

The co-evolution of the Sustainability in Debate journal with sustainability issues and perspectives in a multilevel world

A coevolução da revista Sustainability in Debate e das questões, e perspectivas da sustentabilidade em um mundo multinível

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ABSTRACT

This article analyses the evolution of *Sustainability in Debate* (SiD), a diamond open-access journal hosted by a Brazilian public university, from 2010 to 2025. Combining bibliometric indicators, citation trajectories and an SDG-based text-mining approach (SDGmapper), we examine how the journal's thematic profile, co-authorship patterns and institutional networks co-evolved with national and global transformations in sustainability debates. The analysis traces three phases in SiD's development,

highlighting shifts in article volume, collaboration intensity, methodological complexity and thematic breadth. SDGmapper results show that SiD has consolidated a strong environmental and territorial core (SDGs 15, 2, 13, and 12), while progressively incorporating issues of water, energy, health, and urban sustainability, in resonance with Brazil's socio-environmental conflicts and the global climate agenda. At the same time, themes associated with education, gender, oceans, institutional justice and partnerships remain comparatively weak. By cross-reading SDG signals with bibliometric evidence and SiD's position as a multilingual, open-access journal in the Global South, we argue that SiD has become a key platform for debates on socio-environmental and climate governance, while still facing challenges in fully integrating justice, power, gender, and epistemic diversity into its agenda.

Keywords: Scientific journals. Sustainability science. SDGs. Bibliometrics. Climate change. Open access.

RESUMO

Este artigo analisa a evolução da revista Sustainability in Debate (SiD), um periódico de acesso aberto de nível diamante, sediado em uma universidade pública brasileira, no período de 2010 a 2025. Combinando indicadores bibliométricos, trajetórias de citação e uma abordagem de mineração de texto baseada nos ODS (SDGMapper), examinamos como o perfil temático da revista, seus padrões de coautoria e suas redes institucionais coevoluíram com as transformações nacionais e globais nos debates sobre sustentabilidade. A análise identifica três fases no desenvolvimento da SiD, evidenciando mudanças no volume de artigos, na intensidade da colaboração, na complexidade metodológica e na amplitude temática. Os resultados do SDGmapper mostram que a SiD consolidou um núcleo ambiental e territorial robusto (ODS 15, 2, 13 e 12), ao mesmo tempo que incorporou progressivamente questões de água, energia, saúde e sustentabilidade urbana, em consonância com os conflitos socioambientais brasileiros e com a agenda climática global. Paralelamente, temas associados à educação, gênero, oceanos, justiça institucional e parcerias permanecem relativamente pouco expressivos. Ao interligar os sinais dos ODS às evidências bibliométricas e à posição da SiD como periódico multilíngue e de acesso aberto no Sul Global, argumentamos que a revista se tornou uma plataforma central para debates sobre governança socioambiental e climática, embora ainda enfrente desafios para integrar plenamente a justiça, o poder, o gênero e a diversidade epistêmica em sua agenda.

Palavras-chave: Periódicos científicos. Ciência da sustentabilidade. ODS. Bibliometria. Mudanças climáticas. Acesso aberto.

1 INTRODUCTION

Scientific journals occupy a central place in contemporary knowledge infrastructures. Far from being neutral repositories of academic output, they function as dynamic institutions that mediate the evaluation, stabilisation, circulation, and transformation of ideas within and across scientific communities. In the field of sustainability, the role of journals is even more crucial, given the complexity, urgency, and deeply interdisciplinary nature of related challenges. Sustainability problems—ranging from climate change and biodiversity loss to urban vulnerability and food systems instability—demand integrative research practices, collective forms of reasoning, and epistemic openness to diverse knowledge traditions. Thus, journals that publish sustainability research not only reflect academic trends but actively shape how societies conceptualise, debate, and respond to global environmental change.

This article presents a time-framed, theoretically informed analysis of Sustainability in Debate (SiD), a Brazilian open-access journal on sustainable development established in 2010 at the Sustainable Development Centre at the University of Brasília. Over its fifteen years of publication, SiD has become an important platform for interdisciplinary research in the Global South, fostering dialogue among academics, practitioners, policymakers, and civil society actors. By combining bibliometrics, thematic analysis, and Sustainable Development Goals (SDG) mapping, this article offers a robust empirical and

conceptual assessment of how SiD has contributed to the development of sustainability science and has evolved and adapted to a world in transformation.

Understanding the evolution of a journal such as SiD requires situating it within broader debates on scientific communication. Classical philosophy of science has long emphasised the collective and iterative nature of knowledge production. Popper's model of conjecture and refutation highlights the roles of criticism, transparency, and revisability in scientific advancement (Popper, 1959). Hull (1988), meanwhile, conceptualised science as an evolutionary process shaped by variation, selection, and the retention of ideas within communities of practice. Star and Griesemer's (Star; Griesemer, 1989) notion of *boundary objects* is central here: collaborative research provides shared, yet interpretively flexible artefacts—special issues, editorials, review articles, policy briefs—that can be used by different communities (researchers, practitioners, policymakers, social movements) without requiring full consensus, while still “holding together” heterogeneous practices, devices and epistemic cultures. From this perspective, interdisciplinary sustainability journals can be understood as boundary organisations operating at the interface between science, policy, and society.

In the sustainability domain, the role of journals acquires heightened significance, because many of its central problems — climate change, ecosystem collapse, environmental justice, socio-territorial conflicts — fit the conditions described by Post-Normal Science: deeply uncertain systems, conflicting values, high stakes and urgent decisions (Funtowicz; Ravetz, 1993). Under these conditions, the traditional model of “normal science” is insufficient. Post-Normal Science calls for extended peer communities, transdisciplinarity, and the co-production of knowledge in dialogue with policy and civil society, a mandate that suits journals like SiD: they can host debates, mediate different epistemic traditions, stabilise contested knowledges, and become institutional nodes in broader sustainability governance networks. Since the Brundtland Report¹ in 1987 first introduced the concept of “sustainable development” to the global stage, the notion of sustainability has evolved significantly. What began as a largely normative call for environmental responsibility gradually consolidated into a scientific field in its own right—one marked by growing theoretical depth, methodological diversity, and a clear ambition to link knowledge to real-world change. As the field matured, the boundaries that once separated science, policy, and society became increasingly porous. Sustainability journals now operate within this expanded intellectual landscape: they are expected to engage with interdisciplinary methods, incorporate multiple forms of expertise, and speak to audiences that extend well beyond academia. In doing so, they reflect a broader shift in how knowledge is produced and mobilised in an era of planetary crises.

Furthermore, the acceleration of global environmental change has increased the demand for timely, policy-relevant publications that synthesise complex socio-ecological interactions. Besides, interdisciplinarity and transdisciplinarity have become defining features of the field, bringing together environmental sciences, social sciences, engineering, Indigenous knowledge systems, and policy analysis to co-produce actionable knowledge (Bammer *et al.*, 2025; Hofmann; Salomon; Hoffmann, 2025). Thus, journals become sites where knowledge is not only produced but actively negotiated. In this light, evaluating the evolution of SiD provides insight into how sustainability knowledge is organised in a major context in the Global South. Against this background of strategic repositioning and institutional maturation, three interconnected shifts in the evolution of sustainability science are particularly relevant for this article. Together, they help explain both the changing contours of the field and the growing epistemic demands placed on sustainability journals.

First, sustainability science has progressively embraced complexity and systems thinking. For scientific journals, keeping pace with this transformation requires openness to heterogeneous epistemologies, model-based and qualitative methods, and research designs that cut across conventional disciplinary boundaries. Second, as already mentioned, the consolidation of sustainability science has gone hand in hand with the expansion of interdisciplinary and transdisciplinary approaches. Journals, therefore, play a critical role in enabling dialogue across disciplines and in providing space for the co-production

of actionable insights. Third, sustainability science has become increasingly oriented toward action and policy relevance. Beyond diagnosis, the field now places strong emphasis on generating evidence to inform decision-making, support social learning, and contribute to systemic transformation (Kano; Hayashi, 2021). This orientation is particularly pronounced in Global South contexts, where acute socio-environmental conflicts often shape research agendas, rapid land-use change and governance and institutional fragilities. The corpus of *SiD* includes numerous empirically grounded analyses of Brazilian and Latin American environmental policy, Amazonian governance, socio-territorial disputes, waste management, water security and climate adaptation. These contributions illustrate how sustainability journals increasingly function at the interface between science, policy and society, translating complex analyses into forms that engage with concrete sustainability challenges.

Analysing *SiD*'s themes over time thus provides a means to observe how these global shifts are locally and regionally articulated. Journals located in the Global South often face structural challenges—limited funding, linguistic inequalities, and reduced international visibility, particularly within dominant citation systems (Debat *et al.*, 2025). However, they also play a unique role in expanding access to scientific debate and strengthening plural, transparent knowledge ecosystems (Sahle *et al.*, 2025). *SiD* exemplifies these dynamics through its multilingual approach—publishing articles in Portuguese, English, French, and Spanish—and through its sustained commitment to open access. Multilingualism reduces epistemic barriers (Canagarajah, 2002) and enables contributions from researchers whose work is deeply grounded in local contexts. In 2019, the journal adopted a bilingual publication strategy, ensuring that all articles are first published in English, while allowing authors to include the original version. This fosters international circulation while protecting the linguistic accessibility of local and regional authors. This dual approach strengthens *SiD*'s role as a bridge between local realities and global scientific discourse.

Open access further reinforces this bridging function. As a diamond OA journal, *SiD* stopped charging authors and granted unrestricted access to its content, aligning with UNESCO's (2021) vision of science as a global public good². For many students, practitioners, and public administrators in Latin America, such access is not merely desirable but essential for participating in sustainability debates. Combined with its interdisciplinarity and its embeddedness in Brazil's complex socio-ecological landscape, *SiD* serves as a platform where local knowledge, public policy concerns, and global sustainability agendas intersect.

SiD consistently publishes interdisciplinary content, positioning itself as a “*boundary journal*” that bridges natural and social sciences, academic and policy worlds, and local and global perspectives.

To capture this richness, this article adopts a multimethod and evidence-based analytical strategy. Rather than relying on a single set of indicators, it combines bibliometric evidence with SDG-based textual analysis to capture both the journal's structural evolution and the thematic orientations that have guided its content over time. Bibliometric analyses are used to trace long-term patterns in publication volume, co-authorship, institutional collaboration, language use and citation trajectories, providing insight into changes in collaboration intensity, methodological complexity and knowledge circulation. In parallel, the systematic examination of titles, abstracts and keywords through the European Commission's SDGmapper³ enables a semi-quantitative, rule-based text-mining approach, with qualitative interpretive grounding of how the journal's thematic profile aligns with, anticipates, or diverges from the evolving Agenda 2030 framework.

Together, these approaches enable the reconstruction of the trajectory of Sustainability in Debate across three analytically distinct yet overlapping phases. The first phase (2010–2014) corresponds to the journal's consolidation around land-based socio-environmental conflicts, environmental governance and territorial sustainability, prior to the formal adoption of the SDGs. The second phase (2015–2019) reflects a period of thematic broadening and diversification, shaped by the institutionalisation of the SDGs and the Paris Agreement, and by the growing prominence of climate, water, urban, and health-

related debates. The most recent phase (2020–2025) is marked by heightened climate urgency, crisis convergence with the COVID-19 pandemic, and the expansion of data-intensive, modelling-based approaches, alongside increased attention to vulnerability, risk, and governance under conditions of socio-environmental stress. By integrating these analytical strands, the article offers a historically grounded and critically informed interpretation of SiD's contribution to sustainability science.

2 METHODOLOGY

This study adopts a multimethod, theoretically informed research design, combining bibliometrics, scientometrics, thematic analysis, and SDG-based text mining to analyse the evolution of SiD between 2010 and 2025. The choice of methods acknowledges that journals, particularly in the sustainability field, cannot be understood solely by counting publications and citations. They must be analysed as dynamic, historically situated infrastructures in which quantitative patterns, discursive formations and institutional logics co-evolve. This methodological strategy, therefore, allows for a nuanced understanding of the journal's trajectory as both a scholarly corpus and an institutional actor situated within evolving sustainability debates (Wyborn *et al.*, 2019), in which thematic, linguistic, and institutional dimensions are tightly intertwined.

The empirical basis of the study is the complete set of documents published by SiD from its first issue in 2010 to the most recent issue in 2025, as indexed on the official Open Journal Systems (OJS) used by the University of Brasília. For each article, the following metadata were collected: title, abstract, keywords, year of publication, authors' names, institutional affiliations, country, and first language of publication and digital object identifier (DOI).

Besides, citation data were retrieved using a dual-source strategy that combined Google Scholar with the Publish or Perish (PoP) software, which harvests and structures Google Scholar records. The decision to rely on Google Scholar and PoP rather than a single indexer's metrics reflects growing evidence that mainstream citation databases systematically under-represent non-Anglophone journals, regional outlets, and publications in the social sciences and humanities (Tennant, 2020). Large commercial platforms tend to privilege English-language journals and STEM-oriented publication formats (with a focus on Science, Technology, Engineering, and Mathematics), producing partial and often distorted representations of scholarly impact, particularly for interdisciplinary and Global South-based venues. Google Scholar, despite its known limitations, offers broader coverage of journals, book chapters, reports and policy-oriented outputs, which are especially relevant in sustainability research and environmental governance. Google Scholar's opaque coverage and occasional duplication problems require critical handling (Martín-Martín *et al.*, 2018). For this reason, citation counts obtained via PoP for each DOI were manually cross-checked against hits on the Google Scholar interface. When divergent values were found, the most plausible higher value was retained, without summation, to avoid double-counting. This conservative rule aligns with recent recommendations to treat citation indicators as approximations rather than precise measures, particularly in the Global South (Sugimoto; Larivière, 2018). Cross-referencing citation counts between tools, therefore, constitutes a pragmatic methodological choice aimed at improving robustness and mitigating database-specific biases, rather than an attempt to produce exhaustively precise citation metrics.

The resulting dataset was cleaned and normalised. Author names were standardised to address spelling inconsistencies and duplications; institutional names were harmonised; and keywords, titles, and other metadata were verified for better analysis. Article age was calculated as the difference between the year of citation retrieval and the year of publication. From this curated corpus, a set of derived variables was computed, including citations per article, citations per year, authors per article, and distributions of institutional affiliations and languages over time.

To construct the bibliometric corpus, only peer-reviewed research articles were included. At the same time, editorials, interviews, book reviews and introductory texts to special issues were excluded from the quantitative dataset in accordance with established practices in journal-level scientometrics, which typically analyse research articles as a comparable unit of scholarly output (Kulyk, 2025). These non-research texts, however, were examined qualitatively to contextualise thematic and institutional shifts in the journal. Thus, for the SDG-based analysis, all published documents—including editorials and special-issue introductions—were included, as SDGmapper could help identify conceptual alignments in textual discourse more broadly, and these documents often articulate the journal’s thematic and strategic orientation. This dual approach ensures comparability in quantitative indicators while capturing the broader discursive evolution of SiD.

2.1 BIBLIOMETRICS AND SCIENTOMETRICS

For this research stage, the analytical focus is less on ranking the journal than on reconstructing its trajectory and internal dynamics. Publication counts per year, average number of authors per article, and the distribution of national and international affiliations are used to characterise SiD’s growth, degree of collaboration and institutional reach. Citation indicators - such as total citations by publication year or mean citations per article age - serve to explore the temporal dynamics of impact and the “life course” of the journal’s articles (Sugimoto; Larivière, 2018).

Rather than treating citation counts as proxies for intrinsic quality, the analysis reads them as signals of visibility and connectivity in a heterogeneous global knowledge system. For journals such as SiD, which publish in multiple languages and address regionally specific issues such as Amazonian governance, hydro-social conflicts, or rural territorial development, citation patterns reflect not only academic interest but also the politics of indexing, language hierarchies, and uneven international attention (Debat *et al.*, 2025). The scientometric indicators used in this study are therefore deployed in an exploratory and diagnostic mode, rather than in an evaluative or normative one.

2.2 THEMATIC AND SDG-BASED ANALYSIS OF TITLES, ABSTRACTS AND KEYWORDS

While bibliometric indicators capture the structural aspects of a journal, they offer limited insight into its thematic evolution. To address this dimension, the study employs thematic and SDG-based lexical analyses of the titles, abstracts, and keywords of all peer-reviewed articles published in *Sustainability in Debate* (SiD) between 2010 and 2025.

The objective of this analysis is to examine how the journal’s thematic profile evolves and how its content aligns with the Sustainable Development Goals (SDGs). Rather than conducting a comprehensive qualitative content analysis or topic modelling, the approach focuses on structured, reproducible lexical patterns, interpreted in light of broader socio-environmental and political contexts.

The analysis is based on the combined textual corpus of titles, abstracts and keywords, which are widely used in science mapping and scientometric studies as concise representations of the cognitive content of publications (Sugimoto; Larivière, 2018). Given the multilingual nature of SiD, semantic variation across Portuguese, English, Spanish and occasional French texts was preserved.

To operationalise the connection with global sustainability frameworks, the study employs the *SDGmapper* tool mentioned above. SDGmapper uses a validated lexical matrix that links terms to the 17 SDGs, their targets, and indicators. In this research, the tool was applied at two complementary levels: (i) a year-by-year analysis, capturing temporal changes in SDG profiles, and (ii) an aggregated analysis of the whole corpus, identifying dominant and marginal SDGs, targets and indicators across the journal’s history.

The results of the SDG-based mapping were interpreted alongside bibliometric trends and citation data, enabling cross-reading among thematic orientation, collaboration patterns, and visibility dynamics. SDGmapper outputs are treated as indicative rather than definitive classifications. As automated tools, they may underrepresent themes framed through critical, contextual or multilingual vocabularies. For this reason, the analysis adopts a reflexive stance, using SDGmapper as an analytical aid rather than a strict classificatory device.

Overall, the integration of thematic, SDG-based, and bibliometric analyses supports a comprehensive interpretation of *SiD*'s evolution across three periods (2010–2014, 2015–2019, 2020–2025), while preserving sensitivity to the political, institutional, and epistemic contexts in which the journal operates.

3 RESULTS AND DISCUSSION

This section presents an integrated reading of the evolution of *Sustainability in Debate* (*SiD*) from 2010 to 2025, combining bibliometric trends, citation trajectories, institutional collaboration patterns and the SDGmapper analysis of all article titles, abstracts and keywords. Across these almost sixteen years, three phases become apparent: an early period of consolidation between 2010 and 2014, a phase of diversification during the first years of the 2030 Agenda (2015–2019), and a more recent phase (2020–2025) marked by crisis convergence, climate urgency and increasing methodological sophistication.

3.1 A BIBLIOMETRICS PANORAMA:

a) Patterns in publication volume

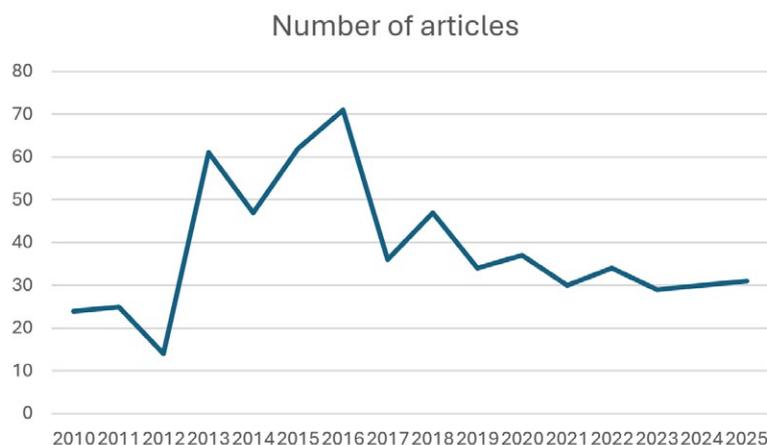


Figure 1 – Annual number of articles published in *SiD* (2010–2025)

Source: The authors

For the year 2025, only the first two issues published at the time of data extraction were considered. As data were automatically retrieved from the journal's OJS system, the 2025 values reflect partial publication output and should not be interpreted as a completed annual trend. Nonetheless, for the purpose of this specific graphic, the remaining 12 articles scheduled for publication in the final 2025 issue were manually added in order to present a complete annual count.

The evolution of article output reveals the journal's shifting institutional rhythms and its responsiveness to external conditions. Publication numbers remain modest and relatively stable between 2010 and 2013, reflecting the journal's early consolidation period, when editorial workflows, peer-review networks and contributor communities were still forming. This lower but steady output is typical of

young academic journals, especially those hosted by public universities, where editorial work relies on non-commercial labour structures. It is important to note that, until 2014, only two editions were published each year.

Starting in 2013, Figure 1 shows a marked expansion, with a sharp rise in the number of articles published annually. This growth corresponds to the first wave of institutionalisation of sustainability science in Brazil, the consolidation of national research networks, and the increasing visibility of SiD following its indexing in major portals. Not to mention the Paris Agreement at COP15 in Paris in 2015, which coincided with a period of intense socio-environmental debate in Brazil (Forest Code revision, water crisis, expansion of agribusiness), thereby amplifying demand for interdisciplinary sustainability venues.

In recent years, around 2019, the figure shows a stabilisation at a lower level, partly reflecting editorial restructuring, the impact of the Covid-19 pandemic on research productivity, and the broader slowdown in Brazilian academic publishing under austerity measures. This decline is consistent with patterns observed across Latin American journals during the same period (Salvador, 2024; Unesco, 2020).

b) Collaboration intensity: co-authorship trends



Figure 2 – Mean number of authors per article by year (2010–2025)

Source: The authors

Co-authorship trends tell a complementary story. This trend is consistent with broader temporal patterns observed across scientific fields. Studies on the evolution of collaboration networks show a gradual increase in the average number of authors per article over time, reflecting growing specialisation, methodological complexity and the need for larger, interdisciplinary teams. In this sense, the trajectory observed in Sustainability in Debate follows a largely linear growth pattern, similar to those reported in fields such as psychology and economics, while differing from disciplines like ecology and astronomy, where collaboration intensifies more rapidly due to data- and infrastructure-intensive research practices (Guimerà *et al.*, 2005). Figure 2 demonstrates that, in the early years, most articles were written by one or two authors, indicating small research teams and locally concentrated collaborations. This aligns with the journal's thematic focus at the time, which was dominated by rural studies, conservation governance, and territorial policy analysis—fields in which research teams in Brazil often remained small and institutionally localised.

From 2015 onwards, a clear rise in co-authorship is visible. This growth reflects the methodological and thematic diversification enabled by the SDGs and the expansion of sustainability science into areas

such as climate modelling, risk analysis, geospatial research, urban planning, and public health. These domains tend to require larger teams, interdisciplinarity and co-production with government or civil society actors, all of which encourage higher author counts.

By 2020–2025, the journal exhibits its highest levels of collaboration. This aligns with global patterns showing a steep rise in teamwork in sustainability and climate studies, as well as with national research consortia responding to Brazil’s overlapping crises—environmental deregulation, climate disasters and health emergencies. Co-authorship thus emerges as a structural indicator of SiD’s increasing methodological sophistication and networked knowledge production.

3.2 CITATION DYNAMICS

a) Citation peaks by publication year (Figure 3)

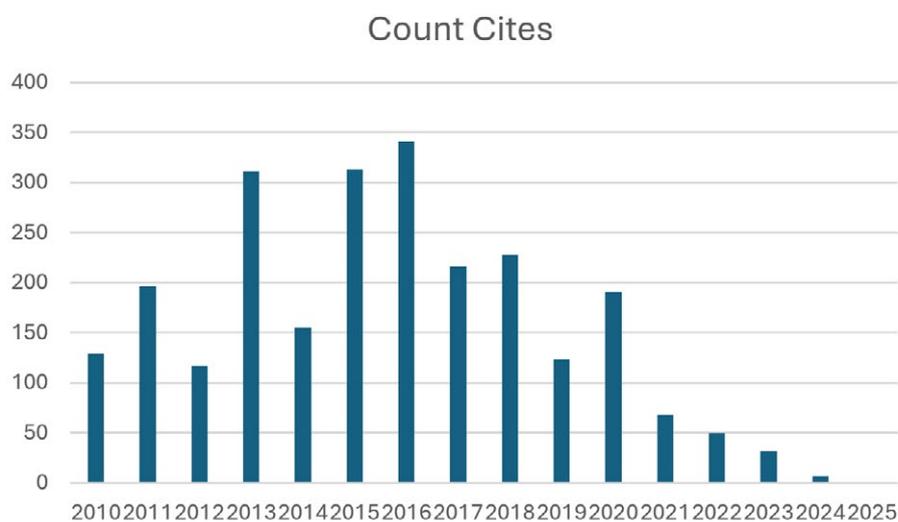


Figure 3 – SiD’s total citations accumulated per year of publication

Source: The authors

Citation dynamics add temporal depth to the journal’s evolution. Figure 3 reveals two major citation peaks: one for the 2012–2013 cohort and another for articles published around 2017–2018.

The 2012–2013 peak corresponds to the publication of seminal articles on payments for environmental services, rural governance and deforestation policy—topics that remain central to Brazil’s socio-environmental agenda. Their long-term citation accumulation reflects their foundational influence and the enduring relevance of territorial governance in sustainability debates.

The second peak in 2017–2018 reflects another moment of thematic expansion. Articles addressing climate risk, water crisis communication and gendered adaptation gained rapid attention. This cluster demonstrates SiD’s increasing engagement with climate governance, vulnerability analysis, and the social dimensions of sustainability, aligning with global scientific shifts following the Paris Agreement..

b) Citation accumulation by article age

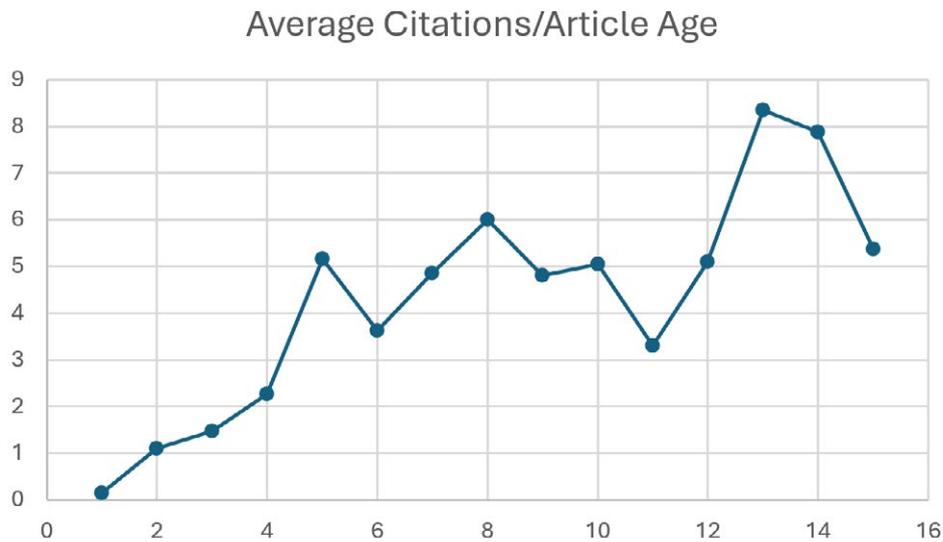


Figure 4 – Total SiD’s citations by publication age

Source: The authors

While Figure 3 shows citation accumulation by *year of publication*, Figure 4 analyses average citations by article age, providing a life-cycle view of SiD’s intellectual influence. The curve shows that articles typically reach peak mean influence between ages 8 and 13, corresponding to SiD’s early territorial governance corpus. These articles —particularly those on PES, rural conflicts, and environmental licensing—continue to anchor academic and policy discussions years later.

Figure 4 provides direct evidence of SiD’s long-tail citation dynamics. By displaying the cumulative number of citations by article age, the figure shows that publications continue to attract substantial scholarly attention well beyond their initial years, with articles aged 7 to 15 years accounting for a significant share of total citations. Rather than a rapid decline after publication, citation accumulation remains distributed over time, a pattern typical of interdisciplinary and policy-oriented research fields.

After age 14–15, mean citations begin to stabilise, a typical decay pattern in scholarly communication. More recent articles (ages 1–4) show lower means simply because they have had less time to accumulate citations. However, some of the newest climate-focused articles are already reaching citation rates comparable to those of older publications, suggesting accelerated uptake in fast-moving debates such as climate scenarios, disaster risk, and the energy transition.

3.3 INSTITUTIONAL NETWORK

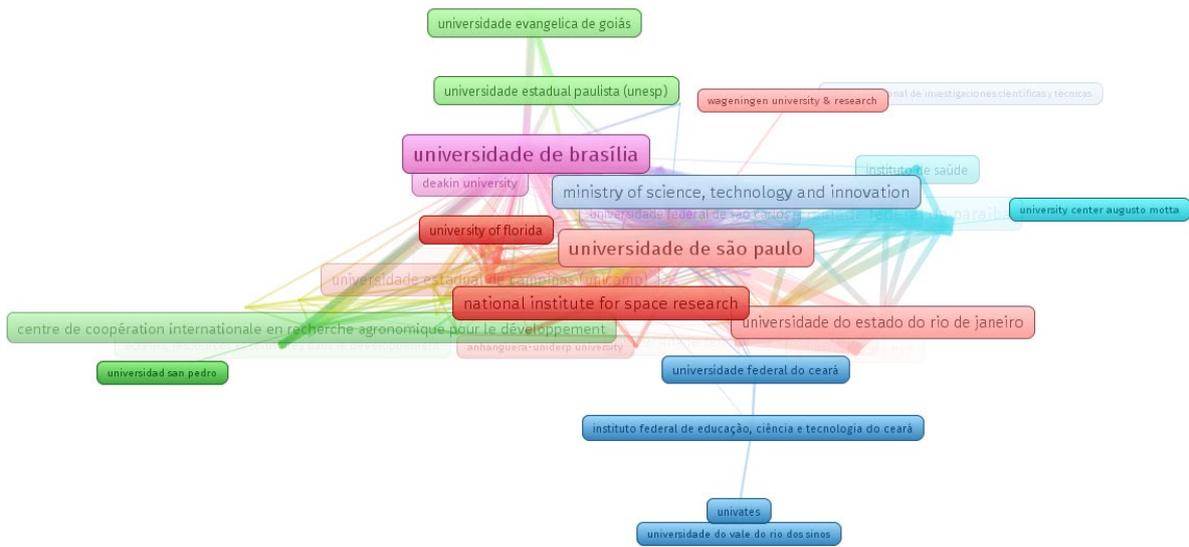


Figure 5 – Institutional collaboration network (VOSviewer), weighted by total link strength

Nodes represent institutions affiliated with the authors. **Node size** corresponds to the number of documents published by each institution. **Links** indicate co-authorship relationships; link thickness reflects the strength of collaboration. **Colours** represent clusters of institutions identified through co-authorship proximity, highlighting communities of collaboration within the network.

Source: The authors

Institutional collaboration networks were generated using *VOSviewer* based on bibliographic metadata automatically retrieved from the journal’s Crossref-indexed records. The analysis uses institutional affiliations as declared in the articles; therefore, node visibility and label completeness depend on the standardisation and completeness of affiliation strings in the source metadata. Networks were built using co-authorship links between institutions (full counting), and visualisation parameters (label length, minimum occurrence threshold to 2, and scaling) were adjusted to maximise readability without altering the underlying network structure.

The institutional collaboration map reveals how SiD serves as a meeting point for Brazilian and international sustainability communities. The Universidade de Brasília (UnB) serves as the central hub, with the highest total link strength, reflecting its institutional role as host and focal point of editorial coordination.

Surrounding UnB, a dense cluster of federal and state universities- including UFMG, UFSC, UFPI, UFRN, Fiocruz, and Unicamp— indicates strong domestic collaboration across regions. These networks align with Brazil’s public research infrastructure, which remains the primary driver of sustainability science in the country.

The map also shows international partners, such as French research centres active in rural development and socio-ecological governance. These links highlight SiD’s role as a South-North bridge, particularly in PES, territorial governance, and political ecology.

3.4 SDG MAPPING AND THEMATIC EVOLUTION

Table 1 – SDG heatmap (counts and percentages per SDG per year)

Year	SDGs	SDG1	SDG2	SDG3	SDG4	SDG5	SDG6	SDG7	SDG8	SDG9	SDG10	SDG11	SDG12	SDG13	SDG14	SDG15	SDG16	SDG17
2010	Percentage	2,13	2,13	17,02	0	0	14,89	0	0	0	0	2,13	2,13	36,17	0	23,4	0	0
2011	Percentage	0	10,29	0	0	0	1,47	13,24	1,47	1,47	0	13,24	4,41	22,06	0	25	1,47	5,88
2012	Percentage	5,26	7,89	5,26	5,26	0	0	0	5,26	5,26	10,53	5,26	23,68	13,16	0	13,16	0	0
2013	Percentage	4,11	12,33	0	0	0	4,11	0	1,37	0	0	1,37	6,85	16,44	0	52,05	1,37	0
2014	Percentage	1,32	36,84	1,32	0	9,21	3,95	3,95	6,58	0	2,63	3,95	14,47	6,58	0	9,21	0	0
2015	Percentage	2,06	18,56	0	1,03	0	1,03	0	3,09	2,06	2,06	12,37	18,56	15,46	0	23,71	0	0
2016	Percentage	1,56	30,47	0	0	0	7,81	8,59	3,91	2,34	3,91	3,91	8,59	8,59	1,56	17,97	0,78	0
2017	Percentage	1,45	15,94	1,45	0	4,35	10,14	1,45	2,9	1,45	0	8,7	7,25	10,14	0	30,43	4,35	0
2018	Percentage	1,01	2,02	14,14	0	0	15,15	5,05	5,05	4,04	1,01	4,04	12,12	13,13	1,01	21,21	0	1,01
2019	Percentage	5,45	8,18	0	0	0	3,64	2,73	0,91	0	0	9,09	13,64	25,45	0	29,09	1,82	0
2020	Percentage	7,34	11,01	8,26	0	0	4,59	6,42	0	0	1,83	0	0	33,03	1,83	25,69	0	0
2021	Percentage	0,88	14,16	8,85	0	4,42	19,47	5,31	0,88	1,77	4,42	7,08	2,65	8,85	0	18,58	0,88	1,77
2022	Percentage	3,7	8,64	0	8,64	0	6,17	33,33	0	1,23	0	3,7	1,23	16,05	0	17,28	0	0
2023	Percentage	1,04	10,42	19,79	0	0	7,29	17,71	1,04	0	0	4,17	7,29	12,5	0	16,67	2,08	0
2024	Percentage	3,03	3,03	24,24	3,03	0	6,06	3,03	0	0	0	6,06	3,03	12,12	0	36,36	0	0
2025	Percentage	1,12	16,85	11,24	0	0	2,25	7,87	1,12	3,37	2,25	7,87	14,61	6,74	0	21,35	2,25	1,12

Source: The authors

The SDG heatmap provides a synthetic visualisation of how SiD's thematic orientation evolved over 16 years. During 2010–2014, SDG 15, SDG 2 and SDG 12 dominated the palette, producing a plain “green-yellow” block in the heatmap associated with land, agriculture and conservation. This aligns with national debates around the Forest Code, rural conflicts and PES.

Between 2015 and 2019, the heatmap is more varied: SDG 11 (Cities), SDG 6 (Water), SDG 3 (Health) and SDG 13 (Climate) appear more frequently, reflecting SiD's diversification under the influence of the SDGs and the Paris Agreement. Notably, 2017–2018 display an extensive distribution across SDGs, corresponding to the peak in climate-urban-water publications.

In 2020–2025, SDG 13 and SDG 6 strongly intensify. This corresponds to the period of crisis convergence—Covid-19, extreme events, energy instability and renewed climate urgency. SDG 7 (Energy) becomes a stable presence. Meanwhile, SDG 5, SDG 14, SDG 16 and SDG 17 remain weak, revealing persistent thematic blind spots and opportunities for editorial strengthening.

3.5 IMPLICATIONS DISCUSSION

The evolution of Sustainability in Debate (SiD) over the past years illustrates how a regional, diamond open-access journal can become an active participant in the shifting architecture of sustainability debate. The results presented earlier—bibliometric trends, citation dynamics, institutional networks and SDG alignments—do not merely describe the journal's growth; they show how SiD has co-evolved with the political, economic and environmental turbulence that has characterised Brazil and the world since 2010, and how the journal has responded to the maturation of sustainability as a field. Interpreting these findings requires attention to the political economy of knowledge—how institutions, funding, language hierarchies and public policy shape what becomes visible or legitimised as sustainability research (Fritz; Binder, 2020).

3.5.1 TERRITORIAL IMPRINT AND SDG PROFILE

One of the clearest patterns across the journal's history is the enduring prominence of themes related to land use, forests, agriculture, rural development, environmental regulation and socio-territorial conflicts. As demonstrated in the early SDG heatmap and reinforced by citation peaks, SiD's most influential and longest-cited articles address Payments for Environmental Services (PES), forest governance, agrarian dynamics, and environmental institutions.

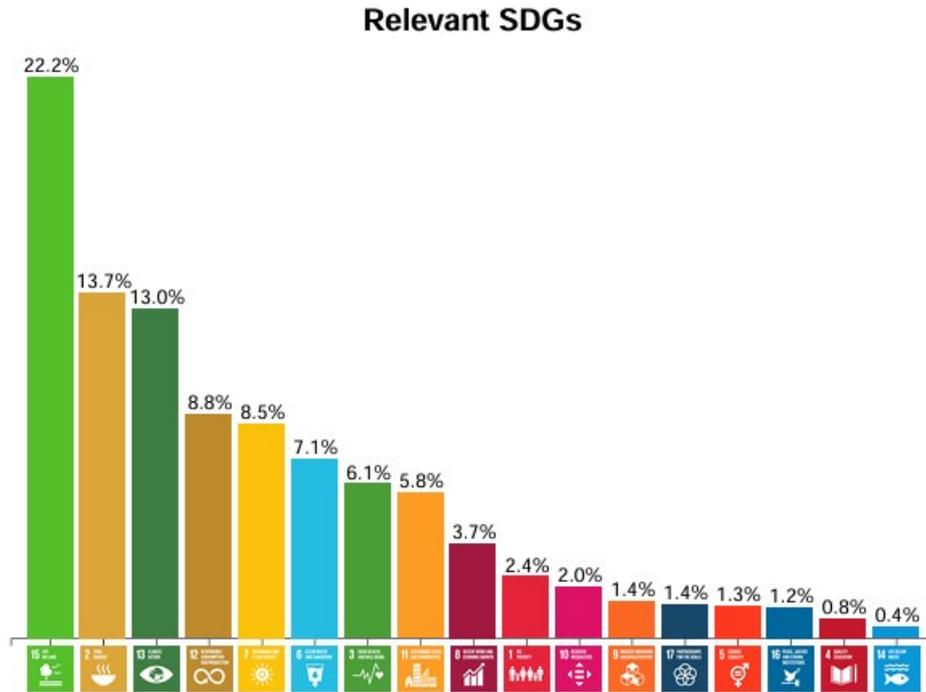


Figure 6 – Relative distribution of SDGs in the complete SiD corpus (2010–2025)

Source: The authors

This figure makes this territorial imprint explicit. When the entire OJS corpus is examined through the JRC SDGmapper, SDG 15 (Life on Land) accounts for 22.2% of all SDG signals, followed by SDG 2 (Zero Hunger/agriculture) with 13.7% and SDG 13 (Climate Action) with 13.0%. SDG 12 (Responsible Consumption and Production) and SDG 7 (Affordable and Clean Energy) follow with 8.8% and 8.5%, respectively. In comparison, SDG 6 (Clean Water and Sanitation) and SDG 3 (Good Health and Well-being) account for 7.1% and 6.1%, respectively. Urban and economic themes associated with SDG 11 (Sustainable Cities) and SDG 8 (Decent Work and Economic Growth) are present but less dominant (5.8% and 3.7%). The remaining goals—SDGs 1, 9, 10, 17, 5, 16, 4 and 14—each register below 3% of the total lexical signal.

Taken together, these results reinforce the idea that SiD’s intellectual centre of gravity lies in land-based socio-environmental conflicts, agro-ecosystems, forest governance and climate–energy interactions—issues that are structurally central to Brazil’s development trajectory and to global debates on tropical sustainability. Brazil’s climate politics and environmental relevance are inseparable from the land question (Silva *et al.*, 2023). Since 2010, national disputes around the Forest Code, the legal status of conservation units, agribusiness expansion and deforestation in the Amazon and Cerrado have shaped public discourse and mobilised academic communities. The long-lasting citation curves of early articles show that these issues remain salient as political struggles intensify, including the rollback of environmental protections between 2019 and 2022 and the renewed emphasis on forest governance under the federal administration inaugurated in 2023.

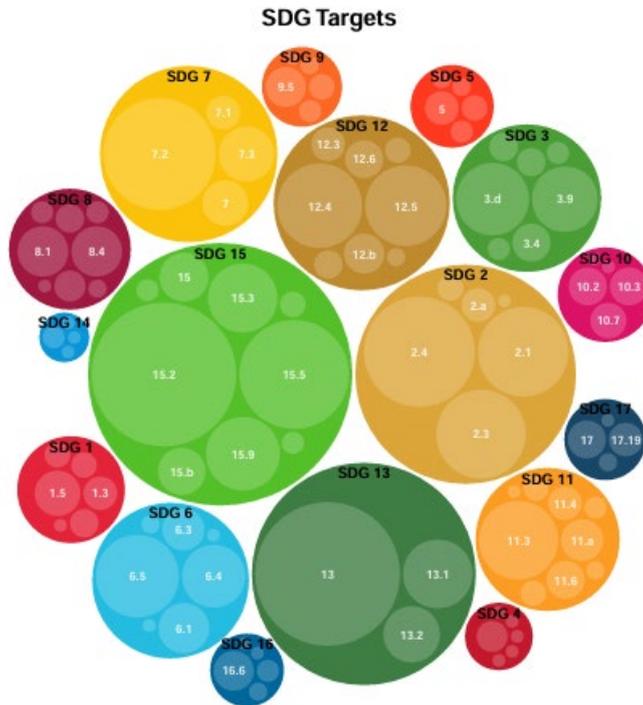


Figure 7 – Distribution of SDG targets in the complete SiD corpus (2010–2025)

Source: The authors

This second lens offers a finer-grained view of this pattern. Within SDG 15, the most prominent targets are 15.2, 15.3, and 15.5, which address sustainable forest management, land degradation neutrality, and biodiversity conservation, respectively. For SDG 2, the focus is on targets 2.3 and 2.4, centred on agricultural productivity, sustainable food systems, and resilient production practices. This configuration closely mirrors highly cited contributions on PES, conservation units, and rural areas, which explicitly debate the trade-offs between agricultural expansion, forest protection, and the rights of rural communities. A similar pattern appears for SDG 13, where targets 13.1 and 13.2—adaptation and integration of climate measures into policy and planning—dominate; these are precisely the concerns of later articles such as Marengo *et al.* (2020) and Perez *et al.* (2020), which examine climate risks, disaster incidence and warming scenarios in relation to institutional capacities and territorial inequalities (Marengo; Filho, 2020; Perez, L., 2021).

SiD thus mirrors the “territorial imprint” of Brazilian sustainability science in which land conflicts, environmental justice and governance tensions form the core of academic and policy debates. Rather than a thematic bias, this reflects the journal’s country-specific focus, where territorial politics are foundational to sustainability transitions.

3.5.2 INTERNATIONALISATION DYNAMICS

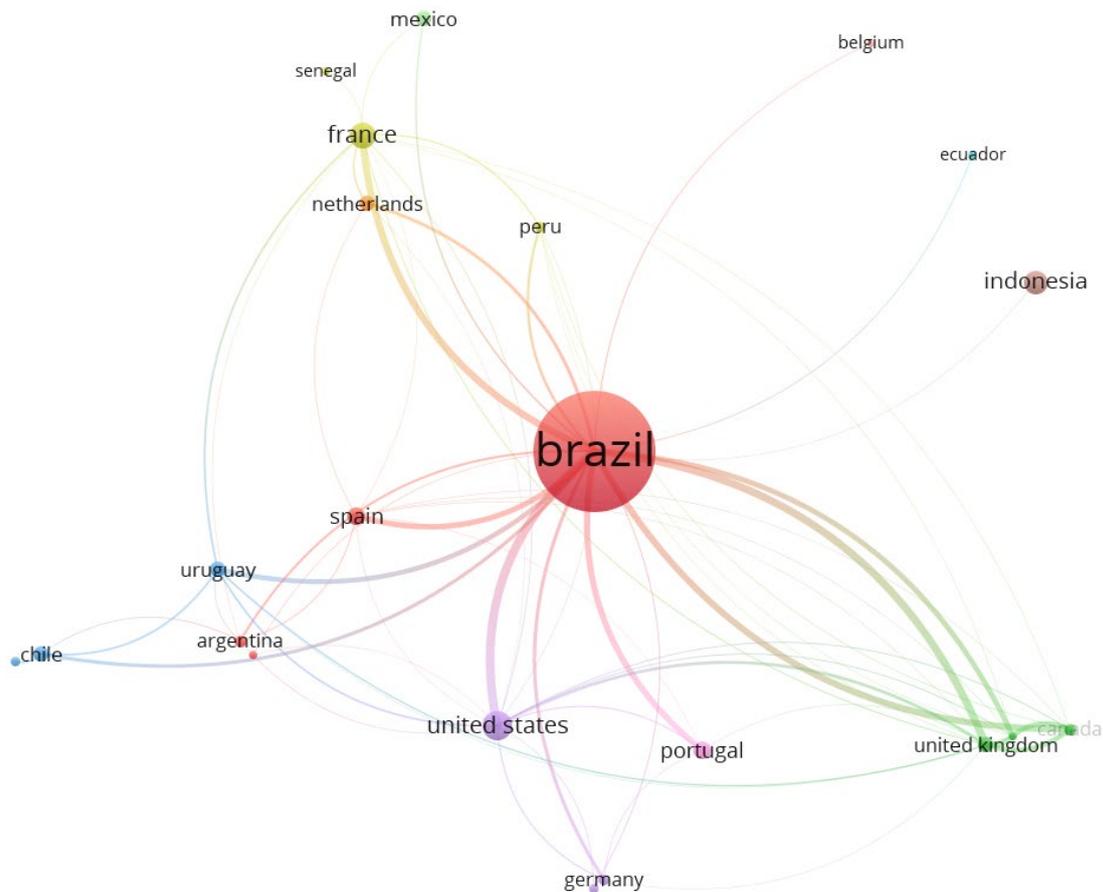


Figure 8 – International distribution and collaboration network of authors' country affiliations in Sustainability in Debate (with two or more contributions) 2010 - 2025

Source: The authors

Figure 8, generated with *VosViewer*, depicts the international co-authorship network by country based on Crossref-indexed affiliation metadata. Nodes represent countries and are sized according to the number of articles with at least one affiliated author, while links represent international co-authorships. The network, therefore, captures patterns of cross-national collaboration rather than purely domestic co-authorships, which are reflected in node size but not shown as reflexive links. Peripheral countries with smaller node sizes, such as Canada, indicate more limited participation in international collaborations within the journal's corpus, rather than invisibility in the dataset.

Alongside thematic diversification, the evolution of Sustainability in Debate also reveals a gradual process of internationalisation. While Brazilian institutions remain structurally central, reflecting the journal's territorial anchoring, the corpus shows a steady integration of authors affiliated with institutions in Europe (notably France, the United Kingdom, Portugal, Spain and Germany), North America (United States, Canada), Latin America and, more recently, Africa and Asia.

This diversification becomes more visible after 2015 and intensifies in the 2020–2025 period, when contributions from countries such as Indonesia, Senegal and Ukraine appear alongside studies grounded in Brazilian socio-environmental issues (Figure 9). SiD's trajectory suggests a relational and thematic form of internationalisation, driven by shared research agendas in climate change, governance, bioeconomy and socio-environmental justice.

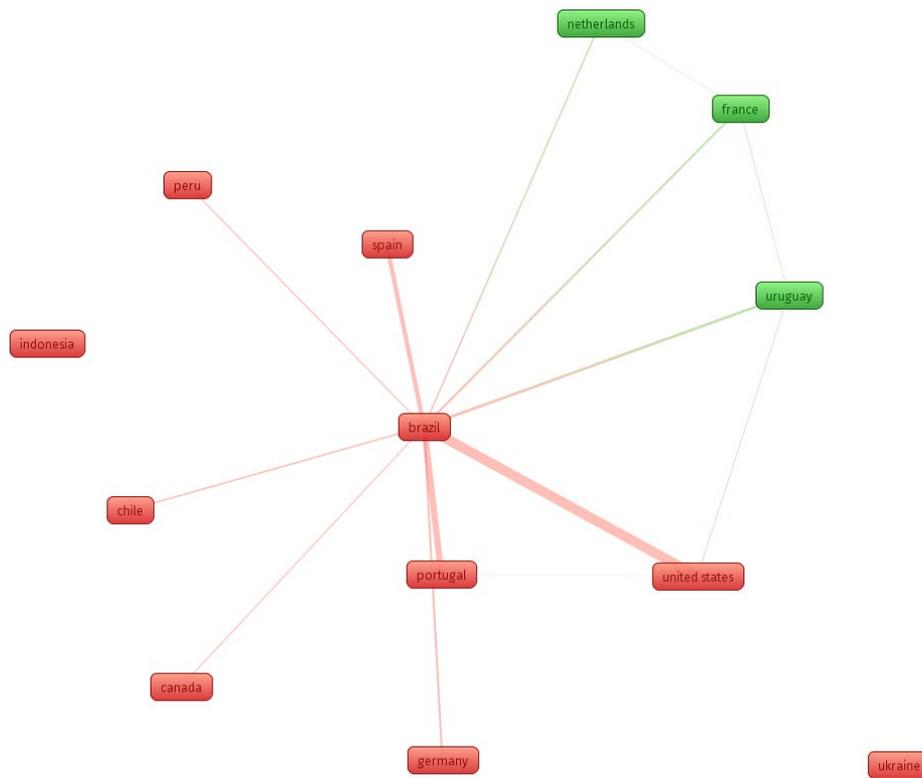


Figure 9 – International distribution and collaboration network of authors' country affiliations in Sustainability in Debate (with two or more contributions) 2020 - 2025

Source: The authors

3.5.3 THE AGENDA 2030 TURN AND THEMATIC DIVERSIFICATION

From 2015 onwards, SiD entered a period marked by a clear broadening of its thematic horizon. This shift is visible across structural indicators: co-authorship levels rise, institutional collaboration networks become denser and more geographically diverse, and the SDG lexical profile becomes more varied, with expanding signals associated with SDGs 11 (Cities), 6 (Water), 3 (Health) and 13 (Climate Action).

This transformation closely corresponds to a broader reconfiguration of sustainability debates. Globally, 2015 was a watershed year. The adoption of the 2030 Agenda and the Paris Agreement did more than add new policy frameworks; they legitimised integrated, cross-scalar and solution-oriented approaches to sustainability. Funding agencies and research networks pivoted toward climate adaptation, low-carbon transitions, urban resilience and the social dimensions of vulnerability—domains that demand interdisciplinary collaboration and shared conceptual languages. Rapid advances in climate modelling, risk assessment and geospatial analysis, encapsulated in successive IPCC assessment cycles (IPCC, 2014, 2023), reinforced this methodological shift.

Brazil's trajectory magnified these dynamics. The severe 2014–2015 drought in São Paulo—the most intense in nearly a century—exposed deep infrastructural and institutional vulnerabilities and catalysed debate around water governance, inequality and hydro-political risk. The 2015 Mariana tailings dam failure, followed by the Brumadinho disaster in 2019, revealed systemic weaknesses in environmental licensing, corporate accountability and risk governance, placing mining-related socio-environmental conflicts at the centre of national and international scrutiny. The 2019–2021 Amazon fires further drew global attention to deforestation dynamics, governance fragility and political conflict surrounding environmental monitoring. More recently, recurrent extreme floods in southern Brazil—culminating in

the 2023–2024 events in Rio Grande do Sul—have underscored the cascading effects of climate change on urban infrastructure, territorial planning and social vulnerability. In parallel, recurrent droughts in the semi-arid Northeast have continued to expose the socio-ecological dimensions of climate vulnerability, particularly affecting rural women and low-income households.

Perez *et al.* (2020) map how climate-related disasters reinforce Brazil's regional inequalities, while Santos *et al.* (2021) reinterpret the 2013–2015 São Paulo water crisis as a socially constructed disaster risk, rooted in governance choices rather than hydrology alone. Braga and Fonseca (2021) examine the regulatory responses that emerged in the wake of the Mariana and Brumadinho mining dam failures, showing how large-scale disasters can trigger reactive — and often partial — improvements in environmental policy. More recently, Fardin *et al.* (2023) analysed extreme rainfall and rain-triggered disasters in Petrópolis (RJ), and Coelho-de-Souza *et al.* (2024) discuss ecological restoration strategies in the context of the “climate catastrophe” in the PAN Lagoas do Sul territory, while Correia (2024) explores (im)mobility and adaptation to drought in the Seridó Potiguar. Together, these contributions illustrate how the journal tracks and problematises the country's shifting disaster landscape, from mining ruptures to urban floods and chronic drought in the semi-arid Northeast. Methodologically, this expansion is supported by a turn to interdisciplinary and transdisciplinary research. As sustainability problems become more complex, SiD increasingly publishes work that relies on collaboration among climatologists, geographers, sociologists, public health specialists, planners and policy analysts. The rise in the average number of authors per article directly corresponds to the need for large-scale data integration, modelling capacity, and multi-actor engagement.

It is also important to distinguish between the SDG coverage emerging from individual submissions and that resulting from the journal's thematic dossiers. While spontaneous submissions reflect broader research agendas circulating in the field, special issues introduce a degree of editorial induction, temporarily amplifying specific SDGs aligned with strategic debates. For instance, thematic dossiers such as *Gender: a necessary approach to water management*, among others, have contributed to heightened visibility of specific SDGs. In this case, SDG5 and 6.

However, diversification is not uniform. The aggregated SDG profile underscores stark asymmetries: SDG 14 accounts for only 0.4% of all signals, SDG 4 for 0.8%, SDG 16 for 1.2%, SDG 5 for 1.3% and SDG 17 for 1.4%. In practical terms, questions of gender justice, institutional quality, peace, partnerships and marine systems are almost absent from SiD's lexical landscape compared with forests, agriculture and climate. These low values partly reflect Brazil's continental, land-centred research priorities, but also mirror well-documented global imbalances in SDG-related co-authorship, in which governance, gender, and research on strong institutions remain underfunded and underrepresented. For SiD, recognising these blind spots is less a matter of self-critique than of strategic diagnosis: they point to concrete opportunities for future calls, thematic dossiers and editorial priorities.

3.5.4 CRISIS CONVERGENCE, DATA-DRIVEN METHODS AND SECOND-GENERATION SUSTAINABILITY

The period from 2020 to 2025 represents a profound reorientation in SiD's thematic and epistemic landscape, coinciding with what scholars describe as “crisis convergence”—the overlapping and mutually reinforcing pressures of climate change, public health emergencies, socio-environmental inequalities and governance erosion (Kelman *et al.*, 2024). These crises interact across temporal and spatial scales, amplifying vulnerabilities and exposing systemic limitations in environmental governance, risk management and social protection. Unsurprisingly, SiD's recent publications bear the imprint of this turbulent conjuncture.

The COVID-19 pandemic catalysed global shifts in sustainability scholarship, renewing attention to the entanglements among ecological degradation, zoonotic disease, public health capacity, and economic fragility. This stimulated work on environmental epidemiology, planetary health, and crisis-responsive

governance, strengthening conceptual bridges between human well-being and ecological integrity (Janaína A.). Although SiD did not become a public health journal, the rise of SDG 3 signals in the SDGmapper heatmap indicates growing engagement with health–environment linkages.

Methodologically, 2020–2025 marks an acceleration toward data-intensive, computational and geospatial approaches. Reliance on satellite monitoring, climate simulation models, machine learning tools for environmental analysis and GIS-based vulnerability mapping aligns SiD with the broader movement toward “data-driven sustainability science”. These tools enable more granular analyses of environmental change but also require interdisciplinary teams with diverse technical capacities, which helps explain the record-high co-authorship levels observed in this period.

This conjuncture is also reflected in SiD’s editorial dynamics. Between 2020 and 2025, the journal experienced a marked increase in submissions, alongside a stable but selective acceptance rate. In the figure below, we see that the journal received 742 submissions, of which 269 were accepted, and 295 were ultimately published, corresponding to approximately 70 submissions and just over 30 published articles per year. The overall acceptance rate of roughly 40%, combined with a 60% rejection rate, indicates a moderate but consistent level of selectivity. Notably, almost half of all rejections occur at the desk-review stage, where manuscripts are filtered for scope, basic quality criteria, and ethical compliance. In contrast, a smaller share of rejections results from the whole peer-review process. This pattern suggests that SiD has progressively consolidated clearer editorial standards and screening procedures, balancing openness to diverse contributions with the need to preserve scientific robustness and thematic coherence.

3.5.5 POLICY RELEVANCE, KNOWLEDGE CO-PRODUCTION AND FUTURE DIRECTIONS

These contributions exemplify a broader shift in sustainability science toward knowledge co-production, in which researchers, policymakers and communities jointly define problems and co-create solutions. SiD’s editorial structure—marked by bilingual editions, thematic dossiers and open-access dissemination—creates favourable conditions for such engagement. By combining scientific rigour with accessibility, the journal helps translate complex socio-environmental evidence into formats that can inform public understanding and institutional action, acting as a mediating infrastructure between epistemic communities and governance arenas.

This infrastructural function is particularly relevant in a country where political fluctuations and uneven institutional capacities frequently destabilise sustainability governance. Journals such as SiD contribute to an institutional memory in sustainability debates. They document long-term patterns that extend beyond electoral cycles and inform future planning. SiD’s sustained attention to Amazonian governance, Indigenous land rights, urban socio-environmental inequality and environmental licensing controversies exemplifies this role.

As Brazil advances its commitments under the Paris Agreement and the 2030 Agenda, the importance of such knowledge infrastructures becomes even more evident. Implementing climate adaptation strategies, advancing energy transitions, designing resilient cities and enforcing environmental regulations require not only technical expertise but also inclusive, accessible and context-sensitive knowledge systems. SiD contributes to this landscape by translating scientific evidence into publicly intelligible narratives, amplifying local and Indigenous knowledge, identifying thematic gaps and emerging priorities through bibliometric and SDG-based analyses, maintaining continuity in environmental policy debates during periods of institutional dismantling, and supporting dialogue among universities, public institutions, NGOs, social movements and international partners.

At the same time, the SDGmapper analysis identifies areas where SiD’s contributions could be further deepened. The relative weakness of SDG 5 (Gender Equality), SDG 14 (Life Below Water), SDG 16 (Peace,

Justice and Strong Institutions) and SDG 17 (Partnerships for the Goals) mirrors global imbalances in sustainability research but also signals opportunities. Strengthening these areas—through targeted calls, interdisciplinary dossiers, and collaboration with networks specialised in gender, governance, and marine systems—would allow the journal to further address governance, equity, and international cooperation, dimensions essential to transformative sustainability and still underdeveloped in both Brazilian policy and global scholarship.

Thus, SiD's role extends beyond scholarly publication: it actively shapes the epistemic and institutional foundations upon which sustainability governance in Brazil is being constructed, while contributing a distinctive Global South perspective to international sustainability science.

4 CONCLUSION

The analysis of *Sustainability in Debate* (SiD) reveals how a regional, diamond open-access journal can become an active agent in the construction of sustainability science rather than a passive repository of articles. By tracing the journal's trajectory from 2010 to 2025 through bibliometric indicators, institutional networks, and SDG-based text mining, this article shows that SiD's evolution is inseparable from Brazil's contested socio-environmental landscape and from wider transformations in global climate and development politics. The journal's thematic core around land, forests, agriculture and environmental governance reflects the centrality of territorial conflicts to Brazilian sustainability debates. At the same time, its later expansion towards climate risk, urban resilience, water crises, energy transitions and health–environment linkages mirrors the Agenda 2030 turn and the current phase of crisis convergence.

At the same time, the SDGmapper results demonstrate how SiD's corpus both reflects and partially challenges global inequalities in knowledge production. The strong presence of SDGs 15, 2, 13, 12, 7, and 6, and the relative absence of SDGs 5, 14, 16, and 17, reproduce a pattern observed in international sustainability research, in which governance, gender, oceans, and partnership remain under-represented. However, by documenting these imbalances at the scale of a single journal, this study turns the SDGs into a diagnostic tool for editorial strategy and field reflexivity. Rather than treating the SDGs solely as external policy goals, the analysis suggests that journals can use SDG-based mapping to monitor their thematic coverage and identify silences and open spaces for emerging agendas.

The findings also highlight the political and epistemic significance of SiD's institutional design. Its diamond open-access model, multilingual publication policy, and dense network of collaborations among Brazilian, Latin American, and European institutions position the journal as a boundary infrastructure connecting academic research, public policy, and social movements. Highly cited articles on Payments for Environmental Services, water crises, climate adaptation, and urban socio-environmental inequalities illustrate how journal publications can inform governmental reports, NGO work, and local struggles, thereby contributing to what might be called the institutional memory of sustainability governance in Brazil. This role is particularly important in settings where environmental policy oscillates sharply across electoral cycles and where scientific evidence is frequently contested.

On this basis, several implications can be drawn for SiD and for similar regional, open-access journals operating in the Global South. First, the territorial grounding that gives these journals their analytical strength should be preserved and deepened, while complemented by a more systematic engagement with themes currently at the margins of their SDG profiles—especially gender, institutions, peace, partnerships, and marine systems. Strategic calls, thematic dossiers and South–South collaborations focused on SDGs 5, 14, 16 and 17 could help rebalance the landscape without diluting the territorial focus that distinguishes these venues. Second, the consolidation of data-driven, geospatial, and modelling approaches observed in the most recent period underscores the importance of investing in methodological pluralism that integrates quantitative tools with qualitative, participatory, and

decolonial perspectives. Journals can play a key role in legitimising such hybrid designs and encouraging knowledge co-production among researchers, public authorities, and affected communities.

Third, the experience of SiD points to the need for sustained support to multilingual and diamond open-access publishing as a matter of epistemic justice, not merely of dissemination logistics. Insofar as language and paywalls structure whose knowledge counts, maintaining open, multilingual platforms in public universities is itself a contribution to more democratic science systems. Strengthening these infrastructures—through stable funding, technical support, and international partnerships that do not recentre Northern agendas—is essential if Global South journals are to continue to serve as spaces where local priorities and global debates can meet on more equal terms.

In sum, the case of *Sustainability in Debate* demonstrates that the geography and governance of scientific publishing are integral components of sustainability transitions. Journals such as SiD help shape which problems are named, which territories are visible, which actors are heard and which solutions become imaginable. Recognising them as strategic sites of knowledge production and political articulation invites a research agenda that goes beyond impact metrics to examine how editorial choices, access models and linguistic architectures condition the possibilities of sustainability science. For SiD and its peers, the challenge ahead is to consolidate their role as territorially rooted, globally connected and epistemically plural infrastructures capable of supporting the profound transformations demanded by the climate and sustainability crises of the twenty-first century.

STATEMENT ON THE USE OF ARTIFICIAL INTELLIGENCE

The authors declare that no generative AI or AI-assisted technologies were used in the creation, writing, or editing of this manuscript.

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