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Growth and trend in area, production and yield of minor millets in Chhattisgarh State

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Abstract

Paddy is main crop of Chhattisgarh, however, millets are important food for sustaining tribal population in Bastar region of Chhattisgarh, India. Keeping in view of livelihood importance of minor millets for Bastar tribes, the present enquiry related to its production, marketing and processing was proposed to undertaken in Bastar district of Chhattisgarh. Out of total millets grower farmers, 10% farmers were selected randomly from four purposively selected villages namely Bhataguda, Turenar, Kalcha and Kumhrawand. The details enquiry was done in the year 2008 to 2009. The study has been carried out based on secondary data and the data was collected for the periods from 2011-12 to 2020-21 from various publications and websites (Agriculture Statistics at a Glance, Directorate of Economics and Statistics, Ministry of Agriculture and Government of India 2021). The present study was carried out to analyze the trend in area, production and productivity of Minor Millets in Chhattisgarh state. The growth in production of minor millets recorded negative and significant at 1 per cent level of significance at the rate of 4.00 per cent per annum while productivity is 1.00 per cent per annum from 2001-2022.

Keywords: Minor millets, area, production and productivity, compound annual growth rate, trend analysis

1. Introduction

Since the dawn of human civilization humans have depended on a large number of crops which are now being reduced to few only. Due to this growing dependency on few and fewer crops diversity of our food basket is also decreasing. Millets are very nutritious and healthy food which is gradually losing its area to commercial crops. The present study was conducted with a view to analyze growth and trend in area, production and yield of minor millets in Chhattisgarh state. The scope of this study was to determine/ assess the growth pattern in the context of total cultivable area, gross production and yield rate of minor millets. Collecting time series data from 2000-2022 (22 years) of those crops from reliable source and using semi-log trend function here the researchers tried to find out the trend and estimate the growth rate of area, production and yield of minor millets. The compound growth rate as well as trend analysis indicated that the production of rice during 2001-2010 was increased due to the corresponding increase in area, production and productivity of minor millets. After 2011 from 2011-2022 the area, production and productivity of minor millets shows decreasing trends.

2. Material and Methods

The data used for the analysis are accumulated from various issues of statistics department of Chhattisgarh. A time series data from 2001-2022 (22 years) regarding the area, production and productivity of minor millets were collected from the above mentioned source. The following semi-log trend function was used to find out the trend and estimate the growth rate of area, production and yield of major crops of Chhattisgarh.

Where

$$Y = \alpha \beta^t$$

$$\text{Log } Y = \log \alpha + t \log \beta$$

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Y= Area/ production /productivity of major crops α = Constant
 β = Regression coefficient
 t= time in year

Where,

Compound growth rate (%) = $(\text{Antilog } \beta - 1)100$.

b = regression coefficient

Coefficient of variation = $\text{standard variation} \div \text{mean} \times 100$

Instability index

Cuddy Della Valle 1978) is a modification of coefficient of variation to accommodate trend present in the data, which is commonly present in economic time series data. This method is superior over the scale dependent measures such as standard deviation. The Cuddy Della Valle index (CDVI) is calculated as follows:

Cuddy Della Valle index (%) = $\text{Coefficient of Variation} R^2 = \text{Coefficient of multiple determination}$

The ranges of CDVI (Sihmat,2014) are given as follows: Low instability = between 0 to 15

Medium instability = greater than 15 and lower than 30

High instability = greater than 30

3. Results and Discussion

Figure 1 showed change in the total area under cultivation of minor millet over the period of 2000-01 to 2021-2022. The trend showed that over the years area under minor millet cultivation has reduced from 256.94 hectares to 55.21 hectares. However, there increasing trend in the production minor millets in Chhattisgarh during the year 2000-2011 and then from 2011-2022 it shows decreasing trend in area of minor millets.

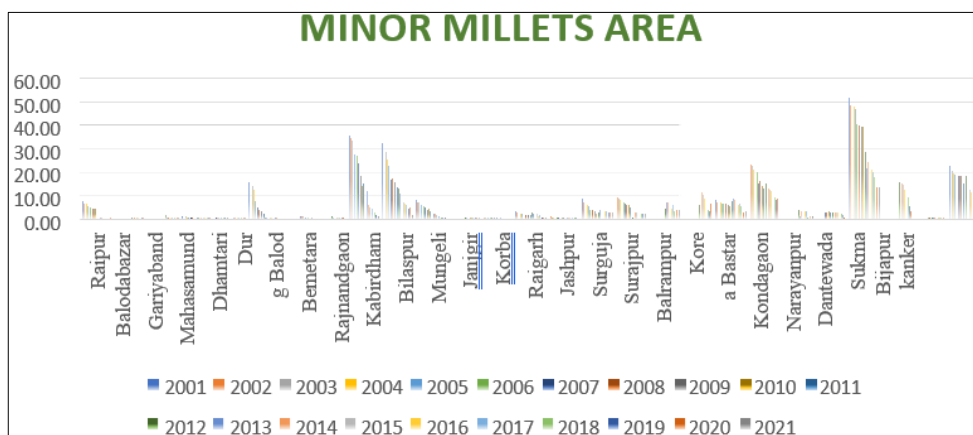


Fig 1: Trends in area, production and productivity of minor millet in India (2000-2022) Source: Directorate of Economics & Statistics, DAC & FW

Figure 2 showed change in the total production under cultivation of minor millet over the period of 2000-01 to 2021-2022. The trend showed that over the years production under minor millet cultivation has reduced from 40.22 MT to

25.64 Mt. However, there increasing trend in the production minor millets in Chhattisgarh during the year 2000-2011 and then from 2011-2022 it shows decreasing trend in area of minor millets.

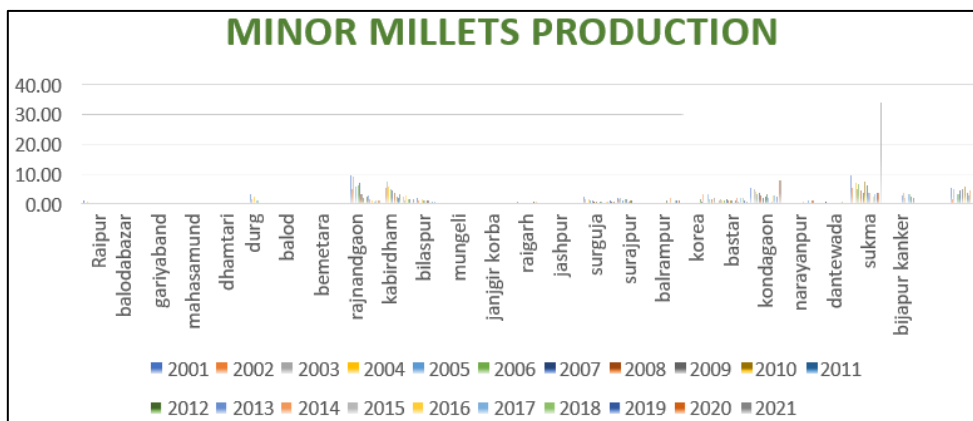
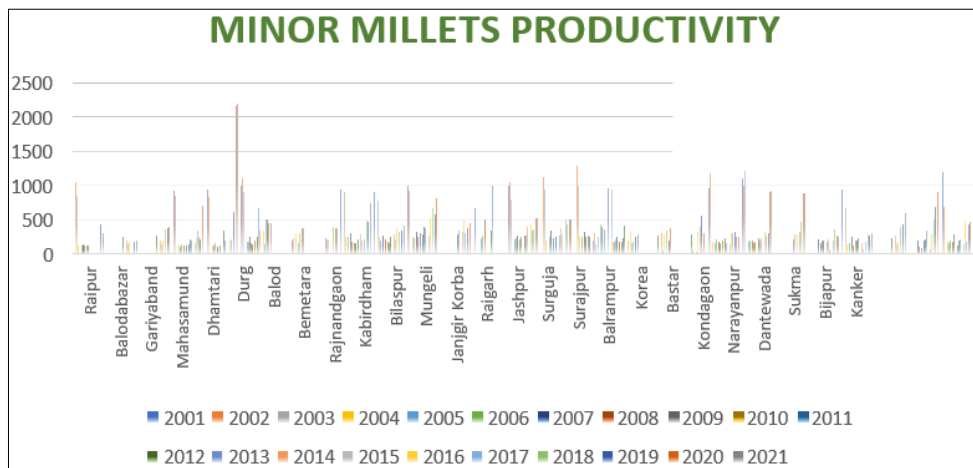


Fig 2: Trends in area, production and productivity of minor millet in India (2000-2022) Source: Directorate of Economics & Statistics, DAC & FW

Figure 3 showed change in the total productivity under cultivation of minor millet over the period of 2000-01 to 2021-2022. The trend showed that over the years production under minor millet cultivation has increased from 4973 kg/ha

to 14307.95 kg/ha. However, there increasing trend in the production minor millets in Chhattisgarh during the year 2000-2011 and then from 2011-2022 it shows decreasing trend in area of minor millets.



Source: Directorate of Economics & Statistics, DAC & FW

Fig 3: Trends in area, production and productivity of minor millet in India (2000-2022)

Table 1: Variations in area, production, and productivity of minor millets during 2000- 01 to 2021-22 (%)

Districts	Area (ha)			Production (mt)			Productivity (kg/ha)		
	Start Year	End Year	CAGR	Start Year	End Year	CAGR	Start Year	End Year	CAGR
Raipur	7.711	0.012	-27.62%	0.40	0.004	-20.57%	52.00	333.3333	9.73%
Balodabazar	0.51	0.082	-8.73%	0.13	0.016	-9.94%	255.00	195.122	-1.33%
Gariyaband	1.7	0.031	-18.14%	0.46	0.012	-16.67%	272.00	387.0968	1.78%
Mahasamund	1.677	0.01	-22.59%	0.19	0.007	-15.30%	116.00	700	9.40%
Dhamtari	0.366	0.006	-18.58%	0.01	0.013	0.00%	36.00	2166.667	22.74%
Durg	15.903	0.076	-23.45%	1.34	0.034	-16.77%	84.00	447.3684	8.72%
Balod	1.07	0.09	-11.64%	0.26	0.034	-9.67%	240.00	377.7778	2.29%
Bemetara	0.87	0.711	-1.00%	0.17	0.264	2.23%	195.00	371.308	3.27%
Rajnandgaon	37.509	1.716	-14.29%	6.31	1.278	-7.67%	168.00	744.7552	7.73%
Kabirdham	13.08	4.583	-5.11%	3.29	1.847	-2.85%	252.00	403.0111	2.38%
Bilaspur	8.177	0.016	-26.79%	1.33	0.013	-20.66%	163.00	812.5	8.36%
Mungeli	0.73	0.191	-6.48%	0.21	0.087	-4.31%	288.00	455.4974	2.32%
Janjgir-Champa	0.067	0	-100.00%	0.01	0	-100.00%	209.00	0	-100.00%
Korba	3.443	0.508	-9.12%	0.53	0.263	-3.41%	153.00	517.7165	6.28%
Raigarh	1.226	0.014	-20.04%	0.19	0.007	-15.13%	152.00	500	6.13%
Jashpur	8.349	2.698	-5.49%	1.63	0.977	-2.52%	195.00	362.1201	3.14%
Surguja	10.65	1.948	-8.14%	1.66	0.524	-5.60%	156.00	268.9938	2.76%
Surajpur	4.24	3.588	-0.83%	1.00	1.341	1.48%	276.00	373.7458	1.53%
Balrampur	5.65	6.244	0.50%	1.17	1.877	2.39%	295.00	300.6086	0.09%
Korea	7.99	2.915	-4.92%	1.67	0.746	-3.95%	131.00	255.9177	3.40%
Jagdapur	24.894	8.602	-5.17%	3.49	7.863	4.15%	140.00	914.0897	9.84%
Kondagaon	3.79	1.202	-5.58%	1.04	1.075	0.17%	273.00	894.3428	6.11%
Narayanpur	2.77	0.755	-6.29%	0.47	0.2	-4.18%	168.00	264.9007	2.30%
Dantewada	53.767	13.26	-6.76%	6.24	3.925	-2.29%	116.00	296.003	4.80%
Sukma	15.66	3.416	-7.33%	3.63	2.033	-2.86%	233.00	595.1405	4.80%
Bijapur	0.71	0.064	-11.34%	0.16	0.058	-4.95%	222.00	906.25	7.29%
Kanker	24.432	2.478	-10.81%	3.25	1.149	-5.06%	133.00	463.6804	6.44%

Table 1 revealed that minor millet over the time area and production under cultivation has decreased, productivity however has increased.

The possible reason for decrease in area under millets cultivation can be attributed to many factors. During green revolution emphasis was given on cultivating high yielding varieties of cereals like rice and wheat which were input responsive. Being supplied with better technologies, inputs and mechanization, wheat and rice showed significant increase in production and productivity. But the indigenous varieties of millets are not much input responsive and give less yield compared to improved varieties of wheat and rice. So, when farmers got access to fertilizers, agro-chemicals and high yielding varieties of wheat, rice and other commercial crops, millets were replaced by those more profitable crops.

The findings of this study are in line with the findings of Nagaraj *et al.*, (2012) ^[8].

Moreover, millets are generally grown by resource poor small and marginal farmers of our country and they are the main consumer of millets too. But over the years millets have been tagged as 'poor man's food' and 'inferior food' as compared to wheat and rice reasoning that they are consumed by poor people. Due to this stigmatization people with higher income have moved towards wheat and rice that has contributed to less demand of millets and, less and less area under cultivation which is consistent with the findings.

4. Conclusion

The study it was found that for pearl millet over the time area under cultivation has decreased, production and productivity

however have increased and in case of finger millet, both area under cultivation and production has decreased but productivity has increased. The total millet production and domestic consumption both has increased over time. Instability analysis found higher degree of variation for both pearl millet and finger millet production and productivity.

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