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Environment and climate change in Brazil: similarities and differences in public opinion based on political identity

Meio ambiente e mudanças climáticas no Brasil: semelhanças e divergências na opinião pública conforme a identidade política

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ABSTRACT: This article explores the similarities and differences in opinions and attitudes reported by individuals with different political identities ("more left-leaning," "center," and "more right-leaning"). It analyzes secondary data from the 2022 survey "Climate Change and Public Perception in Brazil," conducted through a partnership between the Instituto Tecnologia & Sociedade do Rio (ITS), the Yale Program on Climate Change Communication, and Ipec Inteligência. The main objective of this study was to examine the survey data through the lens of politically motivated reasoning theory. It assessed statistically significant differences and tested the hypothesis that individuals who identify as more left-leaning tend to align strongly with environmentalist views, while those on the right are more likely to adopt anti-environmentalist and climate denialist positions. This trend aligns with the historical development of these political identities in relation to environmental issues in Brazil. The findings reveal a strong overall agreement among the Brazilian population, across all political groups, with scientific consensus on climate change and the importance of protecting the environment and the Amazon. However, the highest proportion of individuals who diverge from these majority opinions – expressing views more aligned with anti-environmentalist discourse – are found in the center and especially on the right, where nearly one-third of respondents in some cases hold such views. In contrast, the left shows an almost unanimous pro-environmentalist stance.

Keywords: public opinion; environment; climate change; environmentalism; climate denialism.

RESUMO: Este artigo versa sobre as semelhanças e diferenças entre as opiniões e atitudes relatadas por pessoas de identidades políticas distintas ("mais à esquerda", "centro" e "mais à direita") a partir dos dados secundários

da pesquisa "Mudanças climáticas na percepção dos brasileiros 2022" executada pela parceria entre o Instituto Tecnologia & Sociedade do Rio (ITS), o *Yale Program on Climate Change Communicatio*n e o Ipec Inteligência. O objetivo geral deste artigo foi analisar os dados da pesquisa com base na teoria do raciocínio politicamente motivado, verificando as diferenças estatisticamente significativas bem como as hipóteses de forte alinhamento das pessoas identificadas mais à esquerda com discursos ambientalistas e, principalmente, do alinhamento das pessoas identificadas mais à direita com discursos antiambientalistas e negacionistas climáticos, em consonância com o desenvolvimento histórico de ambas as identidades políticas em relação às pautas ambientais no Brasil. A pesquisa evidenciou uma forte convergência da população brasileira e de todos os grupos de identidade política com os consensos científicos sobre as mudanças climáticas, bem como com ideias que preconizam a defesa do meio ambiente e da Amazônia. Todavia, as maiores proporções de pessoas que divergem de tais opiniões majoritárias, com ideias mais alinhadas ao discurso antiambientalista, encontram-se nos grupos do centro e, sobretudo, da direita, com quase um terço de cada grupo em alguns casos. Por outro lado, a esquerda se destacou com um quase consenso pró-ambientalista.

Palavras-chave: opinião pública; meio ambiente; mudanças climáticas; ambientalismo; negacionismo climático.

1. Introduction

For decades, scientists have presented growing evidence pointing to a severe environmental and climate crisis, primarily driven by human activities. At the same time, political disputes over the role of the state in environmental protection have intensified. On one hand, we have witnessed a steady increase in initiatives by political actors, civil society, and the private sector in support of environmental sustainability, justified by scientific and technological advancements in understanding environmental issues. On the other hand, recent years have seen a surge in efforts by economic and political interest groups aimed at weakening environmental protections – often backed by political propaganda campaigns, particularly on social media, that spread misinformation.

Since the United Nations Conference on the Human Environment, held in Stockholm in 1972, environmental issues have gained prominence in global politics. This shift contributed to the rise of emerging environmental movements and Green parties, which began to multiply across various countries. As a result, the United Nations (UN) became one of the primary platforms for discussing and promoting global strategies to address ecological challenges. In this context, the Intergovernmental Panel on Climate Change (IPCC) stands out. Established in 1988, its primary goal has been to provide national governments with scientific information to support the development of climate policies (IPCC, 2023).

In the 1970s, an anti-environmentalist countermovement (Dunlap & McCright, 2015) took shape in the United States, denying the reality of climate change. This movement gained prominence in the 1990s, backed by the oil industry and promoted by liberal-conservative think tanks, both of which opposed increased regulation of industries engaged in environmentally harmful activities (Oreskes & Conway, 2010). Such an anti-environmentalist countermovement adopted

the manufacturing doubt strategy previously used by the tobacco industry to deny the harmful effects of smoking. The approach involves funding experts with recognized scientific credentials, along with public relations professionals, to spread doubt about scientific findings that could negatively impact their industries. However, the information they promote does not undergo rigorous scientific procedures such as double-blind peer review. Despite this, these claims gain credibility in public debates when traditional media outlets present them in a balanced manner alongside peer-reviewed scientific knowledge (Oreskes & Conway, 2010). In other words, due to journalistic norms that emphasize presenting both sides of a public controversy, media debates in such contexts may give the impression that both perspectives hold equal scientific legitimacy-even when one does not adhere to the established standards of the scientific community. Although this denialist countermovement has been stronger in developed Anglo-Saxon countries, it began to gain traction in Brazilian public discourse in the 2000s (Miguel, 2022).

Recently, the administrations of Donald Trump (2016–2020) in the United States and Jair Bolsonaro (2018–2022) in Brazil became emblematic cases of spreading information and ideas that undermined the credibility of scientific consensus on climate change[1] as well as the scientists and institutions that support environmental preservation policies (Giffoni Pinto & Malerba, 2022; Sousa, 2023; von Behr, 2022; Miguel, 2022). Misinformation about environmental issues shared on social media by both former presidents and their allies fueled digital mobilization campaigns among their supporters, aiming to discredit data and news highlighting the ecological crisis (Sousa, 2023; Recuero & Soares, 2020; Walz, 2022). Their administrations also pursued policies that ran counter to sustainability-based environmental governance, drawing criticism from various domestic and international actors (Giffoni Pinto & Mallerba, 2022). In a political shift, both far-right populists were defeated in elections by candidates who campaigned on strong promises to restore sustainable environmental governance: Joe Biden in the United States and Luiz Inácio Lula da Silva in Brazil.

Understanding how a country's population perceives environmental issues is essential, especially in the context of political and ideological divides. In this regard, for the third consecutive year, the 2022 survey "Climate Change and Public Perception in Brazil*"* (2023) was conducted. Commissioned by the Instituto de Tecnologia & Sociedade do Rio (ITS) in partnership with the Yale Program on Climate Change Communication, the study was carried out by Ipec Inteligência. The research provides valuable insights into how people in Brazil perceive environmental and climate change issues, considering key political factors in the post-

[1] When reviewing scientific journal publications on climate change – all based on double-blind peer review – between 1993 and 2003, Oreskes (2004) found no articles contradicting the understanding that climate change is driven by human activity. Subsequent studies confirmed the existence of a broad consensus within the international scientific community regarding the human contribution to climate change. This aligns with IPCC reports, which have progressively gathered more evidence supporting this conclusion with each edition (von Behr, 2022, p. 51).

2022 election context.

Focusing on political aspects, the study examined the differences and similarities in how Brazilians with different political identities perceive environmental and climate issues. Based on the theory of politically motivated reasoning (Kahan, 2016a; 2016b), the hypothesis was that political identity groups would show significant differences, given the historical alignment of the left with environmentalism and the right with the anti-environmentalist countermovement (Dunlap & McCright, 2015). In this context, this article – written by a researcher involved in analyzing the secondary data from "Climate Change and Public Perception in Brazil" (ITS-Yale-Ipec, 2023) – revisits the study's findings while also providing a broader contextualization of recent political and environmental events in Brazil that may have influenced public opinion. Additionally, this article differs from the original study by presenting and discussing statistical significance tests for differences between political identity groups. In other words, the discussion presented here offers a more contextualized analysis of the differences and similarities among political identity groups regarding environmental and climate issues.

The article is divided into four sections. The first presents the study's methodological aspects. Next, a theoretical section discusses the relationship between political identities and environmental issues in Brazil, outlining expectations regarding the opinions of different political identity groups. The article then focuses on public opinion survey data. It first examines concerns about the environment and environmental protection, along with respondents' reported actions to address these issues. It then explores questions related to global warming and climate change. Finally, it presents data on wildfires and Amazon deforestation. The findings indicate that Brazilian society is not deeply polarized on environmental and climate issues. However, there is a greater presence of minority, anti-mainstream opinions among those who identify from the center to the right of the political spectrum.

2. Methodological considerations

The study "Climate Change and Public Perception in Brazil", conducted by ITS-Yale-Ipec, surveyed a sample of 2,600 respondents through telephone interviews using the CATI (Computer-Assisted Telephone Interviewing) system. The interviews took place between November 25, 2022, and January 26, 2023, with randomly selected landline and mobile phone numbers. Respondents were from various cities across all regions of Brazil. The survey has a margin of error of two percentage points at a 95% confidence level. It is representative of the Brazilian population aged 18 and older, with weighting adjustments made by Ipec to align with population quotas based on regional and spatial distribution, following data from the National Household Sample Survey (PNAD) conducted by the Brazilian Institute of Geography and Statistics (IBGE).

With this weighting, the study aimed to create a statistical representation that closely reflects Brazil's regional and spatial distribution. The Southeast region accounted for the largest share of the sample (43%), followed by the Northeast (26%), the South (15%), and the Central-West

and North (each with 8%). Regarding municipal classification, 59% of respondents lived in inland non-capital cities, 29% in state capitals, and 12% in suburban areas. Thus, while the "Climate Change and Public Perception in Brazil" study provides a broad national overview, there are limitations in generalizing its findings to the realities of specific municipalities and states. Local or state-level surveys may yield different results, especially in regions that were less represented in the study.

The research report provides a complete profile of the sample; however, for the discussion presented here, we focus on the numbers related to the variable "political position." Respondents were asked the following question: "In politics, people often talk about 'left,' 'right,' and 'center.' How would you define yourself: more left-leaning, center, or more right-leaning?" For this article, we treat "political position" as a self-identified political identity, emphasizing respondents' choice of the political stance with which they most identify. This distinction is important because many researchers determine respondents' political-ideological orientation based on a set of questions, whereas this survey relies on self-assessment. Based on weighted data, 22% of the sample identified as "more left-leaning" (n = 565), 19% as "center" (n = 505), and 35% as "more right-leaning" (n = 906).

Based on the survey data on self-identified political identity, we selected key variables relevant to analyzing the formation of political identities and affinities, grouping them into sections with similar themes. Overall, we focused on data from the 2022 survey, except in the first section, where we analyze the decline in environmental concern compared to 2021, as highlighted in the ITS-Yale-Ipec report. For other variables, no significant differences were found between years that would impact the analysis presented here. To ensure the differences observed between groups were not due to random chance, we conducted statistical significance tests using the R software[2]. A 5% significance level ($\alpha = 0.05$) was applied, meaning that p-values below this threshold indicate statistically significant differences, i.e., differences that are likely real rather than coincidental (Table MS1 in the Supplementary Material). Thus, the next section discusses political identities and their relationship with environmental issues, introducing the hypotheses that guided the data analysis.

3. Political identities and the environment in Brazil: what to expect from data?

According to Bobbio (1995), although the left and right are not homogeneous or cohesive blocs in practice, certain principles distinguish these ideologies. This distinction justifies the continued analytical use of political identification concepts, even in an increasingly fragmented political landscape. A central point differentiating

[2] Statistical significance tests for differences in group proportions were conducted using the two-sample proportion test implemented in the "prop.test" function in R. To account for all possible comparisons (left vs. center, center vs. right, and left vs. right), this procedure was repeated multiple times, adjusting the n values (sample size) and p values (proportion of the variable under analysis) for each pair of groups being compared.

left- and right-wing ideologies is their understanding of inequality. The left prioritizes promoting change to achieve social equality, while the right views inequalities as inherent to the social order, emphasizing the preservation of traditions. As a result, left-wing ideologies, generally associated with lower social classes, advocate for state intervention in the economy and society, secularism, antifascism, and "environmental preservation over economic growth and workers' interests over market demands" (Messenberg, 2017, p. 622 [free translation]). Conversely, right-wing ideologies, typically linked to higher social classes, emphasize individualism, tradition, order, private property, free markets, anti-communism, military-based national security, and "economic growth at the expense of environmental preservation and workers' immediate interests" (Messenberg, 2017, p. 623 [free translation]). However, these characteristics should be understood as ideal types representing opposing ideological blocs rather than exact reflections of real-world political positions. The contemporary political landscape includes a diverse range of actors and coalitions that combine ideas from different ideological fields.

In recent years, there has been growing literature on political identities and public opinions on recurring debate topics, particularly due to the perception of political polarization in countries like the United States and Brazil. Over the past decade, both countries have experienced a deepening of affective polarization and moral issues tied to political identities. In the United States, polarization is mainly observed through partisan divisions (Democrats vs. Republicans) or ideological splits (liberals vs. conservatives). In Brazil, polarization is reflected in self-placement on the left-right spectrum (Ortellado *et al.*, 2022). Similarly, research on political identities and environmental attitudes has expanded, particularly in Australia, Europe, and the United States (Bliuc *et al*., 2015; Fielding & Hornsey, 2016; Palm *et al.*, 2017; Lockwood, 2018; Doell *et al.*, 2021; Forchtner, 2020). These and other studies indicate that environmental issues have also become politically polarized, with left-leaning parties and their supporters generally showing stronger belief in anthropogenic climate change and greater support for policies to mitigate its effects compared to right-leaning parties and individuals (Fielding & Hornsey, 2016; Palm *et al.*, 2017).

The theory of politically motivated reasoning (Kahan, 2016a; 2016b) provides a framework for explaining differences in how individuals with different political identities perceive various issues, particularly in an era of increasing polarization. Motivated reasoning is "the tendency of individuals to unconsciously conform assessment of factual information to some goal collateral to assessing its truth" (Kahan, 2016a, p. 2). In the case of politically motivated reasoning, this goal is primarily identity protection, meaning the preservation of one's status and connection to their affinity group (Kahan, 2016a, p. 3). Kahan argues that in the case of climate change, politically motivated reasoning has fueled opinion polarization in the United States, as individuals tend to align their views with those of the political party or group which they most identify.

In Brazil, this topic has received little academic attention, which highlights the importance

of exploring data provided by the study by ITS-Yale-Ipec. In this analysis, we treat the survey's categorical variable "political position" as a self-identified political identity, as respondents selected the political stance with which they most identify. The use of self-placement on the left-right spectrum aligns with the methodology of Ortellado *et al.* (2022) in their study on political polarization in Brazil, which is justified by the country's fragmented party system and low levels of party identification among Brazilians. This section briefly discusses the formation of the environmentalist movement and the anti-environmentalist countermovement in Brazil, considering their political alignments in the country's recent history. Based on this discussion, we present our hypotheses regarding the expected findings in the study by ITS-Yale-Ipec.

Regarding Brazilian environmentalism, Alonso *et al.* (2007) identify its development as stemming from two frames: the conservationist, with a technical-scientific aspect, and the socio-environmentalist, with a political character. The conservationist frame, which emerged in the 1950s, was led by state specialists and bureaucrats professionally engaged in environmental issues. It is characterized by a biocentric perspective on the relationship between nature and society, defining the environment as a "wild natural world" that should be preserved through protected areas, with interventions limited to technical actions by natural scientists. In contrast, during the 1970s, socio-environmentalism emerged as a frame emphasizing the interplay between social and natural processes. It defined environmental problems through the lens of social sciences and expanded the concept of environmental concerns to include urban areas, attributing these issues to modern lifestyles and capitalist development. Socio-environmentalist political groups became closely linked to countercultural movements and struggles for democratization, blending environmental preservation with social critiques of Brazil's development model – particularly its industrialization process and consumerist, pollution-driven urban lifestyle (Alonso *et al.*, 2007, p. 155-157).

Between the late 1970s and mid-1980s, a network of activists led by socio-environmentalist groups mobilized campaigns in support of environmental protection and democratization. This movement attracted backing from other social movements and the Brazilian Democratic Movement (MDB) party. Following the end of the Civil-Military Dictatorship, Brazil saw the professionalization of some environmentalist groups, leading to the creation of nongovernmental organizations (NGOs) and the formation of political associations to participate in the Constituent Assembly. A key development during this period was the founding of the Green Party (PV) in 1986, which adopted a socio-environmentalist and center-left stance. These efforts contributed to the inclusion of environmental rights in the 1988 Constitution, although the final provisions were shaped by a conservationist perspective. Such an outcome was due to resistance from center and right-wing legislators, who opposed the socio-environmentalist framing of environmental policies (Alonso *et al*., 2007).

In the 1990s, alliances led by NGOs and the PV brought together social movements, commu-

nity groups, business leaders, and members of the Workers' Party (PT) to participate in the Rio-92 conference. This mobilization gave rise to the neoconservationist frame within the Brazilian environmental movement, merging conservationist and socio-environmentalist perspectives through the concepts of biodiversity and sustainable development. This approach emphasized a more technical than political perspective and shifted the movement's focus from urban issues to rural areas and forests (Alonso *et al*., 2007). In the 21st century, the environmental movement has played a significant role in national politics, particularly during Lula administrations. A key figure in this process has been Marina Silva, who served as Minister of the Environment from 2003 to 2008 and again from 2023 to the present (Viola & Franchini, 2022).

Thus, environmentalism in Brazil has become primarily rooted in NGOs and grassroots movements, finding greater institutional support within center-left to left-wing parties. Conversely, right-wing parties have increasingly represented those who oppose or express skepticism toward environmental policies.

However, while environmentalism has been more closely aligned with the left, environmental preservation remains a point of ambivalence among the diverse actors within the left-wing political spectrum. This is largely due to the ongoing debate over economic development, which often leads to environmental degradation. Even the center-left PT governments experienced tensions between strict environmental preservation advocates and supporters of development projects with ecological impacts, particularly in the Amazon. A key example is the resignation of Marina Silva as Minister of the Environment in 2008, which was attributed to conflicts between her ministry and other government sectors pushing for looser environmental regulations to support agriculture and infrastructure projects, such as the Growth Acceleration Program (PAC). One of Marina's main points of contention was reportedly with Dilma Rousseff, then Chief of Staff under Lula administration, who criticized the delays in environmental licensing for infrastructure projects (O Globo, 2008). Later, during the Dilma Rousseff administration (2011–2016) and the Michel Temer administration (2016–2018), environmental policies received less emphasis, leading to setbacks in Brazil's climate commitments initially established under Lula. However, these setbacks were less severe than those seen under the Bolsonaro administration (Viola & Franchini, 2022).

On the right-wing spectrum, some contemporary parties and groups – especially in Europe – actively support ecological preservation policies, though often from a nationalist, conservative, or reactionary perspective (cf. Forchtner, 2020). However, recent studies indicate that right-wing parties in the Global North tend to show greater resistance to environmental policies and are more likely to be climate skeptics or denialists compared to other parties (Fielding & Hornsey, 2016; Lockwood, 2018; Doell *et al.*, 2021; Forchtner, 2020). According to Cook &Washington (2011), climate denialism can be categorized into three types. The first, trend denial, rejects the very existence of global warming. The second, attribution denial, acknowledges that global warming

is happening but denies that human activity is its primary cause, instead attributing it to natural factors. The third, impact denial, accepts that climate change is caused by human activity but argues that its impacts may be beneficial in some way (Cook & Washington, 2011).

In Brazil, the first signs of a climate denialist countermovement (Dunlap & McCright, 2015) emerged in the mid-2000s (Miguel, 2022), although its ideological roots trace back to far-right discourses from the late 20th century. The increasing international pressure on Brazil to protect its environment, starting in the 1970s, gradually fueled skepticism toward the environmentalist and climate agenda among nationalist, conservative, and reactionary actors (Piletti, 2008; Viola & Franchini, 2022; Miguel, 2022). A key moment in this process was Rio-92 in 1992, along with the official demarcation of the Yanomami Indigenous Territory, which triggered suspicions among high-ranking military officials regarding the role of NGOs and foreign powers in advocating for environmental preservation and Indigenous rights in the Amazon. Some within the military began to interpret these efforts as part of a broader strategy to undermine Brazilian sovereignty over the region, believing that foreign powers harbored "international greed" for its natural resources. As a result, certain military factions grew concerned that environmental and Indigenous issues in the Amazon could be weaponized by foreign nations to justify interference in Brazilian territory or even to promote the creation of new countries within large Indigenous reserves (Piletti, 2008). Such suspicions resonated with conservative and reactionary political actors who opposed social change and shifts in their lifestyles. Among them was Olavo de Carvalho, a key opinion leader who would later become one of the major ideological influences on the Bolsonaro administration (von Behr, 2022).

While Brazilian environmental protection policies advanced and international cooperation on climate change strengthened, climate denialist views began gaining visibility in the Brazilian media around 2007. Such opinions were promoted by both scientific and nonscientific actors (Miguel, 2022). During legislative debates on the 2012 Forest Code reform, a well-organized network of actors emerged, advocating against increased environmental regulations. Their discourse was based on economic liberalism and the defense of agribusiness, and they were supported by climate denialist university professors, researchers, and opinion leaders. However, their publications did not follow double-blind peer review procedures, nor did they engage with specialized scientific literature (Miguel, 2022).

The ideas of climate denialists in Brazil are rooted in a mix of Christian, nationalist, liberal, and/or anti-communist principles, which are combined in different ways depending on the actor's profile (Miguel, 2022). According to Jean Carlos H. Miguel (2022), Brazilian climate denialists – drawing inspiration from U.S. liberal-conservative think tanks – commonly criticize the IPCC and argue that anthropogenic global warming is merely a hypothesis or a fallacy. They claim that climate alarmism is being used as a tool to undermine the sovereignty of developing countries over their economic decisions. From a more moralistic perspective, reactionary

figures such as Olavo de Carvalho framed environmentalism and multilateral climate agendas as a conspiracy by "globalist and progressive elites" to impose a "global communist regime" that threatens "Western Christian civilization." According to this view, human domination over nature is essential for economic growth under capitalism (Miguel, 2022, p. 307-309).

These ideas found a platform in Jair Bolsonaro's right-wing populism. As a result, throughout his presidency, Bolsonaro, several of his ministers, and close allies repeatedly delivered speeches questioning the reality of climate change. When they did acknowledge its existence, they often denied its anthropogenic origin or its negative impacts (Miguel, 2022; von Behr, 2022; Sousa, 2023). Additionally, some climate denialists with scientific credentials worked closely with the Bolsonaro administration to limit or roll back environmental regulations (Miguel, 2022; Rajão *et al.*, 2022). This denialist and anti-environmentalist discourse was reflected in policies aimed at dismantling environmental governance (Miguel, 2022). These policies led to the weakening and delegitimization of environmental agencies and regulatory bodies, environmental deregulation and reduced enforcement of environmental laws, violations of Indigenous and traditional community rights, and political persecution of environmental scientists and public officials (Giffoni Pinto & Malerba, 2022, p. 143).

During Bolsonaro administration, two environmental issues that drew significant public attention were Indigenous rights and the Amazon rainforest. Investigations into the sharp rise in wildfires in the region, as recorded by data from the Brazilian National Institute for Space Research (INPE), indicate that deforestation was primarily driven by illegal activities. These included land speculation and the illegal occupation of public lands, predatory logging, illegal mining, and the unchecked expansion of the agricultural frontier (Escobar, 2020; Costa, 2020).

A particularly striking case related to this issue was the event known as the "Day of Fire," which took place on August 10 and 11, 2019. It was a coordinated action organized through WhatsApp groups by farmers, rural producers, and business owners in the interior of Pará, who set fire to multiple areas of the forest, including protected conservation units. This resulted in a significant spike in fire outbreaks detected by satellites compared to previous years (Matias, 2019). In the days leading up to this event, Bolsonaro and Salles had publicly criticized the INPE, environmental NGOs, and the funding of the Amazon Fund by Germany and Norway (BBC, 2019; Negrão, 2019).

According to research by Caetano (2021), these statements appear to have stimulated political activity on social media before, during, and after the Day of Fire, coinciding with a record surge in fire outbreaks across the Amazon. Amid the national and international outcry that followed, Bolsonaro quickly claimed that the average number of wildfires in the Amazon was lower than in previous years (Exame, 2019), while the Minister of the Environment Ricardo Salles argued that 2019 had been the driest year in terms of rainfall (Marés *et al.*, 2019). However, when analyzing available rainfall data from the Brazilian National Institute of Meteorology

(INMET) for several cities in the Legal Amazon, Caetano (2021) found no statistically significant difference in precipitation levels compared to previous periods. Instead, his study demonstrated that the increase in fires in August 2019 correlated more strongly with Bolsonaro's statements and the reduction of environmental law enforcement and penalties, a process that intensified that year but had already been observed since 2014.

The trend of rising deforestation in the Amazon persisted throughout Bolsonaro administration (Lacerda, 2023), while the former president baselessly accused various actors of being responsible for the fires (G1, 2020). Despite international outcry over the increase in wildfires in the region – and later in the Pantanal – social media became a battleground for polarized political propaganda campaigns between Bolsonaro's supporters and opponents (Recuero & Soares, 2020; Walz, 2022). In these online disputes, pro-Bolsonaro accounts amplified government narratives and pro-Bolsonaro influencers, working to discredit data from INPE while accusing Indigenous peoples, environmental NGOs, and even the Landless Workers' Movement (MST) of deliberately setting fires to undermine the president (Recuero & Soares, 2020; Walz, 2022).

The Bolsonaro administration followed the narrative that expanding environmental and Indigenous reserves in the Amazon was part of a conspiracy to undermine Brazil's sovereignty, allegedly driven by "international greed" for the region's natural resources (Ramos, 2021; Viola & Franchini, 2022; Sousa, 2023). Ironically, at the beginning of his presidency, Bolsonaro publicly expressed, on multiple occasions, his intent to seek "First World partnerships," particularly with the United States, to exploit the Amazon's natural and mineral resources (Abdala, 2019; Deutsche Welle, 2019). His administration's discourse on the Amazon was rooted in a developmentalist and colonialist vision, emphasizing predatory resource extraction, unregulated agricultural and mining expansion, and disregard for socio-environmental sustainability and the rights of Indigenous and traditional communities (Ramos, 2021; Sousa, 2023).

With this context in mind, and based on the theory of politically motivated reasoning, the main hypothesis regarding the ITS-Yale-Ipec study was that right-leaning individuals would express opinions strongly aligned with Bolsonaro's discourse, which was rooted in anti-environmentalist, climate denialist narratives, including skepticism toward deforestation in the Amazon. Conversely, left-leaning individuals were expected to hold opinions more aligned with environmentalist discourse. For those in the center, a greater division of opinions was anticipated, with some respondents expressing views closer to the left and others more aligned with the right.

4. Concern for the environment, environmental protection, and ecological attitudes

The 2022–2023 survey data show that most of the Brazilian population (79%) was either concerned (27%) or very concerned (52%) about the environment. However, compared to the 2021 survey results, there was a nine-percentage-point decrease in the share of people who reported be-

ing very concerned about the environment. Due to the short historical series of the ITS-Yale surveys, it is still uncertain whether this decline represents a consistent trend or if it was influenced by episodic factors affecting environmental concern.

When considering political identity, individuals who identify as "more left-leaning" show the highest levels of environmental concern, which gradually decrease among those in the center and even more so among those who identify as "more right-leaning" (Figure 1). As shown in Table MS1, there are highly significant statistical differences between all groups ($p < 0.01$ in all cases). However, when analyzing the data by political identity, it is evident that the decline in the number of respondents who reported being "very concerned" was most pronounced among left-leaning (13 percentage points) and centrist respondents (9 percentage points). When testing for statistical significance within each group across the two years[3], the decline was found to be significant across all groups, with $p < 0.01$ for the left and center. Although smaller, the 5-percentage-point decrease among right-leaning respondents was also statistically significant ($p = 0.036$).

Considering the occurrence of environmental issues and even some disasters in 2022 (Globo, 2023), one possible explanation for the decline in environmental concern among left-leaning and centrist respondents could be the election of President Lula. His campaign

[3] In the 2021 survey, which also included 2,600 respondents, the distribution of political identity groups was as follows: 18% left-leaning (n = 468), 23% center (n = 598), and 32% right-leaning (n = 832). When comparing left-leaning respondents between the two years, p = 9.63E-06. For centrist respondents, p = 3.219E-3. For right-leaning respondents, p = 0.04136.

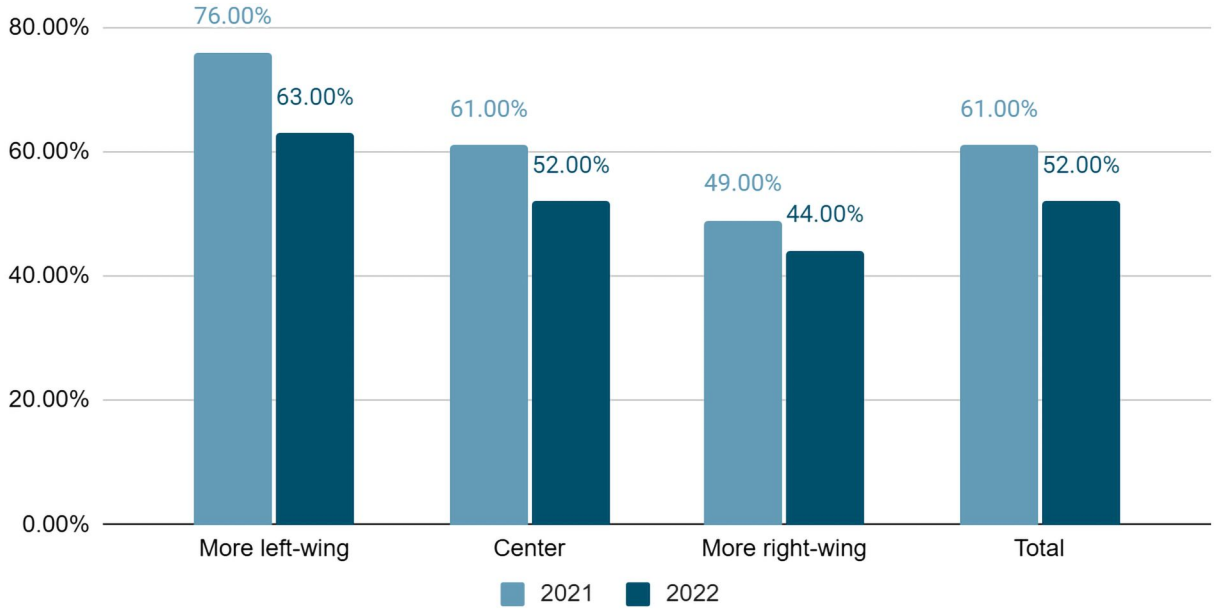

FIGURE 1 – Very concerned about the environment (2021 and 2022).

SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

was marked by strong criticism of the previous administration's environmental policies and by promises of sustainable development and respect for Indigenous rights, recognizing Indigenous peoples as guardians of the forests. Figure 2 shows that optimism about the new government's environmental policies declines from left to right on the political spectrum. Statistically significant differences were observed between all political identity groups across all response categories ($p < 0.01$ in all cases). When calculating the correlation between "being very concerned about the environment" and "believing that Lula's government will be better for environmental preservation than Bolsonaro's," a very strong positive correlation was found (Spearman's coefficient = 1). However, despite this strong correlation, other factors not covered in the ITS-Yale-Ipec survey may have also contributed to the decline in environmental concern, such as increased focus on economic issues, public security concerns, or other pressing matters.

This declining pattern from left to right was also observed in question addressing the dilemma between environmental protection and economic growth (Figure 3). Overall, and across all political groups, environmental protection was the majority preference, although the right-leaning

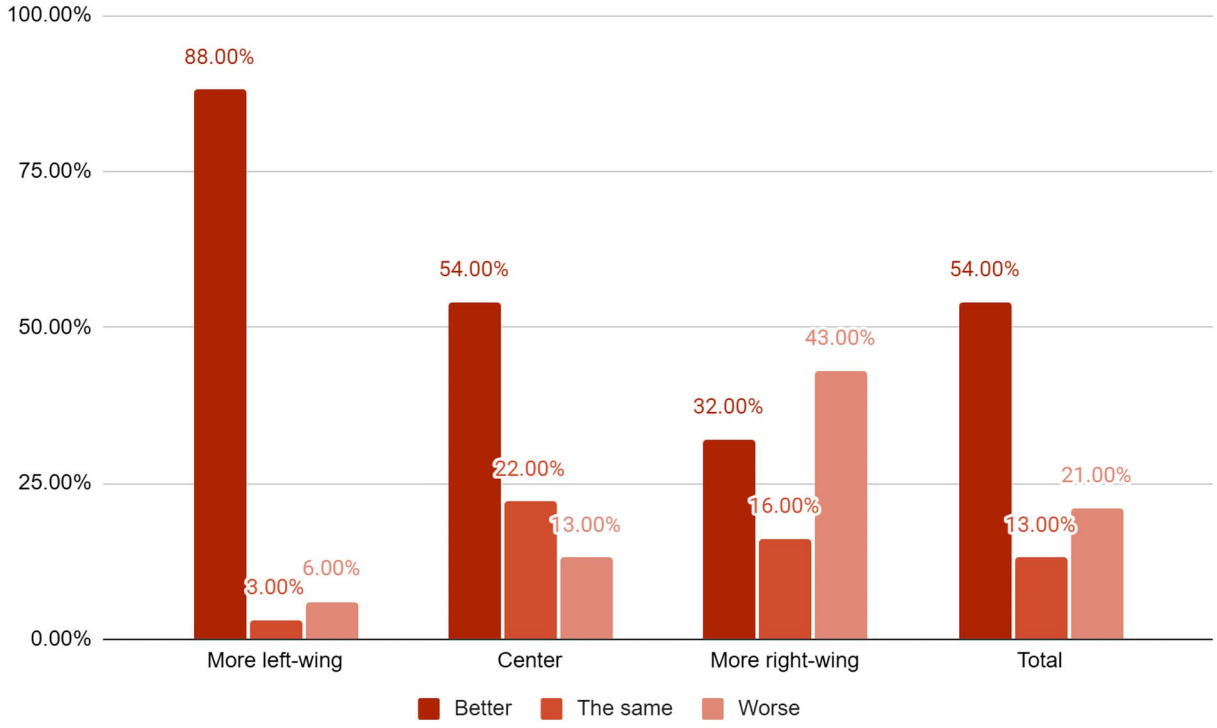

FIGURE 2 – Opinion on how Lula administration will perform in environmental preservation compared to Bolsonaro administration.
SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

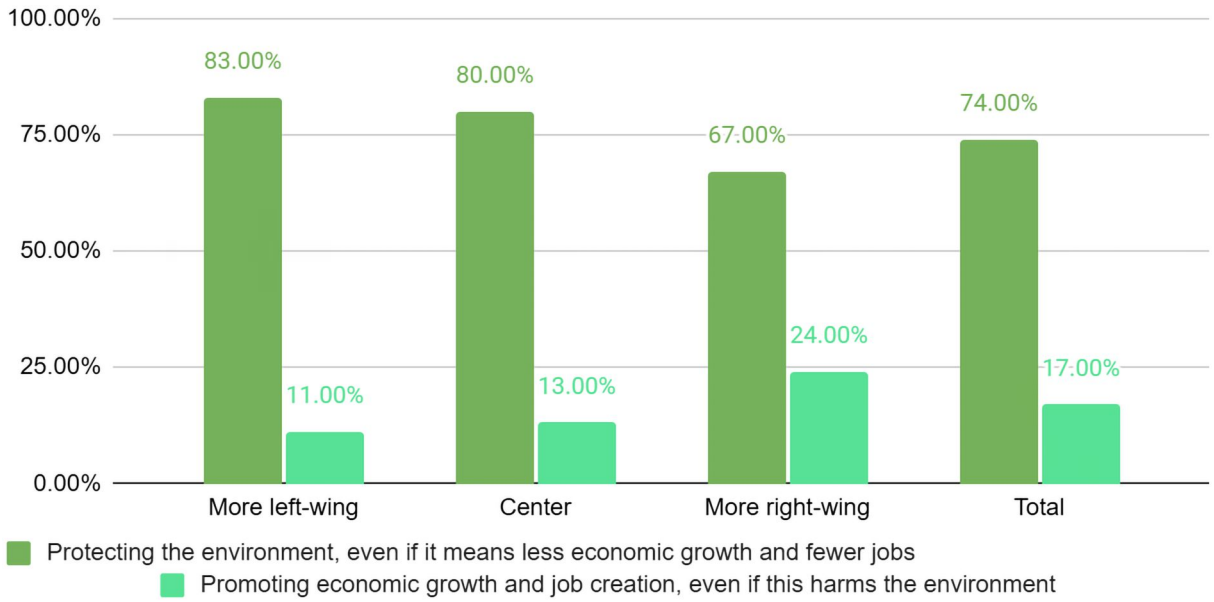

FIGURE 3 – Dilemma between environmental protection and economic growth.

SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

group showed a lower percentage of support compared to the others. Additionally, the percentage of right-leaning respondents who prioritized economic growth over environmental protection stood out, being nearly double that of the other groups. Statistically significant differences were found between the right-leaning group and both the left and center, both in terms of environmental protection being the priority ($p < 0.01$ in both cases) and in economic growth being prioritized ($p < 0.01$ in both cases). However, no significant differences were found between left- and center-leaning respondents in either environmental protection ($p = 0.2361$) or economic growth prioritization ($p = 0.3614$).

From this perspective, it is worth examining whether the patterns observed among political identity groups regarding environmental concern and preference for environmental protection over economic growth are also reflected in significant differences in reported environmental attitudes. In this regard, the 2022 ITS-Yale-Ipec survey included questions about activism, consumption, and political engagement, as shown in Figure 4. Such data reflect self-reported behaviors, meaning that the frequency with which respondents engage in these actions and the quality of their actions cannot be determined. For example, it is not possible to infer how respondents define "products that harm the environment" or how consistent their reported behaviors are.

Data show there are no major differences between political groups in terms of recycling practices, although the difference between center-

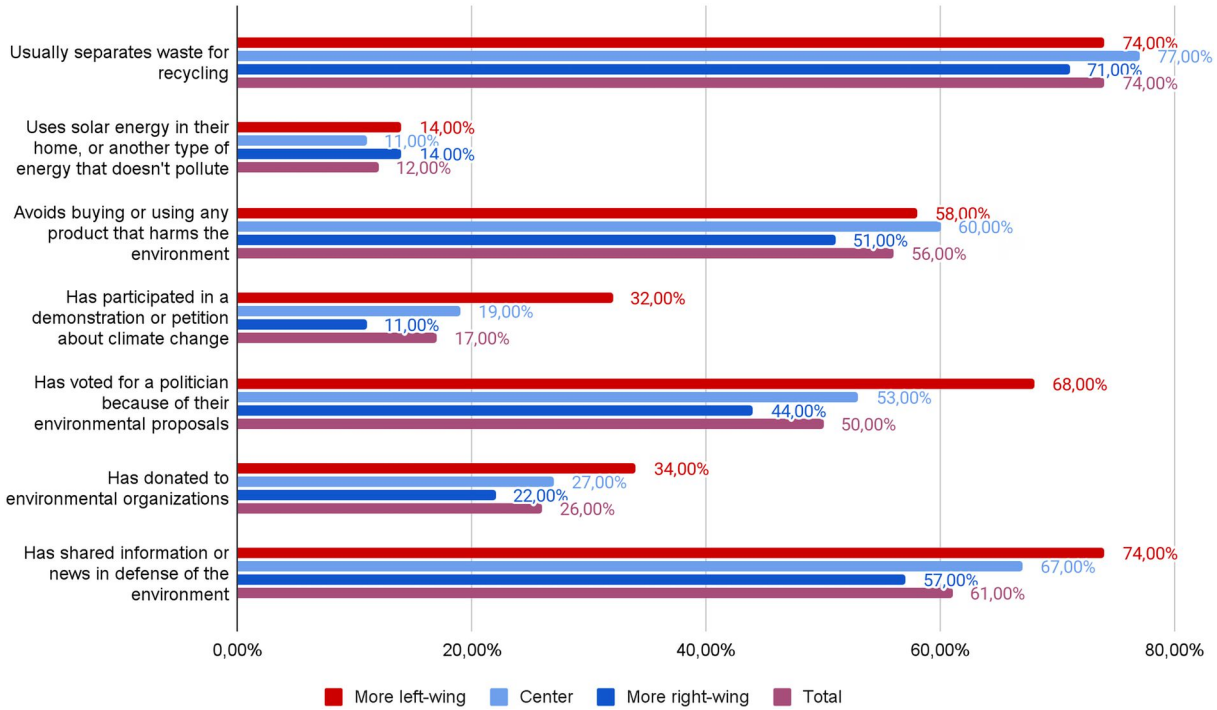

FIGURE 4 – Environmental attitudes reported by respondents.

SOURCE: Own elaboration (2023) based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

and right-leaning respondents was statistically significant ($p = 0.01$). There were no significant differences between groups regarding the use of solar or non-polluting energy at home, which remains a relatively uncommon practice among all respondents. Although the proportions of respondents who reported avoiding the purchase or use of environmentally harmful products were similar, there was a significant difference between the center and the right ($p < 0.01$) as well as between the left and the right ($p = 0.01$).

Additionally, the data reveal that while most of the Brazilian population – and each political group – reports sharing information in defense of the environment, engagement in collective actions, such as donations to environmental organizations and participation in climate-related protests or petitions, is significantly lower, though still more common among left-leaning respondents. The left stands out with the highest participation rates across all analyzed actions, including voting for candidates with environmental proposals. The differences between political groups are statistically significant across all these actions, with particularly notable distinctions between left-leaning respondents and the other groups, with p-values equal to or lower than 1% (0.01). This suggests political identity sig-

nificantly influences the level of engagement in pro-environmental actions, with left-leaning individuals demonstrating a stronger political commitment to environmental causes compared to other groups.

5. Global warming and climate change

Regarding Brazilians' opinions on global warming and climate change, we analyzed the "Climate Change and Public Perception in Brazil" survey questions related to belief in rising global temperatures, perceived causes of the phenomenon, awareness of its consequences, and perceptions of the scientific consensus on the issue. When it comes to belief in global warming (Figure 5), the data indicate that the Brazilian population is nearly unanimous in believing that it is happening. There were no statistically significant differences between left- and center-leaning respondents, either in belief ($p = 1$) or disbelief ($p = 0.4686$) in the phenomenon. However, among those who deny global warming, right-leaning respondents stand out, with nearly double the percentage of deniers compared to the other political groups. As a result, there were

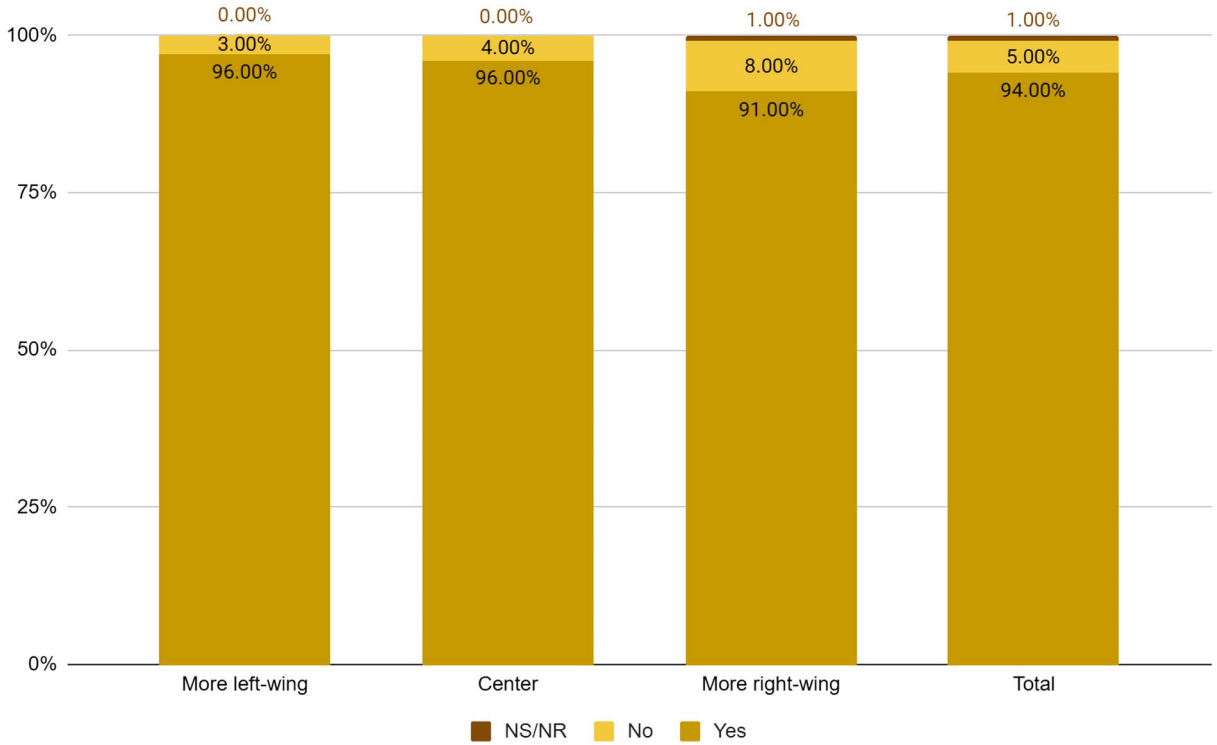

FIGURE 5 – Belief or disbelief in global warming.

SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

statistically significant differences between right-leaning respondents and the other groups, both in belief and disbelief, with p-values lower than 0.01 in all cases.

Regarding perceptions of the causes of global warming (Figure 6), most Brazilians believe that human activity is responsible for the phenomenon. While left-leaning respondents have the highest percentage of people attributing global warming primarily to human actions, right-leaning respondents stand out for having the highest proportion of individuals who deny its anthropogenic nature, with nearly twice the percentage observed in the other groups. There are statistically significant differences between the right and the other groups, both in terms of belief in human-caused global warming and belief in natural causes, with p-values below 0.01 in all comparisons. Between left- and center-leaning respondents, there was a significant difference in belief in human causes ($p = 0.015$), but no significant difference in belief in natural attribution ($p = 0.274$).

Regarding perceptions of scientists' opinions on global warming (Figure 7), most Brazilians and all political groups recognize the scientific

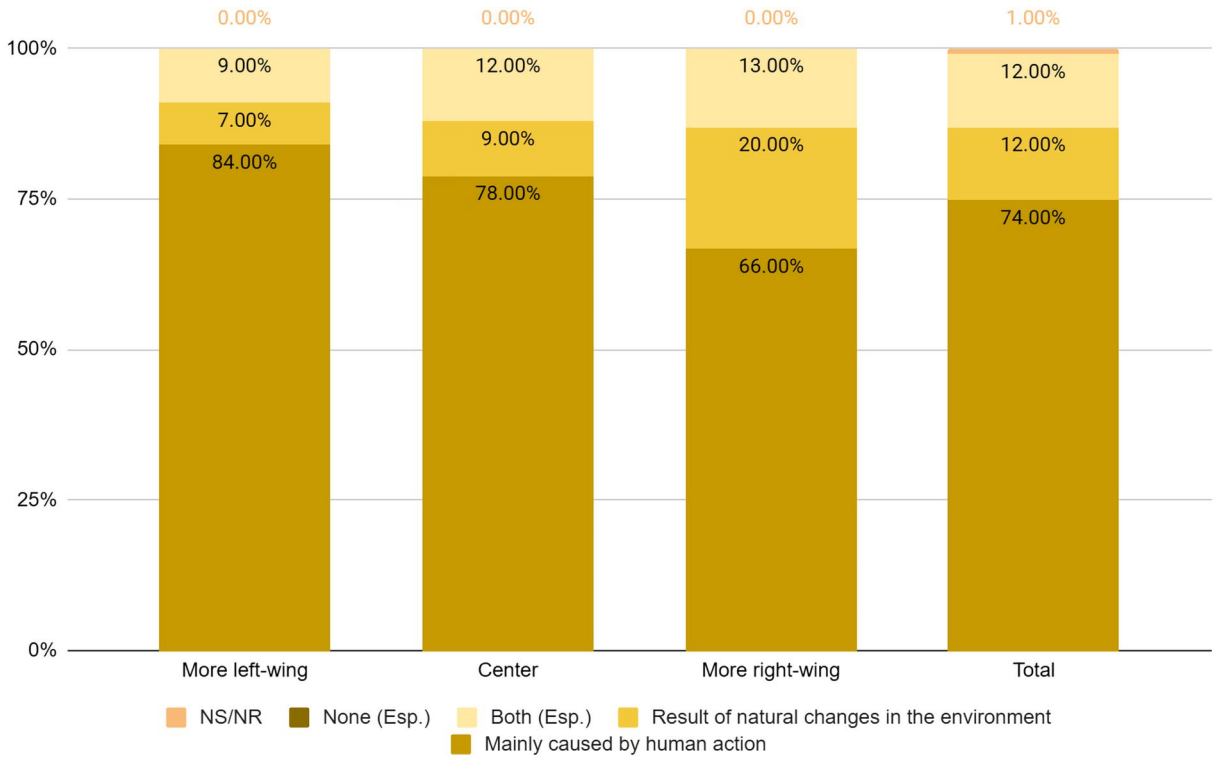

FIGURE 6 – Perception of the causes of global warming.

SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

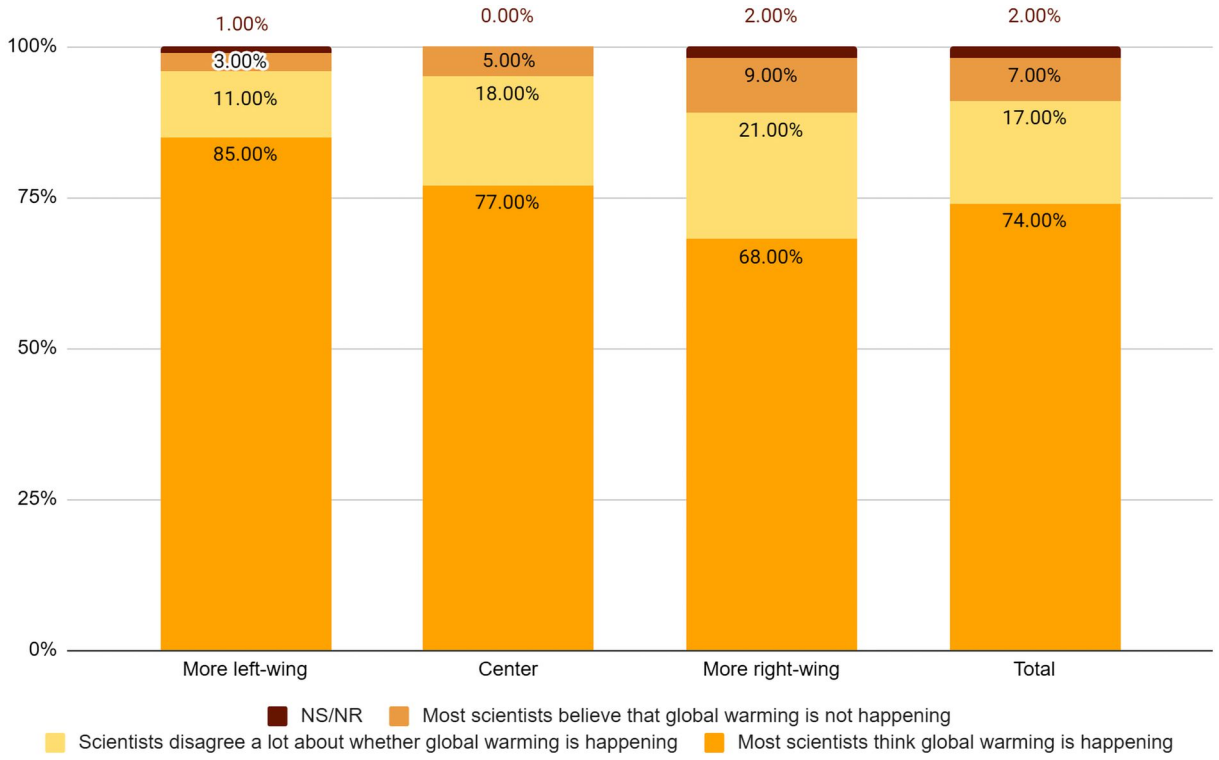

FIGURE 7 – Perception of scientists' opinions on the topic.

SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

consensus on the issue. However, left-leaning respondents are the most likely to believe in this consensus, while right-leaning respondents have the highest percentage of those who deny it, either by believing that scientists are deeply divided on the topic or that science rejects global warming altogether. Among those who stated that "most scientists believe global warming is happening," statistically significant differences were found between all three political groups ($p < 0.01$ in all cases). For those who claimed that "scientists strongly disagree on whether global warming is happening," there was a significant difference between the right and the left ($p < 0.01$) as well as between the left and the center ($p < 0.01$), but no significant difference between the center and the right ($p = 0.199$). Among respondents who believed that "most scientists think global warming is not happening," statistically significant differences were found between the right and the other groups ($p < 0.01$ in both cases), but not between the left and the center ($p = 0.128$).

Regarding perceptions of the harmful effects of global warming (Table 1), most Brazilians across all political groups believe that climate

TABLE 1 – Perception of the harmfulness of global warming.

How much do you think global warming could harm future generations?	More left-leaning	Center	More right-leaning	Total
A lot	92.00%	88.00%	83.00%	87.00%
Somewhat	6.00%	7.00%	7.00%	7.00%
A little	1.00%	4.00%	5.00%	3.00%
Not at all	1.00%	2.00%	4.00%	2.00%
DK/NR	0.00%	0.00%	2.00%	1.00%
In your opinion, how much do you think global warming could harm you and your family?	**More left-leaning**	**Center**	**More right-leaning**	**Total**
A lot	78.00%	70.00%	64.00%	70.00%
Somewhat	15.00%	18.00%	17.00%	17.00%
A little	4.00%	9.00%	12.00%	9.00%
Not at all	2.00%	3.00%	6.00%	4.00%
DK/NR	0.00%	0.00%	1.00%	1.00%

SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

change could cause significant harm both to future generations and to themselves and their families. Once again, there is a declining pattern from left to right in the perception of its harmfulness. As a result, right-leaning respondents have the highest percentages of those who believe that global warming will cause "little" or "no harm" to future generations or to themselves and their families, though these percentages remain relatively low. The most significant differences were observed between left- and right-leaning respondents, with $p < 0.01$ in the comparisons among those who stated that climate change could cause "a lot," "a little," or "no harm" in both questions.

Based on the presented data, all political groups exhibit high levels of agreement with the scientific consensus regarding the primarily human-driven origins of global warming and its harmful effects in both the present and the future. However, skepticism toward these scientific findings increases progressively from left to right, with the center positioned as an intermediate stance. Data from the 2022 survey suggest climate denialism has limited traction in Brazilian public opinion. However, given the recent rise of right-wing political leaders aligned with Bolsonaro's discourse, it will be crucial to monitor future surveys to assess potential shifts in public opinion on these issues.

Thus, climate denialist ideas appear to be more prevalent on the right and, to a lesser extent, in the center, particularly regarding the causes of global warming and scientists' opinions on the issue. When it comes to the harmfulness of climate change, denial of its negative impacts is more significant in relation to the present and near future, despite record-high temperatures and extreme weather events causing major economic

losses in Brazil and other countries. While trend denialism remains minimal across all groups, attribution and impact denialism seem to range from about one-tenth to one-third of respondents in the center and, especially, on the right, along with greater disagreement with the scientific consensus on the topic.

6. Amazon: wildfires and deforestation

In this section, we analyze the ITS-Yale-Ipec survey questions related to the Amazon, focusing on topics such as wildfires, deforestation, and their perceived impacts. As previously discussed, these issues have been widely debated in recent years, often in a highly polarized manner on social media.

Figure 8 shows most Brazilians across all political groups believe that wildfires in the Amazon have increased over the past decade. However, right-leaning respondents have the highest percentages of those who believe that wildfires have either decreased or remained the same. Notably, the proportion of right-leaning respondents who believe wildfires have decreased is more than four times higher than that of left-leaning respondents ($p < 0.01$) and more than twice as high as that of centrist respondents

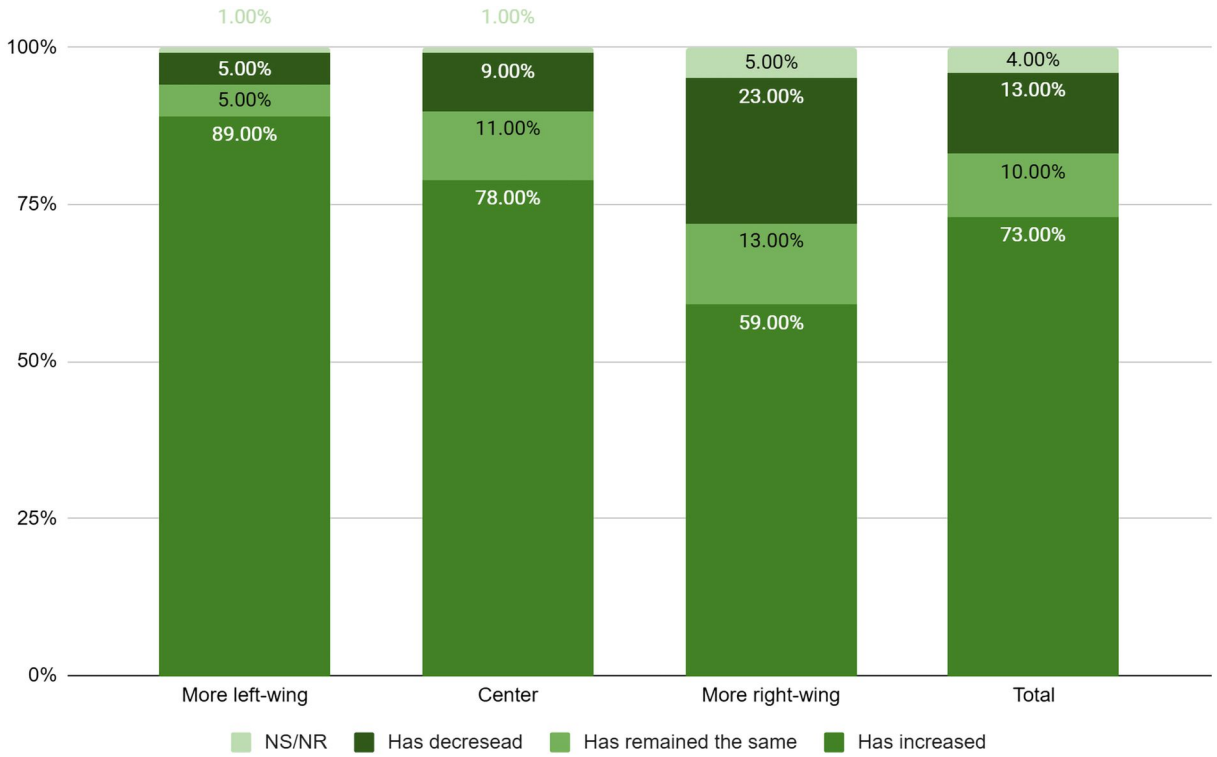

FIGURE 8 – Opinion on the frequency of wildfires in the amazon over the last 10 years.

SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

($p < 0.01$). Statistically significant differences were found between all groups across nearly all response categories, with $p < 0.01$ in almost all comparisons. However, between center- and right-leaning respondents, no significant difference was found in the belief that wildfires have remained the same ($p = 0.311$).

Regarding the causes of increased wildfires (Figure 9), most Brazilians across all political groups believe that human activity is responsible. Once again, right-leaning respondents have the highest proportion of individuals who disagree with this view, although the differences appear to be less pronounced than in other topics. Statistically significant differences were found between all groups in attributing wildfires primarily to human activity, with $p < 0.01$ in comparisons between left-leaning respondents and the other two groups, and $p = 0.02$ between center- and right-leaning respondents. Notably, the proportion of right-leaning respondents who believe wildfires occur due to natural environmental changes that make the forest drier in certain seasons is twice as high as among left-leaning respondents. In this case, there was a statistically significant difference between the left and the right ($p < 0.01$) as well as between the left and the center ($p = 0.03$), but no significant difference between the center

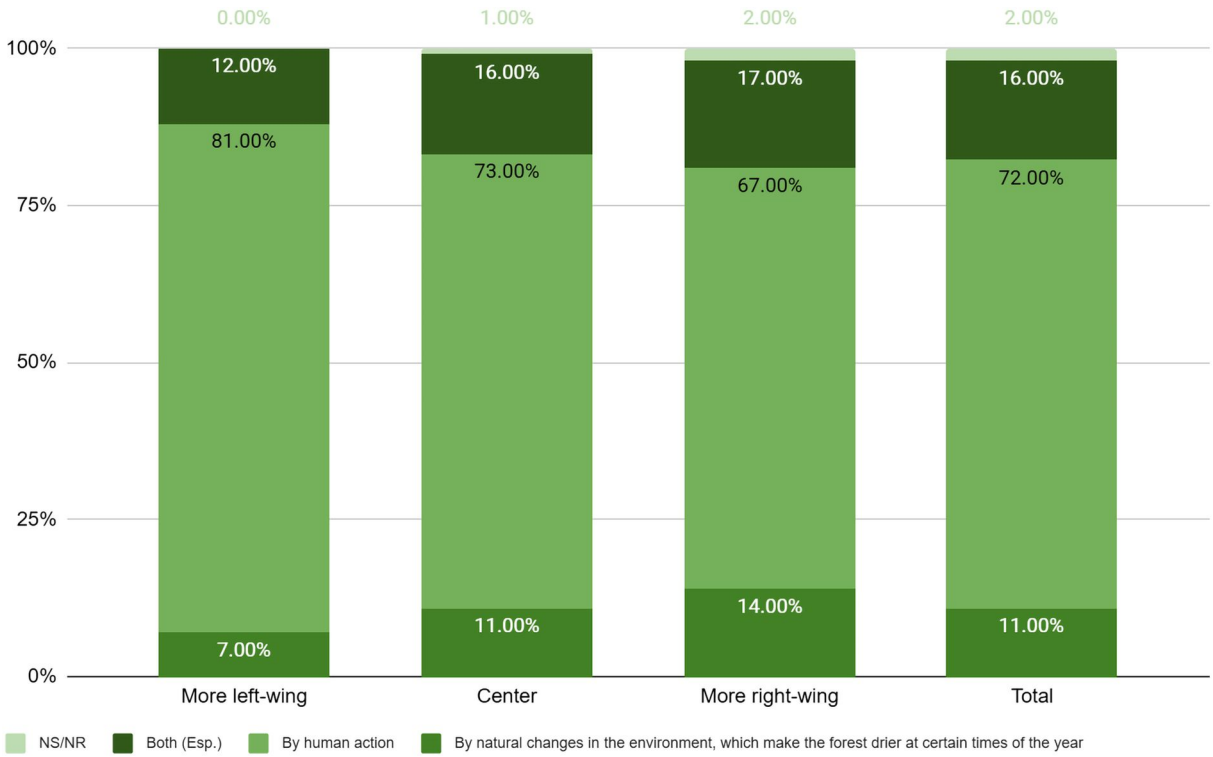

FIGURE 9 – Opinion on the causes of wildfires in the amazon.

SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

and the right ($p = 0.126$).

Regarding perceptions of who is primarily responsible for wildfires, considering the top three responses, the distribution among political groups appears relatively similar for each category (Figure 10). Across the total population and all political groups, the three most frequently cited culprits were "loggers," "illegal miners," and "large-scale farmers." However, left-leaning respondents stood out for being more likely to identify "cattle ranchers and livestock producers" and "illegal miners" as responsible parties. All groups showed statistically significant differences regarding "cattle ranchers" ($p < 0.01$). However, for "illegal miners," only the left and the right differed significantly ($p < 0.01$). Centrist respondents were more likely to select "loggers" as the primary culprits, with $p < 0.03$ in comparison to the left and $p < 0.01$ in comparison to the right.

Finally, right-leaning respondents stood out for being more likely to attribute responsibility to "small farmers," "Indigenous peoples," and "environmental NGOs." Once again, the most significant differences were between the left and the right, with $p = 0.01$ for "small farmers" and $p < 0.01$ for both "Indigenous peoples"

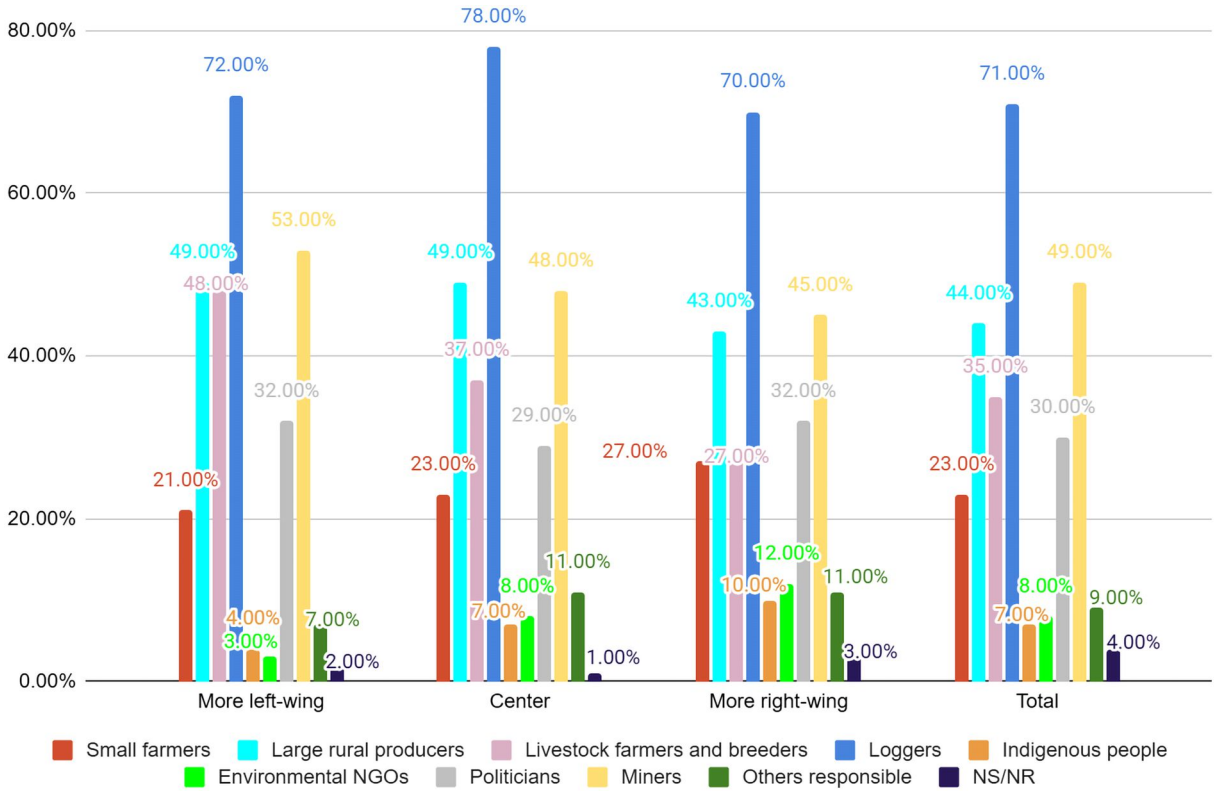

FIGURE 10 – Perception of the main responsible parties for wildfires in the Amazon.

SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

and "environmental NGOs." There were no significant differences between center- and right-leaning respondents regarding "small farmers" ($p = 0.11$) or "Indigenous peoples" ($p = 0.07$). However, a significant difference was found between these two groups regarding "environmental NGOs" ($p = 0.02$), as well as between the left and the center ($p < 0.01$). These findings suggest that right-leaning respondents are more likely to align with pro-Bolsonaro misinformation narratives, blaming environmental NGOs, Indigenous peoples, and small farmers for wildfires in the Amazon compared to respondents in the other groups.

These numbers indicate that political propaganda narratives promoted by Bolsonaro supporters resonate with a relatively small segment within each political group, increasing from left to right. Nevertheless, the vast majority of respondents across all political identities align their opinions with news reports and scientific studies that highlight the rise in Amazon wildfires in recent years, their causes, and their main culprits. However, right-leaning respondents showed higher levels of agreement with messages spread by pro-Bolsonaro officials, although in most cases this segment did not exceed one-third of the total within the group.

Other topics covered in the ITS-Yale-Ipec survey included the degree of public agreement with statements regarding the impacts of Amazon deforestation at local, national, and international levels, international funding for conservation efforts in the region, and Indigenous peoples. These issues have taken center stage in the public agenda in recent years, particularly due to the setbacks in environmental governance under Bolsonaro, which positioned Brazil as an international "climate villain." The country had previously held this status between the late 1980s and 2004, a period marked by extremely high deforestation rates and greenhouse gas emissions (Viola & Franchini, 2022, p. 256). For this article, due to space limitations, we have selected only the survey questions related to public perceptions of the impacts of Amazon deforestation.

The survey reveals an almost unanimous agreement among Brazilians across all political identity groups regarding the harmful effects of Amazon deforestation on local populations, the global environment and climate, Brazil's international reputation, and the country's trade relations with other nations (Figure 11). Once again, disagreement increases progressively from left to right, with 10% to 20% of right-leaning respondents expressing some level of disagreement with these statements. Analyzing the statistical significance of differences between groups, left- and center-leaning respondents show statistically similar opinions on nearly all statements, except for the potential harm of deforestation to Brazil's trade relations ($p < 0.02$). Right-leaning respondents stand out with statistically significant differences compared to the other groups in nearly all statements, with $p < 0.01$ in most comparisons, except for the last question. Disagreement among right- and center-leaning respondents was slightly higher regarding Brazil's international image and trade relations compared to the previous statements.

The last statement stood out due to the near-uniformity in responses regarding whe-

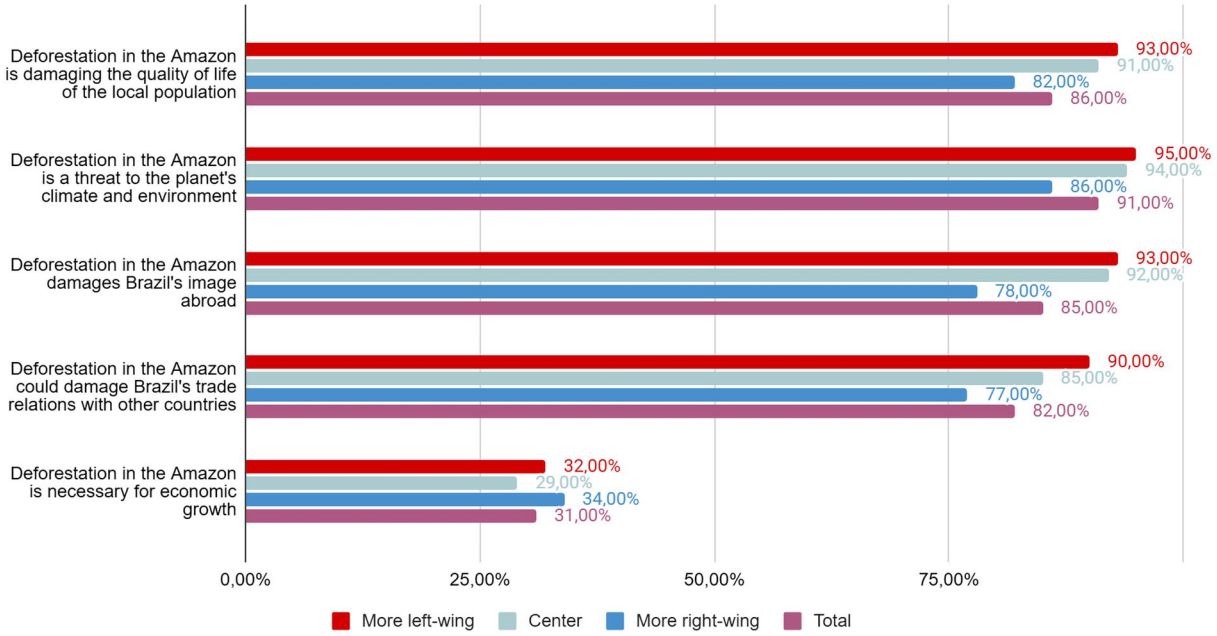

FIGURE 11 – Percentage of people who fully or partially agree with the following statements related to deforestation in the Amazon.
SOURCE: Own elaboration based on the "Climate Change and Public Perception in Brazil" survey (ITS-Yale-Ipec, 2023).

ther deforestation in the Amazon is necessary for economic growth. Although approximately two-thirds of respondents across all political groups and the total population disagreed to some extent with this claim, around one-third of respondents in all political identities expressed some level of agreement, with slightly lower agreement among centrist respondents. However, there were no statistically significant differences between the groups. These findings suggest that most Brazilian public opinion perceives Amazon deforestation as both harmful and unnecessary for economic growth.

Thus, while data show that most political groups agree on the harmful effects of deforestation at local, national, and global levels, there remains a notable minority across all groups that views deforestation as essential for economic development. In this regard, despite the strong correlation between left- and center-leaning political orientations and environmentalist beliefs, a considerable number of individuals within these groups still perceive deforestation as an inevitable component of development in the Amazon region.

7. Final considerations

By analyzing the secondary data from the ITS-Yale-Ipec survey, this article complements the original findings and paves the way for future research. Through the discussion of politically

motivated reasoning (Kahan, 2016a; 2016b) and the contextualization of the data with recent political and environmental events, it was possible to identify factors that likely influenced Brazilian public opinion on environmental issues and climate change. The findings highlight the importance of considering various ideological influences in shaping opinions on these topics. This reinforces the understanding that public policies should focus on effective communication strategies to strengthen consensus on environmental and climate issues.

Data analysis reveals the Brazilian population holds predominantly pro-environmental views, supporting environmental protection and the preservation of the Amazon. Likewise, public opinion largely aligns with scientific consensus on climate change and with news reports and data indicating an increase in Amazon wildfires. Regarding environmental behaviors, a considerable proportion of respondents report engaging in environmentally conscious practices, particularly related to consumption habits. However, political activism on environmental issues appears to be limited to a small segment of the population, with significantly higher participation among left-leaning respondents compared to other political identity groups.

From this perspective, data from the ITS-Yale-Ipec survey indicate that alignment with environmentalist views and behaviors is stronger among individuals who identify from the center to the left of the political spectrum. Conversely, opinions that reflect climate denialist and anti-environmentalist ideas increase from the center to the right, reaching at most one-third of these groups in some cases. However, in general, all political identity groups show a broad majority that tends to support environmentalist ideas and align with the scientific consensus on environmental issues.

Based on the ITS-Yale-Ipec survey, there is no strong polarization in Brazilian public opinion regarding environmental and climate issues. Opinions aligned with Bolsonaro's discourse are limited to a minority – while not insignificant, this group appears louder than it is truly persuasive. Data suggest that public opinion generally favors environmental protection and scientific consensus, despite the recent spread of climate denialist and anti-environmentalist misinformation campaigns on social media.

Therefore, future research should further explore Brazilians' perceptions of these topics through semi-structured interviews and focus groups. This approach would allow for a deeper understanding of how individuals integrate environmental issues into their political identities. A detailed study of these differences in public opinion is essential for fostering discussions on science communication and environmental education, particularly in the context of worsening climate change.

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References

Abdala, V. Bolsonaro diz que busca parceria internacional para gestão da Amazônia. *Agência Brasil*, 2019. Disponível em: <https://agenciabrasil.ebc.com.br/politica/noticia/2019-07/bolsonaro-diz-que-busca-parceria-internacional-para-gestao-da-amazonia>. Acesso em: out. 2023.

Alonso, A.; Costa, V.; Maciel, D. Identidade e estratégia na formação do movimento ambientalista brasileiro. *Novos Estudos*, 79, 151-169, 2007. doi: https://doi.org/10.1590/S0101-33002007000300008

BBC News Brasil. *As críticas de Bolsonaro que levaram à queda do diretor do Inpe, órgão que monitora desmatamento na Amazônia*. 2019. Disponível em: <https://www.bbc.com/portuguese/brasil-49212332>. Acesso em: nov. 2023.

Bliuc, A.; McGarty, C.; Thomas, E. F.; *et al*. Public division about climate change rooted in conflicting socio-political identities. *Nature Climate Change*, 5, 226-229, 2015. doi: 10.1038/nclimate2507

Bobbio, N. *Direita e esquerda*: razões e significados de uma distinção política. São Paulo: Editora Unesp, 1995.

Caetano, M. A. L. Political activity in social media induces forest fires in the Brazilian Amazon. *Technological Forecasting & Social Change*, vol. 167 (13), 120676, 2021, p. 1-10. doi: https://doi.org/10.1016/j.techfore.2021.120676

Congresso em Foco. *Bolsonaro cria programa que estimula garimpo na Amazônia Legal*. 2022. Disponível em: <https://www.congressoemfoco.com.br/noticia/12570/bolsonaro-cria-programa-que-estimula-garimpo-na-amazonia-legal>. Acesso em: nov.2023.

Cook, J.; Washington, H. *Climate Change Denial*: heads in the sand. Editora Earthscan, New York, 2011.

Costa, C. 'A grande mentira verde': como a destruição da Amazônia vai além do desmatamento. *BBC News Brasil*. 2020, Disponível em: <https://www.bbc.com/portuguese/brasil-51317040>. Acesso em: out. 2023.

Doell, K. C.; Pärnamets, P.; Harris, E. A. *et al*. Understanding the effects of partisan identity on climate change. *Current Opinion in Behavioral Sciences*, 42(1), 54-59, 2021. doi: 10.1016/j.cobeha.2021.03.013

Deutsche Welle. *Bolsonaro quer explorar Amazônia com os Estados Unidos*. 2019. Disponível em: <https://www.dw.com/pt-br/bolsonaro-quer-explorar-amaz%C3%B4nia-com-os-estados-unidos/a-48257906>. Acesso em: nov. 2023

Dunlap, R. E.; McCright, A. M. Challenging climate change: the denial countermovement. In: Dunlap, R. E.; Brulle, R. J. (org.). *Climate change and society*: sociological perspectives. New York: Oxford University Press, 2015. p. 300-332.

Escobar, H. Desmatamento da Amazônia dispara de novo em 2020, *Jornal da USP*. 2020, Disponível em: <https://jornal.usp.br/ciencias/desmatamento-da-amazonia-dispara-de-novo-em-2020/>. Acesso em: out. 2023.

Exame. *Está indo para normalidade, diz Bolsonaro sobre queimadas na Amazônia*. 24 ago. 2019. Disponível em: <https://exame.com/brasil/esta-indo-para-normalidade-diz-bolsonaro-sobre-queimadas-na-amazonia/>. Acesso em: out. 2023.

Fielding, K. S.; Hornsey, M. J. A social identity analysis of climate change and environmental attitudes and behaviors: insights and opportunities. *Frontiers in Psychology*, 7, 121, 2016. doi: 10.3389/fpsyg.2016.00121

Forchtner, B. Far-right articulations of the natural environment. In: _____. (Ed.) *The Far Right and the Environment*. Politics, Discourse and Communication. Routledge, New York, 2020.

Giffoni Pinto, R.; Malerba, J. A política (anti)ambiental nos Estados Unidos e no Brasil: uma análise comparativa. *Desenvolvimento e Meio Ambiente*, 60, 143-166, 2022. doi: 10.5380/dma.v60i0.80062

Globo. *Catástrofes naturais geraram US$ 313 bilhões em perdas em 2022, aponta relatório*. Um Só Planeta. 2023. Disponível em: <https://umsoplaneta.globo.com/clima/noticia/2023/02/27/catastrofes-naturais-geraram-us-313-bilhoe

s-em-perdas-em-2022-aponta-relatorio.ghtml>. Acesso em: out. 2023.

G1. *ONGs, índios, Inpe, governadores, Di Caprio*: veja quem já foi acusado por Bolsonaro de ligação com queimadas e desmatamento. 2020, Disponível em: <https://g1.globo.com/natureza/noticia/2020/09/30/ongs-indios-inpe-governadores-di-caprio-veja-quem-ja-foi-acusado-por-bolsonaro-de-ligacao-com-queimadas-e-desmatamento.ghtml>. Acesso em: out. 2023.

_____. *O que frases e medidas de Bolsonaro mostram sobre visão dos indígenas?* Veja em 3 pontos. 2023. Disponível em: <https://g1.globo.com/meio-ambiente/noticia/2022/03/16/o-que-frases-e-medidas-de-bolsonaro-mostram-sobre-visao-dos-indigenas-especialistas-explicam-em-3-pontos.ghtml>. Acesso em: nov. 2023.

ITS - Instituto Tecnologia & Sociedade do Rio; Yale Program on Climate Change Communication; IPEC Inteligência. *Pesquisa Mudanças climáticas na percepção dos brasileiros 2021*. 2022. Disponível em: <https://itsrio.org/wp-content/uploads/2023/06/221715_PERCEP%C3%87%C3%83O-SOBRE-QUEIMADAS_R3_15.03.pdf>. Acesso em: dez. 2023.

_____. *Pesquisa Mudanças climáticas na percepção dos brasileiros 2022*. 2023. Disponível em: <https://www.percepcaoclimatica.com.br/edicao-2022-mudancas-climaticas-na-percepcao-dos-brasileiros>. Acesso em: dez. 2023.

IPCC - Intergovernmental Panel on Climate Change. *History of the IPCC*. 2023. Disponível em: < https://www.ipcc.ch/about/history/>. Acesso em: abr. 2023.

Kahan, D. M. The politically motivated reasoning paradigm, Part 1: what politically motivated reasoning Is and how to measure It. In R. Scott & S. Kosslyn (Eds.), *Emerging Trends in the Social and Behavioral Sciences*. John Wiley & Sons, Inc., 2016a.

_____. The politically motivated reasoning paradigm, Part 2: unanswered questions. In: Scott, R. & Kosslyn, S. (Eds.), *Emerging Trends in the Social and Behavioral Sciences*. John Wiley & Sons, Inc., 2016b.

Lacerda, L. Desmatamento na Amazônia tem 3ª maior marca para o mês de dezembro, e a pior do governo Bolsonaro. *Folha de S. Paulo*. 2023. Disponível em: <https://www1.folha.uol.com.br/ambiente/2023/01/desmatamento-na-amazonia-tem-3a-maior-marca-para-o-mes-de-dezembro-e-a-pior-do-governo-bolsonaro.shtml>. Acesso em: out. 2023.

Lockwood, M. Right-wing populism and the climate change agenda: exploring the linkages. *Environmental Politics*, 27(4), 712-732, 2018. doi: 10.1080/09644016.2018.1458411

Marés, C.; Moraes, M.; Afonso, N. Salles erra ao dizer que seca causou aumento de queimadas na Amazônia. *Lupa*. 2019. Disponível em: <https://lupa.uol.com.br/jornalismo/2019/08/28/salles-seca-queimadas-amazonia/>. Acesso em: out. 2023.

Matias, I. Grupo usou WhatsApp para convocar "dia do fogo" no Pará. *Globo Rural*. 2019. Disponível em: <https://globorural.globo.com/Noticias/noticia/2019/08/grupo-usou-whatsapp-para-convocar-dia-do-fogo-no-para.html>. Acesso em: mai. 2023.

Messenberg, D. A direita que saiu do armário: a cosmovisão dos formadores de opinião dos manifestantes de direita brasileiros. *Revista Sociedade e Estado*, 32(3), 621-648, 2017. doi: 10.1590/s0102-69922017.3203004

Miguel, J. C. H. A "meada" do negacionismo climático e o impedimento da governamentalização ambiental no Brasil. *Revista Sociedade e Estado*, 37(1), 293-315, 2022. doi: 10.1590/s0102-6992-202237010013

Negrão, H. Após Alemanha, Noruega também bloqueia repasses para Amazônia. *El País*. 2019. Disponível em: <https://brasil.elpais.com/brasil/2019/08/15/politica/1565898219_277747.html>. Acesso em: out. 2023.

O Globo. *Marina Silva tinha um histórico de embates desde o início do governo Lula*. 2008. Disponível em: <https://g1.globo.com/Noticias/Politica/0,,MUL468275-5601,00.html>. Acesso em: out. 2023.

Oreskes, N. The Scientific Consensus on Climate Change. *Science*, 306(5702), 1686, 2004. doi: 10.1126/science.1103618

Oreskes, N.; Conway, E. *Merchants of doubt*: how a handful

of scientists obscured the truth on issues from tobacco smoke to global warming. New York: Bloomsbury Press, 2010.

Ortellado, P.; Ribeiro, M. M.; Zeine, L. Existe polarização política no Brasil? Análise das evidências em duas séries de pesquisas de opinião. *Opinião Pública*, 28(1), 62-91, 2022. doi: 10.1590/1807-0191202228162

Palm, R.; Lewis, G. B.; Feng, B. What causes people to change their opinion about climate change? *Annals of the American Association of Geographers*, 107(4), 883-896, 2017. doi: 10.1080/24694452.2016.1270193

Piletti, F. J. *Segurança e defesa da Amazônia*: o Exército Brasileiro e as ameaças não-tradicionais. Porto Alegre, Dissertação (Mestrado em Ciência Política) – UFRGS, 2008.

Rajão, R.; Nobre, A. D.; Cunha, E. L. T. P.; *et al*. O risco das falsas controvérsias científicas para as políticas ambientais brasileiras. *Revista Sociedade e Estado*, 37(1), 317-352, 2022. doi: 10.26512/S&E.v37i1.44658

Ramos, A. Amazônia sob Bolsonaro. *AISTHESIS*, 70, 287-310, 2021. doi: https://doi.org/10.7764/Aisth.70.13

Recuero, R.; Soares, F. B. A Desinformação sobre meio ambiente no Facebook: O caso das queimadas no pantanal brasileiro. *Journal of Digital Media & Interaction*, 3(8), 64-80, 2020. Disponível em: <https://proa.ua.pt/index.php/jdmi/article/view/21243/17196>.

Sousa, A. C. N. C. *Pós-verdade, populismo e meio ambiente*: estratégias comunicativas e políticas do governo de Jair Bolsonaro (2019-2022) para a área (socio)ambiental. Florianópolis, Dissertação (Mestrado em Sociologia e Ciência Política) − UFSC, 2023.

Viola, E.; Franchini, M. A. Governança ambiental: da destruição das florestas até os objetivos de descarbonização. *Revista USP*, 134, 143-162, 2022. doi: 10.11606/issn.2316-9036.i134p143-162

Von Behr, K. R. *A conspiração do clima*: populismo e negacionismo climático no início do governo Bolsonaro (2018 – 2020). Brasília, Dissertação (Mestrado em Desenvolvimento Sustentável) – UnB, 2022.

Walz, S. R. *Os discursos no Twitter sobre as queimadas na Amazônia em 2019*. Florianópolis, Trabalho de Conclusão de Curso (Bacharelado em Antropologia) – UFSC, 2022.