AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT CULTIVATION IN KANYAKUMARI DISTRICT

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Abstract: Agriculture has playing a crucial role in the economic development of all developed and developing countries. Cocount is one of the most valuable gifts of nature to manking. It is occupies a place of significance in the Indian economy due to its prominent role as a horticultural crop of food and livelihood security as well as its socio-religious importance. The present study the trend in area, production and productivity of coconut cultivation in Kanyakumari District during 2000-01 to 2016-17. To analysis the growth performance of area and production Productivity of coconut cultivation in four taluk in kanyakumari district. The study is based on secondary data only. The study mainly focused on growth and trend performance in area, production and productivity of Coconut cultivation in Kanyakumari district. The variable used on area under coconut production, yield per hectare, productivity Kanyakumari district and four Taluk of Agasteeswaram, Thovalai, Kalkulam, Vilavancode. The analysis was done by the use of SPSS and Excel. The study used growth rate percentages, average, Mean, Standard deviation, coefficient of variation, Compound Annual growth analyzing the data.

Index terms: Growth rates, Area, Production, Productivity of Coconut

INTRODUCTION

Coconut is one of the oldest crops grown in India. It has a recorded history of over 3000 years (Thampan P.K 1988). This wonder crop is a great gift of God. This crop occupies a unique position in the socio-economic structure of the country and it is intimately related to the prosperity of a vast multitude of small and marginal farmers especially along the coastal states of this country. It is a food crop as well as a cash crop. Although the coconut tree is grown mainly for its nuts and it provides many by-products of immense utility and industrial application. The coconut industry in India provides livelihood to 10 million people engaged in cultivation, processing, trading, transportation and other related activities (Markose 1994). Coconut makes a significant contribution to the national economy. Taking into consideration the increased demand for fresh coconuts due to the growing population and also the greater demand for convenience-oriented products owing to the increased pace of urbanization and change in life-styles, the coconut industry has great promise of growth in this country. The growth of the coconut industry in India was marked by up sand downs during different periods of the last century. The first stage of expansion in the cultivation of the crop in India could be traced to the use of coconut oil in the production of soap and margarine in the early 19th century when Europe saw an unprecedented demand for coconuts resulting in large scale planting of coconut. At the beginning of the 20th century copra was the king among the oilseeds and was even called "green gold". *By* the end of the 20th century coconut had been dethroned from the position it held in the international trade

due to low production and productivity (Punchihewa 2002).At the beginning of the 21st century the situation has become worse due to the advent of substitute for vegetable oils and synthetics. Coconut oil is thus going to have stiff competition in the domestic and international markets. Therefore, it is the necessary to increase the production and the productivity of coconuts. The establishment of separate government institutions for the development of the industry and coordination among the various agencies dealing with coconut helped the industry very much. In India, the Coconut Development Board came into existence in 1981. The Board is playing a pivotal role for the overall development of the coconut industry in India and its programmes are integrated with the objective of increasing production and productivity besides value addition to the produce (Singh 1998).

Coconut occupies a place of significance in the Indian economy due to its dominant role as a horticultural crop of food and livelihood security as well as its socio-religious importance. It is also an oil seed crop of a tree origin and fruit crop, which gives a nourishing drink. Though coconut and its products have extensive uses and a consistent demand substantial part of its production is accounted for by the four peninsular States of Kerala, Tamil Nadu, Karnataka and Andhra Pradesh. They produce nearly 90 per cent of the total output. The other States like Goa, Orissa, West Bengal, Tiripura and Assam account for the balance 10 per cent. Several new technologies of coconut cultivation and various models of coconut crop based farming system have been evolved in recent years. The development of the coconut industry in India used to be primarily domestic market driven till 1995. The industry was protected from market-induced uncertainties.

COCONUT RESEARCH IN INDIA

The first systematic research on coconut in the world was started in India in 1916 with the establishment of four research stations in the erst while Madras Presidency. Four centers were established for researching on different soil types. In 1931, these stations were put under oil seeds specialist, J.S. Patel in Coimbatore. The first coconut monograph titled “Coconut Monograph” by J.S. Patel was published in 1938. In 1948, Indian Central Coconut Committee was set up for the improvement and development of the crop. The work on coconut was further intensified, with the Kasargod station being upgraded and C.M. John was its first director in the year 1950. In 1996, Indian Central Coconut Committee was abolished and ICAR (Indian Council of Agricultural Research) took over the administrative control of coconut research station at Kayankulam and Kasargod. In 1970, ICAR established Central Plantation Crops Research Institute by merging the two stations at Kayangulam and Kasargod and the Central Arecanut Research Station at Vital along with five Regional Stations. In 1970, the ICAR sanctioned the All India Coordinated Coconut and Arecanut Improvement project with its headquarters at Kasargod. The first workshop was held in 1971 at Kasargod, wherein all the research programmes were finalized and the programmes were initialized in 1972. At present there are ten centers viz. Amdajipeta (Andhra Agricultural University), Kahikuchi (Assam Agricultural University), Jalalgarh (Rajendra Agricultural University), Arshihera (University of Agricultural Science, Bangalore), Retnagiri (Konkan Krishi Vidyalaya), Konarak (Orissa University of Agriculture and Technology) and Mandouri (Bidhan Chandra Krisha Viswa Vidyalaya), etc., functioning as research centers under AICRP to cater to the location specific needs of the crop. A number of universities namely, Kerala Agricultural University, Tamil Nadu Agricultural University, Andra Pradesh Agricultural University, Orissa University of Agriculture and Technology, Bidhan Chandra Krishi Viswa Vidyalaya, Assam Agricultural University and Konkon Krishi Vidyapeeth, and some

state farms like Aralam Farm (Kannur) and private farms are involved actively in the pursuit of research in coconut. Coconut Development Board lends financial and development support to provide impetus to research programmes.

IMPORTANCE OF THE STUDY

Coconut is a principal crop cultivated in Kanyakumari District. It contributes to the district's economic, social and cultural development in many ways. It is also a primary source of food to the people of the district. Coconut provides the basic raw materials to the oil and coir industries in the district. The present study covers only production and productivity of coconuts and does not go into the industrial activities involving coconuts. The study has been undertaken from the point of view of the area production and productivity of coconut cultivation.

OBJECTIVE OF THE STUDY

(i) To study the trend in area, production and productivity of coconut cultivation in Kanyakumari District during 2000-01 to 2016-17

(ii)To analysis the growth performance of area and production Productivity of coconut cultivation in four taluk in kanyakumari district.

METHODOLOGY

The present study is based on secondary data only. The study mainly focused on growth and trend performance in area, production and productivity of Coconut cultivation in Kanyakumari district. The variable used on area under coconut production, yield per hectare, productivity Kanyakumari district and four Taluk of Agasteeswaram, Thovalai, Kalkulam, Vilavancode. The analysis was done by the use of SPSS and Excel. The study used growth rate percentages, average, Mean, Standard deviation, coefficient of variation, Compound Annual growth analyzing the data.

The co-efficient of variation was estimated by using the following formula:

$$\text{Coefficient of variation} = \frac{\text{Standard Deviation}}{\text{Mean}} \times 100$$

Compound Annual Growth Rate

This can be written as follows:

$$\text{CAGR} = \left(\frac{\text{Ending value}}{\text{Beginning Value}}\right)^{(1/\text{Number of Years})} \times 100 - 1$$

DATE SOURCES:

The present study focuses on area, Production and Productivity on Coconut Kanyakumari District. The data for this study have been collected from secondary sources of information mainly from the standard text books, Coconut journals, Coconut Development Board Kochi, District Statistical office, Nagercoil. Directorate of Economics and Statistics, Ministry of Agriculture, New Delhi. Department of Statistics, Government of Tamil Nadu, Chennai.

AREA PRODUCTION AND PRODUCTIVITY OF COCONUT IN KANYAKUMARI DISTRICT

Kanyakumari is the second smallest district in Tamil Nadu, within area of 23,898 Sq. Km. This district has a purely agricultural economy. Among commercial crops, rubber, coconut and cashew nut occupy the major parts of the area. Coconut alone is being raised in around 23,898 hectares. Kanyakumari District also occupies a pre-dominant position in the area and production of coconut in Tamil Nadu. Coconut is cultivated, mostly, in all parts of the districts of Tamil Nadu. The trend in coconut production, area under coconut cultivation and coconut productivity in Kanyakumari District are discussed here. The details of Area under coconut Cultivation and increase or decrease in area over the previous year along with the percentage increase or decrease in area in Kanyakumari district and the trend values are presented in table.1.1

TABLE NO.1.1

TREND IN AREA UNDER COCONUT CULTIVATION IN KANYAKUMARI DISTRICT FROM 2000-01 to 2016-17

Year	Area (Ha)	Increase/Decrease	Percentage	Trend
2000-01	21943			22802
2001-02	22057	114	0.52	22941
2002-03	22187	130	0.59	23080
2003-04	22250	63	0.28	23218
2004-05	23936	1686	7.58	23357
2005-06	24220	284	1.19	23495
2006-07	24440	220	0.91	23634
2007-08	24864	424	1.73	23773
2008-09	25074	210	0.84	23911
2009-10	24938	-136	-0.54	24050
2010-11	24916	-22	-0.09	24189
2011-12	24936	20	0.08	24327
2012-13	24502	-434	-1.74	24466
2013-14	23917	-585	-2.39	24604
2014-15	24232	315	1.32	24743
2015-16	24182	-50	-0.21	24882
2016-17	23898	-284	-1.17	25020

Source: District Statistical office, kanyakumari &Coconut Development Board, Cochin

It could be seen from the table.1.1 that the area under coconut cultivation in kanyakumari was the highest in 2011-12 and the lowest in 2000-2001. The area under coconut cultivation has gone up from 22057 hectares in 2001-2002 to 23898 thousand hectares in 2016-17. Similarly, its growth rate in area of cultivation decelerated from 0.52 per cent to -1.17 percent. The trend value increased from 22802 hectares in 2000-2001 to 25020 hectares in 2016-17.

TABLE NO.1.2

TREND IN COCONUT PRODUCTION IN KANYAKUMARI DISTRICT

FROM 2000-01 to 2016-17

Year	Production (Lakhs Nuts)	Increase/Decrease	Percentage	Trend
2000-01	3264			2118
2001-02	2702	-562	-17.22	2285
2002-03	2436	-266	-9.84	2453
2003-04	2288	-148	-6.08	2621
2004-05	2392	104	4.55	2788
2005-06	2420	28	1.17	2956
2006-07	2680	260	10.74	3124
2007-08	2622	-58	-2.16	3291
2008-09	3259	637	24.29	3459
2009-10	3899	640	19.64	3626
2010-11	4533	634	16.26	3794
2011-12	3615	-918	-20.25	3962
2012-13	4007	392	10.84	4129
2013-14	2871	-1136	-28.35	4297
2014-15	5625	2754	95.92	4465
2015-16	5156	-469	-8.34	4632
2016-17	5031	-125	-2.42	4800

Source: District Statistical office, kanyakumari & Coconut Development Board, Cochin

It is observed from Table.1.2 that the coconut production in Kanyakumari was the highest in 2014-15 and the lowest in 2003-04. The coconut production has gone up from 2702 nuts in 2001- 2002 to 5031 nuts in 2016-17. But its growth rate in area of cultivation gradually decelerated from -17.22 per cent to -2.42 percent. The trend value increased from 2118 nuts in 2000-2001to 4800 nuts in 2016-17.The erratic monsoon patterns and unfavorable climatic conditions were the major reasons for such drastic reduction in production during the years.

TABLE NO.1.3

TREND IN COCONUT PRODUCTIVITY IN KANYAKUMARI DISTRICT

FROM 2000-01 to 2016-17

Year	Productivity (Nuts/Ha)	Increase/Decrease	Percentage	Trend
2000-01	14875			9474
2001-02	12250	-2625	-17.65	10101
2002-03	10979	-1271	-10.38	10727
2003-04	10292	-687	-6.26	11353
2004-05	9993	-299	-2.91	11980
2005-06	9992	-1	-0.01	12606
2006-07	10690	698	6.99	13232
2007-08	10545	-145	-1.36	13859
2008-09	12998	2453	23.26	14485
2009-10	15635	2637	20.29	15111
2010-11	18193	2558	16.36	15738
2011-12	16352	-1841	-10.12	16364
2012-13	16354	2	0.01	16990
2013-14	12004	-4350	-26.60	17616
2014-15	23213	11209	93.38	18243
2015-16	21322	-1891	-8.15	18869
2016-17	20556	-766	-3.59	19495

Source: District Statistical office, kanyakumari & Coconut Development Board, Cochin

From the above Table.1.3.that the coconut productivity in Kanyakumari district was the highest in 2014-15 and the lowest in 2005-06. The coconut productivity has increased from12250 nuts in 2001- 2002 to 20556 nuts in 2016-17. Where as its growth rate in area of productivity declined from -17.65 percent to -3.59 percent. The trend value increased from 9474 nuts in 2000-2001 to 19495 nuts in 2016-17. Due to poor rainfall and unfavorable climatic conditions.

TABLE NO.1.4

TALUK WISE AREA UNDER COCONUT CULTIVATION IN KANYAKUMARI DISTRICT FROM 2000-01 to 2016-17

Year	**Agasteeswaram**	**Thovalai**	**Kalkulam**	**Vilavancode**
2000-01	7371	1289	8923	4360
2001-02	7460	1313	8924	4361
2002-03	7485	1338	8963	4401
2003-04	7493	1350	8992	4415
2004-05	7874	1746	9367	4949
2005-06	8048	1726	9383	5063
2006-07	8102	1769	9403	5166
2007-08	8302	1819	9566	5177
2008-09	8389	1843	9583	5259
2009-10	8443	1848	9430	5217
2010-11	8559	1889	9195	5273
2011-12	8573	1875	9288	5200
2012-13	8600	1617	9115	5170
2013-14	9050	1672	7911	5284
2014-15	9036	1725	8057	5414
2015-16	9044	1740	7998	5400
2016-17	8777	1719	7890	5512

Source: District Statistical office, kanyakumari & Coconut Development Board, Cochin

It could be seen from the table.1.4 that the area under coconut cultivation in Agasteeswaram was the highest in 2013-14 and the lowest in 2000-2001. The area under coconut cultivation has gone up from 7371 hectares in 2000-2001 to 8777 thousand hectares in 2016-17. The area under coconut cultivation in Thovalai Taluk was the highest in 2013-14 and the lowest in 2001-2002. The area under coconut cultivation has increased from 1289 hectares in 2000-2001 to 1719 thousand hectares in 2016-17. The area under coconut cultivation in Kalkulam Taluk was the highest in 2008-09 and the lowest in 2016-2017. The area under coconut cultivation has gone up from 8923 hectares in 2000-2001 to 7890 thousand hectares in 2016-17. The Area under coconut cultivation in Vilavancode Taluk was the highest in 2015-16 and the lowest in 2000-2001. The area under coconut cultivation has gone up from 4360 hectares in 2000- 2001 to 5512 thousand hectares in 2016-17.

TABLE NO.1.5

TALUK WISE COCONUT PRODUCTION IN KANYAKUMARI DISTRICT FROM 2000-01 to 2016-17

Year	**Agasteeswaram**	**Thovalai**	**Kalkulam**	**Vilavancode**
2000-01	1,096	192	1327	649
2001-02	913	161	1093	535
2002-03	786	129	1020	501
2003-04	761	121	942	464
2004-05	787	174	936	495
2005-06	804	172	938	506
2006-07	881	198	1043	558
2007-08	871	188	1013	550
2008-09	1,057	221	1245	736
2009-10	1,498	235	1398	768
2010-11	1655	239	1379	1260
2011-12	1570	189	901	955
2012-13	1665	198	1146	998
2013-14	1085	200	948	638
2014-15	2126	397	1852	1250
2015-16	1897	378	1350	1531
2016-17	1950	380	1106	1595

Source: District Statistical office, kanyakumari & Coconut Development Board, Cochin

It is observed from Table.1.5 that the coconut production in Agasteeswaram was the highest in 2014-15 and the lowest in 2003-04. The coconut production has gone up from 1,096 lakhs in 2000- 2001 to 1950 lakhs in 2016-17. The coconut production in Thovalai Taluk was the highest in 2016-17 and the lowest in 2003-04. The coconut production has increased from 192 nuts in 2000- 2001 to 380 nuts in 2016-17. The coconut production in Kalkulam Taluk was the highest in 2014-15 and the lowest in 2003-04. The coconut production has gone up from 1327 million hectares in 2000- 2001 to 1106 million hectares in 2016-17. The coconut production in Vilavancode was the highest in 2016-17 and the lowest in 2003-04. The coconut production has gone up from 649 lakhs nuts in 2000- 2001 to 1595 lakhs nuts in 2016-17. The erratic monsoon patterns and unfavorable climatic conditions were the major reasons for such drastic reduction in production during the years.

TABLE NO.1.6

TALUK WISE COCONUT PRODUCTIVITY IN KANYAKUMARI DISTRICT FROM 2000-01 to 2016-17

Year	**Agasteeswaram**	**Thovalai**	**Kalkulam**	**Vilavancode**
2000-01	14869	14895	14872	14855
2001-02	12239	12262	12248	12248
2002-03	10501	9641	11380	11384
2003-04	10156	8963	10476	10510
2004-05	9995	9665	9993	9982
2005-06	9990	9965	9997	9994
2006-07	10447	10242	10600	10363
2007-08	10017	9937	10094	9980
2008-09	10031	9946	10108	9991
2009-10	12669	12251	12922	12955
2010-11	10639	10093	10954	10958
2011-12	9948	9264	10327	10304
2012-13	10030	9585	10098	10049
2013-14	10215	10132	9856	10151
2014-15	10435	10324	8450	10441
2015-16	10637	10383	7980	10691
2016-17	10635	10335	7445	10768

Source: District Statistical office, kanyakumari & Coconut Development Board, Cochin

From the above Table.1.6 that the under coconut productivity in Agasteeswaram was the highest in 2000-01 and the lowest in 2005-06. The coconut productivity has decreased from 14869 nuts in 2000- 2001 to 10635 nuts in 2016-17. The coconut productivity in Thovalai Taluk was the highest in 2000-01 and the lowest in 2005-06. The coconut productivity has declined from 14895 nuts in 2000- 2001 to 10335 nuts in 2016-17. The coconut productivity in Kalkulam Taluk was the highest in 2000-01 and the lowest in 2016-17. The coconut productivity has decreased from 14872 nuts in 2000- 2001 to 7445 nuts in 2016-17. The coconut productivity in vilavancode taluk was the highest in 2000-01 and the lowest in 2004-05. The coconut productivity has decelerated from 14855 nuts in 2000- 2001 to 10768 nuts in 2016-17. Due to poor rainfall and unfavorable climatic conditions productivity during this study period.

TABLE NO.1.7

MINIMUM, MAXIMUM, MEAN, STANDARD DEVIATION CO-EFFICIENT OF VARIATION AND COMPOUND GROWTH RATE OF AREA, PRODUCTION AND PRODUCTIVITY IN COCONUT

Area (in hectares)						
Variables	**Minimum**	**Maximum**	**Mean**	**Standard deviation**	**Co-efficient of variation**	**CGR**
Agasteeswaram	7371	9050	8270.94	575.49	1437.17	1.03
Thovalai	1289	1889	1663.41	207.68	800.91	1.71
Kalkulam	7890	9583	8940.47	596.20	1499.57	-0.72
Vilavancode	4360	5512	5036.52	394.77	1275.80	1.39
Production (in Lakhs nuts)						
Agasteeswaram	761	2126	1258.94	469.31	268.25	3.45
Thovalai	121	397	221.88	83.86	264.56	4.10
Kalkulam	901	1852	1155.11	246.95	467.74	-1.07
Vilavancode	464	1595	822.88	376.00	218.85	5.43
Productivity (nuts per hectares)						
Agasteeswaram	9948	14869	10791.35	1302.17	828.71	1.95
Thovalai	8963	14895	10463.70	1435.62	728.86	2.13
Kalkulam	7445	14872	10458.82	1773.39	589.76	3.99
Vilavancode	9980	14855	10919.05	1313.45	831	1.87

Source: *Calculated by researcher

It is observed from the table that the taluk-wise area in Kanyakumari district under coconut cultivation, the mean and standard deviation for the area under coconut cultivation has found as the 8270.94, 1663.41, 8940.47, 5036.52 and 575.49, 207.68, 596.20, 394.77. The co-efficient of variation for the area under coconut cultivation was found as 1437.17, 800.91, 1499.57 and 1275.80. Regarding the Compound growth rate of area under coconut cultivation in Kanyakumari district were concerned, Thovalai has highest compound growth rate of 1.71 per cent per annum and France and Kalkulam has lowest compound growth rate of -0.72 percent per annum.

The taluk-wise coconut production in Kanyakumari district, the mean and standard deviation for the coconut production has found as the 1258.94 221.88 1155.11 822.88 and 469.31 83.86 246.95 376.00. The co-efficient of variation for the coconut production was found as 268.25, 264.56, 467.74, and 218.85. The Compound growth rate of coconut production in Kanyakumari district was concerned, Vilavancode has highest compound growth rate of 5.43 per cent per annum and France and Kalkulam has lowest compound growth rate of -1.07 percent per annum.

The taluk-wise coconut productivity in Kanyakumari district, the mean and standard deviation for the productivity of coconut has found as the 10791.35, 10463.70, 10458.82, 10919.05 and 1302.17, 1435.62, 1773.39,

1313.45 The co-efficient of variation for the coconut productivity was found as 828.71, 728.86, 589.76 and 831.Compound growth rate of coconut productivity in Kanyakumari district were concerned, Kalkulam has highest compound growth rate of 3.99 per cent per annum and France and Vilavancode has lowest compound growth rate of 1.87 percent per annum.

TABLE NO.1.8

AVERAGE AREA PRODUCTION AND PRODUCTIVITY COCONUT CULTIVATION OF TALUK WISE IN KANYAKUMARI DURING 2000-01 TO 2016-17

AREA UNDER COCONUT CULTIVATION			
Taluk	**Average**	**Percentage**	**Rank**
Agasteeswaram	140606	34.59	2
Thovalai	28278	6.96	4
Kalkulam	151988	37.39	1
Vilvancode	85620	21.06	3
Total	406492	100.00	
COCONUT PRODUCTION			
Taluk	**Average**	**Percentage**	**Rank**
Agasteeswaram	21402	36.40	1
Thovalai	3772	6.41	4
Kalkulam	19637	33.40	2
Vilvancode	13989	23.79	3
Total	58800	100.00	
COCONUT PRODUCTIVITY			
Taluk	**Average**	**Percentage**	**Rank**
Agasteeswaram	183453	25.31	2
Thovalai	177883	24.54	3
Kalkulam	177801	24.53	4
Vilvancode	185625	25.61	1
Total	724762	100.00	

**Source: ***Calculated by Researcher

It is found Table 1.8 that the Kalkulam taluk has ranked first, with an average area of 151988 hectare out of the overall average area of 406492 hectare constituting 37.39 per cent of the overall average area of coconut cultivation. Agasteeswaram taluk has ranked first, with an average production of 21402 lakh coconuts out of the overall average production of 58800 lakh nuts constituting 36.4 per cent of the overall average production of coconut. Vilvancode taluk has ranked first, with an average productivity of 185625 lakh coconuts out of the overall average productivity of 724762 lakh nuts constituting 25.61 per cent of the overall average productivity of coconut.

CONCLUSION

Coconut occupies a place of significance in the Indian economy due to its prominent role as a horticultural crop of food and livelihood security as well as its socio-religious importance. The present study seeks to trend in area, production and Productivity of coconut cultivation in Kanyakumari during 2000-01 to 2016-17. The present study brings to the limelight the tremendous prospects of coconut Production in Kanyakumari district. With extension of area there is a bright future for the coconut Producers. Available infrastructure, trained manpower and wide range of

climatic conditions existing in the study area are indicative of optimistic prospects. Simultaneously these resources have to be effectively utilized for making the coconut production more effective. Therefore it is highly essential to make the entire coconut production highly scientific and modern.

The coconut is also a significant foreign exchange earner and a source of income and employment to millions of people this study has been undertaken. Another aim is, mainly, to help the Government to take up policy decisions and formulate suitable schemes and programmes to ameliorate socio-economic conditions of the coconut cultivators. The present study has brought into focus, various issues relating to area production and productivity of coconut cultivation. The policy implications suggested, if properly implemented, may result in increased revenue for the nation and the people concerned.

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