



## TREND ANALYSIS OF AREA, PRODUCTION AND PRODUCTIVITY OF COCONUT IN INDIA

**Shimna. C. U**

Research Scholar Department of Commerce and Management Studies  
PSMO College, Tirurangadi

**Dr. Ayoob. C. P**

Research Supervisor Department of Commerce and Management Studies  
PSMO College, Tirurangadi

### Abstract

*India is one of the leading coconut producer in the world. Despite of this, India is importing coconut and its value added products which clearly manifests the inadequate domestic production of the country. This study was carried out to examine the trends in growth of area, production and yield of coconut in India during the period of 2001-02 to 2020-21. For carrying out the study, secondary data was obtained from Directorate of Economics and Statistics and Compound Annual Growth Rate was estimated. It was observed that coconut had a positive but abated growth in area, production and yield during the last twenty year period. The results of Compound Annual Growth Rate indicates a significant positive growth rate in case of production and yield whereas growth rate of area was found insignificant. However the overall results of the study calls for strong policy measures to be implemented in the field of agriculture from the side of government which otherwise might increase the import dependency of the nation.*

**Keywords :** Coconut, Growth Rate, Trend, CAGR, Area, Production, Productivity

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### Introduction

Coconut is a crop which is known for its rich source of minerals, vitamins, phytochemicals, protein and fat. Its origin in this world is believed to be eighty million years ago. India is the third largest coconut producer in the world. It produces about thirty four percentage of world's coconut (Parmar et al., 2020). The crop contributes 34100 crores to the GDP of India and more than ten million people in India depends upon this crop for their

livelihood. The earnings of the country from export of coconut is Rs 6448 crores (IBEF, 2018). Karnataka, Tamil Nadu and Kerala are the major coconut producing states in India (Naresh Kumar et al., 2009). These three states together contributes almost 84% of India's total area of cultivation and 87% of its production of coconut (Kappil et al., 2021). The area of coconut cultivation has increased from



1529000 hectares in 1991 to 2185000 hectares in 2020.

Despite of being a major producer of coconut, India's share in world market is minimal and besides this, India is still importing coconut from almost thirty four countries (Thasnimol & Prema, 2017). As per the reports, import value of coconut in India during the year 2021-22 is Rupees 728.07 crores which was Rupees 369.36 crores during the year 2017-18 (*Coconut Development Board, 2022*). Import of coconut has doubled in these four year period which clearly indicates that the production of coconut carried out in India is insufficient to meet the needs of the whole nation. The demand for coconut and its value added products is at peak in the international market. So, focusing on increasing production, productivity and also value addition of coconut might take the nation into new heights of international coconut market. In this context, the present study was carried out to analyse the trends in area, production and yield of coconut in India.

### **Objective of the Study**

To analyse the trends in the growth of Area, production and yield of coconut in India.

### **Review of Literature**

Preethi et al., (2018) carried out a trend analysis on area, production and productivity to understand the performance of coconut cultivation in India as well as in Kerala. For this purpose, authors analysed secondary data regarding area, production and productivity ranging from 1980 to 2015 and the results of the comparative study reveals that an increasing trend was

noticed in area, production and productivity of India whereas such an increasing trend wasn't noticed in case of Kerala's area and production even though productivity of coconut showed an increasing trend.

Nareesh Kumar et al., (2009) conducted a trend analysis by collecting thirty year's weather data and productivity of coconut of major coconut producing areas of India. In most of the areas, increased magnitude of temperature was noticed and in areas with minimum temperature, productivity showed a decreasing trend. The study concluded that the level of temperature has significant impact on the productivity of coconut.

Lathika & Ajith Kumar (2005) attempted to examine the trend and growth of area, production and productivity of coconut in major states of India for the period ranging from 1950 to 2002. The increasing growth rate in the area of coconut indicates that the expansion stage of coconut still goes on in the states of India. Production and productivity instabilities were noticed by the authors rather than area instabilities.

Kishore et al., (2016) estimated the Compound growth rate of area, production and productivity of Karnataka by analysing the secondary data of fifteen years ranging from 2000 to 2015. Positive growth rate which is significant at 1% was noticed during the period. Positive and significant growth in productivity was observed for twenty nine districts and non-significant negative growth was examined for one district. The study reported that the overall performance of the state regarding coconut is satisfactory from the year 2007.



## Methodology

For carrying out the study the researcher made use of time series data of area, production and yield of coconut in India from 2001-02 to 2020-21 which was obtained from the official website of Directorate of Economics And Statistics, Department of Agriculture and Farmer's Welfare under the Ministry of Agriculture and Farmer's Welfare, Government of India. Descriptive Statistics and compound annual growth rate was estimated. CAGR was executed to understand the overall changes of variables over the period. Compound Annual Growth Rate was calculated using the following formula:

$$Y_t = ab^t e$$

Here, Y= area, production and productivity

a = the intercept

b = coefficient and t = time period

The equation for estimating Compound Growth Rate is obtained by converting the above equation to log forms

$$\text{Log } Y_t = \text{Log } Y_0 + \text{Log } (1+r)$$

This equation can be rewritten as  $Y = a + b^t$

In this equation  $Y = \text{Log } Y_t$ ,  $a = \text{Log } Y_0$ ,  $b = \text{Log}(1+r)$

From this equation, Compound Growth Rate can be calculated by the following formula,

$$\text{Antilog } (b) = \text{Antilog } (\text{Log}(1+r))$$

$$\text{Antilog } b = 1+r$$

$$r = \text{Antilog } (b - 1)$$

To compute the Percentage of Compound Growth Rate, we can multiply this equation by 100

Thus the final equation to compute the percentage of CAGR =  $\text{Antilog } (b - 1) * 100$

**Table 1 Area, Production and Productivity of Coconut in India from 2001-02 to 2020-21**

Year	Area (in 000 hectares)	Production (in 000 tonnes)	Productivity (in kg/hectare)
2001-02	1893	12822	6773
2002-03	1893	12822	6773
2003-04	1934	12178	6297
2004-05	1935	8829	4563
2005-06	2029	14809	7299
2006-07	1940	15831	8160
2007-08	1903	14748	7750
2008-09	1903	14748	7750
2009-10	1895	15730	8301
2010-11	1896	10840	5717
2011-12	2071	14940	7214
2012-13	2137	15609	7304
2013-14	2140	14911	6966



2014-15	1976	14067	7120
2015-16	2088	15256	7305
2016-17	2082	16486	7918
2017-18	2097	16413	7828
2018-19	2151	16682	6826
2019-20	2173	14006	6445
2020-21	2185	14572	6670
<b>Total</b>	40321	286299	140979
<b>Mean</b>	2016.05	14314.95	7048.95
<b>SD</b>	109.1220828	1978.336741	876.8756423
<b>CV</b>	5.412667482	13.8200744	12.43980511

Source: Directorate of Economics and Statistics, Ministry of Agriculture & Farmer's Welfare, Government of India.

### Results and Discussion

The present study estimated the Compound Annual Growth Rate of Area, Production and Productivity of Coconut in India during 2001-02 to 2020-21 to examine the changes in the above variables and to understand the growth rate of overall coconut production in India. The Details of Area, Production and Productivity of Coconut is shown in Table 1. The results of the Compound Annual Growth Rate of area, production and Productivity, F statistic, and T statistic values are shown in Table 2.

**Table 2 Rate of growth in area, production and productivity of coconut in India**

Particulars	Area	Production	Yield
<b>F statistic</b>	37.22	6.09*	0.64*
<b>T statistic</b>	6.10	2.47	0.80
<b>CAGR (%)</b>	0.75	1.33	0.43

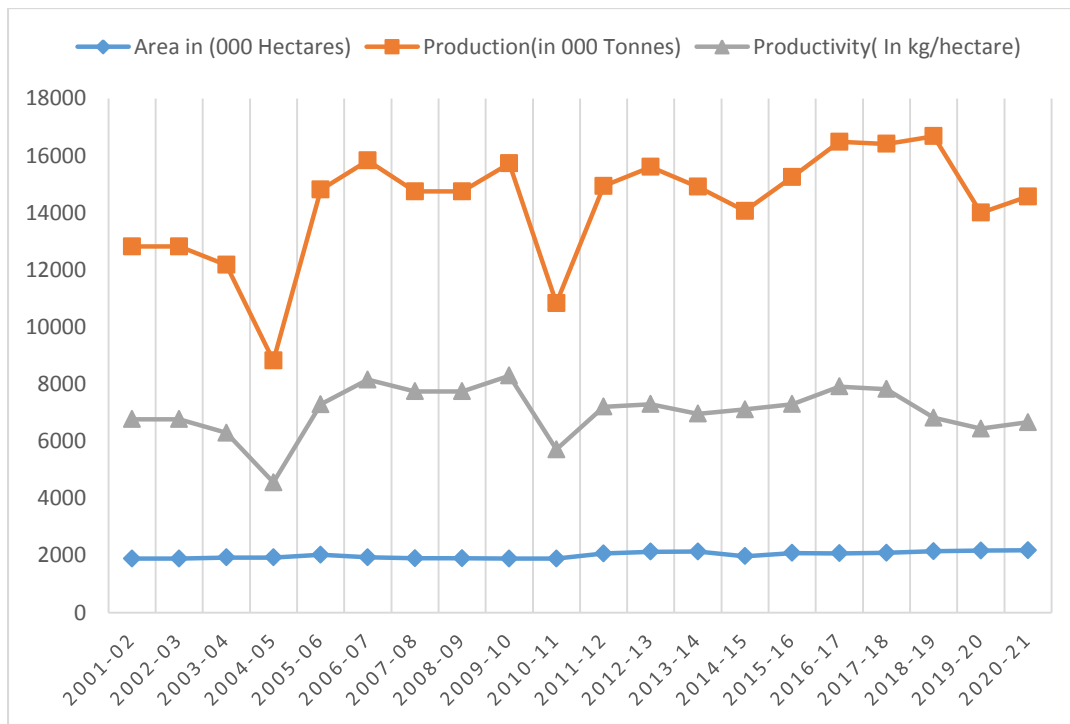
\*Significant at 5 percent level of significance

It is evident from the Table 1 that the Area, Production and Yield of Coconut in India is showing an increasing trend with noticeable fluctuations during the last twenty years, i. e 2001-02 to 2020-21. While considering the area of coconut in India, an insignificant, yet increasing growth rate can be observed. The Area has expanded from 1893000 hectares to 2185000 hectares during the last twenty years. The maximum growth rate observed was 8.45% in the year 2011-12 followed by 5.36% in the year 2015-16. In the year 2014-15, India witnessed a negative growth rate of 8.295% followed by -4.59% in the year 2006-07. However, the overall Compound Annual Growth Rate is 0.75% which indicates a diminishing growth rate of area of coconut cultivation. While taking into account the production of coconut, a hike from 12822000 tonnes to 14572000 tonnes can be detected. The CAGR estimated in case of coconut production of India is 1.33% which shows a positive growth rate in production at 5 percent level of significance. Maximum growth rate in production was observed in the year 2005-06 with 40.38% followed by 27.44% during the year 2011-12. Negative growth rates were also witnessed during the years 2003-04, 2004-05, 2007-08, 2010-11, 2013-14, 2014-15, 2017-18 and 2019-20. Among these years, highest negative



growth rate was observed in the year 2004-05 i.e. -37.93%. In case of yield, the CAGR value shows a positive growth rate of 0.43% at 5 percent level of significance. Yield of coconut decreased from 6773 kg per hectare to 6670 kg per hectare. Maximum growth in yield occurred in the year 2005-06 followed by the year 2011-12 which was 37.48% and 20.75% respectively. However, the negative growth rate happened during the twenty year period is -45.19% which is higher than the highest positive growth rate mentioned above. Another decline in the yield occurred in the year 2004-05, which is -38%.

Hence, it is evident from the results that coconut cultivation in India is increasing at a diminishing rate. No visible improvement can be seen in the area of cultivation. It is not feasible to increase the area of coconut cultivation since land is a fixed asset and hence the only way to increase production is to improve the yield by using high yielding varieties of inputs and through proper crop management practices. Implementation of new policies and offering incentives to coconut farmers might persuade them to carry out production efficiently.



**Figure 1 Growth rate of Area, Production and Productivity of Coconut.**

**Conclusion**

The study was undertaken to inspect the trends of growth in Area, Production and Yield of coconut in India during the period 2001-02 to 2020-21. The findings of the study discloses that the area, production and yield of coconut showed an overall

increasing trend during the period. The results of Compound Growth Rate discloses a significant positive growth in case of production and yield, but the growth rate of area was not significant. If the growth rate of area of coconut cultivation continues like this, the growth rate is likely to decline in future causing



negative effects on overall output. So, the government should implement appropriate policy measures to increase the area and production of coconut with special consideration for boosting the yield of the crop. In addition to this, government should provide the producers of coconut with adequate access to high yielding inputs, credit facilities, latest equipments and all other facilities to increase their interest and investment in coconut cultivation.

## References

- Acharya, S. P., Basavaraja, H., Kunnal, L. B., Mahajanashetti, S. B., & Bhat, A. R. S. (2013). Growth in area, production and productivity of major crops in Karnataka. *Karnataka Journal of Agricultural Sciences*, 25(4).
- Coconut Development Board. (2022). Import / Export Statistics. <http://www.coconutboard.gov.in/>
- IBEF. (2018, September 4). Indian Economy News. <https://www.ibef.org/>
- Kalia, A., Shukla, G., Mishra, D., Mishra, B. P., & Patel, R. R. (2021). Comparative trend analysis of mustard in Bundelkhand Region, Uttar Pradesh and India. *Indian Journal of Extension Education*, 57(1), 15-19.
- Kalidas, K., Mahendran, K., & Akila, K. (2020). Growth, instability and decomposition analysis of coconut in India and Tamil Nadu, Western Tamil Nadu, India: a time series comparative approach. *J. Econ. Manag. Trade*, 26, 59-66.
- Kappil, S. R., Aneja, R., & Rani, P. (2021). Decomposing the performance metrics of coconut cultivation in the South Indian States. *Humanities and Social Sciences Communications*. <https://www.nature.com/articles/s41599-021-00783-0>
- Kishore, M., C. M.-I. J. of C., & 2016, U. (2016). Growth in area, production and productivity of coconut in Karnataka. *International Journal of Commerce and Business Management*, 9(2). <https://www.cabdirect.org/cabdirect/abstract/20173036150>
- Lathika, M., & Ajith Kumar, C. E. (2005). Growth trends in area, production and productivity of coconut in India. *Indian Journal of Agricultural Economics*, 60(4). <https://ageconsearch.umn.edu/record/204437/files/08-Lathika.pdf>
- Naresh Kumar, S., Rajeev, M. S., Vinayan, Nagvekar, D. D., Venkitaswamy, R., Raghava Rao, D. V., Boraiah, B., Gawankar, M. S., Dhanapal, R., Patil, D. V., & Kasturi Bai, K. V. (2009). Trends in weather and yield changes in past in coconut growing areas in India. *Journal of Agrometeorology*, 11(1), 15–18. <https://doi.org/10.54386/JAM.V1111.1216>
- Parmar, P. T., Kumar Singh, A., & Borad, S. G. (2020). Coconut (*cocos nucifera*). In *Oilseeds: Health Attributes and Food Applications* (pp. 163–189). [https://sci-hub.se/10.1007/978-981-15-4194-0\\_7/cover](https://sci-hub.se/10.1007/978-981-15-4194-0_7/cover)
- Preethi, V. P., Jesy Thomas, K., & Kuruvila, A. (2018). Performance of coconut in India: A trend analysis. *Journal of Tropical Agriculture*, 56(2), 210–214.
- Rana, M. J., Islam, S., & Kamruzzaman, M. (2021). Growth and instability in area, production and productivity of



major spices in Bangladesh. *Journal of Agriculture and Food Research*, 6, 100216.

Thasnimol, F., & Prema, A. (2017). Performance and competitiveness of coconut trade in India. *Trends in Biosciences*, 10(22). [https://www.researchgate.net/profile/Thasnimol-Fasil/publication/349287656\\_Performance\\_and\\_Competitiveness\\_of\\_Coconut\\_Trade\\_in\\_India/links/6027e6164585158939a23758/Performance-and-Competitiveness-of-Coconut-Trade-in-India.pdf](https://www.researchgate.net/profile/Thasnimol-Fasil/publication/349287656_Performance_and_Competitiveness_of_Coconut_Trade_in_India/links/6027e6164585158939a23758/Performance-and-Competitiveness-of-Coconut-Trade-in-India.pdf)

