*Original Research Article*

# Research Productivity of Tamilnadu Agricultural University as reflected in Scopus Database: A Scientometric Dimension


## Abstract

*Scientometric dimensions of research productivity of the institution helps out to improve the quality of research and the emerging areas to be worked out. In this connection, A scientometric study has been attempted to analyze the research productivity of faculty members of Tamil Nadu Agricultural University for the period of 2001-2020 as recorded in Scopus database. Total of 4372 publications in Scopus were retrieved and analysed the performance of the faculty members. This study analyzed the scientific parameters such as year-wise distribution of research productivity, most prolific authors, funding sponsors, Collaborating Institutions, Collaborating Countries and top-ranked sources preferred by the agricultural faculty members for publishing their research output. Tamilnadu Agricultural University faculty members published more publications in Scopus 4372. Articles are the predominant publications by the faculty members of Tamilnadu Agricultural University, Coimbatore 3928 in Scopus and Prof. Samiyappan R is the predominant and most impactful author of Tamilnadu Agricultural University.USA is the most predominant country collaborated with Tamilnadu Agricultural University publications about 187 in Scopus , Electronic Journal of Plant Breeding 448 publications in Scopus. Agricultural College and Research Institute, Madurai is the most collaborating institution with 538 publications in Scopus database. Agricultural and Biological Sciences subject category in Scopus 3317 publications. Indian Council of Agricultural Research is the predominant sponsor and supported for 104 research publications followed by Department of Biotechnology, Ministry of Science and Technology, India*



**Keywords:** Agriculture, Tamil Nadu Agricultural University, Research Productivity, Scientometrics


## Introduction

India is an agrarian country, and agriculture makes up a significant portion of the Indian economy, accounting for over 18% of GDP. The agriculture sector in India employs over 52

percent of the country's workforce. Only because of the diligent and serious study conducted by Indian agricultural specialists was the Green Revolution possible in India. Pandit Jawaharlal Nehru, India's previous Prime Minister, emphasised the necessity of agricultural research by saying, "Everything can wait, but agriculture cannot." In India, agricultural research is critical to the country's progress. Scientific research evaluation is a complicated process that can be simplified by utilising bibliometric indicators that are based on the estimation of scientific output, which implicitly signals productivity. For decades, publication counting has been used to assess the effectiveness of research. However, the method's main restriction is that it can only track research efforts that result in written knowledge that is disseminated through established communication channels such as journals, books, and patents. Despite the method's limitations, it was thought worthwhile to investigate the nature and other distinguishing elements of scientific study in Tamil Nadu, as demonstrated by scientific publications.

## Tamilnadu Agricultural University

Agricultural education is an important subject of education and sixty three State Agricultural Universities (SAUs) available in India to offer various undergraduate and post graduate degree programmes related to agriculture. The Tamil Nadu Agricultural University is one of top ranking SAUs in India by introducing innovative ideas in teaching and research. The Tamil Nadu Agricultural University (TNAU) began in 1868 by founding an Agricultural School in Saidapet, Madras, Tamil Nadu later shifted to Coimbatore. It was connected with Madras University in 1920. TNAU have responsibility to provide the agricultural education and research and research products to the State Agricultural Department. The Agricultural College and Research Institute, Coimbatore, was the only Agricultural Education Institute in South India till 1946. It was designated as a Post-graduate Centre for Master's and Doctoral degrees in 1958. Agricultural College and Research Institute, Madurai, was founded in 1965. However, the TNAU was founded in 1971, and these two colleges comprised the nucleus. Presently, The University has 17 constituent colleges, 4 Regional research stations, 22 Agricultural research stations ,13 Horticultural research stations and 14 Krishi Vigyan Kendra (KVKs).The university mandates for each of theSstation ,Departments ,Colleges and directorate charted.

## Scopus

Scopus is a product of Elsevier, which was founded in 2004. Elsevier Publishing Group maintains the Scopus database, which is an abstracting and citations information

portal. Scopus collects and distributes data based on more validated papers published by the researcher. Scopus, in other words, relies on peer-reviewed, high-impact-factor journals, books, conference proceedings, and other sources. Scopus gives information about the researcher's h-Index, CiteScore, and SJR.

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## Review of Literature

**Arumugam J, & Balasubramani R, (2020)** aimed to offer a quantitative and qualitative study of Kumaraguru College of Technology, Coimbatore's publication output. For the years 1997 through 2020, data was gathered from the Scopus database. The largest numbers of 404 papers were published in 2018 and 2019 among the 2110 papers published over a 24-year period. Between 2011 and 2020, 1792 papers were published, accounting for 85.3 percent of the total. With 1665 papers, journals are the most popular mode of publication. This research shows that Kumaraguru College of Technology has made significant contributions to research in Science, Engineering, and Technology, and that faculty publication output has increased significantly in recent years.**Sankar, M (2020)** used Web of Sciences to examine plant science research output at Tamil Nadu Agricultural University from 2000 to 2020. He reported that the TNAU scientist's research output was in the form of research papers in 2015, with the maximum number of publications output 49. (83.01%). Plant Archives was the most popular journal for submissions, accounting for 30 papers. Samiyappan R was the most prolific author, publishing 45 articles in various publications. 28 essays were written in partnership with Kansas State University. Rice was the most commonly used keyword in the plant science category (97 times). **Geetha, N & Kothainayaki, S (2019)** measured research output of Anna University using Scopus database and the top most was given for Type of Source, Chronological growth, Subject wise contribution, Document type preferred, Collaborated Country, Collaborated Institutions, Contributed Journal, Highly contributed author, Keywords Preferred and Language of the paper. A total of 23,883 records have been identified and the same has been analysed.**Jayaprakash G Hugar (2019)** has found the results in their study in the Web of Science Database for publication pattern, trend, and collaboration with different organisations, institutions and different nations. Top most funding agency of Goa University in last ten years. Totally 1218 articles including 497 international collaborated articles with an increasing growth rate during the study period.**Anil Kumar Siwach & Seema Parmar (2018)** analysed Research Contributions of CCS Haryana Agricultural University during the year from 2001 to 2015 The result based on the year-wise research output, subjects ,national and Global contributions

, top most publications of journals, most productive authors,top most using keywords, authorship , citations pattern and highly cited paper. A total of 2649 paper were published during the research period and 15282 citations. **Susan, M. K., Sheeja, N.K. & Cherukodan, S (2018)**analysed the research output of TamilNadu universities top most ranking wise prolific authors, publications, countries and citations etc. only 40 universities analysed out of a total 52. The First rank position in Anna University is the top ranking university in the state with 17859 documents, Second Rank Vellore Institute of Technology (VIT) with 10646 and third rank for University of Madras with 10474. The top three universities in Tamil Nadu come under the first top 30 institutions having more documents in Scopus from India.

## Objectives of the Study

The primary objective of the study is to analyse the scientific research publications by the faculty members of Tamilnadu Agricultural University, Coimbatore for the period of 2001-2020 as reflected in Scopus database.

- To analyze the growth pattern of Tamil Nadu Agricultural University
- To explore the document wise research output
- To understand Subject wise Research output
- To find out the predominant institutions collaborated with Tamil Nadu Agricultural University
- To figure out the Sponsorship wise research output
- To explain the Country wise research output
- To analyze the Author wise in research output
- To understand the Source wise research output

**Scope and Limitations**

The present study is limited to the publications of Tamil Nadu Agricultural University, Coimbatore in Scopus database only. The study is limited to the publications period of 2001 to 2020.

## Methodology

The Scopus citation databases are used as a data collection tool and extracted 4372 records in Scopus as on 30 March 2022 for the period of 2001 to 2020 with the search string “Tamilnadu Agricultural University”. The extracted data were analyzed using Biblioshiny and VoS viewer and a comparative analysis were done with respective of the institution.

***Search Query Employed***

AF-ID ( *"Tamil Nadu Agricultural University" 60025123* ) OR AF-ID ( *"Tamilnadu Agricultural University Agricultural Research Station" 60076450* ) ) AND ( LIMIT-TO ( PUBYEAR , *2020* ) OR LIMIT-TO ( PUBYEAR , *2019* ) OR LIMIT-TO ( PUBYEAR , *2018* ) OR LIMIT-TO ( PUBYEAR , *2017* ) OR LIMIT-TO ( PUBYEAR , *2016* ) OR LIMIT-TO ( PUBYEAR , *2015* ) OR LIMIT-TO ( PUBYEAR , *2014* ) OR LIMIT-TO ( PUBYEAR , *2013* ) OR LIMIT-TO ( PUBYEAR , *2012* ) OR LIMIT-TO ( PUBYEAR , *2011* ) OR LIMIT-TO ( PUBYEAR , *2010* ) OR LIMIT-TO ( PUBYEAR , *2009* ) OR LIMIT-TO ( PUBYEAR , *2008* ) OR LIMIT-TO ( PUBYEAR , *2007* ) OR LIMIT-TO ( PUBYEAR , *2006* ) OR LIMIT-TO ( PUBYEAR , *2005* ) OR LIMIT-TO ( PUBYEAR , *2004* ) OR LIMIT-TO ( PUBYEAR , *2003* ) OR LIMIT-TO ( PUBYEAR , *2002* ) OR LIMIT-TO ( PUBYEAR , *2001* ) )

## Data Analysis and Interpretation

**Table.1 Year wise research output and Annual Growth rate of Tamil Nadu Agricultural University**

| Sl. No | Publication Year | Publications | Annual Growth rate |
|---|---|---|---|
| 1 | 2001 | 122 | - |
| 2 | 2002 | 92 | -24.59 |
| 3 | 2003 | 114 | 23.91 |
| 4 | 2004 | 118 | 3.51 |
| 5 | 2005 | 107 | -9.32 |
| 6 | 2006 | 134 | 25.23 |
| 7 | 2007 | 172 | 28.36 |
| 8 | 2008 | 164 | -4.65 |
| 9 | 2009 | 193 | 17.68 |
| 10 | 2010 | 221 | 14.51 |
| 11 | 2011 | 180 | -18.55 |
| 12 | 2012 | 195 | 8.33 |
| 13 | 2013 | 233 | 19.49 |
| 14 | 2014 | 285 | 22.32 |
| 15 | 2015 | 294 | 3.16 |
| 16 | 2016 | 304 | 3.40 |
| 17 | 2017 | 322 | 5.92 |
| 18 | 2018 | 292 | -9.32 |
| 19 | 2019 | 396 | 35.62 |
| 20 | 2020 | 434 | 9.60 |
| | **Total** | **4372** | |

Table 1 shows the year wise research output of Tamilnadu Agricultural University as reflected in Scopus database for the period of 2001-2020. It is clear evident that the researchers of TNAU published more publications in Scopus 4372 compared. During 2001 - 2010 there is an accountable publications with the annual growth rate in Scopus database ranges from 23.91 to 14.51, in the last decade there is a decreasing trend of AGR value from 22.32 to 9.60.

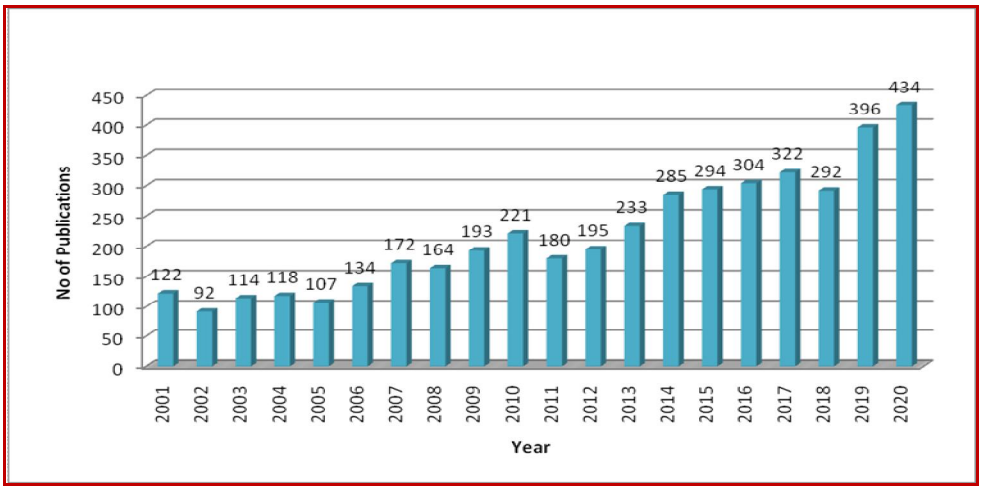


Figure 1 : Growth of Publications

**Document Wise Distribution**

Figure 2 shows the document wise distribution of research output of Tamilnadu Agricultural University as reflected in Scopus database for the period of 2001-2020. It is clear that Articles are the predominant publications by the faculty members of Tamilnadu Agricultural University, Coimbatore 3928 in Scopus.

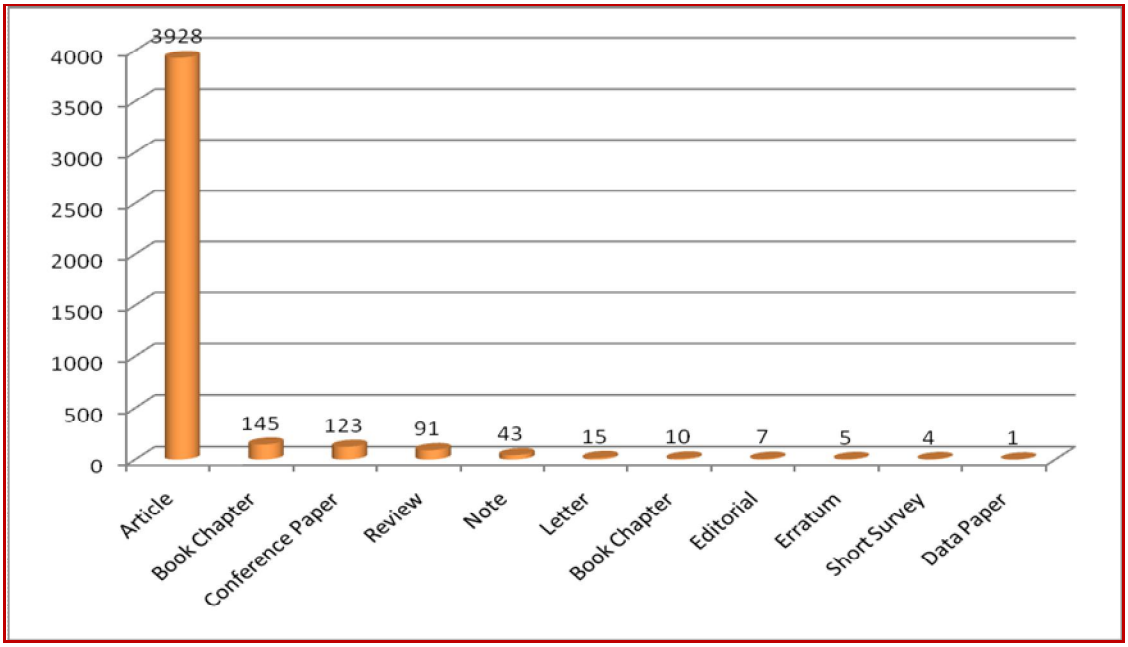


**Figure 2: Document Type Distribution of Tamilnadu Agricultural University**

**Table.2. Document wise output of Tamil Nadu Agricultural University**

| Sl. No | Document Type | Scopus | Percent (%) |
|---|---|---|---|
| 1 | Article | 3928 | 89.84 |
| 2 | Book Chapter | 145 | 3.32 |
| 3 | Conference Paper | 123 | 2.81 |
| 4 | Review | 91 | 2.08 |
| 5 | Note | 43 | 0.98 |
| 6 | Letter | 15 | 0.34 |
| 7 | Book | 10 | 0.23 |
| 8 | Editorial | 7 | 0.16 |
| 9 | Erratum | 5 | 0.11 |
| 10 | Short Survey | 4 | 0.09 |
| 11 | Data Paper | 1 | 0.02 |
| | **Total** | **4372** | **100** |

Table 2 depicts that there are various type of publications are contributed by the faculty members of Tamilnadu Agricultural University such as Article, Conference paper, Book Chapter, Reviews, Notes, Letter, Book, Editorial, erratum, short survey and data paper in which Articles are the predominant source of publications in Scopus by the faculties of the University 89.84 % respectively.

**Table 3. Predominant Author of Tamilnadu Agricultural University**

It is very Clear that Prof Samiyappan R has 141 (3.23%) publications followed by, Raguchandar T has 112 ( 2.56%) , Raveendran M has 113 (2.56) in Scopus publications. It shows predominant top 20 influencing authors of Tamilnadu Agricultural University, Coimbatore.

| S. No | Name of the Faculty | Publications | Percentage (%) |
|---|---|---|---|
| 1. | Samiyappan, R. | 141 | 3.23 |
| 2. | Raguchander, T. | 112 | 2.56 |
| 3. | Raveendran, M. | 112 | 2.56 |
| 4. | Velazhahan, R. | 105 | 2.40 |
| 5. | Senthil, N. | 79 | 1.81 |
| 6. | Kuttalam, S. | 77 | 1.76 |
| 7. | Manivannan, N. | 70 | 1.60 |
| 8. | Vanniarajan, C. | 65 | 1.49 |
| 9. | Karthikeyan, G. | 63 | 1.44 |
| 10. | Nakkeeran, S. | 61 | 1.40 |
| 11. | Rabindran, R. | 57 | 1.30 |
| 12. | Anandham, R. | 55 | 1.26 |
| 13. | Robin, S. | 52 | 1.19 |
| 14. | Manonmani, S. | 50 | 1.14 |
| 15. | Balasubramanian, P. | 49 | 1.12 |
| 16. | Chandrasekaran, S. | 49 | 1.12 |
| 17. | Kathirvel, K. | 48 | 1.10 |
| 18. | Subramanian, K.S. | 46 | 1.05 |
| 19. | Balachandar, D. | 43 | 0.98 |
| 20. | Mohankumar, S. | 43 | 0.98 |

**Table.4. Subject wise Research output of Tamil Nadu Agricultural University**

| Sl. No | Subjects | Documents |
|---|---|---|
| 1 | Agricultural and Biological Sciences | 3317 |
| 2 | Biochemistry, Genetics and Molecular Biology | 769 |
| 3 | Environmental Science | 528 |
| 4 | Immunology and Microbiology | 331 |
| 5 | Engineering | 297 |
| 6 | Medicine | 145 |
| 7 | Chemical Engineering | 140 |
| 8 | Multidisciplinary | 124 |
| 9 | Earth and Planetary Sciences | 118 |
| 10 | Chemistry | 117 |

Table 4 shows the Top 25 predominant subject categories focussed by the faculty members of Tamilnadu Agricultural University, Coimbatore in Scopus Database. Since It is an Agricultural University their focus is more on Agricultural and Biological Sciences subject category in Scopus 3317 publications followed by Biochemistry, Genetics and Molecular Biology, 769 and Environmental Science 528 publications.

**Table.5. Collaborative Institutions**

| Sl. No | Institution Name | Documents |
|---|---|---|
| 1. | Tamil Nadu Agricultural University | 4168 |
| 2. | Agricultural College and Research Institute, Madurai | 538 |
| 3. | Indian Council of Agricultural Research | 128 |
| 4. | ICAR - Sugarcane Breeding Institute, Coimbatore | 84 |
| 5. | ICAR - Indian Agricultural Research Institute, New Delhi | 80 |
| 6. | International Crops Research Institute for the Semi-Arid Tropics | 73 |
| 7. | Ministry of Environment & Forests, Government of India | 71 |
| 8. | Anbil Dharmalingam Agricultural College and Research Institute | 68 |
| 9. | Rajasthan Agricultural University, Agricultural Research Station | 65 |
| 10. | Kansas State University | 59 |

Table 5 shows the Top 10 predominant collaborating institutions with Tamilnadu Agricultural University, Coimbatore as reflected in Scopus Database. Agricultural College and Research Institute, Madurai is the most collaborating institution with 538 publications followed by Indian Council of Agricultural Research (128) and ICAR - Sugarcane Breeding Institute, Coimbatore (84) publications. It is clear that most of the publications are collaborated with agricultural institutions in the Tamil Nadu region.

**Table.6. Predominating Sponsors of Tamil Nadu Agricultural University**

| Sl. No | Name of the Sponsor | Documents |
|---|---|---|
| 1. | Indian Council of Agricultural Research | 104 |
| 2. | Department of Biotechnology, Ministry of Science and Technology, India | 89 |
| 3. | Department of Science and Technology, Ministry of Science and Technology, India | 63 |
| 4. | Department of Biotechnology, Government of West Bengal | 58 |
| 5. | University Grants Commission | 55 |
| 6. | Department of Science and Technology, Government of Kerala | 29 |
| 7. | Science and Engineering Research Board | 26 |
| 8. | Rockefeller Foundation | 22 |
| 9. | Council of Scientific and Industrial Research, India | 18 |
| 10. | Ministry of Human Resource Development | 17 |

Table 6 shows the Top 10 predominant sponsors of Tamilnadu Agricultural University, Coimbatore research publications as reflected in Scopus Database. Indian Council of Agricultural Research has supported for 104 research publications followed by Department of Biotechnology, Ministry of Science and Technology, India 89 publications and Department of Science and Technology, Ministry of Science and Technology, India 63 publications and so on.

**Country wise Collaboration**

**Figure 3. Country wise Collaborative research output of Tamil Nadu Agricultural University in Scopus Database**

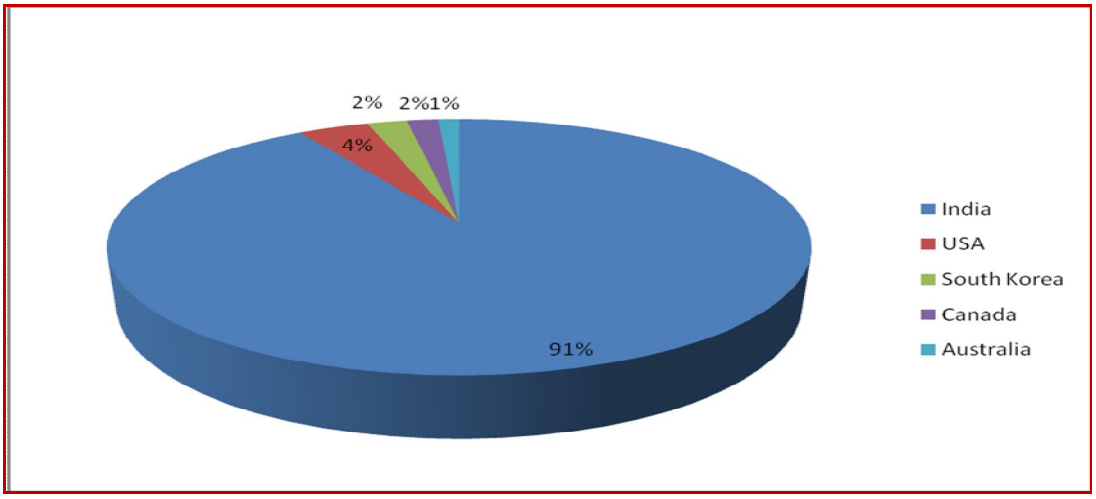

Figure 3 shows the country wise collaboration of research activity by the Tamilnadu Agricultural University, Coimbatore as reflected in Scopus Database for the period of 2001-2020. It is clearly depicted that USA is the predominant country collaborated with 187 in Scopus.

**Source wise Distribution**

**Table.7. Source wise research output of Tamil Nadu Agricultural University**

| Sl.No | Nameof the journal | Documents |
|---|---|---|
| 1 | Electronic Journal of Plant Breeding | 448 |
| 2 | Pestology | 160 |
| 3 | Archives of Phytopathology and Plant Protection | 117 |
| 4 | Acta Horticulturae | 104 |
| 5 | AMA Agricultural Mechanization In Asia Africa And Latin America | 101 |
| 6 | Research on Crops | 81 |
| 7 | Legume Research | 72 |
| 8 | Indian Journal Of Agricultural Sciences | 60 |
| 9 | Journal Of Biopesticides | 60 |
| 10 | Indian Journal Of Agronomy | 58 |

Table 7 shows the predominant source wise publications of Tamilnadu Agricultural University, Coimbatore as reflected in Scopus Database. Electronic Journal of Plant Breeding has 448 publications, Pestology (160) and Archives of Phytopathology and Plant Protection (117) publications.

## Findings of the Study

- Tamilnadu Agricultural University faculty members published more publications in Scopus database in the recent years.2015 onward there is an increasing trend of publications.
- Articles are the predominant publications by the faculty members of Tamilnadu Agricultural University, Coimbatore 3928
- Prof. Samiyappan R is the predominant and most impactful author of Tamilnadu Agricultural University.

- USA is the most predominant country collaborated with Tamilnadu Agricultural University publications about 187.
- Electronic Journal of Plant Breeding is the most predominant journal with 448 publications in Scopus database.
- Agricultural College and Research Institute, Madurai is the most collaborating institution with 538 publications
- Agricultural and Biological Sciences subject category in Scopus 3317 publications.
- Indian Council of Agricultural Research is the predominant sponsor and supported for 104 research publications followed by Department of Biotechnology, Ministry of Science and Technology, India

## Conclusion

Research output is currently assessed using a variety of factors, including contributions to research and innovation in the academic setting. In the Agriculture area, this study highlights the intellectual output of one of the named institutions in the Coimbatore region. Academicians can use a scientometric study to better understand their current situation and the areas of research that need to be addressed. This report provides an overview of agricultural institution research calamities, which is critical in estimating and moving on with more research and innovation in the field of agriculture.

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