

Research Productivity of Agricultural Scientists of Central Rice Research Institute (CRRI), Cuttack: A Study

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Abstract

This paper describes results of research productivity study of agricultural scientists at Central Rice Research Institute (CRRI), Cuttack. The purpose of the study is to evaluate the research performance of CRRI Scientists. The study includes citations of 586 papers collected from the Annual Reports of CRRI, Cuttack for a period of 14 years from 1996-2009. This paper has identified publication trends with regard to subject area, journals, authorship pattern, collaboration, etc. Findings of the study indicate that journal article (72.69%) is the predominant type of publication. The authorship collaboration at CRRI was identified to be very low i.e. 0.15. The individual productivity reveals that 96.68% of the authors have published only ten or less number of articles during the period. Dr. T. K. Adhya was the highest productive author with 55 articles. Oryza has the highest frequency of publication of CRRI articles.

Keywords: Agricultural Science, Citation Analysis, CRRI, Publication Productivity

1. INTRODUCTION

The contribution of research towards the socio-economic development of a country has been well accepted. Scientific publications seem to have provided the best available basis for measuring the productivity of individual scientist as there is a good correlation between the eminence of scientists and their sustained research publications. However, the research productivity of scientists is characterized by an extremely asymmetrical distribution. This property adds a special interest to the analysis of research productivity which subsequently leads to a better understanding of its determinants. In evaluating research productivity of a scientific community, publication of research findings is the most common measure, even though it is not the most accurate indicator. It is now argued that gaps and shortcomings could exist in evaluating research productivity of scientists only through their publications. This may be due to the complex nature of the changing world in the present time where factors other than scientific productivity also exert a major influence on scientific career development. Although publication of

research findings is very important to gain scientific recognition and professional identity, it should not be the main and the only criteria for evaluation of research productivity of the scientific community. Agricultural sciences include research and development on production techniques, improving agricultural productivity in terms of quantity and quality, development of new pesticides, yield-sensing technologies, simulation models of crop growth, transformation of primary products into end-consumer products, prevention and correction of adverse conditions, etc.

The Central Rice Research Institute (CRRI) was established by the Government of India in 1946 at Cuttack, as an aftermath of the great Bengal famine in 1943, for a consolidated approach to rice research in India. The administrative control of the Institute was subsequently transferred to the Indian Council of Agricultural Research (ICAR) in 1966. The Institute has two research stations, one at Hazaribag, in Jharkhand, and the other at Gerua, in Assam.

2. OBJECTIVE OF THE STUDY

The primary objective of the present study is to measure the research productivity of the CRRI scientists on the basis of the analysis of their research publications. Among other things the study aims to find out

- i Authorship pattern in research publication.
- ii Level of collaboration in research.
- iii Journal - wise distribution of research publications.
- iv Year - wise distribution of research publications..
- v Contribution in national and international journals.
- vi To discover the most frequently cited journals in the field.

3. METHODOLOGY

A total of 586 publications published by the 90 CRRI scientists on agricultural science in general and rice in particular during the period 1996 to 2009 formed the basic data for the present study. By type of publication, the study included four major types of sources, such as journals, proceedings, book chapters and bulletins. The publication data were collected from the Annual Reports of CRRI for the above period. All the collected data are imported in MS-Excel for data manipulation and statistical calculations for the present research.

4. REVIEW OF LITERATURE

The measurement of research performance of individuals and institutions through publication and citation counts has been in practice for quite a long time. Similarly, Bibliometric and Scientometric studies on specific domains of science have been carried out by many authors for various purposes. Some of these studies measure the growth and trend of research in different areas. Arunachalam & Umarani [1] have made a scientometric analysis of publications in the field of agriculture and related fields indexed in CAB Abstract. Out of 11,855 publications, only 33 published in the journals with IF higher than 3.0. Kumbar, Harinarayan and Tejaswini [2] have studied the authorship pattern and collaborative research in agricultural sciences in India. Sarkhel and

Raychaudhury [3] have made a bibliometric study on research contributions of Bidhan Chandra Krishi Viswavidyalaya (BCKV), West Bengal to find out the trends of authorship pattern, which showed high degrees of collaboration in agricultural research. Wickremasinghe [4] compared the research productivity of rice scientists in Central Rice Research Institute (CRRI), Cuttack in India and Rice Research and Development Institute (RRDI) in Sri Lanka. The mean research productivity was found to be significantly higher for Indian scientists compared to Srilankan rice scientists. Sharma [5] analyzed 2603 publications to find out the trends of research publication of the scientists at Central Potato Research Institute (CPRI), Shimla. The study found that there is a higher degree of research collaboration (0.82) among the scientists.

5. DATA ANALYSIS AND DISCUSSION

Data analysis is the major part of every research work. For the present study the data is collected from the Annual Reports of CRRI, Cuttack over a period of 14 years, i.e, from 1996-2009. A total of 586 numbers of research publications were collected which has been published during the last 14 years.

5.1 Year-Wise Growth of Research Publications

Research productivity of individuals and institutions is dependent on a various factors of academic, financial, and administrative nature. Hence, the number of research publications shows varying degrees of fluctuation over a period of time. The publication trends of the scientists at CRRI also exhibit a similar character.

Table 1 Year-wise Growth of Research Publications at CRRI Cuttack

| Year | Number of Research Papers published (n=586) | Percentage (%) |
|------|---|----------------|
| 1996 | 3 | 0.51 |
| 1997 | 10 | 1.7 |
| 1998 | 110 | 18.77 |
| 1999 | 79 | 13.48 |
| 2000 | 40 | 6.82 |
| 2001 | 8 | 1.36 |
| 2002 | 32 | 5.46 |
| 2003 | 31 | 5.29 |
| 2004 | 49 | 8.36 |
| 2005 | 66 | 11.26 |
| 2006 | 66 | 11.26 |
| 2007 | 34 | 5.8 |
| 2008 | 46 | 7.84 |
| 2009 | 12 | 2.04 |

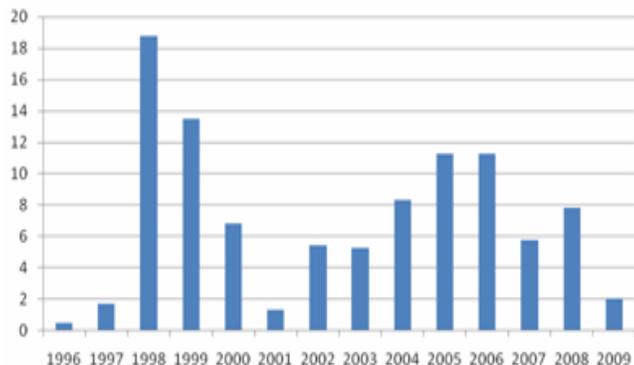


Fig.1 Year-wise growth of research publications at CRRI, Cuttack

Table 1 presents the data relating to growth of research publications of CRRI scientists over a period of 14 years i.e. during 1996 to 2009. The year 1998 is the highest productive year in which 110 (18.77%) research papers were published. The years in which than 10% publications were published are 1999 with 79 (13.48%) followed by 2005 and 2006 each with 66 (11.26%) research publications. The least productive year with lowest number of papers published was 1996 in which only 3 (0.51%) papers were published.

5.2 Type of Publications

The publication from CRRI is grouped into four categories i.e., Journal articles, Conference proceedings, Book chapters, and Bulletin papers. The distributions of the publications of CRRI are as follows:

Table 2 Distribution of Articles According to Type of Publication

| Type of Publication | Number of Articles | Percentage of Articles |
|---------------------|--------------------|------------------------|
| Journals | 426 | 72.69 |
| Proceedings | 88 | 15.01 |
| Book chapters | 46 | 7.84 |
| Bulletins | 26 | 4.43 |

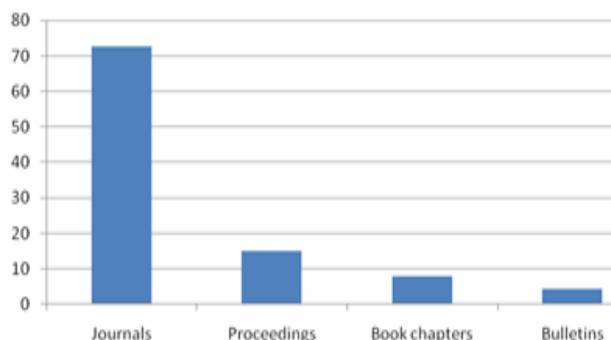


Fig.2 Publication types of CRRI scientists

Table 2 discloses that Journal is the predominant publication type with 426 (72.69%) articles followed by 88 (15.01%) in conference proceedings, 46 (7.84%) book chapters and 26 (4.43%) in bulletin publications. It is evident from the above data that a majority of CRRI publications are published in research journals which has wider circulation as compared to the others.

5.3 Authorship Pattern

Authorship pattern discloses how the papers are distributed among the authors so as to indicate the level of research collaboration. Authorship Pattern is one of the very important bibliometric indicators in order to assess the degree of collaboration of the authors in a particular discipline or in an institution.

Table 3 Authorship Pattern of Whole Contribution

| Authorship Pattern | Number of Contribution (n=586) | Percentage |
|------------------------|--------------------------------|------------|
| Single Author | 88 | 15.01 |
| Two Authors | 149 | 25.42 |
| Three Authors | 155 | 26.45 |
| Four Authors | 84 | 14.33 |
| More than Four Authors | 110 | 18.77 |

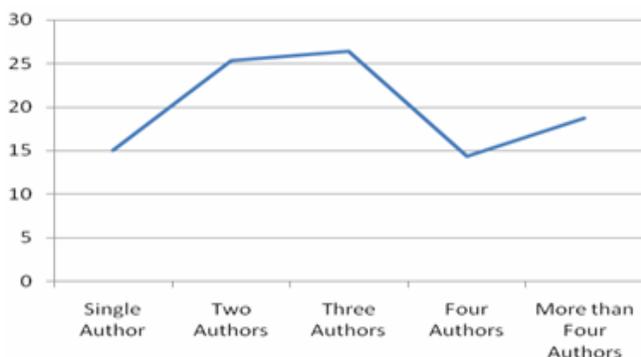


Fig. 3 Authorship pattern

Table 3 indicates that the highest number of articles, i.e. 155 (26.45%) have three authors followed by 149 (25.29%) with two authors, 88 (15.01%) and 84 (14.33%) have single author and four authors respectively. 110 (18.77%) articles are authored by more than four authors. Data relating to authorship pattern and the slope of the author collaboration curve shows that maximum collaboration of CRRI research is with a team of two or three authors. The degree of collaboration (C) = $N_m / (N_m + N_s) = 88 / (88 + 498) = 0.15$. Thus, the degree of research collaboration as regard to the research publications of CRRI scientist for a period of 14 years is very low.

5.4. Distribution of Authors by Number of Publications

The frequency of publication by individual authors at CRRI has been represented through the Table 4.

Table 4 Frequency of Publication of Authors

| Number of Articles | Number of Authors n=513 | Percentage(%) of Authors |
|--------------------|-------------------------|--------------------------|
| 1-10 | 496 | 96.68 |
| 11-20 | 3 | 0.58 |
| 21-30 | 10 | 1.94 |
| 31-40 | 2 | 0.38 |
| 41-50 | 2 | 0.38 |

The Table 4 described about the number of authors by their publications. More than 496 (96.68%) authors have less than 10 publications each, where as 10 (1.94%) authors have more than 20 publications in a period of 14 years. Only two authors have more than 40 publications.

5.5 Ranking of Authors by Number of Contributions (Top 10 Authors)

Table 5 described about the top ten authors according to their publications. Dr. T. K. Adhya, Director, CRRI is the most productive author with a total of 55 (9.38%) research publications. The second most productive author is V.R. Rao, a scientist who has 41(6.99%) publications. R.K. Sarkar with 37 (6.31%) research papers stood 3rd in the list of most productive authors of CRRI Cuttack.

Table 5 Ranking of Authors by Number of Articles Published

| Rank | Name of the Author | Number of Contribution, n=586 | Percentage (%) of Contribution |
|------|--------------------|-------------------------------|--------------------------------|
| 1 | Adhya, T.K. | 55 | 9.38 |
| 2 | Rao, V.R. | 41 | 6.99 |
| 3 | Sarkar, R.K. | 37 | 6.31 |
| 4 | Ramakrishnana, B. | 36 | 6.14 |
| 5 | Setunathan, N. | 28 | 4.77 |
| 6 | Panda, D. | 27 | 4.6 |
| 6 | Saha, S. | 27 | 4.6 |
| 7 | Prakash, A. | 25 | 4.26 |
| 8 | Routaray, S.K. | 24 | 4.09 |
| 8 | Moorthy, B.T.S. | 24 | 4.09 |
| 9 | Rath, P.C. | 23 | 3.92 |
| 9 | Ghosh, A. | 23 | 3.92 |
| 10 | Krishna, P. | 21 | 3.58 |

5.6 Publication in Indian and Foreign Journal

The publishing preferences of CRRI scientists in Indian and foreign journals have been depicted in the graph below. The data clearly stated that out of 426 journals, 219 (51.4%) are foreign journals and 207 (48.59%) are Indian journals. Thus, the CRRI scientists maintain parity in publishing their articles in journals of Indian origin and journals from other countries.

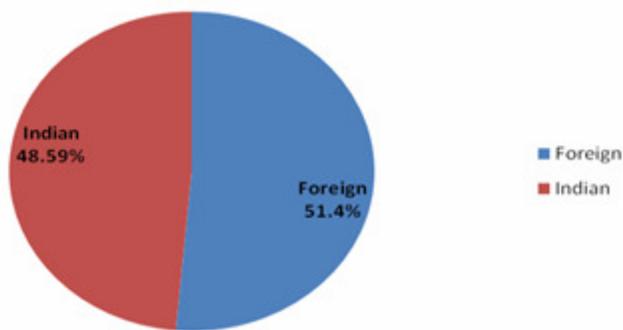


Fig. 4 Type of journals

The above table and graph presents the publishing preferences of scientists in Indian origin and foreign journals. The data clearly stated that out of 426 journals scientists preferred to publish their papers in foreign journals with the majority of 219 (51%), where as scientists preferred 207 (49%) Indian journals.

6. FINDINGS OF THE STUDY

As a result of systematic analysis of data obtained for the present study, the investigator observes the following facts about the study:

- i It was found that research publications of CRRI scientists over a period of 14 years i.e. during 1996 to 2009 have published 586 numbers of articles.
- ii The year 1998 is the most productive year for CRRI, Cuttack having published 110 (18.77%) research papers.
- iii According to the type of publications by the CRRI scientists, Journal articles 426 (72.69%) are the predominant types of publications.

- iv The author collaboration is 0.15. The team research with 3 or 4 authors has produced maximum number of articles.
- v From the whole contribution, it is found that more than 498 (96.68%) authors have ten or less articles in their credits.
- vi T.K. Adhya the Director of CRRI, Cuttack found to be the most productive researcher with 55 (9.38%) articles.
- vii The preference of Indian and foreign journals has almost been the same.
- viii The journal *Oryza* is the most preferred journal by the CRRI, Cuttack scientists having published maximum number of articles i.e. 78 (18.3%).

7. CONCLUSION

CRRI (Cuttack) is a well established and developed rice research institute. The measure of productivity in terms of number of publications will reveal the research activities of the institute in quantitative terms. The study found that the publication productivity of CRRI has been quite inconsistent over the years. Secondly, author collaboration at CRRI needs to be improved in order to raise the productivity both at individual and institutional level.

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