

Civic Education for the Planet: Cross-National Trends of Ecological Citizenship and Strategies for Advancing SDGs

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Abstract: This study aims to map research trends on ecological citizenship and identify ecological-based citizenship education strategies in building citizens' ecological awareness. The environmental crisis and the global need for sustainable development emphasize the concept of citizenship not only as a legal status and as formal political participation, but also as a responsibility that binds humans to a democratic community and to a life-sustaining ecology. This study used a systematic literature review and bibliometric analysis method following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. Data were collected from the Scopus database from relevant articles published between 1998 and 2025. Based on inclusion and exclusion criteria, 155 articles were deemed eligible for analysis. Bibliometric analysis was conducted using VOSViewer to visualize bibliographic data. The research findings show that studies on Ecological Citizenship are mostly centered on studies on the environment, politics, and development policies. Few studies highlight environmental awareness education within citizenship education. This study identifies five important findings regarding ecological citizenship education strategies that can be developed, including through i) curriculum; ii) pedagogy; iii) school movement; iv) social action; and v) digital citizenship. This study concludes that the study of ecological citizenship throughout 1998-2005 experienced dynamic growth and a significant increase, coinciding with the growing attention to green values, sustainability issues, and citizens' ecological responsibilities. However, the pedagogical perspective in Civic Education is relatively marginal. This study provides a strong foundation for future Civic Education to develop a learning model that emphasizes the harmonization of citizens' rights and obligations not only towards the state and fellow citizens, but also towards the universe. So that Civic Education can prepare citizens who have ecological awareness and support sustainable development.

Keywords: civic education, ecology awareness, ecological citizenship, environment education, SDGs.

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■ INTRODUCTION

The world is currently facing a worsening environmental crisis, including climate change, environmental degradation, and increasing greenhouse gas emissions (Mravcová, 2019; Štraupaitė, 2023). Global warming, deforestation, and scarcity of natural resources are evidence of development that lacks ecological justice. Since the industrial revolution, the burning of fossil fuels and deforestation have drastically increased the

concentration of greenhouse gases (GHGs) in the atmosphere, triggering anthropogenic climate change. In the history of human civilization, 2024 will be the first year with a global average temperature exceeding 1.5°C (see Figure 1). This data indicates that the Earth is approaching the global warming threshold set by the Paris Agreement, adopted at the 21st Conference of the Parties (World Meteorological Organization 2025)

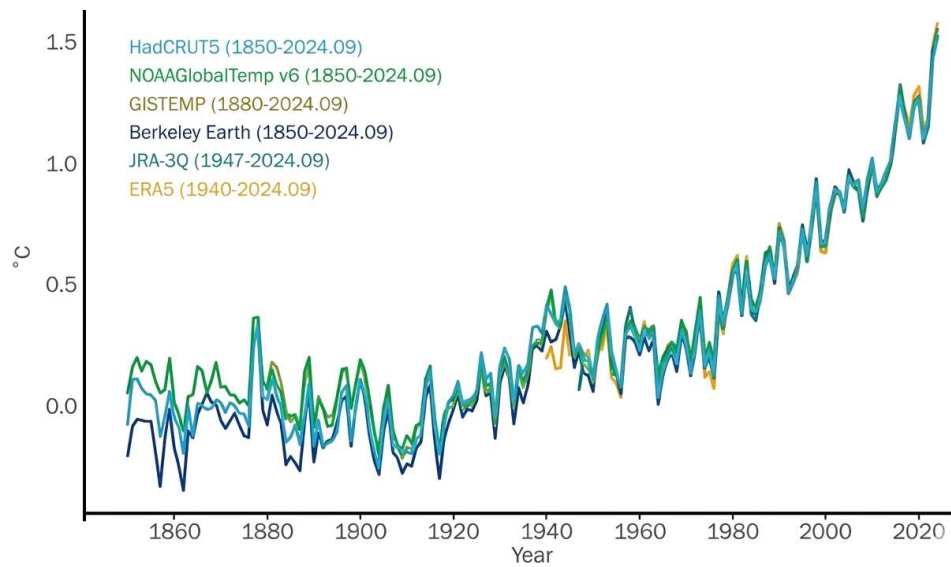


Figure 1. Global average temperature anomalies from 1850 to 2024

Source: World Meteorological Organization, 2025

Research across countries shows that environmental problems stem from the same pattern of cause and effect: human attitudes and behaviors that damage the environment (Anand & Sharma, 2023; Aviste & Niemiec, 2023; Samways, 2025). Environmental damage is caused by the actions of citizens who are unaware of the importance of preserving the environment for humanity's survival. Various literature criticizes anthropocentrism, which views humans as the most important entity in the world, as the cause of environmental degradation because it has prioritized its needs over the needs and interests of other species (Aga et al., 2024; Kopnina et al., 2018; Samways, 2025). In fact, environmental sustainability is the mainstay of human civilization's sustainability. Without environmental sustainability, humanity itself will be threatened.

As the risk of environmental damage to the balance of nature increases, awareness of conservation efforts grows. Environmental issues are a key issue in the 2023 Sustainable Development Goals (SDGs), an international effort by UN member states to address global development challenges. The SDGs mandate all elements, including governments, academic institutions, businesses, and civil society, to act

to protect, manage, and preserve the environment for the sustainability of natural ecosystems and human civilization (UNICEF, 2021)

The urgency of sustainable development amidst the current environmental crisis reaffirms the concept of ecological citizenship, which encourages individuals to take ethical responsibility for the environment, including in patterns of consumption, production, distribution, and other sustainable behaviors (Seyfang, 2005; Zeng et al., 2016). Ecological citizenship also highlights ecological analysis, the importance of environmental justice, and a critical attitude towards social inequality (Asilsoy & Oktay, 2018; Syahri & Salahudin, 2024). As the complexity of environmental issues has grown over the past decade, this concept has increasingly influenced global values and strategies for fostering ecological awareness. In the educational context, the concept of ecological citizenship emerged as a response to traditional citizenship models, which have been deemed insufficient in educating citizens about ecological awareness (Bayer et al., 2021; Huttunen et al., 2020). Conventional citizenship education places greater emphasis on traditional citizenship, which teaches citizens about their rights and obligations, limited to civil,

political, and social rights in building a democratic life (Chia & Neoh, 2024; Fozdar & Martin, 2020).

Ecological citizenship is crucial to addressing global environmental challenges and advancing sustainable development (Spanring, 2019; Syahri & Salahudin, 2024). Existing literature shows that this concept has been extensively researched in political science, environmental studies, and development studies (Gooding et al., 2025; Marcílio Pompeu & Silvério Pereira, 2025; Woods & Qian, 2025; Yap & Anderson, 2025). However, several studies indicate that although ecological citizenship offers important education for sustainable practices, its implementation faces challenges such as inadequate curriculum design, lack of teacher training, and the limited nature-based learning approaches and community engagement that have the potential to enhance ecological citizenship education (Damoah et al., 2024; Linhares & Reis, 2023; Mngomezulu & Ramaila, 2025). In fact, education plays a crucial role in internalizing ecological values, fostering ecological awareness, and encouraging ethical and responsible ecological behavior (Gao, 2025; Hnatyuk et al., 2024; Rakhmawati et al., 2025). To support sustainable development, Civic Education in schools and communities is crucial for developing a civic education strategy grounded in ecological citizenship that fosters a holistic understanding of citizens' rights and obligations in protecting, preserving, and maintaining the environment for sustainability (Seyfang, 2004; Syahri & Salahudin, 2024).

Therefore, the limitations of previous studies underscore the importance of mapping the literature through a systematic literature review and bibliometric analysis to identify themes, patterns, concepts, and research trends on "Ecological Citizenship," while highlighting the remaining gaps in connecting this concept to the practice of Citizenship Education. This study will

explore the current research landscape on Ecological Citizenship, thereby evaluating the extent to which this topic remains relevant as a focus for future research, particularly in Citizenship Education. This study also reviews the evolution of academic discourse on Ecological Citizenship to identify contributions to citizenship theory and educational practice. Based on this focus, the following research questions are posed:

1. RQ 1: What are the global trends, thematic focus, and distribution of ecological citizenship research across nations and research domains?
2. RQ 2: What pedagogical strategies have been identified in the literature for integrating Ecological Citizenship into Citizenship Education?

To answer the three research questions above, the researchers used a Systematic Literature Review (SLR) and Bibliometric Analysis. A systematic literature review is an appropriate method for synthesizing existing research and helping identify trends, gaps, and future research directions. This approach was used to ensure that research conclusions are drawn from a broad and representative sample of studies and to highlight areas requiring further research (Agazu et al., 2022; Snyder, 2019). Meanwhile, a bibliometric analysis was used to measure the frequency, distribution, and impact of publications on Ecological Citizenship. Thus, this study can provide evidence-based insights that can influence relevant policy, practice, and further research. This study also comprehensively maps the trajectory of research on Ecological Citizenship and provides a deeper understanding of its future direction.

■ METHOD

Research Design

This research method used a Systematic Literature Review (SLR) and Bibliometric Analysis to identify patterns, trends, and

developments within the focus of studies within a scientific discipline. To ensure a comprehensive, transparent, and replicable literature review and provide a holistic overview of the research topic, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework was used (Chotisarn & Phuthong, 2025). In this research, the PRISMA protocol

was used to select articles relevant to Ecological Citizenship, the research focus. The researchers designed all stages of the research sequentially, including determining inclusion and exclusion criteria, selecting reliable information sources, selecting literature, collecting data, and selecting data items. The research activities are presented in Table 1.

Table 1. Stages of SLR research

Stages	Activities
Determination of Inclusion Criteria (IC)	<ol style="list-style-type: none"> 1) IC1: The reviewed articles fall into the journal article category. 2) IC2: The selected journal articles have undergone peer review. 3) IC3: The articles are written in English. 4) IC4: The article focuses on strategies for implementing citizen ecological awareness.
Determining Reliable Sources of Information	A literature search was conducted in the Scopus database.
Literature Selection	<ol style="list-style-type: none"> 1) Use the keyword "Ecological Citizenship" in the title, abstract, and keywords. 2) Conduct a screening process based on the inclusion criteria. 3) Read and analyze articles to determine their suitability for inclusion in this study.
Data collection	Data collection was carried out through a bibliographic analysis that included the author's name, year, and article content.
Data Item (Selection)	<ol style="list-style-type: none"> 1) DI 1 Development of ecological citizenship research 2) DI 2 Strategies for building ecological awareness.

Search Strategy

The research data were obtained from the Scopus database, published between 1998 and 2025. The time span since 1998 was based on the results of an initial search in the Scopus database, which showed a graph of publication years with the keyword "ecological citizenship" appearing consistently since 1998. Therefore, researchers identified articles published from 1998 to 2025 to conduct a comprehensive mapping of the topic's development. In addition, research on ecological citizenship also shows gradual dynamics, alongside the increasing global environmental and sustainability issues. Therefore, this search allows researchers to identify patterns,

trends, and changes in research orientation on an ongoing basis. However, this study acknowledges limitations in its search strategy, as it relies solely on the keyword "ecological citizenship". Therefore, it may be unable to capture relevant publications that use derivative terms or other terms related to ecological citizenship.

The search was conducted using the PRISMA protocol in Figure 2, with the following explanation: 1) The initial search related to the topic of ecological citizenship in the Scopus database yielded 243 documents. 2) The researcher conducted a filtering based on the inclusion criteria, namely, only documents with the journal article type will be studied, resulting

in 166 related journal articles. 3) The journal articles were then screened again based on the language inclusion criteria, namely, only articles in English will be studied, taking into account the

researcher's ability in the language aspect, to avoid misinterpretation by translation tools. From this filtering, 155 English-language journal articles with related topics were obtained.

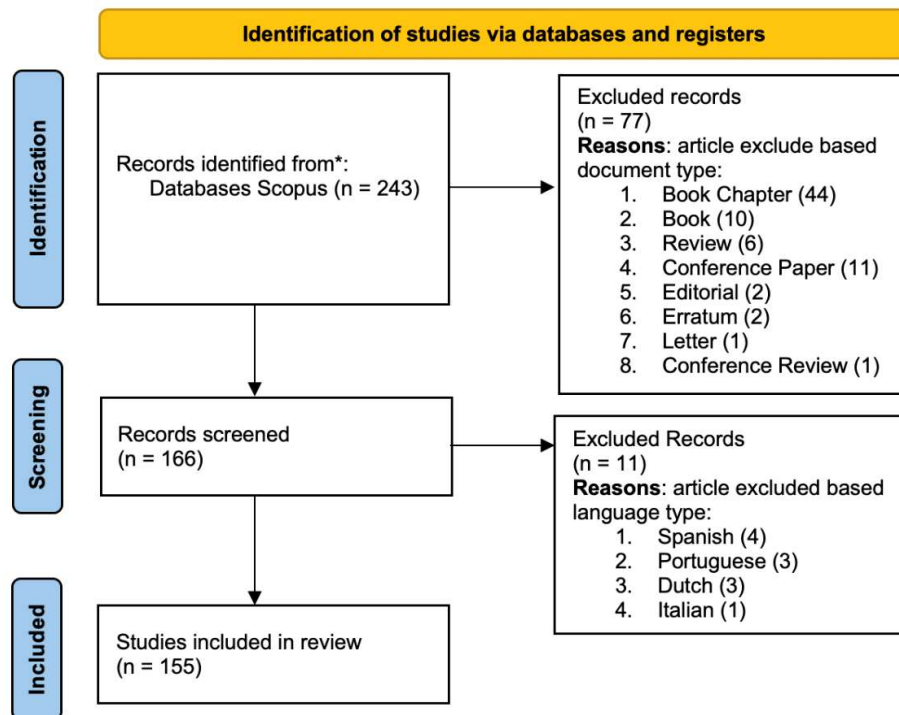


Figure 2. PRISMA diagram

However, this study has limitations in its search strategy, as the analysis relies solely on a single keyword, namely "ecological citizenship." This strategy may not capture relevant publications that use other derived terms or concepts. Therefore, the analysis results need to be interpreted with this limitation in mind. Details of the database and search strategy are presented in the related table.

Data Analysis

Data analysis in this study was conducted through systematic information extraction from selected articles, using a spreadsheet to facilitate uncovering the substance of each article. Data collected included the year of publication, article title, methods used, and the ecological citizenship strategies discussed in each article. The goal was

to organize and categorize the data effectively, thus facilitating the identification of trends, similarities, and differences among the analyzed studies.

Bibliometric analysis was conducted using VOSviewer to visualize the countries that dominate research on ecological citizenship and the co-occurrence of keywords related to the topic. This analysis technique employed a normalization method for association strength with the author's keyword analysis unit. A minimum threshold of 5 keyword occurrences was applied to maintain the network's relevance and readability, ensuring that only high-frequency terms were included in the mapping.

This combined bibliometric analysis and systematic literature review helped researchers synthesize empirical findings and map the research

landscape on the topic under study. Thus, integrating these two approaches provides a comprehensive understanding of the development, historical trajectory, and future directions of this research field.

■ RESULT AND DISCUSSION

This study focuses on the findings from 155 articles collected from the Scopus database that discuss Ecological Citizenship. Researchers identified key findings on ecological citizenship research trends, strategies for building ecological awareness through ecological citizenship, and their theoretical and practical implications for future research.

RQ 1: What are the global trends, thematic focus, and distribution of ecological citizenship research across nations and research domains?

Based on data from the Scopus database, 155 scientific articles on Ecological Citizenship were published between 1998 and 2025. This data indicates that research related to ecological citizenship remains limited. Figure 3 shows that the overall trend in the number of publications on this topic is fluctuating, with increases and

decreases occurring across several periods. However, in the last two years, there has been a relatively high increase in the number of publications compared to previous years. This pattern indicates a growing interest in Ecological Citizenship research along with increasing attention to environmental crisis and sustainability issues.

Initial research in this area, entitled “The Faith of Democratic Ecological Citizenship,” revealed that citizenship is not merely a legal status and formal political participation, but rather a “civic faith” that connects people to both democratic communities and the ecology that sustains life. Engel invites readers to replace the dominant narrative of development, which tends to be dualistic and exclusionary, with a democratic-ecological citizenship that integrates social justice and environmental responsibility.

Currently, research on Ecological Citizenship is attracting increasing interest from a large number of scientists. In 2025, publications on Ecological Citizenship increased significantly compared with previous years (see Figure 3). Nineteen articles were published, focusing on the practical implementation of Ecological Citizenship ideas in policy an politics across various countries.

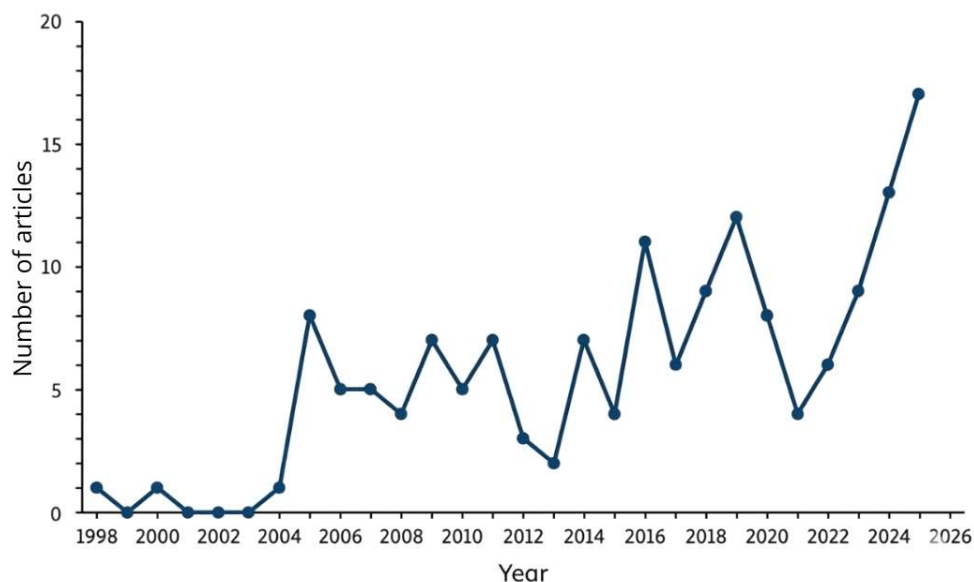


Figure 3. Number of ecological citizenship publications

Furthermore, in Figure 4, the overlay visualization in VOSviewer shows the evolution of themes, identifying changes in keyword trends over time. It should be emphasized that in this OV, the apparent time span begins around 2012, as only keywords that met the minimum occurrence threshold in the co-occurrence analysis were included in the network, so keywords from early publications with low frequencies do not appear in the visualization map. The colors in the OV indicate the average year of keyword appearance, with blue representing earlier themes and yellow representing more recent ones. The visualization results show that in the early stages of the research, themes such as environmental politics, environmental management, ecology, and ethics were more dominant. This indicates that the study's initial focus on Ecological Citizenship was primarily on the discourse of context, environmental ethics,

and environmental policy. Entering the next period, research attention began to shift to issues of desire, as indicated by the increasing interconnectedness of keywords such as sustainability and sustainable development. More recent developments, as indicated by the lighter colors, indicate the emergence of keywords such as climate change, environmental education, learning, and local participation. This demonstrates the growing focus on education, behavioral change, and citizen participation in responding to the environmental crisis. Overall, the analysis of these findings suggests that research on Ecological Citizenship is shifting from a normative, policy-based approach to a more practical, pedagogical approach to building citizens' ecological awareness for sustainable living.

Recent research increasingly recognizes that Ecological Citizenship is not just a concept but an idea that can be implemented to realize

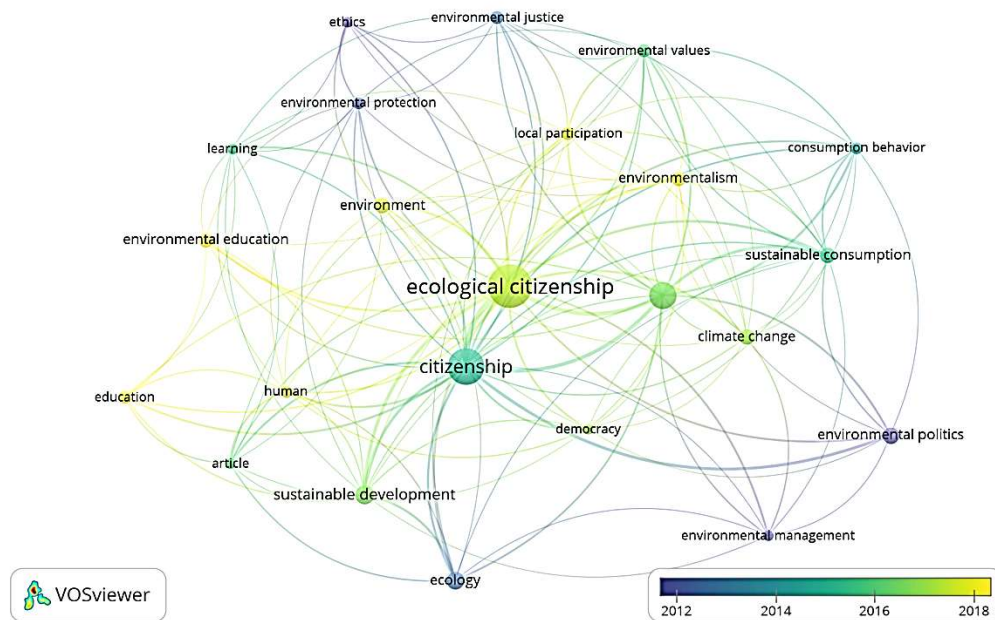


Figure 4. Thematic evolution of ecological citizenship research based on keyword overlay visualization

environmental awareness. Research conducted by Yap & Anderson highlights the importance of building ecological awareness in non-formal education. They proposed Urban Agriculture as

a strategy for implementation in non-formal education to build ecological awareness and active citizenship (Yap & Anderson, 2025). Research by Wu emphasizes the need for a future

curriculum that promotes ecological awareness, including universal values such as human rights, democracy, and ecological citizenship (Wu, 2025). Meanwhile, research by Zeng & Sweet reveals the importance of reviving local cultural values as a way to build ecological citizenship, alongside digital literacy, multi-actor collaboration, and practical community-based approaches (Zeng & Sweet, 2025). Furthermore, research findings by Gooding et al. reveal that there are seven interrelated dimensions in Ecological Citizenship, namely: i) local knowledge or wisdom and community action; ii) intergenerational responsibility; iii) recognition of the connectedness of humans with nature; iv) diverse socio-economic pathways; v) equity and inclusion; vi) resilience and flexibility; vii) governance and policy (Gooding et al., 2025).

A review of the literature published since 1998 shows that research on Ecological Citizenship, specifically in the educational context, remains limited due to a lack of research in reputable journals. This creates an opportunity for future researchers to fill this gap. This research is crucial for broadening insights into Ecological Citizenship amid the challenges global citizens face in the environmental crisis. It can foster a deeper understanding of the practical application of ecological citizenship in schools, which aims to prepare the younger generation with the insight and awareness needed to sustain a sustainable environment for their lives.

The distribution analysis of research on ecological citizenship across 155 articles was conducted by categorizing articles by country, region, affiliation, source, and author, with a limit of the top 10 articles in each category. Understanding the distribution of scientific research relevant to Ecological Citizenship will benefit researchers, academics, and practitioners by clarifying future research agendas, particularly in developing ecological citizenship for a sustainable environment.

First, the distribution of scientific research on Ecological Citizenship based on geographical area is dominated by the United Kingdom with 31 articles, the United States with 28 articles, Canada with 16 articles, Sweden with 9 articles, Indonesia and South Korea with 8 articles, Australia and Spain with 6 articles, Brazil and India with 5 articles (see figure 5). This dominance by the UK and the US is inseparable from the policies implemented to address the long-recognized threat of the environmental crisis (Iles, 2007). Since the 1970s, the United States has been known as a leader in shaping policies on environmental issues, such as water pollution, waste, and vehicle emissions, inseparable from its strong position within the United Nations (Donkers, 2006). Meanwhile, since 2015, the UK has implemented various policies to address the environmental crisis, including carbon storage, zero-carbon homes, onshore wind farms, and solar power. This situation has attracted interest in research and knowledge production on Ecological Citizenship.

Based on country or region categories, research on Ecological Citizenship was primarily conducted in the United Kingdom, with 31 articles, followed by the United States, with 28 articles. In addition, several other European countries made significant contributions, including Canada with 16 articles, Sweden with 9, Spain with 6, and Brazil with 5. Meanwhile, other countries that contributed the most research on Ecological Citizenship from the Asian continent were Indonesia and Korea, with 8 articles each, and India, with 5 articles. Another country was Australia, with 6 articles.

Based on these data, the United Kingdom and the United States appear to dominate research on Ecological Citizenship. This is due to the two countries' academic traditions in environmental political theory and sustainability studies, which provide a strong intellectual foundation for the development of the Ecological

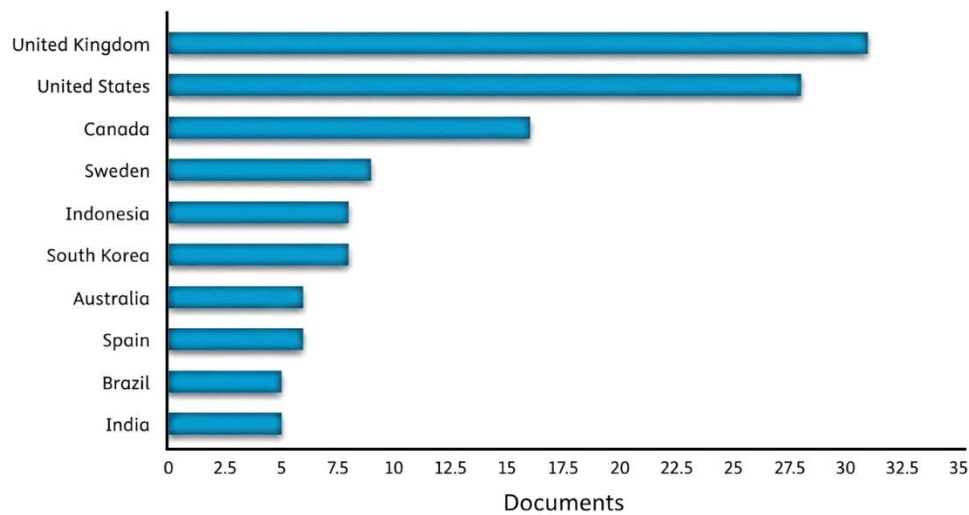


Figure 5. Number of articles by country or territory

Citizenship concept (Morgan & Warwick, 2024; Vincent & Mulkey, 2015). Furthermore, established research funding schemes and institutional support enable researchers to further explore ecological issues that are currently a hot topic in global discourse. The availability of leading journals in these countries that focus on environmental issues also facilitates the publication of research on these issues, further enhancing the research's visibility. This dominance has important implications for the global discourse on ecological citizenship. Research concentrated in Western countries can produce conceptualizations of ecological citizenship from a Western theoretical perspective, thereby neglecting ecological knowledge, environmental practices, and green values in other regions. These findings suggest the need for greater geographic participation in future research to foster diverse and inclusive understandings of ecological citizenship practices across different environmental and socio-cultural contexts.

Furthermore, a visualization of the collaborative network between countries is presented to better understand how knowledge about Ecological Citizenship is produced and disseminated globally (see Figure 6). The visualization shows that research on Ecological

Citizenship is produced through interconnected academic networks. The United Kingdom appears as a central node, with strong collaborative relationships with many countries, indicating that it has significant influence in shaping the research agenda in this field. The next country with extensive research collaborations is the United States, particularly with European and Asian countries. Meanwhile, countries such as Australia, Canada, Sweden, and Indonesia form secondary collaborative clusters that connect regional research communities. The density of connections across the United Kingdom and the United States indicates that these countries serve as primary hubs in the global knowledge network, facilitating the dissemination of ideas and research related to Ecological Citizenship.

These findings indicate that issues related to Ecological Citizenship are most widely researched in European countries, followed by the United States. Related issues are also researched in countries across continents, demonstrating the global relevance of Ecological Citizenship. These findings further reinforce the growing recognition of Ecological Citizenship. This concept combines civic values with citizens' ecological responsibility to protect the environment, in light of the ongoing environmental

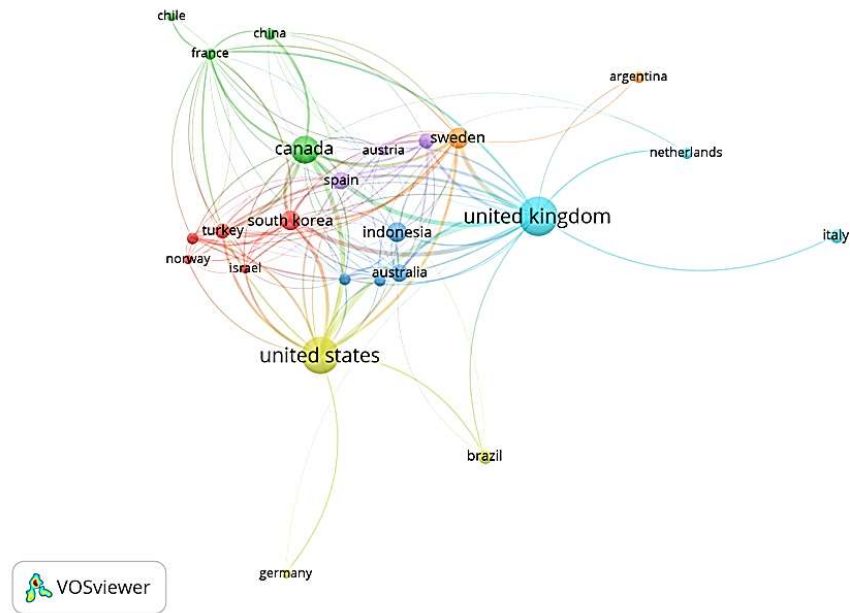


Figure 6. Network visualization of country collaboration in ecological citizenship research

crisis and the importance of the sustainable development agenda.

Based on publication sources, the allocation of research on Ecological Citizenship is dominated by journals such as Environment

Politics (15 articles), International Research in Geographical and Environmental Education (3 articles), Citizenship Studies (2 articles), and Sustainability Switzerland (1 article) (see Figure 7).

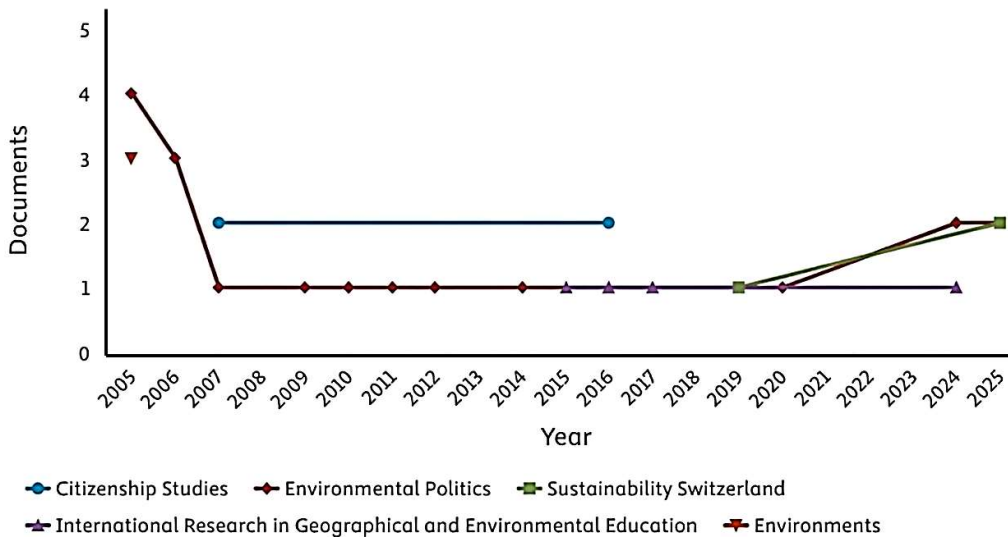


Figure 7. Number of articles by sources (top 10 sources)

The distribution of research by author shows that the author who wrote the most articles on Ecological Citizenship is Seyfang, G, with 5. The next 5 authors (Jogers, S.C.; Martinsson, J.; Matti, S.; Phillips, R.; Sweet, W.) wrote articles

related to Ecological Citizenship, with 3 articles each. Meanwhile, the other 4 authors (Asilsoy, B.; Dobson, A.; Gooding, L.; Hayward, T.) have each written 2 articles related to Ecological Citizenship.

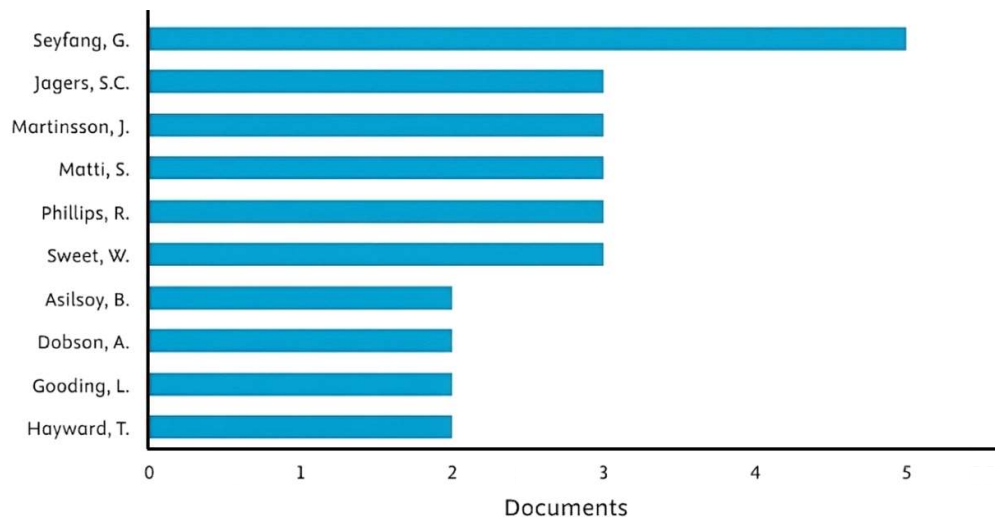


Figure 8. Counts of publications by author (top 10 authors)

RQ 2: What are the theoretical and practical implications of future research on ecological citizenship?

This research was conducted on 155 articles obtained from the Scopus database. VOSviewer was used to illustrate the theoretical and practical implications of the results for future research on Ecological Citizenship. The results of the metadata analysis using VOSviewer can help researchers and practitioners better understand the assumptions and findings related to Ecological Citizenship.

The results of the bibliometric analysis using VOSviewer can also identify variables that have been extensively researched and those that have not been widely explored by previous researchers, thus providing a basis for future research. From a practitioner perspective, the results of the literature review using VOSviewer will assist practitioners in implementing Ecological Citizenship sustainably in the future, particularly in supporting sustainable development efforts.

Figure 9 shows the mapping of keyword co-occurrence that emerged related to the topic of Ecological Citizenship, divided into four main interconnected clusters. The first cluster centers on “Ecological Citizenship,” which is connected to “citizenship,” “democracy,” “ecology,” “sustainable development,” and “education and

environmental education.” This is evident in the relationships among Ecological Citizenship, Citizenship, Democracy, and Environmental Values. This cluster indicates that Ecological Citizenship is studied in the context of sustainability and democracy, and is a pedagogical agenda. The second cluster shows the connection between “sustainability,” “climate change,” “environmental justice,” “environmental values,” and “local participant.” This connection indicates that Ecological Citizenship research related to sustainability, climate change, environmental justice, and social action that reflects ecological citizenship contains practical and participatory dimensions. The third cluster demonstrates the interconnectedness of “ethics,” “environment,” and “environmental protection,” indicating that the construction of ecological citizenship is inseparable from environmental ethics as a moral basis. Meanwhile, the fourth cluster shows studies centered on environmental politics. This suggests that some research on Ecological Citizenship situates its study within the framework of political dynamics and environmental governance. Thus, these clusters demonstrate the multidimensional nature of ecological citizenship research. There is a link between environmental ethics, education, sustainability values, and environmental politics.

Furthermore, the keyword co-occurrence mapping results in Figure 9 show the density and centrality of each cluster. The most central cluster centers on the keywords “ecological citizenship” and “citizenship,” as they occupy the center of the network and are widely connected to various other themes such as sustainability, democracy, ecology, and environmental education. The central position of ecological citizenship indicates that it serves as a conceptual axis connecting various discourses in the existing literature. Meanwhile, the clusters related to “sustainability,” “climate change,” “environmental values,” and “local participation” are the most developed (density) clusters and exhibit a relatively high level of thematic density due to strong internal connections among their keywords. This position

indicates growing research attention to the dimensions of sustainability, environmental justice, and social participation within the context of ecological citizenship. Meanwhile, the clusters related to environmental ethics and environmental protection show more limited connections. However, these clusters still serve as a normative foundation for building a conceptual framework for ecological citizenship. Thus, overall, the structure of these networks shows that the study of Ecological Citizenship develops through the relationship between the normative dimensions of citizenship, global sustainability issues, and the practice of social participation in environmental management. Finally, the ten keywords with the highest frequency are shown in Table 2.

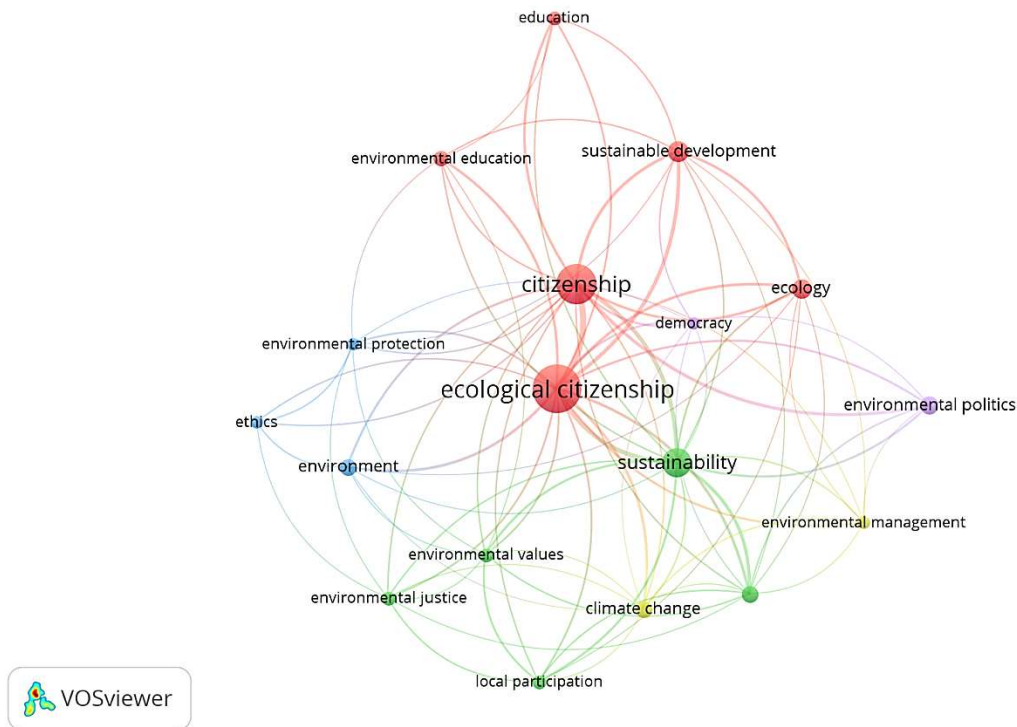


Figure 9. Co-occurrence framework and representation of key terms

Table 2. Keyword by authors

Rank	Key	Total link strength
1	Ecological Citizenship	126
2	Citizenship	106
3	Sustainability	70
4	Sustainable Development	38

5	Sustainable Consumption	33
6	Ecology	27
7	Local Participant	23
8	Environmental Politics	22
9	Environmental Values	22
10	Democracy	21

Mapping these previous studies shows that the research landscape on Ecological Citizenship is dominated by clusters connected to environmental studies, sustainability, geography, and environmental politics. This trend illustrates that Ecological Citizenship has developed within the traditions of environmental science and political theory. This is because, since its inception, the concept has been widely discussed in the context of environmental ethics, political theory, discourses on ecological justice, and sustainable governance (Barak, 2020; Dedeoglu & Dedeoglu, 2020; Latta, 2007). Meanwhile, in the context of Civic Education, the concept has not been widely operationalized in curriculum design, pedagogical strategies, or learning models. However, the concept of ecological citizenship is closely linked to civic values, such as responsibility, participation, and collective awareness (Karatekin, 2019; Zeng & Sweet, 2025). Thus, strengthening ecological citizenship research on strategies, models, and pedagogical approaches to foster citizens' ecological awareness is urgent and essential for filling the research gap and producing substantial innovations in pedagogical studies.

Previous research has explored the importance of ecological citizenship in various landscapes, such as that conducted by Kwang & Hyun (2023) in Korea, which demonstrated the importance of integrating faith-based ecological citizenship to build ecological religiosity as ecological attitudes and behaviors cultivated through religion (Gooding et al., 2025). Matsea's study in South Africa (2025) highlighted the importance of integrating ecological citizenship into social work practice and education in

environmental sustainability and justice, including its methods and approaches into the curriculum (Matsea, 2025). Fernandes et al.'s 2024 study emphasized the importance of Environmental Education (EE) in Brazilian High Schools and highlighted its inadequate integration into key educational documents, such as the BNCC. Thus, it emphasizes the need for effective EE to address pressing environmental issues and foster critical awareness for environmental action among students (Fernandes et al., 2024).

Furthermore, previous studies have explored approaches to building ecological awareness among citizens. Research by Cheng Zeng in 2025 highlighted the role of social media in fostering public commitment to environmental issues, particularly in the Chinese context. Social media has both potential and challenges for promoting ecological practices (Zeng et al., 2016). Research by Gooding et al. in 2025 explored Ecological Citizenship as a dynamic, people-centered approach to achieving carbon neutrality. This research emphasized the importance of local engagement and participatory governance in fostering ecological awareness by advocating for co-designed solutions that integrate social equity and ecological sustainability, and transforming from top-down technological fixes to inclusive, community-driven actions (Gooding et al., 2025). Furthermore, research by Komalasari et al. in 2025 in Indonesia, which developed a project-based learning model called Living Green Values Activities in Secondary Schools, showed promise strengthening ecological citizenship through Citizenship Education.

Based on the bibliometric analysis above, research on Ecological Citizenship has developed

conceptually as a robust discourse on poverty, environmental ethics, environmental politics, and policy governance. Meanwhile, pedagogical strategies oriented toward building ecological awareness in Citizenship Education have not yet emerged as a dominant group within the research network. Based on this understanding, educational approaches to building citizens' ecological awareness can fill the gap and produce important findings for the practice of ecological living.

Next, the researchers identified practical approaches discussed in the literature through thematic content analysis of the abstracts of the 155 articles in the dataset. The results showed that not all articles explicitly discussed ecological citizenship strategies; only a portion of the literature provided conceptual and practical insights into educational approaches, citizen engagement, and institutional initiatives to foster ecological awareness. Based on the identification results through the coding process and recurring patterns, there were 18 articles discussing ecological citizenship strategies with a pedagogical approach, 16 articles stating that ecological citizenship strategies can be implemented through social action, 10 articles highlighting school movements as an ecological citizenship strategy, 8 articles revealing that curriculum integration in learning can be an ecological citizenship strategy, and 5 articles indicating that ecological citizenship strategies can be implemented through digital citizenship (see table 3). These themes represent the most frequently discussed approaches to strengthening ecological citizenship in the context of education and citizenship.

Table 3. Thematic coding of ecological citizenship strategies in the literature

Strategy Theme	Number of Articles
Pedagogical Approaches	18
Social Action	16
School Movement	10
Curriculum Integration	8
Digital Citizenship	5

Based on the synthesis of these recurring themes, Figure 10 presents a proposed ecological citizenship strategy framework, grounded in an educational approach that systematically articulates the bibliometric mapping results and seeks to transform the dominance of normative and policy discourse into an operational, contextual approach to citizen education and participation. First, a curriculum that integrates ecological citizenship values is needed to address the dominance of the normative dimension in the literature. In the literature, ecological citizenship is often discussed in terms of values and principles, thus offering potential for integration into the educational curriculum.

Second, active pedagogical strategies are derived from the sustainability and participation cluster, emphasizing citizen action, responsibility, and engagement in environmental issues. Therefore, approaches such as project-based learning and experiential learning are relevant as operationalizations of sustainability values. Second, active pedagogical strategies emerge in response to the strong research trend emphasizing sustainability and participation. The literature demonstrates that ecological citizenship cannot be understood simply as a set of values but must be realized through concrete actions and citizen engagement in environmental issues.

Third, the school movement strategy and community collaboration emerged from the finding that ecological citizenship issues are closely linked to environmental politics and public governance. This suggests that ecological citizenship learning should not stop in the classroom but can be conducted in a broader social context, through concrete actions with local communities.

Fourth, the social action strategy is closely linked to the dimensions of democracy and political participation that emerged in the main research cluster. This finding confirms that ecological citizenship is not merely a matter of awareness or attitude, but also about the courage to engage, voice aspirations, and participate in advocacy and decision-making processes concerning environmental interests.

Fifth, the digital citizenship strategy becomes relevant in the context of the development of participation spaces that are increasingly shifting online. Today's environmental issues are often championed through digital campaigns, virtual collaborations, and social media-based advocacy.

Therefore, digital literacy and ethics are integral to the practice of ecological citizenship in the contemporary era.

Findings from various studies on Ecological Citizenship by previous researchers indicate that future research should focus on effective strategies

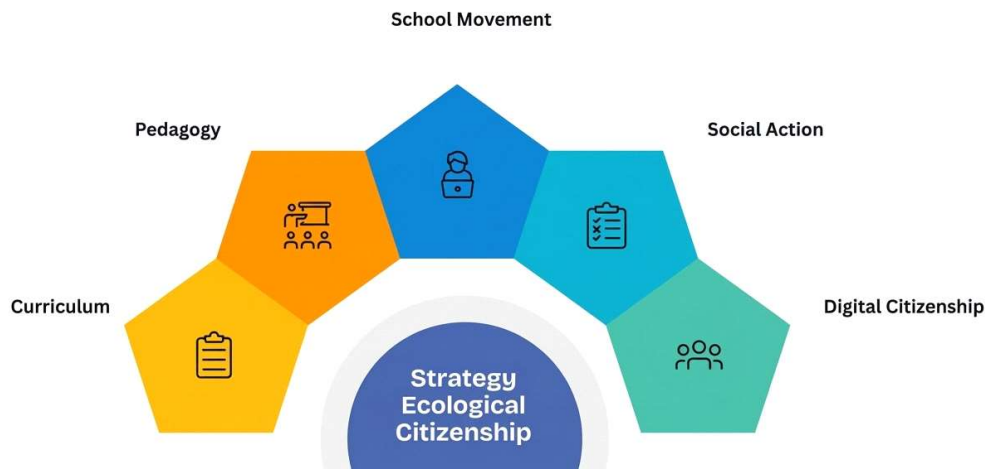


Figure 10. Strategy ecological citizenship

for building citizens' ecological awareness. Various related studies indicate that ecological awareness depends not only on an individual's understanding of environmental issues but also on their ability to interpret their responsibilities as citizens in an environmental context and on an awareness of the importance of environmental sustainability for survival. Further research to develop this ecological Citizenship Education strategy is essential so that ecological awareness does not remain at the theoretical level but can be realized through actions that support the achievement of the Sustainable Development Goals, especially SDG 4.7 (Education for Sustainable Development) and SDG 13 (Climate Action). Thus, Ecological Citizenship can serve as a practical framework for cultivating empowered, critical, and committed citizens committed to environmental sustainability.

■ CONCLUSION

Key Findings: A systematic literature review and bibliometric study of 155 documents revealed that research on Ecological Citizenship exhibited

a fluctuating pattern between 1998 and 2025. However, over the last two years, the number of publications has increased significantly compared to previous years, peaking in 2025. This finding indicates an increase in academic research on ecological issues, green values, and environmental challenges, along with increasing attention to environmental crises and issues of interest. The review of the literature also emphasized that the idea of Ecological Citizenship does not stop at legal status or political procedures, but instead offers a new perspective on the importance of citizens' roles and ethical responsibilities in maintaining environmental ecosystems.

Implications: Most research on ecological citizenship is situated within the discourses of environmental studies, environmental political theory, and sustainability. Meanwhile, pedagogical perspectives on explicit ecological citizenship education strategies remain relatively marginal. This finding implies the need for future studies to strengthen the operationalization of Citizenship Education to build citizens' ecological awareness.

Limitations: This study is limited to a literature review and a bibliometric analysis of documents retrieved from the English-language Scopus database, which may exclude relevant regional or non-English-language publications, particularly from Africa and Latin America. Therefore, while this analysis provides a comprehensive overview of structural trends, it does not fully capture in-depth pedagogical or sociocultural insights across studies. Methodologically, the data analysis is largely descriptive, based on co-occurrence patterns and publication trends. Hence, the findings reflect more the structure and thematic configuration of the field of study than the methodological quality of each study.

Future Research: Current analysis is dominated by research from Global North countries, so further ethnographic case studies in Global South countries are needed to understand how the concept of Ecological Citizenship is implemented across different socio-cultural contexts. Ethnographic case studies and community-based research in regions such as Asia, Africa, and Latin America could provide deeper insights into locally embedded forms of ecological citizenship and contribute to a more inclusive understanding of the concept globally.

■ **DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS**

During the drafting of this manuscript, the author(s) utilized Google Translate for refining sentence structure/translating text. Following the use of this tool, the author(s) reviewed and revised the content as necessary and accept full responsibility for the final content of the article.

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