

Research Performance of University of Agricultural Sciences, Dharwad: A Scientometric Study

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ABSTRACT

The paper presents the Scientometric study of research productivity of University of Agricultural Sciences, Dharwad during the year 1992 to 2020. The study is carried out to determine and give comprehensive view of research activities for a period of three decade. The study used secondary data extracted from Scopus database. The study reveals that highest number of publications were found in the year 2011 followed by 2014(112). There was collaborative research trend (96.62%). Majority (92.09%) of the publications are in the form of articles followed by conference proceedings (2.37%). The agricultural scientists prefer International Journal of Agricultural and Statistical Sciences for research communication followed by Plant Archive.

KEYWORDS: Bibliometrics, Scientometrics Analysis, Authorship Pattern, Degree of Collaboration, Scopus database, University of Agricultural Sciences, Dharwad.

INTRODUCTION

The institutional prestige and reputation are associated with faculty publishing productivity and are strongly associated with an individual faculty member's reputation, visibility, and advancement in the academic reward structure, particularly at higher learning institutions. The scientometric study is a branch of bibliometrics. It is an important research tool for understanding the subjects it aims at measuring the utility of documents and relationships between documents and fields. Scientometrics is a type of research method used in the Library and Information Science. It is an application of mathematical and statistical methods of various aspects of the literature on a topic and is used to identify the pattern of publication authorship and secondary journal coverage to get an insight into the dynamics of the growth of knowledge. It provides tools for the evaluation of scientific research. Scientometrics

those most scientific discoveries and research results eventually are published in an international scientific journal where they can be read and acted by other researchers. Scientometrics analyses have attracted much attention within the past years.

REVIEW OF LITERATURE

Chamy and Ramalingam (2015) evaluate the publication pattern of Pondicherry University based on the data collected from the Scopus database over a period of twenty-seven years from 1987-2013. The study shows that majority (84.8%) of the researchers preferred to their research papers are joint authorship and the degree of collaboration ranges varies from 0.61 to 0.96 and its mean value 0.88. The study also analyzed that Physics and Astronomy produce more number papers while the multi-authorship also possesses a lead role in this subject. S.A. Abbasi is the most prolific author (contributed 132 articles) in the present study. The researchers are most preferred to publish their work in the journal of Acta Crystallographica Section E Structure Reports Online (2.17%) followed by current science (1.79%).

According to Yadav, et al... (2020) the research productivity of Mizoram University is based on the data collected from the Indian Citation Index for fourteen years from 2004-2017. This study endeavors to analyze the overall performance of the faculty members of Mizoram University in research productivity. During the study, a total of 265 articles were collected from the Indian Citation Index between the years 2004-2017. The study endeavors to measure the year-wise distribution of publication output, co-authorship index, and collaborative index, degree of collaboration, collaboration coefficient, modified collaboration coefficient, most productive author, top-ranked subjects, and top-ranked publications based on the collected data. The result of the study indicates that the average research output is 18.93 articles per year. The most productive author was U. K. Sahoo department of Forestry with 25 publications. The highest rank publication was Current Science with 16 publications. The highest publications have been given by Biological Science subject which is 54 and research article 230 was a preferred document by the scientists of Mizoram University during 2004-2017.

Gautam and Mishra (2015) there study to lead a scientometric study of Banaras Hindu University based on the Indian Citation Index from 2004 to 2013, a total of 1041 articles were found from ICI. It found that the research productivity was increasing at the average rate of 104.1 publications per year and maximum articles were contributed by joint authors. The most prolific author was A. K. Singh, Department of Physics with 18 articles. Out of 1041 publications, 60 (5.76 %) articles have collaborated with 18 different countries of the world. The USA was the highest collaborative country. Indian Agricultural Research Institute (IARI) was the topmost collaborative institute. Journal of Food Science and Technology was the topmost impact factor journal, the dominating journal was Current Science with 25 publications and the multi-authorship pattern was dominated in the study. Journal article's contribution was more in comparison to other forms of publications. The most productive author was T.S. Anirudhan from the Department of Chemistry with 114 (10.67 %) articles from 2000-2012.

METHODOLOGY

This paper is based on the work carried out by the Scientometric study of the Research Productivity of a University of Agricultural Science, Dharwad, Karnataka based on the Scopus Database in the Year 1992 – 2020. The Data was retrieved from an online Scopus database (<http://www.library.iisc.ernet.in/>) data were retrieved on 3rd November

2020 and the search term UAS, Dharwad, Karnataka was used in the institutional analyzer search option for the period 1992-2020. A total of 1392 articles were downloaded and the collected data has been scrutinized by the Scientrometric tools and techniques to determine the achievement of the objective of the study.

OBJECTIVES OF THE STUDY

The objectives of the current study are as follows:

- To find out the year-wise distribution of research publications.
- To determine authorship pattern.
- To know the forms of literature.
- To rank the channels of communication-based on research publications.

Results and Discussions

Table - 1: Year-wise distribution of Publications

During the study period of 29 years between 1992 to 2020, faculty and scientists of UAS Dharwad have published 1391 publications, thus the productivity of 47.9 papers per year can be seen.

Sl.No.	Year	No of Articles	Percentage (%)	Cumulative no. of Articles	Cumulative Percentage (%)
1	1992	4	0.28	4	0.28
2	1993	4	0.28	8	0.57
3	1994	6	0.43	14	1.00
4	1995	7	0.50	21	1.50
5	1996	13	0.93	34	2.44
6	1997	12	0.86	46	3.30
7	1998	18	1.29	64	4.59
8	1999	16	1.15	80	5.74
9	2000	29	2.08	109	7.83
10	2001	24	1.72	133	9.55
11	2002	24	1.72	157	11.27
12	2003	31	2.22	188	13.50
13	2004	40	2.87	228	16.37
14	2005	24	1.72	252	18.10
15	2006	51	3.66	303	21.76
16	2007	46	3.30	349	25.07
17	2008	52	3.73	401	28.80
18	2009	45	3.23	446	32.04
19	2010	62	4.45	508	36.42
20	2011	114	8.26	622	44.75

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21	2012	87	6.18	709	50.93
22	2013	93	6.68	802	57.68
23	2014	112	8.05	914	65.73
24	2015	101	7.26	1015	72.98
25	2016	110	7.90	1125	80.89
26	2017	105	7.54	1230	88.43
27	2018	69	3.88	1299	93.39
28	2019	50	3.59	1349	96.98
29	2020	42	3.01	1391	100
Total		1391	100	-	-

Table-1 shows that in 2011, highest 114 papers published and followed by 112 in 2014. In the study period, The lowest publications can be seen 4 each during 1992 & 1993.

Table - 2: Year-Wise Authorship Pattern and their Percentage

Sr. No.	Year	Single Author	Two Authors	Three Authors	Four Authors	Five Authors	More than Five Authors	Total	Percentage
1	1992	2	2	-	-	-	-	4	0.28
2	1993		1	2	1	-	-	4	0.28
3	1994	1	3	1	1	-	-	6	0.43
4	1995		2	3	1	1	-	7	0.5
5	1996		8	4	1		-	13	0.93
6	1997	3	1	4	1	1	2	12	0.86
7	1998		6	6	4	2	-	18	1.29
8	1999	1	4	7	4	1	-	17	1.15
9	2000	3	11	9	2	1	2	28	2.08
10	2001		8	13	1	2	-	24	1.72
11	2002		7	12	2	1	2	24	1.72
12	2003	4	13	11	2	1	1	32	2.22
13	2004	3	10	11	7	1	8	40	2.87
14	2005		9	5	5	2	2	23	1.72
15	2006	1	9	18	13	3	7	51	3.66
16	2007	2	9	8	11	5	11	46	3.3
17	2008	1	15	16	12	3	5	52	3.73
18	2009	2	7	18	11	4	3	45	3.23
19	2010	1	12	13	11	15	10	62	4.45

20	2011	6	13	37	22	16	20	114	8.19
21	2012		8	18	29	13	19	87	6.25
22	2013	1	9	25	33	5	20	93	6.68
23	2014	2	23	37	20	9	21	112	8.05
24	2015	4	23	34	13	12	15	101	7.26
25	2016		40	24	13	9	24	110	7.9
26	2017		34	24	15	7	25	105	7.54
27	2018	4	16	16	8	9	16	69	4.96
28	2019	2	16	10	4	2	16	50	3.59
29	2020		7	9	3	4	19	42	3.01
Total		43	326	395	250	129	248	1391	100

Table-2 indicates the year-wise authorship pattern in the search output of UAS, Dharwad, Karnataka. It is observed that a total of 114 and 112 authors contributed to the year 2011 and 2014. 110 authors contributed in the year 2016. 105 authors contributed during the years 2017. It is observed from the table highest number contributions of three authors 395 (28.39%) contributed during the 29 years.

Table - 3: Authorship Pattern

Sr.No.	Rank	Authorship Pattern	No. of Contributions	Percentage of Contribution	Cumulative Contribution	Percentage of Cumulative Contribution
1	6	Single Author	43	3.09	43	3.09
2	2	Two Authors	326	23.43	369	26.52
3	1	Three Authors	395	28.39	764	54.92
4	4	Four Authors	250	17.97	1014	72.84
5	5	Five Authors	129	9.27	1143	82.17
6	3	More than five Authors	248	17.82	1391	100

Table-3 shows the rankings of the authorship pattern. It is observed from the table that three authored 395 (28.39%) papers occupied the 1st rank. Two authored paper 326 (23.43%) comes in 2nd rank. More than five authored papers 248 (17.82%), occupied in 3rd rank. Four authored paper 250 (17.97%) comes in 4th rank. Five authored paper 129 (9.27%) comes in 5th rank and single author papers 43 (3.09%) occupy the 6th rank in this study.

Table - 4: Single Author vs Multi-Authorship Pattern.

Year	Single	Citations	Multiple	Citations	Total No. of Articles	Total Citations
1992	2	21	2	10	4	31

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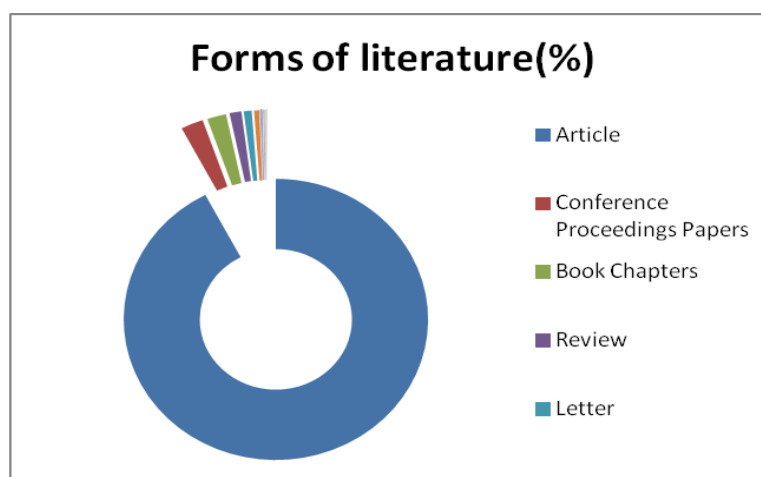
1993			4	12	4	12
1994	1	3	5	35	6	38
1995			7	53	7	53
1996			13	65	13	65
1997	3	5	9	91	12	96
1998			18	82	18	82
1999	1	4	15	60	16	64
2000	3	5	26	156	29	161
2001			24	89	24	89
2002			24	121	24	121
2003	4	3	27	150	31	153
2004	3	2	37	349	40	351
2005			24	107	24	107
2006	1		50	259	51	259
2007	2	3	44	546	46	549
2008	1		51	212	52	212
2009	2	6	43	416	45	422
2010	1		61	484	62	484
2011	6	7	108	706	114	713
2012			87	818	87	818
2013	1		92	454	93	454
2014	2		110	499	112	499
2015	4	2	97	291	101	293
2016			110	161	110	161
2017			105	223	105	223
2018	4		65	100	69	100
2019	2		48	43	50	43
2020			42	16	42	16
Total	43	61	1348	6608	1391	6669

Table-4 shows that single author and multi-author contribution in the Scopus database of research productivity of University of Agricultural Science, Dharwad, Karnataka. There are no Single authored publications during 1993, 1995, 1996, 1998, 2001, 2002, 2005, 2012, 2016, 2017, 2020. Table-4 above indicates that, total of 1348 (96.90%) publications are the results of collaboration, and authors without collaboration contributed 43 (3.09%) publications. The study reveals that faculty and scientists at UAS, Dharwad prefers collaborative authorships. Citation's trend can be seen between 2007 and 2014, in eight years 4151 citations marked which alone shares 62.24% of the total citations. Publications in the year 2012, have received the highest citations 818 (12.26%).

Table - 5: Document types and distribution

Sl.No.	Document types	Frequency	Distribution (%)
1	Article	1281	92.09
2	Conference Proceedings Papers	34	2.44
3	Book Chapters	29	2.08
4	Review	18	1.29
5	Letter	12	0.86
6	Note	8	0.57
7	Erratum	4	0.28
8	Short Survey	2	0.14
9	Book	1	0.07
10	Data Paper	1	0.07
11	Editorial Materials	1	0.07
Total		1391	100

Distribution of Publications



❖ **Graph-5: Document types and distribution**

Table-5 shows that the Major sources of distribution of publications covered by UAS, Dharwad, Karnataka in SCOPUS Database, faculty/Scientists of the University have published 1391 publications. Faculty contributed highest in journal articles 1281 which alone shares 92.09% of the total records, while the Conference Proceedings with 34(2.44%), Book Chapters 29(2.08%), Review 18(1.29), Letter 12(0.86%), Note 8(0.57%), Erratum 4 (0.28%), Short Survey 2(0.14%) and Book, Data paper and Editorial Materials each 1 (0.07%) records found of this study. Graph-5 indicates that UAS, Dharwad Faculty & Scientists have contributed more through journal articles.

Table - 6: Ranking of Channels of Communication

Sl. No.	Name of the Journals	Country	Impact Factor	NAAS Rating	Total no. publications	Rank
01	International Journal of Agricultural and Statistical Sciences	India	0.28	4.92	89	1
02	Plant Archives	India	0.27	4.41	84	2
03	Pestology	India	0.13	-	54	3
04	Indian Journal of Genetics and Plant Breeding	India	0.47	6.6	53	4
05	Indian Journal of Agricultural Science	India	0.33	4.86	53	4
06	Research on Crops	India	1.38	3.4	50	5
07	Journal of Pure and Applied Microbiology	India	0.48	4.49	46	6
08	Biochemical and Cellular Archives 44	India	0.24	4.95	44	7
09	Current Science	India	0.756	4.71	43	8
10	Legume Research	India	0.531	6.53	40	9
11	Indian Journal of Agronomy-	India	0.23	5.46	32	10
12	Euphytica	Netherlands	1.614	7.53	30	11
13	Annals of Biology	India	0.32	3.8	23	12
14	Man-Made Textiles in India	India	0.15	--	21	13
15	Ecology, Environment and Conservation	India	0.45	5.41	19	14
16	Indian Journal of Animal Research	India	0.395	6.40	17	15
17	Journal of Food Science and Technology	India	1.946	8.77	15	16
18	Vegetos	India	0.47	5.27	15	16
19	Plant Breeding		1.832	7.66	13	17
20	Journal of Entomological Research	India	0.21	5.89	13	17
21	Textile Trends	India	0.00	--	13	17
22	Theoretical and Applied Genetics	Germany	4.439	9.93	11	18
23	Indian Veterinary Journal	India	0.22	4.42	11	18
24	Indian Journal of Traditional Knowledge	India	0.731	6.92	10	19
25	Annals of Agri Bio Research	India	0.28	3.97	10	19
26	Indian Journal of Agricultural Research	India	0.37	5.20	9	20
27	Field Crops Research	Netherlands	5.224	9.87	9	20
28	Annals of Arid Zone	India	0.00	3.02	8	21

29	Journal of the Indian Society of Soil Science	India	0.42	--	8	21
30	Indian Silk	India	0.00	--	8	21
31	Indian Journal of Agricultural Economics	India	0.09	5.15	8	21
32	Indian Journal of Social Work	India	0.083	--	8	21
33	Helia	Serbia	0.31	8.29	8	21
34	Molecular Breeding	Netherlands	2.149	7.86	7	22
35	Plant and Soil	Netherlands	3.299	9.26	7	22
36	Scientia Horticulturae	Netherlands	3.463	7.96	7	22
37	Indian Journal of Horticulture	India	0.155	6.11	7	22
38	Range Management and Agro forestry	India	0.67	--	6	23
39	Research Journal of Biotechnology	India	0.45	5.00	6	23
40	Indian Phytopathology	India	0.46	5.90	6	23
41	Journal of Plant Biochemistry and Biotechnology	India	0.773	7.04	5	24
42	Tropical Pest Management		1.907	---	5	24
43	Sugar Tech	India	1.688	7.02	5	24
44	Man in India	India	0.136	--	5	24
45	Journal of the Textile Association	India	0.08	--	5	24
46	Allelopathy Journal	India	1.275	6.73	5	24
47	Oriental Insects	UK	0.333		4	25
48	PLoS ONE	US	2.74	8.78	4	25
49	Microbiological Research	US	5.415	9.70	4	25
50	Indian Journal of Ecology	India	0.54	4.96	4	25
51	Crop Science	US	1.878	7.64	4	25
52	Agricultural Research	Netherlands	0.99	5.90	4	25
Total					975 (70%)	

It is evident from Table-6 that, authors from UAS Dharwad have published the highest 89 papers in the journal *International Journal of Agricultural and Statistical Sciences* followed by 84 in *Plant Archives*, 54 papers in *Pestology*, 53 papers each in *Indian Journal of Genetics and Plant Breeding* and *Indian Journal of Agricultural Science*. It can also be observed from the table that 70% of articles have been covered by the first 52 journals only as rank wise listed.

Table - 7: Publications in Open Access and Closed Access

Year	Open Access	Citations	Closed	Citations	Total No. of Articles	Total Citations
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1992	1	10	3	21	4	31
1993			4	12	4	12
1994			6	38	6	38
1995			7	53	7	53
1996			13	65	13	65
1997	2	61	10	35	12	96
1998	1	4	17	78	18	82
1999			16	64	16	64
2000			29	161	29	161
2001	1	1	23	88	24	89
2002			24	121	24	121
2003			31	153	31	153
2004	1	34	39	317	40	351
2005			24	107	24	107
2006	3	105	48	154	51	259
2007	6	282	40	267	46	549
2008	2	34	50	178	52	212
2009			45	422	45	422
2010	4	263	58	221	62	484
2011	2	320	112	393	114	713
2012	6	383	81	435	87	818
2013	6	109	87	345	93	454
2014	7	181	105	318	112	499
2015	6	82	95	211	101	293
2016	23	40	87	121	110	161
2017	32	142	73	81	105	223
2018	15	18	54	82	69	100
2019	13	20	37	23	50	43
2020	19	4	23	12	42	16
Total	150	2093	1241	4576	1391	6669

Authors of UAS, Dharwad published 150 (10.78%) in Open access journals and 1241 (89.21%) in Closed access journals. In 2017, highest 32 publications published in open access journals whereas 112 papers were published in closed-access journals in 2011. It is observed in the above Table-7 that, Open Access publications received 2093 (31.38%) citations at the rate of 13.95 per paper and closed access publications received 4576 (68.61%) citations at the rate of 3.68 per paper. Data suggests that open access publications have more visibility and accessibility which helps in receiving more and more citations compared to the publications in closed-access journals. This helps in improving the performance of both authors as well as an institute in national and international level rankings.

Table - 8: Cited and Un-cited Publications

Year	Cited Publications	Un-cited Publications	Total Publications
1992	3	1	4
1993	1	3	4
1994	5	1	6
1995	6	1	7
1996	8	5	13
1997	10	2	12
1998	13	5	18
1999	10	6	16
2000	15	14	29
2001	15	9	24
2002	18	6	24
2003	22	9	31
2004	23	17	40
2005	16	8	24
2006	27	24	51
2007	33	13	46
2008	25	27	52
2009	37	8	45
2010	35	27	62
2011	66	48	114
2012	43	44	87
2013	48	45	93
2014	59	53	112
2015	43	58	101
2016	39	71	110
2017	48	57	105
2018	33	36	69
2019	16	34	50
2020	11	31	42
Total	728	663	1391

Table-8 shows 663 (47.66%) uncited publications and 728 (52.33%) cited publications out of 1391 publications published between 1992 to 2020. In 663 uncited publications 57 (4.09%) publications are published in open access and the remaining 606 (43.66%) in closed-access journals. Incited 728 publications, 93 (6.68 %) published in open-access journals and 635 (45.65 %) in closed-access journals. Table above reveals that, publications in open access journals attracts and receives more citations comparing to closed-access journals.

FINDINGS AND CONCLUSIONS

It is found that the core journal in International Journal of Agricultural and Statistical Sciences with 89 articles. The second and third positions go to Plant Archives with 84 articles and Pestology with 54 articles. It is evident from the data that the highest 115 (8.26%) articles were published in the year 2011. 47 (3.37%) of a single author, 331 (23.77%) of two authors, 394 (28.30 %) of three authors, 242 (17.38 %) of four authors, 124 (8.9 %) of five authors and 254 (18.24 %) of more than three author papers published during the study period. Three authored paper 394(28.30%) occupies the 1st rank. Two authored papers 331 (23.77 %) comes in 2nd rank. It is found that 3.37 % of the papers are published by a single author and 96.62 % of the papers are published by multi-author during the study period. Major sources of distribution of publications covered by UAS, Dharwad, Karnataka SCOPUS Database on the research output of faculty/Scientists in journal articles with 1282 (92.09%) records in highest and Book, Data paper, Editorial Materials 1 (0.06%) record in lowest found of this study. Publishing in open access journals is beneficial and provides more exposure to the publications in the research world.

Conflicts of Interest

The authors declare that they have no conflict of interests.

REFERENCES

- [1] Balutagi, Suresh; Huded, Sidlingappa M.; and Devi, K Nirmala, "Measuring Research Contributions of Prof. Anurag Kumar: A Scientometric Analysis" (2020). *Library Philosophy and Practice* (e-journal). 4626.
- [2] Gautam, Madhuri, and Shilpa, Uplaonkar (2021). Scientometrics Analysis of the "Indian Journal of Horticulture" (2011-2019). *Proceeding of the National Conference of Agricultural Librarians and User Community (NCALUC-2021)* on "Management of Knowledge Resources centers in the Networked Digital Environment: Trends, Challenges and Opportunities" Organized by University Library, University of Agricultural Sciences, Bangalore & AALDI during 25th -26th February 2021, p. 612-618.
- [3] Gautam, V.K.& Mishra, R. Scholarly research trend of Banaras Hindu University during 2004-2013: A scientometric study based on the Indian citation index. *DESIDOC J. Libr. Inf. Technol*, 2015, 35(2), 75–81. DOI: 10.14429/djlit.35.2.802
- [4] Kademani, B. S. et al. (2007). Mapping of Indian Publications in S&T: A Scientometric Analysis of Publications in Science Citation Index. *DESIDOC Journal of Library & Information Technology*, 27(1), 17- 34.
- [5] Poornima, A.etal.(2011) Mapping the Indian research productivity of food science and technology: A scientometric analysis. *Food Biology*, 1.1(2011), 36-41.
- [6] Schubert, A., "Scientometrics: A citation-based bibliography 1997-2000". *Scientometrics*, 50.1(2001), 99-198.
- [7] Scopus. (2020). Retrieved September 22, 2020, from <https://www.scopus.com/home.uri>
- [8] Surwase, Ganesh, Kademani, B.S.&Vijay Kumar. "Scientometric dimensions of pulsed laser deposition research: Global perspective". *Annals of Library and Information Studies*. 55.2 (2008), 101-110.
- [9] Keshav and Shilpa S.Uplaonkar. Research trends in the field of Geophysics: Bibliometric analysis. *Library Progress International*, 33(1) Jan-June 2013, pp1-11. ISSN 09701052.