Examining Research on Disasters In India- A Bibliometric Study (1969-2022)

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Abstract

Disasters as a mishap are discussed in multiple forms in theory and practice. Within these multiple dimensions, works can be observed as being related to mitigation, management, rehabilitation, recovery, policy making, governance and others. These works enrich the literature on disaster management aspects and also provide a direction to studies in the field. Numerous practical outcomes can be seen in the discipline of disaster management as an outcome of addition of contributions. In this context, the outcomes in the form of publications tend to provide content to the discipline for practices and policies. The studies on disaster management have gained pace rapidly in explanatory as well as critical forms. In India, the discipline of disaster studies and concerned dimensions have seen immense growth. Besides this, India is also prone to disasters with regards to natural and anthropogenic factors. The focus of the current paper is to visualise the nature of published national and international academic works on the topic of 'India and Disasters' through the well acknowledged Scopus and Web of Science databases, with a bibliometric study of a total of 6,554 (3,072 +3,482 documents respectively) documents. Results highlight an increasing number of publications on the topic 'India and Disasters' but in a very diversified form, geographies, affiliations and institutions in the two databases.

Keywords: *India, Disaster, Research, Bibliometric*

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1. Introduction and Literature Review

Disasters are considered as a calamity which can be either natural or human induced (Britannica, 2023). It can cause a grave disturbance of natural functioning of individuals, societies, economies and all other systems when they are exposed to it. This is due to their vulnerability to such happenings (UNDRR, 2023). India is observed to be in the list of world's most disaster prone countries. In the light of climate change and an ever increasing population, these issues have now become more problematic (UNICEF, 2023). India has also gone through an increased intensity of disasters due to all such concerns (Kumar, Walia, & Chaturvedi, 2011).

Disaster studies are seen to be as an emerging and a distinctly recognised discipline. Further, along with this, disaster management can be seen as a practice. However, it is difficult to mark any boundary between these two (Andharia, 2020). Therefore, works on disasters also have an academic and policy based orientation leading to disaster studies and related works in the field. But there is no single analysis of works which can show what kind of studies are actually taking place in the field. Thus, introspection of research needs to be of multiple kinds (Andharia, 2020). A research based perspective can be helpful in bridging the gaps. This is also required to remove the observed dominance of the Western nations in this academic aspect (Gaillard, 2019).

Bibliometric studies use and provide both qualitative and quantitative information on multiple kinds of publications (Pai & Alathur, 2021). Bibliometric examination can also be of help as it can cover the missing information, help in studying the topic and in assisting academic and research works (Rayner, 1957). This also provides a critical insight into the studies which have been conducted over a period of time and helps in clearly observing the contemporary events such as COVID-19 (Horowitz & Remes, 2021). Examples of bibliometric studies on disasters and related concerns can be seen in literature, although not in plenty, and whatsoever works are visible are basically either conceptual or thematic in nature.

Natural hazards and disaster management have been studied through a bibliometric examination through the Web of Science, Scopus and Google Scholar databases. Rana (2020) has conducted a bibliometric examination on the topics of 'disaster resilience' and 'climate change resilience'. The outcomes indicated a growing field of research with climate change resilience overtaking the number of works on disaster resilience

(Rana, 2020). Chumky, Basu, Onitsuka and Hoshino (2022) have discussed disasters through Web of Science data based bibliometric study in the light of migration. They have suggested that studies on migration due to slow onset type of disasters is lesser as compared to fast setting disasters (Chumky, Basu, Onitsuka and Hoshino, 2022). Sweileh (2019) has examined health concerns related to natural disasters from the Scopus database for publications from 1900-2017. Results indicated that a limited information was available on the evolution of the topic and it is only after 2004 that a surge in the works can be observed (Sweileh, 2019). This information is very essential for reaching out for Sustainable Development Goals and reduce the negative impacts of natural disasters (Sweileh, 2019). Another example can be given as that of work on the scientific and technological aspects of international cooperation through bibliometric analysis. It highlighted that the maximum input is coming from the USA and that there was a strong geographical dissimilarity between the actual location of the disaster and the research conducted (Fan, et al., 2020).

In India, bibliometric studies on disasters are observed in specific fields related to disasters although a broad study on these in bibliometric analysis is not visible in publications. For instance, Pai and Alathur have conducted a bibliometric examination on mobile health services in India through the Scopus database and have indicated an importance of the concept in health services in India (Pai & Alathur, 2021). However, bibliometric analysis for literature on 'India and Disasters' in India is extremely limited and context specific in nature rather than a broad one. The current study is an attempt to get an overview of works on disasters in India through a bibliometric perspective from the well-known Scopus and Web of Science databases.

2. Methodology

2.1 Data Source

Bibliometric information is derived from the Web of Science (WoS) and Scopus e-data sources. The Web of Knowledge database is called Web of Science since 2004. Along with Scopus, it stands as one of the two largest databases for generating bibliographic and bibliometric information on numerous disciplines. Considered as the 'gold standard' for citation (Harzing & Satu, 2016), WoS is provided by Thomson Reuters with records

from 1900 to the present and includes several databases on sciences and social sciences (Annie, Haralstad, & Christophersen, 2015). It is one of the most trusted global citation data sources and has 1.9 billion cited works from 171 million records of more than 115 years of highest quality research works (Clarivate, 2022). Along with multiple kinds of bibliometric information, citation searches with diagrammatic retrieval of data are also feasible through WoS (Annie, Haralstad, & Christophersen, 2015). This makes citation search detailed through indexing, citations, journals, author, country and other related bibliographic content (Ramlal, Ahmad, Kumar, Khan, & Chongtham, 2021). A commercial license is required to do analysis (Ramlal, Ahmad, Kumar, Khan, & Chongtham, 2021). The WoS Core Collection includes three indices- The Science Citation Index Expanded (SCI-EXPANDED), Social Sciences Citation Index (SSCI) and Arts and Humanities Citation Index (AHCI); all containing databases from 1989 to present (Clarivate, 2022).

As per Harzing and Satu, Elsevier's 'Scopus has evolved after the WoS and provides an alternative to Scopus database', although Scopus is defined as a new entrant in the field. It is currently an indicator of publication standards and even University rankings (Harzing & Satu, 2016). Both are observed as fore runners in databases and even competing in nature and are widely used for such analysis (Zhu & Liu, 2020). Besides, both databases are commercial and based on subscription for bibliometric information and its generation. This has also increased their demand (Pranckute, 2021). Scopus and WoS have differences in coverage and also seem to hold a bias in certain respects. Yet, all these databases have a lot of similarity in terms of bibliometric information generated (Mongeon & Hus, 2016).

2.2 Data Collection

The analysis conducted in this paper is based upon data derived from the Scopus and Web of Science databases for the exact phrase 'India and Disasters'. For both the databases, results for the year 2023 were excluded. The data is extracted from WoS Core Collection from WoS website including the following criteria- Author, Title and Source with details extracted on Author(s), Title, Source, Times Cited Count; Abstract, Keyword, Addresses with details extracted for Abstract, Addresses, Affiliations, Document Type, Keywords, WoS Categories and Research Areas and; Cited References and Use with

details extracted for Cited References, Cited References Count, Usage Count and, Highly Cited Publications (Clarivate, 2022). The information extracted from Scopus included- Citation Information with details extracted on Author (s), Document Title, Year, Citation Count, Source and Document Type; Bibliographical Information with details extracted on Publisher; Abstract and Keywords with details extracted on Abstract, Author Keywords, and Index Keywords. The WoS generated 3,482 published research works on the topic while the Scopus database gave 4,672 documents through search from which only 3,072 works could be exported from the Scopus database. Scopus provided data from 1969-2022 while WoS gave data from 1989-2022.

2.3 Data Analytics

Data generated from the both the databases is analysed in the VOS viewer software. It acts as a tool for generating and analysing bibliometric information (Viewer, 2022). The software provides help in observing bibliometric networks, geographies and subsequent mapping of bibliometric information for authors, keywords, languages and linkages of bibliometric information. Analytical diagrams have been generated from Scopus, WoS, as well as VOS viewer to conduct bibliometric analysis.

3. Results

The search on the topic 'India and Disasters' through the Scopus database generated 3,072 results and for the Web of Science database generated 3,482 results. Following analysis was derived from this information:

3.1 Scopus Database

3.1.1 Publication Overview

The number of publications on the topic 'India and Disasters' have steadily increased 2003 onwards in the database. In this category, maximum documents in the subject were observed by Social Sciences at about 17% followed by Environmental Science at 15%. Publications from India had the maximum share followed by publications from

the USA. Articles and conference papers had the highest share of publication types as can be seen in Fig.1.

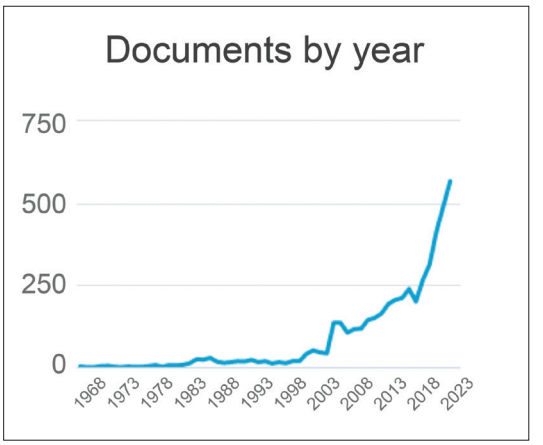

Figure 1 : Publications on Theme 'India and Disasters'- 1969-2022

Source- Scopus, 2022 (Scopus, 2022)

3.1.2 Co-occurrence of Keywords and Terms

In this category were observed 6,883 keywords used by authors with the criteria of analysis set at least occurrence of once. This was done on the basis of full counting which implies that the co- authorship of weight of the link is fractionalized by the software and 5,847 terms met the criteria. The results were generated by the software from 2016-2022. As can be seen in Fig. 2. and 3, India, climate change, and COVID-19 terms dominate the text of publications. This clearly implies the nature of research is focusing around these topics. In terms of the concentration co-occurrence analysis was also conducted to check co-occurrence of text from the abstracts of the publications. Binary counting method was used which counts this information by considering the presence or absence of terms in the publication. Of the 57,195 terms recognized by the software, a limit of occurrence of the term at least twice is set as the criteria which was seen to be met by 11,645 terms. When subjected to analysis to identify the clustering of these terms, it was observed that the term India, COVID-19, landslides and Himalayas were the dominant themes.

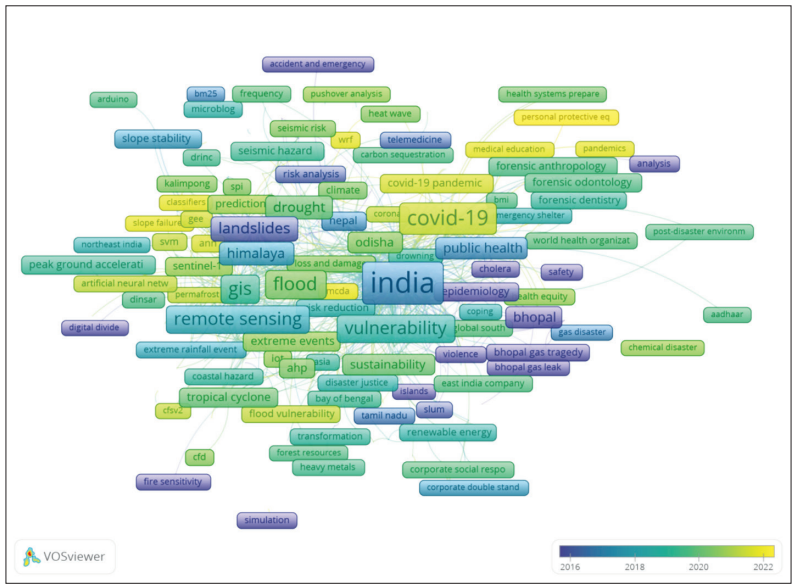

Figure 2 : Co-occurrence of Keywords in Abstract

Source- Author, 2022

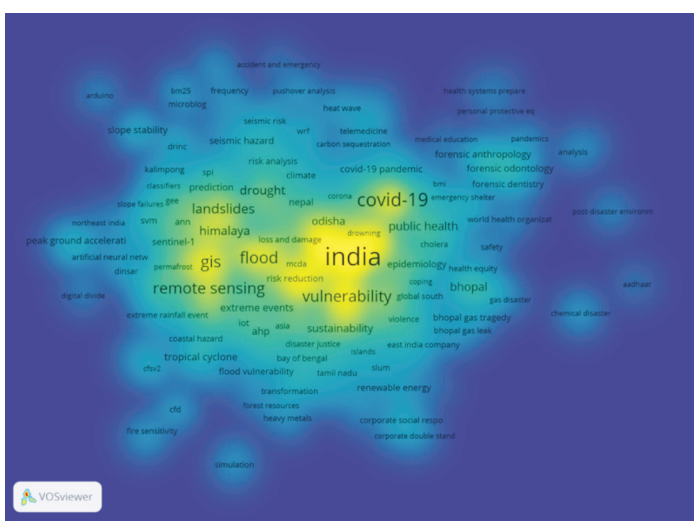

Figure 3 : Clustering of Abstract Keywords

Source- Author, 2022

The works can be seen to be clustered around the themes of vulnerability in India as can be seen form Fig.3. Besides, floods and GIS and Remote Sensing seem to depict a distinct cluster along with landslides in Himalayas. The pandemic of COVID-19 reflects a notable impact on research in this short span of time with a distinct clustering observed near to the dominant theme of vulnerability and India.

3.2. Web of Science Database

3.2.1 Publication Overview

The data indicates that the number of publications and citations have increased constantly since 2012. In these publications, from 'Geosciences Multidisciplinary' with 653 publications as can be seen in Fig. 4.

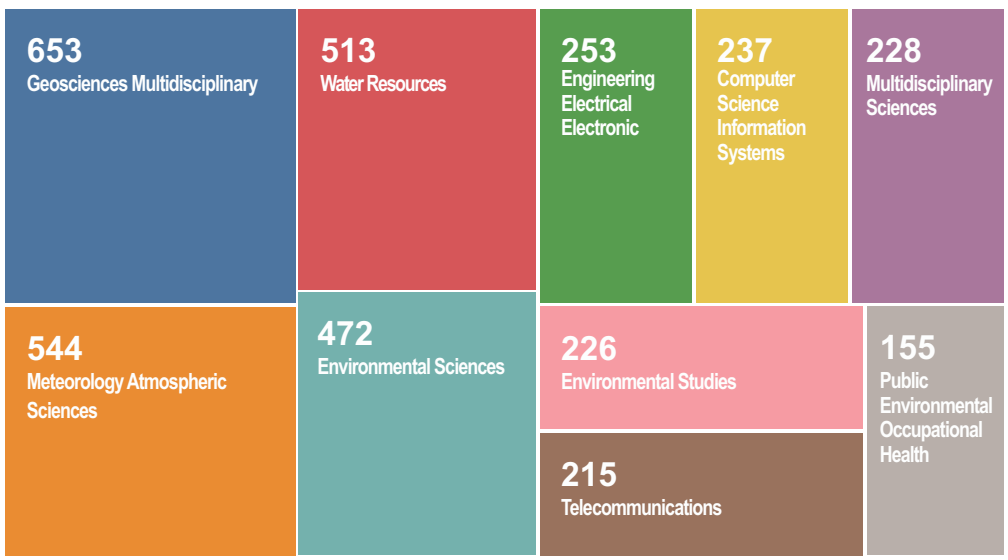

Figure 4 : Publication Record- WoS

Source- Clarivate, 2022

Table 1 : Publication Record from WoS Satabase

Publication Years	Record Count	% of 3,482
2022	556	15.968
2021	550	15.796
2020	422	12.119
2019	296	8.501
2018	203	5.83
2017	184	5.284
2016	148	4.25
2015	147	4.222
2014	122	3.504
2013	105	3.016
2012	98	2.814
2008	80	2.298
2010	79	2.269
2011	72	2.068
2007	56	1.608
2009	56	1.608
2005	51	1.465
2006	47	1.35

Publication Years	Record Count	% of 3,482
2004	26	0.747
2002	24	0.689
2003	20	0.574
2023	18	0.517
2000	16	0.46
2001	14	0.402
1994	13	0.373
1996	12	0.345
1995	10	0.287
1997	10	0.287
1999	10	0.287
1991	9	0.258
1992	9	0.258
1993	8	0.23
1998	7	0.201
1990	3	0.086
1989	1	0.029

Source- Author, 2022 from Clarivate (2022)

3.2.2 Citation Report

Of the 3,466 publications, 2,833 documents were cited at least one. For citations as per the institution, with a criteria of at least one document and at least one citation, 1,931 documents met the criteria. Fig.4. indicates that the IIT's got the maximum citations for the period while the National Institute of Technology had the maximum citations in the last two years. With regards to the number of citations, the average citations were 17.86 per item. (WoS, 2023). Citations of published works have rapidly increased from 2012 onwards which indicates the emergence and development of the field. This can be seen in Fig. below. Further, the citation report on meso topics highlights that 'Climate Change' dominated the theme as can be seen in Fig.5.

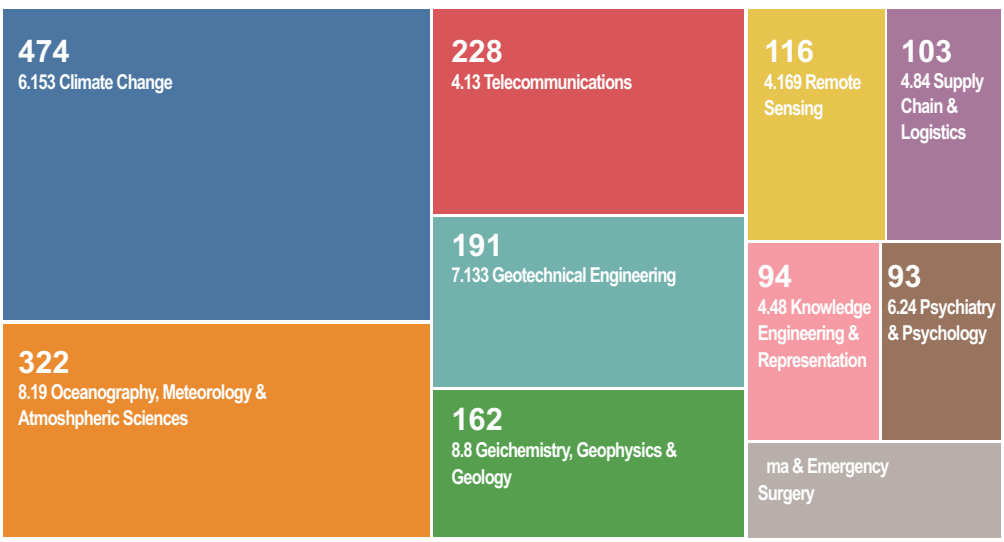

Figure 5 : Themes of Publications

Source- Clarivate, 2022

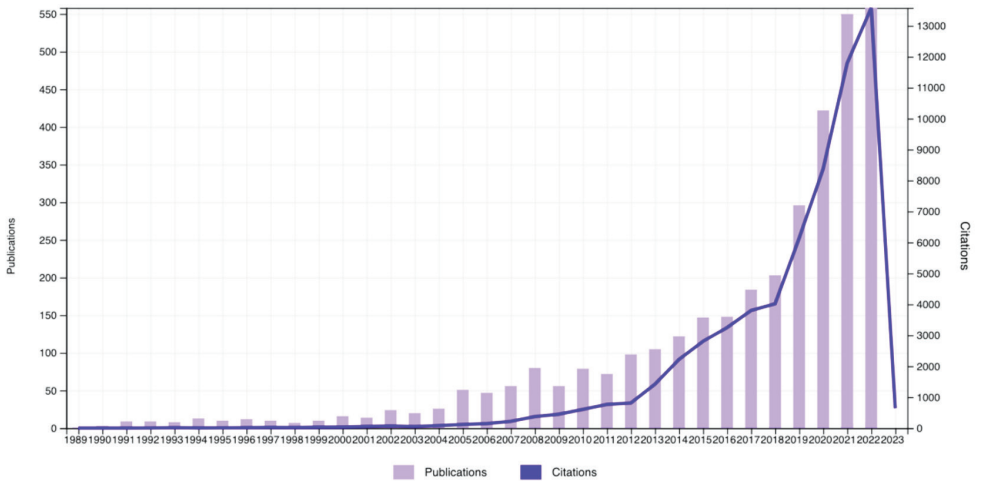

Figure 6 : Citations and Publications Record

Source- Clarivate, 2022

With regards to publishers, Springer Nature did the maximum number of publications on the topic; the details of first fifteen publishers can be seen in Table2.

Table 2. Top 15 Publishers on the Topic 'India and Disasters'

Publishers	Record Count	% of 3,468
Springer Nature	812	23.414
Elsevier	716	20.646
Taylor & Francis	282	8.131
Wiley	202	5.825
Mdpi	137	3.95
IEEE	122	3.518
Indian Academy of Sciences	119	3.431
Sage	87	2.509
Cambridge University Press	69	1.99
Emerald Group Publishing	50	1.442

Publishers	Record Count	% of 3,468
Disaster Advances	33	0.952
Oxford University Press	30	0.865
Amer Geophysical Union	26	0.75
Hindawi Publishing Group	25	0.721
India Meteorological Dept.	24	0.692

Source- Author, 2022 from Clarivate (2022)

3.3 Details on Co-authorship

This information was derived on co-authorship as per countries, authors and organisations. Information on co-authorship as per the number of documents in an organization was derived on the basis of at least two documents per organization criteria. For 3,795 works generated, there were 2,926 documents with co-authorship as per organizations. The maximum co-authored works were observed from the IIT's in India as can be seen from Fig.7. In fact, a dense clustering of works gets absorbed around the IIT's followed by NIT's. Findings on co-authorship as per authors aimed at deriving data for a minimum of two publications per author. The results generated 1,442 number of authors whose works had a co-authorship. The number of countries with co-authorship were found to be 133 and details are depicted in Fig.8. Here, the works within the country dominate the publications. This is followed by PRC and USA.

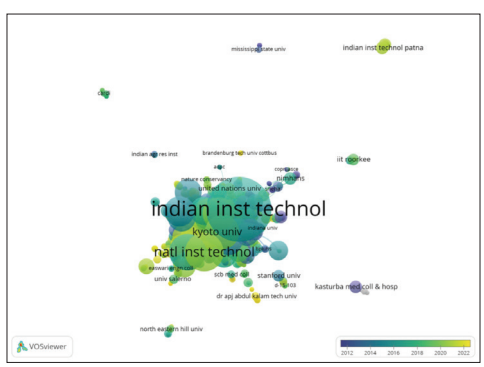

Figure 7 : Co-authorship as per Organisations

Source- Author, 2022

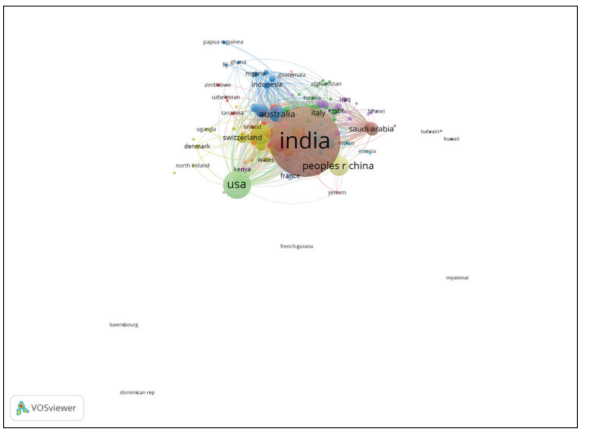

Figure 8 : Co-authorship as per Countries

Source- Author, 2022

3.4 Co-occurrence of Keywords

The keywords are indicative of the focus of publications on the topic for the country. The published research on the topic 'India and Disasters' with regards to Co-occurrence of keywords in these works indicates that at the chosen aspect of a repetition of a keyword twice, 3142 keywords find a repetition. This is visualized in Fig.9

Figure 9 : Co-occurrence of Keywords

Source- Author, 2022

For publication titles, 'Natural Hazards' journal had 156 publication titles followed by 'International Journal of Disaster Risk Reduction' with 142 publications.

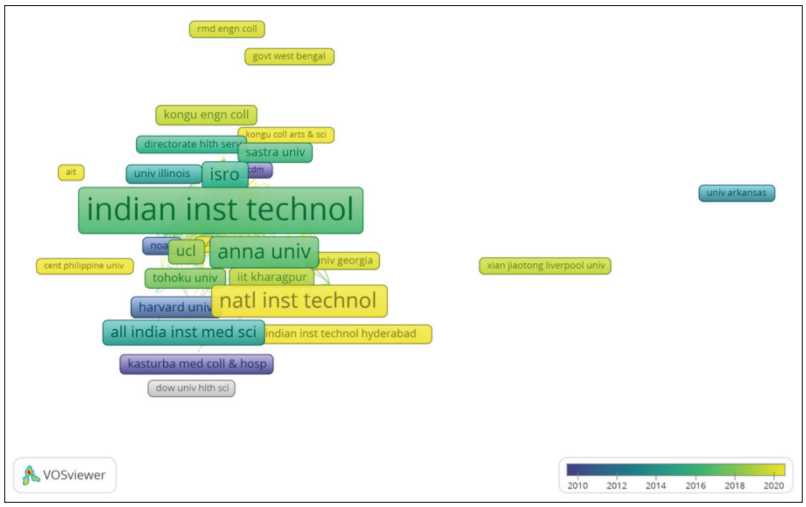

Figure 10 : Citations as per Institute

Source- Author, 2022

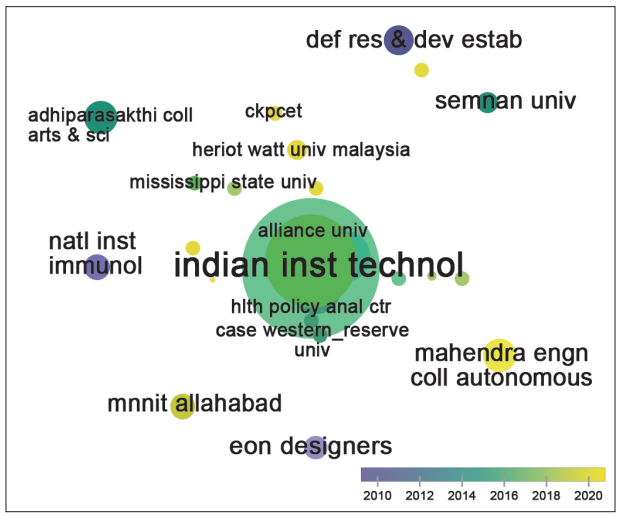

Figure 11 : Bibliographic Coupling as per Organisations

Source- Author, 2022

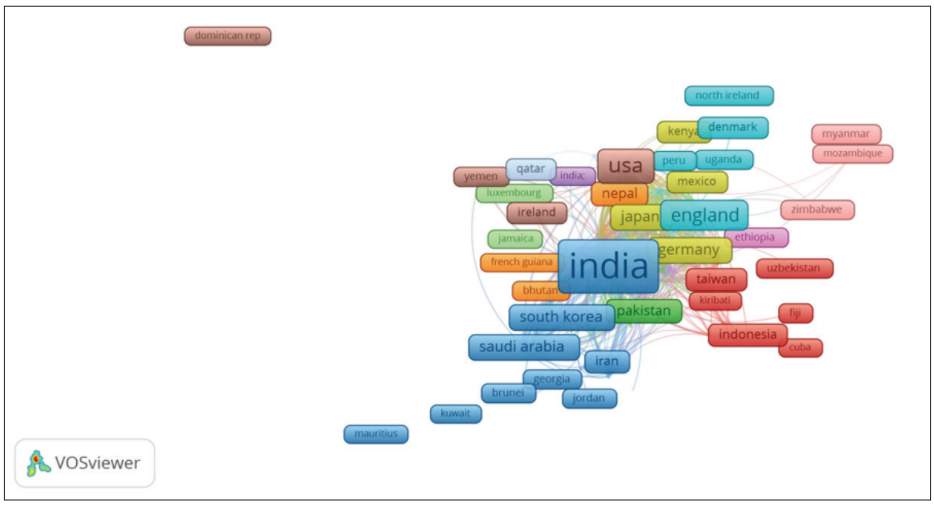

Figure 12 : Bibliographic Coupling as per Countries

Source- Author, 2022

Observing citations as per countries, it can be observed that Indian publications dominated the citations followed by USA and England. This data is available from 2016-22. Bibliographic coupling information also indicated the dominance of IITs as is visible in Fig.10.IIT Delhi also had the maximum bibliographic contribution in coupling as is observed in Fig.11. From 2010 to 2020, the number of documents observed were 3,795 with one document per organisation. Bibliographic coupling for countries is indicative of India being the dominant contributor for the same.

4. Conclusions

It is clearly visible from the attempt that the number of publications on disasters in India have seen a spurt in the 21st century. This was visible earlier in Scopus as compared to the Web of Science. Besides, the citations have also increased. However, there are certain themes around which this research revolves and clusters. In this context, the COVID-19 pandemic has indicated a significant influence on research and that too within a span of about three years in the Scopus database. This is not much visible in the WoS database. The analysis further indicates that research on the topic 'India and Disasters' is dominated by science and technology oriented publications. This also leads

to the suggestion that social science based studies can augment their contributions in the field. This is observant in the keyword search also as more pure science oriented keywords are visible in the database. The contribution of other countries in the field is also notable besides that of India.

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