

# Agronomy of Pepper and the Indo-ASEAN FTA: A Study of Instability in Area, Production and Yield

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## **Abstract**

*The study attempts to examine the trend in area, production and yield of pepper in India, Kerala and Idukki. It also seeks to estimate the instability impact of indo ASEAN FTA on the area, production and yield. It was found that the free trade agreement and the consequent liberal trade policy advocacy has adversely affected the area, production and productivity and has made prices volatile.*

**Keywords:** Pepper cultivation, Pepper economy, Price Instability

## **Introduction**

Spices have a very important role in the domestic and foreign market. Black pepper (*Piper Nilgrum*), also called pepper, is a perennial climbing vine of the family Piperaceae and the hotly pungent spice made from its fruits. India is the second largest pepper producer in the world. Black pepper is one of the important spice commodities of commerce and trade in India since pre-historic period. It originated in the tropical evergreen forests of the Western Ghats of India. It is the major source of income and employment for rural households in the predominantly pepper growing states of India. The total area under the pepper cultivation of the country was estimated to be over 139 thousand hectare as of the financial year 2019. Pepper cultivation plays a key role in India's exports.

In India, pepper is mostly cultivated as a mixed crop and also in the farmstead gardens. In India, Kerala and Karnataka are the major pepper producing states. Kerala is the largest producer of pepper, accounting over 50 per cent of India's total output followed by Karnataka and Tamil Nadu. Idukki district surrounded by hilly regions is the largest pepper producing district in the state of Kerala. The geographical attributes of Idukki coupled with suitability of soil leads to higher production of black pepper in the district.

## **Statement of the problem**

The pepper production in India has been showing a declining trend for the past few years due to an increase in labour cost and input cost. Besides the producers are also facing problems in cultivation and in marketing. This is due an increase in cost of production and selling price. Moreover the producers of the pepper never get the benefits of price hikes but they have to bear all the adverse market conditions. Government investment in the sector is increasing but there is no corresponding effect in production and trade of pepper. Another problem faced by the farmers is the changing climatic conditions. The government and the producers are trying to increase production but still the spice sector is facing a total doom.

India had signed an FTA in goods with the regional bloc in 2009, known as the ASEAN –India Free Trade Agreement (AIFTA). In 2014, an FTA in services was also included. India's imports from ASEAN countries increased sharply in comparison to its exports to them after signing these agreements. India had recorded a trade deficit in all major trade agreements other than the South Asia Free Trade Agreement (SAFTA). Moreover it is criticised (Pal&Dasgupta 2009; Ratna&Kallummal 2013) that the AIFTA has adversely affected the prospects of major commercial crops especially in states like Kerala. In this backdrop, we seek to examine the impact of Indo-ASEAN FTA on the instability of selected agronomic parameters of pepper.

## **Objectives of the study**

The main objectives of the study are:

- To examine the trend in area, production and yield of pepper in India, Kerala and Idukki.
- To estimate the instability impact of indo ASEAN FTA on the area, production and yield.

## **Data**

The present study is based on time series data on annual prices of black pepper in for the period from 1997-98 to 2019-2020 obtained from Spices Board of India and the Kerala Economic Review.

## **Methods**

To study the influence of 2010 Indo-ASEAN FTA on price instability of pepper, the data was divided into two sub-periods viz., pre-FTA (1997-98 to 2009-2010) and post FTA (2010-2011 to 2019-2020) periods.

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Three different measures of instability viz., Coefficient of Variation, Cuddy Della Valle Instability Index and Coppock's Instability Index were computed so as to confirm the dynamics of price instability. Even though Coefficient of Variation (CV) is the simplest measure of instability, it over-estimates the level of instability in time-series data which are characterised by long-term trends.

### Coefficient of Variation

Coefficient of Variation is defined as the ratio of standard deviation to mean.

$$\text{Coefficient of Variation} = \frac{\sigma}{\mu}$$

### Cuddy-Della Valle Index

The Cuddy Della Valle Index de-trends the annual price and shows the exact direction of the instability (Cuddy & Della Valle, 1978). Hence, it is a better measure to capture instability in agricultural production and prices. A low value of this index indicates low instability in prices and vice-versa. The Cuddy-Della Valle index corrects the CV as:

$$\text{Cuddy-Della Valle Instability Index} = CV \cdot \sqrt{1 - R^2}$$

Where, CV is the Coefficient of Variation in per cent, and R<sup>2</sup> is the coefficient of determination from a time trend regression adjusted for its degrees of freedom.

### Coppock's Instability Index

Coppock's Instability Index (CII), which is calculated as the antilog of the square root of the logarithmic variance using the following formula (Coppock, 1962).

$$CII = \text{Antilog} \cdot \sqrt{V \log - 1} \cdot 100$$

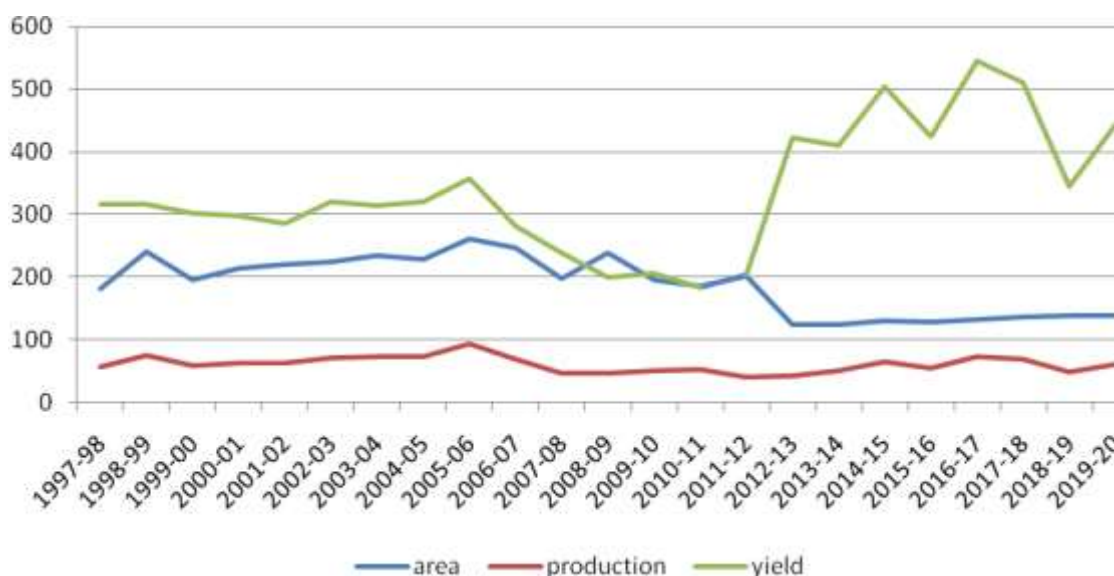
Coppock's Instability Index is a close approximation of the average year-to-year percentage variation adjusted for trend and the advantage of CII is that it measures the instability in relation to the trend in prices. A higher numerical value for the index represents greater instability.

## Results and Discussion

### Trend in Area, Production and Yield

Black Pepper is one of the major spice commodities which are traded in India since pre- historic time. India was one of the largest producers of black pepper. Pepper cultivation is mainly concentrated in Kerala, Karnataka, and Tamil Nadu. Pepper is also cultivated in non- traditional areas like Maharashtra, Orissa, North Eastern states and Andaman Nicobar Island. To understand the trends and growth rates in area, production and productivity (in millions) of pepper in India, a brief trend and growth analysis has been carried using the time series data for the period 1997-2020.

**Fig. 1 Area, Production and yield: India**

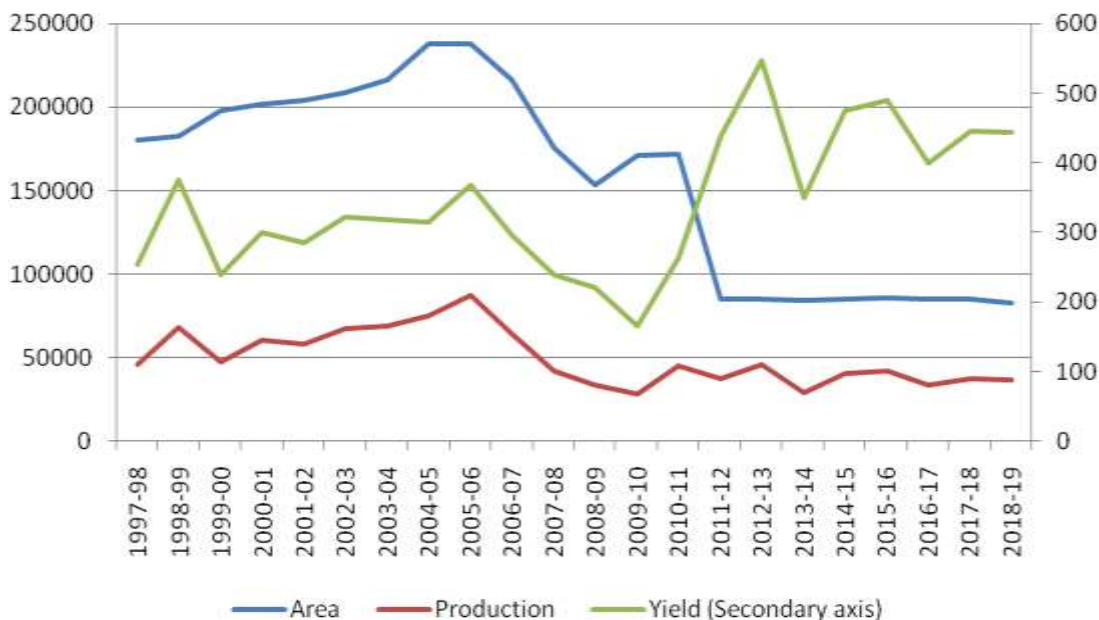


Source: Kerala Economic Review, Various rounds.

The figure 1 depicts the trend in area, production and yield of pepper in India. The Spice board India estimate indicated that in the previous year (2019- 2020) the area under pepper cultivation was 137.3 thousand ha and production was 61 thousand tonnes and the yield was 444 thousand kg per ha. In the year 1997 – 98 the area for pepper cultivation was 181.5 thousand ha with production 57.3 thousand tonnes and yield 316 thousand kg per ha.

The area, production and yield were stagnant form 1998 to 2005. After the year 2005 area, production and yield shows a declining trend till 2008. From 2011 the yield per ha increased steadily with a decrease in area. The highest yield was in 2016-17 with 546 thousand kg per ha with production of 73.25 thousand tonnes and area of 132.35 thousand ha.

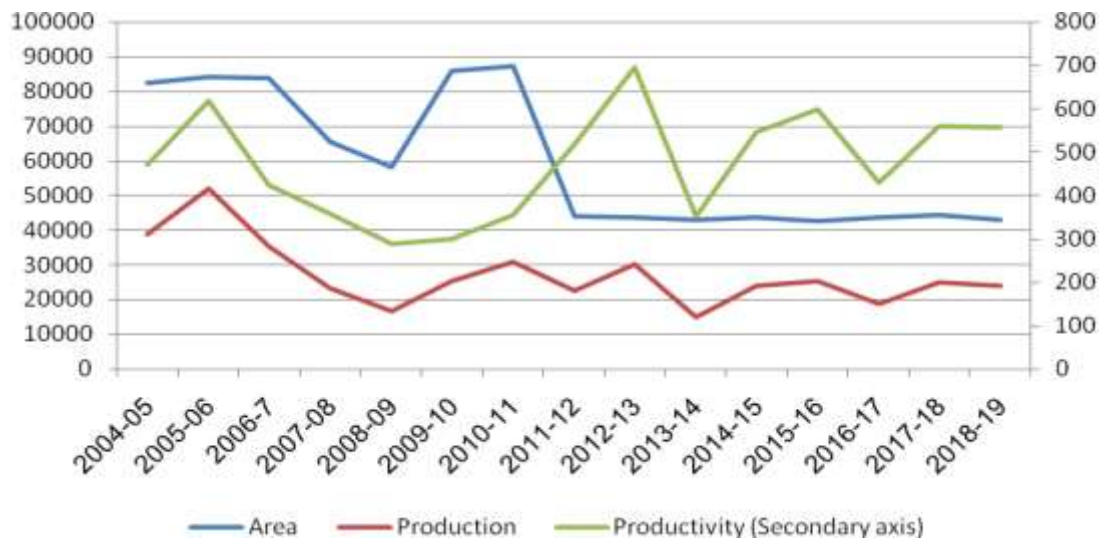
**Fig 2 Area, Production and Yield: Kerala**



Source: Kerala Economic Review, Various rounds

Fig 2 shows the trend in area, production, yield of pepper in Kerala from 1997 to 2019. The area of pepper cultivation decreased from 180370 ha with production 46040 tonnes in 1998 to 82761 ha with 36776 tonnes in 2019. The production was 87605 tonnes in 2005-06 with a yield of 368 kg/ha and area of 237998 ha. Then the area, production and yield started to decline and reached 28497 tonnes of production and yield of 166 thousand per ha with an area of 171489 ha. After 2010, there was a sudden increase in the yield (547 kg per ha) with a decreasing trend in area and then decreased to 350 per/ha. The yield further increased to 490 per/ha in 2016-16. The highest yield was in the year 2012-13 with 547 thousand kg/ha. The area and production remained almost stable from 2011-12 to 2018-19 in Kerala.

**Fig 3: Area, Production and Productivity of Pepper: Idukki**



Source: Kerala Economic Review, Various rounds

The figure 3 shows the trend in area, production and productivity of pepper in Idukki district from 2004 to 2019. The pepper production in Idukki district from 2004 to 2019 decreased from 38781 tonnes to 23981 tonnes. The decrease in production was due to a decrease area from 84219 ha in 2004 to 43103 ha in 2019. Fluctuations were observed in the area, production and productivity of pepper from 2004 to 2019. Pepper production was 38781 tonnes in 2004 and increased to 52063 tonnes in 2006. Then decreased to 16708 tonnes in 2008- 2009. The production along with productivity also decreased.

The area under pepper cultivation decreased steadily from 82316 ha to 58290 ha from 2004 to 2009 before reaching 827274 ha in 2011. Then the area again decreased to 44010 ha in 2012 and was stable till 2019. The highest productivity was in 2013 with production 30424 tonnes and area of 43755 ha. The productivity decreased 350 per ha and then increased to 556 per ha in 2019.

### Indo-ASEAN FTA and Instability

India’s free trade agreement with the ASIAN countries did not benefited India as expected. India’s trade deficit had increased ever since the country entered into FTA with ASIAN. India’s import from these countries rose sharply in comparison to its export after signing these agreements. The cheap imports from the ASIAN countries affected the production of agricultural sector and there is no exemption for pepper.

### Instability measures for India, Kerala and Idukki

The instability impact of Indo-ASIAN FTA in India’s area, production and yield has been measured using CV, Cuddy-Della Valle Instability Index and Coppock’s Instability Index. Pre- Indo-ASEAN FTA refers to 1997-98 to 2009-2010 period while post Indo-ASEAN FTA refers to 2010-2011 to 2019-2020.

There was instability in area and yield of pepper in India with the instability in the latter being the most. Production remained quite stable as before the Indo-ASEAN FTA. In the case of Kerala, instability increased in area and yield while the volatility in production fell after the Indo-ASEA FTA. For Idukki, instability increased in area post Indo-ASEAN FTA, while yield remained quite stable.

**Table 1: Instability measures of Area, Production and Yield for pre and post Indo-ASEAN FTA in India, Kerala and Idukki**

		India			Kerala			Idukki		
		Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
<b>Coefficient of Variation</b>	Pre- Indo-ASEAN FTA	0.105	0.199	0.162	0.127	0.295	0.208	0.152	0.398	0.305
	Post Indo-ASEAN FTA	0.184	0.196	0.308	0.308	0.137	0.193	0.300	0.209	0.223
<b>Cuddy-Della Valle Instability Index</b>	Pre- Indo-ASEAN FTA	10.210	19.364	12.495	12.667	28.396	18.906	14.267	25.224	17.207
	Post Indo-ASEAN FTA	15.580	16.569	24.321	25.600	12.756	18.324	25.152	19.895	21.567
<b>Coppock’s Instability Index</b>	Pre- Indo-ASEAN FTA	40.9	44.9	43.9	41.884	51.011	46.084	43.331	55.28165	49.315
	Post Indo-ASEAN FTA	43.4	44.9	53.7	46.596	42.416	45.652	46.391	46.072	46.551

Source: Computed by the author

Note: Pre- Indo-ASEAN FTA refers to 1997-98 to 2009-2010. Post Indo-ASEAN FTA refers to 2010-2011 to 2019-2020

### Summing Up

India is the largest consumer of pepper in the world and second largest producer after Vietnam. Pepper being a significant foreign exchange earner and a source of income and employment to people from time immemorial deserve a planned and continuous attention. In India, the production of pepper is declining. Fall in productivity, climatic variation, price fluctuation, incidence of pests and diseases and increased cost of production had resulted in decline in pepper production in the country. Pepper is produced mainly by the developing countries of the tropical region. Productivity of in these regions is higher compared to India which provides them a comparative advantage in the world market. In India, the highest producer of pepper is in Kerala but its output has also been firmly worsening during the late 2000s. The indo- ASIAN FTA signed in 2010 has worsened the situation. The cheap imports of pepper from ASIAN countries affected the peppereconomy of India adversely affectingher farmers.

The neo-liberal policy advocacy had a significant impact on pepper farming in India. It has adversely affected the area, production and productivity and has made prices volatile. The issue of the economic feasibility of pepper cultivation has to be

addressed, along with ensuring the sustainability of farmer livelihoods. This calls for policies that augment support to farmers, particularly the smallholders and managing the stability of price.

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