

Indian Literature Output On Forestry – A Scientometric Study

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Abstract

The authors have explored the Indian research output on forestry from web of science, a leading indexing database. For extracting the documents from web of science database, the authors have used 'forestry' keyword in the topic. There were 12758 documents retrieved for the period 2013-2020. Again, a filtering was made refining the records based on Indian literature. Totally, 277 documents from Indian literature were considered for the study. The data were analysed based on year-wise, author-wise, affiliation-wise, source-wise and research area-wise. This study results will enable the scientific and research community to have collaborative study with the top most authors, organizations and countries and to select the high impact factor journals for their research work.

Keywords: Scientometrics; Research output; Research productivity; Metric study; Forestry; Indian Forestry

Introduction

The scientometric study is conducted to assess the scientific publication has changed dramatically over the years. Earlier, emphasis was paid primarily to the contents of article, whereas at present the emphasis is being shifted towards measuring the quality of the journals by ranking the journals in which it is published. At present, the scientometric indicators such as citation, impact factor, h-Index, g-Index, SJR, etc plays major roles in ranking the quality of the contents (Khokhlow, 2020). Both scientometric and bibliometric studies are conducted across the world and are more or less synonymous terms used for measuring the literature in science on various aspects. The major purpose of these studies are to identify the pattern of publications in various aspects such as productivity based on the years, citations, h-index, identify prolific authors, source, research areas and so on (Anandahalli & Achha, 2018). A forest is referred as the wood, or woods, is an area with a high density of trees plays important

role of the biosphere (Pawar & Rothkar, 2015). Forest research is considered as very important for our earth to be healthy. Forest is considered as home for about 80% of the life ranging from human being, animals, plants, insects and so on. It provides shelter, fruits, vegetables for the organisms to live their life healthy and happily. It protects the living beings from various dangers such as landslides, avalanches, soil erosion and so on. Considering the importance of forestry, the authors have chosen the topic to find out the research output in forestry (Fatima, n.d.).

Objectives of the study

Following are the objectives of the study

- To find out the year-wise Indian literature output on forestry
- To find out the top most productive authors
- To find out the organization-wise distribution of publications
- To find out source-wise distribution of documents
- To find out the key research area in which the documents were published

Review of Literature

A trend in horticulture literature in India was conducted by Vasudevan (2018). The findings of the study revealed that fluctuation on horticulture literature was found during the study period 2008-2017 and the year 2016 witnessed highest number of publications. Among the authors, collaborative authorship found dominant than single authors contribution. Government medical colleges were top with highest number of publications among institution-wise publications and highest number of publications was found in 'Journal of Evolution of Medical and Dental Science' publication. The study concluded with the statement that many institutions such as agricultural universities, medical colleges, Research and Development organisations and other institutions have been engaged in the research area.

A study on "Scientometric study on Journal of Biomedical Sciences' was conducted by Jeyachitra et al (2013), The findings of the study revealed that there was no consistency found in the range of articles published from volume to volume. Multi-authored articles dominated when compared with single authored papers. 34 countries have contributed documents in which majority were contributed by foreign authors. From the bibliographical distribution of citations, it is found that journal was the leading source cited by the authors as journal has greater level of significance and disseminated effectively throughout the globe than the other sources.

Joshi et al (2010) examined the research output in the field of forest mycology with primary focus on the global trends of publication output. The findings of the study revealed that the output reached its peak in the year 2006 with 346 papers and 99 countries published in forest fungi research in which 20 countries contributed approximately 89% and remaining 79 countries contributed 11% of the literature. Total publication output was contributed by 839 institutions spread among 99 countries. Again on the total outputs, 20 institutions have contributed 957 publications (29%) scattered in 11 countries.

Methodology

For this study, the authors have used Web of Science, a reputed research database indexes the documents published in high impact factor journals across the globe. As the forestry research plays very important role in protecting the people from various dangers, the research on forestry is considered as most important one to the present environment. The authors have used 'Forestry' as search term for 8 years period as the range of years (2013 to 2020). The term was used in topic in web of science and there were 12758 documents across the globe have been retrieved. Since the authors wanted to measure the research output for Indian scenario, again the search was refined to India. There were 277 records for the period 2013-2020 published have been used for the present study.

Table 1: Year-wise publication of documents on forestry (Total)

Publication Years	Number of documents	% of documents
2020	2230	17.48
2019	1891	14.82
2018	1677	13.15
2017	1517	11.89
2016	1437	11.26
2015	1408	11.04
2014	1346	10.55
2013	1252	9.81

Table 1 reveals year-wise publication of documents for the period 2013 to 2020. It is found from the above table that there is gradual growth found from the year 2013 to 2020. Among the years, highest number of documents 2230 (17.48%) were published in the year 2020 and lowest number of the documents 1252 (9.81%) published in 2013.

Table 2: Year-wise publication of documents published in forestry (India)

Publication Years	Number of documents	%
2013	22	7.94
2014	28	10.11
2015	27	9.75
2016	39	14.08
2017	30	10.83
2018	36	13.00
2019	36	13.00

2020	59	21.30
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Table 2 provides the documents published in forestry research published in India. From the table 2, it is found that highest number of documents 59 (21.30%) were published in the year 2020 and lowest number of documents 22 (7.94%) were published in the year 2013. There is no consistent growth witnessed from 2013 to 2020. Among the publications, there was no growth found in the year 2015 as there were 27 documents published whereas in the year 2014, 28 documents were published. And also from 2013 to 2019, highest number of documents 39 (14.08%) were published in the year 2016 and growth from the year 2013 to 2019 found less but, growth in 2020 found very high comparing with previous year.

Table 2: Document types

Document Types	Number of documents	%
Articles	242	87.37
Review Articles	33	11.91
Proceedings Papers	7	2.53
Early Access	3	1.09
Corrections	1	0.36
Editorial Materials	1	0.36

Table 2 provides the details about the number of publications in forestry research published in different document types. From the table, it is noticed that high majority of the documents 242 (87.37%) were published in articles followed by second highest 33 (11.91%) were published in review articles. Other documents such as proceedings papers and early access had 7 and 3 documents respectively and corrections and editorial materials with one document each.

Table 4: Author-wise distribution of records

S.No.	Authors	Number of documents	%
1	Kumar A	9	3.25
2	Kumar S	8	2.89
3	Das AK	7	2.53
4	Gupta YC	7	2.53
5	Misra AK	7	2.53
6	Singh A	7	2.53
7	Kumar M	6	2.17

8	Kumar P	6	2.17
9	Sharma V	6	2.17
10	Singh SK	6	2.17
11	Kumar R	5	1.81
12	Lata K	5	1.81
13	Ravindranath NH	5	1.81
14	Singh R	5	1.81
15	Singh RK	5	1.81
16	Singh S	5	1.81
17	Chaturvedi RK	4	1.44
18	Dhiman SR	4	1.44
19	Joshi PK	4	1.44
20	Nath AJ	4	1.44

From the table 4, it is found that Kumar A was the highest productive author 9 (3.25%) followed by second highest number of documents 8 (2.89%) were published by Kumar S. It was also found that 7 documents each were published by four authors, 6 documents each were published by four authors. 5 documents each were published by 6 authors and 4 documents each were published by four authors. Overall, there is no much difference found among the authors publication on documents on forestry research.

Table 5 Source Journals in which forestry research published

S.No.	Publication Titles	Number of documents	%
1	CURRENT SCIENCE	16	5.78
2	INDIAN JOURNAL OF AGRICULTURAL SCIENCES	16	5.78
3	AGROFORESTRY SYSTEMS	6	2.17
4	RANGE MANAGEMENT AND AGROFORESTRY	6	2.17
5	ENVIRONMENT DEVELOPMENT AND SUSTAINABILITY	5	1.81
6	FOREST POLICY AND ECONOMICS	5	1.81
7	IEEE ACCESS	4	1.44
8	INDIAN JOURNAL OF HORTICULTURE	4	1.44
9	INTERNATIONAL FORESTRY REVIEW	4	1.44
10	JOURNAL OF SUSTAINABLE FORESTRY	4	1.44
11	JOURNAL OF THE INDIAN SOCIETY OF REMOTE SENSING	4	1.44
12	RENEWABLE SUSTAINABLE ENERGY REVIEWS	4	1.44
13	ENVIRONMENTAL MONITORING AND ASSESSMENT	3	1.08
14	GEOCARTO INTERNATIONAL	3	1.08

15	IEEE JOURNAL OF SELECTED TOPICS IN APPLIED EARTH OBSERVATIONS AND REMOTE SENSING	3	1.08
16	JOURNAL OF ENVIRONMENTAL BIOLOGY	3	1.08
17	JOURNAL OF FORESTRY RESEARCH	3	1.08
18	JOURNAL OF TROPICAL FOREST SCIENCE	3	1.08
19	LAND USE POLICY	3	1.08
20	MITIGATION AND ADAPTATION STRATEGIES FOR GLOBAL CHANGE	3	1.08

It is found from the table 5 that ‘Current Science and Indian Journal of Agricultural Sciences’ were the top most journals in which 16 (5.78%) articles each were published followed by ‘Agroforestry System and Range Management and Agroforestry’ were the second top most journals in which 6 (2.17%) articles each were published. Among the top 20 journals, again four articles were published in 6 different journals. Rest of the journals published 3 articles each.

Table 6: Affiliations

S.No.	Affiliations	Number of documents	%
1	INDIAN COUNCIL OF AGRICULTURAL RESEARCH ICAR	48	17.33
2	INDIAN COUNCIL OF FORESTRY RESEARCH EDUCATION ICFRE	21	7.58
3	INDIAN INSTITUTE OF TECHNOLOGY SYSTEM IIT SYSTEM	19	6.86
4	DEPARTMENT OF SPACE DOS GOVERNMENT OF INDIA	16	5.78
5	INDIAN SPACE RESEARCH ORGANISATION ISRO	15	5.42
6	DR YASHWANT SINGH PARMAR UNIVERSITY OF HORTICULTURE FORESTRY	13	4.69
7	FOREST RESEARCH INSTITUTE FRI	13	4.69
8	BANARAS HINDU UNIVERSITY BHU	12	4.33
9	COUNCIL OF SCIENTIFIC INDUSTRIAL RESEARCH CSIR INDIA	10	3.61
10	CGIAR	8	2.89
11	LEAGUE OF EUROPEAN RESEARCH UNIVERSITIES LERU	8	2.89
12	PUNJAB AGRICULTURAL UNIVERSITY	8	2.89
13	SPACE APPLICATIONS CENTRE SAC	8	2.89
14	TERI UNIVERSITY	8	2.89

15	BIRLA INSTITUTE OF TECHNOLOGY MESRA	6	2.17
16	ICAR CENTRAL SOIL SALINITY RESEARCH INSTITUTE	6	2.17
17	ICAR INDIAN AGRICULTURAL RESEARCH INSTITUTE	6	2.17
18	ICAR NATIONAL BUREAU OF SOIL SURVEY LAND USE PLANNING	6	2.17
19	INDIAN INSTITUTE OF SCIENCE IISC BANGALORE	6	2.17
20	NATIONAL INSTITUTE OF TECHNOLOGY NIT SYSTEM	6	2.17

It is found from the table 6 that 'Indian Council of Agricultural Research (ICAR) was the top most organisations has published highest number of the documents 48 (17.33%) which is more than twice the journal 'Indian Council of Forestry Research Education (ICFRE)' published 21 (7.58%). Indian Institute of Technology System (IIT System), Department of Space, GOI and Indian Space Research Organisation (ISRO) have published 19 (6.86%), 16 (5.78%) and 15 (5.42%) documents. Other organisations have published less than 15 records and last six organizations have published 6 records each.

Table 7: Research Area

S.N.	Research Areas	Number of documents	%
1	Environmental Sciences Ecology	93	33.57
2	Agriculture	56	20.22
3	Science Technology Other Topics	41	14.80
4	Forestry	32	11.55
5	Engineering	25	9.03
6	Plant Sciences	21	7.58
7	Energy Fuels	13	4.69
8	Remote Sensing	13	4.69
9	Geology	12	4.33
10	Mathematics	12	4.33
11	Water Resources	12	4.33
12	Business Economics	9	3.25
13	Computer Science	9	3.25
14	Meteorology Atmospheric Sciences	9	3.25
15	Biodiversity Conservation	8	2.89
16	Biotechnology Applied Microbiology	8	2.89
17	Development Studies	8	2.89
18	Imaging Science Photographic Technology	8	2.89
19	Telecommunications	5	1.81

20	Biochemistry Molecular Biology	4	1.44
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It is noted from above table that highest number of documents 93 (33.57%) were published in Environmental Science Ecology followed by 56 (20.22%), 41 (14.80%) and 32 (11.55%) were published in research areas such as Agriculture, Science Technology other topics, and forestry. It is also found that 25 (9.03%) and 21 (7.58%) of the records were published in Engineering and Plant Sciences and less than 20 records were published in other forestry research areas.

Conclusion

There were 277 records have been published in forestry research in India. Highest number of documents 59 (21.30%) published in the year 2020 and lowest number of documents 22 (7.94%) were published in the year 2013. There is no consistent growth witnessed from 2013 to 2020. Among the total number of records, high majority of the documents 242 (87.37%) were published in articles followed by second highest 33 (11.91%) documents were published in review articles. Among author-wise publication, Kumar A was the highest productive author 9 (3.25%) followed by second highest number of documents 8 (2.89%) were published by Kumar S. There is no much difference found among the authors publication on documents on forestry research. 'Current Science and Indian Journal of Agricultural Sciences' were the top most journals in which 16 (5.78%) articles each were published followed by 'Agroforestry System and Range Management and Agroforestry' were the second top most journals in which 6 (2.17%) articles each were published. In the institutions-wise publications, 'Indian Council of Agricultural Research (ICAR) was the top most organisations has published highest number of the documents 48 (17.33%) which is more than twice the journal 'Indian Council of Forestry Research Education (ICFRE)' published 21 (7.58%). Indian Institute of Technology System (IIT System), Department of Space, GOI and Indian Space Research Organisation (ISRO) have published 19 (6.86%), 16 (5.78%) and 15 (5.42%) documents. Highest number of documents 93 (33.57%) were published in Environmental Science Ecology followed by 56 (20.22%), 41 (14.80%) and 32 (11.55%) were published in research areas such as Agriculture, Science Technology other topics, and forestry. The study throws light on publication pattern on forestry at Indian level. It is found from the study that India's position at global level was not in a satisfactory level and there is no much difference found among the authors contribution. The study suggests allocating more funds to the forestry research as it is base for living organisms. The journals and research areas identified will be more useful to the young researchers to publish their articles and facilitates the librarians to subscribe those journals for the library.

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