Scientometric Anlaysis of Ecology Research Output In India

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Abstract- *Over the past few decades, ecological research has seen a boom that is almost constant. This work is an attempt to map out the research activities in 'ecology' using a'scientometric assessments of the world research outputs,' taking into account the relevance and diversity of ecological research in reference to its vastness and specificity. The objective was to recognize and record the past and present research trajectories in the field. We acknowledge that it is entirely possible that some research areas receive more than enough attention from the global research and policy community while other, equally important areas of the subject go unaddressed or are ignored in the absence of a thorough analysis of the trends in research. The research community needs to pay immediate attention to this issue because the bulk of ecologically sensitive areas and biodiversity hotspots are found in developing countries and have significant effects on ecological processes all over the world. The frequent occurrence of "restoration ecology" and "landscape ecology" among the terms during the keyword analysis might be viewed as a positive development in the ecological research. Finally, we contend that is crucial for the global research community to properly pinpoint the ecological research gap and opportunities, as well as to comprehensively solve ecological significant issues.*

Keywords- Scientometric Anlaysis, Ecology, Research Output, India

I. INTRODUCTION

Only serial publications with an ISSN (International Standard Serial Number) are indexed by Scopus, including journals, trade journals, book series, and conference materials. Conference papers are the lone exception since they can be archived without being published in a serial journal with an ISSN. Trade journals are included in Scopus because users and librarians believe that particular articles are relevant to science. Since 2008, a specific document type guideline for trade journals has been in place to ensure that only articles or reviews with a scientific focus are indexed by Scopus. Trade journal entries must meet the following criteria in order to be included in the Scopus database: (1) at least one page; and (2) at least one author must be mentioned. Scopus's book collection includes the Science Direct Handbooks.

Scientometric:

In order to gain insight into the expansion of knowledge on that subject, the current study, which is a quantitative analysis of the literature on ecology, identifies patterns of publishing, authorship, and secondary journal coverage. This study helps institutional and national policymakers organise the literature for decision-making.

In 1948, the renowned library scientist S.R. Ranganathan introduced the term "librametry," which referred to the use of measurement techniques to optimize library services. This concept is similar to "bibliometrics," which involves applying mathematical and statistical methods to analyze and improve various aspects of library science. It's also analogous to other established sub-disciplines like "econometrics," "psychometrics," "sociometrics," "biometrics," "technometrics," "chemometrics," and "climetrics," where mathematics and statistics are systematically employed to address specific field-related challenges. Currently, the term "scientometrics" is used to describe the quantitative analysis of the history of science, and it naturally intersects with bibliometrics to a significant degree (Thanuskodi 2010).

The area of science known as "scientometrics," which describes output features in terms of organisational research structure, resource inputs, and resource outputs, creates benchmarks to assess the level of information output quality. The expansion of the pattern and other characteristics are used in scientometric research to describe the disciplines. These studies could be useful, especially for evaluating newly developing disciplines. In the current study, we are doing a scientometric analysis of the research output in ecology, a field that is rapidly expanding in the age of information.

Scientometric is an important part of reference and research services. Bibliometric studies are gradually becoming inter-disciplinary in nature and are used to identify the pattern of publication, authorship and citation analysis with the hope that such regularities can give an insight into the dynamics of the area under consideration ***(Maheswari 2012)***

Scientometrics Definition

The Scientometric analysis is the quantitative study of the growth of a subject by using scientometric indication and statistical tool and technique. Sientometric is the study and measurement of the pattern of all forms of published knowledge. It is coined to describe the studies dealing with the quantification of written communication.The term originated from Russia, and perhaps Dobrov and Karennoi were the first to coin the term scientometric. They define it as "the measurement of information process"

II. REVIEW OF LITERATURE

This paper outlines a methodological approach to a study that employs scientometric methods to analyze the literature on climate change and global warming from 2001 to 2016, using data from the Web of Science database. The study investigates various parameters, including the growth trend, authorship patterns, collaborative index, collaborative coefficient, and the degree of collaboration. It also examines the distribution of publications by different forms, identifies the most prominent authors, and explores the geographical distribution of contributions, among other parameters.

The analysis reveals that the number of publications in this field has been consistently increasing over the years, with a decline in single-authored contributions and a rise in multi-authored contributions. Both the degree of collaboration among multiple authors and the collaborative coefficient have shown an upward trend. Additionally, the relative growth rate of publications related to climate change has gradually increased from 2001 to 2016. The doubling time for climate change publications during this period is reported as 0.98 and 4.36, respectively (Sangam 2019).

Methods:

The extraction of data was indexed under the major heading of "ECOLOGY" in India through years 2001-2015. Data base of Science Citation Index Expended (SCIE) was selected from web of science to obtain publications indexed under the topic of ECOLOGY. Web of Science is an online resource that combines three databases: Science Citation Abstracts (SCI), Social Science Citation Index (SSCI), and Arts & Humanities Citation Index (A&HCI).

Period of the study:

The web of science Database was used for this study purpose. The period coverage was from 2001-2015. The keywords "ECOLOGY" in the topic field and "India" in the address field were used. The researches got 826 results.

Significance of a scientometric analysis for ecological research:

It has been observed that, although there is a considerable amount of publications in the form of journal articles, conference proceedings, books, book chapters, etc. published consistently addressing various issues of ecological concern, the historical and current 'trends of research' within the subject area of 'ecology' remain mostly unaddressed. As argued by Keville and colleagues in 2017, despite ecology being a pivotal field within the natural sciences for understanding life's distribution and diversity on Earth, there is a notable absence of a comprehensive ranking system for academic institutions specializing in this discipline. Over the last three decades, ecological research has seen a fourfold increase in research output and visibility. Some noteworthy efforts to assess trends in ecological research include the study conducted by Kim and colleagues in 2018, which examined over a century's worth of publications from the Ecological Society of America, and the review by Livingston and others in 2016, which analyzed the global disparities within the field of ecological sciences.There are a few other studies which focus on the topic and effectively attempt to provide an overview of the trends in research on ecology. Yet, further scopes for addressing the topic still exist.

III. OBJECTIVES OF THE STUDY

The objectives of the study are to find out:

- To find out the year wise distribution of the publications
- To find out the Authorship Contribution and collaboration of publications
- To identify the growth of publishing pattern during 2001-2015;
- To identify Document wise distribution of publications

IV. RESULT AND DISCUSSIONS

Table 1 Year wise distribution of the publications

Sr. No	Year	Number of Articles	Percentage
3	2015	172	6.03
4	2014	200	7.01
5	2013	205	7.20
6	2012	153	5.36
7	2011	163	5.71
8	2010	165	5.78
9	2009	141	4.94
10	2008	129	4.52
11	2007	194	6.82
12	2006	110	3.85
13	2005	124	4.34
14	2004	43	1.50
15	2003	57	2.00
16	2002	61	2.13
17	2001	57	2.1
Total		**2851**	**100%**

Table 1 Year wise Publications Table 2 : show the details of the articles in the issues from the year 2001-2015 and the number of articlespublished in 2013 were the highest with 205 (7.20%). The least number of articles were published in 2004 with just 43 (1.50%).

Table 2 Author wise distribution of the publications

Sr.No	Name of the Author	Frequency	Percentage
1	Wiens, J.	52	8.52
2	Huettmann, F.	33	5.41
3	Jones, K.B.	32	5.26
4	Perera, A.H.	22	3.61
5	Riitters, K.H.	19	3.12
6	Crow, T.R.	19	3.12
7	Cumming, G.S.	19	3.12
8	Lindenmayer, D.B.	19	3.12
9	McGarigal, K.	18	2.96
10	With, K.A.	17	2.79
11	McAlpine, C.A.	16	2.62
12	Baudry, J.	16	2.62
13	Burel, F.	16	2.62
14	BÃ¼rgi, M.	16	2.62
15	Metzger, J.P.	15	2.45
16	Radeloff, V.C.	15	2.45
17	Csontos, P.	15	2.45
18	Drew, C.A.	15	2.45
19	Wu, J.	15	2.45
20	Cushman, S.A.	15	2.31
21	Turner, M.G.	14	2.31
22	O'Neill, R.V.	14	2.31
23	Fahrig, L.	14	2.31
24	Verburg, P.H.	14	2.31
25	He, H.S.	14	2.31
26	Mladenoff, D.J.	14	2.31
27	Gardner, R.H.	14	2.31
28	Penksza, K.	13	2.14
29	Barrett, G.W.	13	2.14
30	Iverson, L.R.	13	2.14
31	Opdam, P.	12	1.97
32	Fortin, M.J.	12	1.97
33	Fu, B.	12	1.97
34	Wickham, J.D.	11	1.81
35	Wiens, J.A.	11	1.81

36	Wiens, J.k.	11	1.81
Total		**610**	**100%**

Table 2 shows Author wise Distribution of the Publications. The highest Publications of AurthorWiens and the number of articles publications 52(8.52%). The least number of Author articles were publications just 11 (1.81%).

Table 3 Document type of publications

Sr. No	Subject Wise	Frequency	Percentage
1	Earth and Planetary Sciences	128	2.45
2	Biochemistry, Genetics and Molecular Biology	2	0.01
3	Agricultural and Biological Sciences	275	5.24
4	Engineering	3	0.05
5	Environmental Science	1896	36.03
6	Medicine	1589	30.2
7	Social Sciences	1369	26.02
Total		**5262**	**100%**

Table 3 shows Documents type of Publications. The highest Documents of Publications Environmental Science Article and the number of articles 1896(36.03%). The least number of documents of publications just 2 (0.01%).

Table 4 Authorship Pattern

Authors	Frequency	Percentage
Single Author	358	58.69
Double Author	147	24.1
Three Author	53	8.69
Four Author	35	5.74
Five Author	17	2.78
Total	**610**	**100**

Table 4 shows Authorship Pattern highest frequency of Single Authors358(58.69%). The least number of Authors of Five Authors just 17 (2.78%).

V. CONCLUSIONS

Today has one of the metric studies of the Scientometric study as a major role in the library and Information Science subjects. It is the journal publication of the Landscape data are collected from the Scopus database. They could also be used to track the level of diffusion of knowledge across use subject categories, countries, Languages, Affiliations, document type and source type. The present study concludes that the 2851articles are contributing in the 35 years of the Landscape Journal.

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