

Dynamics of Production and Export in Transformation of Tea Plantation Sector in India

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Abstract

The study was based on secondary published data with effect from 1971 to 2011 with an objective to examine the trends of production and export of tea and growth in India. It was observed that tea sector plays an important role contributing more than 200 crores to the GNP of the country. The major three producing regions are Darjeeling, Assam and Nilgiri. In the recent years, the sector has witnessed a stiff competition in the international export market affecting domestic production. It was observed that China produces 39.00% of world tea followed by India sharing 24.55% with an annual change of 2.87% during 1971-81 to 3.06% during 2001-11. Production of tea in the country was mainly due to increase of area and productivity. Replanted and replacement area could not influence the production of tea significantly. Number of tea estates was found to increase in between 1991-01 at the rate of 74.09% due to inclusion of small tea gardens and it declined from 5.29% to 3.64% during 1961 to 2011. Productivity change was higher in Assam, Tripura, Tamil Nadu and Kerala with high production change during the decades. The area growth during the decades was low. Production share of tea grades like CTC, Darjeeling and Green tea declined over years while share of Orthodox tea increased over years. The country witnessed high annual change of area of tea bushes under the age group of 5 to 10 years followed by below 5 years due to more area put under the small tea estates in the recent years. The export of tea bags as value added tea grew faster from 1971-72 to 2011-12 in terms of quantity and value followed by packet tea. Auction sale in the country declined. Employment generated per estate varied from 191 in Karnataka to 1011 in West Bengal in 2011. The emerging small tea sector has contributed from 5% in early 90's to 31% during current year and is expected to touch 50% within next few years. It can be concluded that area could influence the production and it needs to be increased under replanting and replacement planting. Steps should also be taken to increase the export of value added tea in the country. The small tea sector should be organised and regulated to make it more productive.

Keywords: India, Production, Green tea, Employment

Tea is the most popular beverage of the world. The use of tea dates back to 2700 B.C. in China as beverage. Tea industry is one of the oldest and well organized and labour intensive, agro-based industries and plays an important role in the national economy. The industry contributes more than ₹ 1200 crores per annum to the GNP creating employment to three million people directly and indirectly. Major three tea producing regions are Darjeeling, Assam and Nilgiri. All three differ in style and flavour. These three distinct tea is also grown in Kerala, Arunachal Pradesh, Karnataka, Tripura Himachal Pradesh, Manipur, Uttaranchal,

Nagaland, Sikkim, Mizoram and Meghalaya, Orissa, Dooars and Terai of West Bengal. World tea production reached 4524 million kilograms in 2012 and China with 38.9% share of the total world tea production dominates the market. India was the market leader at the international level with regard to production and consumption till 2005. At present, India is the second largest producer of tea in the world, and produces around 1111.76 million kilograms of tea accounting for 24.55% of tea produced world wide. The tea industry accounts for the employment of more than 2 million people. The industry has faced stiff competition in

the recent past. An attempt has been made in this study to examine the decadal changes of growth in production and export trade of tea in India.

Methodology

The study was conducted for India based on secondary published data. Tabular analysis was done to examine the change of parameters. Compound growth rate was also estimated to examine the dynamic change of some parameters in tea export. A log linear Cobb-Douglas production function was also fitted to examine the influence of few explanatory variables on production of tea with effect from 1970-71 to 2014-15 in India as follows:

$$Q_t = f(X_{1t}, X_{2t}, X_{3t}, X_{4t}, X_{5t}), \text{ specified as}$$

$$Q_t = \alpha X_{1t}^{\beta_1} X_{2t}^{\beta_2} X_{3t}^{\beta_3} X_{4t}^{\beta_4} X_{5t}^{\beta_5} e$$

Where, Q_t = Total production of tea in India (million kgs) from 1970-71 to 2014-15

X_{1t} = Total area of tea in India from 1970-71 to 2014-15 ('000 ha)

X_{2t} = Total productivity of tea during 1970-71 to 2014-15(kg/ha)

X_{3t} = Total replanting/replacement area (ha) from 1970-71 to 2014-15

X_{4t} = Total rainfall (mm) from 1970-71 to 2014-15

X_{5t} = time (proxy variable for technology) from 1970-71 to 2014-15

α is the intercept and β_i s are the elasticities

The parameters were tested at 1, 5 and 10% level of probability.

Results and Discussion

Present status of Indian tea in global production

During 2013 the global tea production was 4819 mkg out of which India shared 1200 mkg. It was observed that out of total production in the world 96.76% were consumed while the rest of 3.24% were exported.

In India, 83.58% of total production of tea was consumed domestically and only 16.42% of it was exported. India produced 24.90% of tea production from 15.00% area under tea plantation in the world (Table 1).

Table 1: Present status of tea in the global production

Particulars	World (2013)	India (2013)	Rank	p.c share
Area under tea (mh)	3.69	0.56	2nd	15
Production (mkg)	4819	1200	2nd	25
Export (mKg)	1865	219	4th	12
Consumption (mkg)	4663	1003	2nd	22

Decadal change of share of tea production in different countries

Share of tea production in different countries of the world showed that percentage share of tea production varied from 5.64 in Indonesia to 27.35 in India during 2002. China shared 24.31% during this year. It was also found that during 2012 this share varied from 2.87% in Indonesia to 38.92% in china which production of tea in the world during this period. During this decade percentage share of

Table 2: Decadal change in total tea production of India and other countries in Global production

Leading tea producing countries	2002 Total production (mkg)	p.c share	2012 Total production (mkg)	p.c share	Decadal change (pc) of share
India	838	27.35	1111.76	24.57	-2.80
China	745	24.31	1761.00	38.92	14.61
Sri Lanka	311	10.15	326.28	07.21	-2.94
Kenya	287	9.36	369.56	08.16	-1.20
Indonesia	173	5.64.	130.00	02.87	-2.83
World	3064	100.00	4524.98	100.00	

tea production in different countries was found to decline except in China (Table 2). The production of tea in the traditional countries like India and Sri Lanka was found to decline in the last decade.

Decadal changes in area, production and productivity of tea in India

An attempt was made to examine the decadal changes of area, production and productivity of tea in different states of India since 1951 to 2011. It was observed from Table 3 that change in area gained over decades in Assam at the rate of 0.40% in 1951-61 to 1.20% in 2001-11, 0.63 to 1.55% in

Tripura and -0.21% to 0.66% in Tamilnadu during this period. It was found to decline in all other states. The nation gained area under tea towards the end of the decade. During 1971 to 2001, decadal change in area of tea was found to be more erratic in the country. Decadal change of production of tea was found to decline in the tea producing states in the last decade except in Kerala and it was found to gain marginally in the country. Production of tea was found more erratic during 1971-1901.

Annual productivity change of tea in different states in the decades indicated that its change was higher in Assam and Taminadu due to introduction

Table 3: Decadal changes in area, production and productivity of tea in different states of India

Year	Assam	West Bengal	Tripura	Himachal Pradesh	Tamil Nadu	Kerala	Karnataka	All India
1951								
Area	155.7	79.6	4.7	2.6	33.4	33.2	1.6	316.8
Production	150.4	78.2	1.8	1.1	25.2	25.8	0.8	285.4
Productivity	966.0	982.0	392.0	261.0	756.0	776.0	514.0	901.0
1961								
Area	162.4(0.40)	82.7(0.39)	5.0(0.63)	2.0(-2.30)	32.7(-0.21)	39.8(1.99)	1.7(0.62)	331.3(0.46)
Production	182.3(2.12)	86.3(1.04)	2.6(3.0)	1.1(0.00)	39.8(1.09)	39.5(5.31)	1.7(11.25)	354.4(2.42)
Productivity	1123(1.62)	1043(0.62)	532(3.57)	284(0.88)	1215(6.07)	994(2.81)	992(9.29)	1070(1.88)
1971								
Area	182.3(1.22)	88.4(0.69)	5.4(0.8)	4.1(10.5)	34.6(0.58)	37.3(-0.63)	1.8(0.58)	356.5(0.76)
Production	223.7(2.27)	104.1(2.06)	2.9(1.15)	0.8(-2.72)	57.5(4.45)	42.7(0.81)	2.8(6.47)	435.5(2.29)
Productivity	1227(0.93)	1176(1.27)	1227(13.06)	212(-2.5)	1661(3.67)	1146(1.53)	1539(5.51)	1221(1.41)
1981								
Area	203.0(1.12)	94.0(0.63)	5.3(-0.18)	4.1(0.00)	37.0(0.69)	35.6(-0.46)	1.9(0.55)	383.6(0.76)
Production	305.1(3.64)	128.3(2.32)	3.2(1.03)	0.6(-2.5)	71.6(2.45)	47.6(1.15)	3.4(2.14)	560.4(2.87)
Productivity	1503(2.25)	1365(1.61)	604(-5.07)	145(-3.16)	1931(1.62)	1338(1.67)	1793(1.65)	1461(1.97)
1991								
Area	233.3(1.49)	101.9(0.84)	5.8(0.94)	2.0(-5.12)	38.6(0.43)	34.7(-0.25)	1.9(0.00)	420.5(0.96)
Production	400.6(3.13)	155.2(2.10)	5.1(5.9)	1.1(8.33)	119.9(6.74)	66.8(4.03)	4.5(3.23)	754.2(3.46)
Productivity	1717(1.42)	1523(1.16)	874((4.47)	574(29.58)	3104(6.07)	1926(4.39)	2290(2.77)	1794(2.28)
2001								
Area	268.7(1.51)	110.1(0.80)	6.7(1.55)	2(0.00)	75.4(9.53)	36.8(0.60)	2.1(1.05)	510.4(2.13)
Production	453.5(1.23)	190.6(2.28)	6.3(2.35)	1.1(0.00)	131.4(0.95)	66.0(-0.12)	5.4(2.00)	853.7(1.31)
Productivity	1675(-0.24)	1732(1.37)	952(0.89)	502(-1.25)	1741(-4.39)	1796(-0.67)	2577(1.25)	1672(-0.68)
2011			—	—				
Area	322.2(1.20)	115.1(0.45)	—		80.4(0.66)	37.1(1.52)	2.1(0.00)	790.3(5.48)
Production	508.7(1.22)	226.3(1.87)			167.2(2.72)	68.3(0.35)	5.3 (-0.18)	988.3(1.58)
Productivity	2354 (4.05)	2009.0(1.60)			2647(5.20)	2180 (2.13)	2632.40(2.15)	1925 (1.51)

Figures in parentheses indicate annual decal change Area in '000 ha, Production in mkg, Productivity in kg/ha

of small tea cultivation. It was found to increase marginally in West Bengal, Karnataka and Kerala during the last decade. In Karnataka, it was found to change annually at 9.29% during 1951-61 and which declined to 2.15% during 2001-2011. In West Bengal, productivity change of tea was almost stagnant in the recent decade. It was observed that change in production of tea in the country was primarily influenced by change in area other than productivity. Relative productivity was higher in South India.

Factors affecting tea production and their elasticities

The effects of factors contributing to the total production of tea in India were examined with effect from 1970-71 to 2014-15 and the results were:

$$Q_t = 0.09 X_{1t}^{0.88(14.69)***} X_{2t}^{0.94(11.40)***} X_{3t}^{0.01(NS)} X_{4t}^{0.08(1.69)**} X_{5t}^{0.025(1.50)*} R^2=0.99$$

***, ** and * indicate level of significance at 1, 5 and 10% level of probability respectively. Figures in parentheses indicate *t* values.

The elasticities of the C-D function indicated that production of tea in India was influenced more by area and productivity followed by rainfall and technology as proxy. Other factors could not explain the production more significantly. The effect of rainfall on production of tea was found to be adverse during this period. The high rainfall might have adversely affected the production of green leaf accompanied by high incidence of pest and disease affecting production. The area under replanting and replacement of tea bushes was inadequate and could not boost the tea production in the country. All factors were found to be inelastic in nature.

Production of tea in India according to grades

Table 4 indicates that production of CTC tea has

increased from 55.11% in 1971 to 89.0% in 2011. In case of orthodox, Darjeeling and green tea its share declined in the country. In comparison to CTC tea, orthodox and Darjeeling tea production declined faster in the country. Production of green tea declined up to 2001 and then increased. It was also observed that out of total production of tea in the country about 97.2% were shared by CTC and orthodox tea in the recent years.

Decadal changes and growth of export of value added tea in India

Table 5 shows the decadal change of exports of value added tea in India. It was observed that total export of tea was found to decline in the country till 2001 after which it increased faster. It was also observed that export of packet tea increased manifold up to 1991-92 after which it declined. In contrary export of tea bags has reached a momentum with high export growth while the export of instant tea declined faster from 1981-82. The growth of export was lowest for total tea and packet tea while it was higher for other value added tea like tea bags and instant tea. Relative to changes in physical quantity growth of export values were higher for each grade in the country. It was highest for tea bags and instant tea export in the country. This indicates that India should also put more emphasis to export value added tea.

Table 6 indicates that auction sale of tea in the country has declined in the recent past. During 1971, 62.08% of made tea were sold through auction which declined to 51.19% in 2011. In contrary quantity of made tea sold directly was found to increase from 37.92 to 48.81% during this period. In the recent year's buyers from foreign countries established forward linkages and preferred to buy directly from the gardens through e-trading.

Table 4: Production of tea in India according to grades (mkg)

Year	CTC	Orthodox	Darjeeling	Green	Total
1971	240.0(55.11)	164.6(37.80)	10.3(2.36)	20.6(4.73)	435.5(100.00)
1981	357.5(63.80)	183.1(32.67)	12.2(2.17)	7.6(1.36)	560.4(100.00)
1991	603.6(80.03)	126.9(16.83)	13.9(1.84)	9.8(1.30)	754.2(100.00)
2001	759.5(88.94)	79.2(9.29)	9.8(1.14)	5.4(0.63)	853.9(100.00)
2011	880(89.0)	80(8.2)	12(1.2)	16(1.6)	988(100)

Figures in parentheses indicate the percentage of total tea

Table 5: Decadal changes and growth of export of value added tea in India

Years	Total tea	Value added tea						
		Packet tea		Tea bags		Instant tea		
	Quantity (mkg)	Value (₹ in'000)	Quantity (mkg)	Value (₹ in'000)	Quantity (mkg)	Value (₹ in'000)	Quantity (mkg)	Value (₹ in'000)
1971-72	214.3	160.9	4.64	4.39	0.04	0.10	0.20	0.76
1981-82	224.2	406.8	20.49	46.82	0.78	3.35	0.83	4.17
	(4.62)	(152.83)	(341.59)	(966.52)	(185.00)	(325.00)	(315.00)	(448.68)
1991-92	215.2	1196.5	78.32	452.09	0.48	7.14	1.28	15.80
	(-4.01)	(19.37)	(282.23)	(865.60)	(-38.46)	(113.13)	(54.22)	(278.90)
2001-02	190.0	1695.79	42.72	521.14	2.54	59.71	2.59	74.20
	(-11.71)	(41.73)	(-45.58)	(15.27)	(437.5)	(736.27)	(102.34)	(369.62)
2012-13	216.23	4005.93	11.09	309.18	12.12	455.94	2.39	114.52
	(13.80)	(136.23)	(-74.04)	(-40.67)	(377.16)	(663.59)	(-7.72)	(54.34)
CGR(%)	0.02	7.9	2.0	10.6	14.5	22.2	6.1	12.6

Figures in parentheses indicate decadal change

Table 6: Production and quantity of tea sold through auctions

Year	Production (mkg)	Sold through auctions (m kgs)	pc of quantity sold in auction	pc of quantity sold directly
1971	435.5	270.4	62.08	37.92
1981	560.4	306.9	54.76	45.24
1991	754.2	473.9	62.83	37.12
2001	853.7	459.8	53.85	46.15
2011	988.3	506.0	51.19	48.81

Table 7: Status of workforce in Indian tea Industry

State	No. of estates		Workforce in 2001			(2011)			Workforce/estate	
	2001	2011	Permanent	Temporary	Total	Permanent	Temporary	Total	2001	2011
Assam	780	767	54568 (29.6)	129688 (70.4)	184256	411071 (59.4)	280553 (40.60)	691624	236	902
WB	308	324	12110 (21.7)	43702 (78.3)	55812	227652 (69.6)	99377 (30.40)	327029	181	1009
Tamil nadu	228	140	12292 (9.13)	122259 (90.87)	134551	38739 (78.70)	10487 (21.30)	49226	590	352
Kerala	154	91	5928 (61.40)	3729 (38.60)	9657	34341 (79.13)	9053 (20.87)	43394	63	477
Karnataka	16	18	18220 (12.60)	126340 (87.40)	144560	2534 (73.60)	909 (26.40)	3443	9035	191

Moreover, some buyers preferred some reputed gardens to buy quality tea.

Decadal change of work force in Indian tea industry

It is evident from Table 7 that except in WB and

Karnataka number of tea estates declined in all other states of India. Employment pattern in the estates indicated that the states employed temporary labour more than the permanent labour in the tea estates. During 2001 Employment of permanent labour varied from 9.13% in Tamilnadu to 61.40% in

Kerala. Except in Kerala employment of permanent labour was quite low in other states. In contrary the employment of temporary labour was higher in the tea estates. It was more than 90.00% in Tamilnadu. During 2011, employment scenario in the tea sector of the country had undergone changes. Employment of permanent labour was found to increase in all states and the temporary labourer declined to 20.87% in Kerala to 40.60% in Assam. It was also found that total labour per estate increased in Assam, West Bengal and Kerala while it declined in other states during 2001 to 2011.

Emergence of small tea sector

Small tea growers have area under tea plantation upto 10.12 hectares. This sector grew right from 1920 and it spread to NE India in late eighties. Currently there are 2 lakh growers cultivating tea in 1.60 lakh hectares. The contribution of small tea sector has gone upto 5.00% in nineties to 31.00% in the recent years and it is expected to touch 50.00% in the next few years. In absolute terms production volume is around 350 mkg. Small tea sector has emerged as a promising tea sector for domestic market. However, the sector needs to be organized and controlled for producing quality tea attaining more bargaining power.

Summary and Conclusion

It was observed that tea plantation sector is playing an important role contributing more than 200 crores to the GNP of the country. The major three tea producing regions are Darjeeling, Assam and Nilgiri. Production of tea in the country was influenced more by area and productivity while other factors like replanted and replacement area could not influence the production of tea significantly. Number of tea estates was found to increase in between 1991-01 at the rate of 74.09% due to inclusion of small tea gardens and it declined from 5.29% to 3.64% during 1961 to 2011. Productivity change was higher in Assam, Tripura, Tamil Nadu and Kerala with high production change during the decades. The area growth during the decades was low. Production share of tea grades like CTC, Darjeeling and Green tea declined over years while share of Orthodox tea increased over years. The country witnessed a high annual change of area of tea bushes under the age group of 5 to 10

years followed by below 5 years due to more area put under the small tea estates in the recent years. The export of value added tea like tea bags grew faster from 1971-72 to 2011-12 in terms of quantity and value followed by packet tea. Auction sale of tea in the country declined. During 2011 Employment of permanent labour was found to increase in all states and the temporary labourer declined to 20.87% in Kerala to 40.60% in Assam. It was also found that total labour per estate increased in Assam, West Bengal and Kerala while it declined in other states during 2001 to 2011. The emerging small tea sector has contributed from 5% in early 90's to 31% during current year and is expected to touch 50% within next few years. It can be concluded that area could influence the production and it needs to be increased under replanting and replacement planting. Steps should also be taken to increase the export of value added tea in the country. The small tea sector should be organised and regulated to make it more productive in the country.

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