Original Research Article

The trends and growth analysis in the area, production and productivity of turmeric in Surguja district of Chhattisgarh

A B S T R A C T

Turmeric is an important spice crop grown in Chhattisgarh. The present study is mainly based on time series data. The secondary data on area, production and productivity of Turmeric in Chhattisgarh, were collected for the period 2001-02 to 2015-16 from various publications. To analyze the trends and growth rate in the area, production and productivity of turmeric in Surguja district of Chhattisgarh. The performance of Turmeric was examined by estimating the growth rates and instability index of area, production and productivity of turmeric. The compound growth rate and Linear growth rate in area of turmeric crop in Surguja was observed positive and non-significant (1.79 %), (1.73 %). While growth rate in production and productivity was observed negative over the period (-1.16 %), (-1.25 %) and (-2.85 %) (-3.79 %). For Chhattisgarh- the compound growth rate and linear growth rate in area and production of turmeric was observed positive and non-significant (14.89 %), (12.27 %) and (11.94 %), (10.54 %). While growth rate in productivity in Chhattisgarh was found positive and significant (-2.57 %), (-2.52 %) over the period.

KEYWORDS: - *CGR (Compound growth rates) and LGR (Linear growth rate), Area, production and productivity*

1. INTRODUCTION

One of the first crops to be domesticated, turmeric (*Curcuma longa* L.), has been farmed in India and China for thousands of years. Many claim that turmeric, the primary spice in the Indian cuisine curry, is the most potent herb on earth for preventing and maybe curing disease (Sajjan et al. 2018). People all around India often and liberally utilize the spice turmeric. It is one among India's oldest and most enduring export products. It is referred regarded as the "King of Spices" and is also referred to as "Indian saffron" because it is an Indian spice. It is one of the most important components for cooking in the entire world (Choudhury and Kalita 2018). It is a thick underground rhizome-based herbaceous perennial that produces primary and secondary rhizomes known as fingers. The dried rhizome of the herbaceous plant Curcuma longa is what makes up turmeric. Curcumin, a pigment, makes about 1.8 to 5.4 percent of the rhizome while essential oil makes up 2.5 to 7.2 percent. About 80% of the world's production of turmeric and 60% of its exports come from India (Sahu et al. 2021). India is the world's biggest producer, consumer, and exporter of turmeric. There are around 11 lakh tonnes of turmeric produced worldwide each year. China comes in second with 8% of the global production market, followed

by India with 80%, Myanmar with 4%, Nigeria with 3%, and Bangladesh with 3%. Compared to the 1.37 lakh tonnes shipped the year before, India exported 1.71 lakh tonnes of turmeric in 2020–21. Bangladesh imports the most turmeric from India (49,522 tonnes), followed by the UAE (12,182 tonnes), Iran (10,964 tonnes), the USA (9,712 tonnes), and Morocco (8,522 tonnes). Turmeric export demand increased as a result of a surge in orders from the Middle East, the United States, Europe, and Southeast Asia. Bangladesh, from whence the turmeric was shipped by rail rakes, was the country with the highest demand for the stock. Turmeric sales have been steadily rising in 2020–21 after the Covid-19 epidemic (Outlook report of turmeric 2021). Telangana, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Madhya Pradesh, West Bengal, and Chhattisgarh are the principal turmeric-producing states in India. Turmeric is grown on 12,072 thousand hectares in Chhattisgarh, with production expected to reach 106.403 metric tons in 2020–21. Balrampur is in the top spot for the region, followed by Surguja District, and Balrampur and Raigarh are at the top for production. In addition to Surguja, where turmeric is grown, it is also extensively produced in places like Balrampur, Mahasamund, Bilaspur, Koriya, Raigarh, Korba, and Baster District, among others. (Directorate Horticulture and Farm Forestry, Chhattisgarh, Department of Agriculture, Government of Chhattisgarh). In the Surguja district, total spice production in 2020–21 will be 19.571 metric tons on an area of roughly 2.916 thousand hectares.In the 1.340 (thousand hectare) total area used for spices, only the turmeric crop contributed. 2020–2021: Area and 1.347 (metric tonne) productions in the Surguja district

2. METHODOLOGY

2.1 Detail of study area

The present study conducted in surguja district of chhattisgarh based on secondary sources; the study's data was compiled. For the years 2001-02 to 2015-16, data on turmeric's production, area, and productivity were gathered from the *Directorate Horticulture and Farm Forestry, Chhattisgarh, Department of Agriculture, Government of Chhattisgarh*. Due to its status as the second-largest turmeric-growing region in Chhattisgarh, Surguja district will be purposefully chosen for the study.

2.2 Analytical tools - Suitable statistical analysis will be used at the time of analysis looking to the availability of data.

2.3 Linear growth rate: To fulfill the objective 1- a simple linear growth rate will be computed the formula in the same as given as follows-

$$Y = a + b X$$

Where,

Y = Area, production, producer

X = year

a = intercept,

b = slope

2.4. Compound Growth Rate: The compound growth rates in area, production and productivity of crops are worked out by fitting an exponential function

$$Y = A B^{t}$$

Taking the log on both sides

$$\text{Log } Y = \log A + \text{to log } B$$

Assuming,

Log Y = y

Log A = a

Log B = b

We get

y = a + bt

Where,

t = 1, 2, 3…… n

y = Area/production/productivity of crops.

After regression between y and t

We have the value of a and b

Where,

a = Constant,

b = regression coefficient

As b = 1 + r

Hence,

r = b – 1

Therefore,

r = (Anti-log of b-1)*100

Where,

r = Compound growth rate

3. Results and Discussion

3.1 Area, production and productivity of turmeric crop in Surguja distric and Chhattisgarh State covering time period 2001-02 to 2015-16.

The turmeric crop's total area, production, and productivity in Surguja district and Chhattisgarh state are mostly displayed in this table. The Surguja district's largest area and production in 2010–11 were 2474 hectares and 27027 mt, respectively. 757 hectares and 3008 mt., respectively, in 2005–06 and 2007–08, were the lowest in terms of both area and production. In terms of productivity, 2005–06 had the highest levels (20.10 mt./hectare) while 2007–08 saw the lowest levels (2.01 mt./hectare). In the case of Chhattisgarh state, the largest area was 9768 hectares in 2013–14, the lowest was 1838.61 hectares in 2003–04, the biggest production was 88821 mt. in 2014–15, and the lowest was 21998.25 mt. in 2004–05. 12.30 mt./hectare in 2002-03 had the highest productivity, while 6.04 mt./hectare in 2013-14 recorded the lowest.

Table No. 1:-Area production and productivity of turmeric in Surguja and Chhattisgarh

S. No.	Year	Surguja			Chhattisgarh		
		Area (In hac.)	Production (in thousand mt)	productivity (In mt/hac.)	Area (in thousand hac.)	Production (In Thousand Matric Ton)	Productivity (in matric ton./hac,)
1	2001-02	906.00	14317.00	15.80	1985.00	22834.00	11.50
2	2002-03	925.00	14610.00	15.79	1838.61	22612.64	12.30
3	2003-04	944.00	14908.00	15.79	2104.48	24308.61	11.55
4	2004-05	963.00	19212.00	19.95	2210.20	21998.25	9.95
5	2005-06	757.00	15212.00	20.10	2312.30	26680.12	11.54
6	2006-07	797.00	7571.00	9.50	2534.15	26785.95	10.57
7	2007-08	1497.00	3008.00	2.01	4420.00	40017.90	9.05
8	2008-09	1497.00	10629.00	7.10	4420.00	36928.70	8.35
9	2009-10	1902.00	20775.00	10.92	5373.08	59294.68	11.04
10	2010-11	2474.00	27027.00	10.92	7425.33	64444.92	8.68
11	2011-12	1005.00	10958.00	10.90	7956.05	67482.34	8.48
12	2012-13	1070.00	11661.00	10.90	9134.15	88748.58	9.72
13	2013-14	995.00	11044.00	11.10	9768.00	59031.00	6.04
14	2014-15	970.00	10815.00	11.15	8981.00	88821.00	9.89
15	2015-16	970.00	11601.00	11.96	8225.00	76183.00	9.26

Source :- *(Directorate horticulture and farm forestry, Chhattisgarh, department of agriculture, government of Chhattisgarh)*

3.2 Growth rate of Surguja district and Chhattisgarh

The compound growth rate and Linear growth rate in area of turmeric crop in surguja was observed positive and non-significant (1.79 %), (1.73 %). While growth rate in production and productivity was observed negative over the period (-1.16 %), (-1.25 %) and (-2.85 %) (-3.79* %). For Chhattisgarh- the compound growth rate and linear growth rate in area and production of turmeric was observed positive and non-significant (14.89 %), (12.27 %) and (11.94 %), (10.54 %). While growth rate in productivity in Chhattisgarh was found positive and significant (-2.57*** %), (-2.52*** %) over the period.

Table No. 2: - Compound growth rate and Linea growth rate of area, production and productivity of Turmeric Crop in Surguja and Chhattisgarh.

Year	Surguja			Chhattisgarh		
	Area (%)	Production (%)	productivity (%)	Area (%)	Production (%)	Productivity (%)
CGR	1.73	-1.16	-2.85	14.89	11.94	-2.57***
LGR	1.79	-1.25	-3.79*	12.27	10.54	-2.52***

Note :- *** is used to indicate significance at the 1% level, ** is used to indicate importance at the 5% level, and * is used to indicate significance at the 10% level.

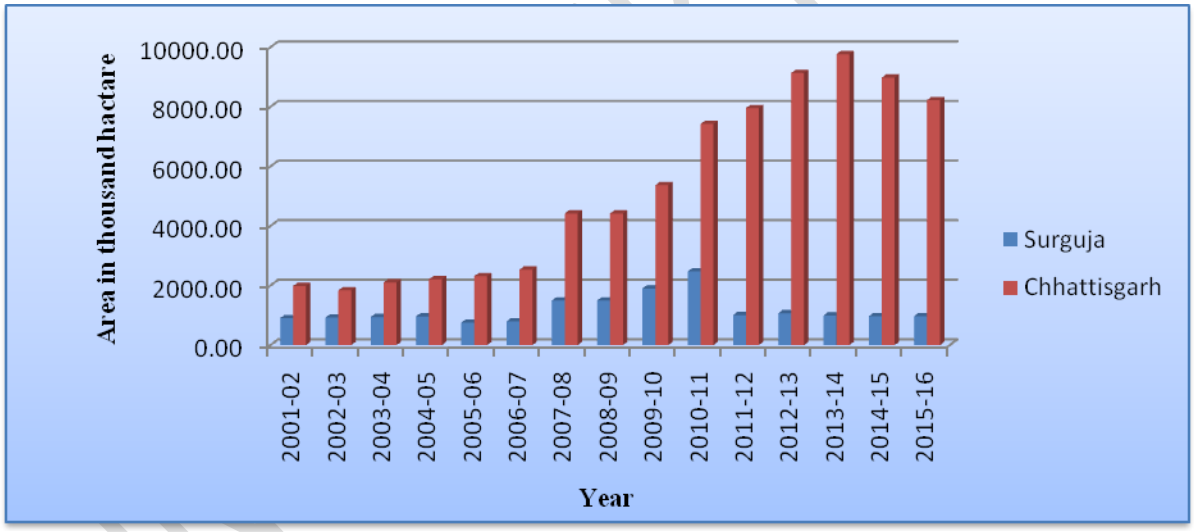

Fig. 1 Area of Surguja district and Chhattisgarh state

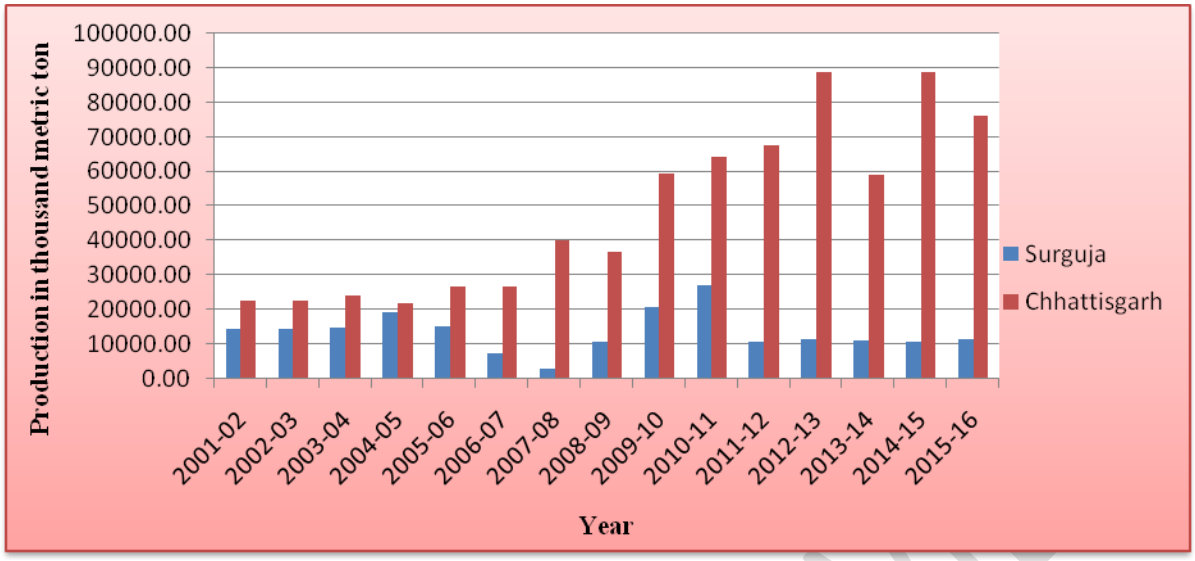

Fig. 2 Production of Surguja district and Chhattisgarh state

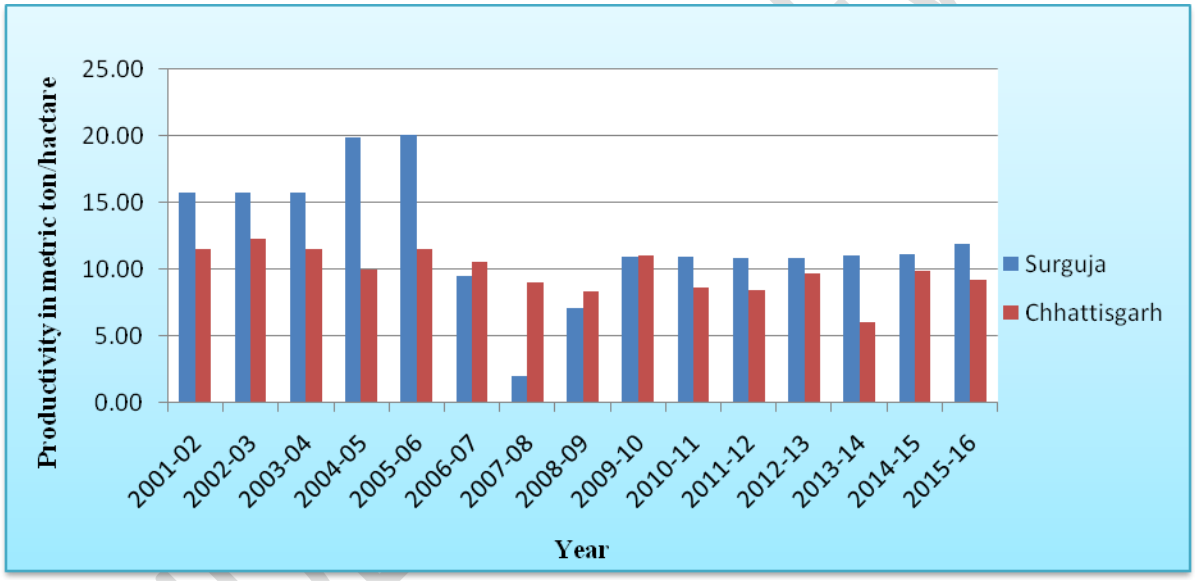

Fig. 3 Productivity of Surguja district and Chhattisgarh state

4. Conclusion

The growth analysis is displayed together with the total area, production, and productivity of the turmeric crop in Surguja district and Chhattisgarh state. Turmeric cultivation in the Surguja region started out expanding, but it started to shrink in the middle of the decade starting in 2010–11. Production and productivity were also found dropping over time. In Chhattisgarh, the area and production are both growing, but productivity had been declining since 2013–2014, however it is currently being observed in increasing order. The area of the turmeric crop in the Surguja district showed positive and unremarkable compound and linear growth rates. While there was a negative growth rate in both production and productivity across the time period. For

Chhattisgarh, the area and production of turmeric both experienced positive and unremarkable compound and linear growth rates. While Chhattisgarh's productivity growth rate was observed to be positive and considerable across the time period. The cause of which is improper farming practices and a lack of appropriate expertise. The combined effects of area and productivity also led to an increase in agricultural production and productivity over the course of the study periods. Consequently, by using the proper production technology, productivity can be further boosted while maintaining the space.A growth analysis of the data from 2001–02 to 2015–16 has been done due to the non-authenticity of the data for Surguja district from 2016–17 to 2022–23.

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