

## Bibliometric Analysis on Millennium Development Goals (MDGs) with Emphasis on “Poverty and Hunger”

Pragati Krishnan<sup>a</sup>, Ravindra Brahme<sup>b</sup>

<sup>a</sup> Assistant Professor (Guest), School of Studies in Economics, Pt. Ravishankar Shukla University, Raipur, CG, India.

Email id: [pragatikrishnan.8@gmail.com](mailto:pragatikrishnan.8@gmail.com)

<sup>b</sup> Professor & Head, School of Studies in Economics and Dean, Faculty of Social Sciences

Pt. Ravishankar Shukla University, Raipur, CG, India.

Email id: [ravibrahme@gmail.com](mailto:ravibrahme@gmail.com)

### Abstract

Millennium development goals (MDGs) are the United Nations Development Programmes (UNDP) initiative launched in the year 2000 with eight objectives and twenty-one milestones to be achieved by 2015. Thus, it is a global agreement and collaborative action. (Hulme, 2009) Poverty is not a new concept, rather it is found in every sphere of life; not only this, it also stirs a lot of misgiving; and as a result, it has a very devastating effect on its victims. Henceforth, the principal threshold of the paper is to exhibit a sketch on the work done on “Millennium Development Goals” through its bibliometric analysis. Therefore, the paper highlights a descriptive-quantitative analysis of the concept of Millennium Development Goal- 1 A for the last twenty-one years, i.e., 2000-2021 and SciVerse Scopus was used to collect the research publications on MDGs. The results of the study show that the Mediterranean Journal of Social Sciences (MJSS) has contributed plenty of publications on the theme “Millennium Development Goals” and “Poverty and Hunger”. With respect to most contributing authors, the Author Fukuda-Parr S has got the maximum number of the papers and also had the highest h-index. Further the keyword mapping results emphasised that in all the seven clusters - “Millennium Development” is the predominant word followed by child mortality, maternal mortality, drinking water, sanitation, environmental sustainability etc.

**Keywords:** Bibliometric analysis, Child mortality, Hunger, Maternal mortality, Millennium Development Goals, Poverty, SCOPUS.

### 1. Introduction

Millennium development goals are the United National development Programmes (UNDP) initiative launched in the year 2000 with 8 objectives and 21 milestones to be achieved by 2015. The Millennium Development Goals (MDGs) is a global agreement and collaborative action (Hulme, 2009)<sup>1</sup> mark an epochal event and hailed as an effective method of global mobilisation to accomplish a set of key social priorities all around the globe (Sachs, 2012)<sup>2</sup>. Furthermore, the MDGs sheds light on the widespread public attention in the sphere of poverty and hunger, health, unaddressed needs towards schooling, gender inequality, and environmental deterioration. As it is evidences that the importance and relevance of MDGs are increasing in the present era, it becomes indispensable to analyse and accumulate the past, present and futuristic literature, on the millennium development goals.

Poverty is very difficult to define, because different people have different perceptions on it. This means the fact that; what may be termed as poor may not always be seen as poor by the other people. Poverty is not a new concept, rather it is found in every sphere of life; not only this, it also stirs a lot of misgiving; and as a result, it has a very devastating effect on its

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<sup>1</sup> Hulme, D. (2009). The Millennium Development Goals (MDGs): A short History of the World’s Biggest Promise. *BWPI Working Paper 100*, pp. 1-55.

<sup>2</sup> Sachs, J. D. (2012). From millennium development goals to sustainable development goals. *The lancet*, 379(9832), pp. 2206-2211.

victims. Kankwenda (2002)<sup>3</sup> defines poverty as: “A multidimensional phenomena influenced by a wide range of factors, these include poor people lack of access to income earning and productive activities and to essential social services”.

The MDG 1 dealt with eradication of extreme poverty and hunger. The principal threshold of the paper is to exhibit a sketch on the work done “on millennium development goals” through its bibliometric analysis. Therefore, the paper highlights a descriptive-quantitative analysis of the concept of millennium development goals for the last twenty-one years, i.e., 2000-2021.

### **1.1 Why bibliometric Analysis?**

The word “bibliometrics” is used to identify a set of quantitative methods of analysis of scientific publications. During the last few decades, the bibliometric methods have become quite popular both for the evaluation of scientific research as well as for the assessment of individual researchers. E. Wyndham Hulme was the first to employ the term statistical bibliography in 1922. Though Pritchard (1969) was the first author who defined the term bibliometrics, based on his scientific production- “application of statistical and mathematical methods set out to define the processes of written communication and the nature and development of scientific disciplines by using recounting techniques and analysis of such communication”.

## **2. Methodology**

### **2.1 About the Database**

An abstract and citation directory of Elsevier introduced in the year 2004 is known as SCOPUS. By and large 36,377 titles from 11,678 publishers and nearly 34,346 peer- reviewed journals in the top-level subject fields of life sciences, social sciences, physics and health sciences comes under its domain. Also, book series, journals and trade journals are the three categories of the sources it covers. Apart from that it encompasses database in 40 languages and record depth of 41,462 indexed titles till 2021. Because of its multidisciplinary nature and easily accessible references it is continues at the front line for the recent decades.

### **2.2 Search Framework**

The present study was explanatory in nature, focused on the scientific literally analysis on “millennium development goals” and to collect research publications Sci Verse Scopus was used. According to SCOPUS factsheet 2019, “The SCOPUS database is formulated independently by the subject experts of different disciplines which includes the source-neutral abstracts and citations and also it has more than 24,000 peer- reviewed journals among which the Gold Open Access is nearly 4,000. Apart from that, SCOPUS is a leading and indeed a very influential and innovative analytics tools both for the researchers as well as the librarians on the one hand and for the research managers, and funders on the other. Falagas et al. (2008)<sup>4</sup> opined that Scopus is generally applied in bibliometric studies and is recognised appropriate for this purpose due to its greater indulgence in indexed journals than that of Web of Science. The current study was performed on May 28th, 2021 and on the single day itself the analysis of data, including the citation analysis was administered.

### **MDGs-related research**

Research documents both at the national and the global level has been taken into consideration in the present work. Thus, for the extraction of the data the keyword phrased “millennium development goals” and “poverty and hunger” was addressed in the paper (title, abstract, and keywords). Afterwards in the SCOPUS search engine using the ALL function we can search any article phrased “millennium development goals” and “poverty and hunger”. The results derived from

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<sup>3</sup>Kankwanda, M. (2002). Poverty Eradication: Where Africa Stands. *London: Económica*.

<sup>4</sup>Falagas, M. E., Pitsouni, E. I., Malietzis, G. A., & Pappas, G. (2008). Comparison of PubMed, Scopus, web of science, and Google scholar: strengths and weaknesses. *The FASEB journal*, 22(2), pp. 338-342.

the assessment of this study is used to evaluate the extent of research on MDGs and its goal one i.e., poverty and hunger among the different parts of the world.

### 2.3 Search strategy

The search strategy has been done for the span of twenty-one years i.e., from 2000 to 2021 with the documents phrased “millennium development goals” and “poverty and hunger” in the SCOPUS database. The documents included articles from both the journals and books, conference paper, editorials and language were restricted to English only. This approach has been adopted with the belief that the maximum potential number of documents will be retrieved for the study. Adopting this methodology 1,216 scientific publications were derived in the current study by implementing the “ALL” function (Sweileh,2020)<sup>5</sup>.

### 2.4 Bibliometric Indicators

Bibliometric analysis is a technique which enables us to grasp knowledge about a particular field of study by analysing the different variables linked to scientific production on any subject. It is emerged as an important branch of study in the present-day context for addressing and exploring concerned subjects, and allowing us to know about what are the main publications, authors, and collaborative institutions. The information collected from the Scopus database includes: the annual number of publications annually, participating countries, active journals, relevant affiliations, and information about citations. Furthermore, the SCOPUS extracted Data was exported to Microsoft Excel software for tabulation and analysis. The below table shows the significant details of the documents extracted by SCOPUS.

**Table No. 1. Significant details of the documents extracted by SCOPUS.**

DESCRIPTION	RESULTS
<b>PRINCIPLE INFORMATION OF DATA</b>	
Timespan	2002:2021
Sources (Journals, Books, etc)	736
Documents	1216
Average years from publication	9.48
Average citations per documents	14.96
Average citations per year per doc	1.391
References	51838
<b>DOCUMENT TYPES</b>	
Article	761
Book	66
Book Chapter	194
Conference Paper	58
Editorial	19
Note	10
Review	104
Short Survey	4
<b>DOCUMENT CONTENTS</b>	
Keywords Plus (ID)	2632

<sup>5</sup> Sweileh, W. M. (2020). Bibliometric analysis of scientific publications on “Sustainable Development Goals” with emphasis on “good health and well-being” goal (2015–2019). *Globalization and Health*, 16(1), pp. 1-13.

Author's Keywords (DE)	2178
<b>AUTHORS</b>	
Authors	2339
Author Appearances	2621
Authors of single-authored documents	476
Authors of multi-authored documents	1863
<b>AUTHORS COLLABORATION</b>	
Single-authored documents	540
Documents per Author	0.52
Authors per Document	1.92
Co-Authors per Documents	2.16
Collaboration Index	2.76

The table no.1 highlights the key details of the extracted documents by SCOPUS for the time span of eighteen years i.e., 2002 to 2021. It sheds light on the facts that the maximum number of documents is 1216 and among them the maximum number of documents is from journal articles, i.e., 761, followed by book chapters which is 194 and review papers are 104. However, the books written on the topic “millennium development goals” and the conferences papers are also in good numbers, i.e., 66 and 58 respectively. Moreover, near to equal number of editorials and short note has been also published. As per the SCOPUS database the total number of 2339 authors were found regarding the theme under study. The Collaboration index is moderate on the theme, i.e., 2.76. From the collaboration index we conclude that, if more authors collaborate on the theme, then probably a greater number of documents could be produced. Millennium development goals has got a very distinguished place in the academic papers in the last twenty years. The first paper appeared in year 2002 in SCOPUS index journals on millennium development goals. The academic world has focused more on the MDGs after the of the United Nations Millennium Summit in 2000, thereby inculcating the adoption of the United Nations Millennium Declaration.

## 2.5 Visualization

In addition to the bibliometric approach, techniques have also been incorporated for mapping purposes, using the VOS viewer software version 1.6.16.

Mapping was made for (1) Co-occurrence and keywords (2) Cumulative Word Growth

## 3. Analysis

### 3.1 Documents Annual Scientific Productions and Average Citations Per Year

In the initial year, only two articles on the theme (of Millennium Development Goals) were published. Since last nine years, this number has significantly grown. It is clearly evidenced from the table no. 2 that as the publication counts are increasing, simultaneously there is an increase in the citation amount too. The reason is that the academia, has a keen interest in millennium development goals in the past fourteen years. Even though the MDGs has been transformed into the sustainable development goals in 2015, then also the articles have been published, but is less in numbers. It helps in identifying that since last fourteen years each year the academia is publishing a good and significant number of publications. This is the natural result that occurs in most of the theme and faced by most of the journals too due to the huge growth of the researchers and the scientists worldwide (Triantafyllou et al., 2020)<sup>6</sup>.

<sup>6</sup> Triantafyllou, G., Toanoglou, M., Eirini, S., & Kaurav, R. P. S. (2020). How Web of Science is shaping the researches on publications on wine tourism: Bibliometric Analysis Approach. *Journal of Tourism Quarterly*, 2(3-4), pp. 67-78.

**Table No. 2. Documents Average Production and Citations Per Year**

Year	Number of Articles	Citations Per Year
2002	2	19
2003	22	18
2004	28	17
2005	63	16
2006	63	15
2007	75	14
2008	73	13
2009	87	12
2010	77	11
2011	119	10
2012	89	9
2013	92	8
2014	91	7
2015	101	6
2016	65	5
2017	65	4
2018	43	3
2019	33	2
2020	25	1
2021	3	0

### 3.2 Most important Sources/ Journals

**Table No. 3. Top 15 Most Important Sources/ Journals**

S. No.	Sources	Articles
1.	Journal of International Development	20
2.	World Development	20
3.	PLOS One	19
4.	Mediterranean Journal of Social Sciences	12
5.	Third World Quarterly	12
6.	Development Policy Review	10

7.	Globalizations	10
8.	International Journal of Social Economics	10
9.	Social Indicators Research	10
10.	International Journal of Educational Development	9
11.	The Millennium Development Goals and Human Rights: Past Present and Future	9
12.	Journal of Human Development	8
13.	Journal of Human Development and Capabilities	8
14.	Journal of Urban Health	8
15.	Social Science and Medicine	8

Table no. 3 highlighted the top fifteen journals in which the articles on “millennium development goals” and “poverty and hunger” were published over the past twenty-one years. The top two relevant sources are the Journal of International Development and World Development which published 20 articles respectively. Next to them is the PLOS ONE which has published 19 articles. However, 9 articles were found in the sources named International Journal of Educational Development and The Millennium Development Goals and Human Rights: Past Present and Future.

**Table No. 4. Impact Factor of Top 15 Sources**

S. No.	Element	h-index	g-index	m-index
1.	Development Policy Review	5	10	0.263158
2.	Energy for Sustainable Development	5	5	0.294118
3.	Food and Nutrition Bulletin	5	7	0.3125
4.	Globalizations	6	10	0.4
5.	International Journal of Educational Development	9	9	0.529412
6.	Journal of Human Development	6	8	0.315789
7.	Journal of Human Development and Capabilities	5	7	0.5
8.	Journal of International Development	9	15	0.473684
9.	Journal of Urban Health	6	8	0.4
10.	PLOS One	15	19	1.25
11.	Renewable and Sustainable Energy Reviews	6	7	0.428571
12.	Social Indicators Research	5	10	0.333333
13.	Social Science and Medicine	6	8	0.375
14.	Third World Quarterly	10	12	0.588235
15.	World Development	18	19	0.947368

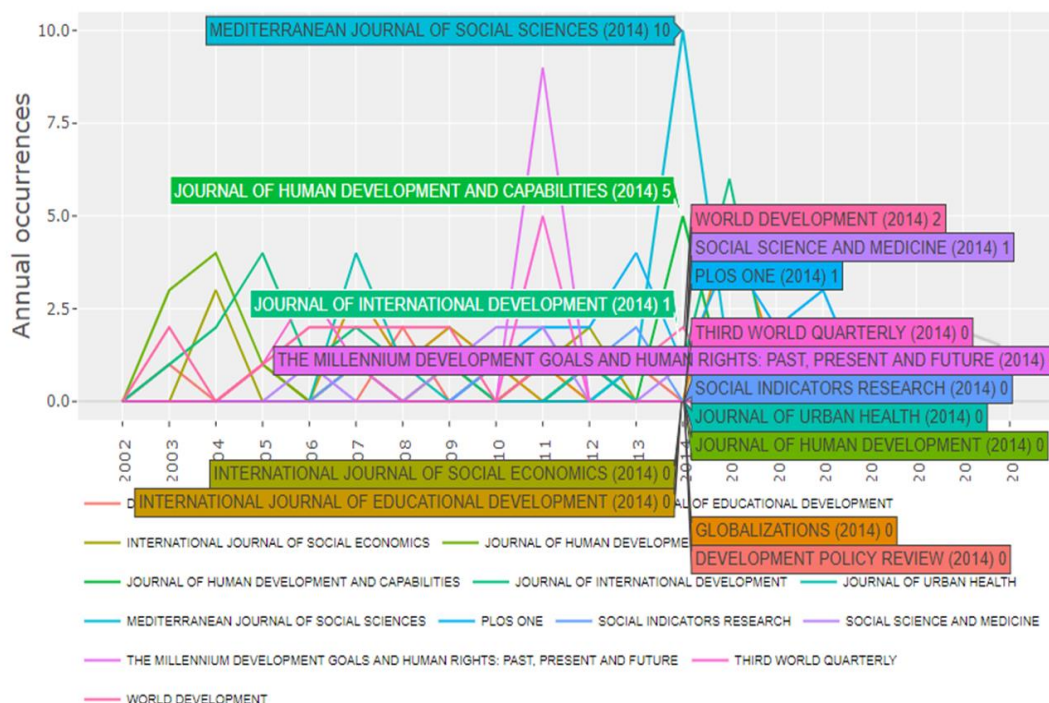
World development, PLOS One and Third World Quarterly has the h-index of 18, 15 and 10 respectively. While the g-index of these journals were 19 and 10. It is highlighted in the table no. 4.

### 3.3 Growth of Sources/ Journals

It is noticeable that Mediterranean Journal of Social Sciences (MJSS) has contributed plenty of publications on the theme “millennium development goals” and “poverty and hunger”. It means that ample quantity of papers is published by the MJSS. The growth of top fifteen sources was recorded and found that MJSS has significantly published the papers and continuously publishing on the same theme, though the numbers declined in the later years. In the starting years journal of Human Development has a good number of publications on the theme but gradually other prominent journals such as Third World Quarterly Journal, Social Science and Medicine, Globalisation, Development Policy Review gained momentum. During 2010 to 2012 The Millennium Development Goals and Human Rights: Past Present and Future has maximum publications. Later on, the publications declined on the themes on MDGs.

When we look into the cumulative occurrence of the source growth journals like The Millennium Development Goals and Human Rights: Past Present and Future, Globalisation, Journal of Human Development, Social Science and Medicine, Journal of International Development, Mediterranean Journal of social Science etc reveals a significant cumulative growth in the past twenty-one years. The figure 1 shows the annual occurrence of the source growth.

**Figure No. 1. Annual Occurrence of Source Growth**



#### 4. Authors Contributions

Author's contribution plays a very pivotal in the success of any research work and gradually the progress of any research journal too. The below table no. 5 highlights the top 15 most relevant authors to the domain. Thus, it is clearly evidenced that UN Millennium Project (UNMP) is the top author among the list of 15 authors with the maximum number of 10 article, followed by Fukuda-Parr S with 9 articles. Also, Asongu SA, Pogge T and Sachs J D have 5 articles each. 4 articles on the theme are of Mavrotas G and Weber H while Addison T has only 3 articles.

**Table No. 5. Top 15 Most Relevant Authors to the Domain**

S. No.	Authors	Articles
1.	UN Millennium Project Unmp	10
2.	Fukuda-Parr S	9
3.	Na Na	8
4.	Sumner A	7
5.	Declerck F	6
6.	Hulme D	6
7.	Langford M	6
8.	Asongu Sa	5
9.	Pogge T	5
10.	Sachs JD	5
11.	Unterhalter E	5

12.	Vos R	5
13.	Mavrotas G	4
14.	Weber H	4
15.	Addison T	3

#### 4.2 Most Contributing Authors and Different Index

After exploring about the sources of the data, it is very important to evaluate about the most noteworthy contributions made by the different authors on the theme “millennium development goals” and “poverty and hunger”. To analyse this, certain criterion has been made such as only those authors has been taken who have produce at least three documents. Further the various indices used to find out the top 15 most contributing authors includes the indices of “h”, “g” and “m” respectively and among them only those authors were considered which has the h-index of three and more than three in the respective domain of “millennium development goals” and “poverty and hunger”.

The h-index is defined as an author level index use to determine the impact of a researcher’s publication both in terms of productivity and citations. It is the composite index of the researchers most cited papers as well as the number of citations they receive in any other publications. Though Jorge E. Hirsch is the first who suggested this index in 2005, so it is also termed as Hirsch index or Hirsch number. Similarly, there is another author level metric proposed by Leo Egghe in 2006 known as the g index. It is computed with respect to the distribution of citations received by a particular researcher’s publications. It represents a peculiar largest number in such a manner that the topmost g articles obtained together at least  $g^2$  citations. Henceforth, the g-index of 10 signifies that the top 10 publications of an author have been cited at least 100 times ( $10^2$ ), whereas, the g-index of 20 shows that the top 20 publications of an author have been cited 400 times ( $20^2$ ). If a particular researchers h-index is divided by the number of years he has been publishing his work, we derive the m index.

**Table No. 6. Most Contributing Authors and Different Indices**

S. No.	Authors	Articles	%	h-index	g-index	m-index	TC	NP	PY Start
1.	Fukuda-Parr S	9	0.7	7	9	0.389	293	9	2004
2.	Sumner A	7	0.6	5	7	0.385	53	7	2009
3.	Declerck F	6	0.5	4	5	0.25	92	5	2006
4.	Hulme D	6	0.5	4	6	0.211	144	6	2003
5.	Langford M	6	0.5	3	4	0.273	22	5	2011
6.	Asongu SA	5	0.4	4	5	0.8	114	5	2017
7.	Pogge T	5	0.4	3	4	0.167	108	4	2004
8.	Unterhalter E	5	0.4	5	5	0.385	88	5	2009
9.	Mavrotas G	4	0.3	3	4	0.176	74	4	2005
10.	Weber H	4	0.3	3	4	0.2	90	4	2007
11.	Addison T	3	0.2	3	3	0.176	57	3	2005
12.	Clements B	3	0.2	3	3	0.167	32	3	2004
13.	Elkins M	3	0.2	3	3	0.375	13	3	2014
14.	Feeny S	3	0.2	3	3	0.214	21	3	2008
15.	Gupta S	3	0.2	3	3	0.167	30	3	2004

The table no. 6 remarkably exhibits that the Author Fukuda-Parr S has got the maximum number of the papers and also had the highest h-index because this author has got the large number of citations. Next it shows that Sumner A and Unterhalter E has the h-index of 5, even though Sumner A had 7 articles and Unterhalter has only 5 articles respectively.

#### 4.3 Collaborations and Country of Authors

Collaboration between countries has been presented in two ways. Firstly, as the ratio of one country publication which is also termed as single country publication (SCP) or the intra-country collaboration and secondly as a percent of many



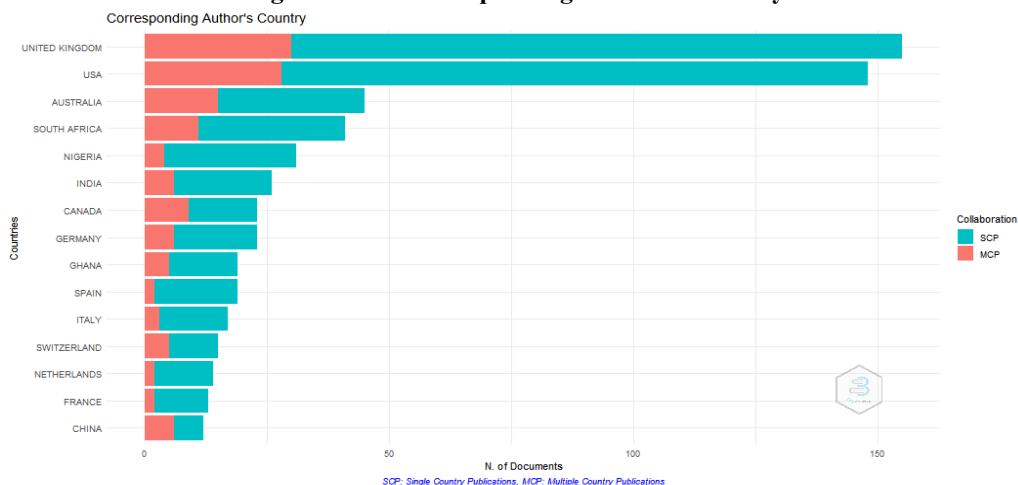
countries publication known as multiple country publications (MCP) or the inter country collaboration (Sweileh, et al., 2016)<sup>7</sup>.

**Table No. 7. Collaborations and Country of Authors**

S. No.	Country	Articles	SCP	MCP	MCP Ratio
1.	United Kingdom	155	125	30	0.194
2.	USA	148	120	28	0.189
3.	Australia	45	30	15	0.333
4.	South Africa	41	30	11	0.268
5.	Nigeria	31	27	4	0.129
6.	India	26	20	6	0.231
7.	Canada	23	14	9	0.391
8.	Germany	23	17	6	0.261
9.	Ghana	19	14	5	0.263
10.	Spain	19	17	2	0.105
11.	Italy	17	14	3	0.176
12.	Switzerland	15	10	5	0.333
13.	Netherlands	14	12	2	0.143
14.	France	13	11	2	0.154
15.	China	12	6	6	0.5

Above table no. 7 draws attention on many significant information. United Kingdom with 1st rank has got the highest papers as a single country paper. Figure and table combined indicates that United Kingdom has got highest ratio of MCP/SCP.

**Figure No. 2. Corresponding Author's Country**



#### 4.4 Countries and Total Production

It is witnessed from the below table number 8 and figure number 3 that USA, followed by UK then Australia had the top three countries in terms of frequencies. Also, it is interesting to note that Canada, Australia and Switzerland have got a

<sup>7</sup> Sweileh, W. M., Sawalha, A. F., Al-Jabi, S. W., Sa'ed, H. Z., Shraim, N. Y., & Abu-Taha, A. S. (2016). A bibliometric analysis of literature on malaria vector resistance: (1996–2015). *Globalization and Health*, 12(1), pp. 1-13.

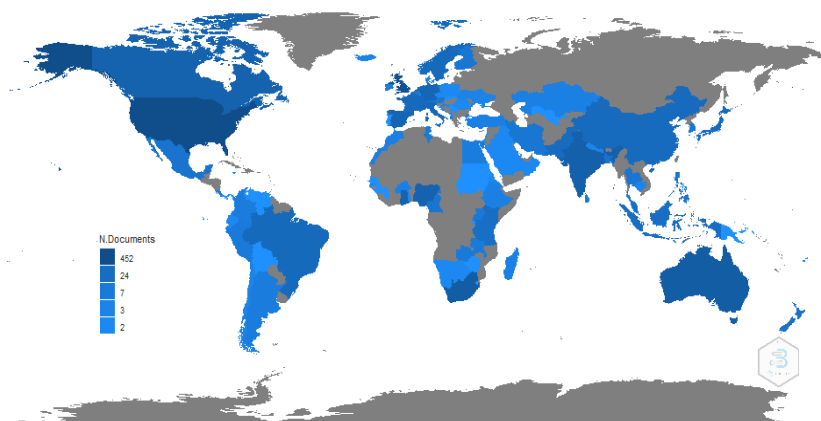
higher ratio of MCP. Moreover, Netherlands, Norway and Brazil were also in the list. Thus, we conclude that these countries work more collaboratively or maybe they have some good funding opportunities in order to attract the papers and other research activity in collaborations.

**Table No. 8. Regions and its Frequency of Total Production**

Rank	Region	Frequency
1	USA	452
2	UK	322
3	Australia	111
4	South Africa	109
5	India	80
6	Canada	62
7	Nigeria	60
8	Ghana	56
9	Spain	52
10	Germany	45
11	Italy	40
12	France	33
13	Netherlands	33
14	Norway	32
15	Brazil	31

**Figure No. 3. Country Scientific Production**

Country Scientific Production



#### 4.5 Most Cited Countries

With respect to the most cited countries the results of the bibliometric analysis show that the United Kingdom has most cited country. Next to it is the USA, followed by Switzerland and Australia. But when we look into the countries scientific productions its USA followed by the UK.

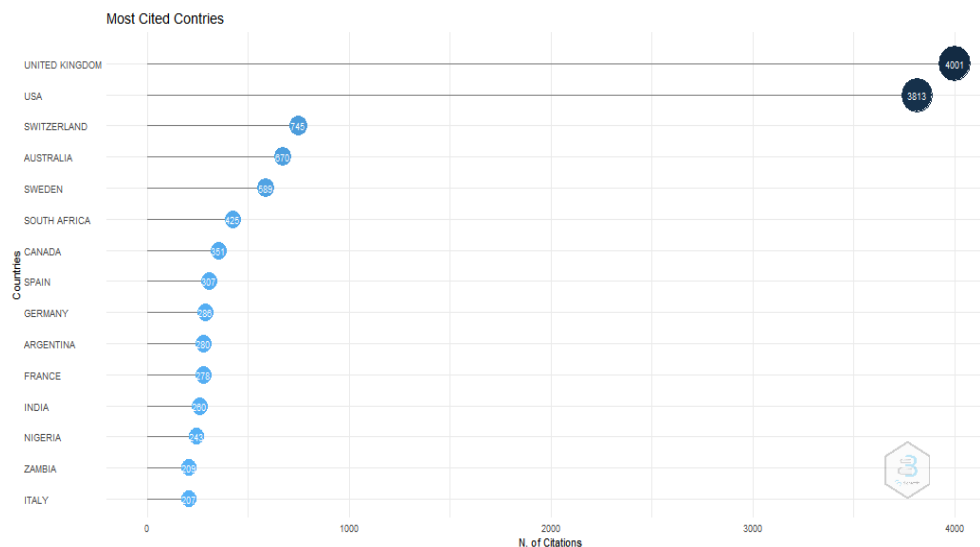
**Table No. 9. Countries and Their Total Citations**

Rank	Country	Total Citations	Average Article Citations
1	United Kingdom	4001	25.81
2	USA	3813	25.76
3	Switzerland	745	49.67

4	Australia	670	14.89
5	Sweden	589	49.08
6	South Africa	425	10.37
7	Canada	351	15.26
8	Spain	307	16.16
9	Germany	286	12.43
10	Argentina	280	140.00
11	France	278	21.38
12	India	260	10.00
13	Nigeria	243	7.84
14	Zambia	209	52.25
15	Italy	207	12.18

**Figure No. 4. Most Cited Countries**

The figure number 4 shows the counties and their number of citations over the span of 21 years.



## 5. Mapping

### 5.1 Keyword analysis

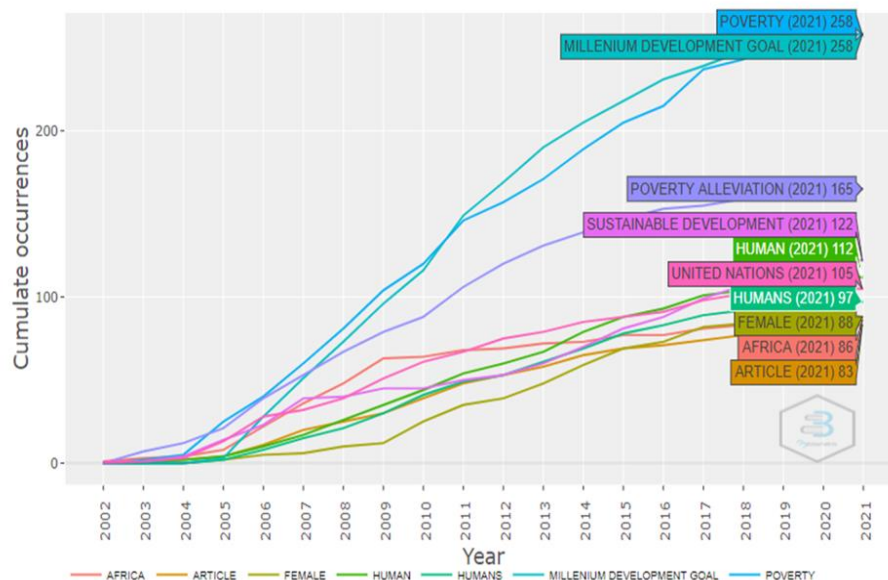
The keywords are used to acquire the information about the prior works carried out in our area of research. Additionally, it is very conducive instrument for probing the documentations regarding the study in any database. Triantafyllou et al. (2020)<sup>8</sup> opined that the information pooled from keywords leads the future researchers to decipher about - the over researched topics, under researched keywords, and also the trending keywords. In this horizon, millennium development goals are the highly used term in the databases. In this sequence the other most prominent terms included poverty, hunger, child mortality, reproductive women, gender equality, climate change, energy access and others. Therefore, with the help of VOS Viewer, the keywords cluster analysis was done and five clusters have been found.

<sup>8</sup> Triantafyllou, G., Toanoglou, M., Eirini, S., & Kaurav, R. P. S. (2020). How Web of Science is shaping the researches on publications on wine tourism: Bibliometric Analysis Approach. *Journal of Tourism Quarterly*, 2(3-4), pp. 67-78.



Table no. 10 shows that Cluster 4 is more inclined towards environmental sustainability and cluster 5 indulges with health scenario. The below figure no. 6 shows the cumulative word growth in these twenty-one years. Here, we found that in the earlier years i.e., from 2002 to 2006 words such as poverty, millennium development goals, sustainable development has not as such popular. But after 2011 they had gained momentum and the pace of the cumulative word growth has been increased rapidly from 2012 onwards. In 2021 the words poverty and millennium development goals has been widely used followed by poverty alleviation and sustainable development.

**Figure No. 6. Cumulative Word growth (2000-2021)**



## Conclusions

The central viewpoint of the present study is to conduct a bibliometric analysis of the scientific literature published on millennium development goal 1 A i.e., poverty and hunger. The main conclusions drawn from the bibliometric analysis are:

The majority of the journals were authored in journals of scientific repute such as Journal of International Development, World Development, POLS One etc. Since the last eleven years about 90% of the papers related to the current study have been published in the SCOPUS databases. World Development, The Lancet and Energy Policy were the local cited journals. In terms of affiliations Columbia University, World Bank and the University of Manchester were the most prominent. The collaboration analysis reveals that most of the authors are affiliated to the universities from United Kingdom, United states of America and Australia.

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2. <http://www.guidelines.kaowarsom.be/bibliometrics>
3. [https://www.elsevier.com/\\_data/assets/pdf\\_file/0017/114533/Scopus\\_GlobalResearch\\_Factsheet2019\\_FINAL\\_WEB.pdf](https://www.elsevier.com/_data/assets/pdf_file/0017/114533/Scopus_GlobalResearch_Factsheet2019_FINAL_WEB.pdf)
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