

Research Paper

Waqf and Environment: A Bibliometric Analysis

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ABSTRACT

Despite the plethora of studies on environmental waqf in the literature, research objectives and results are still inconsistent. Therefore, this study maps the literature on environmental waqf to explore future research directions. Based on data from Scopus from 2001 to March 2022, bibliometric analysis using VOSviewer was used to create this mapping research system. This study visualized a map of co-authorship and co-occurrence of keywords. We present several aspects of the literature on environmental waqf, such as the number of publications per year, document type, journal, author, affiliation, country, subject, and topic. The environmental waqf research review is made up of 120 articles written by 160 authors who are affiliated with 116 institutions across 29 countries. These articles were published in 79 sources. The bibliometric results through the analysis of the keywords identified four research streams: waqf in sustainable development, regional planning, waqf governance in the agricultural sector, and cash waqf for welfare improvement. This study proposes future directions for environmental waqf research, focusing on the role of waqf in achieving the goal of sustainable development for environmental stability.

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Introduction

The world is currently changing due to the effects of climate change, which is approaching a critical point. Climate change has a significant adverse impact on water conditions, habitats, and health (Hernandez-Delgado, 2015; PPID KLHK, 2018). Due to habitat destruction brought on by climate change, the earth's capacity to sustain life will eventually become uninhabitable (Lantz et al., 2022). In preventing this from happening, environmental conservation programs were finally initiated, either in the form of mass movements, funding, or commitment agreements between countries (Aslam & Rana, 2022).

Responding to the goal of environmental preservation, Islamic social financial instruments, such as waqf, are appropriate for use. Waqf is a sustainable entity whose integrity must be upheld and which should be utilized as much as possible for the good of all (Rusydhiana et al., 2021). Additionally, given the potential, particularly in Indonesia, waqf has enormous potential for cash waqf, which is 180 trillion IDR and will increase (Kasri & Chaerunnisa, 2022; Nour Aldeen et al., 2022). In light of this, it is crucial to use waqf for the environment.

Waqf is getting more attention to continue to be researched since it contributes to various aspects, one of which is environmental sector. Waqf has been utilized in the environment in several different ways. For example, the use of waqf for forest or known as waqf forest. When put into practice, productive waqf forests benefit not only the forests but also the habitats of living things, supply water, and food, and mitigate climate change (Ali & Kassim, 2020). Waqf is also used to finance renewable energy sources, which have been shown to have far greater potential than conventional debt financing (Ari & Koc, 2021). These two instances demonstrate the high level of efficiency of waqf-based environmental project financing.

Waqf as a tool of Islamic economics offers the possibility of resolving environmental problems. Several recent studies also emphasize the contribution of waqf in the effort to achieve the Sustainable Development Goals (SDGs) (Budalamah et al., 2019; Robani & Salih, 2018). In addition, waqf land must be developed for agribusiness purposes (Ali Azizan et al., 2022). Ali and Kassim (2021) identified a strategy for developing waqf forests in Indonesia, where an aggressive strategy needs to be carried out by optimizing existing legal institutions and educating human resources to inform the public about the concept of waqf and its application in waqf forests. Ari and Koc (2021) have also developed a waqf-based financing scenario for solar power plants.

Previous studies on environmental waqf have covered a wide range of issues. To provide a structured overview of the existing literature, we conducted a bibliometric analysis, classified the research streams into useful groups, and provided insights for future research on environmental endowments. We collected 120 papers on environmental endowments from the Scopus database that were published between 2001 and 2022, and we used VOSviewer to analyze the co-occurrence of keywords, researcher output, and other relationships.

This study explores the development of research related to waqf in the environmental field through bibliometric analysis. Our review contributes in some novel ways. We begin by outlining some of the key elements of the environmental waqf literature, including document type, author, affiliation, country, and research topic.

Second, we examine four research streams in the environmental waqf literature. Finally, with a meta-literature review, we identified several research directions to further be investigated. Using bibliometric analysis, this study seeks to answer the following questions: (1) What are the influential aspects of the environmental waqf literature? (2) What are the main research streams in the environmental waqf literature? (3) What potential future research questions might be explored?

Method

In this study, we employed a meta-literature review, which includes a bibliometric (quantitative) and content analysis (qualitative) approach, and has been widely used in recent literature (Alshater et al., 2021; Anam et al., 2021; Khan et al., 2020; Paltrinieri et al., 2019). Price first introduced the bibliometric approach in 1965 to identify article networks based on citations. From the Scopus database, bibliometric information about environmental waqf literature is extracted for this study. Because Scopus has a great reputation and is one of the biggest international scientific databases, it was chosen (Parlina et al., 2020). Articles were searched using Scopus on March 3, 2022. The inclusion includes research written in English published from 2001 to 2022 (March) with the keywords “waqf and environment”. 120 were collected for further analysis. To analyze the bibliometric data, we used the VOSviewer software. VOSviewer was developed to create visualizations and view bibliometric maps.

Results

Number of Publication by Year

The number of scientific publications on “waqf and environment” indexed in the Scopus database from 2001 to 2022 was 120 documents (last data accessed on March 3, 2022). Table 1 specifies the distribution pattern of research results.

Table 1. Number of Publications by Year

Year	Publications	Percentage (%)
2022	2	1.67
2021	22	18.33
2020	12	10
2019	15	12.50
2018	23	19.17
2017	12	10
2016	8	6.67
2015	9	7.50
2014	6	5
2013	1	0.83
2012	2	1.67
2011	1	0.83
2010	1	0.83

2009	2	1.67
2008	1	0.83
2007	0	0
2006	2	1.67
2005	0	0
2004	0	0
2003	0	0
2002	0	0
2001	1	0.83
Total	120	100

Environmental waqf research has tended to be small from 2001 to 2013, according to Scopus. The highest number of publications occurred in 2018 with a total of 23 documents (see Figure 1). In the meantime, from 2014 to 2022, the number of articles on "waqf and environment" published and indexed in the Scopus database continued to rise. This circumstance amply demonstrates that waqf for the environment has developed into an intriguing study as of 2018, etc.

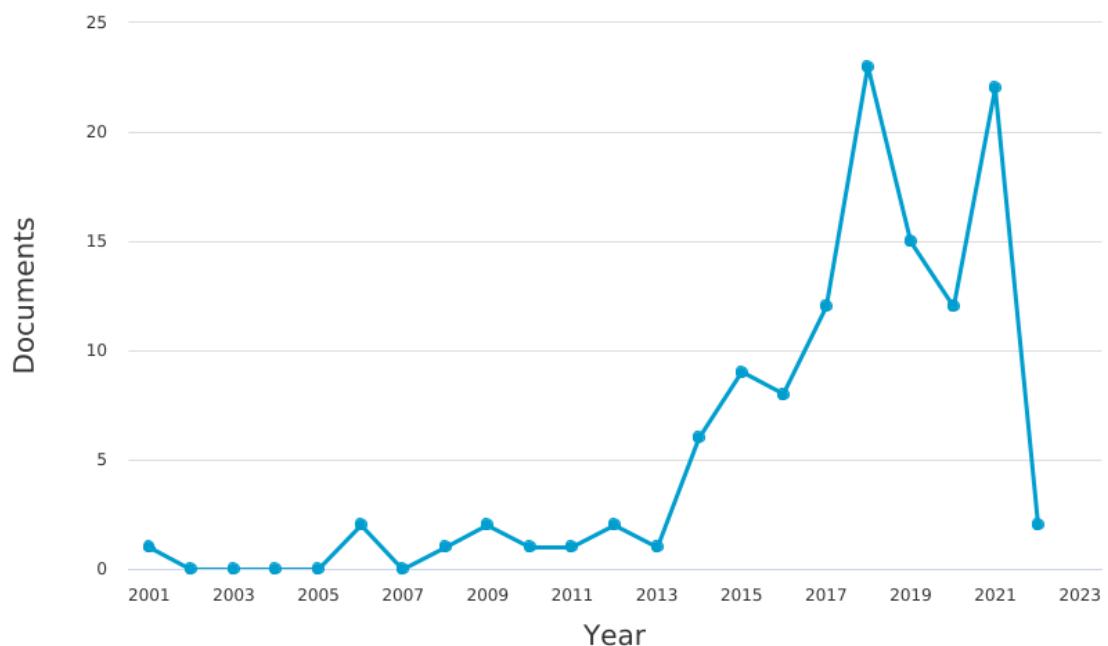


Figure 1. Growth Rate of Publication by Year

Document Type and Source Title

The types of documents related to "waqf and environment" were also examined in this study. According to Figure 2, of the 120 published documents, journal articles (71.7%) make up the majority of the study results on the subject of environmental waqf, accounting for 86 of them. Conference paper documents (15.8%), book chapters (9.2%), reviews (2.5%), and books (0.8%) round out the top five document types.

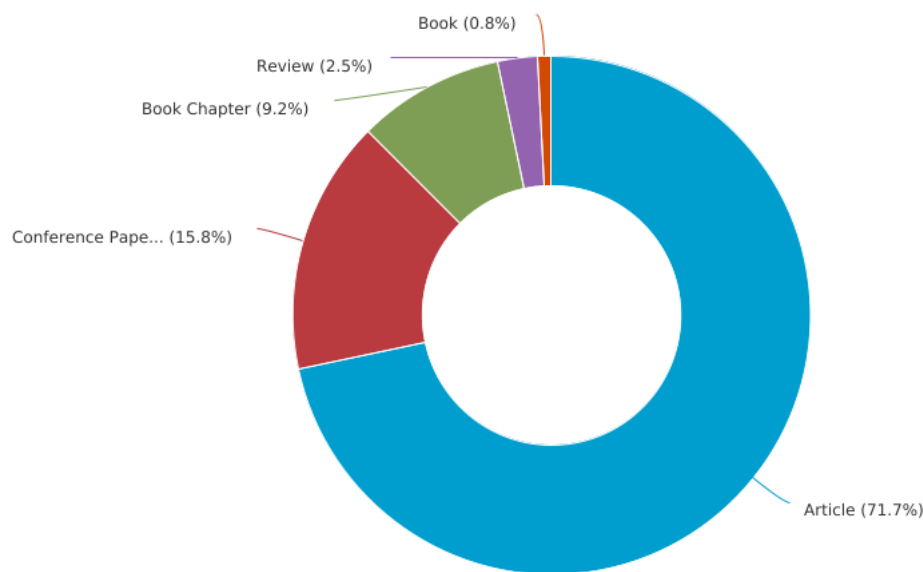


Figure 2. Document Type

The sources that publish research on the subject of environmental waqf are also examined in this study in addition to the types of documents, and they are listed in Table 2. The first source that publishes the most articles on environmental waqf is the Journal of King Abdulaziz University Islamic Economics. This journal has an H-index of 10, placing it at Q4 in Scopus. The Journal of Islamic Accounting and Business Research, which is affiliated with Emerald, came in second and has an H-index of 22. It is ranked Q2 in Scopus. Global Journal Al Thaqafah, which has an H-index of 8 and is ranked Q2 on Scopus, is in third place. Four of the top ten sources are associated with Emerald out of the top ten.

Table 2. Articles from Top Sources

Source	Number of Publications	H-index	SJR 2021	Publisher
Journal of King Abdulaziz University Islamic Economics	6	10	Q4 0.16	King Abdulaziz University
Journal of Islamic Accounting and Business Research	6	22	Q2 0.36	Emerald
Global Journal Al Thaqafah	6	8	Q2 0.18	Kolej Universiti Islam Sultan Azlan Shah
ISRA International Journal of Islamic Finance	5	8	Q2 0.37	Emerald
International Journal of Islamic and Middle Eastern Finance and Management	5	33	Q2 0.5	Emerald
Humanomics	3	23	Q1,0.31	Emerald
Journal of Islamic Economics Banking and Finance	3	4	Q4 0.16	Islamic Bank Training and Research Academy

Source	Number of Publications	H-index	SJR 2021	Publisher
Planning Malaysia	3	9	Q2 0.26	Malaysian Institute of Planners
Advanced Science Letters	3	28	- 0	American Scientific Publishers
IOP Conference Series Materials Science and Engineering	3	48	- 0.25	IOP Publishing

Productivity and Collaboration of Researchers

Based on information compiled from the Scopus database, 15 prolific authors have published more than two documents. Figure 3 shows that Mahmood, S.M. from Universiti Malaya is the most productive writer in publishing research on environmental waqf with a total of six publications. He is followed by Hanif, N.R. from Universiti Malaya with four publications. Furthermore, Hasan, A. from International Islamic University Malaysia, Kassim, S. from International Islamic University Malaysia, Mohammed, M.O. from International Islamic University Malaysia, and Sipan, I. from Universiti Teknologi Malaysia published three documents each.

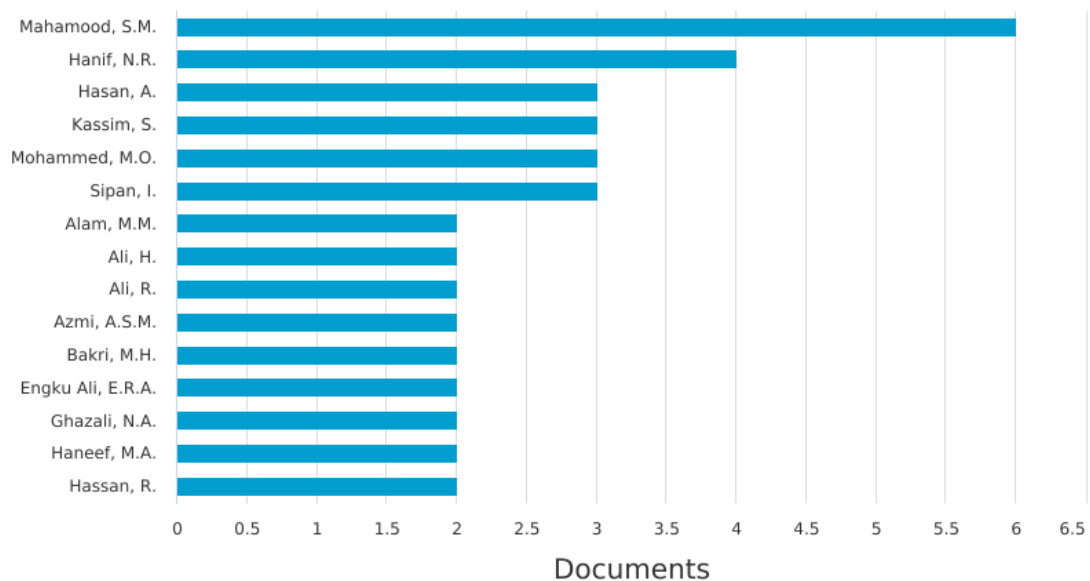


Figure 3. Author Productivity

In addition to looking at the productivity of the authors, this study also analyzes the network map between authors (co-authorship) to find out how often one author collaborates with another author. Based on Figure 4, Engku Ali, E.R.A. is the author with the highest number of collaborations, followed by Alam, M.M, Ali, R., Mahmood, S.M., and Mohammed, M.O.

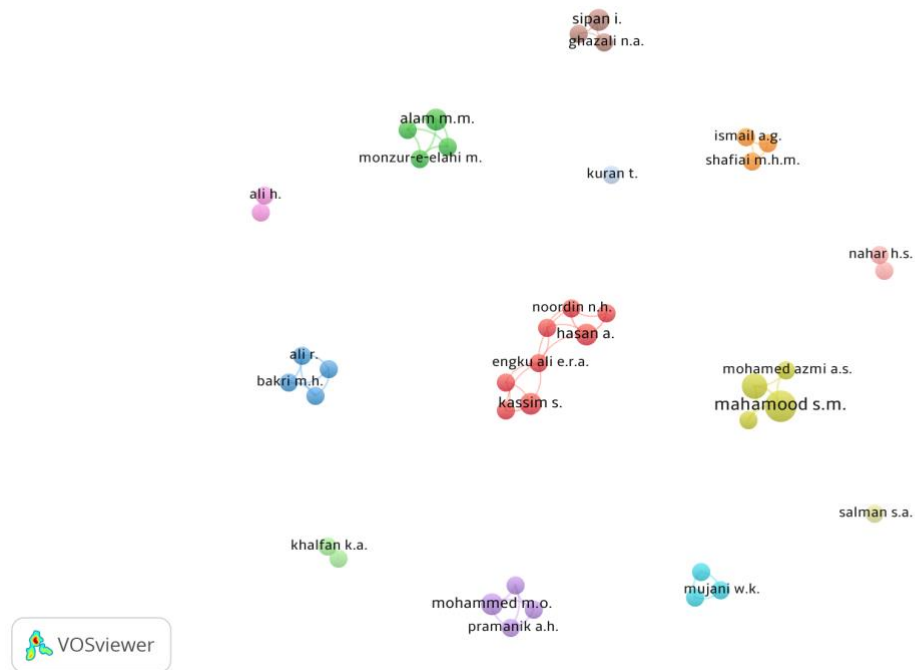


Figure 4. Author Collaboration Map

Number of Publication by Affiliation

Based on Table 3, the institution that has the highest productivity in conducting scientific publications on environmental waqf based on affiliation is the International Islamic University Malaysia with 19 publications. Furthermore, followed by the University of Technology MARA with 18 publications. Then, Universiti Kebangsaan Malaysia and Universiti Malaya with 9 publications each.

Table 3. Number of Publications by Affiliation

Affiliation	Number of Publications
International Islamic University Malaysia	19
Universiti Teknologi MARA	18
Universiti Kebangsaan Malaysia	9
Universiti Malaya	9
International Islamic University Malaysia, Institute of Islamic Banking and Finance`	8
Universiti Sains Malaysia	7
Universiti Utara Malaysia	4
Universiti Teknologi Malaysia	4
Universiti Sains Islam Malaysia	4
College of Business, Universiti Utara Malaysia	4
The University of Jordan	3
University Teknikal Malaysia Melaka	3
Universiti Sultan Zainal Abidin	3
Hamad Bin Khalifa University	3

Affiliation	Number of Publications
International Centre for Education in Islamic Finance	3

Number of Publication by Country

The Scopus database lists publications on environmental waqf from 29 different countries (see [Table 4](#)). Malaysia has published 68 documents, followed by the United States with seven, Indonesia with eight, and the United Kingdom with eight. Nigeria, Qatar, Brunei Darussalam, and Turkey have all released four documents in the meantime. In the meantime, three documents on environmental waqf have each been published by Egypt, Jordan, and the United Arab Emirates.

Table 4. Number of Publications by Country

Country	Number of Publications
Malaysia	68
Indonesia	8
United Kingdom	8
United States	7
Brunei Darussalam	4
Nigeria	4
Qatar	4
Turkey	4
Egypt	3
Jordan	3
United Arab Emirates	3

Number of Publication by Subject

It was found that the subject of Social Science is the most popular subject with a total of 66 documents published. Then, there are 42 published documents on the subjects of economics, econometrics, and finance; 33 documents on the arts and humanities; 30 documents on business, management, and accounting; 19 documents on engineering; 13 documents on environmental science; and as many as 10 documents on computer science. The distribution of the number of publications by subject is presented in [Table 5](#) and [Figure 5](#).

Table 5. Number of Publications by Subject

Subject	Number of Publications
Social Sciences	66
Economics, Econometrics, and Finance	42
Arts and Humanities	33
Business, Management, and Accounting	30
Engineering	19
Environmental Science	13
Computer Science	10
Energy	6
Earth and Planetary Sciences	5

Materials Science	4
Agricultural and Biological Sciences	3
Decision Sciences	3
Mathematics	3
Chemistry	1
Multidisciplinary	1

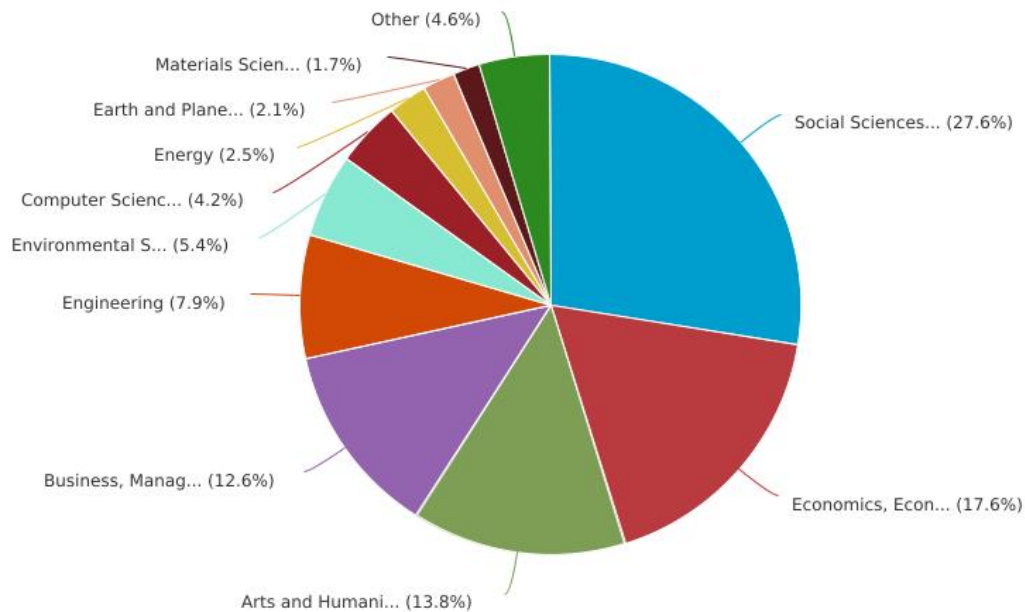


Figure 5. Number of Publications by Subject

Citation Analysis

Table 6 demonstrates the most cited documents in this area. We only select articles that have been cited more than 10 times. Most of them come from Q1 and Q2 journals. For brevity, we only cover the top five articles. First, [Kuran \(2001\)](#) identifies that waqf is used as the main instrument to deliver public goods in a decentralized manner. Second, [Haneef et al. \(2015\)](#) developed an integrated waqf-based Islamic microfinance to reduce poverty in Bangladesh, this paper reports that poverty alleviation can be overcome through the development of the concept. Third, [Kuran \(2018\)](#) evaluates the analytical literature related to the causal relationship between Islam (waqf) and economic performance. Fourth, [Abdul Rahman and Dean \(2013\)](#) highlight the challenges faced by Islamic microfinance institutions and map out suggestions for overcoming these problems, from their paper one of the challenges of Islamic microfinance institutions is low market penetration and requires technical assistance through waqf funds and zakat. Fifth, [Mahamood and Rahman \(2015\)](#) highlight the importance of waqf in the financing of higher education, this paper reports that the role of waqf is very significant in providing financial assistance to their communities as well as strengthening their academic quality.

Table 6. List of Top-Cited Papers

Authors	Title	Year	Source	SJR rank	Cited by
Kuran, T	The Provision of Public Goods under Islamic Law: Origins, Impact, and Limitations of the Waqf System	2001	Law and Society Review	Q1	165
Haneef, M.A., Pramanik, A.H., Mohammed, M.O., Bin Amin, M.F., and Muhammad, A.D.	Integration of waqf-Islamic microfinance model for poverty reduction: The case of Bangladesh	2015	International Journal of Islamic and Middle Eastern Finance and Management	Q2	27
Kuran, T.	Islam and Economic Performance: Historical and Contemporary Links	2018	Journal of Economic Literature	Q1	26
Abdul Rahman, R. and Dean, F.	Challenges and solutions in Islamic microfinance	2013	Humanomics	Q1	25
Mahamood, S.M. and Ab Rahman, A.	Financing universities through waqf, pious endowment: is it possible?	2015	Humanomics	Q1	21
Abdullah, M.	Waqf, Sustainable Development Goals (SDGs) and maqasid al-shariah	2018	International Journal of Social Economics	Q2	20
Allah Pitchay, A., Mydin Meera, A. K., and Saleem, M.	Factors influencing the behavioral intentions of Muslim employees to contribute to cash-waqf through salary deductions	2015	Journal of King Abdulaziz University Islamic Economics	Q4	17
Brown, R. A.	Islamic Endowments and the Land Economy in Singapore	2008	South East Asia Research	Q2	17
Shaikh, S.A., Ismail, A.G. and Mohd Shafiai, M.H.	Application of waqf for social and development finance	2017	ISRA International Journal of Islamic Finance	Q2	12
Heinrichs, T., Salameh, E., and Khouri, H.	The Waqf as Suwwan crater, Eastern Desert of Jordan: aspects of the deep structure of an oblique impact from reflection seismic and gravity data	2014	International Journal of Earth Sciences	Q1	10

Co-occurrence Analysis of the Keywords

Keywords from the 120 data collected were analyzed using VOSviewer software to understand the research area and trends of research on environmental waqf. Figure 6 is the result of cartographic analysis from VOSviewer. The analytical method used is co-occurrence and selects all keywords as the unit of analysis. The minimum number of occurrences of a keyword is set to 2, and a total of 42 keywords appear.

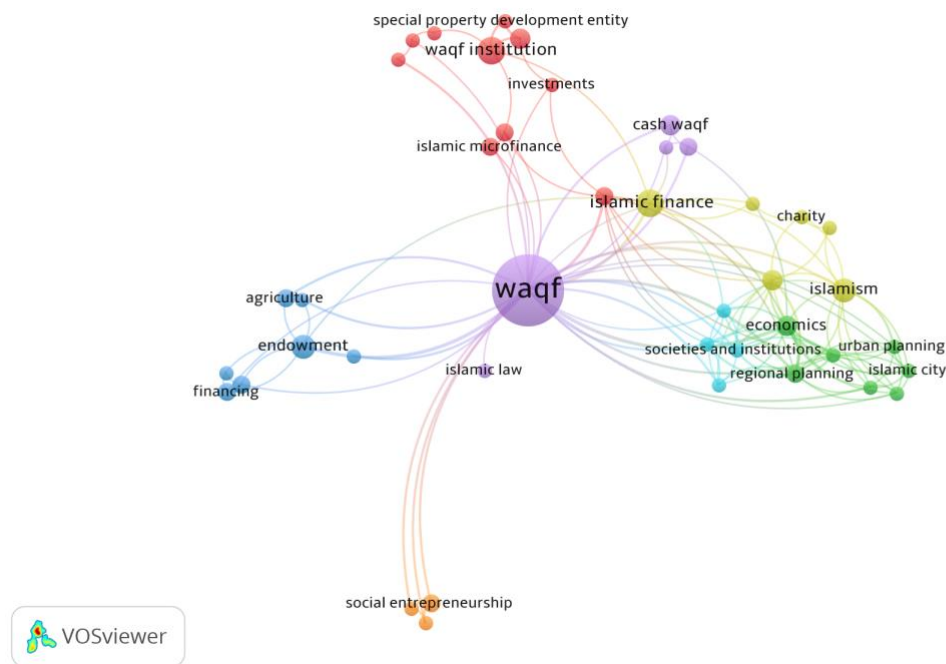


Figure 6. Co-occurrence Network of All Keywords

The results of the analysis show that there are seven clusters represented by the colors 'red,' 'green,' 'blue,' 'yellow,' 'purple,' 'light blue' and 'orange.' In addition, in Table 7, we also report the words key, number of occurrences and link strength. Link strength is the level of link strength between items (Alshater et al., 2022). We found the four keywords that appeared the most, namely Waqf, Regional Planning, Economics, and Sustainable Development.

Table 7. Keywords, Occurrences, and Total Link Strength

No	Keyword	Occurrences	Total Link Strength
Cluster 1			
1	Accountability	3	11
2	Environment	2	3
3	Human Resource Management	2	2
4	Investment	2	3
5	Islamic Microfinance	3	2
6	Property Development	4	5
7	Special Property Development Entity (SPDE)	2	4

No	Keyword	Occurrences	Total Link Strength
8	Sustainability	3	4
9	Waqf Institution	7	7
10	Zakat	2	3
Cluster 2			
1	Architecture	2	8
2	Building	2	9
3	Economics	4	24
4	Islamic City	2	8
5	Profitability	2	15
6	Regional Planning	3	22
7	Urban Planning	2	9
Cluster 3			
1	Agribusiness	2	5
2	Agriculture	3	5
3	Endowment	5	11
4	Financing	3	5
5	Foundation	2	3
6	Governance	2	3
7	Higher Education	3	5
Cluster 4			
1	Charity	2	4
2	Islamic Finance	7	9
3	Islamism	5	15
4	Poverty	2	3
5	Social Finance	2	3
6	Sustainable Development	4	18
Cluster 5			
1	Cash Waqf	4	4
2	Education	3	5
3	Islamic Law	2	1
4	Islamic Microfinance Institutions	2	4
5	Waqf	46	63
Cluster 6			
1	Efficiency	2	8
2	Financial System	2	9
3	Innovation	2	14
4	Societies and Institutions	2	14
Cluster 7			
1	Islamic Entrepreneurship	2	6
2	Social Entrepreneurship	3	6
3	Social Welfare	2	6

Studies on environmental waqf published in reputable journals are used to create

clusters and identify key topics using the co-occurrence method used for cartographic analysis. Based on the results of the analysis, it was found that the first cluster (red) discusses waqf institutions. In this cluster the terms frequently used are 'accountability,' 'environment,' 'human resource management,' 'investments,' 'Islamic microfinance,' 'property development,' 'special property development entity,' 'sustainability,' 'waqf institution' and 'zakat.' The second cluster (green) identifies regional planning. Some of the terms used in this cluster include 'architecture,' 'building,' 'economics,' 'Islamic city,' 'profitability,' 'regional planning' and 'urban planning'. The third cluster (blue) focuses on governance issues related to waqf in the agricultural sector, where terms are used such as 'agribusiness,' 'agriculture,' 'endowment,' 'financing,' 'foundation,' 'governance' and 'higher education.' Then, the fourth cluster (yellow) focuses on sustainable development, especially in poverty alleviation. In cluster four, the terms often used are 'charity,' 'Islamic finance,' 'Islamism,' 'poverty,' 'social finance' and 'sustainable development.' Next, the fifth cluster (purple) discusses the main topic, namely, waqf, where the key items used include 'cash waqf,' 'education,' 'Islamic law,' 'Islamic microfinance institutions' and 'waqf'. The sixth cluster (light blue) identifies problems related to the financial system in waqf management. Some of the items from this group are 'efficiency,' 'financial system,' 'innovation' and 'science and institutions.' Finally, the seventh cluster (orange) presents topics about the role of waqf for social welfare with the keywords appearing 'Islamic entrepreneurship,' 'social entrepreneurship,' and 'social welfare.' These seven clusters collectively represent the key facets of ongoing research on environmental endowments at the global scale.

Discussion

Since the topic of waqf for the environment is relatively new, this study's focus is still only on the conceptual framework, and there are no empirical studies. Based on bibliometric results, there are 120 publications by 160 authors affiliated with 116 institutions located in 29 countries, published in 79 sources. Due to their shared meaning, we simplified seven clusters into four streams of research. The first stream of research focuses on the role of waqf in sustainable development. In the literature we have compiled, several authors focused on the role of waqf in sustainable development. For instance, [Abdullah \(2018\)](#) builds a framework for waqf for some of the fundamental goals of the Sustainable Development Goals (SDGs). Meanwhile, [Ari and Koc \(2021\)](#) investigate a waqf-based sustainable financing model for investment in renewable energy. Several studies in this research stream are generally oriented towards the use of waqf for achieving SDGs.

The second stream of research is related to regional planning issues. In this cluster, several studies discuss regional planning, especially architecture and historical Islamic buildings. Some of the research in this stream discusses the importance of conservation and sustainability of the architectural heritage of waqf buildings ([Disli, 2015](#); [Khalfan & Ogura, 2012](#); [Yaagoubi & Miky, 2018](#)). In addition, some studies discuss green architecture in the design of mosques on environmentally friendly waqf lands to reduce the problem of climate change ([Parlina et al., 2020](#)).

The third stream of research covers waqf governance in the agricultural sector. It is common, especially in developing countries in various regions, that the agricultural sector

is one of the main elements that can contribute to the economy, as well as support the provision of food for human survival (Shafiai et al., 2015). There are two main scopes of waqf for the agricultural sector, namely, waqf used to activate idle agricultural land and waqf administration for agricultural development. Besides, Ali Azizan et al. (2021) elaborate on the issue of waqf land management for agribusiness activities.

The fourth stream deals with the management of cash waqf to improve community welfare. The management of cash waqf that has been widely implemented has a significant impact on the welfare of the community. For example, cash waqf for micro-business financing (Fuadi et al., 2021; Kachkar et al., 2016), source of funds for universities (Mahamood & Rahman, 2015; Usman & Rahman, 2021), and alternative financing for farmers (Afroz et al., 2019). In addition, cash waqf also plays a role in improving the socio-economic community (Amuda et al., 2016; Atan & Johari, 2017; Haneef et al., 2015; Hassan et al., 2019). Table 8 provides future research directions.

Table 8. Future Research Directions

Research Streams		Future Research Question	Author(s)
The role of waqf in sustainable development	1	What is the role of waqf in encouraging sustainable development, especially for social and environmental purposes?	Abdullah (2018)
	2	How is the waqf-based financing model in the effort to build infrastructure in the energy sector?	Ari & Koc (2021)
	3	How can waqf schemes be used to build good water and sanitation?	Authors' suggestion
Regional planning issues	4	Designing green architecture on waqf land as an effort to reduce climate change problems.	Parlina et al. (2020)
	5	How do preserve and maintain the sustainability of the waqf architectural heritage?	Disli (2015), Khalfan & Ogura (2012)
Waqf governance in the agricultural sector	6	How do activate waqf land for agricultural activities so that it can contribute to the economy?	Shafiai et al. (2015)
	7	What are the impacts that will be obtained from the use of waqf land for agribusiness activities?	Ali Azizan et al. (2021)
	8	What are the important steps in the Shariah regulatory framework for the development of waqf in the agricultural sector?	Authors' suggestion
Cash waqf to improve community welfare	9	What is the cash waqf financing scheme to help micro-enterprises?	Fuadi et al. (2021), Kachkar et al. (2016)
	10	What are the cash waqf-based Islamic financing models that can be used to improve community welfare?	Hassan et al. (2019)

The bibliometric analysis combined with content analysis helps us to identify some future research directions, which will not only help to develop scientific work on environmental waqf but can also provide policy implications for policymakers in making waqf schemes for the environment.

Conclusion

The majority of the articles were published in high-impact journals, and the subjects most frequently covered were social sciences. The majority of authors and affiliates who contribute to environmental waqf research are from Malaysia. The author primarily uses the keywords "waqf," "regional planning," "economics," and "sustainable development." Future research directions should raise serious concerns as they are thought to be crucial to the advancement of the waqf and environmental fields.

Authors' Declaration

The authors made substantial contributions to the conception and design of the study. The authors took responsibility for data analysis, interpretation, and discussion of results. The authors read and approved the final manuscript.

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