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STATUS OF PLANTATION CROPS IN INDIA*

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May I at the outset express my gratitude to all the members of ISPC for having bestowed upon me the honour and previlege of delivering the Presidential address to the 25th Annual General Body meeting of our august Society during its silver jubilee year. Keeping in line with the theme of the current symposium namely *"Competitiveness with sustainability"* I have chosen the topic "Status of plantation crops in India" to highlight the area and production over the last four decades and to project the future prospects in the next few decades.

Plantation crops occupy nearly four million ha of area in India which is about 2.3% of the total cropped area. Their contribution to the Gross National Product at the current market price comes to about Rs. 2,98,500 million and export earnings nearly Rs. 30,925 million during 1994-95, which is about 27% of the total from agricultural commodities and 4.8% of total exports (Table 1). Among the plantation crops, coconut, arecanut, cashewnut, black pepper and cardamom are known as small holders plantations whereas, rubber, tea and coffee are known as estate crops or the conventional plantation crops which are generally large plantations. Ginger and

Table 1. ***Plantation crops statistics***

Crop	India		World	India's	Export from India	
	Area ('000ha)	Production ('000 tonnes)	Production ('000 tonnes)	Position in World	Quantity (t)	Value (Mil. Rupees)
Coconut	1795.5	13967.9*	30957	Second	43.6**	1538
Arecanut	235.5	272.4	225	First	0.6	45
Cacao	11.1	6.7	2336	Very low	0.2	11
Oil Palm	8.3	4.0	34176	Very low	0.1	5
Cashew	635.0	418.0	669	First	80.5	12400
Small	83.7	7.0	11	Second	0.4	124
Black pepper	195.1	53.1	160	Second	48.7	1965
Ginger	62.1	186.1	160	First	18.4	383
Turmeric	147.0	659.4	NA	First	25.4	461
Tea	424.5	743.8	2523	First	202.0	9891
Coffee	293.1	180.1	6040	Tenth	86.1	4095
Rubber	523.3	506.9	5007	Fifth	0.2	7
Total	4414.2					30925

*Coconut production in million nuts **Coir and Coir products

** Presidential address delivered in the General Body meeting of the Indian Society for Plantation Crops held on 28.11.1996 at Rubber Research Institute of India, Kottayam.*

turmeric though annuals are also considered as plantation crops. India is the largest producer of arecanut, cashewnut, tea, pepper, ginger and turmeric and second largest producer of coconut and cardamom in the world. Since independence these crops showed an increase in the area and production. However, the changes in area or poduction are neither uniform among the crops nor over the periods as both were very much influenced by the climatic and seasonal changes, especially occurrence of droughts, cyclones, disease and pest incidence and market prices.

Sources of information

The statistical data on area, production and productivity collected from the Directorate of Commodity Boards, Directorate of Economics and Statistics of the concerned States/Govt.of India, New Delhi are used in the study. Data for 45 years from 1950-51 for coconut, coffee, black pepper, ginger and turmeric, 46 years from 1950-51 for rubber, 40 years from 1955-56 for arecanut and small cardamom, 41 years from 1955-56 for cashew, 40 years from 1956 for tea and for 11 years from 1983-84 for cocoa were collected and compound growth rate for five year period was worked out.

Present scenario

1. Coconut

a. Area and production

Coconut plays an important role in the economic, social and cultural activities of the people of India, especially the states like Kerala, Tamilnadu and Andhra Pradesh. With an area of 1.80 million hectares and an annual production of 13,968 million nuts, India ranks second in the world map of coconut. In independent India, the area and production of coconut generally showed increasing trends (Table 2). There was an overall increase of 187% in area and 326% in production during 1995-96 when compared to 1950-51 figures. The area under coconut was 0.63 million ha during 1950-51 and it increased to 1.05 million ha during 1970-71 and to 1.51 million ha, and 1.80 million ha during 1990-91 and 1995-96, respectively. The impressive compound growth rates (CGR) achieved during the fifties and in particular during sixties indicated the success of the programmes undertaken by the erstwhile Indian Central Coconut Committee which was set up during 1945. The growth rates in area scaled down to nearly zero during the seventies and improved during eighties, in particular from 1986 onwards. The production of coconut rose from 3282 million nuts during 1950-51 to 4639 million and to 6075 million during 1960-61 and 1970-71 respectively, but declined thereafter to 5412 million nuts during 1977-78. However, the production showed steep rise to 9700 million nuts during 1990-91 and to 13968 million during 1995-96, an increase of 303% over a period of 46 years. The increase in production for the last ten years alone was about 119%. In India more than 91% of the area under coconut is in the four southern states viz. Kerala, Tamil Nadu, Karnataka and Andhra Pradesh sharing about 92% of the India's production (Table 3).

Table 2. ***Area, production and productivity of coconut in India (1950-51 to 1994-95)***

Year	Area ('000 ha)	Production (m. nuts)	Productivity (Nuts/ha)
1950-51	626.50	3281.70	5238.00
1955-56	647.60	4224.40	6523.00
1960-61	717.40	4639.10	6466.00
1965-66	883.70	5035.40	5698.00
1970-71	1045.50	6075.00	5810.00
1975-76	1069.90	5829.40	5448.00
1980-81	1083.30	5942.00	5485.00
1985-86	1225.60	6770.30	5524.00
1990-91	1513.90	9700.20	6407.00
1994-95	1694.70	13230.70	7807.00

Source: Coconut Development Board, Kochi, Kerala

Table 3. ***Area under coconut, production and productivity in the major coconut producing States in India (1995-96)***

States	Area ('000 ha)	Production (Million nuts)	Producivity (Nuts/ha)
Kerala	982.1(55%)	5905.7(42%)	6013
Tamil Nadu	278.6(16%)	4345.7(31%)	14553
Karnataka	269.4(15%)	1406.5(10%)	5320
Andhra	90.0(5%)	1231.4(9%)	13682
Others	148.8(9%)	1055.2(8%)	-
Total	1795.5	13967.9	7779

Source: Coconut Development Board, Kochi, Kerala

b. Productivity

The trend in productivity of coconut in India is characterised by ups and downs. The average productivity of 5238 nuts / ha during 1950-51 rose to 6466 nuts during 1960-61, but fell to 4982 nuts during the year 1983-84 because of the severe and prolonged drought of 1983, which affected the production and productivity of coconut. The productivity further increased to 6407 nuts/ha during 1990-91 and to 7779 by 1995-96. The CGR which was negative during seventies became positive during late eighties and nineties. Similar decline in productivity during the seventies was seen in respect of world productivity also. The average productivity of copra per ha in the world had fallen from 8.84 tonnes in 1966-70 to 4.51 tonnes in 1971-75 and further to 4.47 tonnes in 1976-1980(Das, 1985). The production and productivity of coconut in India was influenced by several factors. The debilitating and dreaded root(wilt) disease of coconut is affecting the production and productivity of coconut in Kerala, which contributes to about 43% of the total production in India. The estimated loss in yield due to root (wilt) disease during the year 1976 was 340 million nuts (George *et al.* 1976, 1979 and 1985). The survey conducted during 1984-85 revealed that the loss in yield was to the tune of 968 million nuts annually (Anon. 1985). The devastation caused by root(wilt) disease has rendered many coconut gardens unproductive and even the best managed garden in Kerala failed to check the rate of decline in productivity. The unprecedented drought of 1982-83 in Kerala adversely affected the yield of coconut. Added to this, due to the sudden rise in price of natural rubber during seventies, many cultivators preferred large scale planting of rubber through replaçement of standing coconut crop. The severe fluctuation in coconut prices was another factor affecting the coconut cultivation.

It is interesting to note the serious impact of root(wilt) disease in Kerala by comparing the district wise data on the area, production and productivity(Fig 1 to 3) for the last two decades from the districts identified as diseased viz, Ernakulam, Alleppey, Kottayam, Idukki, Pathanamthitta and the disease free districts viz, Kasaragod, Kannur, Wynad, Kozhikode, Malappuram and Palghat. In Kerala, the area under coconut was 7.3 lakh during 1971-72, which is increased to 8.82 lakh ha during 1993-94 recording an increase of about 20%. In the disease-free tract the increase was 85%, whereas in the diseased tract 13% reduction in area was noticed. At the State level production had recorded an increase of 28% within a period of 23 years as against 19% decline in the diseased tract; Malabar tract showed 85% increase in production. In the case of productivity the diseased tract recorded 7% decline as compared to 19% increase in Malabar tract.

In Kerala, about 90% of the crop is grown as rainfed crop and is generally affected by the long dry spell of three to four months a year. The number of unproductive and senile palms are also high in Kerala. The productivity is high in Tamil Nadu and Karnataka, as coconut is predominantly an irrigated crop. In Kerala

wherever irrigation is practiced, the productivity is high as in other states.

2. Arecanut

India is the largest producer of arecanut in the world, and earns about Rs. 45 million annually by exporting arecanut in various forms.

a. Area and production

Area and production of arecanut in India showed an increasing trend during the past 40 years. The area under arecanut in India was 0.106 million ha during 1955-56 which increased to 0.236 million ha during 1994-95, recording an increase of 123% over a period of 40 years. The production for the corresponding period has increased from 0.081 million tonnes to 0.272 million tonnes (236% increase) (Table 4). The compound growth rate for area and production was generally positive and significant.

b. Productivity

The productivity of arecanut remained almost constant from 1957 to 1974 (around 850 kg/ha) and slightly increased therafter during the next five years to around 950 kg/ha, and further increased and reached the peak level of 1200 kg/ha during the year 1988-89. For the year 1983-84 the productivity was only 1010 kg mainly due to the drought in Southern India during the year 1983. The compound growth rate for area and production was generally positive. The CGR for area was high during the period 1960 to 1975 and between 1985 to 1994, whereas the CGR for production was high and significant during the period 1960 to 1980 and 1985 to 1990.

Yellow leaf disease(YLD) is the most serious malady affecting arecanut productivity in Kerala and Karnataka. A comprehensive survey conducted during the year 1976-77 revealed that 36% of areca palms in Kerala were found to be affected by YLD. The disease incidence was very severe (more than 75%) in Trivandrum, Quilon, Kottayam and Idukki districts and very low in Calicut, Malappuram and Cannanore districts (George *et al,* 1984). Now the loss in arecanut yield is very severe even though no valid estimates are available in the absence of any scientific survey since then. During the year 1976-77 the incidence of YLD was observed very mildly in seven villages in Chickmagalur district of Karnataka. A detailed survey conducted during 1989-91 revealed that the disease is prevalent in all the five major arecanut growing districts of Karnataka viz. Dakshina Kannada, Kodagu, Chickmagalur, Shimoga and Uttra Kannada, incurring a loss of 508 tonnes of chali (Anon. 1992).

Table 4. ***Area, production and productivity of arecanut in india (1955-56 to 1993-94)***

YEAR	Area ('000ha)	Production (Kg/ha)	Productivity ('000 tonnes)
1955-56	105.80	81.20	767.49
1960-61	113.00	95.46	844.78
1965-66	138.10	119.90	868.21
1970-71	167.30	141.00	842.80
1975-76	177.50	160.00	901.41
1980-81	184.50	191.40	1037.40
1985-86	185.60	216.20	1164.87
1990-91	217.00	238.50	1099.08
1991-92	221.80	251.00	1131.65
1992-93	222.30	248.40	1117.41
1993-94	235.50	275.10	1168.00
1994-95	235.50	272.40	156.69

Source: Directorate of Cocoa, Arecanut and Spices Development, Calicut, Kerala

3. Cashew

a. Area and production

India is the largest producer of cashew in the world and earns more than Rs. 12,400 million annually as foreign exchange. The area under cashew registred a steady increasing trend over the years. There was an overall increase of 477% in area and 429% in production of cashew between 1955-56 and 1995-96. During the year

1955-56 the area under cashew was only 0.11 million ha. It has increased to 0.241 million ha during 1965-66 and to 0.369 million ha during 1975-76 and further rose to 0.635 million ha in 1995-96 (Table 5). The CGR was all positive, high and significant. Because of the Indian monopoly of cashew in world market and the ever increasing demand and high price, the State Governments of Kerala, Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra and Orissa have taken up large scale expansion programme under the guidance of Multistate Cashew Project (Orissa, Kerala, Andhra Pradesh and Karnataka), All India Coordinated Research Project on Cashew improvement, CPCRI and later NRCC, Puttur and the financial help, developmental programmes and guidance by Directorate of Cashew Development. In Kerala there was about 50% increase in area during seventies. In Karnataka, large scale expansion in area had taken place during seventies and eighties. In Andhra Pradesh, even though the frequent cyclone and flood occurred during seventies, destroying extensive area of cashew plantations, large scale planting had taken place during eighties. In Maharashtra, about 30,000 ha was brought under cashew during 1993-94 itself. In Orissa, around 60,000 ha was brought under cashew during 1970-90. However, Kerala continues to be the largest producing State in India. During the year 1955-56 the contribution of Kerala was around 75% of the production in India. Because of the faster expansion of area in other States the contribution of Kerala has now come down to 40%. The area under cashew at the time of establishment of the Directorate of Cashew Development(1966) was 2.4 lakh ha with an annual production of 1.43 lakh tonnes.

The production of cashew in India during the year 1955-56 was only 0.79 lakh tonnes and it rose to 1.44 lakh tonnes during 1965-66 and further to 2.34 lakh tonnes during 1985-86 and 4.18 lakh tonnes during the year 1995-96. The compound growth rate of production was also positive, high and significant throughout the period, except for the seventies. The production of 1.83 lakh tonnes during the year 1971-72 dropped to 1.66 lakh tonnes during 1974-75 and further to 1.34 lakh tonnes during 1978-79. The unprecedented cyclone and flood occurred in Andhra Pradesh and Maharashtra during seventies which destroyed large areas of cashew plantations.

b. Productivity

The productivity of cashew showed a declining trend till the end of seventies. The highest productivity of 768 kg/ha observed during 1957-58 had declined to 596 kg during 1965-66 and to 465 kg during 1975-76 and further to the lowest level of 314 kg/ha during the year 1979-80, accounting for nearly 60% reduction as compared to the 1957-58 productivity. However, by the concerted efforts taken by Cashew Directorate, All India Coordinated Project for the improvement of cashew (established in 1972) and CPCRI, NRCC, Puttur, such as evolving high yielding varieties, standardization of vegetative propagation techniques, better management practices and plant protection measures, have improved the productivity of cashew. The productivity

Table 5. ***Area, production and productivity of cashew in India (1955-56 to 1995-96)***

Year	Area ('000 ha)	Production ('000 tonnes)	Productivity (Kg/ha)
1955-56	110.00	79.00	718.18
1960-61	175.60	111.40	634.40
1965-66	241.30	143.80	595.94
1970-71	302.70	176.70	583.75
1975-76	368.60	171.40	465.00
1980-81	464.50	185.25	398.82
1985-86	518.40	234.50	452.35
1990-91	531.90	294.60	553.86
1995-96	635.00	418.00	660.00

Source: Directorate of Cashew Development, Kochi, Kerala

was as low as 400 kg/ha in 1966 when the Directorate of Cashew Development was established. However, during the three decades of its existence, the Directorate had helped in increasing the area to 6.35 lakh ha and production to 4.2 lakh tonnes as on 1995-96. The productivity also increased to 725 kg/ha registering 4% annual growth rate.

4. Cocoa

Area, production and productivity

India produces about 6700 tonnes of cocoa beans from an area of 11,000 ha and earns about Rs. 11 million as foreign exchange. The area under cocoa was showing a negative growth since the year 1983-84. The area under cocoa during 1983-84 was 22,230 ha and it has come down to 11,080 ha during 1993-94, whereas the production fluctuated between 56,100 to 77,100 kg.

The productivity was generally increasing every year (Table 6). The CGR for area was negative and significant, whereas that of production was not significant. The CGR of productivity was positive and significant. The negative trend in the area under cocoa was mainly due to the lack of interest among the farmers because of the severe price fluctuation and non-renumerative price. The marketing of cocoa is controlled by a handful of big companies like Cardbury's, Sathe etc., and they imported cocoa at lower rates.

Table 6. ***Area, production and productivity*** **of** ***cocoa in India (1983-84 to 1993-94)***

Year	Area ('000 ha)	Production ('000 tonnes)	Productivity (Kg/ha)
1983-84	22.23	5.61	252.40
1984-85	22.03	6.20	281.40
1985-86	20.95	7.71	368.26
1986-87	18.93	7.62	402.71
1987-88	18.02	7.47	414.85
1988-89	17.59	7.39	420.14
1989-90	16.88	6.91	409.43
1990-91	16.19	6.95	429.08
1991-92	13.96	7.38	528.18
1992-93	12.30	6.82	555.00
1993-94	11.08	6.70	605.00

Source: Directorate of Cocoa, Arecanut and Spices Development, Calicut, Kerala

5. Pepper

a. Area and production

India is the largest producer of black pepper in the world with about 0.053 million tonnes from an area of 0.195 million ha. The country earned about Rs. 1965 million as foreign exchange during the year 1994-95 (Table 7). The area under pepper in India which was only 80,000 ha during 1950-51 has increased to 1,20,0000 ha during 1969-70 and reduced to the lowest level of 80,000 ha during 1978-79 but further, increased to 1,95,000 ha during 1994-95. During the sixties, seventies and upto the middle of eighties the expansion in pepper area was negligible. However, after 1985 the area expansion was considerable and between 1983-84 and 1994-95 there was an increase of 82%. The CGR of area during this period was also positive, high and significant.

The production of pepper in India increased from 21,000 tonnes during 1950-51 to 28,000 tonnes during 1955-56 and remained steady with occasional ups and downs upto 1986-87 and improved substantially thereafter and reached the level of 55,190 tonnes during 1989-90. During the past 12 years i.e. from 1983-84 to 1994-95, the increase in production was around 134% and the CGR was the highest during 1985-90 period. The cultivation of pepper is very much influenced by the demand and price variation in international market. The foot rot/wilt diseases occurring in the major producing areas of Kerala is a major problem affecting the production.

b. Productivity

The productivity of pepper was ranging between 250 and 300 kg /ha with occasional ups and downs during the past 45 years. The maximum productivity of 329 kg/ha was

Table 7. ***Area, production and product ivity of pepper in india (1950-51 to 1994-95)***

Year	Area ('000 ha)	Production ('000 tonnes)	Productivity (Kg/ha)
1950-51	80.00	21.00	262.50
1955-56	89.00	28.00	314.61
1960-61	103.00	28.00	271.84
1965-66	102.00	23.00	225.49
1970-71	119.96	26.16	218.07
1975-76	111.93	25.57	228.45
1980-81	109.29	29.49	269.83
1985-86	125.12	34.00	271.74
1990-91	173.43	47.95	276.48
1991-92	184.20	52.01	282.36
1992-93	189.39	50.76	268.01
1993-94	190.99	51.32	268.71
1994-95	195.05	53.11	272.28

Source: Spices Board, Kochi, Kerala

Table 8. ***Area, production and productivity of cardamom in India (1955-56 to 1994-95)***

Year	Area ('000 ha)	Production ('000 tonnes)	Productivity (Kg/ha)
1955-56	50.00	3.00	60.00
1960-61	55.77	3.35	60.07
1965-66	73.09	4.00	54.73
1970-71	91.48	3.17	34.65
1975-76	91.48	3.00	32.79
1980-81	93.95	4.40	46.83
1985-86	100.00	4.70	47.00
1990-91	81.55	4.75	58.25
1991-92	81.85	5.00	61.09
1992-93	82.39	4.25	51.58
1993-94	82.96	6.60	78.56
1994-95	83.65	7.00	83.69

Source: Spices Board, Kochi, Kerala

observed during the year 1956-57. However, between 1964 and 1985 it was lower than 250 kg/ha, except for the years 1978-79 (254 kg), 1980-81 (269 kg) and 1981-82 (263 kg) .

The lowest productivity observed during the year 1984-85 was mainly due to the spread of foot rot/wilt disease and loss of pepper vines in large areas consequent to the heavy and continuous rains after the severe drought in the Northern Kerala and the pollu beetle attack in Wynad. However, the productivity has gradually improved since 1985-86.

6. Cardamom

Area, production and productivity

India is the second largest producer of small cardamom after Guatemala. It produces 7000 tonnes of cardamom from an area of 83,650 ha. India earned a foreign exchange of about Rs. 124 million during the year 1995-96 (Table 8). This crop is grown in the high ranges of the western ghats. The expansion of area under cardamom was only 67 % over the 40 years, indicating that there is not much scope for further expansion in area because of the specific agroclimatic requirements of the crop. The area under cardamom in India which was only 50,000 ha during 1955-56, increased to 73,090 ha during 1965-66 and to 91,480 ha during 1975-76 and to 100,000 during 1985-86, then decreased to 81,113 ha during 1989-90, but rose again to 83,650 during 1994-95. The production of cardamom is characterised by an overall increasing trend, while the trend in productivity was found highly fluctuating. The productivity ranged from 32.8 kg to 834.7 kg/ha without showing any regular trend.

7. Ginger

a. Area and production

India tops the world in the production of ginger, producing about 1.86 lakh tonnes from an area of 62,090 ha, and has earned a foreign exchange of Rs. 383 million in the year 1995-96. Ginger being an annual crop with high export potential, the cultivation of this crop mainly depends on its price and demand. Again, it is primarily a rainfed crop and the distribution of rainfall in the areas of cultivation also influences the production/productivity. The incidence

Table 9. *Area, production and productivity of ginger in india (1950-51 to 1994-95)*

Year	Area ('000 ha)	Production ('000 tonnes)	Productivity (Kg/ha)
1950-51	17.00	15.00	882.35
1955-56	16.00	16.00	1000.00
1960-61	19.00	18.00	947.37
1965-66	23.00	22.00	956.52
1970-71	21.59	29.29	1356.64
1975-76	27.20	45.15	1659.92
1980-81	40.45	82.44	2038.07
1985-86	53.52	138.02	2578.85
1990-91	53.93	153.45	2845.35
1991-92	59.83	176.95	2957.54
1992-93	59.87	201.63	3367.79
1993-94	60.58	186.20	3073.62
1994-95	62.09	186.05	2996.45

Source: Spices Board, Kochi, Kerala

of major disease like rhizome rot also affects its production. The area under ginger was found to be fluctuating around 20,000 ha between 1950-51 to 1973-74 (Table 9). However, since 1974 an increasing trend was noticed. The area under ginger during 1972-73 was only 22,880 ha, but had increased to 43,830 ha during the year 1982-83 and to 62,090 ha during the year 1994-95, recording about 171% increase over a period of 23 years.

The production remained around 15,000 tonnes from 1950-51 to 1963-64 with ups and downs and later increased gradually. The production rose to 33,630 tonnes during 1972-73 to 94,170 tonnes during the year 1982-83 and to the peak level of 1,86,050 tonnes during 1994-95. There was increase in production from 1982-83 to 1994-95. The CGR for both area and production of ginger was generally positive and the highest was observed during the period 1975-80.

b. Productivity

The productivity of ginger was found to be highly fluctuating between 1000 kg and below from the year 1950-51 to 1969-70, thereafter it was showing an upward trend. The productivity which was 952 kg/ha during 1967-68 rose to 1470 kg during 1972-73 and further rose to 2149 kg and 2996 kg during the years 1982-83 and 1994-95, respectively. The productivity of ginger has tribled during the nineties as compared to fifties and sixties.

8. Turmeric

a. Area and production

India continues to be the largest producer of turmeric producing about 6.59 lakh tonnes from an area of 1.47 lakh ha, and earns about Rs 461 million annually. Turmeric being an annual crop with a large export potential, its cultivation mainly depends upon the price fluctuation in the international market. The area under turmeric remained around 55,000 ha with little variations from 1950-51 to 1961-62, but thereafter it was found increasing (Table 10). The area increased to 69,000 ha during 1972-73, 85,900 during 1982-83, and to 147,000 during the year 1994-95. The production of turmeric was found fluctuating without substanial improvement from 1950-51 to 1978-79 but thereafter it was found improving. The production of 1,21,100

Table 10. *Area, production and productivity of turmeric in india (1950-51 to 1994-95)*

Year	Area ('000 ha)	Production ('000 tonnes)	Productivity (Kg/ha)
1950-51	55.00	152.00	2763.64
1955-56	49.00	149.00	3040.82
1960-61	40.00	93.00	2325.00
1965-66	68.00	128.00	1882.35
1970-71	80.50	150.60	1870.80
1975-76	71.80	135.20	1883.00
1980-81	101.50	216.90	2136.94
1985-86	109.30	367.10	3358.64
1990-91	119.00	342.40	2877.31
1991-92	120.30	373.20	3102.24
1992-93	130.20	407.70	3131.33
1993-94	148.40	707.40	4766.84
1994-95	147.00	659.40	4485.71

Source: Spices Board, Kochi, Kerala

tonnes of turmeric during the year 1972-73 rose to 1,73,100 tonnes during 1982-83 and further to the peak level of 6,59,400 tonnes during the year 1994-95. The increase during the last 10 years was about 80%.

b. Productivity

The productivity of turmeric has not improved much when compared to 1950-51. It was found to be very low in some years mainly because of the neglect of the growers due to the very low market price of the produce. The productivity was found less than 2000 kg/ha during the years 1961-64, 1965-67, 1968-71 and 1972-78. The overall CGR for area and production of turmeric were positive and the maximum CGR was observed during the period from 1960-65.

9. Coffee

a. Area and production

The area under coffee showed an increasing trend throughout the period. The area which was only 92,520 ha during 1950-51 increased to 1,20,000 ha during 1960-61, 1,36,000 ha during 1970-71, 2,08,000 ha during 1980-81, 2,70,820 ha during 1990-91 and 2,93,000 ha during 1994-95 (Table 11). The CGR for the five year periods were all positive and mostly significant. Producing about 0.18 million tonnes from an area of 0.293 million ha, India has earned Rs. 4095 million during 1994-95 as foreign exchange.

The production of coffee was generally following an increasing trend with occasional decline. The production which was 19,000 tonnes during 1950-51 increased to 64,000 tonnes during 1965-66 and 84,000 tonnes during 1975-76 and to 1,22,000 tonnes during 1985-86 and further increased to 1,80,000 tonnes during the year 1994-95. In some years bumper crops were harvested, especially for the year 1970-71 (1,10,000 tonnes), 1979-80 (1,50,000 tonnes), 1984-85 (1,95,000 tonnes) and 1988-89 (2,15,000 tonnes). It is interesting to note that the bumper crop is followed by poor yield during the following year. The CGR for area and production was all positive and significant.

Table 11. ***Area, production and productivity of coffee in India (1950-51 to 1994-95)***

Year	Area ('000 ha)	Production ('000 tonnes)	Productivity (Kg/ha)
1950-51	92.52	18.893	274.73
1955-56	120.32	34.000	336.63
1960-61	120.32	68.169	377.19
1965-66	129.00	64.000	496.12
1970-71	135.46	110.231	799.19
1975-76	171.54	83.984	489.57
1980-81	208.27	118.657	569.69
1985-86	240.60	122.450	508.94
1990-91	270.82	169.726	627.72
1991-92	278.63	180.000	646.23
1992-93	291.01	169.395	645.16
1993-94	292.47	208.000	711.18
1994-95	293.11	180.100	614.48

Source: Central Coffee Research Institute, Chickmagalur, Karnataka

b. Productivity

The productivity of coffee which was only 275 kg/ha during 1950-51 was found increasing with few drops upto 1965-66 with a production of 496 kg/ha. Though during the year 1970-71 there was a peak production of 699 kg/ha, there was low production during next three years. This fluctuating trend in productivity continued except for the high yields of 792 kg/ha during 1986-87, 883 kg/ha during 1988-89 and 711 kg/ha during 1993-94.

10. Tea

a. Area and production

The area under tea in India has been showing an increasing trend. It was only 3,20,590 ha in 1956 has increased to 3,53,000 ha during 1970 and to 4,00,000 ha during 1985 and then stagnant for the last few years (Table 12). The production of 3,08,720 tonnes during the year 1956 has increased to 5,11,820 tonnes during 1976

Table 12. *Area, production and productivity of tea in India (1956 to 1994)*

Year	Area ('000 ha)	Production ('000 tonnes)	Productivity (Kg/ha)
1956	320.59	308.72	963.00
1961	331.23	354.40	1070.00
1966	345.26	373.98	1089.00
1971	356.52	435.47	1221.00
1976	364.28	511.82	1405.00
1981	383.63	560.43	1461.00
1986	407.65	620.80	1523.00
1990	416.56	720.34	1729.00
1992	422.59	703.93	1666.00
1993	425.03	758.06	1784.00
1994	424.47	743.78	1752.00

Source: Tea Board, Calcutta, West Bengal

and to 7,44,000 tonnes during 1994. Thus, India ranks first in the production of tea in the world and earned Rs. 9891 million as foreign exchange during the year 1994.

b. Productivity

The productivity was also showing an upward trend. The productivity of tea during the year 1956 was 963 kg/ha. This has increased to 1405 kg/ha during 1976 and to 1729 during 1990. The CGR of area worked out for the five years period was positive and significant upto the period 1980-'85 and thereafter it was negative. But the CGR of production was positive and mostly significant throughout. The CGR for productivity was also positive.

11. Rubber

a. Area and production

The area and production of rubber were showing an increasing trend. The area was only 59,000 ha during the year 1950-51 and rose to 0.129 million ha during 1960-61, 0.269 million ha during 1980-81 and to 0.516 million ha during 1994-95 (Table 13). The production of rubber which was only 14,000 tonnes during 1950-51 rose to 50,000 tonnes during 1965-66, 0.153 million tonnes during 1980-81 and to 0.472 million tonnes during 1994-95, recording about 34 fold increase over a period of 45 years. Producing about 0.472 million tonnes of rubber from an area of 0.516 million ha, India is self sufficient with regard to the requirement of natural rubber. The CGR of area and production for the five years period was all positive, high and significant. The impressive growth rate in the area and production of rubber was the result of large scale expansion programme implemented by the Rubber Board by way of incentives and subsidies for the new planting as well as for replanting with improved clones, supply of planting materials of high yielding varieties and popularizing better plant protection methods. During the year 1985 to 1990 was about 14,000 ha brought under rubber in the North Eastern region and Andamans together.

b. Productivity

The productivity of rubber which was only 237 kg/ha during 1950-51 increased to 329 kg/ha during 1955-56 and dipped to 194 kg/ha during 1960-61. Again it rose to 454 kg during 1970-71 and 915 kg/ha during 1994-95.

Table 13. *Area, production and productivity of rubber in India (1950-51 to 1994-95)*

Year	Area ('000 ha)	Production ('000 tonnes)	Productivity (Kg/ha)
1950-51	59.00	14.00	237.29
1955-56	70.00	23.00	328.57
1960-61	129.00	25.00	193.80
1965-66	157.00	50.00	318.47
1970-71	203.10	92.17	453.82
1975-76	224.43	137.75	613.78
1980-81	269.20	153.10	568.72
1985-86	382.83	200.47	523.65
1990-91	475.08	329.62	693.82
1991-92	488.51	366.75	750.75
1992-93	499.37	393.49	787.97
1993-94	508.42	435.16	855.91
1994-95	515.57	471.81	915.00

Source: Rubber Board, Kottayam, Kerala

Future prospects

It is evident from the above analysis that the overall trend in area and production of all these plantation crops are positive and significant. For coconut even though there is not much scope for area expansion in Kerala, there is substantial scope for expansion in Tamil Nadu, Andhra Pradesh, Karnataka, Orissa, Maharashtra etc. The productivity can be increased by the adoption of high yielding hybrids and varieties released by CPCRI and State Agricultural Universities, and providing irrigation facilities. An impressive increase in growth rate in production for the last 10 years is likely to continue though the decline in price disappoints the farmer. It is estimated that the production of coconut by 2000 AD may reach 20,000 million nuts from an estimated area of 2.5 million ha. By the end of the IX five year plan it is expected that the production would be 24,000 million nuts. For arecanut, though the policy of the Government is not to encourage any expansion in area, the growers are going in a bigway for replanting with the high yielding varieties like Mohitnagar, Sreemangala and Sumangala, because of the high price of the produce. By 2002 AD the production of arecanut is estimated to exceed 3.7 lakh tonnes from an estimated area of 2.5 lakh ha.

The price of cashew kernel in the international market is ever increasing and the demand is also showing an increasing trend. Hence, the present high rate of expansion in area is likely to continue in

Table 14. ***Projection of plantation crops for 21st century***

Crops ('000 ha)	Expected values for 2000 AD Area ('000 ha)	Production ('000 tonnes)	Remarks
Coconut	2500 -	20,000 24,000	Scope for expansion in area in states other than Kerala by end of IX Plan
Arecanut	250	300 370	No need to increase in area for 2002 AD
Cashew	700	700	Scope for area expansion in Orissa, M.R, AP, KA, TN 2 ton/ha can be achieved
Cocoa	18	12	-
Pepper	300	100	Scope for expansion in area and increase in productivity
Small cardamom	85	7	No scope for area expansion in traditional area
Coffee	318	225	Scope for increase in area and production by the end of IX Plan
Tea	450	905	Target fixed by Min. Comm. for WB for 2025 AD is 1640 m kgs
Rubber	600	700	Scope for improvement in area and production for 2011 AD
Ginger			No valid forecasting is possible
Turmeric			No valid forecasting is possible

Maharashtra, Orissa, Karnataka, Andhra Pradesh and Tamil Nadu. The propagation of released high yielding varieties by NRCC Puttur, the Co-ordinating centres and private agencies can contribute to increase in productivity. Cashew production is estimated to reach 0.7 million tonnes from an estimated area of 0.7 million ha by 2000 AD. With some of the varieties released recently having an yield potential of 10 kg per tree by the 12th year, it would be possible to realise an yield of 2 ton/ha if the plants are planted at 10m x 5m hedge row system. The area under cocoa is being affected due to the uncertainty of remunerative price for the growers, rodent menace and the lack of marketing facility. The productivity is likely to increase so that the production is maintained or even increased marginally. However, by 2000 AD the National requirement will be about 14,000 tonnes.

For pepper and cardamom the positive trend in area as well as production is likely to continue as the demand for these commodities are very high in the International market. By 2000 AD the pepper production is expected to reach one lakh tonnes from an estimated area of about 3 lakh ha. For cardamom, though there is not much scope for area expansion there is scope for increasing the productivity of 81 kg/ha to 90 kg/ha and consequently the estimated production of cardamom by 2000 AD will be around 7000 tonnes. For ginger and turmeric also considerable expansion in area and increase in production is expected. But, the forecasting of area and production for these annual crops is not valid because of the unpredictable nature of price fluctuation and the immediate reaction of the growers to these fluctuations in their market prices. For coffee the production is likely to exceed 0.225 million tonnes from an estimated area of 0.318 million ha by 2000 AD. The Coffee Board has envisaged a production target of 3 lakh tonnes by the end of IX five year plan with annual growth rate of 7.5 per cent. For tea the scope for the expansion of area is very limited. The production may reach 0.95 million tonnes by 2000 AD, by way of improvement in productivity. The estimate for future production of tea in India, a target of 1.64 million tonnes of made tea in 2025 AD was fixed by Commerce ministry for World Bank financial assistance (Assam Review, August 1996)

The positive and significant rate of increase in area, production and productivity of rubber is likely to continue by expanding the cultivation in non-conventional areas, replanting with high yielding seedlings and adopting better plant protection measures. The estimated production of rubber will be around 7 lakh tonnes from an area of 6 lakh ha by 2000 AD and 9.5 lakh tonnes from an area of 7 lakh ha by 2011 AD.

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