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## **An economic analysis of growth rates in area, production and productivity of major cereals in Narayanpur district of Chhattisgarh state**

**Jairam Wadde, Anil Divya and Jeevan Lal Nag**

### **Abstract**

The present study is based on “An Economic Analysis of Major Cereals in Narayanpur District of Chhattisgarh State” in the year of 2021-22 to estimate growth rate in area, production and productivity of major cereals of Narayanpur district of Chhattisgarh state. Selection of two major cereals paddy and maize was carried out by considering maximum area in selected study area. The secondary data of last ten years in paddy production of Narayanpur district from 2012-13 to 2021-22 showed negative and non-significant compound growth rate -0.40 percent in areas, production was also 1.28 percent non-significant and productivity 2.04 percent non-significant. Maize crop Narayanpur district from 2012-13 to 2021-22 showed non-significant compound growth rate 7.06 percent in areas, production was also 12.20 percent non-significant and productivity 4.79 percent significant.

**Keywords:** Economic Analysis, Major cereals, growth rate in area, production and productivity

### **Introduction**

The cereals sector occupies a very important place in the Indian economy. India is the world's second largest producer of rice, the world's major food staples. In India, rice occupied 43.19 million hectare area, production 110.15 million tones and productivity 25.50 q/ha in India, West Bengal, Uttar Pradesh and Punjab are the three major rice producing states, which contribute more than 35 percent of the total production. (Anonymous, 2018) <sup>[1]</sup> Chhattisgarh is the 10<sup>th</sup> largest and 16<sup>th</sup> most-populated state of the nation. Rice (*Oryza sativa* L.) is one of the most important crops in India. Chhattisgarh state is well known as a rice bowl of the India and rice is grown in more than 80% of the total cropped area. (Pathak, *et al*, 2018) In Chhattisgarh paddy is grown on area 17 lakh hectares. In the total rice production in India Chhattisgarh state occupies 7<sup>th</sup> position with production of 65.27 lakh metric tonnes with productivity of 2101 kg/hectare, (Directorate of Agriculture, Raipur 2020-21). Maize (*Zea mays* L.) is a grain belonging to the family Poaceae and is known as “Queen of Cereals” because of its several uses. Maize is the second most-sought after paddy crop preferred by farmers in Chhattisgarh. Maize is mainly produced in Bastar district ‘Patar region (Plateau, area) during the kharif season. The plateau areas of Bastar higher reaches are ideally suited for cultivating corn crop, (Karmakar, *et al*, 2018) <sup>[2]</sup>. Maize in Chhattisgarh is one of maize cereals crop as it contributes 119.63 area in thousand hectare which have production 306.96 thousand metric tonnes and productivity 2566 kg/hectare in the year (2018-19). In the state rice and maize are the important major cereals grown in area rice crop 3848.78 thousand hectare and maize crop in area 150.00 thousand hectare, (Directorate of Agriculture, Raipur 2020-21). The conducted in Narayanpur district of Chhattisgarh state paddy and maize crops occupied maximum cultivated area among total cereals crops 39.65 thousand hectare with an annual production of 66.65 thousand metric tonnes and productivity of 3725 kg/ha. Narayanpur district contributed 2% of total production of major cereals (paddy and maize) in Chhattisgarh. (Department of Agriculture, Narayanpur 2020-21).

### **Material and Methods**

Chhattisgarh state has 32 District out of which Narayanpur district was selected purposively. Selection of major cereals was carried out by considering maximum area in selected study area. After analysis of secondary data we found that rice and maize crops covers area, production and productivity. The secondary data was collected area, production from various source i.e. different state and Central Government publications, like department of

Agriculture, directorate and department of Agriculture, Narayanpur etc

To analysis the pattern of growth in area, production and productivity of major cereals in study area, Compound Growth Rate (CGR) was computed. To compute the growth rate in area, production and productivity of selected major cereals in the Narayanpur district the exponential function of the following form was used:

$$Y = a B^t$$

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

Where

Y = Area/Production/Productivity (Major cereals)

a = Constant

B = regression coefficient

t = time in year

Compound growth rate (%) = (Antilog of B - 1)\*100

### Result and Discussion

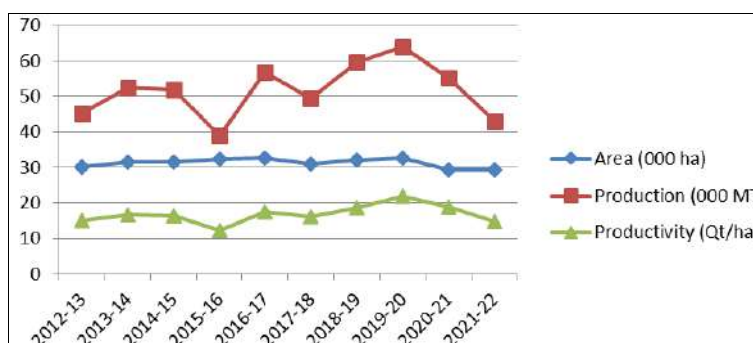
#### Compound growth rate in area, production and productivity of paddy in Narayanpur district of Chhattisgarh state

The area, production and productivity of paddy crop was estimated the period of 2012-13 to 2021-22. The presented area of paddy 30.035 thousand hectare in 2012-13 to 29.150 thousand hectare in 2021-22, production 45.223 thousand metric tons in 2012-13 to 43.031 metric tons in 2021-22 and productivity 1505 kg/ha in 2012-13 to 1476 kg/ha 2021-22 in Narayanpur district. (Table 1) Compound growth rate of paddy was found -0.40 percent negative non-significant growth, which was attributed by not significantly increase whole in production 1.28 percent non-significant and productivity 2.04 percent non-significant. (Table 2)

**Table 1:** The Area, production and production of paddy in Narayanpur District of Chhattisgarh State

Narayanpur District (2012-13 to 2021-22)				
S. No.	Years	Area (000 ha)	Production (000 MT)	Productivity (qt/ha)
1	2012-13	30.035	45.223	15.05
2	2013-14	31.450	52.355	16.64
3	2014-15	31.560	51.758	16.39
4	2015-16	32.220	38.946	12.08
5	2016-17	32.490	56.765	17.47
6	2017-18	30.840	49.346	16.00
7	2018-19	32.150	59.470	18.49
8	2019-20	32.645	63.974	21.94
9	2020-21	29.240	55.114	18.84
10	2021-22	29.150	43.031	14.76

Source: Department of Agriculture, Narayanpur District



**Fig 1:** Area, production and productivity of paddy in Narayanpur district

**Table 2:** Compound growth rate of area, production and productivity of paddy in Narayanpur District

District	Compound growth rate% (2012-13 to 2021-22)		
	Area%	Production%	Productivity%
P-value	0.027	0.005	0.001
Narayanpur	-0.40 (NS)	1.28***	2.04***

Note: \*-significant in 1% level of probability, \*\*-significant in 5% level of probability

#### Compound growth rate in area, production and productivity of maize in Narayanpur district of Chhattisgarh state

The area, production and productivity of maize crop was estimated the period of 2012-13 to 2021-22. The presented area of maize 7.315 thousand hectare in 2012-13 to 13.770 thousand hectare in 2021-22, production 12.911 thousand metric tons in 2012-13 to 33.862 thousand metric tons in 2021-22 and productivity 1765 kg/ha in 2012-13 to 2459 kg/ha 2021-22 in Narayanpur district. (Table 3) Compound growth rate of maize was found 7.06 percent non-significant growth, which was attributed by not significant increase whole in production 12.20 percent non-significant and productivity 4.79 percent significant. (Table 4)

**Table 3:** The Area, production and productivity of Maize in Narayanpur District of Chhattisgarh state

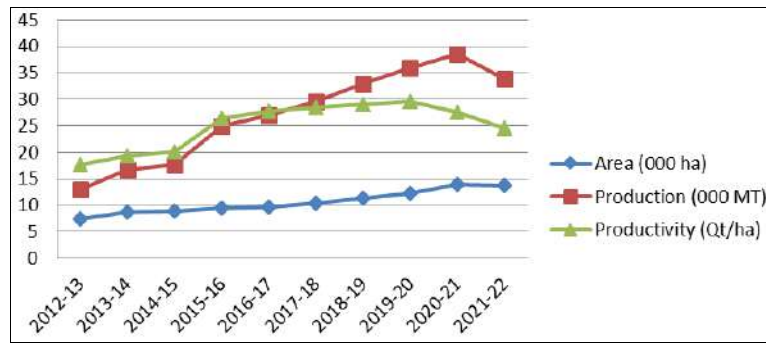
Narayanpur District (2012-13 to 2021-22)				
S.No.	Years	Area (000 ha)	Production (000 MT)	Productivity (qt/ha)
1	2012-13	7.315	12.911	17.65
2	2013-14	8.700	16.775	19.28
3	2014-15	8.800	17.675	20.08
4	2015-16	9.400	24.900	26.48
5	2016-17	9.700	26.940	27.77
6	2017-18	10.400	29.590	28.45
7	2018-19	11.350	32.985	29.06
8	2019-20	12.150	35.899	29.54
9	2020-21	14.000	38.615	27.58
10	2021-22	13.770	33.862	24.59

Source: Department of Agriculture, Narayanpur District

**Table 4:** Compound growth rate of area, production and productivity of Maize in Narayanpur District

District	Compound growth rate% (2012-13 to 2021-22)		
	Area%	Production%	Productivity%
P-value	0.009	0.008	0.87
Narayanpur	7.06***	12.20***	4.79***

Note: \*-significant in 1% level of probability, \*\*-significant in 5% level of probability



**Fig 2:** Area, production and productivity of maize in Narayanpur district

### Conclusion

The finding of the study following conclusion has been derived.

1. Growth in area, production and productivity of paddy crop was estimated the period of 2012-13 to 2021-22. The presented area of paddy 30.035 thousand hectare in 2012-13 to 29.150 thousand hectare in 2021-22, production 45.223 thousand metric tons in 2012-13 to 43.031 metric tons in 2021-22 and productivity 1505 kg/ha in 2012-13 to 1476 kg/ha 2021-22 in Narayanpur district.
2. Compound growth rate of paddy was found -0.40 percent negative non-significant growth, which was attributed by not significantly increase whole in production 1.28 percent non-significant and productivity 2.04 percent non-significant.
3. Growth in area, production and productivity of maize crop was estimated the period of 2012-13 to 2021-22. The presented area of maize 7.315 thousand hectare in 2012-13 to 13.770 thousand hectare in 2021-22, production 12.911 thousand metric tons in 2012-13 to 33.862 thousand metric tons in 2021-22 and productivity 1765 kg/ha in 2012-13 to 2459 kg/ha 2021-22 in Narayanpur district.
4. Compound growth rate of maize was found 7.06 percent non-significant growth, which was attributed by not significant increase whole in production 12.20 percent non-significant and productivity 4.79 percent significant.

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