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Trend in growth rate in area, production and productivity of turmeric in Bemetara district and in Chhattisgarh state

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Abstract
The present study entitled "Trend in growth rate in area, production and productivity of turmeric in Bemetara District and in Chhattisgarh state" was carried out to calculate the growth rate in area, production and productivity of turmeric crop in Bemetara district as well as in Chhattisgarh state. compound growth rate (CGR) of area, production and productivity of turmeric in Bemetara district as well as in Chhattisgarh were calculated by using the last 10 years data (2010-11 to 2019-20), collected from directorate of Horticulture, Chhattisgarh. The study came up with the findings that the compound growth rate of area, production, and productivity of turmeric in Bemetara district was found 3.89 per cent, 13.95 per cent, and 9.69 per cent respectively. This shows the significant growth in area, production and productivity of turmeric in bemetara district while the compound growth rate of area, production, and productivity of Chhattisgarh state was found 2.69 per cent, 2.62 per cent, and -0.06 per cent showing the negative growth rate in productivity due to less interest of farmers to word the turmeric crop cultivation in the districts where rice is grown as main crop in kharif season.

Keywords: CGR (compound growth rate), area, production and productivity

Introduction
India is the largest producer, consumer and exporter of turmeric in the world. It is an herbaceous perennial with a thick underground rhizome giving rise to primary and secondary rhizomes called fingers. Turmeric is the dried rhizome of Curcuma longa, an herbaceous plant. The rhizome has 1.8 to 5.4 percent curcumin, the pigment, and 2.5 to 7.2 percent essential oil. India accounts for about 80 percent of world turmeric production and 60 percent of exports. In India, the production of turmeric is around 11 lakh tonnes during 2019-20. About 2.54 lakh ha of area was covered by turmeric, which is about 6 percent of the total area under spices in India. Chhattisgarh also has a good position in turmeric production. In year 2019-20, the total area under turmeric was 11925 ha and production was 105509 million tonnes. (Director Horticulture Nava Raipur, Atal Nagar, Chhattisgarh -2019-20)

Collection of Data
The study is based on secondary sources of data. Data regarding area production and productivity of turmeric in Bemetara district as well as of Chhattisgarh were collected through various Govt. offices as, office of the Deputy Director Horticultural, Dist.-Bemetara and Directorate of Horticulture, Chhattisgarh. Bemetara district was formed in year 2011-12 previously this district was a part of Durg district. So, data on area, production and productivity of turmeric, of the year before 2011-12 was collected from Durg district of Chhattisgarh.

Research Methodology
The statistical tool, Compound Growth Rate was adopted to calculate the growth rate in area, production and productivity of turmeric in study area.

Calculate compound growth rate
The details of the formulae given as under:

$$Y = A.B^t$$

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Taking log on both sides
Log Y = log A + t log B

Assuming
Log Y = y
Log A = a
Log B = b
We get, y = a + b t

Where,
T= 1, 2, 3……n
Y= area/production/productivity of crops.
After regression between Y and t
We have 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 rare

Results and Discussion
Total area, production and productivity of the turmeric crop in Chhattisgarh (2010-11 to 2019-20) is presented in table 1. It reveals that the area of turmeric crop increased from 8635.83 (9747.25, 10791.) ha in 2010-11 to 10933 ha in 2013-14, while it is decreased in year 2015-16 and 2016-17, and again increasing from year 2017-18. The calculated compound growth rate in area of turmeric shows a significant growth rate of 2.69 per cent. The similar trand was found in production of turmeric which registered a positively significant compound growth rate of 2.62 per cent. Productivity of the turmeric shows significantly negative growth rate (-0.06 per cent.) which is the state where paddy is grown as main Kharif crop. a negative

Table 1: Area, production and productivity of turmeric in Chhattisgarh (2010-11 to 2019-20)

S. No.	Year	Area (In Hectare)	Production (MT)	Productivity (MT/Hectare)
1	2010-11	8635.83	73257.45	8.48
2	2011-12	9747.25	83470.26	8.56
3	2012-13	10791.00	103402.00	9.58
4	2013-14	10938.00	107106.00	9.79
5	2014-15	11021.00	113347.00	10.28
6	2015-16	10575.00	95653.00	9.05
7	2016-17	10542.00	94935.00	9.01
8	2017-18	11356.00	100696.00	8.87
9	2018-19	11849.00	105703.00	8.92
10	2019-2020	11925.00	105509.00	8.85

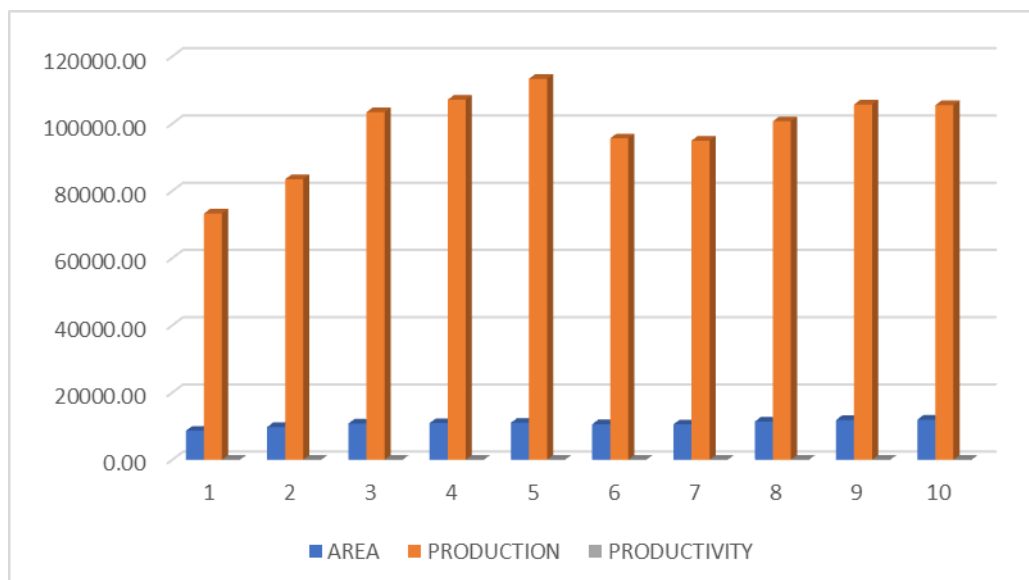Source: Director Horticulture and Farm Forestry Nava Raipur, Atal Nagar, Chhattisgarh

Fig 1: Area, production and Productivity in Chhattisgarh

Table 2: Compound growth rate of area, production and productivity of Turmeric Crop in Chhattisgarh

Particular	Area (%)*	Production (%)*	Productivity (%)*
Compound Growth Rate (%)	2.69*	2.62*	-0.06*

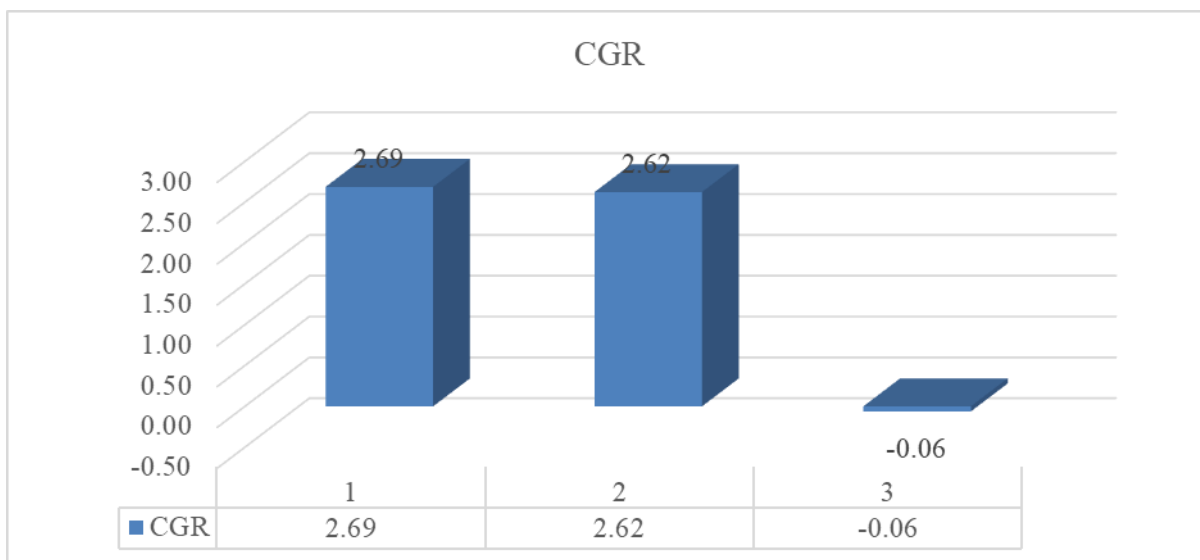Note: Compound growth rate is significant at a 1% level of significance.

Fig 2: Compound growth rate of area, production and productivity in Chhattisgarh

Compound growth rate of area, production and productivity of Turmeric crops in Bemetara District (CG.)
Total area, production and productivity of the turmeric crop in the Bemetara district (2010-11 to 2019-20) is presented in Table 3. It reveals that the area of turmeric crop increased from 235 ha in 2010-2011 to 300 ha in 2013-14, while area was constant in year 2013-14 to 2016-17, and again increased in year 2016-17 to 2018-19. 320 ha in 2019-20. Therefore, the compound growth rate has shown a significant growth rate of

3.89 percent. The production of turmeric crop increased from 1012 MT in 2010-2011 to 1350 MT in 2013-14, then similar 1350 MT to 1350 MT in 2013-14 to 2016-17, and again increased to 1465 MT and 8000 Mt in 2019-20. The calculated compound growth rate in area of turmeric shows a significant growth rate of 3.89 per cent. The similar trand was found in production and productivity of turmeric which registered a positively significant compound growth rate of 13.95 per cent and 9.69 per cent.

Table 3: Area, production and productivity of turmeric in Bemetara District (2010-11 to 2019-20)

S. No	Year	Area (In Hectare)	Production (In MT)	Productivity (In MT /Hectare)
1	2010-11	235.00	1012.00	4.30
2	2011-12	240.00	1085.00	4.52
3	2012-13	275.00	1238.00	4.50
4	2013-14	300.00	1350.00	4.50
5	2014-15	300.00	1350.00	4.50
6	2015-16	300.00	1350.00	4.50
7	2016-17	300.00	1350.00	4.50
8	2017-18	325.00	1465.00	4.50
9	2018-19	352.00	1465.00	4.16
10	2019-2020	320.00	8000.00	25.00

Source: District Directorate of Department of horticultural bemetara District (C.G.)
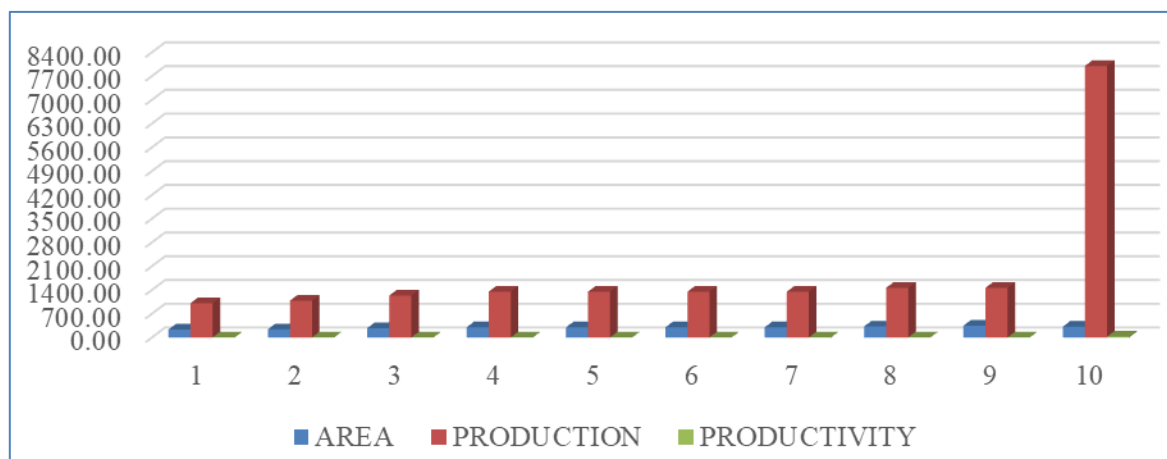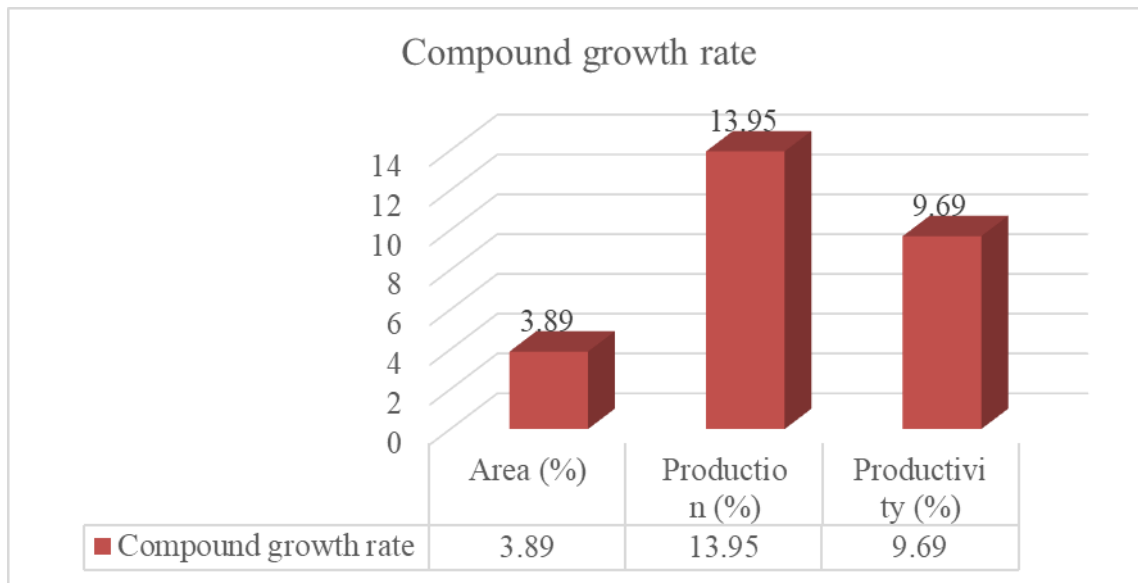

Fig 3: Area, production and Productivity Bemetara District

Table 4: Compound growth rate of area, production and productivity of Turmeric Crop

Particular	Area (%)*	Production (%)	Productivity (%)
Compound growth rate	3.89*	13.95*	9.69*

Note: Compound growth rate is significant at a 1% level of significance

Fig 4: Compound growth rate of area, production and productivity Bemetara District (CG.)

Conclusion
The growth rate for area, production and productivity of turmeric in Bemetara district as well as in Chhattisgarh were calculated taking the data of last 10 years from 2010-11 to 2019-20 by using CGR method. The compound growth rate of area, production, and productivity of turmeric in Bemetara district were 3.89 per cent, 13.95 per cent, and 9.69 per cent respectively, which shows the significantly positive and the compound growth rate of area, production, and productivity of Chhattisgarh state were calculated 2.69 per cent, 2.62 per cent, and -0.06 per cent respectively showing significantly positive except the growth rate of productivity.

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