JOCAE
Journal of Character and Environment
JOCAE 2(2): 96–115
ISSN 3025-0404

Institute for Advanced Science, Social and Sustainable Future
MORALITY BEFORE KNOWLEDGE

Bibliometric analysis of ecocentrism: Perspective on sustainable development and addressing environmental issues

Chandra Egy Setiawan[1,*]
[1] *School of Environmental Science, Universitas Indonesia, Central Jakarta, DKI Jakarta 10430, Indonesia.*
*Correspondence: chandra.egy@ui.ac.id

Received Date: December 11, 2024 Revised Date: January 29, 2025 Accepted Date: January 29, 2025

ABSTRACT

Background: Ecocentrism, emphasizing the intrinsic value and interconnectedness of nature, has become a significant perspective in environmental and development fields. This article aims to explore research trends on ecocentrism using a science-mapping approach. **Methods**: A bibliometric analysis of 1,317 documents from Scopus (1982–2024) was conducted using VOSviewer and Biblioshiny to visualize research linkages. **Findings**: Research on ecocentrism has grown exponentially since 2010, with a peak in 2022. Key topics in this field include ecocide, ecocriticism, rights of nature, future generations, indigenous peoples, and posthumanism, providing a foundation for future studies. **Conclusion**: Ecocentrism plays a pivotal role in sustainable development, focusing on ecosystem restoration, responsible management, and ecological sustainability while promoting the rights of future generations and strengthening indigenous conservation efforts. **Novelty/Originality of the Study**: This study provides a comprehensive mapping of research on ecocentrism, revealing its growing significance and key topics that are central to advancing future ecological research and sustainable development.

KEYWORDS: ecocentrism; bibliometric analysis; sustainable development; VOSviewer; environmental studies.

1. Introduction

Ecocentrism, as part of environmental ethics, has become a contemporary perspective for sustainable development and addressing environmental issues. Ecocentrism contributes to higher values of nature perception, while nature plays a role in wellbeing and social relationships (Yoshida et al., 2022). The ecocentric perspective emerged after the anthropocentric view was proposed. Ecocentrism recognizes the intrinsic value of all forms of life and ecosystems, including abiotic components, whereas anthropocentrism values other forms of life and ecosystems only to the extent that they contribute to human well-being, preferences, and interests (Washington et al., 2017).

Ecosystems, or the interconnectedness of life, involve a complex dependency relationship among all organisms and their environments. This interconnectedness serves as the foundation for how ecocentrism operates as a fundamental perspective in maintaining ecological balance and defining human-nature relations. Since the late 1960s, our planet has faced numerous environmental challenges threatening nature and human

Cite This Article:
Setiawan, C. E. (2025). Bibliometric analysis of ecocentrism: Perspective on sustainable development and addressing environmental issues. *Journal of Character and Environment, 2*(2), 96-115. https://doi.org/10.61511/jocae.v2i2.2025.1483

life (Hoffman et al., 2005 in Altun, 2020). These environmental problems have driven the adoption of sustainability concepts in development efforts. da Silva et al. (2011) emphasize that sustainability is linked to organizational growth, profitability, leadership, and good governance. From an individual perspective, it closely aligns with the ecocentric view, highlighting how sustainability connects to law enforcement and ecological efficiency.

Ecocentrism, as an environmental ethic evolving from anthropocentrism and zoocentrism or biocentrism, is considered not entirely adequate. Each of these ethical positions fails to be a fully comprehensive environmental ethic due to implicit assumptions common in normative theories. However, each position may contribute positively to values (Carter, 2011). Furthermore, King (2006) states that ecocentrism, "green technology," and "civil environmentalism," as three strategic visions of how society progresses toward a more environmentally responsible culture, fail to adequately address how society is trapped in consumptive practices, and thus, fall short in guiding transformative steps toward building a culture that respects and is accountable to the natural environment.

Studies on human perspectives and approaches toward nature in the context of development and environmental problem-solving must continue. What matters most is not merely determining the most appropriate perspective or approach, but also ensuring their optimal and effective implementation. Numerous bibliometric analyses have been conducted on directions and approaches related to environmental ethics and similar topics. In the past five years, at least five bibliometric studies have examined the New Environmental Paradigm (NEP) (Çelik, 2023), highlighting the most frequently used keywords related to NEP: sustainability, sustainable development, climate change, ecology, and environmental values. Another study on Pro-environmental Behavior (Lu et al., 2023) identifies seven main research directions, including environmental cognition, emotion, and motivational processes, which can further be classified into three horizontal and three vertical levels. Eco-friendly studies (Sarie et al., 2023) provide insights into environmentally conscious behavior in popular culture and offer in-depth information to academics, instructors, and professionals across disciplines. Ecocriticism (Yadav & Sinha, 2024) reveals its interdisciplinary nature, progressive expansion into various cultural expressions, and its crucial role in understanding the impact of diverse human activities on the environment. Finally, studies on Environmental Ethics (Căpuşneanu et al., 2024) indicate a clear direction toward expanding the field, particularly among researchers in economics and ecology. Despite these contributions, there remains a significant gap in bibliometric studies specifically addressing ecocentrism as a contemporary perspective on human-environment interactions.

To fill this knowledge gap, a bibliometric analysis is essential to identify the current status of research on ecocentrism. This study aims to contribute to the existing literature, recognizing the urgent need for values embedded in sustainable development practices and environmental problem-solving. Literature related to ecocentrism must be systematically categorized, considering the most influential studies that underpin this field of research. The network analysis in this bibliometric study is intended to provide new insights into themes or branches of ecocentrism studies with potential for further exploration, particularly in supporting sustainable development and addressing environmental challenges.

2. Methods

The Scopus database was used as the source of literature data for this bibliometric analysis. Broadus (1987) and Pritchard (1969) in Donthu et al. (2021) stated that bibliometric methodology involves the application of quantitative techniques (e.g., citation analysis) to bibliometric data (e.g., units of publications and citations). The process of searching for literature data sources in this bibliometric analysis on the Scopus platform involved searching titles, abstracts, and keywords using the terms ecocentrism and ecocentric, with the following details: TITLE-ABS-KEY ("ecocentrism" OR "ecocentric") for all years and all document types. A total of 1,317 publications were found from 1982 to

2024, comprising 13 document types. Articles were the most frequent document type, with 974 documents, accounting for 74% of the total. The second most common type was book chapters, with 169 documents (12.8%). Review articles ranked third, with 79 documents making up 5.5% of the dataset. Table 1 provides a summary of the dataset information.

Donthu et al. (2021) explained that bibliometric analysis techniques are divided into two main categories: (1) performance analysis and (2) science mapping. The standard workflow for science mapping consists of five steps: (1) study design, (2) data collection, (3) data analysis, (4) data visualization, and (5) interpretation (Zupic & Cater, 2015, as cited in Aria & Cuccurullo, 2017). This study utilized the Bibliometrix software package from the R programming language, further developed into the web-based Biblioshiny for data analysis and visualization purposes. Bibliometrix and Biblioshiny were developed by the Italian researcher Massimo Aria (Xie et al., 2020b).

Table 1. Key information of the data collection

Description	Results
Timespan	1982: 2024
Sources (Journals, Books, etc)	855
Documents	1317
Annual Growth Rate %	11.82
Document Average Age	8.12
Average citations per doc	20.13
Document contents	
Keywords Plus (ID)	2115
Author's Keywords (DE)	3409
Authors	
Authors	2518
Authors of single-authored docs	551
Authors collaboration	
Single-authored docs	630
Co-Authors per Doc	2.21
International co-authorships %	16.32
Document types	
Article	974
Book	25
Book article	2
Book chapter	169
Conference paper	48
Editorial	6
Erratum	3
Letter	2
Note	9
Review	72
Review article	1
Review book chapter	1
Short survey	5

(Scopus, 2024 proceed by Biblioshiny)

3. Results and Discussion

3.1 Annual research productivity

The trend of publications over the years carries its own significance. The annual distribution of releases based on the number of documents reflects the general overview and research trends, while publications in recent years highlight the characteristics of trends through the depiction of development stages (Xie et al., 2020a). The first study that mentioned ecocentrism as a philosophy was conducted by Coursey in 1982, which explored the storage and processing technologies of traditional tropical root crops based on a concept more ecocentric than technocentric in philosophical terms. Research on ecocentrism or

ecocentric philosophy began to emerge and consistently appeared annually starting from 1990 to the present. Based on data compiled from Biblioshiny, the average annual growth rate is recorded at 11.82%.

The number of studies related to ecocentrism was relatively stable between 1982 and 2006, with small fluctuations not exceeding 25 documents per year (Figure 1). A significant increase in the number of studies occurred after 2010, indicating growing interest in this topic. Moreover, starting from 2018, research productivity surged to over 50 publications annually. The peak annual publication count occurred in 2022, with more than 150 publications in that year. Research productivity after that period has shown a decline, though interest in ecocentrism remains aligned with global concerns such as climate change, development, and environmental problem-solving. This decline may result from research saturation on this topic or a shift in focus to other more specific related fields. Nonetheless, overall, ecocentrism-related research has played a significant role over the past two decades.

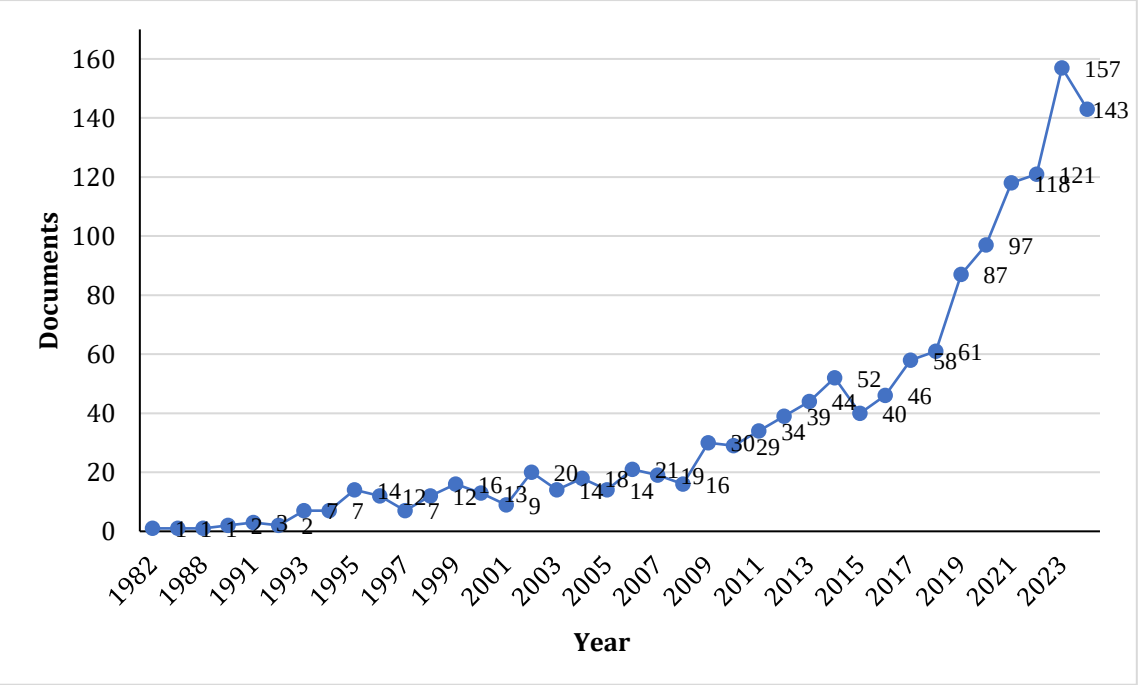

Fig. 1. Research documents related to ecocentrism published from 1982 to 2024 (Scopus, 2024)

3.2 Main researcher

Several parameters that represent a researcher's level of influence include the h-index, g-index, and m-index. Ence et al. (2016) explained that the Hirsch index, or h-index, is defined as the number (h) of a researcher's publications that have been cited at least h times, while the m-index is calculated by dividing the h-index by the duration of the research career in years. Meanwhile, the g-index was introduced as an improvement over the h-index, representing the largest (unique) number such that the top g articles received at least g^2 citations (Egghe, 2006).

Based on data processing through Biblioshiny, the ten most influential authors were extracted and assessed using the h-index, g-index, and so on (Table 2). Washington ranked as the top author with an h-index of 17 and the highest number of publications (30 documents). However, their total citations (1,365 citations) were still fewer than those of Gursoy (2,537 citations), who published four research documents. This indicates that Gursoy's work has a broader impact despite their lower productivity. Additionally, the m-index shows that Washington, who began publishing in 2012, and Washington, who started in 2018, have significant influence with values exceeding one. The relationship between the

number of publications and total citations is also relatively inconsistent, indicating that the impact of publications can vary even if the number of publications is similar. Kaltenborn BP has identical h-index and g-index values (7), demonstrating that their citations are more evenly distributed across publications rather than concentrated in a few specific works.

Table 2. Top 10 most influential authors

Author	h-index	g-index	m-index	Total citation	Number of publication	Publication year start
Kopnina, H	17	35	1.308	1365	35	2012
Washington, H	9	14	1.286	388	14	2018
Kaltenborn, B. P	7	7	0.269	573	7	1999
Taylor, B	6	8	0.667	328	8	2016
Piccolo, J. J	5	7	0.625	315	7	2017
Bjerke, T	4	4	0.154	461	4	1999
Eckersley, R	4	5	0.114	186	5	1990
Gray, J	4	9	0.118	287	9	1991
Gursoy, D	4	4	0.174	2537	4	2002
Kotzé, L. J	4	4	0.364	246	4	2014

(Scopus, 2024 proceed by Biblioshiny)

From the perspective of productivity in a time series (Figure 2), Washington is the author with the longest productivity span, starting in 2012 and remaining active in writing to this day. Similarly, Washington began publishing in 2016 and has continued actively since. Gray started writing on ecocentrism in the 2000s but experienced a long hiatus before resuming in 2018. In general, the dominance of research on ecocentrism began in 2011, reaching its peak in 2018 and continuing strongly to the present.

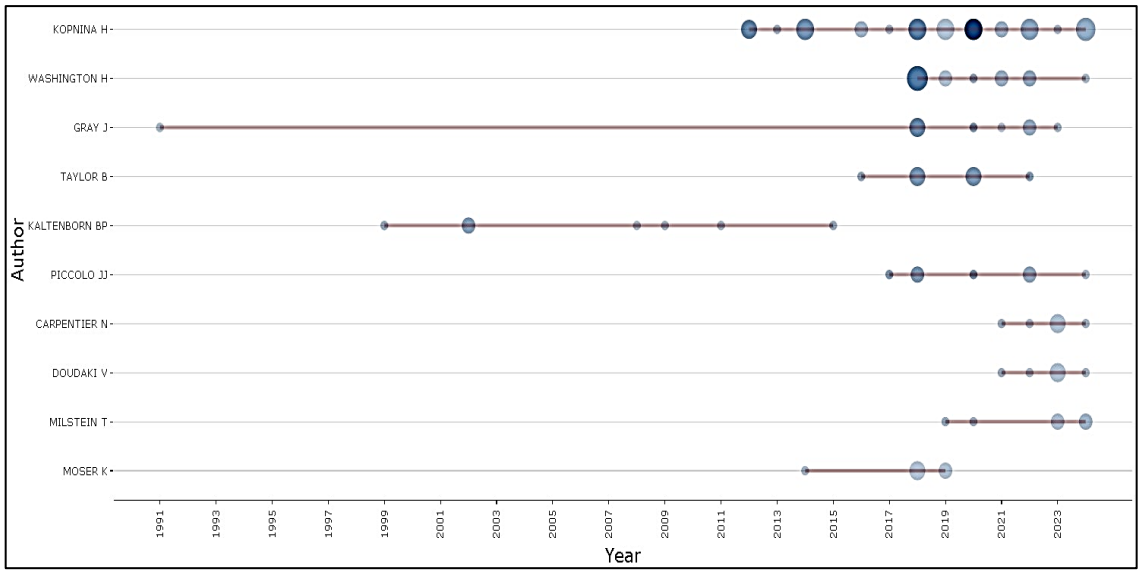

Fig. 2. Author productivity over the years
(Scopus, 2024 proceed by Biblioshiny)

3.3 Most productive countries

Based on data processing through Biblioshiny, the ten most productive countries (Table 3) in producing ecocentrism-related research were identified. The United States is the most productive country, contributing 111 articles, 9.9% of which involve multi-country collaboration (MCP). The United Kingdom ranks second with 80 articles, also emphasizing international collaboration, as 25% of its publications are MCPs. Meanwhile, Canada and Turkey prioritize domestic publications, with relatively low MCP percentages of 8.3% and 11.1%, respectively. Sweden and South Africa, despite their relatively low contribution of articles (1.9% and 1.7% of the total, respectively), show high levels of collaboration, with

MCPs of 56% and 30.4%. This indicates the significant role of international collaboration in their research activities.

Table 3. Top 10 most productive countries (based on first author affiliation)

Country	Articles	Articles %	Single Country Publications (SCP)	Multiple Country Publication (MCP)	MCP %
USA	111	8.4	100	11	9.9
United Kingdom	80	6.1	60	20	25
Australia	73	5.5	59	14	19.2
Spain	53	4	43	10	18.9
Netherlands	41	3.1	30	11	26.8
Canada	36	2.7	33	3	8.3
Turkey	27	2.1	24	3	11.1
Sweden	25	1.9	11	14	56
Norway	23	1.7	20	3	13
South Africa	23	1.7	16	7	30.4

(Scopus, 2024 proceed by Biblioshiny)

3.4 Most influential journals

Based on data processing through Biblioshiny, the ten most influential journals (Table 4) in ecocentrism-related research were identified. Environmental Education Research and the Journal of Environmental Psychology have the highest h-index values (9), although the difference is not substantial compared to the other eight journals in the top 10 list, with a gap of only one to two points in terms of h-index. From the perspective of the g-index, Sustainability (Switzerland) holds the highest value (17), followed by Environmental Ethics (16). Interestingly, although the total citations of the Journal of Environmental Psychology are high, reaching 2,100 citations, its total publications number only 11. This results in a g-index of 11, despite the journal being one of the oldest in the list.

The highest m-index (0.875) is attributed to Education Sciences, indicating it as one of the more influential journals with a high ratio of citation growth per year since its first release in 2017, even though its total citations are relatively low (153). Meanwhile, the most productive journal in publishing articles on ecocentrism is Sustainability (Switzerland), with a total of 21 publications since 2013.

Table 4. Top 10 most influential journals

Source	h-index	g-index	m-index	Total Citation	Number of Publication	Publication Year Start
Environmental Education Research	9	13	0.6	514	13	2010
Journal of Environmental Psychology	9	11	0.29	2100	11	1994
Environment And Behavior	8	8	0.296	1615	8	1998
Environmental Ethics	8	16	0.286	286	16	1997
Environmental Politics	8	10	0.25	246	10	1993
Environmental Values	8	15	0.276	231	15	1996
Sustainability (Switzerland)	8	17	0.667	316	21	2013
Biological Conservation	7	10	0.5	414	10	2011
Education Sciences	7	9	0.875	153	9	2017
Organization And Environment	7	8	0.28	215	8	2000

(Scopus, 2024 proceed by Biblioshiny)

3.5 Most frequent occurrence keywords

Based on data processing through Biblioshiny, the ten most frequently used keywords

(Table 5) in ecocentrism-related research were identified. The keyword ecocentrism itself unsurprisingly emerged as the most dominant (279 occurrences). Interestingly, as a human perspective on the environment, ecocentrism research is closely linked to anthropocentrism, with the latter appearing as a keyword (171 occurrences) more frequently than biocentrism (33 occurrences). This suggests that many studies focus on comparing anthropocentrism, as the initially dominant perspective, with the transition toward ecocentrism. This aligns with Washington's (2020) observation that ecological economics is largely dominated by anthropocentrism, which must be abandoned in favor of new perspectives such as ecocentrism, ecological ethics, and ecological justice.

Table 5. Top 10 most frequently occurring keywords

Words	Occurrences
Ecocentrism	279
Anthropocentrism	171
Sustainability	80
Environmental Ethics	76
Ecocentric	49
Sustainable Development	47
Nature	44
Environment	43
Rights Of Nature	41
Biocentrism	33

(Scopus, 2024 proceed by Biblioshiny)

Furthermore, from the keyword analysis in ecocentrism-related studies, terms like sustainability (80 occurrences), sustainable development (47 occurrences), and rights of nature (41 occurrences) reflect a strong indication of how ecocentrism forms a foundation for practices in development, natural resource management, and addressing environmental issues. These practices prioritize ecosystem interests in their approach.

3.6 Science mapping

3.6.1 Citation analysis

Based on the data processing results through Biblioshiny, the top ten most-cited documents in ecocentrism-related research are extracted (Table 6). At the top is the publication by Gursoy et al. (2002) with a total of 915 citations, discussing a support model from host communities toward tourism development, focusing on the factors influencing their reactions using the LISREL-8 structural equation modelling package with maximum likelihood estimation and a two-step process. The study found that host community support is influenced by levels of concern, ecocentric values, resource base utilization, and the perceived costs and benefits of tourism development.

In second place is the publication by Thompson & Barton (1994) with 782 citations, addressing the relationship between two motives underlying environmental attitudes (ecocentrism and anthropocentrism) using a traditional attitude scale. The study found that the differences between these motives can explain individual behaviours and environmental attitudes. Third is the publication by Schultz & Zelezny (1999) with 772 citations, conducting multinational research on the relationship between values and attitudes using regression analysis. The results showed consistent patterns across the countries studied: scores on the New Environmental Paradigm (NEP) scale and the ecocentrism scale were positively predicted by universalism values and negatively predicted by power and tradition values. Meanwhile, anthropocentrism was closely related to negative virtue values and positive power, tradition, and security values. In fourth place is the frequently cited publication by Gursoy & Rutherford (2004) with 738 citations, further discussing host attitudes toward tourism with an advanced model structure. Additionally, Jurowski et al.

(1997) with 616 citations, Gursoy & Kendall (2006) with 475 citations, and Gursoy et al. (2010) with 409 citations discuss similar topics.

Other highly cited publications include Nordlund & Garvill (2002) with 667 citations, discussing pro-environmental behaviour; Egri & Herman (2000) with 561 citations, focusing on leadership in the environmental sector; and Binder et al. (2013) with 553 citations, exploring social-ecological systems.

Table 6. Top 10 most cited documents

Paper	Title	Total Citations (TC)	TC/ Year
Gursoy et al., 2002, Ann Tour Res	Resident attitudes: A Structural Modeling Approach	915	39.78
Thompson & Barton, 1994, J Environ Psychol	Ecocentric and Anthropocentric Attitudes Toward the Environment	782	25.23
Schultz & Zelezny, 1999, J Environ Psychol	Values as Predictors of Environmental Attitudes: Evidence for Consistency Across 14 Countries	772	29.69
Gursoy & Rutherford, 2004, Ann Tour Res	Host Attitudes Toward Tourism: An Improved Structural Model	738	35.14
Nordlund & Garvill, 2002, Environ Behav	Value Structures behind Proenvironmental Behavior	667	29.00
Jurowski et al., 1997, J Travel Res	A Theoretical Analysis of Host Community Resident Reactions to Tourism	616	22.00
Egri & Herman, 2000, Acad Manage J	Leadership in the North American Environmental Sector: Values, Leadership Styles, and Contexts of Environmental Leaders and Their Organizations	561	22.44
Binder et al., 2013, Ecol Soc	Comparison of Frameworks for Analysing Social-ecological Systems	553	46.08
Gursoy & Kendall, 2006, Ann Tour Res	Hosting Mega Events: Modelling Locals' Support	475	25.00
Gursoy et al., 2010, J Travel Res	Locals' Attitudes toward Mass and Alternative Tourism: The Case of Sunshine Coast, Australia	409	27.27

(Scopus, 2024 proceed by Biblioshiny)

3.6.2 Co-citation analysis

Co-citation analysis using Biblioshiny indicates that Our Common Future (United Nations World Commission on Environment and Development, 1987) is the most highly cited reference (57 citations) and serves as a key reference for global policy on environmental issues. Following this, A Sand County Almanac (46 citations) and Environmentalism and Political Theory: Toward an Ecocentric (44 citations) are in second and third place, respectively. The details of the references and the number of citations are shown in Table 7.

Table 7. Top 10 most cited references

Cited References	Citations
Our Common Future, (1987)	57
Leopold, A., A Sand County Almanac, (1949)	46
Eckersley, R., Environmentalism and Political Theory: Toward an Ecocentric Approach, (1992)	44
Regan, T., The Case for Animal Rights, (1983)	40
Plumwood, V., Feminism and The Mastery of Nature, (1993)	28
Carson, R., Silent Spring, (1962)	26
Devall, B., Sessions, G., Deep Ecology: Living as If Nature Mattered, (1985)	26
Berry, T., The Great Work: Our Way into The Future, (1999)	23
Leopold, A., A Sand County Almanac and Sketches Here And There, (1949)	23
Curry, P., Ecological Ethics: An Introduction, (2011)	22

(Scopus, 2024 proceed by Biblioshiny)

Co-citation analysis was also performed by clustering references with similar topics and interconnections. The clustering process for ecocentrism-related research was assisted by the VOSviewer software, resulting in four main clusters of references for ecocentrism research, as shown in Table 8 and Figure 3.

Table 8. Reference clusters based on co-citation analysis

Name of claster	No	References
Cluster 1 (5 items)	1	Berry, T., The great work: our way into the future, (1999)
	2	Hardin, G., The tragedy of the commons, Science, 162, pp. 1243-1248, (1968)
	3	Kortenkamp & Moore, Ecocentrism and anthropocentrism: moral reasoning about ecological commons dilemmas, Journal of Environmental Psychology, 21, pp. 261-272, (2001)
	4	Leopold, A., A sand county almanac and sketches here and there, (1949)
	5	Thompson & Barton, Ecocentric and anthropocentric attitudes toward the environment, Journal of Environmental Psychology, 14, 2, pp. 149-157, (1994)
Cluster 2 (4 items)	1	Carson, R., Silent spring, (1962)
	2	Leopold, A., A sand county almanac, (1949)
	3	Regan, T., The case for animal rights, (1983)
	4	Singer, P., Animal liberation: a new ethics for our treatment of animals, (1975)
Cluster 3 (3 items)	1	Curry, P., Ecological ethics: an introduction, (2011)
	2	Taylor, P., Respect for nature: a theory of environmental ethics, (1986)
	3	Wilson E.O., Biophilia, (1984)
Cluster 4 (3 items)	1	Devall B., Sessions G., Deep ecology: living as if nature mattered, (1985)
	2	Eckersley, R., Environmentalism and political theory: toward an ecocentric approach, (1992)
	3	Plumwood, V., Feminism and the mastery of nature, (1993)

(Scopus, 2024 proceed by VOSviewer)

References from Cluster-1 focus more on the reflection of environmental ethics needed in resource management and the challenges posed by ecological threats. For example, The Great Work: Our Way into the Future, a collection of essays published by Berry (1999) in the last two decades of the twentieth century, calls for a grand task of reconstructing our culture and ourselves to face ecological threats to human survival (O'Hara, 2005). Similarly, The Tragedy of the Commons (Hardin, 1968) states that the issues of population and natural resource management cannot be resolved by technical approaches alone but require a shift in human values and morality. Kortenkamp & Moore (2001) and Thompson & Barton (1994) also discuss the dilemmas between ecocentrism and anthropocentrism.

Cluster-2, consisting of Silent Spring (Carson, 2017), A Sand County Almanac (Leopold, 1949), The Case for Animal Rights (Regan, 2023), and Animal Liberation: A New Ethics for Our Treatment of Animals (Singer, 1977), focuses on the special attention given to the relationship between humans, nature, and other living beings. Cluster-3, consisting of Ecological Ethics: An Introduction (Curry, 2012), Respect for Nature: A Theory of Environmental Ethics (Taylor, 1986), and Biophilia (Wilson, 1984), provides perspectives on human-nature relationships through the lens of ethics. Finally, Cluster-4, including Deep Ecology: Living as if Nature Mattered (Luke, 2002), Environmentalism and Political Theory (Eckersley, 1992), and Feminism and the Mastery of Nature (Plumwood, 1993), explores ecocentric thought integrated with philosophy, politics, and social issues.

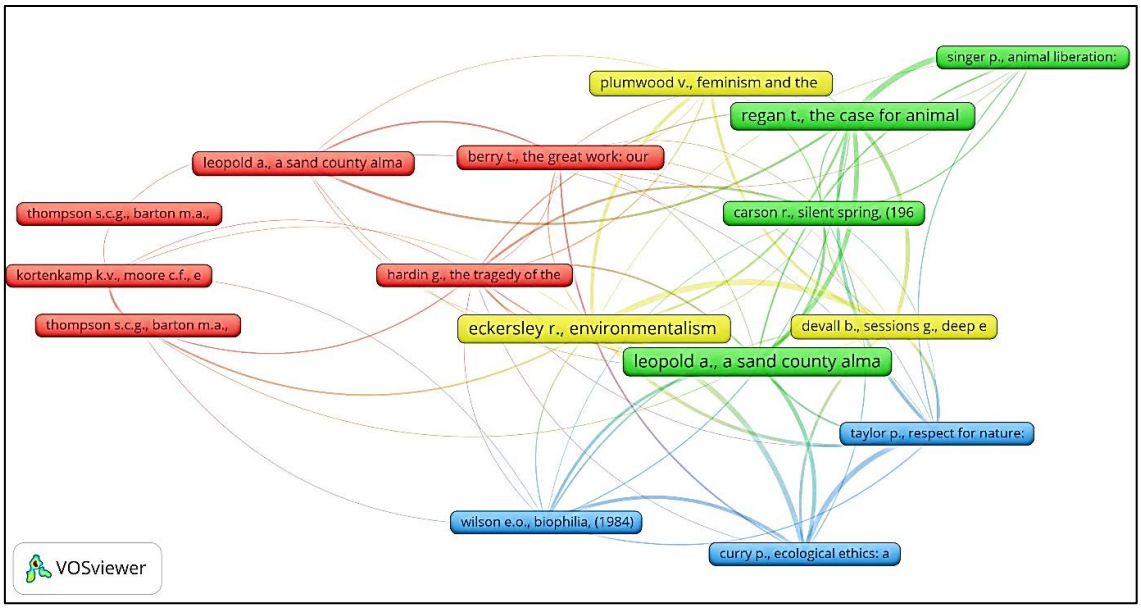

Fig. 3. Clustering of research references related to ecocentrism
(Scopus, 2024 proceed by VOSviewer)

3.6.3 Bibliographic coupling

In this study, two bibliographic coupling analyses were performed using the author and source approaches with the VOSviewer application. The bibliographic coupling with the author approach (Figure 4) was conducted by setting a minimum document threshold of 5 and a minimum citation threshold of 25. This resulted in three main author clusters: Cluster-1, which includes Washington et al. (2017); Cluster-2, which consists of White and Eckersley; and Cluster-3, which includes Bjerke, Borland, Hernandez, Karltenborn, Milstein, Sahin, and Suarez. A closer look at these author connections in the three clusters reveals that they are based on several collaboratively written articles among the members of the cluster or articles written by these authors individually.

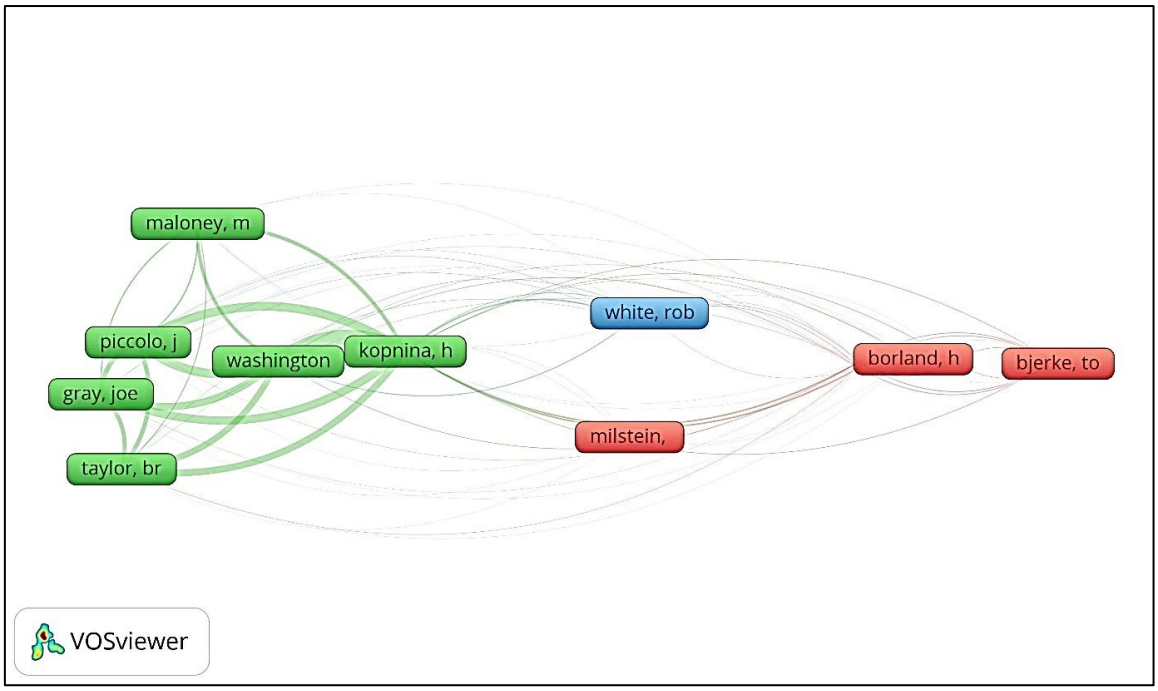

Fig. 4. Bibliographic coupling with author approach
(Scopus, 2024 proceed by VOSviewer)

Meanwhile, the bibliographic coupling with the source approach (Figure 5) was conducted by setting a minimum document threshold of 10 and a minimum citation threshold of 25. This resulted in two main source clusters. Cluster-1 consists of the journals Biological Conservation, Environmental Ethics, Environmental Politics, and Environmental Values. Cluster-2 consists of Environmental Education Research, Journal of Environmental Psychology, and Sustainability (Switzerland). The configuration in Cluster-1 indicates a focus on theoretical and conceptual research, while the configuration in Cluster-2 emphasizes a focus on the implementation aspects.

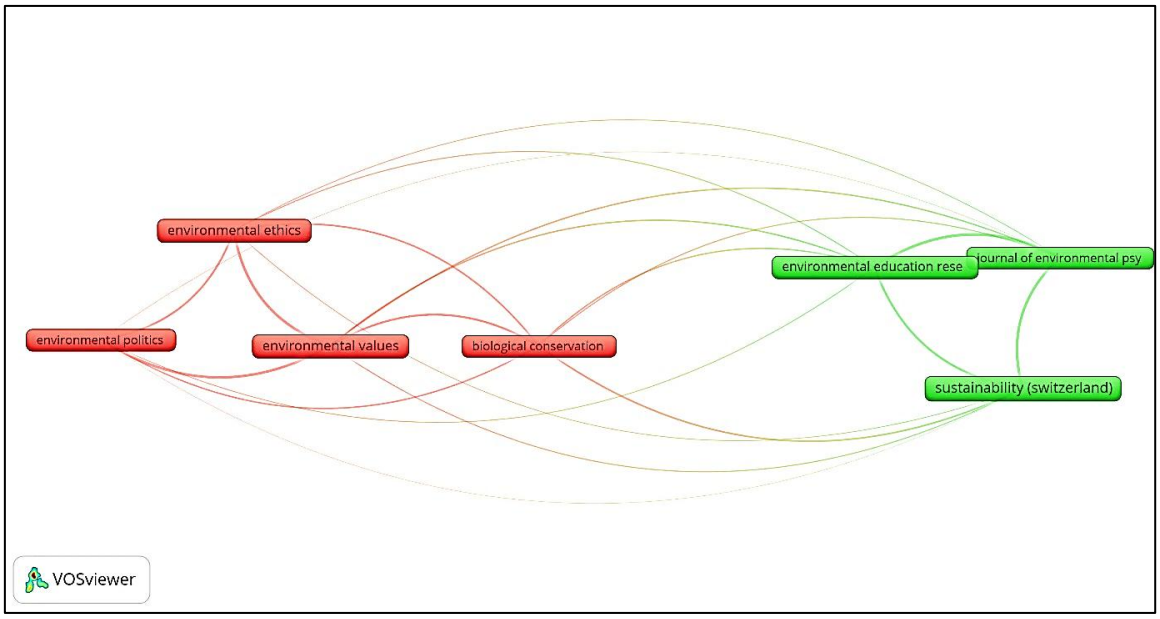

Fig. 5. Bibliographic coupling with source approach
(Scopus, 2024 proceed by VOSviewer)

3.2.4 Co-word analysis

Co-word analysis, also known as co-occurrence analysis, is used to explore and build graphs of emerging and developing topics (De Santis et al., 2020; Lis et al., 2020). In this study, the co-word analysis used keywords from authors with a minimum occurrence of 25 keyword appearances. The visualization process was assisted by the VOSviewer software with dual visualizations: network analysis with clustering and network analysis with year-based trends.

The keyword network analysis with clustering identified four main clusters (Figure 6). Cluster-1 consists of anthropocentric, ecocentric, environmental attitudes, environmental education, ethics, and nature. Cluster-2 consists of Anthropocene, biodiversity, climate change, ecology, environmental ethics, and the right of nature. Cluster-3 consists of anthropocentrism, biocentrism, and ecocentrism. Cluster-4 consists of ecocriticism, environment, and sustainability. Cluster-1 focuses on environmental ethics and education approaches, Cluster-2 highlights environmental changes and the rights of nature. Cluster-3 emphasizes environmental philosophy and ethical perspectives on human-environment relationships. Cluster-4 focuses on sustainability and environmental critique.

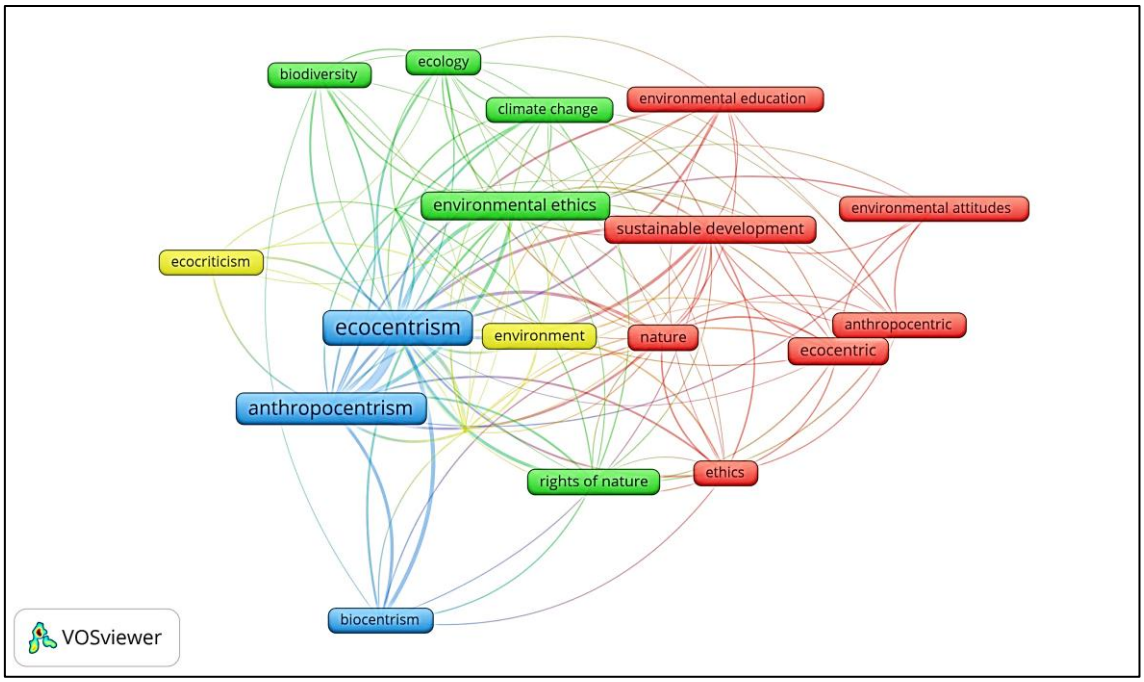

Fig. 6. Author keyword network analysis with cluster approach
(Scopus, 2024 proceed by VOSviewer)

In the framework of broadening research perspectives on ecocentrism from the author keyword approach, which is identified from the frequency of occurrences extracted from Biblioshiny (Figure 7), it can be observed that ecocentrism research is closely related to comparing perspectives that have previously developed, such as anthropocentrism and biocentrism. The most recent and relevant focus of research, which is also extensively studied, relates to current issues and is directed towards implementable research, such as its correlation with sustainability, sustainable development, climate change, and the Anthropocene. Also widely discussed are topics related to ethics and philosophy, reflected in keywords like environmental ethics, environmental education, ethics, environmental attitudes, ecocriticism, and values. Equally important is its connection to living organisms and nature itself, as seen in keywords such as nature, environment, ecology, biodiversity, and the right of nature.

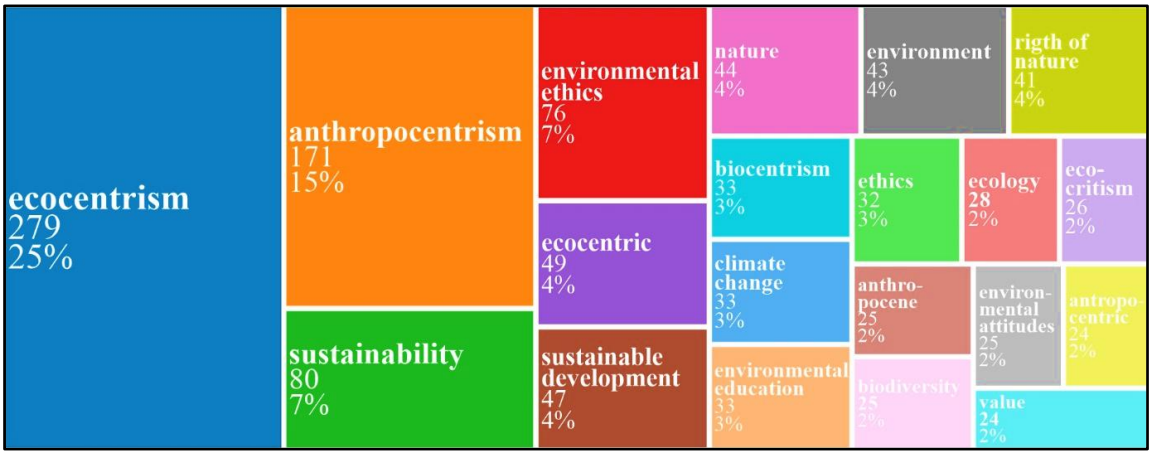

Fig. 7. Word Treemap of keywords with the highest frequency
(Scopus, 2024 proceed by Biblioshiny)

3.6.5 Co-authorship analysis

The co-authorship analysis process using a country-based approach with a threshold value of 20 documents was assisted by the VOSviewer software (Figure 8).

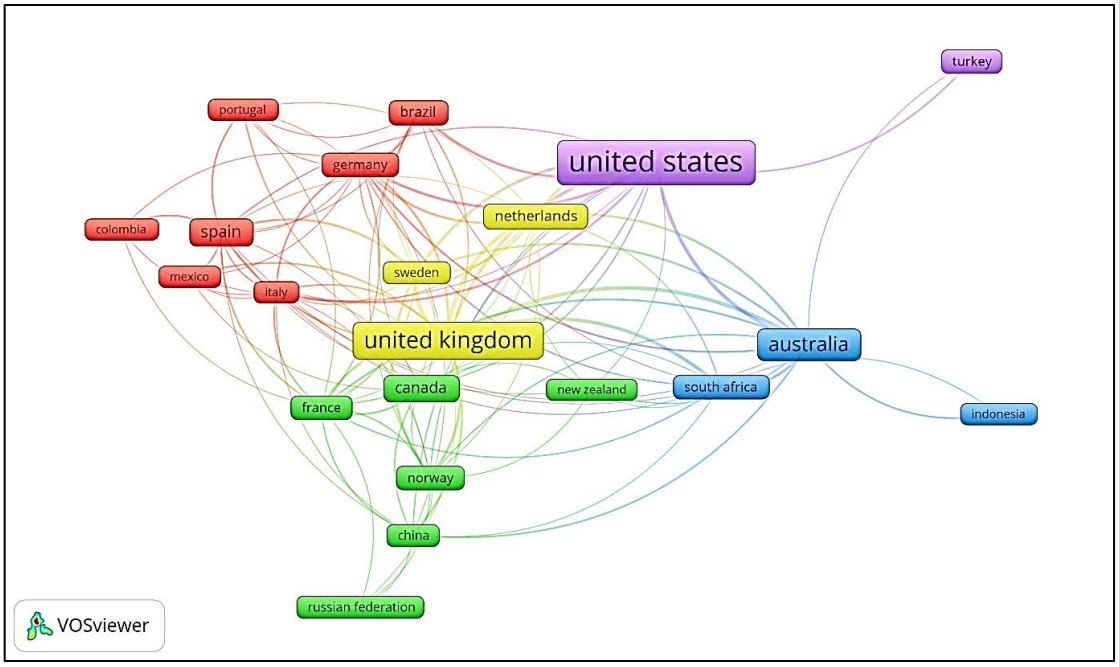

Fig. 8. Co-Authorship analysis with country approach
(Scopus, 2024 proceed by VOSviewer)

The United States and the United Kingdom dominate, as reflected in the number of publications and global collaborations in research related to ecocentrism. Both countries have extensive connections across almost all color clusters. In the red-colored cluster, European countries exhibit stronger internal links among themselves compared to countries from other continents. Indonesia is only associated with Australia in cross-country collaborations, presenting an opportunity for expanding research networks beyond Australia. Additionally, the cross-country collaboration map processed through Biblioshiny is shown in Figure 9.

Fig. 9. Country collaboration in ecocentrism research
(Scopus, 2024 proceed by Biblioshiny)

3.6.6 Evolution and research rend

The evolution of research themes using a Sankey diagram (processed using Biblioshiny) with the year 2021 as a cutoff point to show current research trends is divided into two periods: 1982-2021 and 2022-2024 (Figure 10). This diagram visually illustrates the initial research themes and their transformation into emerging themes. Initial themes such as animal welfare, attitudes, ecocentrism, environmental attitudes, and sustainability remain relevant in the 2022-2024 period. Other themes such as COVID-19 and earth jurisprudence are no longer visible in the current period. Furthermore, many new themes emerged in the 2022-2024 period, including the Anthropocene, new ecological paradigm, ecosystem services, and pro-environmental behavior.

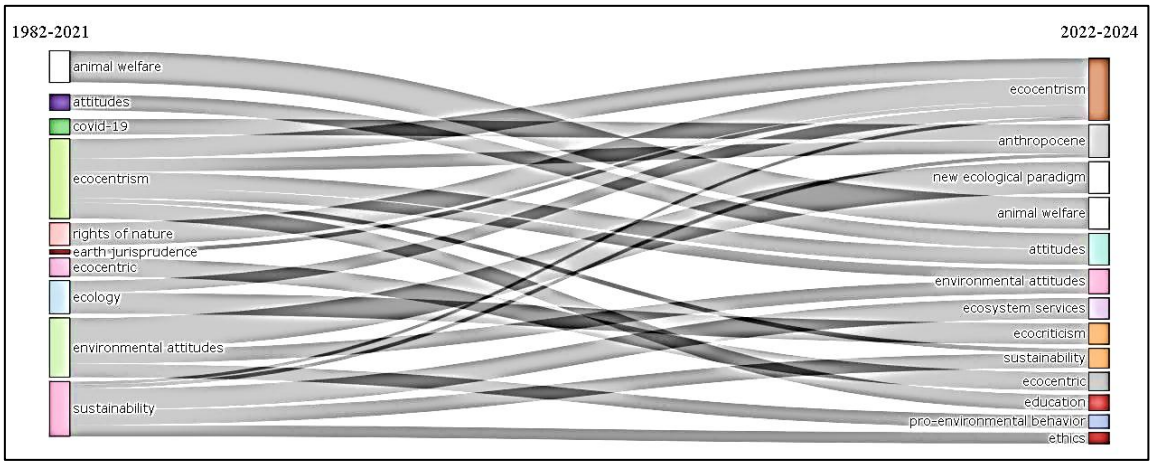

Fig. 10. Evolution of research themes related to ecocentrism
(Scopus, 2024 proceed by Biblioshiny)

The network analysis of author keywords with a year-based approach (Figure 11) shows that the latest research trends are marked by keywords in yellow boxes, namely ecocriticism, climate change, and the right of nature. This is also consistent with the keyword analysis processed using Biblioshiny (Figure 12). Research conducted in the past two years, from 2022 to the present, focuses on topics such as ecocide, environmental destruction, ecocriticism, the right of nature, future generations, indigenous peoples, and posthumanism, which could serve as the foundation for future research endeavours.

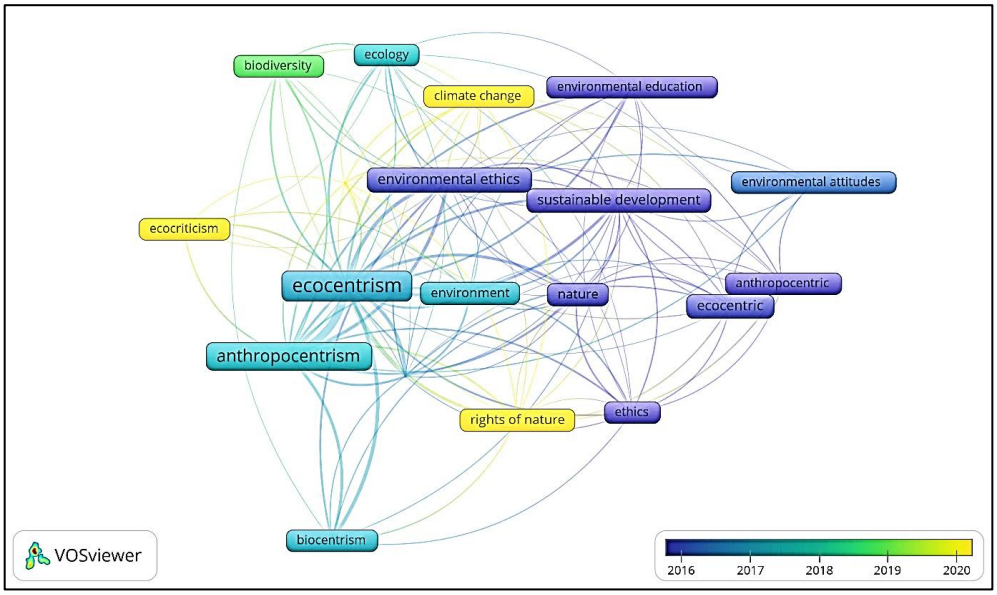

Fig. 11. Author keyword network analysis with year approach
(Scopus, 2024 proceed by VOSviewer)

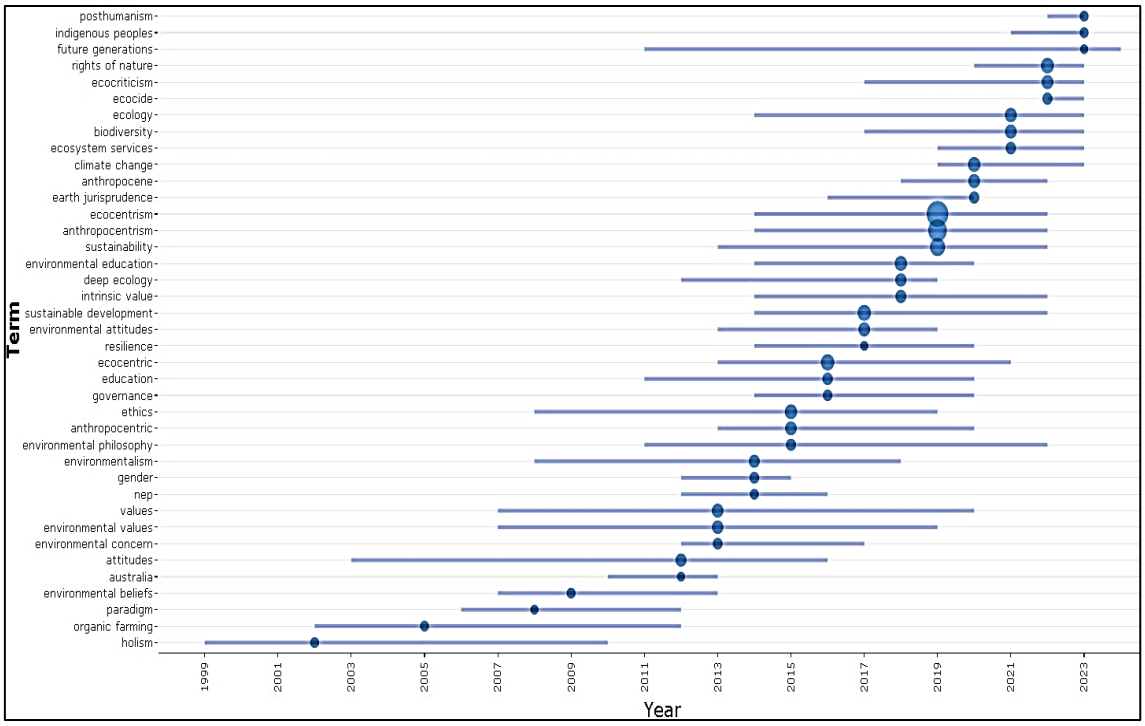

Fig. 12. Keyword trends in a period of years
(Scopus, 2024 proceed by Biblioshiny)

Using a thematic map approach (Figure 13) that illustrates the relationships between themes in ecocentrism research, the map is divided into 4 quadrants based on development degree (density) and relevance degree (centrality). In the bottom-left quadrant (emerging or declining themes), themes like environmental attitudes, environmental values, and ecocriticism show low development and relevance. This indicates that these themes are still in the development stage or have seen a decline in relevance. The bottom-right quadrant (basic themes) includes ecocentrism, anthropocentrism, environmental ethics, the right of nature, and biocentrism, which have high relevance but low development, suggesting that more specific and critical research is needed to build theoretical foundations.

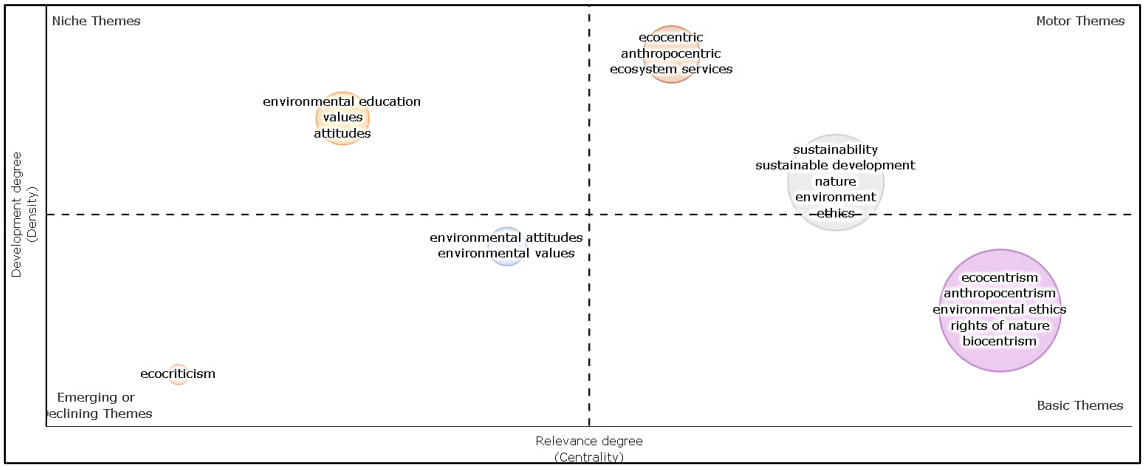

Fig. 13. Thematic map of research related to ecocentrism
(Scopus, 2024 proceed by Biblioshiny)

In the top-left quadrant (niche themes), with high development or density but low relevance (environmental education, values, and attitudes), these themes are very specialized and tend to be in-depth but are seldom connected to other themes. In the top-right quadrant (motor themes), there are two major themes: (1) ecocentric, anthropocentric, and ecosystem services, and (2) sustainability, sustainable development,

nature, environment, and ethics. These two themes have both high development and relevance, meaning they are central and act as driving forces in ecocentrism research.

3.7 Ecocentrism on sustainable development and addressing environmental issues

Two main aspects are critical in maintaining the sustainability of the Earth as a source of benefits for humans and other living beings, namely: (1) addressing Existing Environmental Issues and Restoration Efforts: This involves resolving existing environmental problems and restoring conditions to their appropriate state, based on assessments of the environment's carrying and assimilative capacities. For ongoing initiatives, proper management and oversight are essential to prevent further environmental degradation and, ideally, to align with environmental conservation principles. On a more technical level, these efforts must consider compliance with quality standards for individual parameters as well as broader environmental quality indices; (2) sustainable Development of New Initiatives: Any new development or activity must adhere to values that deliver benefits not only economically and socially but also environmentally. These values should be globally recognized and translated into local regulations derived from in-depth expert studies.

Environmental degradation infringes upon the rights of future generations and, as such, can be treated as an ecological crime. Ecocide and threats to the rights of nature—utilizing public interest law instruments to recognize future generations and non-human entities as victims—can be categorized as ecological crimes and are thus subject to legal processes (Medlock & White, 2022). Preventive measures against environmental destruction must include community involvement, particularly that of Indigenous peoples, whose proven conservation practices should be strengthened while addressing their vulnerability to exploitation. In conservation efforts, Indigenous communities are not only ideal stewards but also face socio-economic complexities that make them susceptible to exploitation. Understanding these dynamics is crucial to ensuring that local communities can act as strategic partners in conservation (Washington et al., 2024)

Furthermore, several technical tools can be employed to facilitate or enhance studies on biodiversity and ecosystem services. A significant practical implication of incorporating intrinsic values into conservation, such as ecological justice or humanity's obligations toward nature, is the promotion of platforms like The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) to inclusively embrace intrinsic values and ecocentrism (Piccolo et al., 2022).

From the perspective of sustainable development, the prevailing economic-oriented paradigm must be reoriented toward ecological sustainability, which is equally critical. The substantial economic growth witnessed over recent decades has proven to be not only ecologically impractical but also ethically unjust (both for humans and non-human entities/nature). Therefore, the focus should shift toward an ecological economy and a sustainable future (Washington, 2021).

4. Conclusions

The bibliometric analysis in this study utilizes Scopus as the database, covering the period from 1982 to 2024 with 1,317 publications spanning 13 document types. Studies on ecocentrism exhibit several characteristics, such as: research productivity related to ecocentrism has experienced exponential growth since 2010, peaking in 2022, although there has been a decline since then, the output remains abundant due to its relevance to global issues such as climate change, sustainable development, and environmental problem-solving. Washington et al. (2017) are influential and productive authors in terms of productivity, h-index, and g-index parameters, meanwhile, authors like Gursoy et al. (2002), despite their high citation counts, are not affiliated with other authors and have limited relevance to current ecocentrism research as their focus is primarily on host attitudes toward tourism.

The USA, the United Kingdom, Australia, and European countries (Spain, the Netherlands, and Sweden) are significant contributors to research on ecocentrism. But there is no single journal that stands out in terms of influence in ecocentrism research, the top 10 influential journals each have their strengths, whether in terms of g-index, citation counts, or the number of publications released. Also, references in ecocentrism research frequently cite older books or essay collections, with A Sand County Almanac (1949) being the second most cited reference after Our Common Future (1987), the global milestone on environmental issues.

Recent research trends on ecocentrism over the past two years (from 2022 to the present) address topics such as ecocide, ecocriticism, the rights of nature, future generations, indigenous peoples, and posthumanism, which could serve as foundational topics for future studies. Alternatively, from a thematic map perspective, sustainability, sustainable development, and ecosystem services are key themes driving the field.

The application of ecocentrism in sustainable development and environmental problem-solving requires the integration of ecosystem restoration, responsible management, and development that balances economic, social, and ecological aspects. This effort involves restoring environmental conditions based on carrying capacity, preventing further degradation through effective oversight, and applying ecocentric principles in both global and local policies. The recognition of the rights of future generations and non-human entities must be incorporated into efforts to prevent ecocide, strengthening the role of Indigenous communities as partners in conservation, and shifting the development paradigm toward ecological sustainability.

Acknowledgement
The author would like to express sincere gratitude to all individuals and organizations that supported this research. The valuable insights, encouragement, and assistance provided during the study significantly contributed to its successful completion. Special thanks are also due to the various resources and tools that facilitated the data collection and analysis processes.

Author Contribution
The author was responsible for the entire process of the research, including the conceptualization, data collection, analysis, and manuscript preparation. The design, execution, and interpretation of the study were all conducted independently by the author.

Funding
This research received no external funding.

Ethical Review Board Statement
Not available.

Informed Consent Statement
Not available

Data Availability Statement
Not available.

Conflicts of Interest
The author declares no conflict of interest.

References

Altun, D. (2020). Preschoolers' pro-environmental orientations and theory of mind: ecocentrism and anthropocentrism in ecological dilemmas. *Early Child Development and Care*, *190*(11), 1820–1832. https://doi.org/10.1080/03004430.2018.1542385

Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, *11*(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

Berry, T. (1999). *The Great Work: Our Way into the Future*. Bell Tower.

Binder, C. R., Hinkel, J., Bots, P. W. G., & Pahl-Wostl, C. (2013). Comparison of frameworks for analyzing social-ecological systems. *Ecology and Society*, *18*(4). https://doi.org/10.5751/ES-05551-180426

Căpuşneanu, S., Stolojescu, B. I. N., & Rakoş, I. S. (2024). Bibliometric Analysis on the Environmental Ethics Performance. Future Trends. *Ovidius University Annals, Series Economic Sciences*, *24*(1). https://ideas.repec.org/a/ovi/oviste/vxxivy2024i1p164-174.html

Carson, R. (2017). *Silent Spring (1962)*. The Future of Nature.

Carter, A. (2011). Towards a multidimensional, environmentalist ethic. *Environmental Values*, *20*(3), 347–374. https://doi.org/10.3197/096327111X13077055166027

Çelik, A. A. (2023). Paradigm Shift for the Consumers on the Edge of the Environmental Crisis: Bibliometric Analysis of New Environmental Paradigm. *Journal of Management and Economics Research*, *21*(1), 1-24. https://doi.org/10.11611/yead.1101612

Coursey, D. G. (1982). Traditional Tropical Root Crop Technology: Some Interactions with Modern Science. *The IDS Bulletin*, *13*(3), 12–20. https://doi.org/10.1111/j.1759-5436.1982.mp13003003.x

Curry, P. (2012). Ecological Ethics: An introduction. *Management of Environmental Quality: An International Journal*, *23*(3). https://doi.org/10.1108/meq.2012.08323caa.008

da Silva, S. S., Reis, R. P., & Amâncio, R. (2011). Environmental paradigms in sustainability reports of energy sector organizations. *Revista de Administracao Mackenzie*, *12*(3), 146–176. https://doi.org/10.1590/S1678-69712011000300007

De Santis, E., Martino, A., & Rizzi, A. (2020). An Infoveillance System for Detecting and Tracking Relevant Topics From Italian Tweets During the COVID-19 Event. *IEEE Access*, *8*, 132527–132538. https://doi.org/10.1109/ACCESS.2020.3010033

Devall, B., & Sessions, G. (1985). *Deep ecology: Living as if nature mattered*. Sage Journals.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of business research*, *133*, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Eckersley, R. (1992). *Environmentalism and political theory Toward an ecocentric approach.* Taylor & Francis Group.

Egghe, L. (2006). Theory and practise of the g-index. *Scientometrics*, *69*(1), 131–152. https://doi.org/10.1007/s11192-006-0144-7

Egri, C. P., & Herman, S. (2000). Leadership in the North American environmental sector: Values, leadership styles, and contexts of environmental leaders and their organizations. *Academy of Management Journal*, *43*(4), 571–604. https://doi.org/10.2307/1556356

Ence, A. K., Cope, S. R., Holliday, E. B., & Somerson, J. S. (2016). Publication productivity and experience: factors associated with academic rank among orthopaedic surgery faculty in the United States. *The Journal of Bone and Joint Surgery*, *98*(10), e41. https://doi.org/10.2106/JBJS.15.00757

Gursoy, D., Chi, C. G., & Dyer, P. (2010). Locals' attitudes toward mass and alternative tourism: The case of Sunshine Coast, Australia. *Journal of Travel Research*, *49*(3), 381–394. https://doi.org/10.1177/0047287509346853

Gursoy, D., Jurowski, C., & Uysal, M. (2002). Resident attitudes: A structural modeling approach. *Annals of Tourism Research*, *29*(1), 79–105. https://doi.org/10.1016/S0160-7383(01)00028-7

Gursoy, D., & Kendall, K. W. (2006). Hosting mega events. Modeling Locals' Support. *Annals of Tourism Research*, *33*(3), 603–623. https://doi.org/10.1016/j.annals.2006.01.005

Gursoy, D., & Rutherford, D. G. (2004). Host attitudes toward tourism: An improved structural model. *Annals of Tourism Research*, *31*(3), 495–516. https://doi.org/10.1016/j.annals.2003.08.008

Hardin, G. (1968). The Tragedy of the Commons. *Science*, *162*(3859), 1243–1248. https://doi.org/10.1126/science.162.3859.1243

Jurowski, C., Uysal, M., & Williams, D. R. (1997). A theoretical analysis of host community resident reactions to tourism. *Journal of Travel Research*, *36*(2), 3–11. https://doi.org/10.1177/004728759703600202

King, R. J. H. (2006). Playing with boundaries: Critical reflections on strategies for an environmental culture and the promise of civic environmentalism. *Ethics, Place and Environment*, *9*(2), 173–186. https://doi.org/10.1080/13668790600694576

Kortenkamp, K. V, & Moore, C. F. (2001). Ecocentrism and anthropocentrism: Moral reasoning about ecological commons dilemmas. *Journal of Environmental Psychology*, *21*(3), 261–272. https://doi.org/10.1006/jevp.2001.0205

Leopold, A. (1949). *A Sand County Almanac and Sketches Here and There*. Oxford University Press.

Lis, A., Sudolska, A., & Tomanek, M. (2020). Mapping Research on Sustainable Supply-Chain Management. *Sustainability*, *12*(10), 3987. https://doi.org/10.3390/su12103987

Lu, H., Zhang, W., Diao, B., Liu, Y., Chen, H., Long, R., & Cai, S. (2023). The progress and trend of pro-environmental behavior research: a bibliometrics-based visualization analysis. *Current Psychology*, *42*(8), 6912–6932. https://doi.org/10.1007/s12144-021-01809-1

Luke, T. W. (2002). Deep Ecology: Living as if Nature Mattered. *Organization & Environment*, *15*(2), 178–186. https://doi.org/10.1177/10826602015002005

Medlock, F., & White, R. (2022). Ecocide, Ecocentrism and Social Obligation. *Erasmus Law Review, 15*(3), 142–155. https://doi.org/10.5553/ELR.000220

Nordlund, A. M., & Garvill, J. (2002). Value structures behind proenvironmental behavior. *Environment and Behavior*, *34*(6), 740–756. https://doi.org/10.1177/001391602237244

O'Hara, D. (2005). The Great Work: Our Way into the Future By Thomas Berry New. *Spirituality and Health International*, *6*(4), 263–267. https://doi.org/10.1002/shi.35

Piccolo, J. J., Taylor, B., Washington, H., Kopnina, H., Gray, J., Alberro, H., & Orlikowska, E. (2022). "Nature's contributions to people" and peoples' moral obligations to nature. *Biological Conservation, 270*, 109572. https://doi.org/10.1016/j.biocon.2022.109572

Plumwood, V. (1993). *Feminism and the Mastery of Nature*. Routledge.

Regan, T. (2023). *The Case for Animal Rights*. University of California Press.

Sarie, F., Murthada, M., & Jusatria, J. (2023). Bibliometric Analysis of Eco-Friendly Practices in Contemporary Popular Culture. *West Science Social and Humanities Studies*, *1*(04), 189–200. https://doi.org/10.58812/wsshs.v1i04.273

Schultz, P. W., & Zelezny, L. (1999). Values as predictors of environmental attitudes: Evidence for consistency across 14 countries. *Journal of environmental psychology*, *19*(3), 255-265. https://doi.org/10.1006/jevp.1999.0129

Singer, P. (1977). Animal Liberation. *The Philosophical Review*, *86*(4), 557. https://doi.org/10.2307/2184568

Taylor, P. W. (1986). *Respect for Nature*. Princeton University Press.

Thompson, S. C. G., & Barton, M. A. (1994). Ecocentric and anthropocentric attitudes toward the environment. *Journal of environmental Psychology*, *14*(2), 149-157. https://doi.org/10.1016/S0272-4944(05)80168-9

United Nations World Commission on Environment and Development. (1987). *Report of the World Commission on Environment and Development: Our Common Future.* Macat Library.

Washington, H. (2021). Questioning the Assumptions, Sustainability and Ethics of Endless Economic Growth. *Journal of Risk and Financial Management, 14*(10), 497. https://doi.org/10.3390/jrfm14100497

Washington, H., Piccolo, J. J., Kopnina, H., & O'Leary Simpson, F. (2024). Ecological and social justice should proceed hand-in-hand in conservation. *Biological Conservation, 290*, 110456. https://doi.org/10.1016/j.biocon.2024.110456

Washington, H., Taylor, B., Kopnina, H., Cryer, P., & Piccolo, J. J. (2017). Why ecocentrism is the key pathway to sustainability. *The Ecological Citizen*, *1*(1), 35-41. http://www.ecologicalcitizen.net/

Wilson, E. O. (1984). *Biophilia*. Harvard University Press.

Xie, H., Zhang, Y., Wu, Z., & Lv, T. (2020a). A bibliometric analysis on land degradation: Current status, development, and future directions. *Land*, *9*(1). https://doi.org/10.3390/LAND9010028

Xie, H., Zhang, Y., Zeng, X., & He, Y. (2020b). Sustainable land use and management research: A scientometric review. *Landscape Ecology*, *35*, 2381-2411. https://doi.org/10.1007/s10980-020-01002-y

Yadav, C., & Sinha, J. (2024). Exploring the evolution of ecocriticism: A bibliometric study and literature review. *Multidisciplinary Reviews*, *7*(12), 10–11. https://doi.org/10.31893/multirev.2024304

Yoshida, Y., Matsuda, H., Fukushi, K., Takeuchi, K., & Watanabe, R. (2022). The missing intangibles: nature's contributions to human wellbeing through place attachment and social capital. *Sustainability Science, 17*(3), 809–822. https://doi.org/10.1007/s11625-021-01067-x

Biography of Author

Chandra Egy Setiawan, School of Environmental Science, Universitas Indonesia, Central Jakarta, DKI Jakarta 10430, Indonesia

- Email: chandra.egy@ui.ac.id
- ORCID: N/A
- Web of Science ResearcherID: N/A
- Scopus Author ID: N/A
- Homepage: N/A