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### Growth performance of area, production and productivity of turmeric in India: An economic analysis

**Srividyarani S Sajjan, Balachandra K Naik, Shilpa P Chowti, Neelamma R Kolageri and K Shiny Israel**

#### Abstract

Turmeric the main spice in the Indian dish curry, is argued by many to be the most powerful herb on the planet at fighting and potentially reversing disease. Turmeric is one of the oldest cultivated crop which has been grown in India and China since several thousand years. The turmeric is traditionally well known for its culinary and medicinal properties. It is one of the multiuse product which has many valuable properties and uses. It is extensively used in food, textile, medicine and cosmetic industries. Turmeric can be grown in the tropical and subtropical countries. This study is mainly based on time series data. The secondary data on area, production and productivity of Turmeric in India, were collected for the years 1997-98 to 2016-17 from various sources. The performance of Turmeric was examined by estimating the growth rates and instability index of area, production and productivity of Turmeric. The results revealed that, compound growth rates for Area, production and productivity for period of 20 years were found positive and significant at both 1 per cent and 5 per cent level of probability. The instability in Turmeric productivity exhibited less variation than area and production over the years. However, production witnessed highest instability as compared to area and productivity, over the period of time.

**Keywords:** turmeric, growth rate, instability value and production

#### 1. Introduction

Turmeric (*Curcuma longa* L.) is one of the oldest cultivated crop which has been grown in India and China since several thousand years. Turmeric the main spice in the Indian dish curry, is argued by many to be the most powerful herb on the planet at fighting and potentially reversing disease. Turmeric is an erect perennial crop, but it is grown as an annual crop. The leafy shoot rarely exceeds one meter in height. The primary tuber at the base of the aerial stem bears rhizome which is the economic portion called as bulb and fingers. The turmeric is traditionally well known for its culinary and medicinal properties. It is one of the multiuse products which have many valuable properties and uses. It is extensively used in food, textile, medicine and cosmetic industries. Turmeric can be grown in the tropical and subtropical countries. It is grown throughout the world particularly in the tropical countries. Though it is grown in many countries, yet it is not commercially exploited in most of the countries. It is widely cultivated in the countries such as India, Pakistan, Bangladesh and China, which form the important producing countries in the world. Turmeric was cultivated over an area of 1, 93,395 ha in India with a production of 10, 51,160 tonnes during 2016-17.

India is the leading producer and supplier of turmeric in the world. During 2000-01 the export of turmeric was 44,627 tonnes and was increased to 51500 tonnes in 2006-07. However export earnings have increased from Rs. 11558 Lakhs in 2000-01 to Rs.16480 Lakhs in 2006-07. The UAE, Bangladesh, Srilanka, USA and Japan are the major markets for Indian turmeric. India enjoys a monopoly position with a share of 90 percent in the International trade for turmeric. However China, Peru and Thailand are emerging as stiff competitors in the recent years (Sakamma 2009) [4]. The study was taken up with a following objective

1. To estimate the growth in area, production and productivity of Turmeric in India

#### 2. Methodology

The data used for the study was based on the secondary sources. The data on area, production and productivity of turmeric were collected from India stat web site for the years 1997-98 to 2016-17.

### 3. Analytical tools

#### Growth rate analysis:

To analyze the CAGR (Compound Annual Growth Rate), the exponential form of regression analysis was employed.

To compute average compound growth rates of area, production and productivity, the following form of regression equation was used.

$$Y_t = ab^t e^u$$

Where,

$Y_t$  = dependent variable (area/yield/production)

$a$  = intercept term

$b = (1+r)$  and 'r' is the compound growth rate

$t$  = time trend

$u$  = error term

The above model in the Logarithmic form is expressed as,

$$\text{Log } Y = \log a + t \log b + \log u$$

Log  $a$  and Log  $b$  values were obtained using the ordinary least squares procedures and the  $R^2$  was computed for testing the goodness of fit. Antilog of  $(\text{Log } b - 1) \times 100$  give the per cent growth rate. Significance of the growth rate was tested using 't' test.

#### Co-efficient of variation:

The coefficient of variation (CV) also known as relative standard deviation (RSD), is a standardized measure of dispersion of a probability distribution or frequency distribution. It is often expressed as a percentage, and is defined as the ratio of the standard deviation to the mean (average). It is a measure of relative variability.

CV = Co-efficient of variation =  $(\text{Standard deviation}/\text{Mean}) \times 100$

### 4. Results and Discussion

In this chapter an attempt is made to discuss the results obtain from the study. The important findings of this study are presented under following area, production and productivity.

Table 1 presents the percent Share in area and production of all spices in India during 2016-17. In area chilli stands 1<sup>st</sup> place with 23.54 percent, cumin stands 2<sup>nd</sup> place with 21.54 percent, Coriander stands 3<sup>rd</sup> place with 18.77 percent and Turmeric stands 6<sup>th</sup> place with 5.48 percent. In production chilli stands 1<sup>st</sup> place with 26.46 percent followed by Garlic with 17.97 percent, Ginger with 15.28 percent and Turmeric stands 4<sup>th</sup> place with 14.86 percent.

Table 2 represents the growth in area, production and productivity of turmeric in India. The average area under turmeric in India was 182.875 thousand hectares, average production was 833.31 thousand MT and average productivity was 4.48 MT/ha. It was observed in case of Indian scenario the, highest growth rate was observed in production with 3.952 per cent per annum, followed by productivity with 2.130 per cent per annum and area to be 1.789 per cent per annum. The growth rate for area, production and productivity were found positive and significant at both 1 per cent and 5 per cent level of probability. With respect to instability index the highest variation was seen in production with 27.03 per cent followed by area with 13.98 per cent variation and least variation was in productivity with 0.149 per cent. In 2014-15 there was a decrease in turmeric production due to harsh weather conditions.

Table 3 shows the major state wise share in area and production of turmeric in India 2016-17. The highest area was seen in Telangana state with 25.85 percent followed by others with 16.25 percent, 15.15 percent with Tamil Nadu and Karnataka stands 6<sup>th</sup> place with 7.75 percent. In production Telangana stands 1<sup>st</sup> place with 24.67 percent followed by others with 24.26 percent and Karnataka stands 5<sup>th</sup> place with 7.28 percent.

**Table 1:** Area and production of spices in India during 2016-17

Spices	Area (Ha)	Percentage share	Production (tonnes)	Percentage share
Pepper	131230	3.72	57000	0.81
Cardamom(Small)	69357	1.97	17990	0.25
Cardamom(Large)	26617	0.75	5572	0.08
Chilli	830770	23.54	1872010	26.46
Ginger	164850	4.67	1081430	15.28
Turmeric	193395	5.48	1051160	14.86
Coriander	662345	18.77	609350	8.61
Cumin	760130	21.54	485480	6.86
Celery	4010	0.11	5510	0.08
Fennel	74660	2.12	124610	1.76
Fenugreek	218430	6.19	220160	3.11
Ajwan	24230	0.69	13820	0.20
Garlic	274550	7.78	1271220	17.97
Tamarind	49020	1.39	190700	2.70
Clove	2350	0.07	1220	0.02
Nutmeg	23080	0.65	15460	0.22
Cinnamon	320	0.01	70	0.00
Others	19856	0.56	52738	0.75
<b>Total</b>	<b>3529200</b>	<b>100</b>	<b>7075500</b>	<b>100.00</b>

**Source:** Spices Board, India & Ministry of Agriculture and Farmers Welfare, Govt. of India

**Table 2:** Growth in area, production and productivity of turmeric in India

Years	Area (In ' 000 Hectare)	Production (In ' 000 MT)	Productivity (In MT/Hectare)
1997-98	139.7	549.2	3.9
1998-99	160.7	598.3	3.7
1999-2000	176.3	646.2	3.7
2000-01	187.4	719.6	3.8
2001-02	163	552.3	3.4
2002-03	149.4	528	3.5
2003-04	153.4	587.1	3.8
2004-05	164.1	751.9	4.6
2005-06	173.7	870.1	5
2006-07	178.5	786.8	4.4
2007-08	175.3	794.4	4.5
2008-09	190.7	877.2	4.6
2009-10	184.4	918.9	5
2010-11	222.9	1237.4	5.6
2011-12	218.7	1166.8	5.3
2012-13	194.2	986.8	5.1
2013-14	232.7	1189.9	5.1
2014-15	184.4	830.4	4.5
2015-16	186	943	5.1
2016-17	222	1132	5
MEAN	182.875	833.315	4.48
STDEV	25.56	225.25	0.6701
R <sup>2</sup>	0.575	0.708	0.660
CAGR	1.789*** (0.0035)	3.952*** (0.0058)	2.130*** (0.0035)
CV	13.980	27.031	0.1495

**Source:** Spices Board, India & Ministry of Agriculture and Farmers Welfare, Govt. of India

**Note:** figures in the parentheses indicate standard error.

\*\*\* Significant at one per cent level of probability.

\*\* Significant at five per cent level of probability.

**Table 3:** Major state wise share in area and production of turmeric in India 2016-17

State	Area	Percent share	Production	Percent share
Tamil Nadu	29306	15.15	112590	10.71
Telangana	50000	25.85	255000	24.67
Andhra Pradesh	16570	8.57	134122	12.76
Karnataka	14994	7.75	76490	7.28
Gujarat	4100	2.12	65500	6.23
West Bengal	18000	9.31	45500	4.33
Orissa	3233	1.67	35759	3.40
Mizoram	7204	3.73	27816	2.65
Assam	17059	8.82	17025	1.62
Hariyana	1500	0.78	22000	2.09
Others	31429	16.25	259358	24.26
Total	193395	100.00	1051160	100.00

**Source:** Spices Board, India & Ministry of Agriculture and Farmers Welfare, Govt. of India

## 5. Summary and Conclusions

In this perspective an analysis has been made to know the growth trend of area, production and productivity of Turmeric. The growth rates and variability in area, production, and productivity of Turmeric has been analyzed by obtaining the secondary data on area and production of Turmeric from various sources. The data has been collected for a period of 20 years i.e. from 1997-98 to 2016-17. The results revealed that, compound growth rates for area, production and productivity for period of 20 years were found positive and significant at both 1 per cent and 5 per cent level of probability. The instability in Turmeric, productivity exhibited less variation than area and production over the years. Whereas, production witnessed highest instability as compared to area and productivity, over the period of time. The reason for reduction in production estimates of 2014-15 there was a decrease in turmeric production due to harsh weather conditions.

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