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Evolution and Thematic Structure of Research on The Right to a Healthy Environment in Scopus (2018–2023)

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Abstract

This article analyzed scientific output indexed in Scopus regarding the right to a healthy environment during the 2018–2023 period, with the aim of identifying its evolution, its disciplinary configuration, and its main lines of research. A descriptive, retrospective, and longitudinal bibliometric study was conducted based on an advanced search across titles, abstracts, and keywords, which retrieved 713 documents. The analysis encompassed seven indicators: total publications, citation distribution, disciplinary fields, primary sources, document types, keywords, and lines of research. The findings revealed sustained growth in scholarly output, with a higher concentration occurring in the final years of the period. The disciplinary structure was concentrated primarily within the social sciences, followed by environmental sciences, thereby demonstrating an inherently interdisciplinary field characterized by a distinct legal and political-institutional foundation. In terms of publication formats, journal articles predominated, although book chapters also held a significant position. A keyword co-occurrence network analysis identified five thematic clusters: human rights and environmental rights; climate change and litigation; environmental protection and regulation; sustainability and impacts; and environmental justice with democratic participation. Taken together, the study demonstrated that the right to a healthy environment has established itself as an expanding scientific agenda, increasingly linked to issues of enforceability, climate justice, and environmental governance.

Keywords: *Right To a Healthy Environment, Human Rights, Bibliometrics, Environmental Justice, Climate change.*

Introduction

The relationship between human rights and environmental protection currently occupies a prominent place on the international legal and scientific agenda (May, 2020; Scheidel et al., 2020; Vale et al., 2021). Although this connection has historical precedents, in recent years it has gained conceptual depth, institutional development, and increased prominence in specialized research. Part of this expansion is explained by the growing body of evidence regarding the effects of environmental degradation on health, a life of dignity, food security, access to water, and the persistence of social inequalities. These factors have prompted a discussion of a healthy environment not merely as a collective good, but also as a prerequisite for the effective exercise of other rights (Challender et al., 2022; Higuera Carrillo, 2022; Purnomo et al., 2020).

Within this framework, the right to a clean, healthy, and sustainable environment has ceased to be a peripheral concept within international law (Cima, 2022; Rajamani et al., 2021; Tang & Spijkers, 2022). A review by Knox (2020) demonstrates that its recent construction has been bolstered by three converging pathways: the incorporation of environmental rights into national constitutions and domestic legislation, their recognition in regional instruments, and their development through the interpretive work of human rights bodies. This trajectory reached a point of high visibility in 2022, when the United Nations General Assembly adopted Resolution 76/300, thereby recognizing this right as a human right. Although this resolution did not, in itself, resolve the debates regarding the scope of its legal force, it did consolidate a political and normative framework that has intensified academic discourse concerning its content, its correlative obligations, and its effects across various regulatory levels (Becerra Valdivia, 2022; Liu et al., 2021; Moreira & Reis Fonseca, 2024).

Latin America and the Caribbean occupy a particularly significant position within this process. The region has served as a fertile ground for the articulation of environmental constitutionalism, human rights, social mobilization, and jurisprudential development (Araque Geney, 2023). Tigre (2023) argues that recent

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international recognition acquires particular significance in this region, precisely because it engages in dialogue with prior legislative and judicial advancements. Along these same lines, the Escazú Agreement has reinforced the procedural dimension of the issue by linking the right to live in a healthy environment with access to information, public participation, and access to justice in environmental matters (Etemire, 2023b; Hernández Ordoñez, 2020). Consequently, the regional discourse is not limited to the abstract recognition of the right, but rather extends to the institutional conditions necessary to render it enforceable (López-Cubillos et al., 2022; Murgas Téllez et al., 2023a).

At the same time, recent literature indicates that the subject is shifting toward more concrete scenarios of controversy (González Vallejo, 2023; Hassanali, 2021; Perlaviciute & Squintani, 2023). One such scenario is climate litigation, where the right to a healthy environment appears with increasing frequency as an argumentative basis for examining the adequacy of state responses to climate change. De Vilchez and Savaresi (2023) examine this trend, arguing that invoking this right can strengthen the architecture of climate litigation. Another front involves Inter-American jurisprudence. Mardikian (2023) analyzes how the Inter-American Court of Human Rights has treated the right to a healthy environment as an autonomous right, with implications extending beyond the indirect protection of individual interests. In addition to these developments, the literature shows that the discussion has moved from doctrinal affirmation toward issues of justiciability, judicial interpretation, and the scope of state obligations (Angstadt, 2023; Murgas Téllez et al., 2023b; Putzer et al., 2022).

Alongside this normative and jurisprudential expansion, the field has also undergone theoretical diversification. Chalabi (2023) notes that the right to an environment operates at individual, collective, and global levels, thereby necessitating a re-examination of its conceptual contours and its relationship with other already-recognized rights. In parallel, discussions regarding environmental justice, environmental democracy, and the rights of nature have gained ground; these discussions broaden the horizon of the debate and challenge strictly anthropocentric interpretations of contemporary environmental law (Clarke & Mcphie, 2020; Vázquez Vidal & Martínez Prats, 2023). Consequently, recent literature is no longer organized around a single central question. Rather, it unfolds in various directions: legal foundations, access and participation, climate litigation, protection of vulnerable groups, ecological governance, and the reformulation of the relationship between society and nature (Beauregard et al., 2021; González Ávila et al., 2023; Robinson & Carlson, 2021).

This thematic breadth renders a systematic review of recent scientific output particularly pertinent. When a field expands rapidly and is dispersed across diverse disciplinary areas, journals, and editorial formats, it becomes increasingly difficult to identify its growth trajectories, its conceptual core, and its primary research foci (Raudales-Garcia et al., 2024). In this instance, this imperative is even more pronounced, as the right to a healthy environment is situated at the intersection of legal studies, the social sciences, and environmental studies—characterized by a transnational circulation that synthesizes global debates with regional developments. For this reason, a bibliometric analysis offers an appropriate avenue for structuring the field, observing its evolution, and identifying the research agendas that have gained the greatest traction in recent years.

Addressing this challenge, the present article analyzes the literature indexed in Scopus concerning the right to a healthy environment published between 2018 and 2023. The study aims to examine publication dynamics, citation distribution, the most closely related disciplinary fields, key sources, predominant document types, keyword structures, and the research trajectories that organize the field. In doing so, it seeks to provide an updated cartography of recent scientific output and to establish an empirical foundation for understanding how this subject is currently being shaped within contemporary academic research.

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Methodology

Study Design and Scope

- A descriptive, retrospective, and longitudinal bibliometric study was conducted on literature indexed in Scopus concerning the right to a healthy environment as an element associated with human development. The analysis focused on the 2018–2023 period, with the aim of examining the field's recent evolution, its citation patterns, predominant publication modalities, disciplinary distribution, and the conceptual structure of the retrieved output.

- The study design combined two analytical levels. The first evaluated the field's performance using indicators of production volume, citations, document typology, and source concentration. The second examined its thematic organization—based on keywords as well as the content of titles and abstracts—in order to identify the main lines of research.

Information Source and Search Strategy

- The information source used was Scopus, selected for its multidisciplinary coverage, its consistency for bibliometric studies, and the availability of metadata suitable for the analysis of scientific performance and structure (Ledesma & Malave González, 2022). Document retrieval was carried out via an advanced search across the title, abstract, and keyword fields, using the following search equation: TITLE-ABS-KEY("right to a healthy environment" OR "right to a clean environment" OR "right to a clean healthy and sustainable environment" OR "right to a healthy and sustainable environment" OR "environmental right*" OR "right to environment*") AND PUBYEAR > 2017 AND PUBYEAR < 2024.

- The search yielded 713 records for the defined interval. Annual production exhibited an upward trajectory, with 81 documents in 2018, 90 in 2019, 99 in 2020, 125 in 2021, 145 in 2022, and 173 in 2023. These figures served as the basis for the analysis of the field's growth.

Corpus Construction and Data Processing

- The corpus was constituted by the entirety of the records retrieved from Scopus for the study period. The decision to retain the complete set was driven by two reasons. On the one hand, document type was treated as a central indicator of the study; thus, excluding specific categories from the outset would have distorted the actual representation of the publication modalities present within the field. On the other hand, literature concerning the right to a healthy environment circulates across a variety of formats—including journal articles, book chapters, reviews, conference papers, and other forms of academic communication—particularly within the legal and socio-environmental domains.

- The bibliographic export, generated in CSV format, included metadata covering authorship, title, publication year, source, citation count, abstract, author keywords, indexed keywords, references, publisher, document type, and open access status. These fields served as the basis for a preliminary data cleaning process, which involved verifying the consistency of titles and identifiers, as well as identifying potential duplicates. Concurrently, the keywords underwent a process of semantic and formal normalization aimed at standardizing orthographic variations, singular and plural forms, capitalization usage, and equivalent expressions.

- For the conceptual analysis, priority was given to documents that provided substantive content within their titles, abstracts, and keywords. Consequently, records such as errata, retractions, and brief editorial pieces were retained within the descriptive profile of the corpus; however, they were excluded from the thematic interpretation whenever their content proved insufficient for that specific purpose.

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Bibliometric Indicators

The study was structured around seven indicators.

The first was the total number of publications. This indicator allowed for a description of the annual evolution of scientific output and an assessment of the temporal trends in academic interest regarding the right to a healthy environment. It was analyzed using absolute frequencies and relative proportions per year.

The second indicator corresponded to the distribution of citations. To this end, the citations received by each document—as recorded in Scopus on the date of data extraction—were utilized. The supplementary report showed a cumulative total of 4,145 citations and an h-index of 28. Furthermore, it indicated that 525 documents had received at least one citation, implying the existence of 188 records with no citations at the time of the data cutoff. Given that citation counts typically exhibit an asymmetrical distribution, this indicator was interpreted based on the cumulative total, the proportion of cited versus uncited documents, and the annual trends in citations.

The third indicator focused on the primary areas of disciplinary affiliation. This dimension was reconstructed based on the Scopus thematic classification system, which allowed for the positioning of the field within its broader interdisciplinary landscape. The analytical report revealed a strong presence of "Social Sciences," followed by "Environmental Science," "Arts and Humanities," "Energy," "Earth and Planetary Sciences," and "Agricultural and Biological Sciences," among other categories. Since a single document may be assigned to more than one disciplinary area, the sum of frequencies across disciplines exceeds the total size of the corpus; therefore, this variable was interpreted in terms of thematic relationships rather than as a set of mutually exclusive partitions.

The fourth indicator was that of primary sources. Its purpose was to identify the journals, edited volumes, or publication series in which the subject matter was most heavily concentrated. To achieve this, the "Source title" field from the exported data file was utilized, and frequencies were calculated for each source. This analysis made it possible to identify core publishing outlets as well as the degree of dispersion within the retrieved literature.

The fifth indicator was document type, which was incorporated as a substitute for the analysis of international co-authorship. This adjustment allowed for a more precise description of the predominant forms of scholarly communication within the field.

The sixth indicator focused on keywords. For this analysis, author keywords were prioritized, supplemented by indexed keywords whenever their presence proved consistent. Following terminological normalization, a co-occurrence analysis was applied to identify recurring terms, thematic associations, and conceptual clusters within the corpus. This procedure made it possible to observe the thematic agenda evident in the database, as well as its areas of highest density.

The seventh indicator focused on the main lines of research. These were not defined solely by lexical frequency, but rather through an integration of the keyword network and an analytical reading of titles and abstracts. The identification of these lines was based on thematic clusters and the most representative documents within each grouping, thereby allowing for the naming of research trends in a manner consistent with the actual content of the corpus.

Supplementary Analytical Sources from Scopus

In addition to the primary bibliographic export, analytical outputs from Scopus were utilized, covering annual production, citation overview, document type, subject areas, and the countries and institutions with the highest number of records. Data regarding countries and institutions were reserved as supporting contextual input to characterize the geography and institutional landscape of the field. However, they were not incorporated into the main set of indicators defined for this methodological phase.

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Analysis Procedure

Data processing was carried out in two stages. The first stage involved a bibliometric performance analysis, focusing on publication volume, citation distribution, disciplinary fields, publication sources, and document types. The second stage addressed the conceptual structure of the field through a keyword co-occurrence analysis and a thematic review of titles and abstracts.

Spreadsheet and bibliographic processing tools were utilized to organize, clean, and tabulate the metadata. Specialized software—specifically VOSviewer—was selected for the visualization of networks and thematic maps, given its utility in co-occurrence analysis and cluster representation. The names assigned to the research lines were not generated automatically; rather, they were determined after reviewing the dominant terms within each cluster and cross-referencing them with the content of the most representative documents.

Interpretive Considerations

The results were confined to literature indexed in Scopus and, therefore, represent the visible structure of the field within that database. This delimitation fostered analytical consistency and international comparability, although it may have excluded unindexed legal or regional scholarship. It was also taken into account that citation counts depend on the exposure time of each document; consequently, works published in more recent years had a shorter window in which to accumulate citations.

From a disciplinary standpoint, the overlap among subject areas indicated that the right to a healthy environment has been approached through a cross-cutting lens, characterized by a strong presence of the social sciences and a sustained interconnection with environmental studies. Furthermore, the distribution by document type provided a more suitable basis for assessing the manner in which this field has circulated and consolidated itself within the available scientific literature.

Results

Evolution of Scientific Production

The search retrieved 713 documents published between 2018 and 2023. The annual series demonstrated sustained growth throughout the entire period, rising from 81 records in 2018 to 173 in 2023. In relative terms, this represented an increase of 113.6% between the first and last years analyzed. The trend was not linear, though it was upward: 2018 contributed 81 documents, 2019 gathered 90, 2020 reached 99, 2021 rose to 125, 2022 reached 145, and 2023 recorded the highest figure with 173 publications (Figure 1).

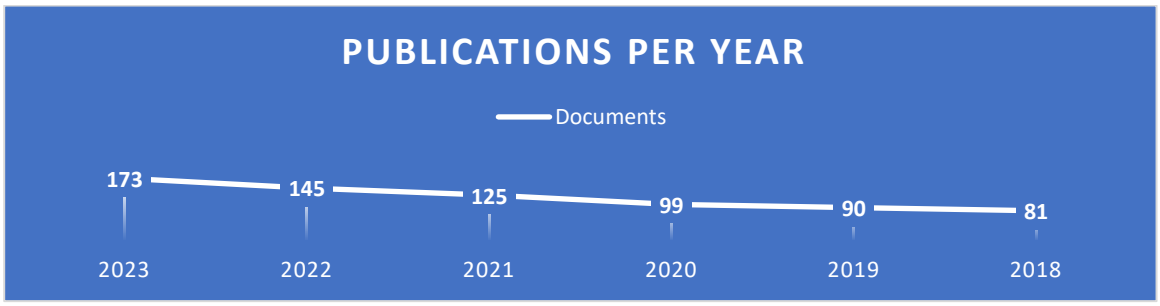

Figure (1) Publishing Trends

The temporal distribution suggested a progressive expansion of academic interest in the right to a healthy environment within the literature indexed in Scopus. The 2021–2023 period accounted for 443 documents—equivalent to 62.1% of the corpus—thereby situating the highest publication density at the end of the series. This pattern allowed for the identification of an acceleration point beginning in 2021, when output increased by 26 documents compared to the previous year. Since then, growth has continued, with increases of 20

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records in 2022 and 28 in 2023. Taken together, the average annual growth rate stood at approximately 16.4%, a figure that reinforced the interpretation of an expanding research agenda.

From a descriptive perspective, the observed trajectory indicated that the topic has ceased to occupy a marginal position within recent scientific output. The annual sequence showed no setbacks, thereby suggesting an accumulative process of consolidation. Nevertheless, the increase in volume did not, in itself, imply a homogeneous maturity of the field; consequently, it proved necessary to contextualize this expansion against citation patterns and the internal structure of the scholarly output.

Distribution of Citations

The Scopus report recorded a cumulative total of 4,145 citations for the analyzed set, along with an h-index of 28. Furthermore, the citation overview revealed 525 documents with at least one citation, implying that 188 works—equivalent to 26.4% of the corpus—had not received any citations at the time of data extraction. This initial finding highlighted an uneven distribution of impact, with a substantial segment of documents remaining relatively low in visibility in terms of citations.

An examination of the exported data file revealed an asymmetrical distribution. The mean stood at 5.81 citations per document, while the median was 2; this disparity underscored a concentration of citations within a relatively small subset of publications. The maximum value reached 178 citations—far exceeding the central tendency of the corpus. At the lower end of the spectrum, nearly half of the documents (45.9%) had accumulated between 1 and 5 citations, whereas only 4.35% had surpassed the 25-citation mark. This pattern aligns with trends observed in fields that have experienced rapid growth in recent years—fields where highly cited texts coexist alongside a large volume of scholarly output that is still in the early stages of academic reception.

When citation data was analyzed by year of publication, an expected contrast emerged between a document's age and its cumulative citation count. Documents published in 2018 recorded an average of 10.89 citations per work, compared to 3.19 for those published in 2023. This discrepancy did not necessarily reflect a lower level of relevance for more recent works, but rather a shorter time window in which to accrue citations. Consistent with this observation, the percentage of documents with zero citations was lower in 2018 (at 13.6%) and higher in 2023 (at 34.1%). Consequently, interpreting this indicator required caution, as the lower citation counts observed in the most recent years were attributable, in part, to the limited time elapsed since publication—rather than solely to the intellectual reception of the subject matter (Figure 2).

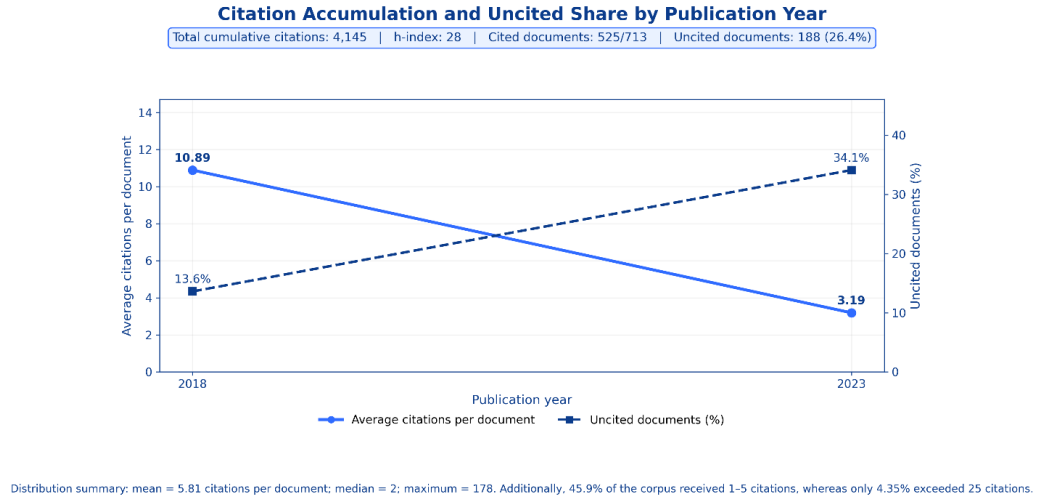

Figure (2) Citation Analysis

In global terms, the distribution of citations revealed a field characterized by sustained documentary expansion, albeit with recognition still concentrated in certain reference works. This pattern suggested that

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the literature concerning the right to a healthy environment had increased its presence in Scopus, yet continued to maintain a hierarchical citation structure, wherein a minority of documents captured a significant proportion of academic attention.

Main Areas of Disciplinary Interrelation

- The distribution by thematic area revealed that the literature concerning the right to a healthy environment was markedly concentrated within the social sciences. This category comprised 608 documents, equivalent to 85.3% of the corpus. Occupying a secondary position was Environmental Science, with 221 records, corresponding to 31.0%. Further behind appeared Arts and Humanities with 56 documents, Energy with 52, Earth and Planetary Sciences with 43, Agricultural and Biological Sciences with 41, and Economics, Econometrics and Finance with 40. A presence was also recorded—albeit a more limited one—in Medicine; Business, Management and Accounting; Engineering; and Computer Science.

- This pattern indicated that the field was structured, above all, through a normative, political, and social lens regarding the environmental problem. The high concentration in Social Sciences suggested that the debate unfolded primarily around rights, governance, environmental justice, public policy, ecological citizenship, and regulatory disputes. At the same time, the second-place ranking of Environmental Science demonstrated that the discussion did not remain circumscribed to the legal or institutional sphere, but rather maintained a sustained link with evidence regarding environmental degradation, climate change, conservation, and land use (Figure 3).

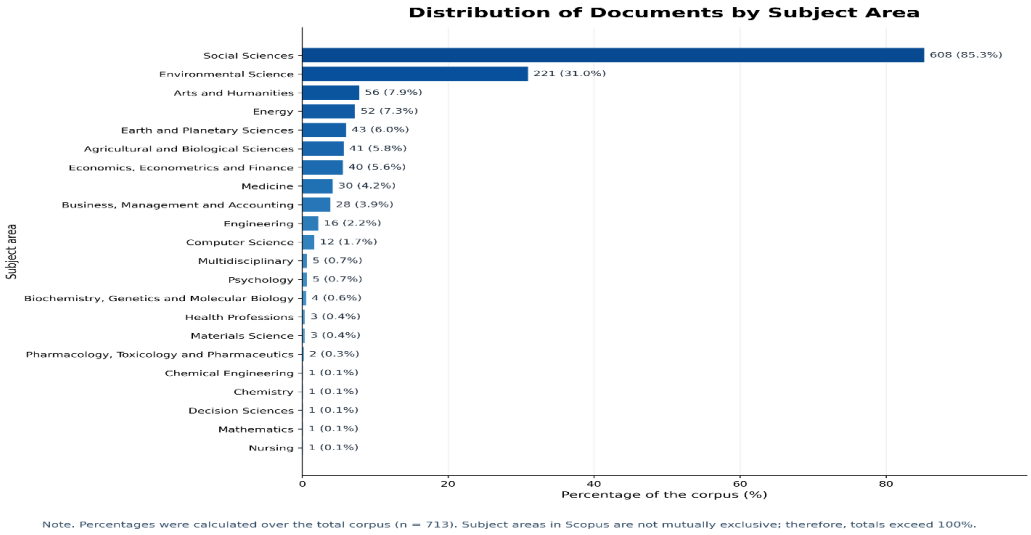

Figure (3) Documents by Knowledge Area

The presence of Arts and Humanities introduced another significant nuance. Although its quantitative weight was minor, this area revealed that a segment of the field engaged with debates concerning ethics, political philosophy, ecological thought, and the cultural foundations of the relationship between society and nature. In parallel, the participation of Energy, Earth and Planetary Sciences; Agricultural and Biological Sciences; and Economics, Econometrics and Finance suggested that the right to a healthy environment was also examined in connection with the energy transition, extractive conflicts, natural resource management, food security, and the social and economic costs of environmental degradation.

It is worth clarifying that these categories were not mutually exclusive. In Scopus, a single document may be classified under multiple subject areas; consequently, the sum of records per discipline exceeds the total size of the corpus. For this reason, the distribution did not depict watertight compartments, but rather a web of disciplinary relationships. Interpreted in this light, the evidence revealed a clearly interdisciplinary field—albeit one with a center of gravity anchored in the social sciences, and an active periphery engaged in dialogue with the environmental sciences, the humanities, and certain applied domains.

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From an interpretive standpoint, this configuration supports the argument that the right to a healthy environment was approached primarily as a problem of a social, institutional, and axiological nature, rather than as an exclusively technical issue. The relatively lower presence of areas such as Engineering, Computer Science, or Materials Science did not imply an absence of links to the technological dimension; however, it did suggest that, during the period under analysis, scientific discourse coalesced more strongly around rights-based frameworks, socio-environmental conflicts, and the regulation of ecological transformations.

Main Sources

An examination of the sources revealed a relatively defined editorial core, albeit one characterized by significant dispersion across the corpus. The ten most frequent sources collectively accounted for 111 documents, equivalent to 15.6% of the total retrieved. This pattern indicated that scholarly output was not concentrated within a single publication channel, but rather distributed across specialized journals focusing on environmental law, human rights, and environmental policy, alongside various edited volumes centered on the nexus between the environment and fundamental rights.

At the very top of the distribution stood the *Review of European, Comparative and International Environmental Law* and the *Journal of Agricultural and Environmental Law*, both with 15 documents each. Next appeared *The Human Right to a Healthy Environment*, with 14 records. Following these were the *Journal of Environmental Law*, *Human Rights and the Environment in Africa: A Research Companion*, and the *Journal of Human Rights and the Environment*, each contributing 11 documents. This pattern suggested that the field is structured around two complementary circuits: on one hand, established legal and socio-environmental journals; on the other, edited volumes comprising specialized chapters on ecological constitutionalism, human rights, and environmental protection.

Also noteworthy was the simultaneous presence of academic publishers with international reach—such as Oxford University Press, Cambridge University Press, Edward Elgar, MDPI, and IOS Press—alongside publishers and journals with a more regional or thematic focus. Taken together, this composition reinforced the notion that the right to a healthy environment has evolved as a field grounded in strong legal and social foundations, yet remains open to comparative and transnational discourse.

Given that Scopus records both journals and books or edited volumes under the category of "source title," the table below reports the number of documents indexed per source. Consequently, the quantitative column is not limited to articles in the strict sense, but rather encompasses the total number of contributions associated with each source within the corpus (Table 1).

Table (1) Leading Sources By Number Of Publications

Source	Documents	Editorial
Review of European, Comparative and International Environmental Law	15	John Wiley and Sons Inc / Blackwell Publishing Ltd
Journal of Agricultural and Environmental Law	15	CEDR - Hungarian Association of Agricultural Law
The Human Right to a Healthy Environment	14	Cambridge University Press
Journal of Environmental Law	11	Oxford University Press
Human Rights and the Environment in Africa: A Research Companion	11	Taylor and Francis
Journal of Human Rights and the Environment	11	Edward Elgar Publishing Ltd.
Environmental Rights in Europe and Beyond: Swedish Studies in European Law, Volume 11	10	Bloomsbury Publishing Plc.
Sustainability (Switzerland)	8	MDPI

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Source	Documents	Editorial
Environmental Policy and Law	8	IOS Press BV
Human Rights and the Environment under African Union Law	8	Springer International Publishing

From an interpretive standpoint, the table revealed that the field did not rely exclusively on periodical journals. A visible portion of the output circulated through book chapters in thematic volumes, which could indicate a phase of consolidation underpinned by collective debates, legal compilations, and regional research agendas. At the same time, the presence of specialized journals among the leading sources demonstrated that the subject already possessed stable publication venues within the indexed circuit.

Document Type

The distribution by document type revealed a clear predominance of the article as the primary mode of publication. Of the 713 records retrieved, 450 corresponded to articles, representing 63.1% of the corpus. Book chapters ranked second, with 174 documents, equivalent to 24.4%. Trailing significantly behind were conference papers and reviews, both with 27 records and a share of 3.8% each. Books totaled 17 documents—that is, 2.4% of the total. The remaining categories had a limited presence: notes with 5 records, editorials with 4, errata with 3, letters with 2, short surveys with 2, and retracted items with 2.

This publication profile allowed for the identification of two key characteristics of the field (Figure 4). The first was the centrality of scientific journals as the dominant channel of dissemination. The proportion of articles suggested that the right to a healthy environment has successfully established itself within the indexed academic circuit, and that a significant portion of the discourse has been formalized in periodicals subject to editorial review. The second characteristic was the still-substantial weight of book chapters. Their volume was by no means marginal; on the contrary, it indicated that a significant fraction of the debate continued to unfold within collective works, specialized compilations, and thematic books—a pattern frequently observed in fields with strong legal, philosophical, and socio-environmental foundations.

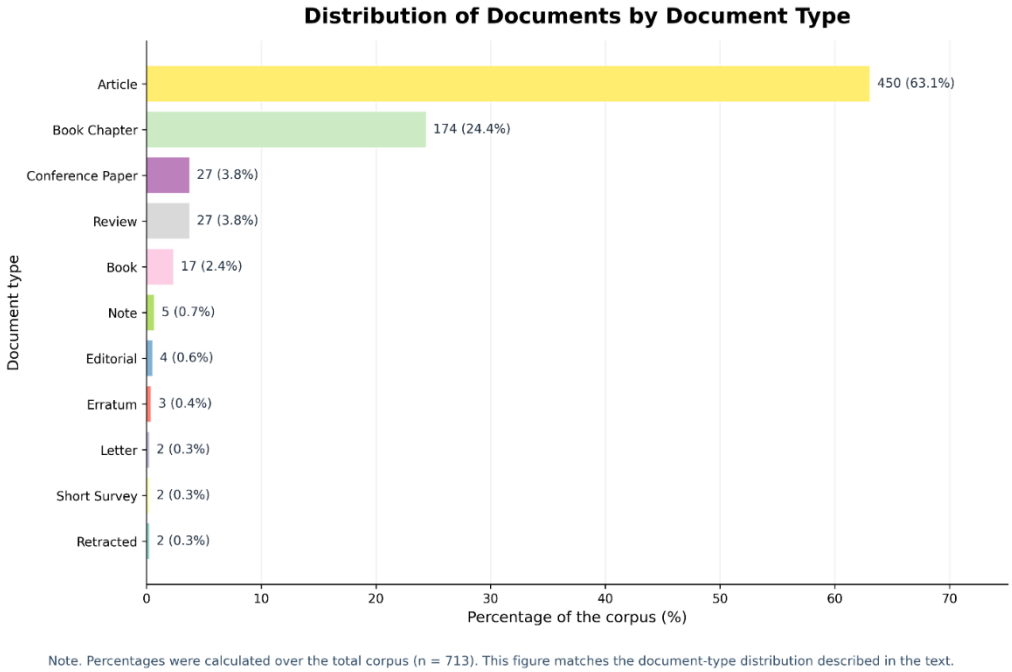

Figure (4) Document Type

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The simultaneous presence of journal articles and book chapters, therefore, suggested a hybrid configuration of scientific output. On one hand, the field showed signs of stabilization within specialized journals. On the other hand, it maintained considerable circulation in formats that favor broad doctrinal discussions, comparative analyses, and more extensive conceptual developments. This combination could indicate that the research agenda concerning the right to a healthy environment is currently in a stage of expansion, wherein empirical works, normative studies, and broader-ranging reflections coexist.

Review articles and conference papers occupied a smaller segment, although their presence also provided insights into the dynamics of the field. The number of reviews was relatively low compared to the total corpus, which may reflect that the systematization of knowledge has not yet kept pace with primary research output. As for conference papers, their limited proportion suggested that the field has not relied predominantly on preliminary dissemination channels, but rather on more established editorial formats.

Residual documents—such as editorials, notes, letters, errata, and retractions—carried little quantitative weight and did not alter the general profile observed. Nevertheless, their inclusion ensured a faithful representation of the universe of documents retrieved from Scopus. Taken together, the distribution by document type revealed a field whose output relies primarily on journal articles, yet features a significant contribution from book chapters; this reinforced the notion of an academic discourse that is robust within journals while remaining highly active within specialized volumes.

Keywords and Conceptual Structure of The Field

The keyword co-occurrence analysis—generated in VOSviewer using the "All Keywords" option—comprised 997 terms distributed across 32 clusters. This breadth confirmed that the corpus was not organized around a single thematic conversation, but rather around a constellation of interconnected debates (Figure 5). Nevertheless, the network exhibited a relatively clear core, dominated by terms related to human rights, environmental regulation, climate change, and environmental protection.

Figure (5) All Keyword Network

The centrality of certain nodes made it possible to identify with considerable clarity the concepts that articulated the literature. The term with the greatest presence was "human rights", with 169 occurrences and a total link strength of 1,099. It was followed by "environmental rights" (102 occurrences, total link strength of 550), "climate change" (59 and 448), "right to a healthy environment" (53 and 264), and "environmental protection" (52 and 469). "Environment", "environmental legislation", "environmental justice", "international law", and "sustainable development" also occupied prominent positions, demonstrating that the field is grounded in an articulation among rights-based language, normative governance, and contemporary environmental conflicts (Table 2).

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Table (2) Keywords co-occurrence

Keywords	Occurrences	Total link strength
human rights	169	1099
environmental rights	102	550
climate change	59	448
right to a healthy environment	53	264
environmental protection	52	469
environment	45	277
environmental legislation	41	314
environmental justice	40	281
international law	36	255
sustainable development	35	230

The network revealed not only frequency but also conceptual proximity. The "human rights" node connected particularly intensely with "environmental rights," "climate change," "environmental protection," "environment," and "international law." This configuration indicated that the right to a healthy environment has been discussed primarily within a broader framework of human rights, rather than as a category isolated from the rest of the legal system. Along similar lines, "environmental rights" maintained significant links with "environmental protection," "climate change," "environmental regulations," "sustainable development," and "environmental legislation," suggesting a persistent association between normative recognition, regulatory implementation, and the ongoing debate regarding the effectiveness of these rights.

The term "right to a healthy environment" occupied a less prominent position than "human rights," yet it demonstrated significant connectivity with "human rights," "climate change," "rights of nature," the "Inter-American Court of Human Rights," "environmental law," and "environmental protection." This pattern proved significant because it situated the specific subject of the study at the intersection of the juridification of the environment, the expansion of climate litigation, and the emergence of debates concerning non-human subjects and the enhanced protection of nature. In other words, the literature did not treat the right to a healthy environment solely as a normative proclamation, but also as an issue of justiciability, judicial interpretation, and the substantive scope of environmental protection.

The organization into clusters reinforced this interpretation. One of the densest clusters coalesced around "environmental rights," "environmental justice," "democracy," "environmental democracy," and "procedural environmental rights," pointing to an agenda centered on participation, access, environmental citizenship, and the democratization of ecological governance. Another cluster was structured around the "right to a healthy environment," "environmental human rights," "climate justice," the "Inter-American Human Rights System," and "procedural rights," placing a clear emphasis on the legal and rights-guaranteeing dimensions of the subject. Added to this was a group associated with "climate change," "environmental law," "climate litigation," "judicial activism," and "justiciability," which highlighted the advancement of an agenda in which climate litigation and judicial responses have gained increased prominence.

A fourth cluster brought together terms such as "environmental protection", "law enforcement", "mining", "public interest litigation", "Paris Agreement", and "environmental defenders". This grouping demonstrated that a portion of the scholarly output shifted away from the abstract formulation of rights toward issues of compliance, extractive conflicts, and territorial defense. Another significant cluster organized itself around "sustainable development", "environmental impact", "clean environment", "environmental sustainability", and "environmental planning", thereby linking the right to a healthy environment with agendas concerning sustainability, impact assessment, and development planning.

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A temporal reading of the overlay map provided an additional nuance (Figure 6). The terms showing the greatest recent prominence included "climate litigation" (with an average publication year of 2022.25), "rights of nature" (2021.83), "right to a healthy environment" (2021.75), and "clean environment" (2021.71). These values suggested that, during the latter part of the analyzed period, the field shifted toward more concrete debates regarding litigation, judicial recognition, ecocentrism, and the expansion of the repertoire of protected subjects. In contrast, terms such as "international law", "environmental legislation", and "environmental protection" appeared as more established nodes, thereby allowing for a distinction between a consolidated conceptual foundation and thematic lines of recent expansion.

Figure (6) All Keyword Overlay

It is also worth noting that the use of "All Keywords" incorporated peripheral descriptors lying outside the strict core of environmental law—including "adult", "child", "adverse event", "air quality", and "acoustic noise". While this presence did not undermine the coherence of the map, it did indicate that the search captured works originating from adjacent fields, particularly public health and environmental exposure studies. For this reason, the interpretation of the network focused on the terms possessing the highest semantic density relative to the study's objective—namely, those linked to rights, regulation, environmental justice, litigation, and sustainability (Figure 7).

- **Figure (7) All keyword density**

The keyword network revealed that the literature concerning the right to a healthy environment is organized around five conceptual axes: human rights and environmental rights; climate change and litigation; environmental protection, regulation, and policy; sustainability and impact assessment; and environmental justice with democratic participation. This structure provided a solid foundation for transitioning to the next

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section—focused on the main lines of research—where these groupings can be interpreted as the field's thematic agendas.

The conceptual structure of the field made it possible to identify a set of relatively stable lines of research. These did not emerge from an isolated analysis of frequently occurring terms, but rather from the interplay between frequency of occurrence, total link strength, nodal proximity, and the thematic clusters observed in the VOSviewer maps.

Within this framework, the retrieved literature was organized around five main lines: human rights and environmental rights; climate change and litigation; environmental protection, regulation, and policy; sustainability, planning, and impacts; and environmental justice with democratic participation. Collectively, these lines demonstrate that the right to a healthy environment has been addressed as a legal, political, and socio-environmental issue, with a growing openness toward climate-related disputes, procedural guarantees, and alternative models for the relationship between society and nature.

Research line	**Predominant content**	**Most representative associated terms**
Human Rights and Environmental Rights	It gathered works focused on the legal foundation of the right to a healthy environment, its recognition as a human right, and its integration into national, regional, and international protection frameworks.	*human rights*, *environmental rights*, *right to a healthy environment*, *international law*, *environmental human rights*
Climate Change and Litigation	It grouped together studies on the judicialization of the climate crisis, the enforceability of state obligations, climate justice, and the expansion of environmental litigation in national and international courts.	*climate change*, *climate litigation*, *climate justice*, *judicial activism*, *justiciability*
Environmental Protection, Regulation, and Policy	It included research oriented toward normative design, regulatory implementation, compliance with environmental obligations, and the effectiveness of protection instruments.	*environmental protection*, *environmental legislation*, *environmental law*, *law enforcement*, *environmental regulations*
Sustainability, Planning, and Impacts	It brought together works linking the right to a healthy environment with sustainable development, spatial planning, impact assessment, and natural resource management.	*sustainable development*, *environmental sustainability*, *environmental planning*, *environmental impact*, *clean environment*
Environmental Justice and Democratic Participation	It incorporated studies on access to information, access to justice, citizen participation, environmental democracy, and procedural guarantees in ecological governance.	*environmental justice*, *environmental democracy*, *access to information*, *access to justice*, *procedural environmental rights*

Discussion

The sustained growth in output between 2018 and 2023 suggests that the right to a healthy environment has ceased to occupy a peripheral position within indexed literature, becoming an integral part of a more established academic discourse instead. This trend aligns with the arguments put forth by Knox (2020)—who demonstrates that the construction of this right was grounded in the convergence of domestic constitutionalization, international practice, and doctrinal development—as well as with those of Chalabi (2023), who, as early as 2023, analyzes the right to the environment through a more refined architectural lens, encompassing individual, collective, and global levels. Viewed from this perspective, the surge in publications observed during the 2021–2023 period appears to reflect less of a sudden eruption and more of a consolidation phase for a debate that had been maturing—one that has now begun to translate into a more visible scientific agenda.

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The disciplinary structure of the field reinforces this interpretation. The heavy concentration within the social sciences—followed, at a considerable distance, by the environmental sciences—indicates that the field is organized primarily around issues of governance, regulation, justice, participation, and conflict, rather than around purely technical approaches. This composition aligns with the framework proposed by Pickering et al. (2020), who situate environmental issues at the intersection of democracy, sustainability, and normative contestation. It also resonates with the work of Peeters (2020) and Olmos Giupponi (2019), whose contributions regarding environmental democracy and access rights demonstrate that environmental protection depends, to a significant extent, on institutional mechanisms for information, participation, and justice. Consequently, the primacy of the social sciences within this body of literature should not be interpreted as a deficiency of the field, but rather as a reflection of its underlying legal-political foundation.

The distribution of content by document type offers yet another element for discussion. The predominance of journal articles indicates that the subject matter is now circulating steadily within scientific journals; however, the significant volume of book chapters suggests that the field remains heavily reliant on doctrinal venues and thematic compilations. This particular combination is frequently observed in fields where conceptual elaboration, comparative jurisprudential analysis, and normative reflection continue to occupy a prominent position. In this regard, the coexistence of specialized journals, high-level reviews, and edited volumes appears to align with what is observed in works where scholarly discourse advances simultaneously through theoretical systematization and through the analysis of specific case studies and jurisprudential developments (Marshall, 2019; O'Donnell, 2020; Wewerinke-Singh & Salili, 2020).

Furthermore, the keyword network confirms that the core of the field is articulated around the relationship between human rights and environmental rights. The centrality of "human rights," "environmental rights," and the "right to a healthy environment" indicates that the literature does not treat the environment as an isolated regulatory issue, but rather as a good whose protection is intertwined with dignity, health, life, equality, and access to justice. This trend aligns with Knox's (2020) review regarding the progressive construction of this right, as well as with Chalabi's (2023) proposal, which seeks to clarify its conceptual scope and its relationship to other already recognized rights. Added to this is the analysis of various studies demonstrating how the Inter-American Court has contributed to consolidating this right as an autonomous right, thereby expanding the scope of its enforceability in Latin America (Auz, 2022; Calderón-Gamboa & Recinos, 2022; Souza et al., 2019).

The prominence of terms such as "climate change," "climate litigation," "environmental justice," and "access to justice" suggests that recent literature is shifting from the normative affirmation of rights toward their operationalization within contexts of climate crisis and socio-environmental inequality. De Vilchez and Savaresi (2023) found that invoking the right to a healthy environment in climate litigation is associated with more favorable judicial outcomes, particularly in the Global South. Along a complementary line, Resnik (2022) emphasizes that climate policies must incorporate criteria of environmental justice, while Levy et al. (2024) examine the climate crisis through a framework centered on rights, differentiated attention, and participation. Taken together, these contributions help explain why the vocabulary within this body of literature increasingly converges on themes of litigation, justice, and vulnerability: the right to a healthy environment is no longer discussed merely as a principle, but rather as a tool for redressing unequal harms and demanding state accountability.

The presence of terms associated with the Aarhus Convention, access to information, public participation, and the Escazú Agreement likewise demonstrates that a significant segment of the field is organized around the procedural dimension of environmental rights (Aguilar Cavallo, 2020). This finding is by no means trivial: the literature addresses not only the substantive content of the right to a healthy environment but also the institutional conditions required to exercise it. Olmos Giupponi (2019) previously noted that the Escazú Agreement should be understood as a catalyst for the advancement of environmental democracy in Latin America and the Caribbean, while Etemire (2023a) examines public participation under this agreement from a comparative perspective.

Although approaching the subject from an angle more focused on conservation, López-Cubillos et al. (2021) reach a convergent conclusion, observing that the Escazú Agreement integrates democracy, human rights,

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and transboundary cooperation. Consequently, the high density of these keywords within the corpus appears to reflect an agenda in which the effectiveness of the law depends as much on its substantive recognition as it does on the avenues available for its access, defense, and social oversight.

Another aspect deserving of attention is the recent convergence between the right to a healthy environment and the rights of nature. In the conceptual map, this relationship appears as a more recently emerging line than the classic core of environmental protection and legislation. This observation aligns with Mardikian (2023), who demonstrates that Inter-American jurisprudence has opened up a more ambitious space for environmental protection, and with Alves et al. (2023), who examine the links between the rights of nature and the human right to nature within the European context. This shift could indicate that a segment of the field is moving beyond an exclusively anthropocentric interpretation to explore broader protection frameworks, although this transition does not yet appear to be dominant within the body of literature analyzed.

In summary, the findings suggest that the literature on the right to a healthy environment is currently in a phase of expansion characterized by three distinct features: a strong socio-legal foundation, a growing orientation toward litigation and climate justice, and a gradual opening toward ecocentric and procedural approaches. At the same time, the relatively limited presence of technological and engineering fields suggests that there remains ample scope to more deeply integrate the discourse on rights with the technical instruments used for transition, mitigation, monitoring, and remediation. This disconnect does not undermine the field, but it does highlight one of its primary challenges for the years ahead.

Conclusions

Scientific output regarding the right to a healthy environment demonstrated sustained expansion between 2018 and 2023, with a greater concentration occurring in the latter part of this period. This trend indicated that the subject attained a more stable presence within the literature indexed in Scopus, moving beyond a state of dispersed or peripheral circulation. However, the distribution of citations revealed an uneven structure, suggesting that the consolidation of the field progressed more rapidly in terms of publication volume than in terms of uniform recognition across individual documents.

The field was shaped primarily by the social sciences and maintained a constant interplay with the environmental sciences, thereby confirming its interdisciplinary nature—albeit with a center of gravity rooted in legal, political, and institutional frameworks. Furthermore, the predominance of journal articles—coupled with the significant contribution of book chapters—pointed to a dual pathway for knowledge dissemination: one oriented toward specialized journals, and the other linked to thematic compilations and doctrinal developments. This composition allowed for the inference that the right to a healthy environment was studied both as a consolidating normative category and as an applied issue concerning governance and environmental protection.

An analysis of the keyword network revealed that the field's recent research agenda has coalesced around five core thematic clusters: human rights and environmental rights; climate change and litigation; environmental protection and regulation; sustainability and environmental impacts; and environmental justice coupled with democratic participation. Within this framework, the right to a healthy environment appeared increasingly associated with mechanisms for enforcing rights, climate-related conflicts, and procedural safeguards. This trend may suggest that the literature has transitioned from a phase focused primarily on the recognition of the right to one more oriented toward its implementation, its judicial enforcement, and its effective realization within contexts marked by socio-environmental inequality.

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