Two Decades of Expanding Acreage of Coconut in Tamil Nadu, India:An Analysis in Food Security Perspective

Abstract

Coconut is an important horticultural crop which has a significant bearing on the livelihood security of small and marginal farmers across the nation. Trend analysis was done on the expansion of coconut acreage in Tamil Nadu over the past two decades and the simultaneous expansion of other prominent food grains in the state. In Tamil Nadu, the area under coconut registered an expansion of +35.27 % in 2020 compared to that of 2000 and concomitantly the production registered an increase by 68.24 % and productivity by 24.56% during the said period surpassing thedrowning effect of biotic and abiotic stresses. During the past two decades, the area under major food grains *viz.*, paddy registered a negative growth rate of -12.12%, pearl millet -51.16%, finger millet – 31.35 %, sugarcane – 45.71% , sesame – 60.19% and groundnut – 53.22% in the state. Many rice growing districts of the state sacrificed the area under rice to coconut over the past two decades. Expanding acreage of coconut in the state of Tamil Nadu is an obscure drift in food security perspective.

Key words : Acreage, Coconut, Food grains, Production, Rice

Introduction

Agriculture inevitably forms the backbone of Indian economy as nearly 70 – 75 % of the population is dependent directly or indirectly on this noble profession for their livelihood. Coconutis inseparably embedded in the social heritageand cultural identity of the countryand is being eulogized as “Kalpavriksha”or theTree of Heaven. Globally, out of 12.5 million ha of area under coconut, nearly nine million hectares is contributed by three major countries *viz.*, Indonesia, the Philippines and India. In India, coconut is proclaimed as a crop of small and marginal farmers as 98 % of the coconut plantations in India vests with holdings < 1.0 ha (Singh, 2010).

Tamil Nadu is the major coconut producer contributing around 34 percent of the total production in the country (CDB, 2021). Trend analysis of the past two decades reveals that the crop has registered a spectacular expansion in the state in terms of area and production. The

present document is an attempt to answer the question regarding the acreage of coconut over past decades (2000 -20) in Tamil Nadu and its impact onother crops of the state.

Overview of Tamil Nadu

Tamil Naduis geographically located between $8^0$5' & $13^0$35' N latitude and between $76^0$15' & $80^0$20'E longitude. Tamil Nadu enjoys semi-arid to dry sub humid climate which paves way for higher productivity of crops. Tamil Nadu is the 11th largest state of the country with a total geographical area of 130.33 lakh ha and is one of the water starved states with only three percent of the nation's water resources (Anon., 2019). The average annual rainfall of the state is around 947 mm which is less than the average annual rainfall of the nation of 1200 mm.About 47 % of the total rainfallis being received from North-East Monsoon (October – December) followed by 36 % from South –West Monsoon, 14 % from summer showers (March– May) and 3 % from winter rains (January – February). The per capita availability of water is 750 cubic meters per year as compared to the All India average of 2200 cubic meters. Of the total irrigated area, 77 percent is under food crops and 23 percent under non-food crops (Anon., 2020).

Area Trends of Coconutin India and Tamil Nadu

Coconut cultivation in India spreads over 2.15 million ha of which Tamil Nadu shares 20.31 % of the area. The state stands third in coconut area (4.36 lakh ha) next to Kerala (7.60 lakh ha) and Karnataka (6.19 lakh ha). In Tamil Nadu, a steady expansionincoconut areawas witnessed from 2000-01 till 2014-15 and a sharp decline thereafter which is mainly attributed to the worst drought experienced by the state after 140 years,with the rainfall short by62 % of the normalduring 2016, because of the failure of north east monsoon.Of the two decades, the highest areaexpansion was witnessed during 2011-12 in the state which was 0.407 lakh hectares higher than the previous year respectively. During 2018-19, coastal districts of Tamil Nadu wereravaged by Gaja cyclone damaging atleast one crore coconut trees. Comparing 2000-01, national scenario of coconut registered an expansion by +17.98 % during 2018-19 and in the state, the area expansion was phenomenal to the tune of + 35.27 % during the said period **(Table 1, Fig. 1)**.

Table 1. Area ('000 ha) of coconut in India and Tamil Nadu from 2000 to 2019

Year	India ('000 ha)	Annual Growth Rate (%)	Tamil Nadu ('000 ha)	Annual Growth Rate (%)

2000 - 01	1823	-	323	-
2001 - 02	1932	+ 5.98	335.8	+ 3.96
2002 - 03	1921	-0.57	345.9	+ 3.01
2003 - 04	1933.7	+ 0.66	352.7	+ 1.97
2004 - 05	1935	+ 0.07	357.10	+ 1.25
2005 - 06	1946.8	+ 0.61	370.6	+ 3.78
2006 - 07	1936.8	-0.51	374.6	+ 1.08
2007 - 08	1903.2	-1.74	383.37	+ 2.34
2008 - 09	1894.7	-0.45	389.60	+ 1.63
2009 -10	1895.2	+ 0.03	390.0	+ 0.10
2010 -11	1895.9	+ 0.04	390.0	0.00
2011 -12	2070.7	+ 9.22	430.7	+ 10.44
2012 -13	2136.6	+ 3.18	465.11	+ 7.99
2013 -14	2140	+ 0.16	465.11	0.00
2014 -15	1975.8	-7.67	465.11	0.00
2015 -16	2088.4	+ 5.70	459.74	-1.15
2016 -17	2082.11	-0.30	461.06	+ 0.29
2017 -18	2096.7	+ 0.70	441.49	-4.24
2018 -19	2150.9	+ 2.58	436.94	-1.03
% change (2000 - 19)	**+ 17.9**		**+ 35.27**	

(https://tn.data.gov.in/)

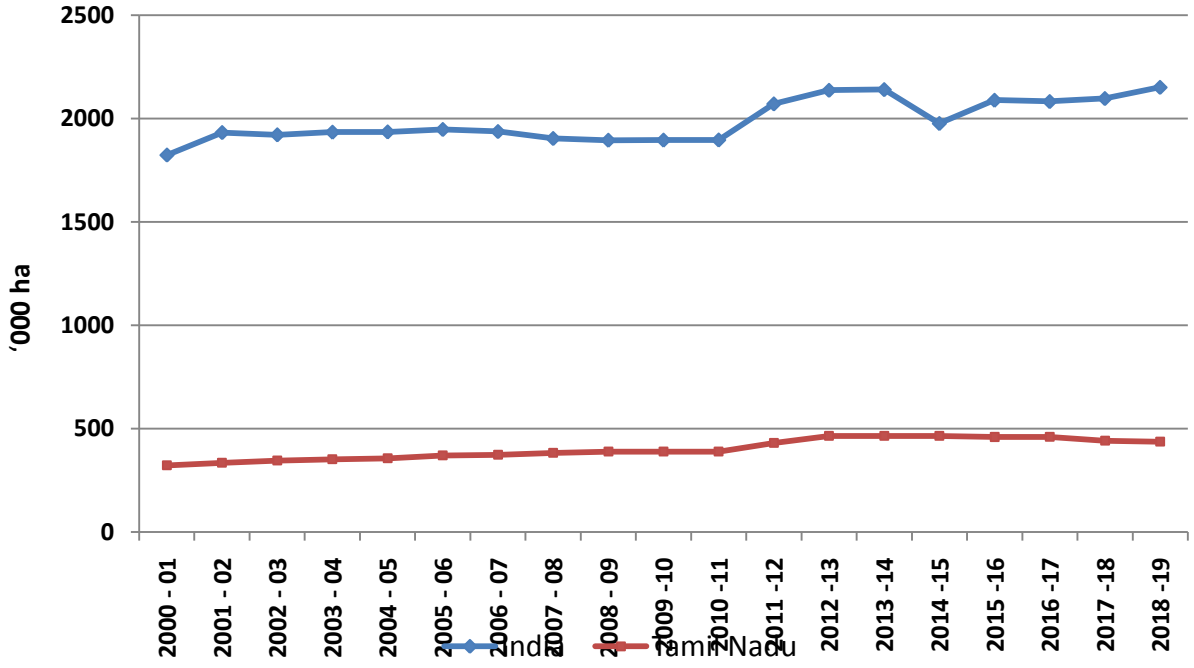

Fig. 1. Area trends of Coconut Cultivation in India and Tamil Nadu (2000 – 2019)

The prominent rice growing districts of the state*viz.*,Thanjavur, Trichy, Villupuram, Namakkal, Nagapattinam and Coimbatore recorded a major shift from rice to coconut production over the past two decades. Comparing the area statistics of 2000-01, excepting Villupuram and Trichy, other rice growing districts registered a magnificent growth in coconut area during 2017-18 and it is highly obvious in the case of Thanjavur and Namakkal districts **(Table 2)**.

Table 2. District wise distribution of coconut area (hectares) in Tamil Nadu

Year	Thanjavur	Coimbatore	Trichy	Namakkal	Villupuram	Nagapattinam
2000-01	24473	91799	5727	2116	2005	3374
2001-02	24833	96072	5845	2122	2124	3548
2002-03	23934	99250	5991	2174	2118	3660
2003-04	24240	99381	5927	3715	1933	3808
2004-05	24893	100160	6231	3841	2254	3847
2005-06	26287	101541	6428	5119	2231	3850
2006-07	28414	104197	6475	5108	1947	4148
2007-08	30305	107106	6374	5434	2026	4241
2008-09	30950	110555	6763	6082	2009	4176

2009-10	32077	79532	6490	6623	1995	4105
2010-11	33271	80712	6397	6654	1948	4041
2011-12	33742	82704	6648	7466	1890	4026
2012-13	34747	83341	6574	7460	1807	3665
2013-14	35237	84531	6487	7793	1780	3854
2014-15	35726	83789	6241	8237	1731	3919
2015-16	37210	85448	6249	8059	1701	3898
2016-17	36136	85832	6070	8269	1723	3833
2017-18	37346	87413	5704	8610	1612	3761

(https://tn.data.gov.in/)

Area and Production Trends of Food Grains in Tamil Nadu

Area and production of rice and total food grains in Tamil Nadu during the period 1950-51 to 2018-19 is furnished in **Table 3**. Area under food grains registered a conspicuousrise from 40.40 lakh hectares in 1950-51 to 51.09 lakh hectares during 1970-71 and with a consolable increase during 2011-12, again the area declined to 26.4 lakh ha during 2012-13 with a gentle and stable increase thereafter and was at 36.90 lakh ha during 2018-19. Theproduction of food grains stepped up from 44.99 lakh tonnes in 1950-51 to 67.06 lakh tonnes in 1970-71 and then to 86.1 lakh tonnes in 2000-01 followed by a decline to 75.94 lakh tonnes during 2010-11. The strong production trend of 2011-12 with a record production of 101.51 lakh tonnes was interrupted due to severe drought conditions caused by a deficit rainfall which was less by 178 mm than the mean annual rainfall of 947 mm of the state, eventually pulling down the gross sown area by 12.7 per cent, gross irrigated area by 15 per cent and cropping intensity by 4.23 %. The food grain production registered a steep increase in the years that followed and again the dent during 2016- 17 was due to the telling effect of the failure of north east monsoon in the state.

Rice is the staple food of Tamil Nadu and the state is one of the prominentrice growing regionsof India. Area under paddy in Tamil Nadu registered a steep increase from 16.86 lakh ha during 1950-51 to 26.35 lakh ha during 1970-71. Again the area declined to 20.80 lakh ha during 2000-01 and to 19.03 lakh ha during 2011-12. During 2012-13, the area again declined to 14.93

lakh ha and there was a gentle hike during 2015-16 followed by an immediate depression during 2016-17and an inconsistent trend in the years that followed(Ramasamy *et al.*, 2015).

Table 3. Area ('000 ha) and production ('000 tonnes) trends of food grains in Tamil Nadu

Year	Rice			Food grains		
	Area (lakh ha)	Production ('000 tonnes)	Productivity (kg ha^{-1})	Area (lakh ha)	Production ('000 tonnes)	Productivity (kg ha^{-1})
1950 -51	16.86	24.58	1457	40.40	44.99	1114
1960 –61	25.17	35.59	1414	51.01	53.02	1039
1970 -71	26.35	50.09	1897	51.09	67.06	1313
1980 -81	22.99	42.79	1861	42.47	56.51	1331
1990 -91	18.55	57.82	3116	38.85	74.95	1929
2000-01	20.80	73.66	3541	35.00	86.16	2461
2005-06	20.50	52.09	2541	33.16	61.16	1844
2009-10	18.45	56.65	3069	30.34	75.05	2474
2010-11	19.05	57.92	3039	31.74	75.94	2393
2011-12	19.04	74.58	3918	32.09	101.51	3164
2012 -13	14.93	40.50	2712	26.47	56.05	2117
2013 -14	17.25	53.50	3470	34.75	110.03	3166
2014-15	17.95	57.28	3572	36.06	127.95	3548
2015-16	20.00	75.17	4206	37.55	113.85	3031
2016-17	14.43	35.54	2463	29.46	56.70	1925
2017-18	18.28	66.38	3630	35.38	107.3	1627
2018-19	18.50	61.32	3314	36.90	103.9	2816

(Ramasamy *et al.*, 2015)

Of the thirty-two rice growing districts of Tamil Nadu, only three districts registered a positive growth in area during 2012-13 compared to 1985-86. Majority of the paddy growing districts of Tamil Nadu registered a declinein area during the period 2000 – 2013 **(Table 4).** Comparing tables 2 and 4, it is evident that sacrifice in rice area during various periods is well utilized for the cultivation of coconut in the prominent rice growing districts of the

state.Comparing the area statistics of food and non-food crops of the stateduring 2000-01 with that of 2017-18**(Table 5)**, it is apparent that almost all the food crops registered a negative trend during the said period except for sorghum, maize and'other millets' and in non-food crops category, except cotton, sunflower and coconut (+34.98 % growth), others registered a negative growth rate during the period.

Table 4. Districtwise fluctuations in Annual Crop Growth Rate in area of rice in TamilNadu(1985 to 2013)

Name of the District	Area (%)				Production (%)			
	1985-86 to 1989 -90	1990-91 to 1999 -2000	2000-01 to 2009-10	2010-11 to 2012-13	1985-86 to 1989 -90	1990-91 to 1999 -2000	2000-01 to 2009-10	2010-11 to 2012-13
Kancheepuram	-7.23	-4.60	-3.71	-6.69	-3.84	-4.23	-2.69	-3.06
Thiruvallur	-	0.90	-1.39	-2.00	-	7.72	-2.48	6.29
Cuddalore	-6.85	-4.48	-0.25	-1.12	-4.17	-3.24	-2.59	4.01
Villupuram	-	3.07	-0.33	-8.30	-	3.56	-0.87	-8.17
Vellore	-30.14	3.73	-2.71	-6.17	-25.73	7.97	-4.33	-
Thiruvannamalai	-	6.21	-2.55	-9.90	-	6.30	2.77	-3.09
Salem	10.72	4.47	-6.14	-27.04	15.74	7.04	-6.17	-28.98
Namakkal	-	-2.71	-6.73	-26.66	-	3.54	-6.87	-27.88
Dharmapuri	2.73	6.25	-9.63	-19.33	5.61	7.63	-8.36	-16.80
Krishnagiri	-	-	5.27	2.81	-	-	6.21	0.98
Coimbatore	3.69	-0.16	-14.88	-6.83	-1.12	1.01	-14.97	-8.80
Tiruppur	-	-	3.98	-72.51	-	-	-	-76.58
Erode	19.92	-0.63	-4.12	-43.53	21.70	0.03	-4.98	-42.66
Trichy	1.20	-1.35	-2.30	-12.34	8.85	1.71	-1.72	-19.84
Karur	-	5.91	-1.77	5.77	-	9.50	-2.33	-13.89
Perambalur	-	2.47	-14.00	-8.52	-	6.27	-13.21	-6.95
Ariyalur	-	-	2.82	-33.85	-	-	-	-4.24
Pudukottai	-4.16	3.77	0.05	-3.46	-3.88	7.50	-5.25	4.79
Thanjavur	-2.33	-8.50	-1.62	-4.02	6.68	-7.35	-5.07	-3.30
Thiruvarur	-	1.30	-0.47	-0.28	-	19.73	-3.09	-12.27
Nagapattinam	-	-7.53	-0.58	-3.05	-	-7.58	-2.34	-14.41
Madurai	6.34	-3.63	-4.03	-33.42	13.00	-1.14	-4.57	-37.01
Theni	-	-0.73	-1.68	-12.40	-	4.84	-0.39	-13.66
Dindigul	5.54	2.59	-3.15	-19.77	14.89	5.44	-3.08	-32.03
Ramanathapuram	0.70	-1.51	0.75	-3.93	10.39	-10.67	-0.09	-35.37
Viridhunagar	5.32	-1.21	0.23	32.20	13.82	0.60	-1.21	11.30

Sivaganga	2.29	-0.14	-0.82	-33.96	25.42	-18.3	-4.48	-57.37
Tirunelveli	-8.66	-1.60	1.21	-18.52	-7.30	-0.19	0.49	-1.02
Tuticorin	8.91	-4.80	2.27	-32.21	13.72	-5.28	3.59	-35.16
The Nilgiris	-7.82	-3.52	-12.94	-9.93	0.44	1.48	-14.31	-10.38
Kanyakumari	-0.32	-2.66	-4.90	-9.66	5.33	4.58	-5.55	-6.40
Tamil Nadu	**-2.81**	**1.55**	**-1.19**	**-7.81**	**2.46**	**2.68**	**-2.59**	**-11.24**

(https://tn.data.gov.in)

Table 5. Area (lakh ha) under food and non-food crops in Tamil Nadu during 2000-18

	2000 – 01	**2009 – 10**	**2017-18**	**Growth Rate (2000 – 18)**
	(lakh ha)			**(%)**
Food Crops				
Paddy	20.80	18.45	18.28	-12.12
Sorghum	3.31	2.39	3.85	+16.31
Maize	0.814	2.30	3.24	+298.03
Pearl millet	1.29	0.544	0.630	-51.16
Finger millet	1.26	0.82	0.865	-31.35
Other millets	1.45	2.77	1.87	+28.97
Pulses	6.87	5.35	8.24	+19.94
Sugarcane	3.15	2.93	1.71	-45.71
Total food crops	45.3	40.9	35.38	-21.90
Non Food Crops				
Cotton	1.69	1.04	1.81	+ 7.10
Groundnut	6.99	4.13	3.27	-53.22
Sesame	1.03	0.62	0.41	-60.19
Coconut	3.23	4.00	4.36	+34.98
Sunflower	0.061	0.170	0.067	+ 9.84
Tobacco	0.0827	0.0705	0.0179	-78.36
Total non food crops	18.02	14.7	13.55	-24.81

(Salient Statistics on Agriculture. 2019)

Production scenario of coconut

In the national front, Tamil Nadu stands second in production with 5370 million nuts next to Kerala (7683 million nuts). Slide in coconut production during 2014-15**(Table 6)** is mainly attributed to climatic shift, water stress and erratic rainfall experienced by state with the water reservoirs short by 82 % of normal levels in Tamil Nadu. During 2018-19, the slide in production is due to abiotic stress *viz.*, drought and heat stress along with pest incidence mainly due to Rugose Spiraling Whitefly.

Table 6. Production (million nuts) of coconut in India and Tamil Nadu from 2000 to 2019

Year	India	Annual Growth Rate (%)	Tamil Nadu	Annual Growth Rate(%)
2000 - 01	12678	-	3192	-
2001 - 02	12963	+ 2.25	3293.6	+ 3.18
2002 - 03	12535	-3.30	2860.7	-13.14
2003 - 04	12178.2	-2.85	2560.5	-10.49
2004 - 05	12832	+ 5.37	3243.5	+ 26.67
2005 - 06	14811	+ 15.42	4867.1	+ 50.06
2006 - 07	15840	+ 6.95	5429.9	+ 11.56
2007 - 08	14743.5	-6.92	4968.2	-8.50
2008 - 09	15729.7	+ 6.69	5365.0	+ 7.99
2009 -10	16918	+ 7.55	5770.6	+ 7.56
2010 -11	16942.9	+ 0.15	5770.6	0.00
2011 -12	23351.2	+ 37.82	7057.8	+ 22.31
2012 -13	22680	-2.87	6917.2	-1.99
2013 -14	21665	-4.48	6917.2	0.00
2014 -15	20439.6	-5.66	6917.4	0.00
2015 -16	22167.5	+ 8.45	6171.1	-10.79
2016 -17	23904.1	+ 7.83	6570.6	+ 6.47
2017 -18	23798.2	-0.44	6020.4	-8.37
2018 -19	21288.24	-10.55	5370.4	-10.80
% change (2000 - 19)	**67.9 %**		**68.24 %**	

(Salient Statistics on Agriculture. 2019)

Productivity Trends of Coconut

The productivity of coconut registered a steep increase from 2000 - 01 to 2011-12 and thereafter a conspicuous plunge was witnessed both at national and state levels, the causes mainly attributed to cyclonic storms, water stress, incidence of debilitating pests like Rugose Spiraling Whitefly and dreadful diseases like Root(wilt) in the major coconut regions across the nation **(Table 7).**Although the national average of coconut productivity is 9897 nuts per ha, the

position of the state is thirdwith a productivity of 12291 nuts per ha, which is 24.18 % higher than the national productivity.

Table 7. Productivity (nuts per ha) of coconut in India and Tamil Nadu from 2000 to 2019

Year	India (nut per ha)	Annual Growth Rate (%)	Tamil Nadu (nuts per ha)	Annual Growth Rate (%)
2000 - 01	6951	-	9867	-
2001 - 02	6709	-3.48	9808	-0.60
2002 - 03	6523	-2.77	8270	-15.68
2003 - 04	6298	-3.45	7260	-12.21
2004 - 05	6632	+ 5.30	9083	+ 25.11
2005 - 06	7608	+ 14.72	13133	+ 44.59
2006 - 07	8179	+ 7.51	14995	+ 14.18
2007 - 08	7747	-5.28	12959	-13.58
2008 - 09	8303	+ 7.18	13771	+ 6.27
2009 -10	8927	+ 7.52	14796	+ 7.44
2010 -11	8937	+ 0.11	14796	0.00
2011 -12	11277	26.18	16387	+ 10.75
2012 -13	10615	-5.87	14872	-9.25
2013 -14	10122	-4.64	14872	0.00
2014 -15	10345	+ 2.20	14873	0.01
2015 -16	10614	+ 2.60	13423	-9.75
2016 -17	11481	+ 8.17	14257	+ 6.21
2017 -18	11350	-1.14	13637	-4.35
2018 -19	9897	-12.80	12291	-9.87
% change (2000 - 19)	**+42.38**		**+ 24.56**	

Stimulating Farm gate price of coconut

Farm gate price of coconut registered a magnificent increase from 2003 and reached an all time high of Rs. 20.79 per nut during 2018in the state of Tamil Nadu which can be attributed to the depression in production of coconut during 2018. During 2019, farm gate price of coconut plummeted compared to the previous years due to glut in coconut oil in the world market owing to its low demand**(Fig. 2.)**.

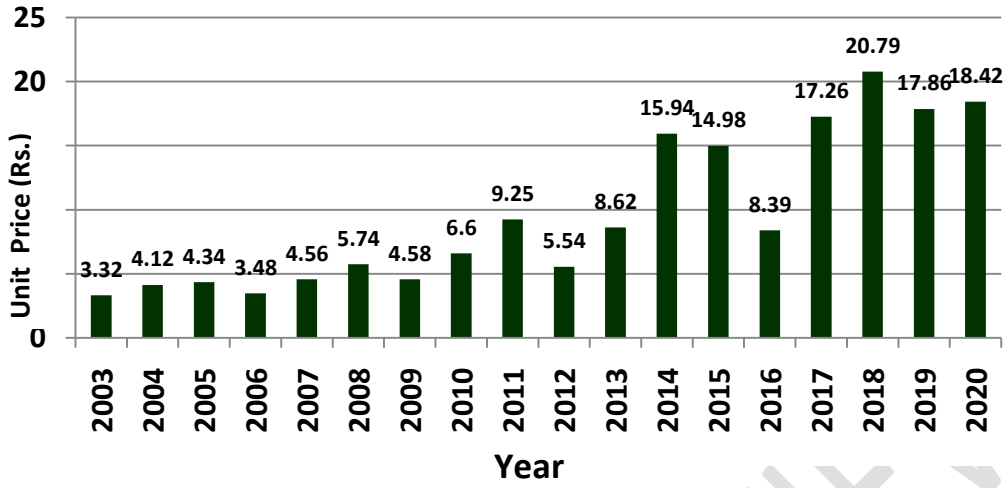

Fig.2. Farm gate price of coconut (2003 – 2020)

Conclusion

Coconut is one of the traditional palms of Tamil Nadu and is in a comfortable position and in profitable preposition in the state with minimal threats. Affluent water facilities, acute labour scarcity, scope for mechanization for operations from irrigation to harvest, favourableagroclimate and complacent returns compared to other field crops are the key players behind expanding area of coconut in the state. Animal husbandry is an inevitable component of agriculture and coconut culture provides ample scope for integration of animal components and many compatible intercrops, escalating the returns of the small and marginal farmers. Trend analysis over the past two decades (2000 – 2019) reveals that there is exploding expansion in the acreage of maize in the state (+ 298.03 %) followed by coconut (+ 34.98 %) and pulses (+ 19.94 %). Negative growth rate was registered in crops *viz.*, rice (-12.12 %), sugarcane (- 45.71 %), groundnut (-53.22 %) and sesame (- 60.19 %) over the past two decades. Although coconut presents a wide array of opportunities interms of product diversification, export market, constant money flow etc., to the resource poor farmers, trend analysis of two decades of area statistics reveals that this crop has engulfed considerable acreage under crops like paddy, groundnut, gingellyand sugarcane and thus it sounds more an obscure drift and less a perceptible shift.

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