

Research Output on Climate Emergency and its Related Issues in India as Indexed by Web of Science: An Analysis

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Abstract

Purpose: Climate emergency is a major crisis currently facing all over the world. A sizeable number of scholarly communications in the field had shown different dynamics on the issue. India's contribution is also not an exception to this. The present paper attempts to study the research outputs on climate emergency and its related issues contributed by Indian researchers as indexed in Web of Science core collection database.

Design/methodology/approach: A strategy has been adopted to extract the digitally published research output on climate change and its related issues from Web of Science core collection database and analysis has been done using "RStudio Bibliometrix-Biblioshiny" package.

Research limitation(s): The study is specifically on research of climate change and its related issues extracted from Web of Science Database.

Key finding(s): Analysis of 1615 documents for the period 1990–January 2021 shows clues on the research areas, major subjects, publication trends through years, institutional affiliation, article sources, document types and author keywords occurrence, etc.

Practical implication(s): The paper empirically establishes the need to analyze the scientific output of the research carried out in the field of climate emergency and its related filed so as to make use of the literature at its best possible way.

Contribution to knowledge: The study highlights and enriched the existing knowledge of mainstream issues of "Climate Emergency" and also determines the critical needs and requirements of future directions of research in this particular field.

Research Type: Research.

Keywords: Climate emergency; Climate change; Web of Science; Research output; India.

Introduction

The alteration of climate patterns, may it be global or regional is climate change. It leads to exquisite storms, droughts, floods, landslides, rise in temperature etc. With the progress of time, the consequence of these events have become a serious concern for the survival of human race and the environment. Climate change is a serious issue of the present era, causing the rise of temperature all over the world, melting of ice in the arctic region, rising of sea level etc. which contribute in the global warming phenomena. Without an immediate action to regulate and control this issue, adapting to this state in the future will be more difficult to deal. Emphasizing more on the climate change issue is the need of the hour and this can be achieved when 'Emergency' is associated with 'Climate Change'. This will specify the need and discern of urgency towards this serious challenge. The term 'Climate Emergency' cannot be define precisely.

As the term suggest, climate emergency is the idea that elucidate the urgency of taking actions to lessen and control the climate change entities. The risk and urgency arisen due to the degradation of the climate conditions leads to the emergence of climate emergency. Climate emergency is a serious and urgent problem caused by changes in weather, climate and particularly the earth is getting warmer as a result of increase in the level of carbon dioxide in the atmosphere. The intentness of climate emergency has disembarked amongst the scientist all over the world, leading to rise of concern for many environmentalist and even the common public. The concept of climate emergency has been endorsed by many politicians, climate activists and renowned personalities who have keen interest in climate change. This enhance the perception of urgency towards the climate change and help in formulating measures to overcome climate change. It is a major crisis currently facing all over the world. To cope up with the changes occurring around us many scientists have carried out researches on various issues

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and areas of climate emergency. Their scientific products are then made available electronically in different databases.

In the study, scientific literatures on climate emergency which are available on the “Web of Science” Core Collection Database are considered. The inferences resulted from the research study will be a guide to future research and develop consensus of scientific productivity. It will also further help in policy making to overcome the problem stated. The climate chaos is one of the most important threats that impact the earth. Research on this area is also being carried out abundantly in different parts of the world. In this study attempt has been made to analyses the digitally available scholarly communications on climate emergency with respect to Indian efforts based on the data available in the said database.

The paper will serve a meticulous analysis to delve into large volumes of scientific data and also facilitates the larger audience to disgorge the progressive nuances of the importance of the very topic “Climate Emergency”. As a whole, it aims to bring forth in procuring insights on the bibliometric procedures & techniques for the scholarly scientific publications which are available in the databases.

Objectives of the Study

The objectives of the study are:

- To provide descriptive account of data pertaining to India’s Climate Emergency Research;
- To measure the publication patterns, trends, institutional affiliation and area and discipline on which thrust has been given by the scientists;
- To ascertain the contribution of India in the climate emergency research;
- To assess the communication channels of the research publications such as symposia, seminars, conferences, journals, book chapters, repositories, research monographs etc.

Review of Related Works

Climate change, climate emergency, global warming, environmental sustainability, etc. have become household words today when the earth is facing a dangerous crisis of the environmental degradation. As such there is no dearth of scholarly communications as outcomes of research conducted in this issue, the phenomenon being global. Review of some recent past studies has provided us enough clues on it.

On different perspectives Adam et al., Ruben and Peter, Benjamin and Peter, Anastasia, Kathryn and Peter, Stefan, Kelechi et al., David conducted studies on climate emergency considering diverse area of research. They depict the climate emergency faced by the world. The described both the crises as destructive manifestation of human race and diminishing tenaciousness of an unhealthy earth. The researchers also give a bird-eye-view on political concerns regarding climate emergency. They also convey the need to signify the theological legacies while deliberating the pertinence of today’s portentous belief.

With an aim to combat climate change, many researchers around the globe undertake research works in their respective area of interest tie in with the climate change Oloo and Omondi, Brzoska, Yamamoto, Serraglio and Cavedon-Capdeville, Matthew and Kelly, Marianne, Aaron & Vincent, Steve, Damien et al. executed research in the field of climate change in discrete fields. The researchers also scrutinize the repercussion of climate change for the armed forces’ future and their contribution towards national ammunition documents. In the context of climate change disaster in national laws and policies, the researchers further examine the alteration level amongst the international credentials with national policies on human mobility. The concern to contemplate and overcome climate change is examine in the study. They also describe and consolidate the remedies to enhance the public diligence towards climate change. They discussed the collective measures to be tackle by different communities to improve adaptation in the post-disaster period, including enhancement of care and prevention system, community’s flexibility and requisite consciousness to face the post disaster period. They have also discussed and stated that a strong perception about the biological mechanism is needed to mediate the climate & man made alteration of climate to successfully alleviate the destructions of the environment & ecosystem.

The climate emergency is emerging as an important issue day-by-day. Global warming can be considered as a parallel issue with climate emergency. Yongxiao, Nathan & Adam, Brageetal. and Yi-Ming et al. described the various climatic models that proclaim different future warming in the 21st

Century. The researches measures the effort of each country in mitigating the climate change plights. The authors resulted in showing that following the current efforts will lead the world to heal at a certain point. Climate emergency is expected to be one of the thrust areas of research in the years to come.

Scope and Methodology of the Study

The scope, methods and procedures of the study include the following:

- Strategy has been adopted to explore the digitally published research output from India on climate emergency and its related issues;
- The data have been extracted from Web of Science Core Collection Database for the period 1990 till January 2021;
- Data from different indexes in Web of Science has been considered;
- The analysis is done using “RStudio Bibliometrix-Biblioshiny” package along with the Web of Science in-built analytics tool;
- Table, charts and graphs etc. have been used for data presentations.

Results

Research Publication Trends

As the Table 1 shows in India during 1990-2021(January) there is an increasing pattern in the number of research outputs. The year 2020 marks the highest number of research documents published. As the data is being recorded till January 2021, it is expected that the number of publications will be increasing enormously by the end of the year. Figure 2 is the graphical depiction of the publication patterns year wise.

Table 1. Publication Trends (n=1615)

Sr#	Year	#Publications	Sr#	Year	#Publications	Sr#	Year	#Publications
1	1990	4	12	2001	3	23	2012	89
2	1991	4	13	2002	11	24	2013	85
3	1992	1	14	2003	4	25	2014	121
4	1993	4	15	2004	11	26	2015	120
5	1994	3	16	2005	8	27	2016	137
6	1995	7	17	2006	19	28	2017	120
7	1996	3	18	2007	26	29	2018	157
8	1997	3	19	2008	33	30	2019	174
9	1998	13	20	2009	53	31	2020	211
10	1999	11	21	2010	57	32	Jan 2021	20
11	2000	7	22	2011	96	Total		1615

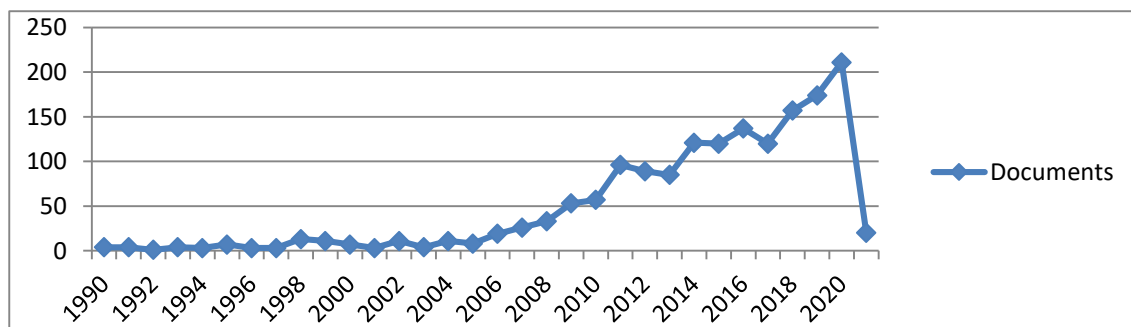


Figure 1. Publication trends over the years

Publications in Top Journals

Table 2 shows the top 10 journals covering research publications on climate emergency and its related areas. A total of 168 publications (10.40%) is contributed by Current Science, followed by Journal of Agro meteorology with 65 publications (4.02%).

Table 2. Journal Trends (n=1615)

Sr#	Title of journal	No. of documents	% of total documents
1	Current Science	168	10.40%
2	Journal of Agro meteorology	65	4.02%
3	Climatic Change	52	3.22%
4	Theoretical and Applied Climatology	26	1.61%
5	Science of the Total Environment	24	1.48%
6	Indian Journal of Agricultural Sciences	23	1.42%
7	Ecological Indicators	22	1.36%
8	Natural Hazards	21	1.30%
9	Water Resources Management	21	1.30%
10	Journal of Water and Climate Change	20	1.23%

Top Author Keyword Occurrences

There are 20 author keywords in the entire research documents. The word “Climate Change” has the highest number of occurrence with 105 times. “Change” is the least occurring word with 17 times. Table 3 shows the entire keywords and their number of occurrences.

Table 3. Author Keyword Occurrences

Sr#	Keywords	No. of occurrences
1	Climate Change	646
2	India	105
3	Adaptation	99
4	Global Warming	72
5	Temperature	48
6	Agriculture	43
7	Vulnerability	43
8	Climate	41
9	Rainfall	24
10	Rice	24
11	Swat	24
12	Mitigation	23
13	Wheat	22
14	Uncertainty	20
15	Resilience	19
16	Stream flow	19
17	Cmip5	18
18	Food Security	18
19	GCM	18
20	Change	17

Major Subjects

Table 4 represents the top 10 subjects, the researches have undertaken. The most focused discipline is found to be Environmental Sciences contributing 480 (29.72%) research publications with civil engineering being the lowest with 3.77% only.

Table 4. Discipline-wise Distribution of the Documents (n=1615)

Sr#	Discipline	No. of documents	% of total documents
1	Environmental Sciences	480	29.72%
2	Meteorology Atmospheric Sciences	333	20.61%
3	Multidisciplinary Sciences	241	14.92%
4	Water Resources	180	11.14%
5	Geosciences Multidisciplinary	177	10.96%
6	Environmental Studies	134	8.29%
7	Agronomy	124	7.67%
8	Ecology	81	5.05%
9	Green Sustainable Science Technology	63	3.90%
10	Engineering Civil	61	3.77%

Document Types

From the database, 12 types of documents have been extracted. Of the 1615 documents, a maximum number of documents are published in the form of articles comprising of 1312 in number (81.23%). The Table 5 below shows the different types of documents published and available in the database.

Table 5. Types of the Publications (n=1615)

Sr#	Document type	No. of documents	% of total documents
1	Articles	1312	81.23%
2	Reviews	135	8.35%
3	Editorial material	87	5.38%
4	Proceedings	43	2.66%
5	Letters	40	2.47%
6	Early access	25	1.54%
7	Book chapters	15	0.92%
8	Meeting abstracts	13	0.80%
9	Corrections	10	0.61%
10	Book reviews	9	0.55%
11	News items	7	0.43%
12	Notes	2	0.12%

Institutional Affiliation

The researchers are affiliated to different institutions of the country. Table 6 demonstrates the top 10 institutions to which the researchers belong. Researchers of Indian Institute of Science has the highest number documents (10.03%) followed by Indian Institute of Technology (9.04%).

Table 6. Institutional Affiliation (n=1615)

Sr#	Name of the institute	No. of documents	% of total documents
1	Indian Institute of Science	162	10.03%
2	Indian Institute of Technology	146	9.04%
3	Indian Agricultural Research Institute	68	4.21%
4	Indian Institute of Tropical Meteorology	49	3.03%
5	International Crops Research Institute for the Semi-Arid Tropics	45	2.78%
6	International Maize & Wheat Improvement Center(CIMMYT)	45	2.78%
7	Jawaharlal Nehru University	41	2.53%
8	Banaras Hindu University	37	2.29%
9	Punjab Agricultural University	35	2.16%
10	National Institute of Hydrology	32	1.98%

Conclusion

The effect of climate change leads to the warming up of our planet earth. The process will further precede to more unfavorable changes and also many more consequence will be followed in the near future. In order to save the planet earth and prevent global warming, it is necessary to know about the science of climate change. Knowing the ramification of climate change, many scientists and environmentalists from all over the world carried out many scientific researches on the topic related to climate change and global warming.

The outcome of their studies is indexed by many databases, peers can be aware of what is happening with the planet they are living in. The unfavorable effects of climate change are much more destructive than expected and these grievous effects is threatening both the biodiversity and the existence of human race. Thus, more emphasis must be given to the researches on climate change and the situation must be highlighted as an emergency so that it will alarm the whole world. Researchers and scholars from source and destination countries are advisable to explore and look into the condition of global warming and the changes occurring in the climate.

The paper will eventually shed lights on the relevance of bibliometric study on many emerging trends of researches in the scientific communities. It is also gaining immense popularity in recent times amongst the research scholars as bibliometric techniques helps them in pursuing a retrospective of broad & rich areas in their area of interest. More investments in international research collaborations should be encourage to inculcate the importance of climate emergency and help prioritize researches on climate change in every nook and corner of the world. In today's era of technology most of the scientific outputs are easily available over the internet. The scientific output of the research carried out in the field need to be analyzed so as to make use of the literature at its best possible way. Countries of the world need to join together for the cause of sustainability of the mother earth by facing the challenges of climate emergency for the years to come.

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