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Trends in Area, Production, Yield and Export-Import of Cashew in India- An Economic Analysis

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Cashew is known as ‘maintenance free’ crop and the recommended package of practices are not followed and this leads to low yield. The study is based on secondary data and analyzed by using standard statistical tools like arithmetic mean and coefficient of variation, compound growth rates and graphical representations to draw the overview of trends in area, production and productivity of cashew in India. Both area and production of cashew has been increasing and finally productivity in the country. Area under cashew nuts in India has increased from 464 thousand hectares in 1980-81 to 1062 thousand hectares during 2017-18 (CAGR of 2.33%); production has increased from 185 thousand metric tonnes in 1980-81 to 817 thousand tonnes in 2017-18 (CAGR of 3.97%) and productivity has increased from 399 kg per hectare during 1980-81 to 769 kg per hectare in 2017-18 (CAGR of 1.60%). India’s cashew kernels export decreased from 1,18,540 metric tonnes in 2006-07 to 82,302 metric tonnes in 2016-17. Nearly one third of the total national cashew production is from Maharashtra only (32.93%) and productivity is also highest in Maharashtra state (1378 kg/ha). Growth in both area and production is highest in Maharashtra state indicating immense scope to increase area and production in the state.

Introduction

The cashew tree (*Anacardium occidentale* L.), native of Brazil, was introduced to Mozambique and then to India in the sixteenth century by the Portuguese as a means of controlling coastal erosion. It was spread within these countries with the aid of elephants that ate the bright cashew fruit along with the attached nut. The nut was too hard to digest and was later expelled with the droppings. It was not until the nineteenth

century that plantations were developed and the tree then spread to a number of other countries in Africa, Asia and Latin America (Hareesh, 2009). The Portuguese traders thus introduced the cashew tree into India and Africa to prevent soil erosion. Cashew is now widely cultivated for its kernel, fruit, cashew nut shell liquid and other products. However, it is mostly found in the coastal regions of South Africa, Madagascar, Tanzania, and South Asia, from Sri Lanka to the Philippines.

India is the largest producer, processor, consumer and exporter of cashew in the world (Elakkiya *et al.*, 2017). The current Cashewnut production in India accounts for 45 per cent of the global production. India being the leader in the world in raw Cashew nut production and is also the largest supplier of cashew kernels to the major world markets. It is grown in Kerala, Karnataka, Goa, and Maharashtra along the West coast and Tamil Nadu, Andhra Pradesh, Odissa and West Bengal along the East-coast, occupies an area of 10.30 lakh hectares in the country with a production of 9.98 lakh metric tonnes. Even though strong competition from other countries has reduced India's share in the global cashew exports, India's advantage in terms of less percentage of broken kernels has brought European and US buyers to its proximity. To strengthen cashew exports, there is scope for increasing production by developing cashew as plantation crop on commercial basis, exploring new markets and strengthening non-traditional markets, adding value to the product by introducing innovations in processing and branding them. Among the major states in the country, Maharashtra tops with respect to area, production and productivity of cashew nut.

Keeping in view the importance of cashew in the Indian economy in general and its major growing states in particular, the present study made an attempt to analyze the trends in area, production, yield and export and import of cashew in India.

Materials and Methods

Nature and sources of data

The study is based on secondary data collected from different sources for achieving the objectives of the study. Secondary data was collected from various sources like websites, Directorate of Cashewnut and Cocoa

Development, Cochin, www.indiastat.com etc.

Analytical tools

For the purpose of evaluating the objectives of the study, based on the nature and extent of data availability, the following analytical tools will be used for analyzing the data to draw meaningful results and conclusions. State-wise area, production, yield prices and export-import of Cashewnut in India has been collected and analyzed by using standard statistical tools like arithmetic mean and coefficient of variation, compound growth rates and graphical representations to know the trends in area, production and productivity of cashew in India.

Compound annual growth rate analysis

To study the annual growth rate in quantity and value of export of coir products, the compound growth rate was computed using semi-log or exponential model (Kulkarni *et al.* 2012).

$$\ln Y_t = \alpha + \beta t + u_t$$

Where,

Y_t = Quantity (tonnes) of coir products exported in year t .

t = Time element which takes the value 1, 2 n for various years.

α = Intercept

β = Regression co-efficient

Compound Annual Growth Rate (CAGR) = $[(\text{Antilog } \beta_t) - 1] \times 100$

Co-efficient of variation (CV)

It explains the fluctuations over the period as follows:

$$CV = \frac{\sigma}{\bar{X}} * 100$$

CV= Co-efficient of variation

σ = Standard deviation

\bar{X} = Mean

Results and Discussion

The findings of the present study as well as appropriate discussion have been summarized under following heads:

Trends in area, production and yield of raw Cashewnut in India (1980-81 to 2017-18)

In India, cashew cultivation is largely found in Kerala, Karnataka, Goa and Maharashtra along the west coast and Tamil Nadu, Andhra Pradesh, Orissa and West Bengal along the east coast. Area under cashew nuts in India has increased by more than two folds gradually from 464 thousand hectares in 1980-81 to 1062 thousand hectares during 2017-18 (Table 1). Total cashew production has increased by more than four folds from 185 thousand metric tonnes in 1980-81 to 817 thousand tonnes in 2017-18. With respect to productivity, during 1980-81 it was very low at 399 kg per hectare and shown an upward trend *i.e.*, yield increased to 769 kg per hectare which is less than two folds. We can see a gradual increase in area under cashew with less fluctuation but trends in production and yield are more fluctuating over the years. More sharp fluctuation is observed in the period between from 1987-88 to 1992-93. Pattern of yield follows the pattern of production in most of the years (Fig. 1).

The compound annual growth rate (CAGR) for area under Cashewnut (Table 1) has found to be 2.33 per cent per year which is significant at one per cent probability level. The growth in production was found to be 3.97 per cent per year (significant at one per cent) which is

more than the growth in area under cashew. While the growth in yield of cashew was found to be 1.60 per cent per year which is lower than growth in both area and production. Major reasons attributing to low productivity in the country are:

- Use of low yielding local varieties
- Planting of cashew in marginal and poor fertile land
- Non-adoption of recommended package of practices
- Pest infestation (tea mosquito bug and cashew stem and root borer) leading to yield reduction up to 30 to 40 percent (Kulkarni *et al.*, 2012).

With respect to fluctuations in area under cashew measured in terms of co-efficient of variation (CV) is found to be 26.27 per cent per year. These variations in area under cashew might be due to endemic disease and pest outbreak and also price level. While variations in production was found to be 40.64 per cent per year and that of for yield was 24 per cent per year. Fluctuations are more in production might be due to pest and disease outbreak, floods, landslides and also fluctuations in price level of cashew.

State-wise area, production and yield of cashew during 2016-17

State-wise share in area, production and yield of cashew during 2016-17 are presented in Table 2. It is observed that in India cashew plantation area was 1040.89 thousand hectares of which Maharashtra had more area with 186.20 thousand hectares (17.89 % of the total area) followed by Andhra Pradesh with 185.57 thousand hectares (17.83 % of the total area), Odisha with 183.32 thousand hectares (17.61 % of the total area), Tamil Nadu (13.60 % of the total area), Karnataka (12.28 % of the total

area) and so on. With respect to production, in India total production was found to be 779.34 thousand metric tonnes of Maharashtra alone produced 256.61 thousand metric tonnes (32.93 % of the total production) followed by Andhra Pradesh with 111.39 thousand metric tonnes (14.29 % of the total production) and Odisha with 93.9 thousand metric tonnes (12.05 % of the total production) and so on. With respect to productivity, average yield of cashew in India was found to be 762 kg per hectare. Maharashtra stands in first position with productivity of 1378 kg per hectare which is almost double the national average yield. This might be due to availability suitable climatic conditions, soil type, land topography and adoption of improved cultivation practices.

State-wise price trends of raw cashew (1990-91 to 2017-18)

State-wise price trends of raw cashew from 1990-91 to 2017-18 are presented in Table 3. It is observed from table that during 1990-91 average price of raw cashew was found to be highest in Goa state (Rs. 17/kg.) followed by Karnataka (Rs. 15/kg.), average of prices in all the states was found to be Rs. 14/kg. We can see an increasing trend in prices over the years in all the states. Growth in prices was found to be highest in Karnataka state (6.61% per year) followed by Kerala (6.22% per year) while growth at average prices in all these states was 6.16 per cent per annum. Growth rates in all the states are significant at one per cent. Fluctuations in price in terms of co-efficient of variation (CV) is found to be highest in Karnataka state (72.31%) followed by Kerala (65.60%) while CV in average price is 62.13 per cent (Fig. 2).

We can observe from the figure 3 that increase in prices in all states was almost gradual up to 2010-11 thereafter; there is a sharp increase in prices in all the states. This might be due to

sudden increase in demand for cashew nuts on account of nutritional consciousness of the consumers.

Export and import performance of cashew

India has been exporting cashew kernel from long back to various countries like US, UAE, Netherlands, Japan, etc. and importing raw cashew nuts for processing from abroad. Cashew nut shell liquid (CNSL) is a by-product which is obtained in processing of raw cashew and India is exporting this also.

During 2006-07 India has exported 1,18,540 metric tonnes of cashew kernels with a value of Rs. 2,455.15 crore (Table 4). There is a decreasing trend in quantity of cashew kernel exported and has come down to 82,302 metric tonnes with a value of Rs. 5,168.78 crore during 2016-17 even though there is an increasing production over the years. It might be due to the reason that now a day health consciousness of the people has been improving on account of this there might be increase in demand for cashew kernel in domestic markets. The rate of decline in export is found to be 2.13 per cent (-2.13%) per annum which is significant at five per cent and co-efficient of variation was found to be 12.20 per cent.

With respect to import of raw cashew, during 2006-07 India has imported 5,92,604 metric tonnes with a value of Rs. 1811.62 crore (Table 4). In contrast to export there is an increasing trend in quantity imported over the years. During 2016-17 quantity of raw cashew imported has rose to 7,70,446 metric tonnes with a value of Rs. 8,839.42 crore. The reason for this might be due to increasing processing capacity in India on account of increase in number of processing units. The rate of increase in import was found to 4.67 per cent per annum. Per annum variation in quantity imported was 19.78 per cent.

During 2006-07, India has exported 6139 metric tonnes of cashew nut shell liquid (CNSL) with a value of Rs. 10.29 crores (Table 4). Over the years, quantity of export of CNSL has increased up to 2011-12 and decreased during 2012-13 and 2013-14 and again increased thereafter and during 2016-17 quantity of CNSL exported was 11,422 metric tonne worth Rs. 44 crores.

Trends in state-wise area under raw Cashewnut from 1993-94 to 2016-17

It is seen from the Figure 4 that Kerala had more area under cashew during 1993-94 compared to other states. All states showed a positive growth in area over the years except

Kerala where a negative growth is seen up to 2007-08 thereafter a slight positive trend has seen. The reason for this are felling of cashew trees, conversion of cashew area into rubber plantations, rising in prices and conversion cashew into turmeric in small patches (Senthil and Mahesh, 2013). In Goa and West Bengal only a slight increase in area (more or less same area) over the years is seen. In Karnataka and Tamil Nadu gradual increase has seen over the years. In Andhra Pradesh, Maharashtra and Orissa there seen a more rapid increase in area compared to other states. During 2016-17 area under cashew in Andhra Pradesh, Maharashtra and Orissa almost become same.

Table.1 Trends in area, production and yield of cashew in India (1980-81 to 2017-18)

Year	Area ('000' ha)	Production ('000' MT)	Yield (kg/ha)	Year	Area ('000' ha)	Production ('000' MT)	Yield (kg/ha)
1980-81	464	185	399	2000-01	720	450	625
1981-82	481	196	407	2001-02	770	472	613
1982-83	492	201	409	2002-03	770	506	657
1983-84	504	191	379	2003-04	780	535	686
1984-85	510	221	433	2004-05	820	544	663
1985-86	722	234	324	2005-06	837	573	685
1986-87	523	246	470	2006-07	854	620	726
1987-88	527	260	493	2007-08	868	665	766
1988-89	529	274	518	2008-09	893	695	778
1989-90	541	530	980	2009-10	923	613	664
1990-91	532	295	555	2010-11	945	653	691
1991-92	534	534	1000	2011-12	979	725	741
1992-93	560	349	623	2012-13	991	752	759
1993-94	565	348	616	2013-14	1011	753	745
1994-95	577	322	558	2014-15	1030	745	723
1995-96	635	418	658	2015-16	1037	671	647
1996-97	659	430	653	2016-17	1041	779	762
1997-98	701	360	514	2017-18	1062	817	769
1998-99	706	460	652	CAGR (%)	2.33**	3.97**	1.60**
1999-00	686	520	758	CV (%)	26.27	40.64	23.99

Table.2 State-wise area, production and yield of cashew in India (2016-17)

State	Area (000ha)	% Share	Production (000MT)	% Share	Yield (kg/ha)
Kerala	90.87	8.73	83.98	10.78	962
Karnataka	127.86	12.28	85.15	10.93	672
Goa	58.18	5.59	32.66	4.19	561
Maharashtra	186.20	17.89	256.61	32.93	1378
Tamil Nadu	141.58	13.60	67.65	8.68	478
Andhra Pradesh	185.57	17.83	111.39	14.29	600
Odisha	183.32	17.61	93.9	12.05	513
West Bengal	11.36	1.09	12.96	1.66	1140
Jharkhand	14.83	1.42	5.83	0.75	393
Chhattisgarh	13.70	1.32	9.33	1.20	681
Gujarat	7.22	0.69	6.5	0.83	900
Pondichery	5	0.48	2.16	0.28	432
Tripura	4.25	0.41	3.45	0.44	812
Others	10.95	1.05	7.77	1.00	710
Total (India)	1040.89	100	779.34	100	762

Table.4 Export and import of Cashew (2006-07 to 2016-17)

Year	Cashew Kernel Export		Cashew Nut Shell Liquid Export		Rawnut Import	
	Quantity	Value	Quantity	Value	Quantity	Value
2006-07	1,18,540	2455.15	6,139	10.29	5,92,604	1811.62
2007-08	1,14,340	2289.02	7,813	11.98	6,05,970	1746.80
2008-09	1,09,522	2988.40	9,099	26.06	6,05,850	2632.41
2009-10	1,17,991	2801.60	11,227	27.62	7,55,959	3047.50
2010-11	1,05,755	2819.39	12,051	33.77	5,29,370	2649.56
2011-12	1,31,760	4390.68	13,575	59.46	8,09,371	5337.76
2012-13	1,00,105	4067.21	9,192	29.84	8,92,160	5331.12
2013-14	1,14,791	5058.73	9,480	30.61	7,71,356	4563.99
2014-15	1,18,952	5432.85	10,938	55.81	9,39,912	6570.93
2015-16	96,346	4952.12	11,677	57.59	9,58,339	8561.01
2016-17	82,302	5168.78	11,422	44.00	7,70,446	8839.42
CAGR (%)	-2.1327*		4.32*		4.67**	
CV (%)	12.20		20.72		19.78	

Table.3 State-wise price trends of raw cashew (1990-91 to 2017-18)

Year	Kerala	Karnataka	Andhra Pradesh	Tamil Nadu	Goa	Average price
1990-91	12	15	13	13	17	14
1991-92	15	20	18	21	23	19
1992-93	22	26	21	24	29	24
1993-94	21	20	20	20	24	21
1994-95	21	22	23	23	30	24
1995-96	25	26	26	28	32	27
1996-97	29	29	29	29	30	29
1997-98	26	22	30	24	33	27
1998-99	31	25	30	24	33	29
1999-00	42	28	34	25	47	35
2000-01	42	27	35	35	36	35
2001-02	27	28	28	29	34	29
2002-03	25	28	35	35	34	31
2003-04	30	32	28	35	36	32
2004-05	29	30	29	36	35	32
2005-06	38	35	38	48	45	41
2006-07	31	31	29	37	38	33
2007-08	30	31	29	36	38	33
2008-09	34	34	30	37	47	36
2009-10	42	42	41	43	47	43
2010-11	40	52	52	53	55	50
2011-12	71	71	70	71	83	73
2012-13	60	61	59	61	77	63
2013-14	52	53	53	56	73	57
2014-15	61	78	74	64	87	73
2015-16	90	115	75	72	122	95
2016-17	100	113	100	81	130	105
2017-18	133	137	114	102	142	126
CAGR (%)	6.22**	6.61**	5.95**	5.78**	5.78**	6.16**
CV (%)	65.60	72.31	60.07	51.51	63.92	62.13

Figure.1 Trends in area, production and yield of cashew (1980-81 to 2017-18)

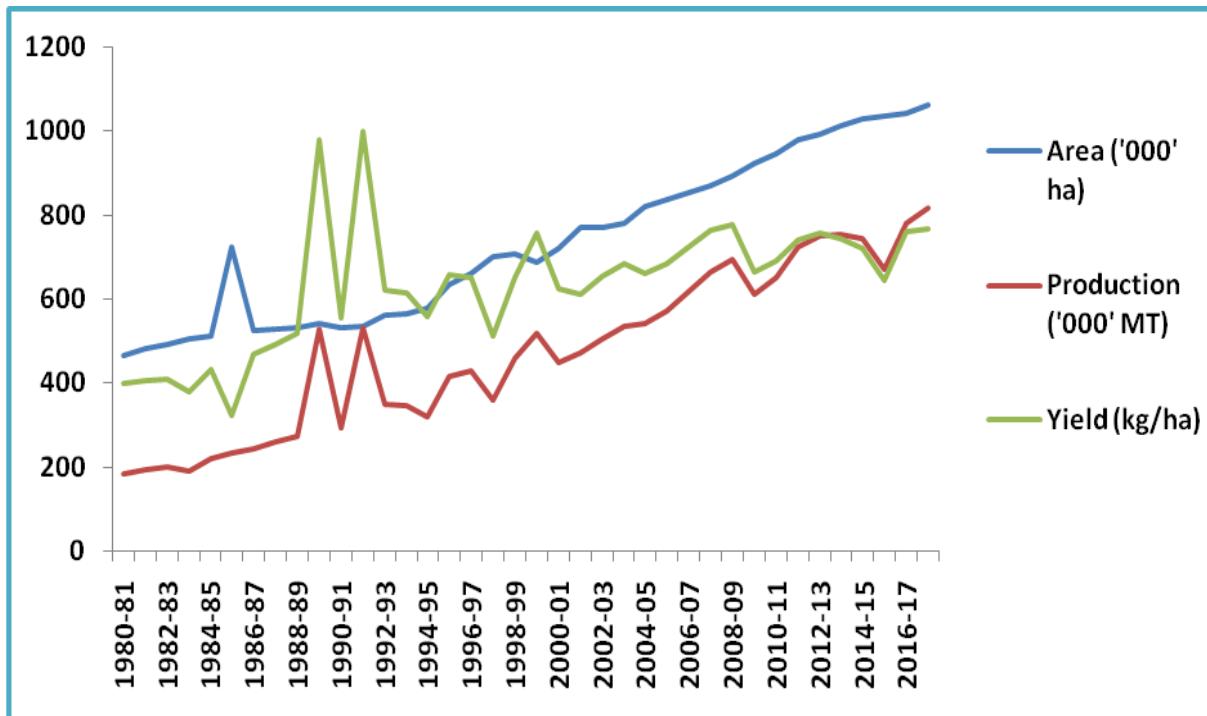


Figure.2 Comparison of cashew yield levels in different states

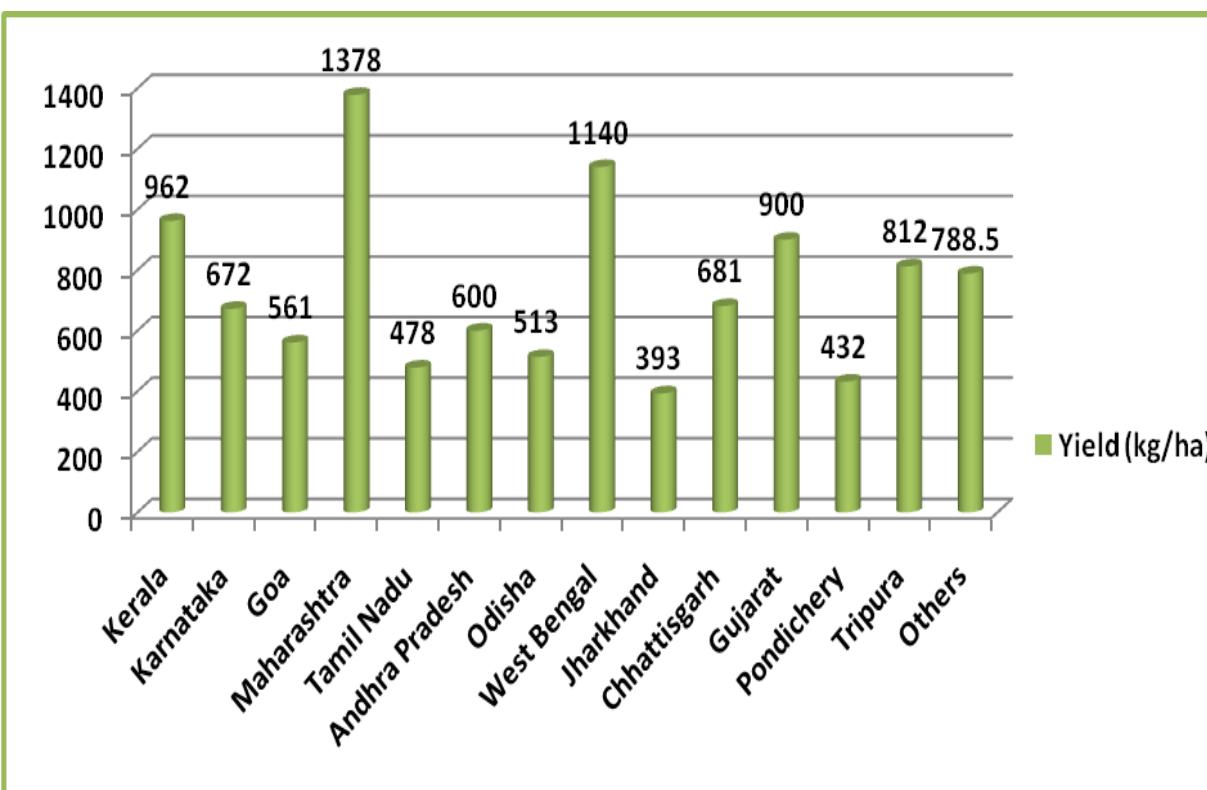


Figure.3 Trends in prices of raw cashew from 1990-91 to 2017-18

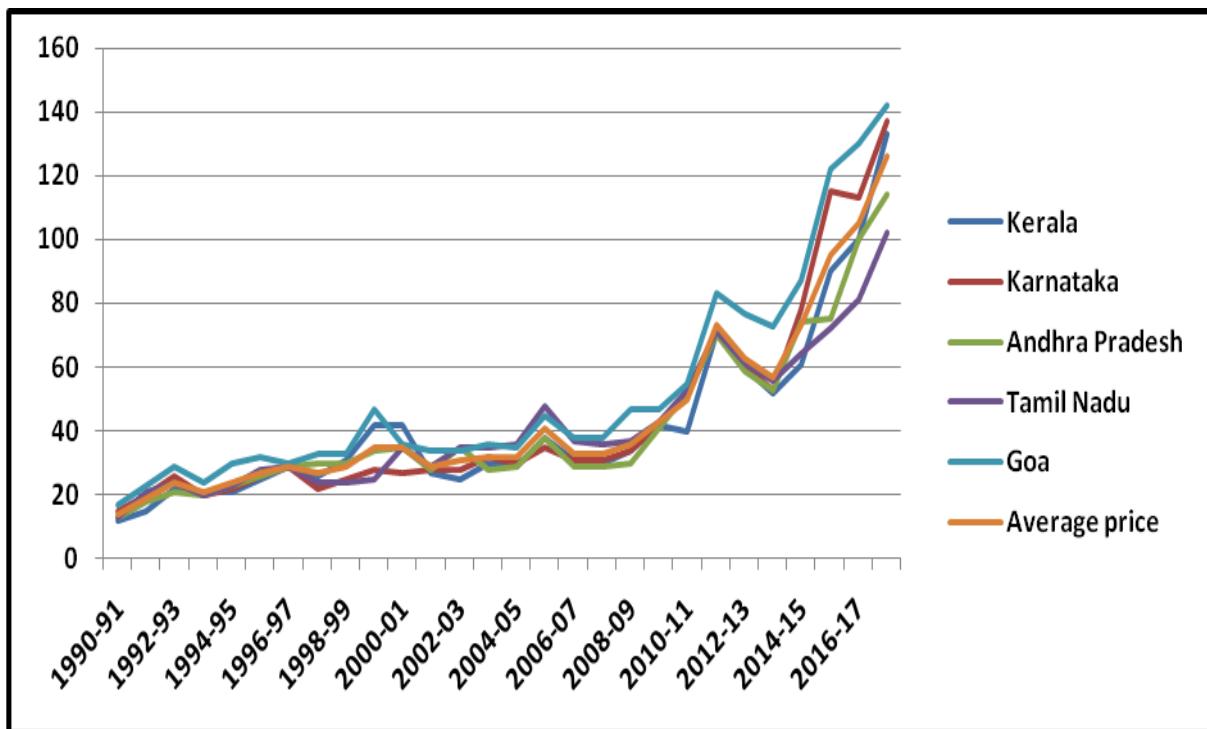


Figure.4 Trends in state-wise area under raw Cashewnut from 1993-94 to 2016-17

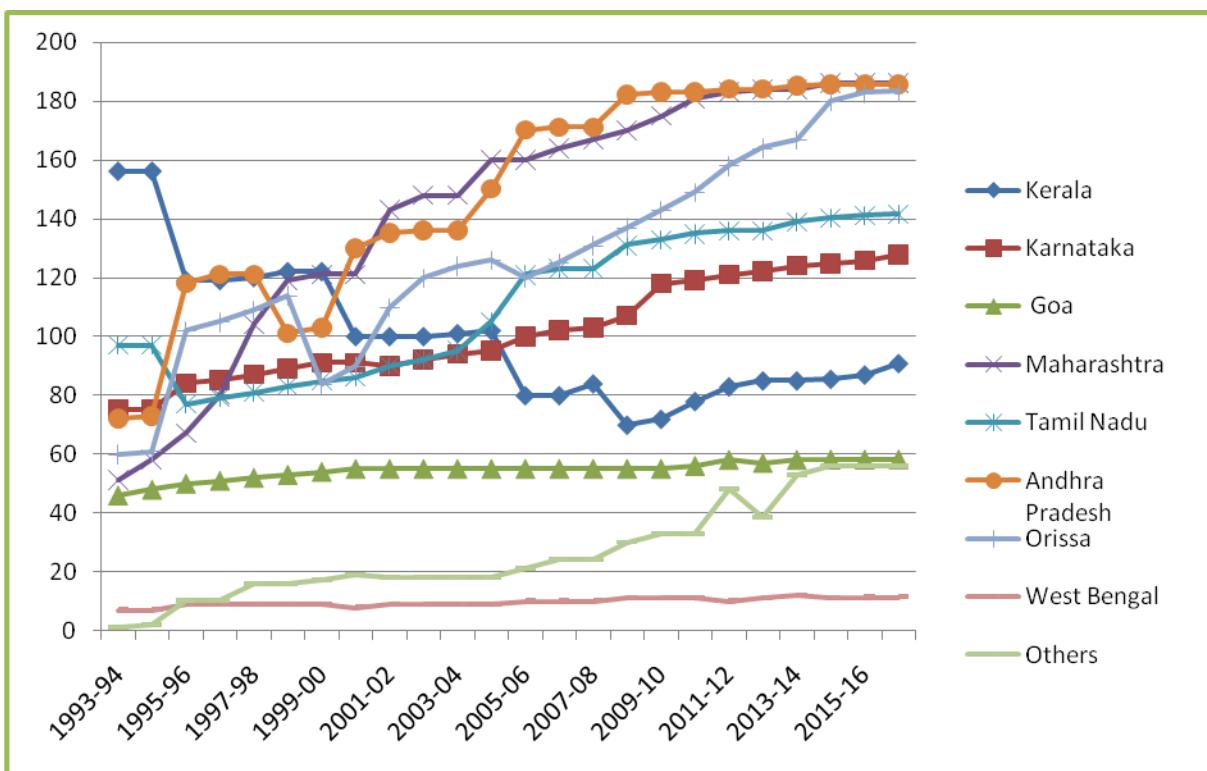


Figure.5 Trends in state-wise production of raw Cashewnut from 1993-94 to 2016-17

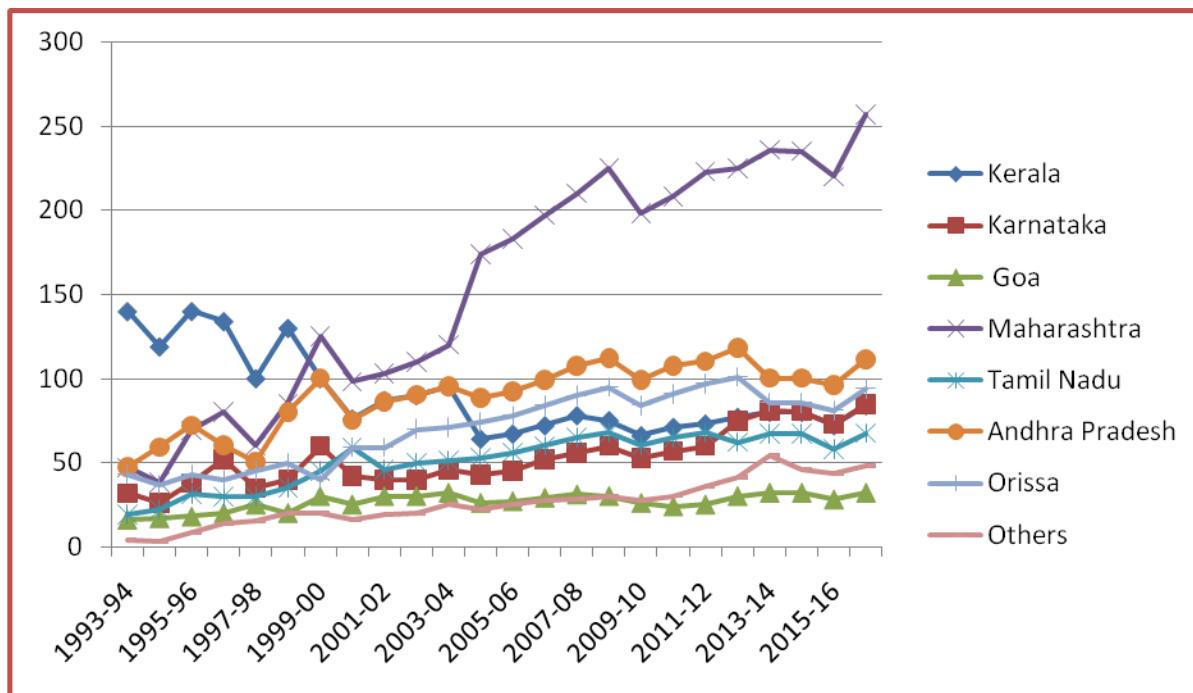
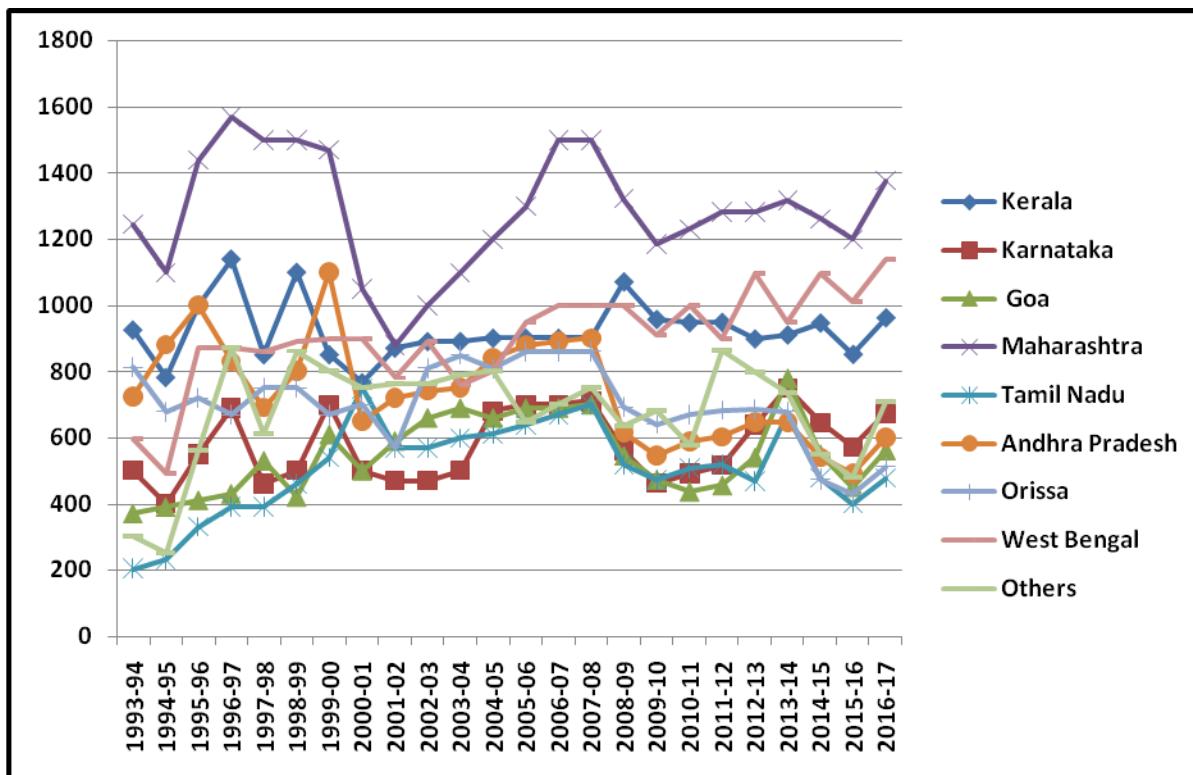


Figure.6 Trends in state-wise yield of raw Cashewnut from 1993-94 to 2016-17



Trends in state-wise production of raw Cashewnut from 1993-94 to 2016-17

It is seen from Figure 5 that during 1993-94 like area under cashew, production was also highest in Kerala and shown a decreasing trend up to 2004-05, thereafter become positive. In all states production showed a gradual positive trend over the years but in Maharashtra production has hiked more rapidly compared to other states.

Trends in state-wise yield of raw Cashewnut from 1993-94 to 2016-17

It is evident from the Figure 6 that productivity remained higher in Maharashtra throughout the study period (1993-94 to 2016-17) with fluctuations. But productivities in remaining states are par below compared to productivity in Maharashtra. This might be due availability of most suitable climatic and soil conditions, land topography and agronomic practices of the farmers, etc. All states shown huge fluctuations in yield over the years, this again might be due to climatic variability. Hence there is more scope to increase and maintain stability in productivity.

In conclusion, large area under cashew is grown with poor quality seedlings. Compared to other plantation crops, cashew is mostly restricted to marginal and poor fertile lands and is considered as a wasteland crop. Moreover, cashew has been considered as ‘maintenance free’ crop and the recommended package of practices are not followed. All these factors lead to low yield. Growth in both area and production is highest in Maharashtra state indicating immense scope to increase area and production in the state. Nearly one third of the total national cashew production is from

Maharashtra only (32.93%) and productivity is also highest in Maharashtra state (1378 kg/ha). There is also more scope to boost the area and production of cashew that ultimately leads to productivity in other states by the usage of improved cultivars and adopting scientific cultivation practices. Since demand for cashew kernel is increasing demand for raw cashew is also increasing. To meet this domestic demand quantity imported is increasing and export of cashew kernels is decreasing over the years.

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