	1.62	0.25	2.30	95.83
13.	Karur	1.27	0.48	0.87	97.38
14.	Perambalur	2.72	0.58	3.50	93.19
15.	Thanjavur	1.05	0.18	3.53	95.24
16.	Thiruvavur	3.33	0.59	0.91	95.17
17.	Nagapattinam	2.24	0.85	1.68	95.23
18.	Pudukottai	1.86	0.35	0.92	96.87
19.	Madurai	2.08	0.37	1.05	96.50
20.	Theni	0.79	0.27	0.44	98.50
21.	Dindigul	1.95	0.36	0.46	97.23
22.	Ramanathapuram	2.24	0.63	0.00	97.13
23.	Virudhunagar	2.60	0.27	0.00	97.13
24.	Sivagangai	0.97	0.18	1.28	97.57
25.	Thirunelveli	3.63	1.64	6.19	88.54
26.	Thoothukudi	3.19	0.56	0.11	96.14
27.	Kanyakumari	0.93	0.07	0.06	98.94
28.	The Nilgiris	0.02	2.10	0.20	97.68
29.	Krishnagiri	1.15	1.07	3.18	94.60
30.	Ariyalur	1.15	2.40	0.20	96.25
31.	Tiruppur	2.30	0.25	1.15	96.30
STATE		4.20	0.15	1.45	94.20

It may be noted that about 94.20 per cent of the coconuts harvested were marketed and the domestic consumption of produce accounted for only 4.20 per cent. Estimated usage of coconut for extracting oil and for other religious puposes are very negligible with 1.45 per cent and 0.15 per cent respectively.

DISPOSAL OF COCONUTS PRODUCED IN 2015-16
(In Percentage)



Price

The price of coconut varies widely from market to market in accordance with the quality, size of nuts, etc., The table below shows the average price of tender and ripe coconut in four different harvest periods during the year 2015-16.

Table - 10

Prices of Nuts

(Rs. Per 100 Nuts)

Period of Harvest	Tender	Ripe
I - July to September	882	792
II - October to December	880	785
III- January to March	894	751
IV- April to June	925	709

As already reported in the earlier tables-6 only 7 per cent of the coconut were harvested as tender coconut.

Table - 11

Districtwise Average Farm Price

(Rs per 100 nuts)

Sl. No.	District	Harvest								Average Price	
		I		II		III		IV			
		Tender	Ripe	Tender	Ripe	Tender	Ripe	Tender	Ripe	Tender	Ripe
	1	2	3	4	5	6	7	8	9	10	11
1.	Kancheepuram	782	802	821	820	881	834	886	817	844	818
2.	Thiruvallur	879	832	904	864	936	882	929	875	912	863
3.	Cuddalore	493	542	517	558	533	558	503	548	512	551
4.	Villupuram	617	651	634	659	664	682	679	679	647	667
5.	Vellore	993	834	963	818	967	813	992	871	977	830
6.	Thiruvannamalai	536	639	538	646	550	641	577	681	546	648
7.	Salem	1046	706	1057	593	1067	588	1080	585	1061	620
8.	Namakkal	794	753	809	769	950	779	950	721	876	756
9.	Dharmapuri	0	928	0	889	0	844	0	771	0	861
10	Coimbatore	1600	805	1700	838	1500	756	1633	592	1608	748
11.	Erode	1000	752	1000	778	1100	729	1000	644	1025	728
12.	Thiruchirappalli	1050	1016	1088	1092	1367	1035	1340	1021	1220	1041
13.	Karur	717	593	707	518	700	442	700	459	706	507
14.	Perambalur	825	681	888	716	825	778	0	838	846	741
15.	Thanjavur	0	813	0	811	0	772	0	714	0	779
16.	Thiruvarur	1000	628	0	597	0	578	0	461	1000	566
17.	Nagapattinam	600	648	0	650	0	589	0	545	600	608
18.	Pudukottai	1500	904	1300	1198	1500	790	1500	652	1420	886
19.	Madurai	875	778	889	795	909	802	921	752	899	782
20.	Theni	1083	960	1050	888	967	835	783	790	971	868
21.	Dindigul	1007	838	975	791	962	770	947	679	973	770
22.	Ramanathapuram	1040	743	1040	739	1040	755	1040	709	1040	736
23.	Virudhunagar	0	593	0	609	0	572	0	512	0	571
24.	Sivagangai	750	562	858	618	683	462	900	393	771	515
25.	Thirunelveli	825	801	856	800	881	787	913	693	869	771
26.	Thoothukudi	1100	777	1075	756	926	746	1125	745	1057	756
27.	Kanyakumari	0	1069	0	1058	0	1036	0	899	0	1016
28.	The Nilgiris	0	1000	0	900	0	800	0	800	0	875
29.	Krishnagiri	1185	1580	1165	1040	1165	940	1172	933	1172	1128
30.	Ariyalur	1156	1117	889	1150	1156	1183	1178	1117	1094	1142
31.	Tiruppur	1550	810	1645	824	1520	764	1513	744	1557	785
	TOTAL	882	792	880	785	894	751	925	709	894	760

The average farm price of tender coconut was Rs.8.94 per nut at the State level during 2015-16, however, the price of ripe nut was Rs.7.60 for the same period.

SECTION-B

ARECANUT

Estimated Production of Arecanut

The district wise estimated yield rate and production of Green nuts and cured nuts are given below

Table – 12
Estimated yield and Production of Arecanut - 2015-16

Sl. No.	District	Estimated Average yield Kg./Ha Green nuts	Estimated Production (in Tonnes)	
			Green Nuts	Cured Nuts
1.	Villupuram	2680	172	67
2.	Vellore	4382	13	5
3.	Thiruvannamalai	4382	44	17
4.	Salem	3629	8787	3446
5.	Namakkal	6267	3986	1563
6.	Dharmapuri	13039	3990	1565
7.	Coimbatore	3265	5775	2265
8.	Erode	5474	2600	1020
9.	Thiruchirappalli	11001	715	280
10.	Perambalur	196	10	4
11.	Thanjavur	976	45	18
12.	Thiruvarur	4382	13	5
13.	Madurai	4382	4	2
14.	Theni	1510	44	17
15.	Dindigul	2149	125	49
16.	Virudhunagar	4382	9	3
17.	Thirunelveli	296	36	14
18.	Kanyakumari	8495	2701	060
19.	The Nilgiris	2259	1039	408
20.	Krishnagiri	940	17	7
21.	Tiruppur	1534	41	16
	TOTAL	4382	30166	11831

The average yield rate of areca nut crop in terms of green nuts during 2015-16 was 4382 kg / hec. as against 3347 kg / hec. during 2014-15 showing a increase of 31 per cent.

Area under Arecanut:-

The district wise area and the estimated no.of arecanut palms are furnished below.

Table - 13**Area, Estimated number of Palms and average number of Palms 2015-16**

Sl. No.	District	Area as per Season and Crop Report 2015-16 (In ha.)	Estimated yield rate (Kg/hect)Cured nuts	Estimated No. of Arecanut Palms in '000'		
				Bearing	Non-Bearing	Total
1.	Villupuram	64	67	111	19	130
2.	Vellore	3	5	5	0	5
3.	Thiruvannamalai	10	17	15	2	17
4.	Salem	2421	3446	4326	422	4748
5.	Namakkal	636	1563	1009	390	1399
6.	Dharmapuri	306	1565	478	13	491
7.	Coimbatore	1769	2265	2443	246	2689
8.	Erode	475	1020	677	319	996
9.	Thiruchirappalli	65	280	75	3	78
10.	Perambalur	52	4	101	0	101
11.	Thanjavur	46	18	25	1	26
12.	Thiruvarur	3	5	5	0	5
13.	Madurai	1	2	2	0	2
14.	Theni	29	17	9	1	10
15.	Dindigul	58	49	40	1	41
16.	Virudhunagar	2	3	3	0	3
17.	Thirunelveli	121	14	38	7	45
18.	Kanyakumari	318	1060	624	105	729
19.	The Nilgiris	460	408	321	8	329
20.	Krishnagiri	18	7	14	1	15
21.	Tiruppur	27	16	22	2	24
	TOTAL	6884	11831	10343	1540	11883

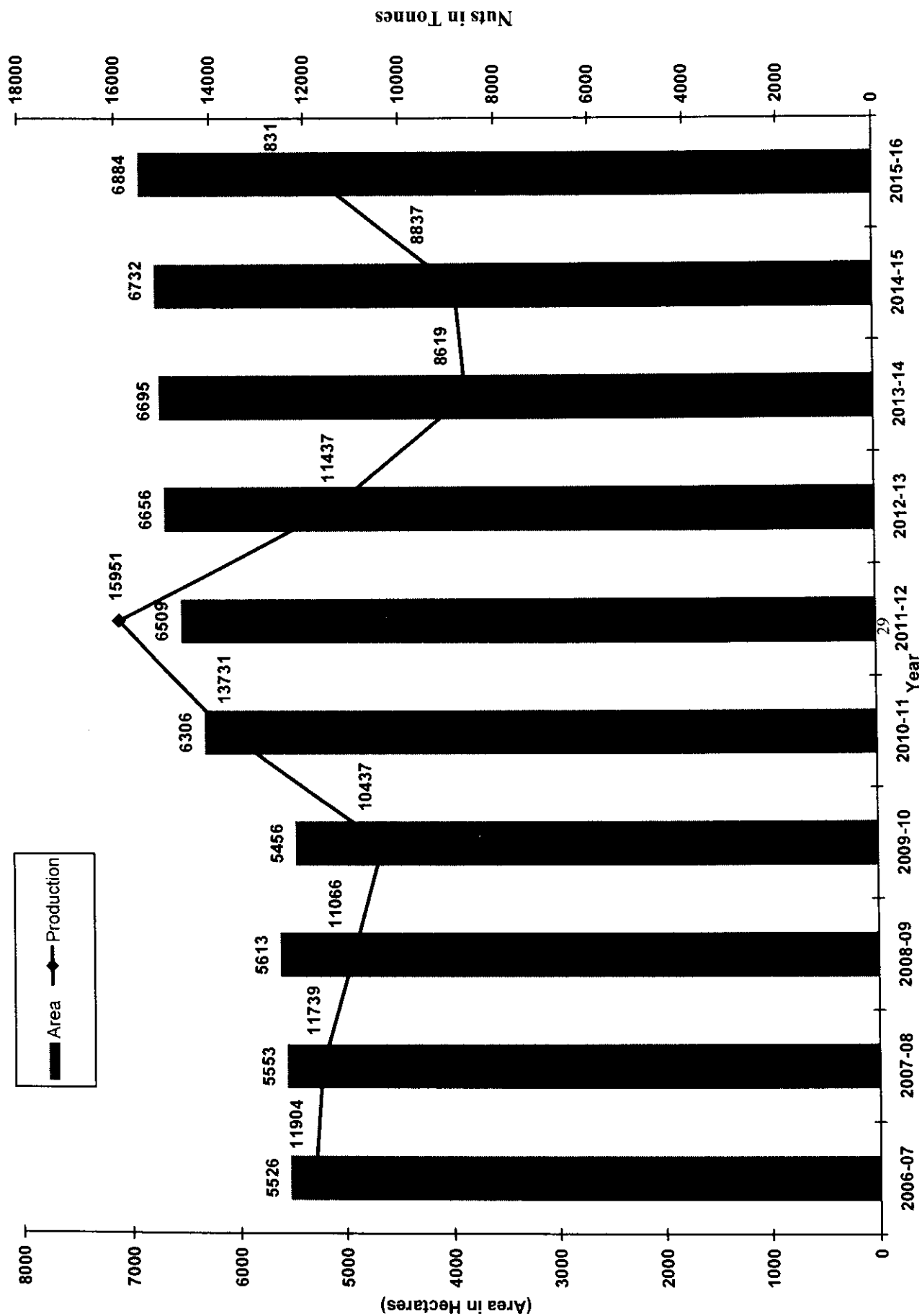
During 2015-16 the area under arecanut is 6884 ha. as against 6732 ha. In 2014-15 showing an increase of 2.3 percent. Salem and Coimbatore districts have the major share of area under arecanut. Vellore, Thiruvarur, Madurai and Virudhunagar districts are having an area of less than 5 hectares.

The estimated number of palms rise up during 2015-16 is 118.83 lakhs as against 97.95 lakhs in 2014-15 showing a increase of 21 per cent over the previous year

Table - 14
Yearwise Area and estimated Production of Arecanut
from 2005 – 06 to 2015-16

Sl. No.	Year	Area under Arecanut (in ha.)	Production Of Cured nuts in Tonnes (Nuts)	Yield rate of Cured nuts (Kg./hect.)
1.	2006 - 07	5526	11904	2154
2.	2007 - 08	5553	11739	2114
3.	2008 - 09	5613	11066	1971
4.	2009-10	5456	10437	1913
5.	2010-11	6306	13731	2177
6.	2011-12	6509	15951	2451
7.	2012-13	6656	11437	1719
8.	2013-14	6695	8619	1312
9.	2014-15	6732	8837	1313
10.	2015-16	6884	11831	1719

AREA AND PRODUCTION OF ARECANUT (2005-06 TO 2014-15)



The total production of Arecanut in terms of green nuts for the State as a whole worked out to 30166 tonnes with a 34 percent increase over the previous year production of 22532 tonnes.

Curing and Processing of Arecanuts

Curing is an essential process in the production of Arecanuts for marketing since the presence of large quantity of tanning in tender or immature nuts is injurious to health of the consumers. The different methods adopted for curing of Arecanuts are boiling, water curing and sun drying.

Boiling of Nuts

In this method, tender nuts are sliced, boiled, coloured and dried. This method is prevalent in Salem, Dharmapuri and Coimbatore districts. The main varieties produced in Tamil Nadu according to this method are given below.

- i. Kalipauk : Tender nuts are cut into pieces, boiled, coloured and dried.
- ii. Kottapauk : Tender nuts which are most matured but not fit for preparation of Kalipauk are cut into 3 or 4 pieces, boiled, coloured and dried.
- iii. Theppakaraunai : The end pieces of Kottapauk are cut into pieces, boiled, coloured and dried.

Water Curing

The cultivators in Kanniyakumari district usually use water and cure nuts during the off-season.

Sun-Drying

As soon as mature nuts are harvested they are cut into slices and dried in the hot sun during the off-season. This method is followed in Thanjavur district.

PART V

Table -15
Findings of the Survey – At a Glance

DETAILS			2015-16	2014-15	% variation
COCONUT					
1.	a)	Number of Bearing Palms ('000's)	76274	75374	1.2%
	b)	Number of Non-Bearing Palms ('000's)	--	--	--
2.	Area under cultivation of Coconut as per Season and Crop Report (in Ha.)		434875	427842	1.6%
3.	Average yield / Palms (in Nuts)		78	63	23.8%
4.	Average yield rate per Ha. (in Nuts)		13711	11655	17.6%
ARECANUT					
1.	a)	Number of Bearing Palms ('000's)	10343	9678	6.8%
	b)	Number of Non-Bearing Palms ('000's)	--	--	---
2.	Area under cultivation of Arecanut as per Season and Crop Report (in Ha.)		6884	6732	2.3%
3.	Average Yield rate Green nuts (Kg/Ha.)		4382	3347	30.9%

Estimation Procedure

The ratio estimate is adopted for estimating the number of Coconut palms for both fresh and retained villages and added up using regression estimate. The estimate of average yield per bearing palms is done to work out the production. The estimation procedure is given below.

N_i	Total Number of Villages In i^{th} stratum growing the Crop.
n_i	Number of Villages selected for palm enumeration in i^{th} stratum.
A_i	Total Area under the crop in i^{th} stratum as per 'g' return.
a_{ij}	Area under the crop in j^{th} village of i^{th} stratum.
t_{ij}	Number of trees enumerated during the current year.
I	Number of strata considered.

ESTIMATION OF COCONUT PALMS

$$X_i = \left[\frac{\sum_{j=1}^{n_i} t_{ij}}{\sum_{j=1}^{n_i} a_{ij}} \right] \times A_i$$

is the ratio of number of palms for i^{th} stratum based on the palms enumerated during the year in all the selected villages.

Estimated total trees = $Rn_i \times A$

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Estimated total trees = $Rn_i \times A$

ESTIMATE OF TOTAL PRODUCTION

b_i Estimated number of bearing palms for i^{th} stratum.

Estimate of production of nuts for i^{th} stratum is

$$P_i = \bar{Y}_i \times B_i$$

Its variance is

$$V(P_i) = V(B_i) \bar{Y}_i^2 + V(\bar{Y}_i) B_i^2$$

Estimate of total production of nuts for all the strata is

$$P = \sum_{i=1}^L P_i$$

Variance for this estimate is

$$V(P) = \sum_{i=1}^L V(P_i)$$