

Research Paper

Indian Coffee: A Quadragenary Growth Analysis

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ABSTRACT

Coffee, the favorite beverage of the civilized world, plays a more significant role in India's trade-dependent agriculture. More than 70 percent (3,08,148 tonnes) of coffee produced in the country was exported in the year 2020. The majority of Indian coffee plantations are in Karnataka, Kerala, and Tamil Nadu. The present study overviews the growth trends in the area, production, productivity, and export of Indian coffee from 1980-81 to 2019-20 by employing CAGR estimates. Indian coffee exhibited an overall growth of 1.98, 2.96, 0.98, 4.42, and 10.37 percent in area, production, productivity, quantity, and value of export, respectively, over the last 40 years. Even with significant positive growth in all the components, the Indian coffee sector is experiencing difficulties due to climatic aberrations, bottlenecks in the export business, including quality issues, and heavy competition from traditional and emerging coffee growers and traders in the international market.

Highlights

- Indian coffee exhibited an overall growth of 1.98, 2.96, and 0.98 percent in area, production, and productivity, respectively, over the last 40 years.
- The three times the higher growth rate in pre-WTO production of coffee in India in comparison with the post-WTO period was due to the introduction of intensive cultivation in coffee plantations and the evident area expansion of Robusta coffee after the 1960s.
- The second decade (1990-91 to 1999-20) could be considered as the golden era for coffee production in India because the growth in coffee production and productivity during this decade reached the all-time high of 8.12 and 5.66 percent.
- The CAGRs of quantity and value of export for the overall period (1980-81 to 2019-20) were 4.42 and 10.37 percent, respectively.

Keywords: Coffee, growth, export, value

Coffee is the favorite drink of the civilized world (Jefferson, 1824) and the second most traded commodity after petroleum (Mussatto, 2011). For many nations in the tropic, coffee constitutes a significant source of foreign exchange (Bates, 1997). Brazil is the leading grower of coffee beans, producing one-third of the world production in 2019-20 (ICO, 2020), and India is the third-largest Asian producer and exporter of coffee (IBEF, 2020). Indian coffee is famous for its finest quality and diverse varieties. Indian coffee is most preferred by Europeans over African coffee due to its less acidic nature (Robertson, 2010). The two most commonly

grown species of coffee are *Coffea arabica* and *Coffea robusta*. The major botanical cultivars in India are Kent, S.795, Cauvery, and Selection 9 (Coffee Board, 2020).

India is characterized by the cultivation of trade-dependent plantation crops that are either export-oriented or import-substituting (Abhinav *et al.* 2019). The trade liberalization policies of WTO have

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brought challenges and opportunities because of the increased integration of the country with the world, with severe implications for price stability and trade competitiveness (Chand, 2001). In India, coffee was predominantly an export-oriented commodity, and about 70 percent of coffee produced in the country was exported, while the rest used to be consumed within the country (IBEF, 2020). The majority of Indian coffee plantations are in the southern states of Karnataka, Kerala, and Tamil Nadu. Small growers contribute substantially to the coffee sector by accounting for over 90 percent of the operational holdings and 70 percent of the production (Upendranath, 2010). In 2019-20, India produced 2,98,000 MT of coffee, 2.94 percent of the world's production. The value of total exports of coffee from India declined from 6159.24 million rupees in 2018-19 to 5814.60 million rupees in 2019-20, with a decline in the share of world production from 3.08 percent to 2.94 percent (ICO, 2020). These could be attributed to the impact of adverse climatic conditions on production and severe competition in the EU market from Asian competitors like Vietnam and Nepal (Adhikari *et al.* 2020). Even though India had a persistent increase in area under coffee and production over the last 30 years, the country was found to be struggling in international and domestic markets due to competition from the low-cost coffee producers in these markets (Coffee Board, 2020).

Against this backdrop, the present analysis of growth helps to understand the trends in the area, production, productivity, and export of Indian coffee from 1980-81 to 2019-20.

MATERIALS AND METHODS

Source of data

The time-series data on area, production, the productivity of coffee in India, and quantity, value, and unit value of coffee exports about the period from 1980-81 to 2019-20 were analysed in the study. The data was collected from the website of Coffee Board (www.indiacoffee.org). The analyses were done by dividing the study period into sub-periods *viz.*, the pre-WTO period from 1980-81 to 1994-95, the post-WTO period from 1995-96 to 2019-20, the over-all period from 1980-81 to 2019-20 and different decades *viz.*, Decade I from 1980-81 to 1989-90, Decade II from 1990-91 to 1999-20, Decade III from

2000-01 to 2009-10, and Decade IV from 2010-11 to 2019-20.

Analysis of growth

The Compound Annual Growth Rates (CAGR) measure the past performance of the economic variables. The growth rates were estimated to find out the trend in the area, production, and export of coffee from India from 1980-81 to 2019-20. The CAGR was measured by fitting an exponential function for the variables *viz.*, area, production, export quantity, export value, and unit value of export (Gujarati and Sangeetha, 2007).

The functional equation for the exponential growth expressed in the form, $Y = ab^t e_t$ and the model was fitted.

where, Y = The predicted variable for which the growth rate is to be estimated with given conditions; a = Intercept; b = Regression co-efficient; t = Time variable; e = Residual term/ Error term

A logarithmic form of exponential equation is derived to obtain the compound annual growth rates, and the equation is given below:

$$\ln Y = \ln a + t \ln b$$

Then, utilized the relationship to compute the compound annual growth rate (r)

$$r = (\text{Anti } \ln \text{ of } b) - 1 \times 100$$

The significance of estimated compound annual growth rates were tested using the given statistics

$$t = r / SE (r)$$

where,

$$SE(r) = [100 b \times SE (\ln b)] / \ln e$$

RESULTS AND DISCUSSION

Analysis of Compound Annual Growth Rates

The exponential growth function was used to evaluate coffee production and export performance from India in terms of its growth in the area, production, quantity, value, and unit value for the period from 1980-81 to 2019-20. The results are presented in Tables 1 and 2.

Table 1: Growth in area, production, and productivity of coffee in India (in percent per annum)

Period	Area (Ha)			Production (Kg)			Productivity (Kg/ha)		
	CAGR	SE	Sig	CAGR	SE	Sig	CAGR	SE	Sig
Overall	1.98	0.18	10.98*	2.96	0.53	5.62*	0.98	0.52	1.86
Pre WTO	1.32	1.00	1.31	3.93	2.45	1.60	2.58	2.62	0.98
Post WTO	1.92	0.27	7.21*	1.31	0.53	2.42**	-0.61	0.40	-1.53
Decade-1	2.62	0.83	3.14*	5.17	4.62	1.11	2.48	4.21	0.58
Decade-2	2.46	2.59	0.93	8.12	3.02	2.69**	5.66	4.33	1.28
Decade-3	1.39	0.18	7.64*	-0.83	1.17	0.70	-2.19	1.11	-1.98
Decade-4	1.78	0.24	7.35*	0.06	1.19	0.05	-1.72	1.12	-1.50

Note: 1. Pre-WTO period implies 1980-81 to 1994-95, post-WTO period - 1995-96 to 2019-20, over-all period -1980-81 to 2019-20, Decade I -1980-81 to 1989-90, Decade II - 1990-91 to 1999-20, Decade III - 2000-01 to 2009-10, and Decade IV - 2010-11 to 2019-20.

2. CAGR implies Compound Annual Growth Rate, SE is Standard Error of CAGR and Sig indicates the significance of CAGR.

3. * denotes significant at one percent level, ** indicates significant at five percent level.

Table 2: Growth in export of Indian coffee

Period	Quantity (kg)			Value (₹)			Value (US\$)			Unit value (₹/kg)			Unit value (US\$/kg)		
	CAGR	SE	Sig	CAGR	SE	Sig	CAGR	SE	Sig	CAGR	SE	Sig	CAGR	SE	Sig
Overall	4.42	0.50	8.77*	10.37	1.20	8.66*	10.95	1.71	6.38*	5.69	0.99	5.75	6.25	1.43	4.36*
Pre-WTO	4.67	1.73	2.69**	8.39	4.30	1.95	17.45	4.85	3.59*	3.55	3.76	0.94	12.22	4.38	2.78*
Post-WTO	3.03	0.86	3.52*	7.61	2.07	3.66*	5.00	2.11	2.37**	4.44	1.98	2.24	1.91	2.10	0.91
Decade-1	4.52	3.59	1.25	2.54	1.76	1.44	12.48	2.22	5.62*	-1.89	3.51	-0.53	7.61	4.95	1.53
Decade-2	9.29	2.14	4.34*	27.91	8.98	3.10*	29.05	14.27	2.03**	17.03	7.91	2.15	18.07	12.66	1.42
Decade-3	-1.93	1.97	-0.98	8.97	4.42	2.02**	8.74	5.51	1.58	11.11	3.49	3.18	10.88	4.32	2.52**
Decade-4	2.52	1.86	1.35	4.62	2.65	1.74	0.86	3.31	0.26	2.04	2.22	0.91	-1.62	2.57	-0.63

Note: 1. Pre-WTO period implies 1980-81 to 1994-95, post-WTO period - 1995-96 to 2019-20, over-all period - 1980-81 to 2019-20, Decade I - 1980-81 to 1989-90, Decade II - 1990-91 to 1999-20, Decade III - 2000-01 to 2009-10, and Decade IV - 2010-11 to 2019-20.

2. CAGR implies Compound Annual growth rate, SE denotes Standard Error of CAGR and Sig denotes significance of CAGR.

3. * denotes significant at one per cent level, ** indicates significant at five per cent level.

The Indian coffee exhibited an overall growth of 1.98, 2.96, and 0.98 percent in area, production, and productivity, respectively, over the last 40 years. The CAGRs of 1.32, 3.93, and 2.58 percent were observed in the pre-WTO against the respective growth rates of 1.92, 1.31, and -0.61 percent in the post-WTO period. It could be observed that the increase in production during the pre-WTO period was mainly contributed by the growth in productivity rather than area. On the other hand, during the post-WTO period, even with a decline in productivity, there was an increase in production because of the increase in area. This increase in area offset the decline in productivity and increased production. The three times the higher growth rate in pre-WTO production of coffee in India was due to the introduction of intensive cultivation in

coffee plantations and the evident area expansion of Robusta coffee after the 1960s.

The yield of the Robusta variety is much higher than that of the Arabica species. Robusta used to be comparatively unaffected by pests like white stem-borer and diseases like leaf rust. These peculiar characteristics enhanced the production and productivity in a pre-liberalization period and the early post-liberalization period (Joy, 2004). The decadal growth chart shows high positive growth in production during the first and second decades. These were due to the intensive shift from Arabica to Robusta coffee from 1960 to 1980. The second decade could be considered the golden era for coffee production in India because the growth in coffee production and productivity during this decade reached an all-time high of 8.12 and 5.66

percent, respectively. This was supplemented by consistent blossom showers and coffee-growing areas' temperature levels (Girippa, 1995). Even after the second decade, the expansion in area under coffee was sustained, with significant growth rates of 1.39 and 1.78 percent in the third and fourth decades, respectively. While comparing the growth in the area, the third and fourth decadal growth rates were comparatively lower than that of the first and second decade. It could be attributed to the shift in cultivation from coffee to black pepper and other commercial crops. Farmers started practicing mixed cropping and diversified farming for better earnings and reduced risk in the high hills, which also led to the comparative decline in area under coffee cultivation. In addition, severe climatic abnormalities and temperature fluctuations led to a significant drop in production and productivity during the third and fourth decades (CPCRI, 1997).

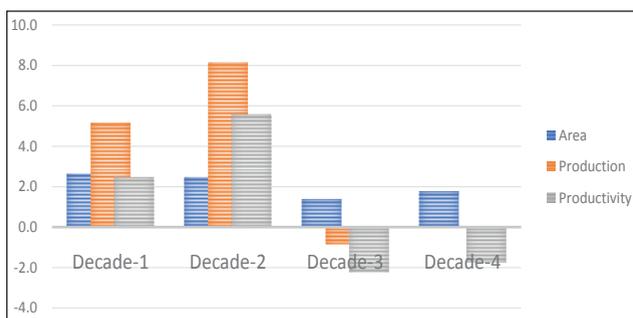


Fig. 1: Growth in area, production and productivity of Indian coffee

The growth rates in quantity, value, and unit value of coffee exports from India over the last forty years are presented in Table 2. The CAGRs of quantity and value of export were 4.42 and 10.37 percent, respectively. It could be observed that the growth in value of coffee exports from India was contributed mainly by growth in unit value rather than quantity in the overall period. The Indian coffee exporters achieved a CAGR of 4.67 percent in quantity, 8.39 percent in value (₹), and 3.55 percent in Unit value (₹/kg) during the pre-WTO period, whereas in the post-WTO period, the exports exhibited a comparatively lower growth. While considering the decadal growth of exports (Fig. 2), it could be observed that the second decade, including the liberalization period, showed the highest growth in export quantity, value, and unit values. Among the four decades, the third decade exhibited significant negative growth in quantity exported. This period

was severely affected by climatic fluctuations like inadequate rainfall in coffee belts and frequent droughts, ultimately reflecting as retarded growth in production and exports (Joy, 2004). In addition, competitions from high-quality coffee produced by Brazil and Colombia and cheap coffee from Vietnam and Indonesia in the world market induced the retardation of 1.93 percent in the third decade (Adhikari *et al.* 2020). Even with heavy competition from Nepal and Vietnam in the EU market, the fourth decade was hopeful for Indian coffee exporters. The coffee exports achieved a growth of 2.52 percent in export quantity and 4.62 percent in export value. The growth in export unit value in the Indian rupee was 5.69 while, for unit value in US dollar it was 6.25 percent during the forty years from 1980-81 to 2019-20. In line with the growth in export quantity and value, the unit values peaked in the third decadal period.

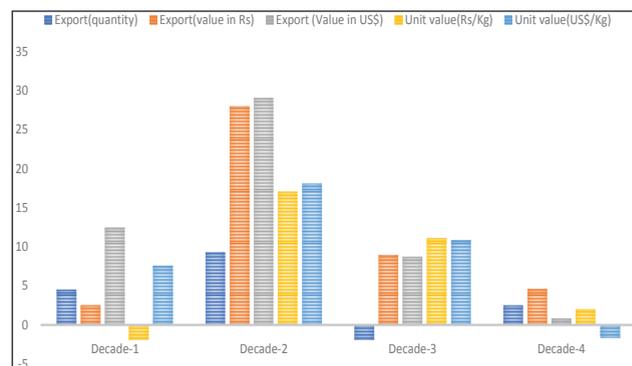


Fig. 2: Growth in Export of Indian coffee in different decades

The Coffee Market Expansion Board, the forerunner of Coffee Board acted as the sole authority of coffee marketing in India. They followed a total pooling system for coffee trade in international as well as domestic markets. Later, the stringent activities of coffee board turned the farmers against the pooling system. Then, a partial pooling system was introduced in total pooling in 1992-93 period (Coffee Board, 2018). Under partial pooling, a system of internal sales quota was introduced according to which growers were allowed to sell 30 percent of their produce in the open market. As the Internal Sale Quota (ISQ) proved to be a success, a Free Sale Quota (FSQ) system was introduced during the liberalization in 1995 (Joy, 2004). These trade liberalization policies opened up wider opportunities for exports from the country. However, the MFN clause and lifted quantitative

restrictions on imports as per WTO guidelines negatively influenced the Indian coffee market (Adhikari *et al.* 2020).

Trade liberalization opened a wide variety of opportunities to the Indian coffee farmers and exporters. However, due to climatic aberrations (droughts, inadequate rainfall/blossom showers, rise in temperature), bottlenecks in the export business, including quality issues, and heavy competition from traditional as well as emerging coffee growers and traders in the international market, the overall growth of Indian coffee sector was adversely affected. Even with all these constraints, India still stands as the major coffee producer and exporter in the international market. Hence, with better strategies and executions, the “Indian coffee” has the potential to capture a prominent place in the international market.

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