

## Trend analysis of coconut production in india

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### Abstract

The paper attempts to estimate trend in area, production and productivity of coconut in India for the period of 1977-78 to 2001-2002. The analysis is based on the data for the last 25 years. The entire analysis was done separately in three phases for the overall period under study : 1977-78 to 1986-87 is I phase, 1987-88 to 1996-97 is II phase and 1997-98 to 2001-2002 is III phase. The index number revealed the area, production and productivity of coconut in the period. The trend in growth rate analysis reveals that the growths in area, production and productivity over the years were positive in the first two periods while in the third period, productivity is negative. On the basis of fitted trend, future area, production and productivity has been predicted.

*Key words:* Coconut, trend analysis, India, area, production, productivity

### Introduction

Coconut is unique in all respects among horticultural crops grown in the country as a source of food, drink, shelter, and its raw materials are also used for industrial purposes. This crop assumes considerable importance in the national economy in view of the income and employment potential for rural population.

Coconut is an important tree crop grown extensively in coastal areas providing livelihood to about 10 million people in cultivation, processing and related activities. The production of coconut is around 8.8 million tonnes and the coir obtained from processing coconut husk is also of high commercial value. Shell based products have gained entry into the national and international markets. The coir pith made into brick like structure is now used for raising horticultural and ornamental plants particularly in greenhouses.

The economy of the region is closely interlinked

with the prospects of the crop wherever coconut is grown. This crop contributes Rs. 7,000 crores annually to the GDP and earns valuable foreign exchange to the extent of Rs. 341.08 crores by the way of export of coconut products. (Rethinam 2000).

The area and production of the crop for the year 2001-2002 are 1,89,23,000 hectares and 12821.7 million nuts. The productivity of coconut per hectare in India is 6,776 nuts.

Coconut trees are cultivated in 92 countries across the globe, occupying over 550 billion-hectares, producing 54129 nuts annually. India, which is the leading producer in coconut production has lost its place to Indonesia according to the recent findings.

The southern states of India (Kerala, Tamil Nadu, Karnataka, and Andhra Pradesh) contribute to nearly 90 per cent of the total area and production of coconut in India. Orissa, Maharashtra, Goa, West Bengal, Assam,

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Bihar, and Union Territories of Andaman and Nicobar Islands, Pondicherry and Lakshadweep also contribute a small portion of production.

In India, the raw kernel consumption accounts over 5 per cent of the nuts produced mainly for edible and religious purposes, 10 per cent for tender coconut and around 30 per cent for oil extraction. The ninth plan programme on "Integrated Development of Coconut Industry in India" was sanctioned with a total outlay of Rs. 105 crores. Of this, Rs. 72.97 crores were spent for the period 1997-98 to 1999-2000 (Rethinam, 2000). The total export earning from coconut and its products including coir and coir products during 1998-1999 was Rs.302.173 crores.

**Research Methodology**

The secondary data regarding area, production and productivity of coconut were collected from various publications of the Coconut Development Board, and The Hindu's Survey of Indian Agriculture. The temporal analysis is based on data for the last 25 years starting from 1977-78 to 2001-2002. The entire analysis was done separately in 3 phases for the overall period under study from 1977-78 to 1986-87 is I, 1987-88 to 1996-97 is II and 1997-98 to 2001-2002 is III. Statistical tools were used for identifying the production performance of coconut.

The index numbers were estimated with the formula:

$$I = \frac{X_i}{X_0} \times 100$$

where,

$X_i$  = Area/production of Coconut in the current year

$X_0$  = Area/production of the Coconut crop in the base year

i.e. triennium ending [TE] 1977-78.

The index number of productivity was calculated by the formula:

$$I_t = \frac{\text{Index number of production}}{\text{Index number of area}} \times 100$$

The index number is calculated on the chain base method to account for the change in coverage in crop estimation. The base year for the index numbers has been taken as the first year of the sampling years.

The coefficient of variation was estimated by using the following formula:

$$\text{Coefficient of variation} = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

The trend analysis was worked out using linear model and secular trend models. The secular trend function was finally selected to explain the trend due to its superiority over others in terms of coefficient of multiple determination ( $R^2$ ).

The secular Trend model is  $\log Y = a + bt$

where

$Y$  = Index number of area /production/ Productivity

$a$  = Constant

$t$  = Time in years

$b$  = Regression coefficient

In this model, the growth rate will be  $(b \times 100)$  in terms percentages (Suseendra Babu, 1997, Guledgudda, et al. 2001).

**Index Number of Area, Production and Productivity of Coconut in India**

The Index number of area, production and productivity of coconut is presented in Table 1. The index number of area shows that the area has increased in all the years, except from 1997-98 to 1998-99. (Fig.1). This could be due to the unsuitable climatic condition for coconut production during the period.

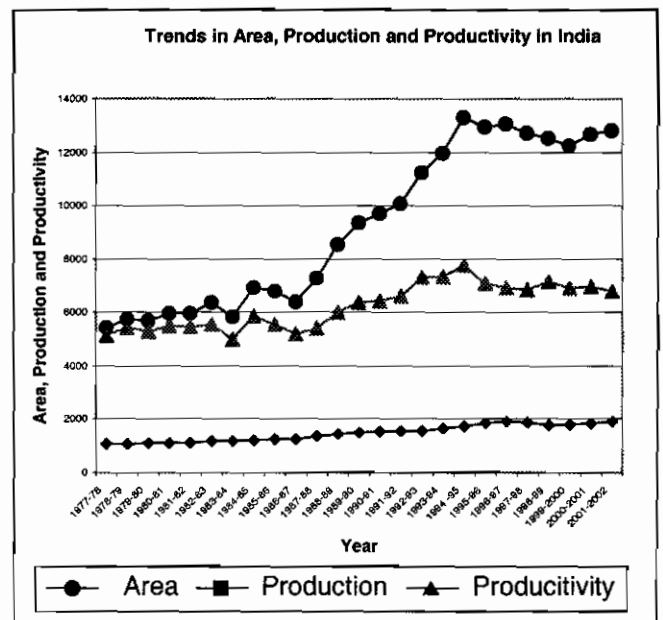


Fig. 1. Trends in area, production and productivity in India from 1977 to 2002

**Table 1. Index Number of Area, Production and Productivity of Coconut in India**

[Base T.E: 1977-78=100]

Year Period	Area	Production	Productivity
<b>Period - I</b>			
1977-78	100	100	100
1978-79	99.85	105.85	105.99
1979-80	101.81	104.59	102.72
1980-81	102.51	109.75	107.04
1981-82	103.21	109.70	106.25
1982-83	108.72	113.37	107.90
1983-84	110.26	103.58	97.20
1984-85	111.92	123.30	113.95
1985-86	115.91	120.76	107.76
1986-87	116.43	113.74	101.02
<b>Period - II</b>			
1987-88	127.28	129.66	105.34
1988-89	134.73	152.32	116.84
1989-90	139.13	166.89	137.52
1990-91	143.06	172.96	138.59
1991-92	144.47	179.72	142.58
1992-93	145.29	200.42	158.10
1993-94	154.48	213.48	158.36
1994-95	161.91	237.09	167.79
1995-96	173.04	230.87	152.82
1996-97	178.69	232.78	149.22
<b>Period - III</b>			
1997-98	175.86	266.63	147.60
1998-99	165.78	262.81	154.31
1999-00	163.60	256.84	148.83
2000-01	167.83	265.77	150.09
2001-02	174.09	268.77	147.55

In order to find out the variation in area, production and productivity of coconut in all the years, coefficient of variance analysis was used (Table 2). It was observed that the variation in production was the highest period in (8.09 per cent) period II (19.34 per cent), (1.75) in period III and overall period (32.68 per cent) compared to the variation in area and productivity. The area and productivity contributed towards more variation in production.

**Table 2. Co-efficient of Variation in Area, Production and Productivity (Per Cent) of Coconut in India**

Period	Area	Production	Productivity
Period - I	6.00	8.09	4.60
Period - II	11.06	19.34	10.50
Period - III	3.12	1.75	2.05
Overall	20.99	32.68	13.53

### Trends in Area, production and productivity of coconut in India

The results show the trends in area, production and productivity of coconut. It is observed from the table

that in all the periods, the growth trends in period I, area, production and productivity were more or less similar. The growth rate in period I for area was 1.94 per cent and that of the production and productivity were 2.23 and 0.28 per cent respectively. In period II the growth trend was 3.58 per cent 6.69 per cent and 3.00 per cent for the area, production and productivity respectively. In period III, the growth rate was -0.72 per cent in area, 0.27 per cent in production and -0.44 per cent in productivity. As far as overall period was concerned, the growth trend in area, production and productivity was 2.87 per cent, 4.52 per cent and 1.60 per cent respectively.

**Table.3. Compound growth rate in area, production and productivity of Coconut in India (per cent)**

Period	Area	Production	Productivity
Period - I	1.94	2.23	0.28
Period - II	3.58	6.69	3.00
Period - III	0.72	0.27	-0.44
Overall	2.87	4.52	1.60

The trend in growth rate analysis reveals that the growths in area, production and productivity over the years were positive in the first two periods while the third period productivity is negative growth.

### Projected Area, Production and Productivity of Coconut in India

The results reveals that the future trend of coconut area, production and productivity, the trend is likely to continue upto 2006-07 A.D. The projected area, production and productivity will be 2139.85 thousand hectares, 15908.05 thousand tonnes and 7882.83 nuts respectively.

**Table.4. Projected area, production and productivity of Coconut in India**

Year	Area ('000 ha)	Production (Million nuts)	Productivity
2002-2003	1978.17	14342.77	7491.79
2003-2004	2018.59	14734.09	7589.55
2004-2005	2059.01	15125.41	7687.31
2005-2006	2099.43	15516.73	7785.07
2006-2007	2139.85	15908.05	7882.83

### Conclusion

The trend analysis for coconut production in India shows that India has made a significant contribution to coconut production. The Indian position in the international scenario of coconut production has gone to third place, eventhough the production has not significantly decreased. This is due to the marginal increase in the production in Indonesia and Phillipines. The results reveals that the future trend of coconut area, production and productivity, is continued to 2006-07 A.D.

Increased production can be achieved under the scientific management of coconut garden, through better cultivation practices, increased application of plant nutrients, irrigation and pest control management.

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