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Bibliometric analysis of the Research Performed on Rice Research in Chhattisgarh

ORIGINAL ARTICLE

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Abstract

This paper presents the results of a bibliometric analysis titled "Bibliometric Analysis of Research on Rice in Chhattisgarh" for the period 1997–2024. The data were retrieved from direct searches in the J-Gate Plus Database (https://www.jgateplus.com) using the query "Rice research in Chhattisgarh." Various bibliometric indicators were applied to assess the growth and current status of research output on this subject. The study aims to analyze the research trends in Rice research in Chhattisgarh, focusing on key bibliometric aspects such as: Distribution of Publications, Authorship Patterns and Contributions (Single vs. Multi-author contributions), Degree of Collaboration, Affiliation of Contributors, Geographical Distribution of Articles, Geographical Distribution of Research Journals, Publisher-wise Distribution of Articles. This analysis provides valuable insights into the research landscape of rice studies in Chhattisgarh, highlighting publication trends and collaboration patterns.

Key Words

Bibliometrics, Scientometrics, Authorship Pattern, Degree of Collaboration, Geographical Distribution, Rice Research.

Introduction

Chhattisgarh, known as the "Rice Bowl of India," is a major hub for rice research and production. The state has extensive paddy fields and a strong focus on improving rice varieties through scientific research. Here are some key aspects of rice research in Chhattisgarh:

Key Institutions for Rice Research

- Indira Gandhi Krishi Vishwavidyalaya (IGKV), Raipur (State level)
- National Rice Research Institute (NRRI) (National Level)
- International Rice Research Institute (IRRI) (International Level)

Major Research Focus Areas of rice research in Chhattigarh are:

- **High-Yielding Varieties (HYVs):** Developing rice varieties with better productivity.
- **Climate-Resilient Rice:** Research on drought-tolerant, flood-resistant, and saline-resistant rice.
- **Hybrid Rice Development:** Increasing rice yield potential through hybrid breeding.
- **Organic Rice Farming:** Promoting eco-friendly cultivation methods.
- **Disease and Pest Resistance:** Improving resistance to diseases like bacterial leaf blight and pests like brown planthopper.
- **Nutrient-Enriched Rice:** Fortifying rice with essential nutrients like zinc and iron to combat malnutrition.

Chhattisgarh continues to be a leader in rice research, ensuring food security and sustainable farming practices.

Bibliometric analysis is a powerful research evaluation tool that applies quantitative methods to assess the impact, trends, and influence of scientific literature. It is widely used in academic, scientific, and policy-making fields to analyze research output.

Key Importance of Bibliometric Analysis are:

- It helps identify emerging areas of study by analyzing publication patterns over time and reveals the most active research domains and knowledge gaps.
- It helps to assesses the influence of research papers through citation analysis and track highly cited papers, influential authors, and impactful journals.
- It helps in highlights top contributors in a specific field and recognizes the most productive universities, research organizations, and funding agencies.
- It maps co-authorship networks to identify key research partnerships and shows international and interdisciplinary collaboration patterns.
- It helps policymakers and funding agencies allocate resources to impactful research areas and aids in setting national or institutional research priorities.
- It helps to reveals underexplored areas needing further investigation and predicts potential future research trends based on publication patterns.

Bibliometric analysis is a crucial tool for understanding scientific progress, guiding research strategies, and optimizing resource allocation to understand the rice research in Chhattisgarh.

Review of Literature

The review of works relating to various aspects of Rice research in Chhattigarh has been done. It is observed that by reviewing the related articles, enables the researcher to identify the research gap as well as research priorities in the earlier studies.

A bibliometric analysis is conducted to study the history and status of rice research from 1985 to 2014. We find that the number of publications has grown rapidly over the past 30 years, especially in Asia.

However, the gap of research output quality between Asian countries/regions and USA is obvious. The key-words co-occurrence analysis shows that the genetic analysis for agronomic traits is a hot topic. It could be expected that more technologies such as metabonomics and proteomics will be integrated to accelerate the comprehensive analysis of rice genome function. A bibliometric analysis is conducted to study the history and status of rice research from 1985 to 2014. We find that the number of publications has grown rapidly over the past 30 years, especially in Asia. However, the gap of research output quality between Asian countries/regions and USA is obvious. The key-words co-occurrence analysis shows that the genetic analysis for agronomic traits is a hot topic. It could be expected that more technologies such as metabonomics and

proteomics will be integrated to accelerate the comprehensive analysis of rice genome function. A bibliometric analysis is conducted to study the history and status of rice research from 1985 to 2014.

Sahu et al. (2022) concluded that stigma colour in rice, which is useful for varietal identification and linkage study with other major and minor genes. The inheritance of stigma colour followed normal monogenic ratio 3 (Purple) : 1 (White) which is control by one major gene.

Hossain and Nayak (2020) studied that Punjab, with its 38% SRR, registers 3.97 ton per ha yield whereas it is just 1.51 ton per ha in Chattisgarh where SRR is 44%. There are many varieties, quite older than stipulated 10 years, that are largely indented and grown due to lack of substitutes and poor varietal awareness. Because of this slow varietal awareness and replacement, rice yield still stagnates despite seeds are of assured quality. They concluded that varietal replacement rate is as important as seed replacement rate.

Sharma et al. (2016) observed that, In association analysis days to 50% flowering and days to maturity exhibited highly significant negative genetic association with number of productive tillers per plant, 1000 grain weight and grain yield per plant. Plant height and panicle length exhibited highly significant positive genetic association with tillers per plant and 1000 grain weight but grain yield recorded negative association with plant height.

Amin and Parekh (2019) Studied the scientometric analysis of research output of biochemistry, genetics and molecular biology from the Gujarat University, Ahmedabad. The research article was published during 1980-2018. However, the data was collected and indexed in Scopus were considered for the analysis included a total of 400 publications. Various scientometric indicators have been calculated to acquire an appropriate perception of the growth and current status of research output of Gujarat University, Ahmedabad. The paper also analysed the publication trend of Gujarat University. The other aspects that were identified in the paper were the most prolific authors, collaborative authorship patterns and trends, most preferred publications.

Objectives of the Study

The main objectives are to study the research conducted in Rice research in Chhattisgarh between 1997-2024 based on publications output, as indexed in J gate database. The study focuses on following areas:

- To identify and examine the exponential growth rate of research literature on Rice research in Chhattisgarh.
- To analyze the Year wise distribution of publications.
- To analyze the authorship pattern and their percentage.
- To analyze the Year wise Single author vs Multi author contribution.
- To analyze the Degree of Collaboration.
- To analyze the Types of Affiliation of contributors.
- To analyze the Geographical Distribution of Articles.
- To analyze the Geographical distribution of Research Journals.
- To analyze the Publisher wise distribution of Articles.

Methodology

Bibliometrics scientific domain which includes the quantification and evaluation of the impacts of science, technology, and innovations and the usage of such measurements in the policy and management contexts. Bibliometric efforts to estimate the impact of publications and their authors in influencing knowledge. Furthermore, it provides an insight on the behaviour of scientific citations as a medium of scholarly communication, mapping of intellectual landscapes and the production of focus indicators used in the assessment of performance and productivity.

Data Collection

A bibliometric analysis was conducted on 80 open access and peer-reviewed papers published between the year 1997 and 2024 in J – Gate plus e-Journals. Identification of these articles was cognized in Januarry 2025 (Access Date: 11.01.2025) through direct searches in the J – Gate plus Database (https:// www.jgateplus.com). The articles were extracted from a 'Rice research in Chhattigarh' search query. The study included all document types (80) published within the targeted timescales (1997 – 2024). J-Gate is an electronic gateway to global e-journal literature. Launched in 2001 by Informatics India Limited, J-Gate provides seamless access to millions of journal articles available online offered by 12,791 Publishers.

Results and Analysis

The Table -1 explained the yearly allocation of publications on Rice research in Chhattigarh. It provides the year wise output of publications. It found that the most product year in the terms of publications count is 10 with the highest number of publications in the year of 2016 and 2024. The least number of publications is found to be one publication in the years 1997, 2001, 2006 and 2009.

Table 1: Year wise distribution of publications

SN	Year	No of Research Paper	% of
01	1997	1	1.3
02	2001	1	1.3
03	2002	2	2.5
04	2003	3	3.8
05	2006	1	1.3
06	2008	4	5.0
07	2009	1	1.3
08	2010	2	2.5
09	2011	2	2.5
10	2013	5	6.3
11	2014	9	11.3
12	2015	3	3.8
13	2016	10	12.5
14	2017	5	6.3
15	2018	5	6.3
16	2020	5	6.3
17	2021	2	2.5
18	2022	3	3.8
19	2023	6	7.5
20	2024	10	12.5
	Total	80	100.0

Year wise Authorship Pattern and their Percentage

Table 2 suggestes the year wise authorship pattern in the source topic. Five single authors contributed all over the publication output. Thirteen double authors paper contributed for the source title. Three, triple authors contributed for publishing and 60 multi authors contributed for paper publishing.

Table 2: Year wise Authorship pattern and their percentage.

SN	Year	Single Author	Two Author	Three Author	More than three Author	Total	Percentage
01	1997	0	0	0	1	1	1.3
02	2001	0	0	0	1	1	1.3
03	2002	0	0	0	2	2	2.5
04	2003	1	0	0	2	3	3.8
05	2006	0	0	0	1	1	1.3
06	2008	0	0	0	4	4	5.0
07	2009	0	0	0	1	1	1.3
08	2010	0	0	0	2	2	2.5
09	2011	0	0	0	2	2	2.5
10	2013	1	2	0	2	5	6.3
11	2014	0	3	1	5	9	11.3
12	2015	0	1	0	2	3	3.8
13	2016	0	0	0	10	10	12.5
14	2017	0	0	0	5	5	6.3
15	2018	0	1	1	3	5	6.3
16	2020	1	2	0	2	5	6.3
17	2021	0	1	0	1	2	2.5
18	2022	0	0	0	3	3	3.8
19	2023	1	0	0	5	6	7.5
20	2024	0	3	1	6	10	12.5
	TOTAL	4	13	3	60	80	100
	% age	5	16.2	3.7	75.0	100	

Year Wise Single author vs. Multi Author Contribution

Table 3 exhibits that single author and multi author contribution in the source topic. It is found that four papers are published by single author and 76 papers are published by multi author during the study period.

Table 3: Year wise Single author vs. Multi author contribution

SN	Year	Single Author	Multi Author	Total
01	1997	0	1	1
02	2001	0	1	1
03	2002	0	2	2
04	2003	1	2	3
05	2006	0	1	1
06	2008	0	4	4
07	2009	0	1	1
08	2010	0	2	2
09	2011	0	2	2
10	2013	1	4	5
11	2014	0	9	9
12	2015	0	3	3
13	2016	0	10	10
14	2017	0	5	5
15	2018	0	5	5
16	2020	1	4	5
17	2021	0	2	2
18	2022	0	3	3
19	2023	1	5	6
20	2024	0	10	10
	Total	4	76	80

Degree of Collaboration

The degree of collaboration is defined as the ratio of the number of collaborative research papers to the total number of research papers in the discipline during a certain period of time. The formula suggested by Subramanyam is used in this study.

$$C = \frac{Nm}{Nm + Ns}$$

C = Degree of Collaboration
Nm = Number of Multiple authors
Ns = Number of single authors

Degree of Collaboration

Thus the degree of collaboration in present study is 0.952 which clearly indicates its dominance over individual contribution.

Table 4: Degree of Collaboration

SN	Year	Degree of Collaboration
01	1997	1.0
02	2001	1.0
03	2002	1.0
04	2003	0.7
05	2006	1.0
06	2008	1.0
07	2009	1.0
08	2010	1.0
09	2011	1.0
10	2013	0.8
11	2014	1.0
12	2015	1.0
13	2016	1.0
14	2017	1.0
15	2018	1.0
16	2020	0.8
17	2021	1.0
18	2022	1.0
19	2023	0.8
20	2024	1.0
		95.2

Types of Affiliation of Contributors

The Table 5 showed the affiliation wise contributors. These sectors have been grouped into five distinct categories for the convenience of the study. The highest contributions were from Agriculture universities with 22 (66.7 %). This is followed by national institute with 05 (15.2 %), State University 04 (12.1 %) and 01 (3.0 %) for private institute and international institute each.

Table 5: Institution wise contributors

Types of Affiliation	No. of Articles	% age
Agriculture University	22	66.7
State University	4	12.1
National Institute	5	15.2
International Institute	1	3.0
Private Institute	1	3.0
Total	33	100.0

Geographical Distribution of Articles

Table 6 indicated that most of the contributors are from India with 96.3 % and the rest 3.7 % only from Canada, Pakistan and Philippines (1.3 % each)

Table 6: Geographical Distribution of Articles

Types of Affiliation	No. of Articles	% age
India	77	96.3
Canada	01	1.3
Pakistan	01	1.3
Philippines	01	1.3
Total	80	100

Geographical Distribution of Research Journals

Table 7 described the analysis of the data, geographical distribution of research journals retrieved for the years considered for the study. There were four articles (7.7 %) each were published in International Journal Of Agriculture Sciences. This is followed by Indian Journal Of Agricultural Sciences , International Journal Of Chemical Studies, Journal Of Experimental Agriculture International and Oryza-an International Journal On Rice with 3 articles (5.8 %) each. Annals Of Agricultural Research, Bhartiya Krishi Anusandhan Patrika, Indian Journal Of Agronomy, International Journal Of Commerce And Business Management and Mausam with 2 papers (3.8 %) each. Annals Of Arid Zone, Asian Journal Of Chemistry, Bioscan, Climate And Development, Current Science, Electronic Journal Of Plant Breeding, Environment Conservation Journal, Environment And Ecology, Flora And Fauna, Grassroots Journal Of Natural Resources, Indian Journal Of Spatial Science, International Journal Of Agricultural And Statistical Sciences, International Journal Of Emerging Research In Engineering, Science, And Management, International Journal Of Plant And Soil Science, International Journal Of Research In Chemistry And Environment, International Journal Of Research In Management And Social Science, International Rice Research Notes, Journal Of Agricultural Issues, Journal Of Biological Control, Journal Of Earth Science And Climatic Change, Journal Of Emerging Technologies And Innovative Research, Journal Of Genetics, Genomics And Plant Breeding, Journal Of Progressive Agriculture, New Agriculturist Journal, Pakistan Journal Of Botany and Research Journal Of Recent Sciences occupied one article (1.9 %) each.

Table 7: Geographical distribution of Research Journals

Name of Journal	Published From	No. of Articles	% age
International Journal Of Agriculture Sciences	India	4	7.7
Indian Journal Of Agricultural Sciences	India	3	5.8
International Journal Of Chemical Studies	India	3	5.8
Journal Of Experimental Agriculture International	India	3	5.8
Oryza-an International Journal On Rice	India	3	5.8
Annals Of Agricultural Research	India	2	3.8
Bhartiya Krishi Anusandhan Patrika	India	2	3.8
Indian Journal Of Agronomy	India	2	3.8
International Journal Of Commerce And Business Management	India	2	3.8

Mausam	India	2	3.8
Annals Of Arid Zone	India	1	1.9
Asian Journal Of Chemistry	India	1	1.9
Bioscan	India	1	1.9
Climate And Development	United Kingdom	1	1.9
Current Science	India	1	1.9
Electronic Journal Of Plant Breeding	India	1	1.9
Environment Conservation Journal	India	1	1.9
Environment And Ecology	India	1	1.9
Flora And Fauna	India	1	1.9
Grassroots Journal Of Natural Resources	Canada	1	1.9
Indian Journal Of Spatial Science	India	1	1.9
International Journal Of Agricultural And Statistical Sciences	India	1	1.9
International Journal Of Emerging Research In Engineering, Science, And Management	India	1	1.9
International Journal Of Plant And Soil Science	India	1	1.9
International Journal Of Research In Chemistry And Environment	India	1	1.9
International Journal Of Research In Management And Social Science	India	1	1.9
International Rice Research Notes	Philippines	1	1.9
Journal Of Agricultural Issues	India	1	1.9
Journal Of Biological Control	India	1	1.9
Journal Of Earth Science And Climatic Change	India	1	1.9
Journal Of Emerging Technologies And Innovative Research	India	1	1.9
Journal Of Genetics, Genomics And Plant Breeding	India	1	1.9
Journal Of Progressive Agriculture	India	1	1.9
New Agriculturist Journal	India	1	1.9
Pakistan Journal Of Botany	Pakistan	1	1.9
Research Journal Of Recent Sciences	India	1	1.9

Subject wise Distribution of Papers

Table 8 demonstrate the name of subject, in which authors have published their work and findings. Plant pathology subject got the maximum number of papers viz., 13 papers (16.3 %) followed by Seed Technology & Propagation with 11 papers (13.8 %), Agricultural Biotechnology 7 papers (8.38%), Crop Production And Protection 6 papers (7.5 %), Agronomy 5 papers (6.3%), Agricultural Engineering 4 papers (5.0%), Biotechnology, Soil Chemistry, Microbiology, Fertility & Fertilisers, Biology, Dryland Farming, Horticulture And Plant Culture, Post Harvesting Operations And Storage and Water And Water Resources subjects occupied 3 papers each (3.8 %) and Animal Husbandry, Livestock Management & Poultry Sciences, Pest Control & Integrated Pest Management, Genetics and Plant Breeding, Botany, Ecosystems & Ecology and Micro And Molecular Biology subjects engaged 2 papers (2.5 %) each and subject Dairy Technology acquired only one paper (1.3 %).

Table 8: Subject wise distribution of Articles

Name of Publishers	Total no of Papers Published	% age of 198
Plant pathology	13	16.3
Seed Technology & Propagation	11	13.8
Agricultural Biotechnology	7	8.8
Crop Production And Protection	6	7.5
Agronomy	5	6.3
Agricultural Engineering	4	5.0
Biotechnology	3	3.8
Soil Chemistry, Microbiology, Fertility & Fertilisers	3	3.8
Biology	3	3.8
Dryland Farming	3	3.8
Horticulture And Plant Culture (Including Arboriculture)	3	3.8
Post Harvesting Operations And Storage	3	3.8

Water And Water Resources	3	3.8
Animal Husbandry, Livestock Management & Poultry Sciences	2	2.5
Pests, Pest Control & Integrated Pest Management	2	2.5
Genetics and Plant Breeding	2	2.5
Botany	2	2.5
Ecosystems & Ecology	2	2.5
Micro And Molecular Biology	2	2.5
Dairy Technology	1	1.3
Total	80	100.0

Conclusions

It should be highlighted that research articles serve as the primary mode of communication among researchers, providing a key indication of the extent of work conducted on the topic of rice research in Chhattisgarh.

The study was observed the maximum number of publication was recorded with 10 (12.5 %) in the year of 2016 and 2024 and least number of publications were found to be 1997, 2001, 2006 and 2009 with one publication.

It is observed that 4 single authors contributed all over the publication output. 13 double authors paper contributed for the source title. 3 triple authors contributed for publishing. 60 multi authors contributed for paper publishing.

It is found that 4 papers are published by single author and 76 papers are published by multi author during the study period.

In the present study, It was found that the degree of collaboration in present study is 0.952 which clearly indicates its dominance over individual contribution.

It is observed that affiliation wise contributors have been grouped into five distinct categories for the convenience of the study. The highest contributions were from Agriculture universities with 22 (66.7 %). This is followed by national institute with 05 (15.2 %), State Universities 4 (12.1) and 01 (3.0 %) for Private institute and international institute each.

Present study revealed that most of the contributors are from India with 96.3 % and the rest 3.7 % only from foreign sources.

In the present study it is observed there were 47 articles (92.1 %) each were published from Indian Journals. This is followed by Canada, Philippines, Pakistan and United kingdom occupied with one articles (1.9 %) each.

It is revealed that subject Plant npathology got the maximum number of articles viz., 13 articles (16.3 %) followed by Seed technology and propogation with 11 article (13.8 %) and then subject agricultural biotechnology 7 articles (8.8 %). However, Dairy technology subject received only single article (1.3 %).

The scientometric method is used for various purposes, including identifying different indicators, analyzing scientific output, and predicting the potential of a research field. This study presents an analysis of rice research in Chhattisgarh over the period 2001–2010. Such studies can help researchers understand the scope and impact of rice research in Chhattisgarh and establish future research directions.

References

1. Amin, Jignesh; and Parekh, Yogesh R.(2019) Scientometric Analysis of the Research Output of Biochemistry, Genetics and Molecular Biology of Gujarat University, Ahmedabad. Library Philosophy and Practice (e-journal). 2633.

2. Hossain, S.K. Mosharaf; and Nayak, Swati (2020) Paradox of Rice Seed System in India. Grassroots, *Journal of Natural Resources,* Vol. 3(1), 29-35.

3. Sahoo, Biswajit; Bhandarkar, Sandeep; Verma, Ramlakhan; and Nair, Sunil (2022) Study of Inheritance pattern of Stigma colour in rice (Oryza sativa L.), *JETIR,* Volume 9 (7), 381-385.

4. Sharma, Devendra Jeet; Parihar, Roshan; Agrawal, Ajay Prakash; Minz, Madhuri Grace; And Neelofer, Sara (2016) Correlation and Path Coefficient Studies for Grain Yield and other Yield Attributes on Aromatic Short Grain Rice (Oryza Sativa L.) Genotypes, *International Journal of Agriculture Sciences,* Volume 8, (51), 2318-2320

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