

**2012-13**

***CONCURRENT ESTIMATION OF  
COCONUT PRODUCTION IN TAMIL NADU***



Statistics Section  
Coconut Development Board  
2012-13

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# 1 Introduction

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## 1.1 Background

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Agriculture sector contributes for about 14% of the nation's GDP, about 11% of its exports earnings and Half of the population still relies on agriculture for their employment and as its principal source of income.

Coconut palm provides food security and livelihood to large size of population in the world particularly in Asia Pacific Countries. Considering the versatile nature of the crop and the multifarious uses of its products, coconut palm is eulogized as KALPAVRIKSHA (Tree of Heaven). Coconut is a source of food, beverage, medicine, natural fiber, fuel, wood and raw materials for units producing a variety of goods. Coconut is also interlinked with socio economic life of large number of small and marginal farmers in the peninsular India. It is estimated that about 12 million people in India are dependent on the coconut sector in areas of cultivation, processing and trading activities. With an annual production of around 17,000 million nuts, coconut contribution to nation's GDP is about 15,000 crores rupees.

The official statistics on area and production of coconut is released by the Directorate of Economics and Statistics (DES) in Kerala, Tamil Nadu, Karnataka and Andhra Pradesh. In other states like Maharashtra, Gujarat, Odisha and UTs coconut production estimation is exercised by Agriculture or Horticulture Department of State Governments. The All India final estimate of area and production of coconut were officially released by the Directorate of Economics and Statistics under the Ministry of Agriculture & Cooperation, Government of India until 2008-09. Thereafter the mandate was shifted to the Horticulture Division under the Ministry of Agriculture, Government of India

It is observed that the release of official data by the State DES/Agri/ Hort Departments has a two years lag. Whereas, availability of concurrent data on coconut production is critical for informed decision making on many policy issues related to the crop and its development programmes including declaration of Minimum Support Price fixation. Hence it was felt appropriate to have a concurrent estimation of coconut production by the Coconut Development Board itself. Further the Board has been advised by the Ministry of Agriculture for undertaking an advance production estimation of coconut. Accordingly Coconut Development Board took a decision in its 111th Board meeting held on 15.09.2012 for undertaking a production estimation survey in 31 major coconut growing districts of Kerala, Tamil Nadu Karnataka and Andhra Pradesh for the agriculture year 2012-13.

## 1.2 Objective

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- To estimate concurrent production and yield of coconut in four major southern states including Tamil nadu for 2012-13.
- To develop a scientific model for predicting the coconut production in the country 6-10 months in advance.

### 1.3 Coverage

Of the 32 districts in Tamil Nadu, major 8 districts were selected based on the extent of area under coconut cultivation. The districts selected, and sample area covered is given in the table below:

**Table 1.3**

SI No	Districts	Area under Coconut cultivation(Ha)	Sample Area (Ha)	Percentage of area covered
1	Coimbatore	82704	736.6	0.89
2	Tiruppur	51478	606.33	1.18
3	Thanjavur	33742	285.77	0.85
4	Dindigul	29478	190.84	0.65
5	Kanyakumari	24936	29.35	0.12
6	Theni	19116	100.81	0.53
7	Krishnagiri	15550	77.69	0.50
8	Dharmapuri	7836	39.35	0.50
	<b>Total</b>	<b>264840</b>	<b>2066.74</b>	<b>0.78</b>

Source: DES Tamilnadu 2011-12data, survey data - sample area

### 1.4 Sampling Design

Multistage sampling method is used for the selection of holdings/gardens for collecting the primary data. District is selected based on area under coconut cultivation. Minimum area cut off for selecting a district in the state was 14000 ha. Villages were selected based on statistical sampling technique; from each village, 10 holdings having minimum of 40 bearing palms were selected. For yield estimation from each holding, 10 palms are selected at random and bunch wise yield data was recorded.

## 1.5 Sample Size

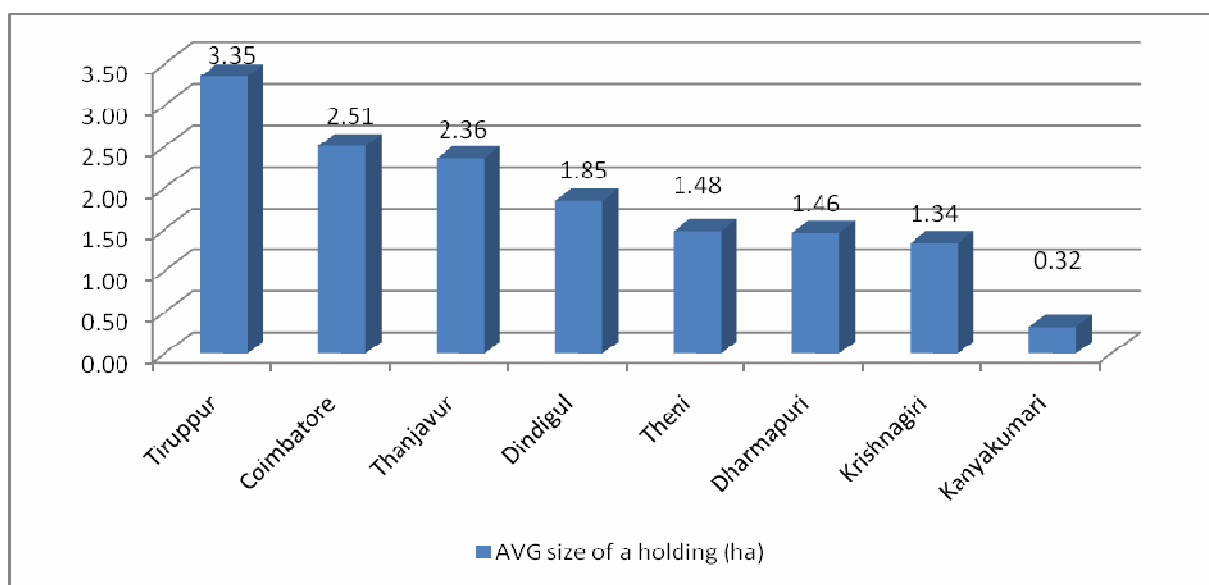
Total area under coconut cultivation in the 8 districts is about 264840 ha according to DES Tamil nadu 2011-12 results. Out of which the sample area covered under the survey is **2066.74 ha**. In total, we 10,000 palms were surveyed and average holding size in the district is **2.19 ha** according to the survey.

Sample size details : Tamil Nadu				
Sl No	Districts	Number of holdings	Total number of palms surveyed	Average holding size(in ha)
1	Coimbatore	294	2940	2.51
2	Tiruppur	181	1810	3.35
3	Thanjavur	121	1210	2.36
4	Dindigul	103	1030	1.85
5	Kanyakumari	91	910	0.32
6	Theni	68	680	1.48
7	Krishnagiri	58	580	1.34
8	Dharmapuri	27	270	1.46
	<b>Tamil Nadu</b>	<b>943</b>	<b>9430</b>	<b>2.19</b>

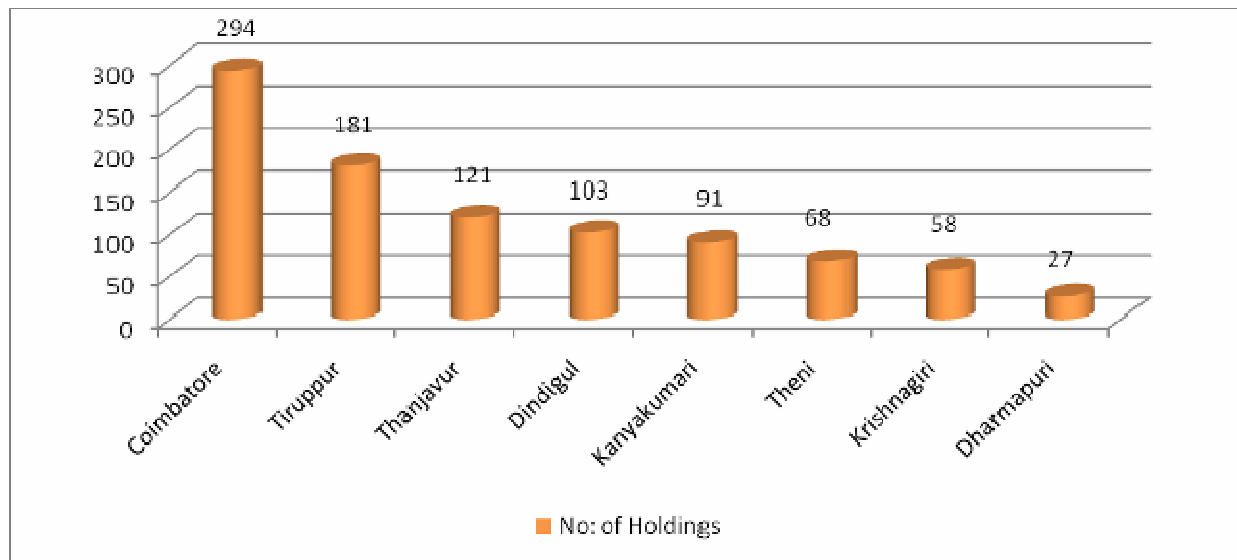
Table 1.5: District wise details of Holdings selected and

### Average holding size

Chart 1- District wise Average size of holdings



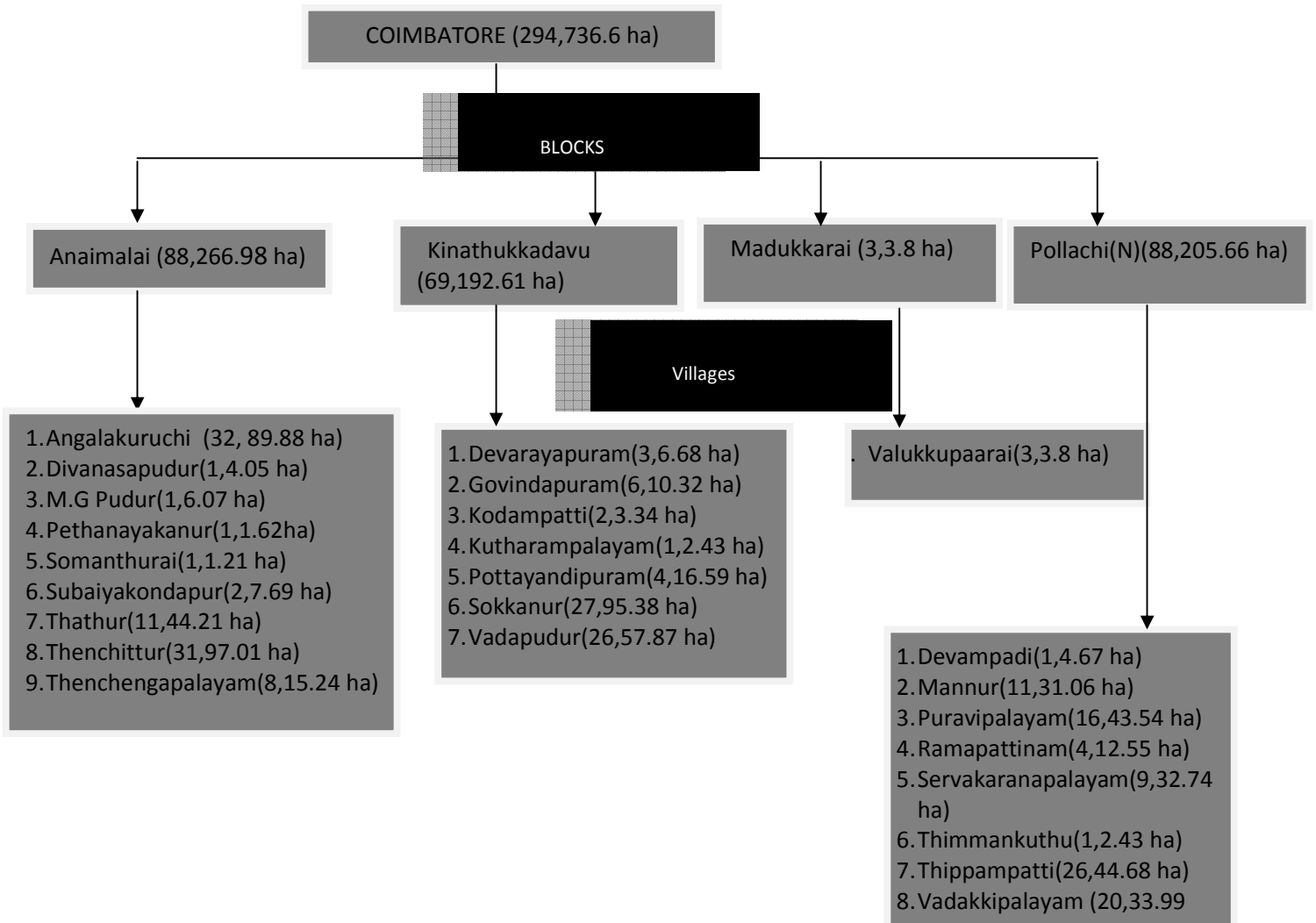
**Chart 2 – District wise distribution of holdings selected for the survey**



The data given in the parentheses in the below charts are (number of holdings, sample area in ha)

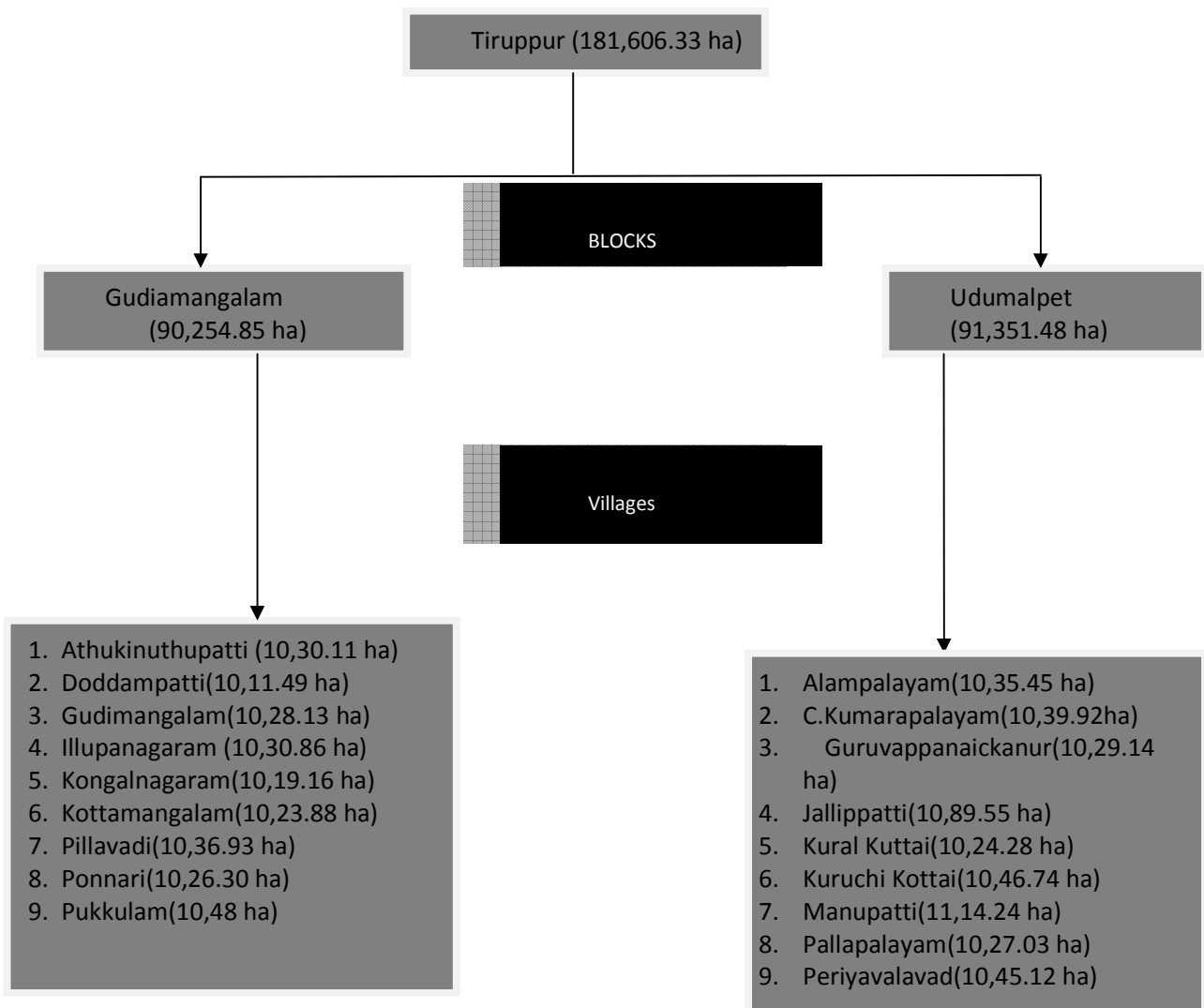
### 1. COIMBATORE

Coimbatore district accounts for 20% (82704 ha) of state's total area under coconut cultivation. 5 blocks were selected. The sampling frame covered 294 holdings located in 25 villages in 5 blocks with a total area of 736.6 ha.



## 2. Tiruppur

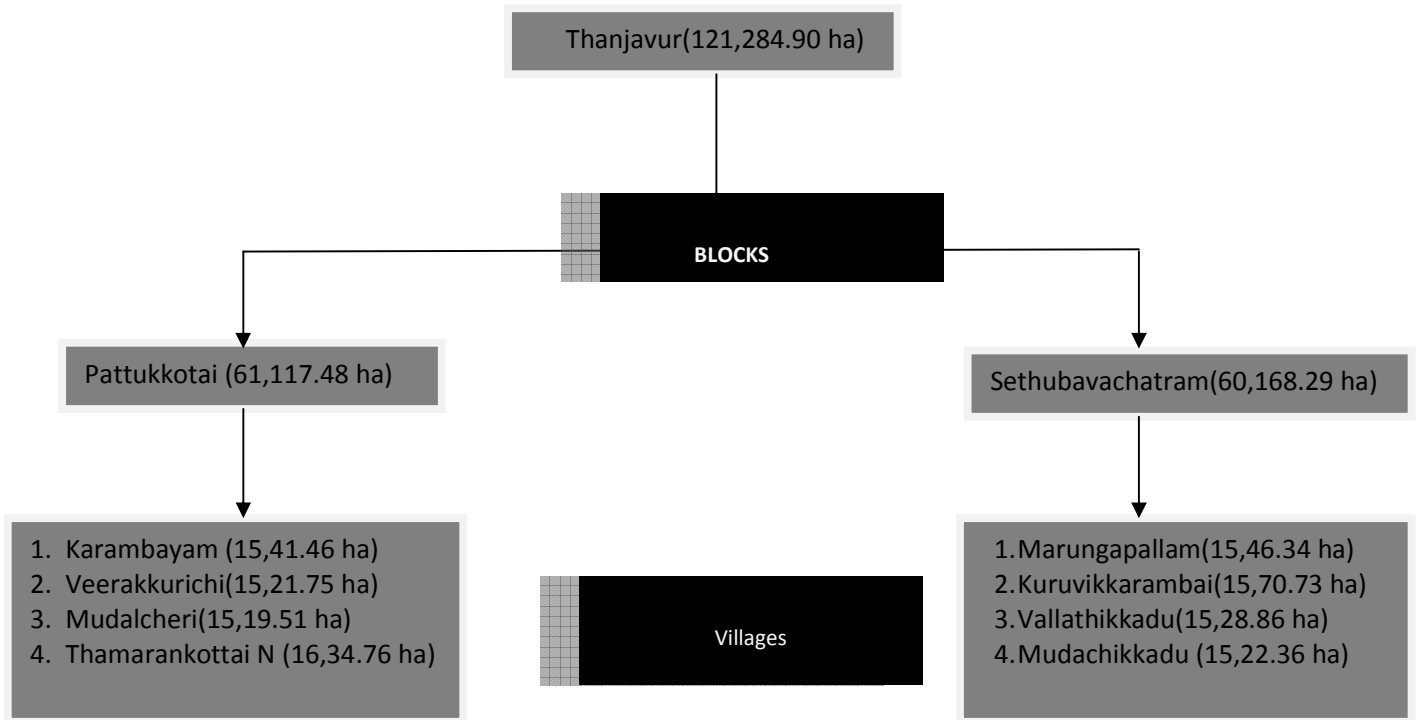
Area under coconut cultivation in Tiruppur constitutes to 12% (51478 Ha) of total area (419400 ha) under coconut cultivation in the state. Gudiamangalam & Udumalpet , the 2 blocks selected constitutes in total 50% of the total coconut cultivated area in the district. From here 18 grama pamchayats are selected. In total 1810 palms were surveyed and the sample area taken accounts to 606.33 ha.





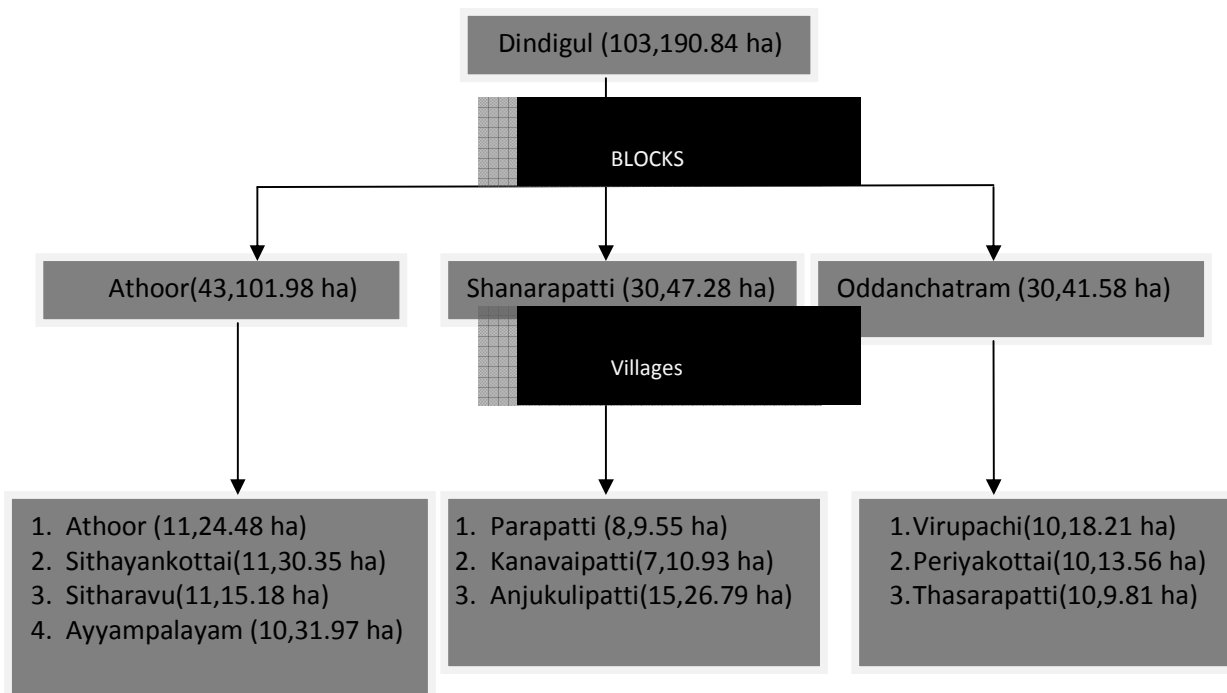
### 3. Thanjavur

Area under coconut cultivation in Thanjavur constitutes to 8% (33742Ha) of total area (419400ha) under coconut cultivation in the state. Pattukkotai & Sethubavachatram , the 2 blocks selected constitutes in total 41% of the total coconut cultivated area in the district. From here 8 grama pamchayats are selected. In total 1210 palms were surveyed and the sample area taken accounts to 284.90 ha.



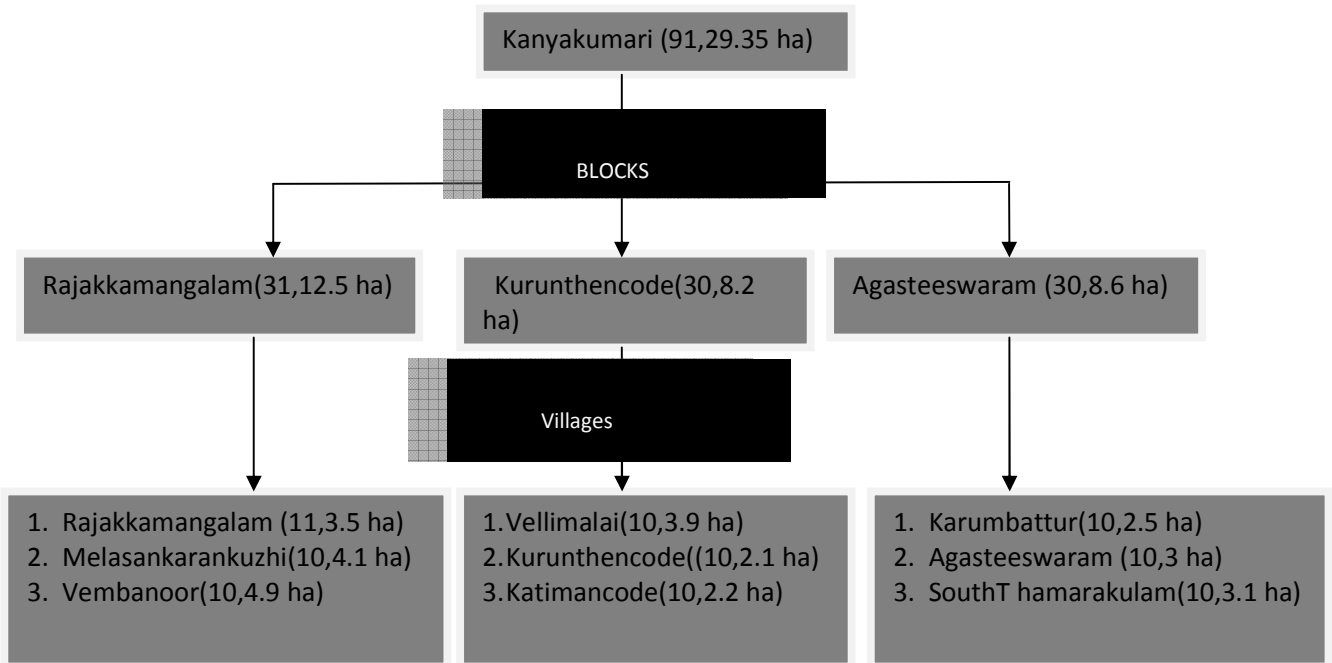
#### 4. Dindigul

Area under coconut cultivation in Dindigul constitutes to 7% (29478 Ha) of total area (419400 ha) under coconut cultivation in the state. 3 blocks selected based on the extend of total coconut cultivated area in the district. From here 10 grama pamchayats are selected. In total 1030 palms were surveyed and the sample area taken accounts to 190.84 ha.



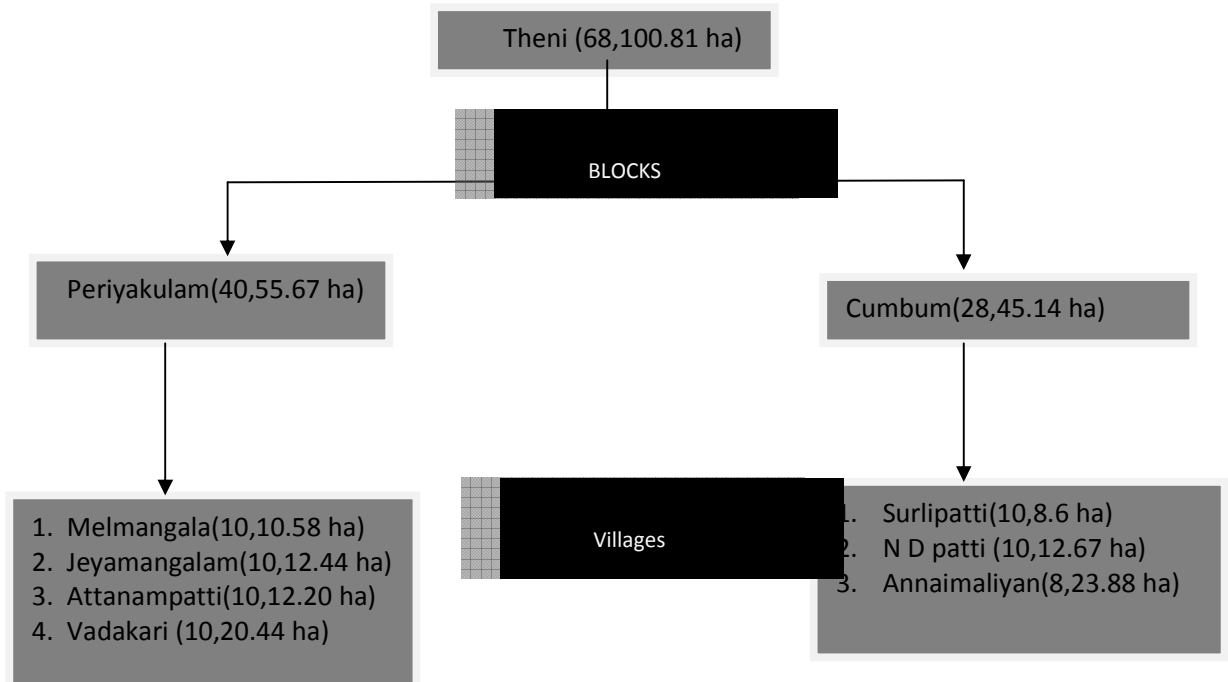
5. **Kanyakumari**

Area under coconut cultivation in Kanyakumari constitutes to 6% (24936Ha) of total area (419400 ha) under coconut cultivation in the state. 3 blocks selected based on the extend of total coconut cultivated area in the district. From here 9 grama pamchayats are selected. In total 910 palms were surveyed and the sample area taken accounts to 29.35 ha.



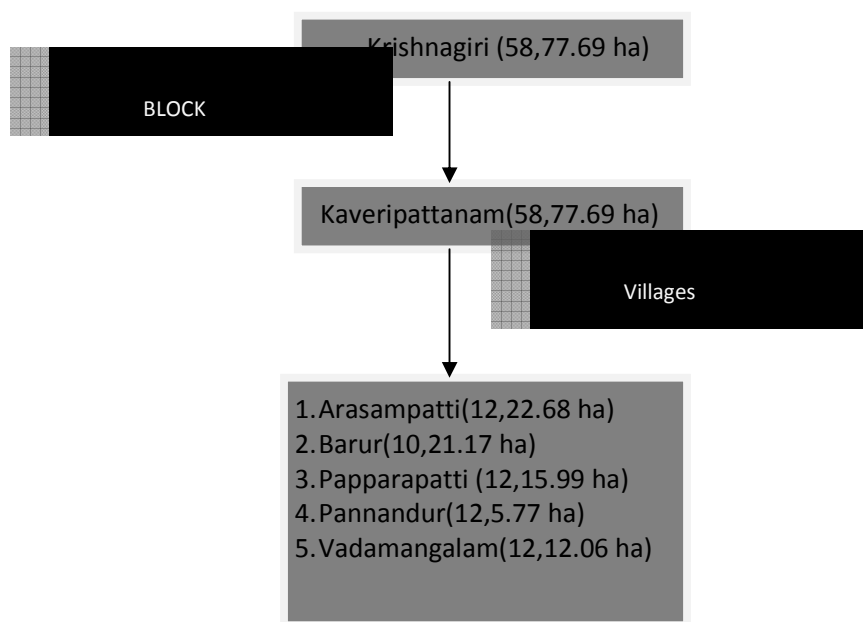
## 6. Theni

Area under coconut cultivation in Theni constitutes to 5% (19116 Ha) of total area (419400ha) under coconut cultivation in the state. 2 blocks selected based on the extend of total coconut cultivated area in the district. From here 6 grama pamchayats are selected. In total 680 palms were surveyed and the sample area taken accounts to 100.81 ha.



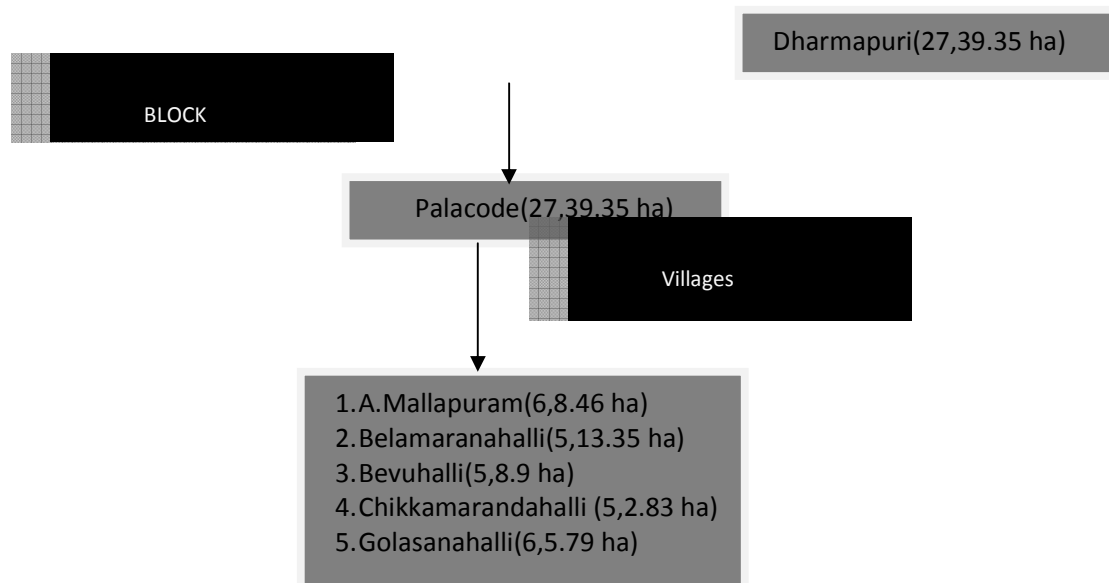
## 7. Krishnagiri

Area under coconut cultivation in Krishnagiri constitutes to 4% (15550 Ha) of total area (419400 ha) under coconut cultivation in the state. From here 5 grama pamchayats are selected. In total 580 palms were surveyed and the sample area taken accounts to 77.69 ha.



## 8. Dharmapuri

Area under coconut cultivation in Dharmapuri constitutes to 2% (7836Ha) of total area (419400 ha) under coconut cultivation in the state. From here 5 grama pamchayats are selected. In total 270 palms were surveyed and the sample area taken accounts to 39.35 ha.



### 1.6 Period of Survey

The survey started in Tamil nadu during the month of February.

## 2 Methodology

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For the estimation survey of coconut production in Tamilnadu, 8 major districts were selected based on the extent of area under coconut cultivation. From each identified districts, selection of blocks were made on the basis of statistical sampling techniques. From each block, selection of Grama panchayat was done on the basis of accepted scientific sampling norms for selecting the holdings. From each panchayat, 10 holdings having minimum 40 bearing palms is selected randomly for collection of data. From these, 10 palms are selected at random. From the selected palms, all bunches carrying developing nuts after fertilization i.e. three months and above will be identified and serially numbered and number of nuts in each bunch is recorded.

Properly structured formats were used by field investigators for collection of primary data. Part A meant for geographical information of the holdings surveyed, part B the details of coconut farmer, part C information about coconut holdings and part D meant for specific yield details of the selected palms.

## 3 Survey Results & Analysis

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### 3.1 Concept and Definitions

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The main purpose of analysis of data is to arrive at estimate of yield and production per palm and per hectare basis which is required for estimating production with a reasonable degree of accuracy. Estimate of production can be obtained according to different concepts used which are

1. **Yielding palms:** Coconut palms which have attained fruit bearing stage at the time of enumeration are classified as yielding palms.
2. **Non- Yielding palms :** Coconut palms which have not attained nut bearing stage at the time of enumeration and coconut palms which have reached bearing stage but not bearing due to reasons like sterility, disease, old age etc. are classified as non- bearing palms
3. **Yield:** A measurement of output obtained or harvested per tree or a unit of land area.
4. **Plant Density:** The number of plants standing within a given unit of area (here the unit area taken is Ha).
5. **Yielding Plant Density:** The number of Yielding plants within a given unit of area (here the unit area is taken Ha).

### 3.2 Formulae

- 1) 
$$\text{Average yield per palm} = \frac{\text{Total number of coconut nuts obtained in a year (Count)}}{\text{Total number of yielding coconut palms (Count)}}$$
- 2) 
$$\text{Average plant density} = \frac{\text{Total number of coconut palms (Count)}}{\text{Coconut cultivated area (Ha)}}$$
- 3) 
$$\text{Area yielding palm density} = \frac{\text{Total number of yielding coconut palms (Count)}}{\text{Yielding coconut area (Ha)}}$$
- 4) 
$$\text{Average holding size} = \frac{\text{Total coconut cultivated area (Ha) covered in the sampling area}}{\text{Total No of holdings (Count) in the sampling area}}$$
- 5) 
$$\text{Average yield /ha} = \text{Average per palm yield} \times \text{yielding palm density /ha}$$

### 3.3 Distribution of Holding Size

The total area surveyed in the state is 2066.74 ha . The number of holdings surveyed in the state is 943 and yield observed was of 9430 palms .The size of holding according to the Agricultural Census of Operational Holdings can be categorized as marginal , small, medium and large and is shown in the table below.

Table 3.3

Sl No:	District	marginal	small	medium	large	Grand Total
1	Coimbatore		9	8	277	294
2	Dharmapuri		5	17	5	27
3	Dindigul			18	85	103
4	Kanyakumari		71	20		91
5	Krishnagiri			12	46	58
6	Thanjavur				121	121
7	Theni			10	58	68
8	Tiruppur				181	181
	Total		85	85	773	943

Source : Survey data;  
 Note:<1 Ha = marginal;1-4 ha = small;4-10 ha = medium and >10 ha =large



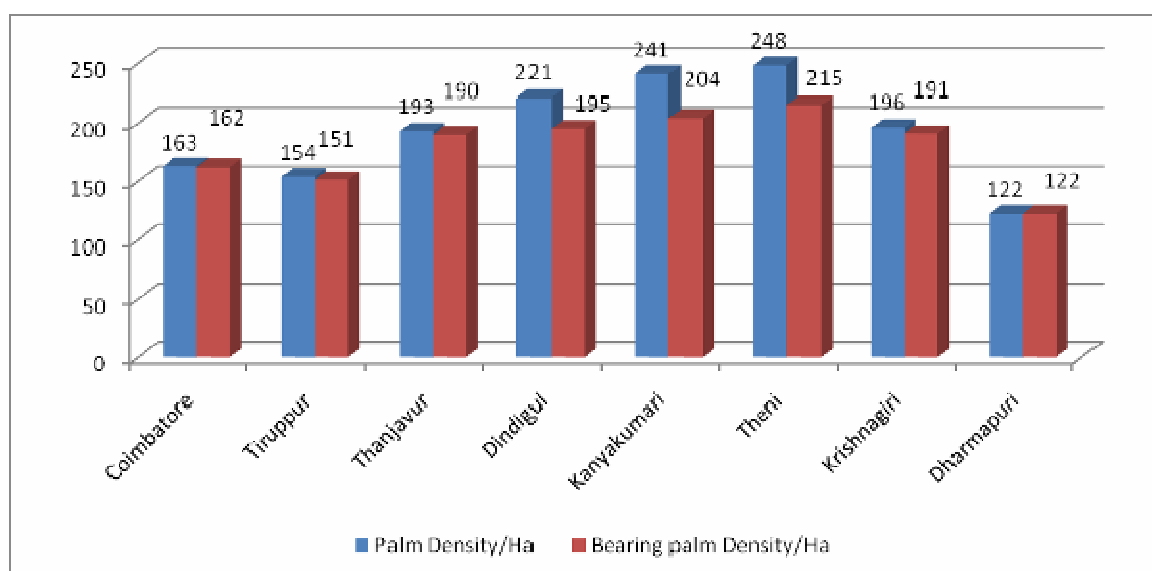
### 3.4 Plant Density, of Bearing & Non Bearing Palms

The most important management tool in achieving optimal overall productivity is coconut spacing that is expressed as the planting density per unit area. 175 palms per ha is considered as the optimum palm density. The survey revealed that the plant density in the state varies from 122 palms/Ha , the lowest at Dharmapuri to 248 palms /Ha in Theni . Density of yielding palms varies from 151 to 215 palms .The highest yielding palm density is reported at Theni district and lowest in Dharmapuri district. Table 3.2 shows the details of palm density for the surveyed districts.

**Table 3.4**

Districts	Palm Density	Bearing palm Density	Bearing Palms	Non yielding palms	% of Bearing Palms
Coimbatore	163	162	119532	900	99
Tiruppur	154	151	91608	1931	98
Thanjavur	193	190	54312	949	98
Dindigul	221	195	37121	5006	88
Kanyakumari	241	204	5999	1061	85
Theni	248	215	21633	3322	87
Krishnagiri	196	191	14810	450	97
Dharmapuri	122	122	4787	0	100
State	176	169	349802	13619	96

**Chart 3**



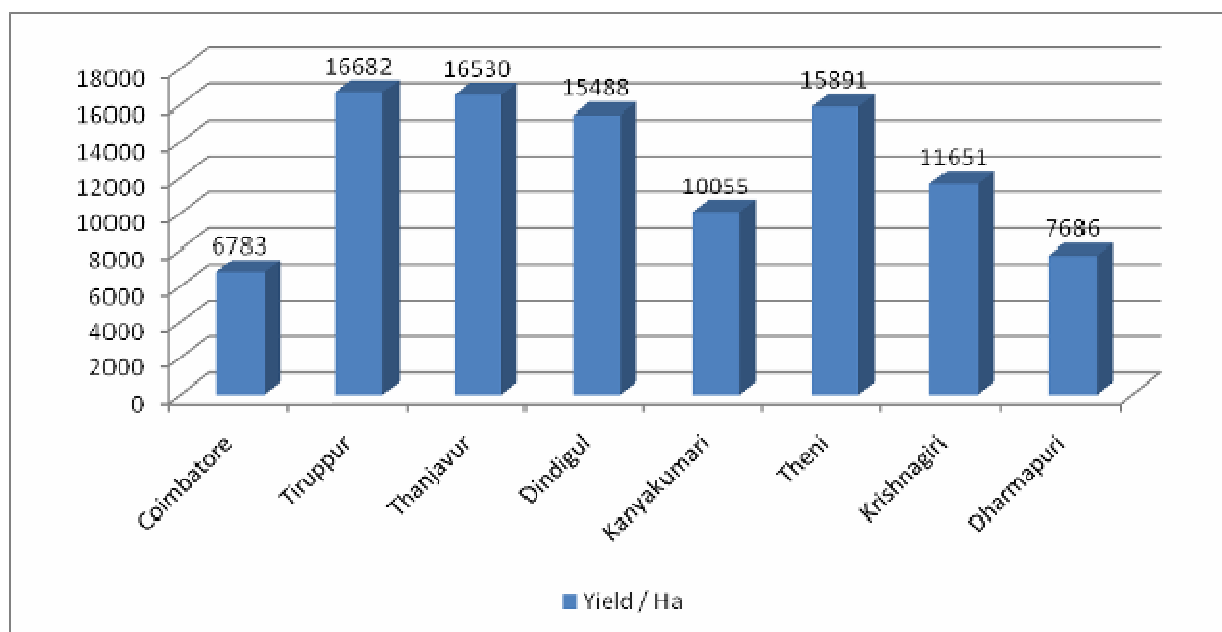
### 3.5 Yield – Palm wise and per Hectare

The table shows the per palm yield and per hectare yield obtained from the survey.

**Table 3.5.1**

Sl No	Districts	Bearing Palms	Yield /Palm	Yield / Ha
1	Coimbatore	119532	42	6783
2	Tiruppur	91608	90	16682
3	Thanjavur	54312	87	16530
4	Dindigul	37121	79	15488
5	Kanyakumari	5999	49	10055
6	Theni	21633	74	15891
7	Krishnagiri	14810	61	11651
8	Dharmapuri	4787	63	7686
	STATE	349802	68	12196

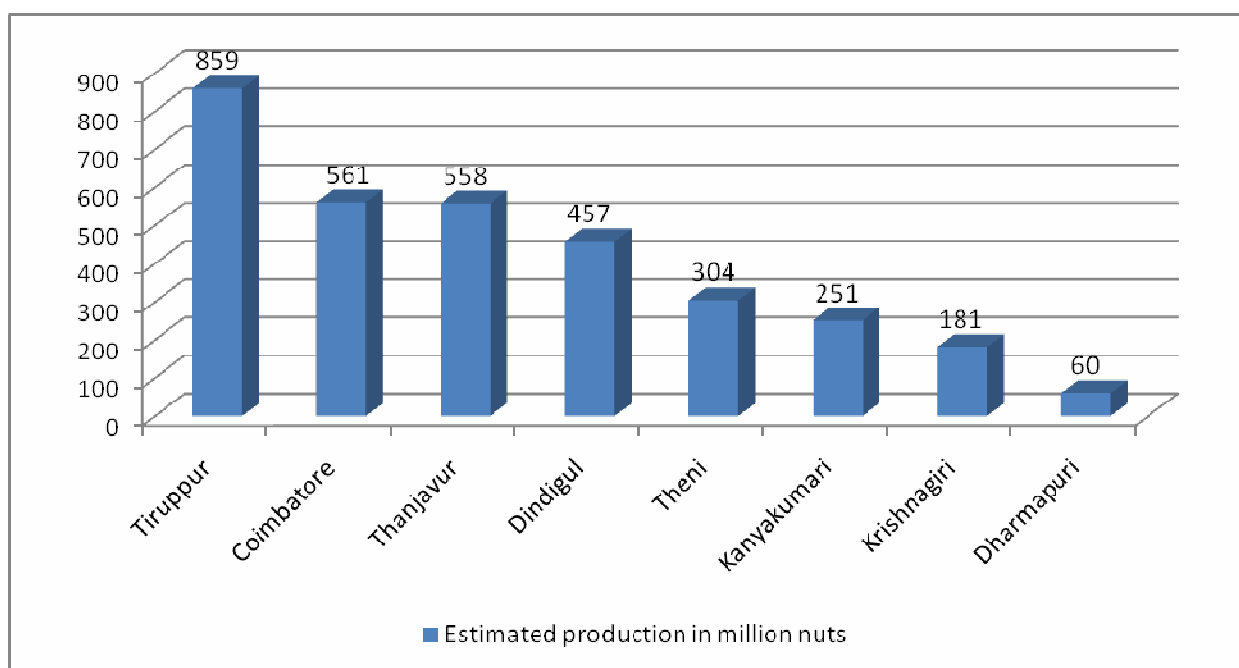
**Chart 4 Yield / Ha for the surveyed districts**



**Table 3.5.2**

Districts	Estimated Pdn in Million nuts (2012-13)
Coimbatore	561
Tiruppur	859
Thanjavur	558
Dindigul	457
Kanyakumari	251
Theni	304
Krishnagiri	181
Dharmapuri	60
Surveyed Districts	3230
Non Surveyed Districts	1885
State	5115

**Chart 5 Estimated Coconut Production in million nuts for the year 2012-13**



## 4 Findings at a Glance

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<b>Number of Districts Selected for the Survey</b>	<b>8</b>
<b>Number of Blocks Selected for the Survey</b>	<b>18</b>
<b>Number of Panchayats Selected for the Survey</b>	<b>88</b>
<b>Total Sample Area Covered (Ha)</b>	<b>2066.74</b>
<b>Total Number of Holdings</b>	<b>943</b>
<b>Total Number of Palms from which yield recorded</b>	<b>9430</b>
<b>Average Holding Size (Ha)</b>	<b>2.19</b>
<b>Total Number of Bearing palms in sample area</b>	<b>349802 (96%)</b>
<b>Total Number of Non Bearing palms in sample area</b>	<b>13619 (4%)</b>
<b>District with highest bearing palm density</b>	<b>Theni (215)</b>
<b>District with lowest bearing palm density</b>	<b>Dharmapuri (122)</b>
<b>Estimated Yield /Hectare (number of nuts) 2012-13</b>	<b>12196</b>
<b>District with highest productivity (Estimate)</b>	<b>Tiruppur (16682 Nuts / Ha )</b>
<b>District with lowest productivity (Estimate)</b>	<b>Coimbatore (6783 Nuts / Ha )</b>
<b>District with highest production (Estimate)</b>	<b>Tiruppur (859 Million Nuts)</b>
<b>District with lowest production (Estimate)</b>	<b>Dharmapuri (60 Million Nuts )</b>
<b>Estimated Production in million nuts for the year 2012-13</b>	<b>5115</b>
<b>Production in million nuts for 2011-12 (DES)</b>	<b>6201</b>

## 5 Data Tables

Table 5.1

Districtwise Area and Production of Coconut in Tamil Nadu - 2011-12						
Sl No:	Districts	Area in Ha	Percentage share in Area	Production in Lakh Nuts	Percentage share in Production	Productivity (Nuts/ha)
1	Coimbatore	82704	19.7	12508	20.2	15124
2	Tirupur	51478	12.3	6467	10.4	12563
3	Thanjavur	33742	8.0	8238	13.3	24415
4	Dindigul	29478	7.0	5749	9.3	19503
5	Kanyakumari	24936	5.9	1584	2.6	6352
6	Vellore	22680	5.4	2985	4.8	13161
7	Theni	19116	4.6	3649	5.9	19089
8	Tirunelveli	15621	3.7	1280	2.1	8194
9	Krishnagiri	15550	3.7	2972	4.8	19113
10	Salem	14590	3.5	1861	3.0	12755
11	Madurai	11382	2.7	1773	2.9	15577
12	Erode	11368	2.7	2021	3.3	17778
13	Virudhunagar	9844	2.3	1279	2.1	12993
14	Pudukottai	8639	2.1	1258	2.0	14562
15	Ramanathapuram	8267	2.0	599	1.0	7246
16	Dharmapuri	7836	1.9	1241	2.0	15837
17	Namakkal	7466	1.8	1139	1.8	15256
18	Sivaganga	6731	1.6	752	1.2	11172
19	Thiruchirappally	6648	1.6	796	1.3	11974
20	Karur	6155	1.5	543	0.9	8822
21	Thoothukudi	5717	1.4	473	0.8	8274
22	Thiruvarur	4916	1.2	1063	1.7	21623
23	Nagapattinam	4026	1.0	554	0.9	13761
24	Kancheepuram	3435	0.8	259	0.4	7540
25	Cuddalore	2343	0.6	437	0.7	18651
26	Villupuram	1890	0.5	189	0.3	10000
27	Thiruvalluar	1090	0.3	102	0.2	9358
28	Thiruvannmalai	803	0.2	134	0.2	16687
29	Perumbalur	560	0.1	77	0.1	13750
30	Ariyalur	323	0.1	26	0.0	8050
31	The Nilgiris	66	0.0	1	0.0	1515
	<b>State</b>	<b>419400</b>	<b>100.0</b>	<b>62009</b>	<b>100.0</b>	<b>14785</b>

Source : DES, Tamil Nadu

Table 5.2

AREA AND PRODUCTION DATA OF COCONUT							
SI No:	STATES	2011-12					
		Area "000" ha	% Share in Area	Production "000" MT	% Share in Production	Pdn Million nuts	Yield
1	Andaman & Nicobar Islands	21.8	1.1%	72.3	0.5%	113	5184
2	Andhra Pradesh	142	7.0%	1270	9.1%	1985	13979
3	Assam	18.8	0.9%	101	0.7%	158	8397
4	Chhattisgarh	0.8	0.0%	6.3	0.0%	10	12309
5	Goa	25.7	1.3%	88.7	0.6%	139	5394
6	Gujarat	20.9	1.0%	217.9	1.6%	341	16296
7	Karnataka	506.8	24.9%	3770	26.9%	5893	11627
8	Kerala	766	37.6%	3973.9	28.4%	6211	8109
9	Lakshadweep	2.7	0.1%	40	0.3%	63	23156
10	Maharashtra	21	1.0%	120	0.9%	188	8931
11	Nagaland	0.9	0.0%	0.3	0.0%	0	521
12	Orissa	53.9	2.6%	258	1.8%	403	7482
13	Puducherry	2.1	0.1%	20	0.1%	31	14886
14	Tamil Nadu	420.7	20.6%	3692	26.4%	5771	13717
15	Tripura	5.9	0.3%	8.6	0.1%	13	2278
16	West Bengal	29.1	1.4%	367.5	2.6%	574	19739
	<b>Total</b>	<b>2039.1</b>	<b>100%</b>	<b>14006.5</b>	<b>100%</b>	<b>21892</b>	<b>10736</b>

Source : Department of Agriculture and Cooperation (Horticulture Division)

## 6 References

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1. Survey report for Coimbatore district by Dr.V.MohanaSundaram.
2. Survey report for Dharmapuri & Krishnagiri districts by Dr.D.Janagam
3. Survey report for Dindigul & Theni districts by Dr. S. Ramasamy
4. Survey report for Kanyakumari district by Dr. J. Cyril kanmony
5. Survey report for Thanjavur district by Dr.N.Rajendran
6. Survey report for Tiruppur district by Dr. M Raju
7. Data entry done on Coconut Development Board website

<b>List of Institutions/Colleges</b>			
<b>Sl.No</b>	<b>District</b>	<b>College/Institute</b>	<b>Survey Coordinators</b>
1	Coimbatore	Department of Economics, PSG college of Arts and science, Coimbatore	Dr.V.MohanaSundaram
2	Dharmapuri	Department of Economics, Periyar Universiy, Salem	Prof.Rajendran,Dr.D.Janagam
3	Dindigul	Department of Economics, Gandhigram Rural Institute Gandhigram, Dindigul	
4	Kanyakumari	Department of Economics, Scott Christian College, Kanyakumari	Dr. J. Cyril kanmony
5	Krishnagiri	Department of Economics, Periyar Universiy, Salem	Dr.D.Janagam
6	Thanjavur	Department of Economics, AVVM Sri Pushpam College, Thanjavur	Dr.N.Rajendran
7	Theni	Department of Economics, Gandhigram Rural Institute Gandhigram, Dindigul	Dr. S. Ramasamy
8	Tiruppur	Department of Economics, Gobi Arts & Science College, Erode	Dr. M Raju