Asian Journal of Agricultural Extension, Economics & Sociology

Volume 42, Issue 11, Page 87-95, 2024; Article no.AJAEES.124891
ISSN: 2320-7027

Assessing the District-Wise Growth and Instability of Rice Production in Chhattisgarh, India

Nitiprasad Namdeorao Jambhulkar [a++*], Biswajit Mondal [a#], Sudipta Paul [a++] and G. A. K. Kumar [a†]

[a] *Social Sciences Division, ICAR-National Rice Research Institute, Cuttack, Odisha, 753006, India.*

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.9734/ajaees/2024/v42i112593

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/124891

Original Research Article

Received: 11/08/2024
Accepted: 14/10/2024
Published: 18/10/2024

ABSTRACT

Rice is the crop which is cultivated in 6 ft below sea level as well as at 2700 ft higher altitude from the sea level. In India farmers mainly depend on rainfall for its production as it depends on weather conditions. Therefore, there is a need to study the fluctuation in the production. Fluctuation in growth rate as well as instability affects the price and overall supply of product in the region. Chhattisgarh state contributes 8.1% rice area and 6.2% rice production of the country in 2021-22. Its contribution plays vital role in agricultural growth of the country. But, yield of the state is less than the national average yield. Therefore, the present study has been undertaken to analyze the growth rate and instability in area, production and yield of rice in Chhattisgarh state. District-wise

[++]*Senior Scientist;*
[#]*Principal Scientist;*
[†]*Principal Scientist and Head;*
**Corresponding author: E-mail: nitiprasad1@gmail.com;*

Cite as: *Jambhulkar, Nitiprasad Namdeorao, Biswajit Mondal, Sudipta Paul, and G. A. K. Kumar. 2024. "Assessing the District-Wise Growth and Instability of Rice Production in Chhattisgarh, India". Asian Journal of Agricultural Extension, Economics & Sociology 42 (11):87-95. https://doi.org/10.9734/ajaees/2024/v42i112593.*

compound annual growth rate and Instability index have been computed for various periods from 2000-01 to 2019-20. The districts have been classified into five classes based on instability. Growth rate ranges from -0.10 to 0.04 for area, 2.02 to 4.01 for production and 1.98 to 4.12 for yield in the state. The highest growth rate was recorded for production in period I while lowest growth rate was recorded for area in period II across the districts and periods. The instability of the state ranges from 0.80 to 1.92 for area; 13.21 to 24.43 for production and 12.97 to 23.73 for yield. Highest instability was observed for yield and lowest instability was recorded for area in period I. None of the districts were classified as very high instability for area, production and yield in all the periods. Similarly, none of the districts were classified as medium and high instability for area; and very low instability for production and yield. The study may be useful for planners of Chhattisgarh state to implement the plan for the state at district level based on the result of the study.

Keywords: Rice; Chhattisgarh; growth rate; instability; production; area; yield.

1. INTRODUCTION

Agriculture is one of the most important factors in India where more than fifty percent population are associated with agriculture and its related activities directly or indirectly. Agricultural production depends on weather conditions and in India farmers are mainly dependent on rainfall as the technologies developed on research stations is not yet reached on farmer's field in large scale Mahendradev [1] Therefore, there is a need to study the fluctuation or growth rate in the production which will ultimately useful in understanding production status at regional level. Fluctuating instability in agriculture increases the risk in farm production and adversely affects farmers' income. Instability in production affects price stability and it increases vulnerability of low-income households to market [2].

"Rice is the staple food for about half of the world population and more than two third of the Indian population. India ranks first in rice area and second in rice production next to China. In India, rice is grown in more than 46-million-hectare area with the production of 129 million tons of milled rice in 2021-22 contributing approximately 24% of the global rice production. Rice accounts for 41% of the total food grain production occupying 35% of the food grain area of the country"(https://desagri.gov.in/statistics-type/five-year-estimates/)

"Chhattisgarh state is carved out from the erstwhile Madhya Pradesh in 2000. Rice is one of the vital crops in Chhattisgarh state. Chhattisgarh is the sixth largest producer of rice with the production of 8 million tons contributing 6% of the rice production of the country and forth largest state in terms of rice area contributing 8% area of the country in 2021-22. The yield of Chhattisgarh state is 2.1 tons/ha which is less than the average yield of the country (2.8 tons/ha). Hence, it is essential to study the trend of area, production and yield of rice over the years to enhance its contribution" (https://desagri.gov.in/statistics-type/five-year-estimates/)

"For higher growth of agriculture, quantitative assessment of the contribution of various factors of agricultural output growth is important for reorienting the programmes and prioritizing the agricultural development. Many factors affect the growth of agricultural output. Major ones of these factors are area and yield" [3,4]. "The most essential sources of output growth have significance in finalizing programmes of agricultural development and priorities of investment in it" Ranade [5], Deosthali [6]. "Therefore, it is important to find the causes of different growth rates from one another, so as to remove the shortcomings to reach the fast development of agricultural sector" [7].

The study of instability is quite essential to find out the variability in the trend for area, production and yield of rice which is adversely affecting the production and income distribution there by hampers the economic growth of the state.

Samal et al. [8] "computed the growth rate of production of rice in India for various states. Some studies have been conducted to compute the district wise growth rate and instability of rice" [9-15]. Gupta et al. [16] "studied the growth performance and instability of major cereals in Chhattisgarh; Patel et al. [17] studied the growth performance and instability of oilseeds in Chhattisgarh; Sarva et al. [18] studied the growth rate and instability of major pulses in Chhattisgarh"; Chanchal et al. [19] studied the

growth rate and instability of linseed for the districts in Chhattisgarh; but could not able to trace the district wise study of growth rate and instability of rice for all the districts in Chhattisgarh state from the inception of the state.

Therefore, the present work is undertaken with the objective to study the district wise growth rate and instability of area, production and yield of rice in Chhattisgarh state.

2. MATERIALS AND METHODS

The present study is conducted based on the secondary data on area, production and yield of rice in Chhattisgarh state collected for the year 2000-01 to 2019-20. The district wise data on area, production and yield of rice in Chhattisgarh state was collected from Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers' Welfare, Ministry of Agriculture and Farmers' Welfare, Government of India during the last ten years. The twenty years rice data from 2000-01 to 2019-20 have been used for the current study.

Chhattisgarh state was formed by splitting sixteen districts of Madhya Pradesh in 2000. At present there are thirty-three districts in the Chhattisgarh state. Chhattisgarh originally had sixteen districts. Two new districts were formed in 2007, nine new districts were formed in 2012, one district was added in 2020 and five new districts were inaugurated in 2022 with a total of 33 districts (Fig. 1). The analysis has been done from 2000-01 to 2019-20 from inception of the state. The thirty-three districts were merged into sixteen districts. The complete data were divided into three periods namely period I (2000-01 to 2009-10), period II (2010-11 to 2019-20) and the period III (2000-01 to 2019-20). Then growth rate and instability were calculated for each of the periods.

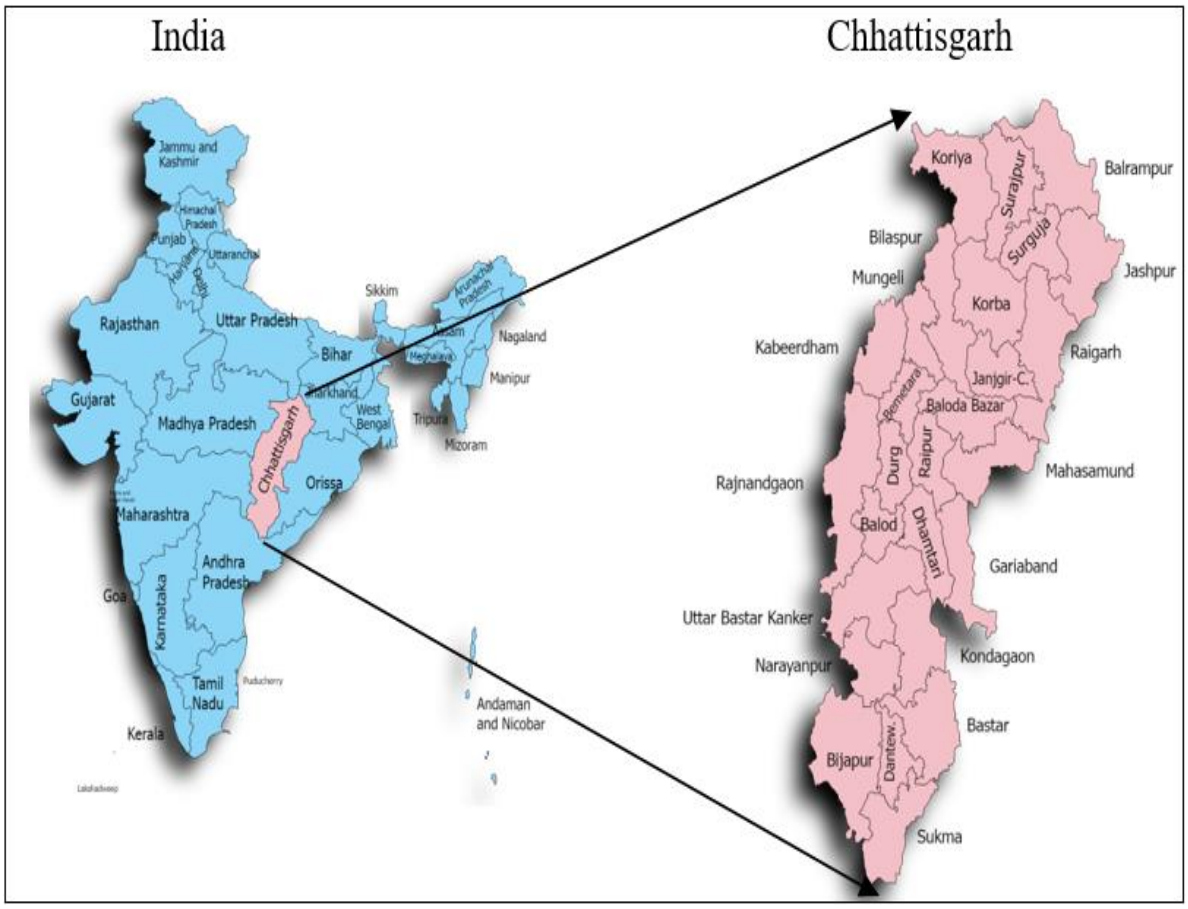

Fig. 1. Map of Chhattisgarh state consisting of different districts

2.1 Analysis of Growth Rate

The exponential model used to compute the compound growth rate is as follows [20]

$$Y = ab^t$$

taking log to both sides we get,
Log Y = log a + t log b
Here, log a is the intercept and log b is slope.

$$CGR(r) = [Antilog(\log b) - 1] \times 100$$

where,

CGR = Compound growth rate
t = time period in year
Y= area/production/productivity
The growth rate was calculated based on three years moving average data [20-23]

2.2 Analysis of Instability

To measure the instability in the studied variables, an index of variability i.e. Cuddy-Della Valle index (CDVI) [23] has been used.

$$CDVI = CV \times \sqrt{(1 - Adj.R^2)}$$

Where,

CDVI =Cuddy-Della Valle Instability index (per cent)
CV= Coefficient of variation (per cent)
Adj. R^2=R^2 adjusted for number of predictors in the model

2.3 Classification of Instability

The instability has been classified into very low instability (0-5), low instability (5-15), medium instability (15-30), high instability (30-50) and very high instability (>50) [12, 13].

3. RESULTS AND DISCUSSION

The area (million hectare), production (million tons) and yield (t/ha) of rice in Chhattisgarh state from 2000-01 to 2019-20 is depicted in Fig. 2. The rice area changed from 3.77 million hectare in 2000-01 to 3.67 million hectare in 2019-20, the rice production 2.37 million tons in 2000-01 increased to 6.77 million tons in 2019-20 and rice yield 0.67 t/ha in 2000-01 increased to 1.85t/ha in 2019-20. During the last twenty years, area remains almost constant, production and yield increased by more than twice.

3.1 Compound Annual Growth Rate

The district wise growth rate of area, production and yield of rice in Chhattisgarh state has been presented in Table 1. It is revealed from the table that for all the three components area, production and yield; the growth rate ranges from -3.34 to 9.05 across the districts for the studied three periods. The growth rate of area, production and yield ranges from -3.34 to 2.17, -3.08 to 9.05 and -3.16 to 8.17 respectively during the studied period.

During period I (2000-01 to 2009-10), the highest growth rate for area (2.16) was recorded in Dhamtari district and highest growth rate for production (9.05) and yield (8.17) was observed in Raipur district. Whereas, the lowest growth rate for area (-1.62) was recorded in Dantewada district and lowest growth rate for production (-3.08) and yield (-2.89) was found in Sarguja district. During this period I, the growth rate for area, production and yield was positive for most of the districts.

During period II (2010-1 to 2019-20), highest growth rate for area (2.17), production (4.51) and yield (4.72) was recorded in Kabirdham, Sarguja and Raigarh districts respectively. The lowest growth rate for area (-3.34) was found in Bilaspur district while lowest growth rate for production (-2.96) and yield (-3.16) was recorded in Jashpur district. In period II also most of the districts have positive growth rate for area, production and yield.

During the overall period III (2000-01 to 2019-20), highest growth rate for area (1.60), production (5.17) and yield (4.95) was recorded in Kabirdham, Durg and Janjgir-Champa districts respectively. The lowest growth rate for area (-2.16) and production (0.42) was observed in Bilaspur district while lowest growth rate for yield (1.22) was recorded in Rajnandgaon district. In almost all the periods, the lowest and highest growth rate was observed in different districts. In this period, the growth rate for production and yield was positive for all the districts. The similar trend was observed in Punjab [10] Telangana Akul et al. [11] and West Bengal [14].

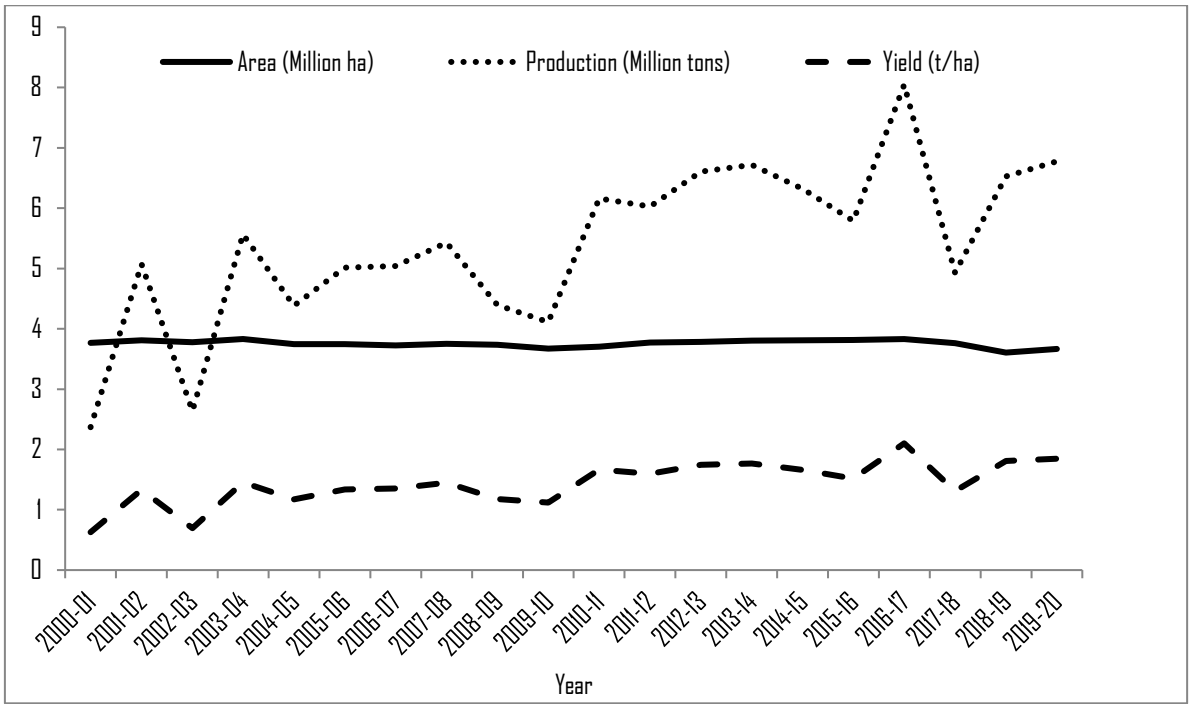

Fig. 2. Area (million hectare), production (million tons) and yield (t/ha) of rice in Chhattisgarh state during 2000-01 to 2019-20

Table 1. District wise growth rate of area, production and yield of rice in Chhattisgarh state for various periods

Districts	Area			Production			Yield		
	P-I	P-II	P-III	P-I	P-II	P-III	P-I	P-II	P-III
Raipur	0.81*	0.24	0.61*	9.05*	3.96*	4.23*	8.17*	3.71*	3.60*
Mahasamund	1.03*	0.98*	1.26*	8.31*	1.07	4.74*	7.20	0.09	3.44*
Dhamtari	2.16*	0.75	1.50*	5.56*	3.17	4.82*	3.33*	2.40*	3.27*
Durg	1.45*	0.94*	1.22*	8.22*	3.19	5.17*	6.67	2.23	3.90*
Rajnandgaon	0.87	1.30*	1.35*	-1.14	1.76	2.58*	-1.99	0.46	1.22
Kabirdham - Kawardha	0.81	2.17*	1.60*	6.57*	-0.05	3.64*	5.71	-2.18	2.01*
Bilaspur	0.23	-3.34*	-2.16*	2.21	-1.99*	0.42	1.98	1.40	2.63*
Janjgir - Chapma	0.69	-0.59*	0.21	6.37*	1.38	5.17*	5.64*	1.98	4.95*
Korba	-0.09	-0.02	0.25	-0.89	1.35	1.64*	-0.79	1.36	1.38*
Raigarh	-1.27	-0.29	-0.40*	4.60*	4.41*	3.25*	5.95*	4.72*	3.66*
Sarguja	-0.20	0.22*	0.03	-3.08*	4.51*	1.41*	-2.89*	4.28*	1.38*
Jashpur	0.18	0.20*	0.44	1.96	-2.96	1.71*	1.78	-3.16	1.27*
Koriya	-0.54	-0.17	-0.12	-0.80	1.48	2.45*	-0.26	1.65	2.57*
Dantewara	-1.62*	1.64*	-0.24	0.64	3.53	2.42*	2.30	1.86	2.66*
Kanker	1.42*	0.95*	1.16*	5.30*	0.38	3.82*	3.82*	-0.56	2.63*
Bastar	0.25*	-0.22	0.02	4.05*	0.66	2.16*	3.80*	0.88	2.14*
State	-0.10	0.04	0.00	4.01*	2.02	3.32*	4.12*	1.98*	3.32*

P-I: Period I (2000-01 to 2009-10); P-II: Period II (2010-11 to 2019-20); P-III: Period III (2000-01 to 2019-20)
**Significant at 5% level of significance*

A survey was conducted to find out the reasons for fluctuation of rice production in that area. Rice crop needs more amount of water for its growth than other crop, so the farmers shifted to less water required crops. Rice crop requires more manpower or labour. For employment, the rural population is shifting to urban area, so farmers are not getting labours to accomplish their field work, so they are shifting from rice to less labour-intensive crop. Sometimes farmers shifted to

cash crop than rice. These are some of the reasons for variation in the growth rate of rice area in the state.

3.2 Cuddy-Della Valle Instability Index

The level of instability cannot be detected by focusing only on growth rates. Growth rate will simply explain the rate of growth over time, whereas instability will determine whether the growth performance for the variable under study was stable or unstable over time. In this study, the level of instability in the area, production and yield of rice was determined by using Cuddy-Della Valle Index.

The Cuddy-Della Valle Index for area, production and yield of rice in Chhattisgarh state has been presented in Table 2. During period I (2000-01 to 2009-10), highest instability for area (9.37) was observed in Raigarh district while highest instability for production (41.73) and yield (44.48) was recorded in Mahasamund district. Similarly, lowest instability for area (0.27) was recorded in Bastar district whereas lowest instability for production (11.40) and yield (13.67) was observed in Janjgir-Champa district. Same district recorded highest and lowest instability for production and yield.

During period II (2009-10 to 2019-20), highest instability for area (13.62) was recorded in Bilaspur district whereas highest instability for production (30.06) and yield (29.74) was found in Kanker district. The lowest instability for area (0.54), production (11.39) and yield (10.75) was observed in Korba, Janjgir-Champa and Kabirdham-Kawardha districts respectively. In this period, same district recorded highest instability for production and yield.

During the overall period III (2000-01 to 2019-20), highest instability for area (11.35) was recorded in Bilaspur district while highest instability for production (30.98) and yield (30.20) was observed in Dantewara district. In the same way, lowest instability for area (1.23) was observed in Bastar district; and lowest instability for production (15.57) and yield (14.86) was found in Janjgir-Champa district. Like period I, in this period III also same district recorded highest and lowest instability for production and yield Sarva et al. 2024, Chanchal et al. [19], Jambhulkar et al. [14].

The highest and lowest instability for state was found in production (24.43) and area (0.80) respectively during period I. Same districts recorded highest instability for production and yield in all the three periods and Bilaspur district recorded highest instability for area during period II and III. Lowest instability for production was recorded by Janjgir-Champa district during all the districts while same district recorded lowest instability for yield during period I and III.

Table 2. District wise instability of area, production and yield of rice in Chhattisgarh state for various periods

District	Area			Production			Yield		
	P-I	P-II	P-III	P-I	P-II	P-III	P-I	P-II	P-III
Raipur	3.09	1.83	2.65	29.30	21.20	24.35	31.43	20.65	25.22
Mahasamund	3.47	1.52	2.44	41.73	13.38	27.08	44.48	13.34	29.67
Dhamtari	7.56	9.58	8.84	22.05	25.88	25.19	17.47	19.64	18.61
Durg	6.88	2.58	4.77	39.20	22.61	28.11	42.19	20.40	29.02
Rajnandgaon	7.93	4.73	6.07	24.95	28.09	29.72	24.69	25.08	27.60
Kabirdham - Kawardha	8.75	5.80	7.67	28.14	14.68	21.91	33.48	10.75	26.03
Bilaspur	6.87	13.62	11.35	24.20	24.88	24.11	23.78	23.41	23.82
Janjgir - Chapma	6.11	4.00	5.27	11.40	11.39	15.57	13.67	11.11	14.86
Korba	6.74	0.54	4.51	22.48	19.75	21.40	22.56	19.97	21.26
Raigarh	9.37	2.95	7.03	20.74	21.10	20.50	25.95	19.44	21.34
Sarguja	5.03	0.89	3.51	18.99	14.85	20.77	18.50	15.12	20.48
Jashpur	6.13	0.61	4.05	21.28	15.92	23.55	24.23	15.82	24.07
Koriya	7.25	4.15	5.69	24.81	29.04	28.75	26.64	26.65	27.52
Dantewara	4.48	1.14	6.42	35.87	27.57	30.98	34.12	27.33	30.20
Kanker	5.59	1.61	3.73	20.30	30.06	28.90	20.73	29.74	28.48
Bastar	0.27	1.58	1.23	28.58	24.75	25.31	28.69	24.30	25.05
State	0.80	1.92	1.56	24.43	13.21	18.09	23.73	12.97	17.47

P-I: Period I (2000-01 to 2009-10); P-II: Period II (2010-11 to 2019-20); P-III: Period III (2000-01 to 2019-20)

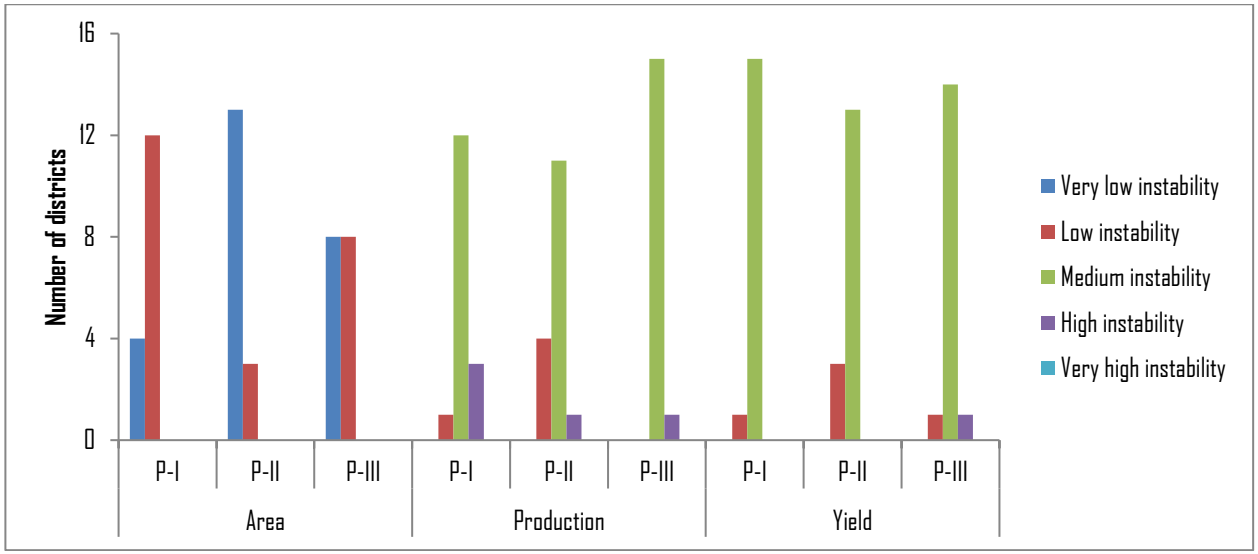

Fig. 3. Number of districts under each instability class for area, production and yield of rice during three periods in Chhattisgarh state

P-I: Period I (2000-01 to 2009-10); P-II: Period II (2010-11 to 2019-20); P-III: Period III (2000-01 to 2019-20)

3.3 Classification of Instability Index

All districts of Chhattisgarh state have been classified based on the criteria proposed by Jambhulkar et al. [12] Jambhulkar et al. [13] as very low instability, low instability, medium instability, high instability and very high instability based on the instability value of the area, production and yield of rice. Numbers of districts fall under each class have been presented in Fig. 3. None of the districts have been classified as very high instability for area, production and yield [21-23].

For area, all the districts fall under very low instability and low instability in all the periods. Similar result was found in Jambhulkar et al. [13], Jambhulkar et al. [15]. In period I, 75% districts classified as low instability; under period II, more than 81% districts fall under very low instability; while in overall period III, 50% districts fall under both classes very low and low instability. For production, none of the districts showed very low instability and very high instability in all the periods. This is in line with Jambhulkar et al. [13]. More than 68% districts classified as medium instability in all the periods. For yield also none of the districts were grouped as very low instability and very high instability. Jambhulkar et al. [12] observed none of the districts were classified as very high instability. However, more than 81% districts were classified as medium instability in all the periods [24]. In period II, maximum numbers of districts fall under medium instability class followed by low instability for production and yield.

4. CONCLUSION

The study revealed that, for the state as a whole growth rate was positive in all periods for area, production and yield except it was negative for area in period I. The growth rate for production ranges from 2.02 to 4.01 and for yield ranges from 1.98 to 4.12. The highest growth rate was recorded in period I for yield. The instability for the state as a whole was varying from 0.80 for area to 24.43 for production in period I. The instability was classified as very low instability for area, while it classified as low instability in period II and medium instability in period I and III for production and yield respectively. None of the districts show medium, high and very high instability for area, whereas none of the districts classified as very low and very high instability for production and yield in all the periods. For production and yield most of the districts classified as medium instability.

Some of the reasons for variation in growth rate are farmers are shifted to less water required crops, less labour-intensive crop and they are attracted by cash crop than the crop like rice. So, the government may prepare a plan to create additional irrigation facility, the price of rice may be enhanced. So, this study may be useful for planners of Chhattisgarh state for prepare the district-wise plan to increase the rice production of the state.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

ACKNOWLEDGEMENTS

The authors are thankful to the Director, ICAR-National Rice Research Institute, Cuttack, India for providing necessary facilities.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Mahendradev S. Growth and instability in food grains production: An interstate analysis. Economic and Political Weekly. 1987;22(39):A82-A92.
2. Chand R, Raju SS. Instability in Indian agriculture during different phases of technology and policy. Indian Journal of Agricultural Economics. 2009;64(2):187-207.
3. Singh DV. A component analysis and value productivity growth of important crops in Himachal Pradesh. Agricultural Situation in India. 1981;36(6):479-484.
4. Cauvey R. Groundnut production in Tamil Nadu: A decomposition analysis. Agricultural Situation in India. 1991;46(5): 321-324.
5. Ranade CG. Impact of cropping pattern on agricultural production. Indian Journal of Agricultural Economics. 1980;35(2):85-92.
6. Deosthali V, Chandrashekhar MN. Rice: Region-wise growth trends in Maharashtra. Economic and Political Weekly. 2004;39(3):240-242.
7. Sikka BK, Vaidya CS. Growth rates and cropping pattern changes in agriculture in Himachal Pradesh. Agricultural Situation in India. 1985;39(11):843-846.

8. Samal P, Rout C, Repalli SK, Jambhulkar NN. State-wise analysis of growth in production and profitability of rice in India. Indian Journal of Economics and Development. 2018;14(3):399-409.
9. Jambhulkar NN, Jena SS, Mondal B, Samal P. Estimation of growth rate and instability analysis of area, production and yield of rice in Odisha state of India. International Journal of Current Microbiology and Applied Sciences. 2020;9(07):3107-3115.
10. Jambhulkar NN, Panigrahi US, Bisen J, Mondal B, Mishra SK, Kumar GAK. Growth rate and instability analysis of rice area, production and yield in Punjab. The Pharma Innovation Journal. 2021;10(9): 352-355.
11. Akul M, Bandumula N, Rathod S. Rice production in Telangana: Growth, instability and decomposition analysis. Oryza. 2022;59(2):232-240.
12. Jambhulkar NN, Mondal B, Bisen J, Mishra SK, Pradhan AK. Growth and instability analysis of rice production: A district level assessment in Uttar Pradesh and Uttarakhand states of India. The Pharma Innovation Journal. 2023a;12(2):813-819.
13. Jambhulkar NN, Mondal B, Pradhan AK. Growth and instability in rice production: A district level analysis of Bihar and Jharkhand states of India. Wulfenia, 2023b;30(5):20-31.
14. Jambhulkar NN, Mondal B, Bisen JP, Pradhan AK. Growth and instability of rice production: A district level analysis in West Bengal, India. *Oryza*. 2023c;60(3):487-494.
15. Jambhulkar NN, Mondal B, Paul S, Pradhan AK, Kumar GAK. Analysis of growth and instability in rice: A district level study in Maharashtra, India. *Oryza*. 2024; 61(3):258-264.
16. Gupta AK, Patra C, Kumar RR, Mamata. Growth and instability analysis of area, production and yield of major cereals in Chhattisgarh plains zone of Chhattisgarh. International Journal of Current Microbiology and Applied Sciences. 2019; 8(12):128-133.
17. Patel M, Chandrakar MR, Pandey S, Wasnik SB, Parte J. Growth performance and instability of major oilseeds in Chhattisgarh. The Pharma Innovation Journal, SP. 2022;11(5):1815-1821.
18. Sarva A, Sushila Choudhary VK, Saini BK. Growth and instability of major pulses in Chhattisgarh. The Pharma Innovation Journal, SP. 2023;12(7):1419-1422.
19. Chanchal, Choudhary, VK, Vashishth A. Growth and instability analysis of linseed for major selected districts in Chhattisgarh. International Journal of Advanced Biochemistry Research. 2024;8(5):133-143.
20. Dandekar VM. Introduction seminar on data and methodology for the study of growth rates in agriculture. Indian Journal of Agricultural Economics. 1980;35(2):1-12.
21. Minhas BS. Rapporteur's report on measurement of agricultural growth. Indian Journal of Agricultural Economics. 1966;21(4):165-182.
22. Singh IJ, Rai KN. Regional variations in agricultural performance in India. Indian Journal of Agricultural Economics. 1997;52(3):374-377.
23. Cuddy JDA, Della Valle PA. Measuring the instability of time series data. Oxford Bulletins of Economics and Statistics. 1978;40(1):1-38.
24. Directorate of Economics and Statistics, Government of India. (n.d.). Five year estimates. Available:https://desagri.gov.in/statistics-type/five-year-estimates/

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/124891