

An overview of Brazilian scientific production on climate denial and disinformation

Um panorama da produção científica brasileira sobre negacionismo e desinformação climática

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Abstract: The impacts of the climate crisis rank among the most severe and urgent global risks of our time. However, the gravity of this scenario has been systematically obscured by the deliberate spread of disinformation, which undermines public engagement and weakens collective efforts aimed at formulating and implementing effective solutions. In this context, this article aims to identify and analyze Brazilian scientific production on climate denial and disinformation through an integrative systematic literature review conducted via the CAPES journal portal and the SciELO Brazil database, covering the period from 2018 to 2024. The findings indicate that the term climate denial was widely used and generally addressed as a subset of scientific denialism. The phenomenon was predominantly understood as a political-ideological expression, linked to neoliberal interests and deliberate strategies to obstruct public awareness of the effects of the climate crisis and the measures necessary to mitigate them. The findings highlight the urgent need for interdisciplinary approaches that integrate critical science education, media literacy, regulation of information technologies, strengthening of environmental governance, and the valuing of pluralistic and emancipatory forms of knowledge, in order to confront the political, cognitive, and communicational conflicts that permeate this debate. By mapping and systematizing this body of research, this study seeks to contribute to the strengthening of academic and institutional responses to the structural impacts of climate denial and disinformation in Brazil.

Keywords: denialism; disinformation; climate crisis; systematic review.

Resumo: Os impactos da crise climática figuram entre os mais graves e urgentes riscos globais da contemporaneidade. No entanto, a gravidade desse cenário tem sido sistematicamente obscurecida pela disseminação deliberada de desinformação, a qual compromete o engajamento público e enfraquece os esforços coletivos voltados à formulação e implementação de soluções eficazes. Nesse contexto, este artigo tem como objetivo identificar e analisar a produção científica brasileira sobre negacionismo e desinformação climática, por meio de uma revisão bibliográfica sistemática integrativa realizada no portal de periódicos da CAPES e na base SciELO Brasil, abrangendo o período de 2018 a 2024. Constatou-se que o termo negacionismo climático foi amplamente utilizado, geralmente tratado como desdobramento do negacionismo científico. Predominou a compreensão do fenômeno como uma expressão político-ideológica, relacionado a interesses neoliberais e estratégias deliberadas de obstrução da conscientização pública sobre os efeitos da crise climática e as medidas necessárias para mitigá-los. Os achados apontam para a urgência de enfoques interdisciplinares que integrem educação científica crítica, letramento midiático, regulação das tecnologias da informação, fortalecimento da governança ambiental e valorização de conhecimentos plurais e emancipatórios, a fim de enfrentar os conflitos políticos, cognitivos e comunicacionais que permeiam esse debate. Ao mapear e sistematizar esse corpus de análise, esta investigação visa contribuir para o fortalecimento de respostas acadêmicas e

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institucionais frente aos impactos estruturais do negacionismo e da desinformação climática no Brasil.

Palavras-chave: negacionismo; desinformação; crise climática; revisão sistemática.

1. Introduction

Evidence of the climate crisis has mounted for decades, as notably warned in *The Limits to Growth* (Meadows et al., 1972). However, climate disinformation has gained unprecedented traction in the contemporary landscape, accelerated by digital communication and the strategic exploitation of online platforms. The *Global Risks Report 2025* (Elsner et al., 2025) notes that while the greatest long-term threats to humanity stem from climate and nature breakdown, disinformation has emerged as the premier short-term global risk, followed closely by extreme weather events. In this setting, climate disinformation functions not as an isolated threat, but as a cross-cutting driver that intensifies and connects other socio-environmental risks, impeding consensus, stalling policy responses, and compounding the impacts of the climate emergency.

Within this framework, profound transformations have occurred in socialization and communication processes, reshaped by the logic of digital interactions. Information circulating on online platforms has become pivotal in shaping public perceptions, attitudes, and behaviors, steering the collective imagination and facilitating the spread of denialist narratives across both scientific domains and socio-political disputes (Bertoli et al., 2025). Regarding the climate crisis specifically, Latour (2020) argues that disinformation is a deliberate practice funded by global economic elites and deployed as an instrument of power. By distorting facts and delaying public awareness, this strategy deepens social inequalities and accelerates environmental and democratic degradation, exposing the structural and political dimensions of disinformation in addressing contemporary crises (Latour, 2020).

The magnitude of the problem is evident in the United States, where leading climate disinformation websites¹ logged approximately 56.6 million weekly visits between 2021 and 2022, with 80% funded by major ad platforms including Google, Amazon, and Taboola (Climate Action Against Disinformation [CAAD], 2022). Moreover, roughly 90% of the US population underestimates public support for climate policies, reflecting a distorted perception of reality that is likely sustained by a false consensus fostered by biased content (Sparkman et al., 2022). In Brazil, catastrophic flooding in Rio Grande do Sul in April 2024 sparked a proliferation of conspiracy theories attributing the heavy rainfall to laboratory manipulation and alleged new world order schemes (Rômany, 2024; Pacheco, 2024). In

1 The term “climate disinformation” is used throughout this manuscript as shorthand for “disinformation related to climate change”.

contrast, atmospheric experts explained the disaster as the convergence of extreme heat, humidity, low atmospheric pressure, and El Niño dynamics, all intensified by climate change and compounded by deficient public management (Orsi, 2024).

Given the direct impact of information on policymaking and governmental decisions, understanding the operation of climate denialism and disinformation in the current landscape, especially their treatment within the scientific literature, is critical. Santini and Barros (2022) identified 2020 as a turning point for climate science studies in Brazil, coinciding with the onset of the COVID-19 pandemic. However, the authors emphasize that research on climate denialism and online disinformation remains nascent, with diffuse conceptual applications and a lack of analyses focused on local contexts, particularly in the Global South.

To address this gap, this study identifies and analyzes Brazilian scholarship on climate denialism and disinformation, examining general characteristics (temporal distribution and thematic categorization), conceptual frameworks, methodological approaches, core findings, and proposed recommendations. To this end, we conducted an integrative systematic literature review using the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) journal portal and the *Scientific Electronic Library Online* (SciELO) Brazil database from 2018 to 2024, spanning the earliest to the most recent studies retrieved with the search terms.

By mapping national scientific production on this subject, this study synthesizes knowledge on the dynamics of climate denialism and disinformation in Brazil, providing theoretical and methodological foundations to advance the field and strengthen academic and institutional responses to these phenomena. Consequently, this review sheds light on how Brazilian scholarship has understood, conceptualized, and responded to this complex issue, which bridges communication, politics, science, and power amid profound technological shifts and global socio-environmental crises.

2. Methodology

We conducted an integrative systematic literature review, an approach well suited for socio-environmental research because it accommodates diverse theoretical and methodological frameworks, providing a comprehensive understanding of the analyzed phenomenon (Silva et al., 2024a). The methodological guidelines of Silva et al. (2024a), Silva et al. (2024b), and the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins et al., 2024) were adapted to meet the objectives of this research. The review followed seven methodological steps: (a) formulating the research question; (b) locating and selecting studies; (c) critically appraising studies

and establishing inclusion and exclusion criteria; (d) extracting data; (e) analyzing data; (f) presenting data across analytical categories; and (g) developing a narrative synthesis.

The study was guided by the following question: “What are the characteristics of Brazilian scientific studies addressing climate denialism and disinformation?” Given the focus on research in the national context, searches were conducted in the CAPES journal portal and the SciELO Brazil database. These platforms were selected because they represent two of Brazil’s largest digital scientific repositories, indexing publications from domestic higher education and research institutions and offering broad representation of national scientific output.

An advanced search was conducted for open-access, peer-reviewed articles using the terms² “climate denialism” (negacionismo climático), “climate disinformation” (desinformação climática), and keyword combinations pairing disinformation (desinformação), fake news, and denialism (negacionismo) with climate crisis (crise climática), climate change (mudança climática), and scientific denialism (negacionismo científico), as well as post-truth and scientific denialism (pós verdade e negacionismo científico). All articles published through December 2024 were considered.

The initial search retrieved 59 studies. After removing duplicates, 41 articles remained for critical appraisal. Inclusion criteria required studies to be open-access, peer-reviewed scientific articles in Portuguese, produced nationally, and focused primarily on climate issues. Among articles meeting these criteria, studies were included if they made reference to climate change and/or climate denialism and disinformation with a focus on the Brazilian context, excluding those where climate issues were not central.

Consequently, 18 articles were selected and are listed in Table 1. The studies were analyzed and the findings are presented across analytical categories through a narrative synthesis.

2 In the CAPES journal portal, the search filter “any field” with “contains” was used. Multi-word combinations were executed using the “add another field” feature. In the SciELO Brazil database, searches queried “all indexes” across Brazilian collections in Portuguese, applying the Boolean operator “AND” for search term combinations.

Table 1 List of articles selected for analysis.

Title	Authors	Year	Primary theme
<i>Gramsci e o negacionismo climático estadunidense: a construção do discurso hegemônico no Antropoceno</i>	Gastaldi; Fernanda Castro	2018	Climate denialism
<i>A crise climática nos livros didáticos de Biologia (PNLD 2018-2020) à luz do modelo do Conhecimento Especializado de Professores de Biologia</i>	Carneiro, Katherine Iasmin Lima Rossito; Mello, Geison Jader; Moriel Junior, Jeferson Gomes	2020	Climate crisis in Biology textbooks
<i>O ataque organizado à ciência como forma de manipulação: do aquecimento global ao coronavírus</i>	Pivaro, Gabriela Fasolo; Giroto Júnior, Gildo	2020	Scientific denialism
<i>Rio de Janeiro e crise climática: governança, interatividade e construção discursiva no Twitter</i>	Andrade, Francisca Marli Rodrigues de; Barreto, Tarssio Brito; Henriques, Alen Batista	2020	Climate change discourses on Twitter
<i>Comunicação pública da ciência diante das coalizões em conflito sobre aquecimento global</i>	Oliveira, Maria José da Costa; Barbosa, Ronaldo; Carneiro, Celso Dal Ré; Matos e Nobre, Heloiza	2021	Discourses on anthropogenic global warming
<i>Negacionistas são os outros? Verdade, engano e interesse na era da pós-verdade</i>	Costa, Alyne de Castro	2021	Scientific denialism
<i>Negacionismo ambiental em O segredo do Bonzo a partir das leituras de imaginário, real e ilusão em Clément Rosset</i>	Almeida, Rogério de; Micca, Caio Chung	2021	Environmental denialism
<i>Negacionismo climático e desinformação online: uma revisão de escopo</i>	Santini, Rose Marie; Barros, Carlos Eduardo	2022	Disinformation and climate denialism
<i>Qual ciência é negada nas redes sociais? Reflexões de uma pesquisa etnográfica em uma comunidade virtual negacionista</i>	Pivaro, Gabriela Fasolo; Giroto Júnior, Gildo	2022	Scientific denialism
<i>Hiperparticularização de conceitos, negativismo científico e a natureza da ciência</i>	Giroto Júnior, Gildo; Vasconcelos, Cyntia Almeida; Pivaro, Gabriela Fasolo	2022	Disinformation during the COVID-19 pandemic
<i>Pela Ciência, contra os cientistas? Negacionismo e as disputas em torno das políticas de saúde durante a pandemia</i>	Duarte, Daniel Edler; Benetti, Pedro Rolo	2022	Uses of science during the COVID-19 pandemic
<i>Crescimento demoeconômico no Antropoceno e negacionismo demográfico</i>	Alves, José Eustáquio Diniz	2022	Impact of economic and demographic growth in the Anthropocene
<i>A “meada” do negacionismo climático e o impedimento da governamentalização ambiental no Brasil</i>	Miguel, Jean Carlos Hochsprung	2022	Climate denialism
<i>O negacionismo climático e suas deletérias consequências: O filme-documentário europeu “A Campanha contra o Clima” como estudo de caso</i>	Pires-Oliveira, Thiago; Simões, André Felipe; Carvalho, Marcos Bernardino de	2022	Climate denialism
<i>Tramar histórias para adiar o fim do mundo: estratégias do comum para nomear, descentralizar e perspectivar a modernidade</i>	Tietboehl, Lúcia Karam; Tietboehl, Léo Karam	2023	Nature and politics in the Anthropocene
<i>Perspectivas CTS na contraposição ao negacionismo científico: investigando estudos de 2011 a 2021</i>	Santos, Sheila Pires dos; Leão, Marcelo Franco	2024	Scientific denialism

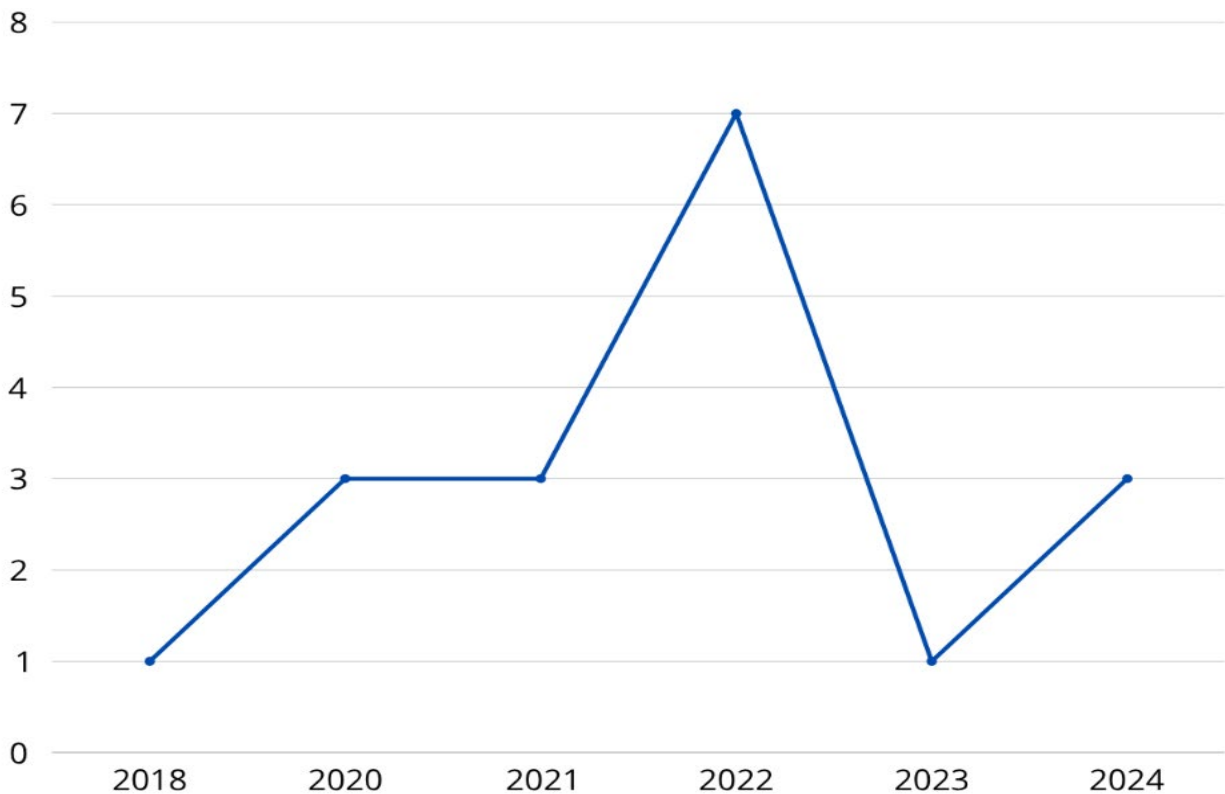
<i>Desinformação e economia política nas plataformas digitais</i>	Jesus-Silva, Thiago Henrique de	2024	Role of digital platforms in spreading climate disinformation, advertising fraud, and conspiracy theories
<i>Pseudociências e os Desafios Atuais</i> <i>Impostos ao Ensino de Ciências</i>	Souza, Daniel Victor Lima de; Oliveira, Irlane Maia de	2024	Dissemination of pseudosciences

3. Results

3.1. Characterization of articles: temporal and thematic distribution

This section examines publication years, journal subject areas, and primary themes across the selected articles. Based on the terms and criteria used, no studies published prior to 2018 were retrieved. Publications peaked in 2022 with 7 articles, as shown in Figure 1. The concentration of studies in recent years underscores the emerging nature of this research field, as noted by Santini and Barros (2022).

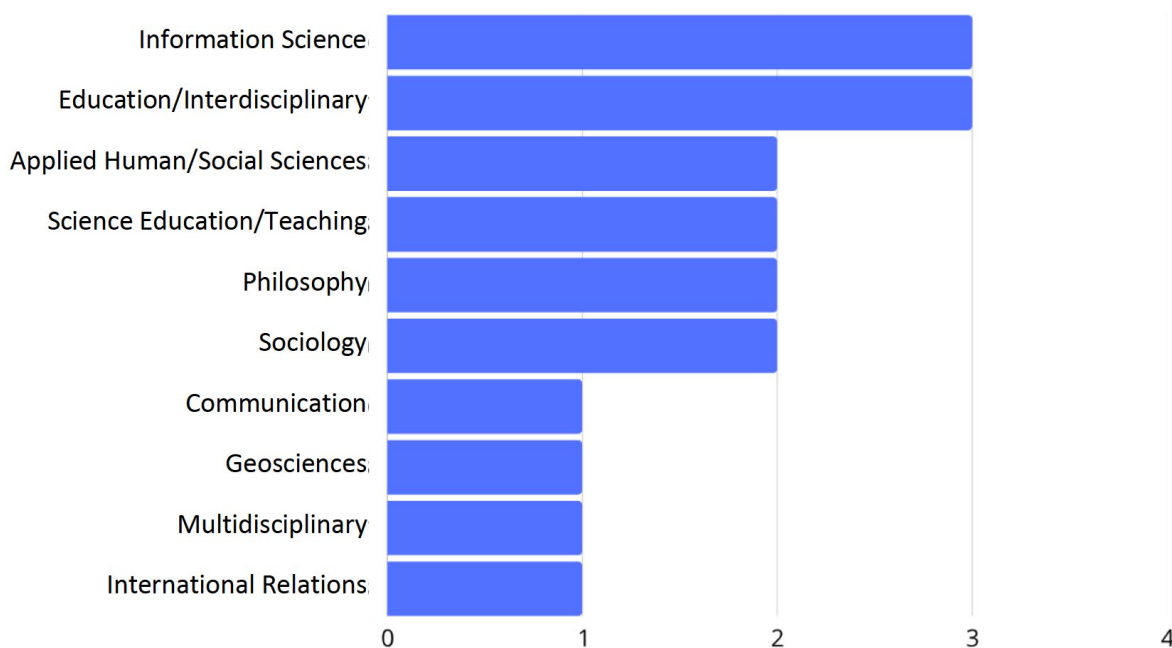
Figure 1
Publication year of the analyzed articles.



The selected articles appeared predominantly in Information Science and Interdisciplinary Education³ journals, with 3 articles published in each area. These were followed by Humanities/Applied Social Sciences, Science Education, Philosophy, and Sociology, each with 2 publications, as shown in Figure 2. While the study by Santini and Barros (2022) identified a predominance of publications in Communication⁴, our review identified only 1 article published in this field. Regarding authorship, researchers Gabriela Fasolo Pivaro and Gildo Giroto Júnior were the most prominent, co-authoring 3 articles on the subject. Both affiliated with Universidade Estadual de Campinas, their studies were published in Science Education and Philosophy journals.

The primary themes of the articles were categorized into core thematic axes to identify the focus of research. In this regard, 8 studies focused centrally on climate denialism, an expected finding given the inclusion criteria applied in *corpus* selection.

Figure 2
 Number of articles by journal field.



Within this thematic axis, the studies by Gastaldi (2018) and Pires-

- 3 “Interdisciplinary Education” was defined as journals centered primarily on education while interfacing with other fields of knowledge, such as philosophy, sociology, social sciences, humanities, linguistics, teacher education, and new technologies, among others.
- 4 The study by Santini and Barros (2022) analyzed articles published between 2000 and 2021 in Portuguese, English, and Spanish in the Web of Science and Scopus databases. The search in title, abstract, and keyword fields used wildcard variations organized into two axes: (1) Disinformation and Denialism, and (2) Climate Issues. Their sample was divided into a broad thematic corpus, covering disinformation and denialism regarding scientific facts and Anthropocene climate change, and a specific subset examining empirical evidence on the role of digital media in this issue. The reported predominance of Communication publications applied strictly to this specific thematic subset.

Oliveira et al. (2022) examined international contexts. Gastaldi (2018) analyzed climate denialism in the United States from a Gramscian perspective, given its influential role in global discourse. In turn, Pires-Oliveira et al. (2022) analyzed strategies of the climate denial industry based on the European documentary “The Campaign Against the Climate”.

Almeida and Micca (2021) used a hermeneutic reading of Machado de Assis’s short story “*O Segredo do Bonzo*” and concepts from Clément Rosset and Gilbert Durand to reflect on contemporary environmental denialism. Santini and Barros (2022) conducted a scoping review mapping studies that link disinformation and climate science denial on the internet. Jesus-Silva (2024) investigated the role of digital platforms in spreading climate disinformation, ad fraud, and political instrumentalization. Although other studies commented on Brazil, the study by Miguel (2022) was the only one strictly focused on identifying and analyzing the specific emergence and operation of climate denialism in the country through an examination of public events since 2007.

Oliveira et al. (2021) and Andrade et al. (2020) fall within this thematic axis by analyzing discourses on global warming and climate change, respectively, including analyses of denialist rhetoric. Oliveira et al. (2021) analyzed the resources employed by competing coalitions formed around discourses affirming or denying anthropogenic global warming. Meanwhile, Andrade et al. (2020) analyzed Twitter discourse under the theme “climate change” during an extreme torrential rainfall event in Rio de Janeiro in April 2019.

The second thematic axis includes 4 articles addressing scientific denialism in a more general manner. Pivaro and Giroto Júnior (2020) provided a historical summary of denialism from its origins to the present day, highlighting climate change and the COVID-19 pandemic. In another study, the same authors analyzed discourse in an online community to understand how virtual interactions reinforce distorted conceptions of science (Pivaro & Giroto Júnior, 2022). Costa (2021) investigated the discursive construction of the “denialist” label from a philosophical perspective, whereas Santos and Leão (2024) conducted a literature review analyzing how denialism is addressed in Natural Sciences studies.

The third axis comprises 3 articles focusing centrally on scientific denialism during the COVID-19 pandemic. Giroto Júnior et al. (2022) analyzed disinformation posted in response to science communication texts during the pandemic. Duarte and Benetti (2022) analyzed uses of science, focusing on the rhetoric and official stance of the Brazilian administration during that period. Souza and Oliveira (2024) presented conceptual reflections on pseudosciences and their proliferation during the COVID-19 pandemic. Although they did not focus specifically on climate change, these studies analyzed the Brazilian context, providing valuable insights into the specific features of scientific denialism domestically.

Two other articles focused centrally on political, economic, and environmental aspects of the Anthropocene. Alves (2022) analyzed the impact of economic and demographic growth on environmental degradation and rising carbon emissions to debunk demographic denialism, while Tietboehl and Tietboehl (2023) discussed truth and denialism in the context of planetary catastrophe.

Finally, the only included study with a central focus on the climate crisis in an educational context was by Carneiro et al. (2020), who evaluated specialized knowledge on the subject in Biology textbooks recommended by the National Textbook Program (PNLD 2018–2020).

Overall, the central thematic axes and terminologies across the studies are diverse, though closely interrelated. This aspect is explored further in the next section, which examines the conceptual approaches adopted in the selected studies.

3.2. Conceptual Approaches

The precise definition of concepts and terminologies is essential for scientific inquiry, especially in emerging fields where theoretical and methodological frameworks are actively developing. To understand the concepts and terminology used in studies on climate denialism and disinformation, this section presents the theoretical frameworks and terms identified across the sample.

Among studies dealing specifically with climate denialism, Almeida and Micca (2021) use “environmental denialism” as a synonym for “climate denialism”, referring to discourses that deny human impacts on the environment and their associated risks. For these authors, denialism manifests in different historical forms: Holocaust revisionism in the past, contemporary debates regarding slaughter conditions for meat consumption, and climate denialism as a future-oriented phenomenon.

Alves (2022) defines “climate denialists” or “climate skeptics” as individuals who do not recognize anthropogenic effects on global warming and deny the climate and ecological crisis. The author also introduces the terms “demographic denialists” and “demography skeptics” to describe those who hold that population size has no direct, significant impact on the environment.

Gastaldi (2018) defines climate denialism as the expression of various forms of skepticism regarding the reality of global warming or its anthropogenic origin. According to the author, the concept ranges from those who deny the phenomenon outright to those who acknowledge it but challenge its representations or oppose human interventions for mitigation. Santini and Barros (2022) conceptualize climate denialism as a manifestation of disinformation propagated through social contagion, framed by network theory. The authors highlight the conceptual diversity

in climate denial and disinformation research, noting that definitions remain markedly diffuse.

Andrade et al. (2020, p. 7) do not provide a formal theoretical definition, but operationally define climate denialism as messages “that mischaracterize and delegitimize scientific evidence on the existence and impacts of climate change”, while defining critiques of climate skepticism as “messages criticizing denialist actions, agendas, positions, and discourses, primarily produced by government officials, institutions, and citizens”.

Regarding scientific denialism, Miguel (2022) defines it as a product of post-truth, in which public opinion is shaped more by beliefs than by facts. The author argues that climate denialism is more than disinformation, operating as a device that obstructs environmental governance and is connected to specific dynamics of power. In the political and media arenas, Pires-Oliveira et al. (2022) introduce the concept of the “denial industry”, referring to the coordinated actions of lobbyists and *think tanks*⁵ funded by the fossil fuel sector, which disseminate denialist discourses with broad media access comparable to or exceeding that of the scientific community.

Denialism in a broader sense is presented by Costa (2021, p. 311), who defines it as an “expression of the will to truth in a world where ‘the truth’ is no longer conceivable”, proposing that denialism sustains a “hyperscientific science” and a “hypertrue truth” as defense mechanisms against the unpredictability of the world. The author also explores categorizations of denialism, such as post-denialism, classical conspiracy, and new conspiracism. Costa emphasizes that while traditional denialism sought to simulate scientific controversy to manufacture doubt, post-denialism rejects facts without concern for rational explanation. Drawing on Rosenblum and Muirhead (2019, as cited in Costa, 2021), the author distinguishes new conspiracism from the classical model: unlike the latter, new conspiracism presents no elaborate theories, operating solely through repetition and vague assertions. In the case of climate change, the earlier strategy of manufacturing controversies is replaced by the reduction of the subject to mere rumor.

Tietboehl and Tietboehl (2023) define denialism as an evasive behavior in the face of ideologically sensitive issues. For these authors, denialists do not reject science itself, but what they perceive as the ideological use of scientific facts, maintaining a belief in neutral and impartial science and defending the existence of a single “true truth”. In the context of the

5 According to Stone (2015), *think tanks* are organizations dedicated to public policy research and analysis, characterized by significant diversity in organizational structure, institutional goals, and degree of autonomy, which varies across sociopolitical contexts. Although traditional Western frameworks define them as entities independent of the state, political parties, and corporate interests, many think tanks maintain direct ties to governments, political leaders, or corporations, and may even be integrated into state structures.

climate crisis, denialism is seen as a strategy to avoid the discomfort caused by truths perceived as threatening.

Giroto Júnior et al. (2022) use the typology of scientific denialism proposed by Cohen (2021, as cited in Giroto Júnior et al., 2022) to analyze their research sample. Among the identified types, three stand out: literal denialism, which consists of the direct denial of facts; interpretative denialism, which admits the existence of facts but assigns them a different meaning; and implicatory denialism, which acknowledges both facts and their interpretation but denies or minimizes their moral, political, or social implications.

Duarte and Benetti (2022) analyze the relationship among the concepts of scientific populism, denialism, and post-truth. For the authors, scientific populism is characterized by government leaders who claim greater scientific authority and credibility than their critics, fostering distrust in experts and prioritizing individual experiences over evidence. Former President Jair Bolsonaro is cited as an example of “scientific populism” who used fake news to support denialist agendas, producing discourses whose scientific legitimacy is contested. Santos and Leão (2024) characterize scientific denialism as a covert distortion of reality that undermines historical and social understanding of facts. The authors link this phenomenon to the logic of post-truth, which manipulates seemingly accurate elements and credible sources to build misleading narratives co-opted by populist movements, establishing a connection with the concept presented by Duarte and Benetti (2022).

Pivaro and Giroto Júnior (2020) and Souza and Oliveira (2024) converge in arguing that the post-truth era enables cherry-picking parts of science to justify preexisting beliefs. Pivaro and Giroto Júnior (2020) associate the origin of post-truth with the rise of postmodernism, which rejects absolute truths in favor of narratives that allow multiple interpretations. In this context, the post-truth era expands the subjectivity of reality, going beyond simple science denial with the emergence of so-called alternative facts. Souza and Oliveira (2024) highlight the strengthening of pseudosciences in this landscape, characterized by appeals to special abilities, non-replicable experiments, biased examples, lack of rigorous testing, dismissal of contradictory evidence, and convenient selection of explanations (Hanson, 2021, as cited in Souza & Oliveira, 2024). Examples include homeopathy, astrology, Holocaust denial, climate change denial, and anti-vaccine movements.

Several studies present concepts regarding disinformation. Jesus-Silva (2024) argues that disinformation does not result solely from error or misunderstanding, but is shaped by values, beliefs, and social contexts, favored by structures that economically benefit major digital platforms. The author adopts the perspective of the Political Economy of Disinformation, which characterizes disinformation as a tool for control and the

accumulation of power. In this approach, the author distinguishes financial disinformation, aimed at maximizing traffic to sensationalist websites for profit, from ideological disinformation, which reinforces authoritarian political agendas, particularly on the far right. Climate disinformation, in turn, manifests in the denial of climate change and the distortion of its causes and consequences.

Giroto Júnior et al. (2022) define disinformation as a decontextualized and individualized explanation of a given phenomenon. In another study, Pivaro and Giroto Júnior (2022) state that the dissemination of scientific disinformation is linked to a limited understanding of the nature of science and the processes of knowledge construction. The authors emphasize that this gap is exploited in discourses aimed at undermining scientific credibility, as demonstrated during the COVID-19 pandemic.

Oliveira et al. (2021) and Carneiro et al. (2020) do not provide specific definitions of denialism or climate disinformation. However, their studies respectively examine discourses affirming or denying anthropogenic global warming and emphasize that climate denialism tends to intensify as political leaders capitalize on public disbelief regarding environmental catastrophes.

Based on the analysis of the selected literature, the term climate denialism was predominantly used, frequently understood as a specific branch of scientific denialism, with both widely employed across most examined studies. Only Jesus-Silva (2024) adopts an approach centered on the concept of climate disinformation. The concept of post-truth is also addressed in 7 studies, characterized as a sociocultural context conducive to the emergence and dissemination of denialist discourses, in which empirical facts lose centrality to subjective beliefs and narratives.

3.3. Methodological Approaches

In addition to conceptual definitions, analyzing the methodologies used in the studies is equally essential for understanding the field. In emerging areas where standard procedures are not yet established, methodological choices directly influence the validity and reliability of the findings. Therefore, this section analyzes the methodological approaches of the selected studies.

Among the theoretical articles, Tietboehl and Tietboehl (2023) discuss the relationships between truth and denialism based on events related to the climate crisis, combining ecological, Amerindian, and Amefrican perspectives. Pires-Oliveira et al. (2022) conducted comparative analyses connecting socioeconomic, political, and environmental contexts, centering their reflections on the documentary “The Campaign Against the Climate”.

Pivaro and Giroto Júnior (2020), examining denialism from a historical perspective, provided examples of Bolsonaroista denialism during the COVID-19 pandemic while drawing parallels with international events.

Similarly, Duarte and Benetti (2022) conducted a critical analysis of the Bolsonaro administration's actions during the pandemic, focusing on its stance and discourse. Souza and Oliveira (2024) presented conceptual reflections on pseudosciences, providing examples of their spread in Brazil during the COVID-19 pandemic and proposing science education approaches to counter them.

Several theoretical articles engage directly with philosophy. Almeida and Micca (2021), for example, conducted a philosophical and hermeneutic analysis based on the works of Clément Rosset and Gilbert Durand. Costa (2021) examined the phenomenon of denialism using the Nietzschean notion of the "will to truth". Gastaldi (2018) conducted a theoretical analysis using the hypothetico-deductive method, drawing on Antonio Gramsci's concepts of historical bloc, intellectual bloc, and hegemony.

Three studies used content analysis based on the methodology proposed by Bardin. Girotto Júnior et al. (2022) applied this approach to examine user comments in response to science communication texts published on a blog. Comments from three specific texts were selected, and the analysis evaluated three central aspects: hyper-particularization of concepts, types of denialism, and non-consensual views on the Nature of Science.

Miguel (2022) applied the same methodology to investigate public events related to climate denialism in Brazil, based on data mapped from 2007 onward. The research involved analyzing digital archives of newspapers and official institutional websites, YouTube videos, public hearing transcripts, and denialist books and blogs. Jesus-Silva (2024) also used content analysis to examine three reports from the Internet and Social Media Studies Laboratory at the Federal University of Rio de Janeiro (NetLab/UFRJ). The analytical categories were organized into three main themes: climate disinformation, ad fraud, and political instrumentalization.

Two studies conducted literature reviews. Santini and Barros (2022) conducted a scoping review in the Web of Science and Scopus databases to analyze studies investigating the relationship between disinformation and climate science denial on the internet from 2000 to 2021. The choice of a scoping review was justified by the need to explore fundamental questions in a research field that is still developing. The search was guided by terms related to disinformation and denialism, as well as specific topics within climate change. The selected articles were analyzed across 27 variables, including publication year, discipline and journal area, methodological approach, social media platforms investigated, country of focus, and terminology used in titles and abstracts. Santos and Leão (2024) conducted a literature review akin to a state-of-the-art overview, using *Web of Science* and CAPES. The search was conducted using the term "scientific denialism" in Natural Sciences studies published between 2011 and 2021.

Four other studies used distinct methodologies. Carneiro et al. (2020) used the Biology Teacher Specialized Knowledge (BTSK) model to analyze

high school Biology textbooks covering climate change content within ecology units. Excerpts from textbooks designated for the 1st and 3rd grades of high school were examined. The BTSK model provides a framework for analyzing specialized pedagogical content knowledge across three main domains: biological content knowledge, pedagogical knowledge, and beliefs. Based on this framework, the selected textbook excerpts were classified according to the corresponding subdomains.

Oliveira et al. (2021) used the Advocacy Coalition Framework (ACF) to analyze the arguments of competing coalitions regarding anthropogenic global warming. The ACF is a theoretical model designed to explain public policy change in settings characterized by high technical complexity and ideological disputes. This analytical framework posits that competing coalitions of actors vie within a policy subsystem over time to influence policy formulation and implementation.

Pivaro and Giroto Júnior (2022) employed virtual ethnography by systematically observing a Twitter community supportive of then-president Jair Bolsonaro. Data collection began by creating a profile that followed Bolsonaro and then followed all accounts automatically recommended by the platform as ideologically aligned. All suggested accounts were followed, forming the observed network. The research was based on the non-participant observation of public interactions over a four-month period without researcher intervention.

Andrade et al. (2020) used thematic analysis to examine Twitter posts concerning the extreme rainfall event in Rio de Janeiro. Data were collected between April 7 and 10, 2019, via the Twitter API using the R programming language. A total of 375,000 *tweets* were identified using keywords such as “chuvarj” and “chuva”; filtering for mentions of “global warming” and/or “climate change” yielded 53 unique *tweets*. These *tweets* were classified into six analytical categories: climate denialism, adaptation, governance, vulnerability, critiques of climate skepticism, and education/information.

Finally, a single article adopted a quantitative approach. Alves (2022) used secondary statistical data from the *Global Footprint Network*, *Global Carbon Project*, and the *Maddison Project Database* to analyze causal relationships and statistical correlations. The data were presented through graphs and tables with numerical variables, including CO₂ emissions, global temperature, GDP, ecological footprint, and Earth’s biocapacity.

Thus, 17 articles adopted a qualitative approach, while only 1 article used a quantitative approach. Among the qualitative studies, 8 were exclusively theoretical, 3 used content analysis, 2 conducted literature reviews, and 4 applied specific methodologies (the BTSK model, the ACF model, virtual ethnography, and thematic analysis). The only quantitative article was based on the analysis and interpretation of databases and time series.

3.4. Key Findings and Proposed Interventions

This section synthesizes the key evidence identified in the analyzed studies and the proposals formulated by their authors. By bringing together evidence and propositions, this synthesis clarifies the links between empirical observations and theoretical interpretations across Brazilian studies on climate denialism and disinformation.

Climate denialism was identified as an expression of subjective resistance to an inconvenient reality. Tietboehl and Tietboehl (2023) linked denialism to evasion in the face of uncomfortable truths, highlighting its implications for the disconnection between environmental justice and struggles against structural violence. For these authors, this pattern of denial, which spans issues such as racism, climate change, and Western white identity, reflects the persistence of modern-colonial thought. Almeida and Micca (2021) understood climate denialism as the substitution of reality with desire-based illusory constructs, a process intensified by the intangibility of climate change as a “hyperobject”, as defined by Timothy Morton. Both studies emphasized the imaginary as a contested space, proposing, respectively, a fictional ethic based on plural narratives and environmental education as a tool to deconstruct illusions and build emancipatory imaginaries.

Similarly, Souza and Oliveira (2024) emphasized that cognitive biases, aversion to uncertainty, and the search for control contribute to adherence to pseudoscientific beliefs. They noted that emotions such as fear and anxiety, intensified during the COVID-19 pandemic, favored the acceptance of practices such as astrology, homeopathy, and conspiracy theories, often sustained by religious, cultural, and group factors. To address this scenario, the authors propose educational strategies such as: promoting critical thinking focused on argumentation, evidence analysis, and refutation; developing scientific media literacy to understand the role of media in producing and disseminating scientific content; and providing teacher training dedicated to addressing pseudosciences in education.

Gastaldi (2018) and Pires-Oliveira et al. (2022) converged in analyzing climate denialism as an instrument for maintaining the neoliberal order, highlighting the central role of the United States in this process. Gastaldi (2018) demonstrated the coordinated action of corporations, conservative *think tanks*, partisan media, and politicians as pillars of a historical bloc that legitimizes unsustainable economic practices, reinforcing the hegemony of dominant elites. Complementarily, Pires-Oliveira et al. (2022) demonstrated how the fossil fuel industry employs strategic disinformation to influence public policy and undermine regulatory progress, especially in contexts such as COP26. Both studies identified the disproportionate influence of private actors on environmental decisions, the systematic use of ideological campaigns, and state inaction as factors sustaining climate denialism. In terms of proposals, while Gastaldi (2018) points to the potential of subaltern

mobilizations, such as Indigenous and environmental movements, to challenge the prevailing hegemony, Pires-Oliveira et al. (2022) advocate strengthening international environmental governance.

Pivaro and Giroto Júnior (2020), Duarte and Benetti (2022), and Costa (2021) reinforced the understanding of denialism as a political-ideological phenomenon operating especially in authoritarian contexts marked by a crisis of legitimacy in scientific institutions. For Pivaro and Giroto Júnior, denialism is a historical strategy linked to economic interests, mobilized by administrations such as Trump's and Bolsonaro's to challenge scientific consensus. In the Bolsonarista context, Duarte and Benetti (2022) observed that denialism operated through the instrumentalization of scientific controversies to delegitimize experts and institutions and promote an apolitical conception of science. Thus, the studies advocate critical and communicative science education, emphasizing the understanding of science as a social practice grounded in shared culture and public engagement.

Among the content analyses, Miguel (2022) traced the genesis of climate denialism in Brazil as a structured political project linked to actors who instrumentalized denialist discourse to advance economic interests. Disseminated by conservative-liberal organizations, this narrative relies on the rhetoric of freedom of opinion, criticisms of the Intergovernmental Panel on Climate Change (IPCC), and anti-communist conspiracy theories. Although predating Bolsonarismo, the phenomenon gained momentum under that administration, which promoted the dismantling of environmental policies and consolidated denialism as a form of resistance to environmental governance.

Jesus-Silva (2024) analyzed climate disinformation as an instrument for reproducing economic interests that benefit from climate inaction, showing that instrumentalizing collective ignorance helps maintain the status quo. The study demonstrated that digital platforms play distinct roles in this ecosystem: Facebook specializes in promoting sensationalist content via *clickbait*, YouTube in disseminating conspiracy theories, and WhatsApp in facilitating the private circulation of fake news. Accordingly, the author proposes structural measures such as algorithmic transparency, economic regulation of platforms, and educational initiatives focused on digital literacy and critical consciousness.

Pivaro and Giroto Júnior (2022), in analyzing Twitter posts, identified recurring patterns of science denial, including the use of personal anecdotes over evidence, the misuse of scientific terminology, selective skepticism toward official sources, and the reliance on individual opinions to validate knowledge. In another study, Giroto Júnior et al. (2022), analyzing the structure of science denial discourses, highlighted the distinction between «true science,» viewed as neutral and validating personal beliefs, and «ideological science,» viewed as manipulated. They observed

that conclusions are based on personal anecdotes or disconnected data, fragmented use of scientific terms, and an excessive citation of sources intended solely to reinforce preconceived narratives. Both studies propose scientific and media literacy, the adoption of integrative communication strategies, and the incorporation of critical approaches into educational practice.

Meanwhile, Andrade et al. (2020) found that of the 53 *tweets* analyzed during the intense rainfall in Rio de Janeiro, 9.4% expressed skepticism regarding climate change, accompanied by criticisms of experts and journalists. In contrast, 49% of the posts criticized the skeptical stance of public authorities, highlighting government omission as an aggravating factor. This finding suggests that experiencing an extreme weather event firsthand significantly strengthened public perception of the urgency and severity of the climate crisis. As recommendations, the authors emphasized the need to expand education and information initiatives to enhance public engagement and citizen participation in environmental governance.

Among the review studies, Santini and Barros (2022), using a scoping review, identified an increase in publications on climate denialism beginning in 2016, with a predominance in Communication. Most analyzed papers employed qualitative approaches on social media platforms such as Twitter and YouTube, exhibiting a geographic bias concentrated in the United States. Denialist discourses were widely associated with the terms *denialism* and *conspiracy theory*, characterized by challenging scientific consensus and claiming alternative forms of science. To overcome this landscape, the study recommends adopting interdisciplinary approaches sensitive to local specificities.

In a complementary manner, Santos and Leão (2024), in a literature review in Natural Sciences, noted that denialism is frequently linked to partisan political discourses, especially conservative, right-wing, and far-right ideologies. The studies analyzed by the authors focused primarily on denialism related to environmental and public health issues, such as climate change and COVID-19. Similar to Santini and Barros (2022), they also observed an increase in publications starting in 2016. To counter denialism in Natural Sciences, the authors recommend pedagogical approaches based on the Science-Technology-Society (STS) perspective, combined with Paulo Freire's critical pedagogy, emphasizing scientific literacy and critical, contextualized, and dialogic education.

In textbook analyses, Carneiro et al. (2020) observed a descriptive emphasis in content and a mixed approach to the causes of climate change, giving equal weight to natural factors and anthropogenic influence. Although "Sustainability" was presented with scientific data, it was superficially addressed, with a narrow focus on individual awareness while neglecting socio-political and structural dimensions. The study defends

the importance of critical, integrated, and interdisciplinary environmental education capable of fostering environmental citizenship.

Finally, Alves (2022) demonstrated that global demoeconomic growth has occurred at an accelerated and disproportionate pace. The analysis showed a strong correlation among population growth, increased production, carbon emissions, and rising global temperatures, indicating that recent warming is overwhelmingly driven by human activities. In this context, the author proposes a degrowth paradigm combining reductions in consumption and population with a transition to a low-carbon economy.

In a convergent manner, the analyzed studies understand scientific denialism and, specifically, climate denialism as a historical, political, and ideological phenomenon linked to sustaining economic interests and reproducing power structures, especially within frameworks defending neoliberalism and ultraconservative orientations. The evidence indicates that climate denialism and disinformation operate through strategies designed to delegitimize scientific consensus and deploy discursive tactics – such as selective data use, misinterpretation of scientific concepts, and the spread of conspiracy theories – amplified by digital platforms. In summary, the studies advocate an interdisciplinary approach linking the regulation of information technologies, the strengthening of global environmental governance, the recognition of plural and counter-hegemonic knowledge, and the promotion of critical, dialogic media and scientific literacy capable of fostering emancipatory consciousness.

4. Discussion

This study aimed to analyze Brazilian scientific production on climate denialism and disinformation through an integrative systematic literature review conducted in the CAPES journal portal and the SciELO Brazil database. The final sample comprised 18 articles published between 2018 and 2024, with the highest concentration in 2022, highlighting the recent growth of academic interest in this topic nationally. A predominance of research in Information Science and Interdisciplinary Education was observed, alongside the recurrent use of qualitative methodologies, particularly literature reviews, theoretical essays, and content analysis.

The results indicate that Brazilian scholarship on climate denialism and disinformation is still undergoing epistemological, conceptual, and methodological consolidation. The limited number of identified studies, coupled with terminological dispersion and analytical heterogeneity, characterizes an emerging field marked by diverse theoretical frameworks and interpretive debates. Across most reviewed studies, the concept of “climate denialism” emerged as a central category, frequently understood as an outgrowth of scientific denialism and linked to broader ideological, political, and economic processes. In contrast, only one study directly used

the concept of “climate disinformation”, while a significant portion of the research connected the phenomenon to post-truth dynamics.

The analyzed studies conceptualize climate denialism primarily as a structural political phenomenon tied to protecting economic interests, maintaining environmentally predatory development models, and reproducing hegemonic power structures. This interpretation aligns closely with the analyses of Oreskes and Conway (2010), who demonstrated how corporate sectors, conservative think tanks, and political groups organized systematic campaigns to manufacture scientific doubt to block environmental regulation and safeguard fossil fuel interests. In the Brazilian context, however, the findings suggest that these dynamics take on specific contours, intertwining with historical inequalities, fragile environmental governance, growing political polarization, and the economic and discursive prominence of agribusiness.

In this regard, Miguel (2022) argues that climate denialism in Brazil serves as a mechanism that blocks environmental governance, impeding the effective integration of the ecological crisis into institutional rationalities and public policies. Denialism therefore operates not merely as a factual rejection of climate science, but as a contested strategy surrounding development models, forms of territorial exploitation, and legitimate modes of social and political organization. This understanding corroborates analyses that interpret climate denialism as organized political action historically linked to conservative think tanks, industrial sectors, philanthropic foundations, contrarian scientists, and right-wing media (Oreskes & Conway, 2010; Dunlap & McCright, 2015; Brulle, 2021).

This interpretation converges with the concept of the “denial countermovement” formulated by Dunlap and McCright (2015), according to which climate denialism constitutes an organized political and ideological movement dedicated to deliberately obstructing institutional responses to the climate crisis. In Brazil, the reviewed studies show that this process is linked not only to the circulation of disinformation, but also to the discursive construction of political antagonisms, anti-environmentalism, and the delegitimization of scientific, educational, and environmental institutions.

Another central aspect identified is the strong association between climate denialism and post-truth. The recurrence of this relationship shows that contemporary climate disputes extend beyond the strictly scientific domain, involving broader shifts in how knowledge is produced, circulated, and legitimized. In this context, post-truth can be understood as a dynamic in which beliefs, affects, and political identities exert greater influence on public opinion than verifiable scientific evidence. This scenario is intensified by the persuasive use of digital technologies, the expansion of anti-science discourses, and the spread of conspiracy narratives and strategies that relativize factual truth (Bertoli et al., 2025).

At the same time, the concentration of research in Interdisciplinary Education and Information Science demonstrates that addressing climate denialism in Brazil has frequently been framed from pedagogical, cognitive, and informational perspectives. The recurrent focus on scientific literacy, media literacy, and critical education underscores the recognition that the climate crisis is also a symbolic, epistemological, and communicational struggle. This perspective echoes the reflections of Freire (1987), for whom educational processes cannot be divorced from the power structures and ideological conflicts that permeate the social production of knowledge. In this context, the contributions of Cook et al. (2017), Lewandowsky et al. (2020), and Cook (2020) are noteworthy regarding strategies for raising awareness of disinformation techniques and effective mechanisms for identifying and countering them.

Internationally, multilateral organizations have advocated media literacy as a strategic tool to combat disinformation in hyperconnected societies (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2023; Organisation for Economic Co-operation and Development [OECD], 2024). However, the findings of this review also indicate the limitations of approaches centered exclusively on informational correction or the transmission of scientific facts. As argued by Latour (2020) and Raskin (2016), the contemporary ecological crisis involves material, economic, political, and civilizational conflicts deeply rooted in modern forms of social organization, requiring broad structural transformations. Thus, the persistence of climate denialism highlights conflicts surrounding economic interests, political rationalities, and legitimate ways of inhabiting the planet. Reducing climate denialism to a mere informational problem ignores the political, economic, and ideological dimensions that sustain its social reproduction.

Among the main challenges identified, the scarcity of research addressing the regional, territorial, and sociocultural realities of the Global South is evident in the small number of studies retrieved across the analyzed Brazilian databases. This gap reveals not only quantitative limitations in national scientific output on the topic, but also persistent epistemic asymmetries in the construction of climate knowledge. Furthermore, the reviewed studies question whether conventional modern epistemology can adequately respond to contemporary crises, pointing to the need for socially engaged, critical scholarship committed to a plurality of knowledge systems and historical experiences. In this sense, the findings dialog with contemporary decolonial perspectives that challenge the epistemological dominance of the Global North in defining global environmental agendas

and legitimizing dominant knowledge production regimes (Mignolo, 2017; Maldonado-Torres, 2021).

At the macrostructural level, the reviewed studies indicate that the transformations required to address the climate crisis remain constrained by elite economic resistance, the persistence of unsustainable production and consumption models, and the fragility of environmental governance structures. In this context, there is an urgent need to expand investigations into the relationships among climate denialism, governance strategies, geopolitical struggles, and economic power structures.

The findings also reinforce the necessity of interdisciplinary approaches that connect communication, education, politics, technology, economics, and socio-environmental justice. Given the complexity of the phenomenon, systematic reviews such as this are essential for critically mapping existing scientific output, identifying analytical gaps, and providing theoretical and methodological foundations for future research and policymaking.

Additionally, the United Nations (UN) Sustainable Development Goals (SDGs) represent an important normative framework for addressing contemporary challenges. The 2030 Agenda establishes interconnected targets related to climate action (SDG 13), institutional and democratic strengthening (SDG 16), and expanding access to reliable information. However, the spread of climate disinformation directly undermines these objectives by weakening public debate, eroding trust in scientific institutions, and hindering evidence-based policymaking.

Ultimately, the findings of this review demonstrate that climate denialism and disinformation are not peripheral or purely communicational phenomena, but central expressions of contemporary disputes over democracy, environmental governance, and the legitimacy of science. In this regard, strengthening Brazilian scholarship on this topic requires not only increasing academic output quantitatively, but also deepening critical interdisciplinary analyses that capture the multifaceted political, economic, technological, territorial, and cultural dimensions of the contemporary climate crisis.

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