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The politics of climate change adaptation in Brazil: framings and policy outcomes for the rural sector

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ABSTRACT

This study addresses the problem of defining the scope and substance of the climate adaptation policy, which operates with comprehensive objectives and engages with multiple meanings, policy tools, and sectors to allow societies to cope with the effects of climate change. Analyzing the design of Brazil's National Adaptation Plan sheds light on the main goals and tools of the country's adaptation strategy for the rural sector and its divergent policy approaches at distinct subnational levels. This study shows that the government's ambition for promoting change drove the design process by mainstreaming climate adaptation goals into well-established development agendas, but it resulted in the layering of existing sector-based instruments. The Plan became a mix of loosely coordinated and inconsistent strategies, lacking a common implementation approach. Thereby, this analysis provides insight into the politics of adaptation policies and the challenges of promoting policy integration in this field.

KEYWORDS Adaptation to climate change; policy framing; policy integration; Brazil; rural policy

Introduction

Adaptation is becoming progressively more relevant due to the negative impacts of climate change on natural, human, production, and infrastructure systems. Governments around the world have established policies aimed at reducing the vulnerability of populations to climate-related risks (Vogel and Henstra 2015). A diverse range of policy approaches, specifically aimed at promoting adaptation, have emerged. However, knowledge in this policy field is still evolving, and the adaptation agenda operates with comprehensive objectives and engages with multiple meanings, and policy tools, thus

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making it difficult to define in scope and substance (Dupuis and Biesbroek 2013, Dupuis and Knoepfel 2013, Vogel and Henstra 2015).

The climate change adaptation initially put forward by the United Nations Framework Convention on Climate Change (UNFCCC) considered anthropogenic action as the main cause of vulnerability in natural and human systems, but also recognized natural variability. According to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), adaptation should reduce the harm provoked by actual or expected climatic stimuli or their effects (IPCC 2001). The fourth IPCC assessment report highlights that many other social, environmental, and economic factors can lead to climate change vulnerability (IPCC 2007).

According to Dupuis and Biesbroek (2013), adapting has remained complex, owing to the theoretical differences in what constitutes adaptation policy – what are the main goals – and to the highly inconsistent use of the ‘adaptation’ label in policy documents. Such theoretical differences reflect in practice, as countries’ framing of adaptation varies widely. These range from welfare development goals and the need to reduce poverty and insecurity in several low and middle-income countries, to the specific need to manage climate-related economic risks in countries like the UK, Finland, and Sweden. This variance of objectives and approaches is not unique to adaptation policy; however, the extent of the problem is pronounced. Furthermore, adaptation policy is likely to encounter coordination challenges as it addresses complex problems spanning several policy sectors (Dupuis and Knoepfel 2013, Vogel and Henstra 2015).

The present study addresses this difficulty in defining the scope and substance of the adaptation policy and coordinating policy sectors. It argues that this policy can be framed in distinct, sometimes conflicting or disconnected, goals and instruments, owing to the power struggles and institutional arrangements involved in policy design. By analyzing the design of Brazil’s National Adaptation Plan (NAP), the main components (ends and means) of the country’s climate adaptation strategy for the rural sector and its divergent policy approaches at distinct subnational levels are elucidated. This provides insight into the politics of adaptation policies, which have been layered over existing sector-based policies, and reflect their respective policy dynamics. After presenting the analytical framework, the study begins by briefly tracing the evolution of climate policy in Brazil, the main actors involved, and controversies regarding the rural sector. It then critically analyzes the process of drawing up the NAP.

Analytical framework

Driven by the goals of enhancing resilience and adjustment to climate-change impact, climate adaptation measures comprise broad development goals and are increasingly integrated within wider policy frameworks. They rarely consist of

standalone initiatives; often being multi-sectoral and multi-target, which complicates the framing process and is likely to face conflicts (Biesbroek *et al.* 2010, Dupuis and Knoepfel 2013, Vogel and Henstra 2015). A common concern of adaptation planners has been the complexity of interactions between adaptation actions, which can inadvertently lead to inconsistency or maladaptation – characterized by an intervention in one location or sector increasing the vulnerability of another location, sector, or target group to future climate change. Maladaptation can also be caused by overemphasizing short-term responses to increasing climate risks (Barnett and O'Neill 2010).

Therefore, analyzing the substance and interactions between adaptation measures is a step toward understanding their outcomes in each context. The policy framing process involves actors confronting a situation where understanding is problematic and uncertain, creating awareness that helps in analyzing and making sense of the situation, and then persuading others to act (Zito 2011). As summarized by Vogel and Henstra (2015), the way in which a policy problem is framed reflects its perception by policymakers and influences the will to address it, the interests that mobilize around it, and the type and range of solutions proposed. It relates to causal and normative judgements about the appropriate course of action. This is a political process as actors operationalize it in a way that advances their interpretation of causes and effects and the solutions chosen to address the problem (Dupuis and Knoepfel 2013, Vogel and Henstra 2015).

To date, engineering and technological options are the most common adaptive responses, although there is growing emphasis on ecosystem-based, institutional, and social measures, including the provision of climate-linked safety nets for the most vulnerable (IPCC 2014 Adaptation).

The perspective underlying the prior options privileges *engineering resilience*, which refers to resistance to change and conservation of existing material structures (Folke 2006). This notion includes engineered and natural infrastructure as well as technologies that optimize agricultural outputs (e.g. irrigation systems, technical components, and decision support and risk-management tools) and contributes to reducing vulnerability to climate change. According to the existing literature, this notion predominantly influenced the *disaster risk reduction* adaptation framing, which focuses on changing climate effects that exceed the current norm and requires calculation and management of associated risks (Dupuis and Knoepfel 2013, Vogel and Henstra 2015, Béné *et al.* 2018).

The ecosystem-based perspective for adaptation aligns with an *ecological resilience* approach, that is, the capacity to absorb shocks and still maintain functionality (Folke 2006). Finally, the institutional and social measures mentioned above are consistent with a *social-ecological* approach of resilience. Béné *et al.* (2018) explain it as an approach not limited to the conservation of existing structures or persistence to change, but rather operating as an emergent

property that includes adaptive capacity (capacity to learn, combine experience, adjust to change, and continue operating) and transformative capacity (capacity to create a fundamentally new system). This also aligns with the *vulnerability-centered* approach to adaptation by highlighting the role of unequal socio-economic conditions in framing the capacity of communities to respond to climate events (Dupuis and Knoepfel 2013, Vogel and Henstra 2015).

The policy solutions arising from these approaches are significantly different, as are the actors involved in their implementation and empowered by the establishment of these strategies. These framing processes elucidate both the policy knowledge that underpins adaptation strategies in each context, and the material impacts on policy development – in other words, it sheds lights on which instruments are concretely adopted, why, and by whom. Moreover, analyzing the policy approaches privileged in distinct subnational spheres provides insights on the expected adaptation outcomes and actors strengthened by these policies. By doing so, the study seeks to add substance to the analysis of design and implementation of adaptation policies at the national and subnational levels.

The analysis draws on a sociopolitical approach to policy integration, assuming that it consists of a political ‘governing’ process – dependent on actors’ beliefs, priorities, and structural elements – rather than a technical and administrative problem or a final policy output (Biesbroek *et al.* 2013, Candel and Biesbroek 2016). This includes different perspectives on the framing process. The next section discusses the political interplay and institutional settings in the development of adaptation policy in Brazil. The divergent policy frames and challenges in terms of integrating the analysis of conflictive agendas follow in the subsequent sections.

Emergence of climate adaptation policy in Brazil

Agenda-setting: from mitigation to adaptation

Historically, the establishment of climate policies in Brazil was influenced by the evolution of the international climate agenda, and the country’s diplomacy has played a proactive role. It hosted the 1992 Rio Conference and was also the first country to ratify the UNFCCC (Friberg 2009). Brazil’s foreign policy advocated for what became the underlying message of the Kyoto Protocol, highlighting the responsibility of industrialized nations to take the lead in reducing greenhouse gas emissions, given their greater contribution to global warming since the industrial revolution (Vieira 2013). The Brazilian government has often reiterated its role as a major initiator of the clean development mechanism (Friberg 2009).

Subsequent administrations in the 1990s and early 2000s steadily resisted efforts to include carbon credits for ‘avoided deforestation’ in the clean

development mechanism, which would benefit the forest-rich countries in UNFCCC Annex 1 (Vieira 2013). This position was consistent with Brazil's image as a fast-growing economy that relied mostly on renewable energy sources (hydropower and biomass), but which experienced increased rates of deforestation.

Moreover, Brazil's Ministry of Foreign Relations (MRE), which historically led international environmental negotiations, was not receptive to the idea of establishing clear targets to tackle deforestation (Vieira 2013). This ministry was a key stakeholder in climate policy decision-making, working closely with the Ministry of Science and Technology (MS&T), while the Ministry of Environment was absent in the process (Friberg 2009). Viola and Franchini (2014) contend that the MS&T's position, influenced by Brazil's foreign policy, has become progressively inconsistent with the consensus built in the national scientific community. According to Lahsen (2009), although officers in the Ministry of Environment saw the national advantage of forest conservation and carbon trading mechanisms, compared to the MRE and MS&T, this ministry's role in international negotiations is marginal. Contrastingly, the Ministry of Agriculture has been traditionally headed by conservative political parties that privilege fast economic growth over environmental considerations (Zanella and Milhorange 2016).

This situation changed only in the late 2000s, under President Lula's left-wing Workers' Party administration. Following Brazil's steady reduction in deforestation rates, the government finally distanced itself from the entrenched diplomatic position on considering clear targets for deforestation control in international climate negotiations.

Brazil's position against the 'avoided deforestation' mechanisms was slowly revised due to powerful resistance from domestic stakeholders, such as private and public actors in agribusiness, as well as high-ranking civil servants, especially in the area of foreign policy (Vieira 2013). The institutional capacity of the Ministry of Environment was improved, and the deforestation control enforcement system became more effective over the early 2000s. The appointment of a former environmental leader – Marina da Silva – as minister also supported these results. Furthermore, growing transnational pressures from state and nonstate actors, combined with increasing domestic activism by NGOs and public environmental bodies, also contributed to governmental commitments toward deforestation control. Finally, certain cities and states made movements toward a climate commitment, including the city of São Paulo and the Amazonian states. These states, along with some corporate national coalitions, advocated for changing Brazil's international position on forest-related policies (Viola and Franchini 2014, Aamodt 2018b).

Following these pressures, Brazil's government announced its National Plan on Climate Change in 2008, outlining a deforestation reduction target. At the international level, it advocated in the COP-15 (2009) and COP-16

(2010) for the establishment of a credit market mechanism aimed at reducing emissions from forest loss and degradation (REDD+). The National Policy on Climate Change (NPCC) became a law that year (Law 12.187/2009). The voluntary commitment sought to reduce emissions focused particularly on the Amazon (Gallo and Albrecht 2018). In parallel, the National Forum on Climate Change and the Brazilian Panel on Climate Change gained recognition as institutional instruments to the NPCC, and sector-based plans for mitigation were issued. These included the Sectoral Plan for Mitigation and Adaptation to Climate Change and for the Consolidation of a Low-Carbon Economy in Agriculture (ABC Plan). That same year, Brazil hosted the Rio +20 Conference on Sustainable Development and the country signed the COP-21 agreement in 2015, signaling its commitment to reduce greenhouse gas emissions by 37% (from 2005 levels) by 2025.

Nonetheless, after the positivity following the COP-15, the climate agenda suffered considerable setbacks coinciding with a strengthening of conservative forces and political influence, particularly in the oil, agriculture, and automotive sectors. Implementation of the Climate Law barely advanced, and the government responded to the international financial crisis with a carbon-intensive industrial stimulus. This was followed by the reform of the Forest Code in 2012, lowering the level of forest protection under Brazilian law and exempting many producers from environmental obligations; the reform was advocated by conservative agribusiness groups and heavily resisted by the environmental movement (Viola and Franchini 2014). Note that land-use conflicts are common in Brazilian climate politics, and the authorities governing these issues are poorly coordinated. This is reflected in public disputes between the Ministry of Environment and Ministry of Agriculture regarding environmental restrictions on the expansion of land for agricultural use (Zellhuber 2016).

In this context of climate agenda diminishment, the NAP was established. Launched in 2016, the design of the plan followed the recommendation of the 2010 UN Cancun Framework for Adaptation, and several extreme climate events.

Design of the National Adaptation Plan

In Brazil, the relevance of the climate adaptation goals in defining national policy strategies has been mounting since the late 2000s. Interviews with Ministry of Environment representatives confirmed that the growing number of climatic disasters (e.g. floods and droughts) that occurred in the early 2010s contributed toward establishing climate adaptation concerns in the policy agenda (Brasilia, June/2019).

According to NAP leaders, the design process followed a network and evidence-based approach that took two years and involved almost 50

organizations (Silverwood-Cope 2017). In 2013, a working group coordinated by the Ministry of Environment was established, mainly comprising ministry officers. In addition to public institutions, members of the scientific community, NGOs, and the private sector participated in the meetings (Rodrigues Filho *et al.* 2016). It also benefited from climatic models developed by Brazil's Institute for Space Research and the Center for Natural Disaster Monitoring and Alerting. Funds came from the federal government and from international agencies such as the German cooperation agency, GIZ (Silverwood-Cope 2017).

The NAP aimed at ensuring the implementation of risk-management strategies in a coordinated manner. Eleven sector-based strategies shaped national priorities on climate vulnerability: agriculture, biodiversity and ecosystems, cities, natural disasters, industry and mining, infrastructure, vulnerable populations, water resources, health, food and nutrition security, and coastal areas. The intent to coordinate these strategies was clear in the initial debates during the formulation of the NAP (GT Adaptação 2013a).

The establishment of a permanent and consultative technical group helped promote coordination between institutions and monitor the plan's implementation (Ministerial Decree 150/2016). Nevertheless, the group met only once since its launch. Another group in charge of developing a monitoring system was created in 2017. It reported that only a few initiatives, primarily research development, were set up in the first two years of the NAP's implementation (MMA 2017). This is consistent with the group members' agreement on the lack of climate adaptation knowledge in Brazil (GeX-CIM 2013).

The NAP's ambition was that climate adaptation goals could be mainstreamed into existing policy instruments that shaped its sector-based strategies. Integrating adaptation policy into already established policies is common (Lesnikowski *et al.* 2019); however, this requires political power to influence change in the established sector-based policies.

Nevertheless, as noted above, climate change was downgraded in the political agenda at the launch of the NAP. In the mid-2010s, Brazil faced a political and economic crisis which led to the impeachment of President Rousseff, large budget cuts to the climate agenda, and the reinforcement of a conservative political coalition (Rochedo *et al.* 2018, Aamodt 2018b). For instance, the right-wing Temer administration (2016–2018) signed provisional acts and decrees that lowered environmental licensing requirements, suspended the ratification of indigenous lands, reduced the size of some protected areas, and facilitated land grabbing (Rochedo *et al.* 2018). This context hindered the capacity of the Ministry of Environment in influencing sector-based agendas. The ministry's focus on the forest-related aspect (Aamodt 2018a) also prevented stronger dialogue with all the sectors involved in the NAP, as will be discussed below. Furthermore, the understanding of climate adaptation during the NAP's design process was problematic and incomplete. It involved several

institutional actors with different understandings of development priorities, territorial vulnerabilities, and adaptation needs. Although it began with a conceptual debate and an attempt to align the problem framing, distinct concepts of adaptation were used in different sections of the same document. The result was a low-level policy framework that layered old instruments on new climate adaptation goals, resulting in different degrees of coherence regarding its frames and tools. Further discussion of this point for the rural sector follows in the section below.

Distinct frames, actors, instruments, and territorial targets in the NAP's strategies for the rural sector

As mentioned earlier, the design process of the NAP relied on a network-approach, with chapters/strategies developed by different actors. Given their uneven degrees of involvement, concern about the adaptation agenda, and knowledge of vulnerabilities and adaptation needs, the strategies were framed based on distinct, and sometimes divergent concepts of adaptation, tools, and regional priorities. This section looks at the framing process of three distinct strategies for climate adaptation in the rural sector and their material implications in three Brazilian macro-regions, namely: i) low-carbon agriculture in the Center-West, ii) agroecology and access to water in the Northeast, and iii) the conservation of environmental services in the North. These regions comprise some of the biomes of the country which face key challenges in terms of climate adaptation (Figure 1). Governance nuances and specific initiatives are beyond the scope of this section. The objective is to provide a general background on the NAP's strategies for the rural sector, their main underlying concepts, and the policy outcomes of privileged instruments and regional targets. Understanding the conceptual and material basis of the framing process is relevant to critically analyzing the chosen policy approaches in each context and coordination issues.

Low-carbon agriculture: agribusiness adaptation in the Cerrado region

The ABC Plan is the main line of action under the NAP's Strategy for Agriculture. It consists of six programs aimed at disseminating mitigation technologies and a seventh that presents actions for adaptation, whose main objective is to establish a *climate-smart agriculture* (CSA) program. This concept refers to a series of integrated measures promoting adaptation, mitigation, and agricultural productivity (to increase income and food security) (Lipper *et al.* 2014, Rosenstock *et al.* 2016). According to Ministry of Agriculture representatives, by the end of the ABC Plan design, participants decided to introduce adaptation goals that would focus on the development of CSA and the diversification of production systems, among others

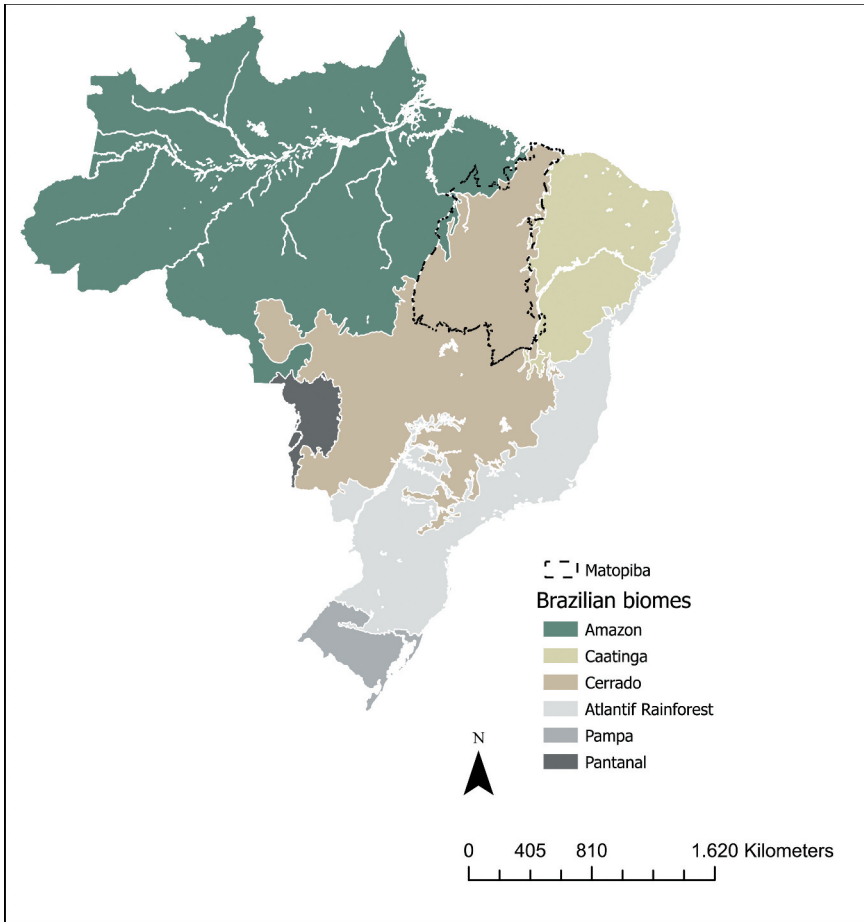


Figure 1. Map of Brazilian biomes. Source: Authors.

(Brasilia, December/2018). However, adaptation remained poorly detailed when compared to mitigation actions in the Plan (Neves *et al.* 2015).

As stated by a researcher at the ABC Observatory, the Brazilian government took inspiration from international concepts for the ABC Plan design, especially CSA. Nevertheless, CSA is still subject to much debate, particularly with respect to concrete policy options that should be adopted (São Paulo, March/2018). According to Lipper *et al.* (2014), this approach provides scope for the adoption of nearly any agricultural practice that improves productivity and promotes the efficient use of natural resources. This concept is unclear about the potential strategies to be followed, except for a special emphasis on the diffusion of agricultural technologies. In this regard, the perspective underlying these measures privileges an *engineering resilience* approach, combining technologies to optimize agricultural outputs.

Politically, it is interesting to note how agribusiness associations and their public counterparts have gradually raised the adaptation agenda. Although the measures initially promoted by the ABC Plan were seen as climate mitigation, interest in adaptation has increased as these actions have provided the backdrop for funding new technologies and improving both productivity and efficiency (Brasilia, December/2018). Moreover, mitigation measures are associated with deforestation control and environmental enforcement, opposed by many agribusiness actors. According to Ministry of Agriculture representatives, agribusiness actors increasingly view some of the key adaptation measures such as the restoration of degraded pastures and soil conservation as positive areas for development (Brasilia, October/2018). Interviews have shown how the National Agribusiness Association recently adopted a pro-adaptation narrative to attract funds for soil and pasture restoration, and to divert them from the conservationist agenda.

Representatives of Brazil's Agricultural Research Corporation (Embrapa) support this pro-adaptation perspective, which promotes technology-driven adaptation as a means of improving production efficiency and the value of Brazilian products in international markets. Most of the technological solutions promoted were not necessarily new, they consisted of a repackaging of well-known productivity increase technologies. This strategic positioning of agribusiness actors represents a major change in recent climate policy; according to Embrapa's researchers, adaptation represents an evolution of the climate agenda in Brazil (Brasilia, April/2019). Although these actors traditionally focused on mitigation, following Brazil's negotiation targets and the agribusiness sector's interest in expanding international markets, the adaptation narrative became strategic.

Note that Embrapa has historically fostered the diffusion of technologies and agrochemical inputs aimed at increasing productivity of crops in Brazil. Although Embrapa's work is currently diversified, the solutions initially developed strongly contributed to the reinforcement of the agribusiness sector and to the expansion of the agricultural frontier to the Cerrado region. The power of agribusiness groups in Brazilian politics is considerable. A cross-party and strong conservative political group called *bancada ruralista* is known for promoting their interests in Congress. Moreover, this group traditionally appoints the Minister of Agriculture and provides a direct influence on the design of agricultural policy.

Nevertheless, access to the ABC credit line accounts for only 1% of the total amount of rural credit allocated in the 2010–2018 period. Despite a recent decrease in its interest rates (from 8.5% p.a. in 2016/2017 to 6% p.a. in the 2018/2019 crop), these are considered high compared to the conditions of credit lines financing conventional agricultural systems and chemical inputs. Conventional credit is also less bureaucratic and complex (with lower technical requirements for project development), making the ABC line

unattractive. Furthermore, the ABC credit has been accessed by large-scale producers in the Cerrado biome, while smallholder farmers and traditional communities lack adequate funding options and volumes to foster sustainable production. Producers located in the Matopiba region (Figure 1), characterized by agribusiness frontier expansion and environmental degradation, are the main credit receivers; whereas disbursement is significantly lower in the Caatinga biome, considered a priority for pasture recovery (2015–2019 disbursements: Caatinga = R\$ 631 million; Cerrado = R\$ 4,942 billion) (Observatório ABC 2019, BCB 2020). The competition between credit lines show a need for greater coherence in public financing for agriculture in terms of supported systems and population groups.

The same asymmetries are seen in projects supporting the ABC Plan. Concrete initiatives and funds come mainly from international donors or public-private partnerships and focus on technology diffusion in the Cerrado. These include a World Bank-funded project that promotes managerial and technical assistance to farmers in this region. Moreover, a network composed of public institutions such as Embrapa, and agribusiness companies established technological reference units to disseminate technologies of integrated crop-livestock-forestry systems throughout the country, but mainly in the Cerrado region (iLPF Network) (Embrapa 2018). Only recently, an initiative funded by the UK cooperation promoted the implementation of the ABC Plan beyond the Cerrado region.

A common criticism of this perspective is that the emphasis on production, productivity, and efficiency – based, for instance, on the use of industrialized inputs – is to the detriment of other variables relevant to food security, such as patterns of distribution and consumption, and the system's resilience (Loos *et al.* 2014). Alternative framings of adaptation have upheld this criticism, as presented below.

Agroecology and access to water: adaptation of family farming in the semiarid region

The NAP's Strategy for Food and Nutritional Security has put forth a distinct adaptation framing. The strategy presents a social inclusion and territorial approach with special attention to family farmers, predominantly from the semiarid region in the Caatinga biome (Figure 1). Besides production, several vulnerability aspects were considered, aligning the strategy with a *social-ecological* approach to resilience. According to this perspective, climate change poses a threat to food security by triggering drought and desertification; however, these effects depend more on the vulnerability of affected social groups and the de-concentration of natural resources than merely climate conditions. Most guidelines presented rely on existing policies of support to family farming (like expansion of warehouse capacity and

inclusive rural production), access to drinking and production water (through rainfall-catchment and storage cisterns), and the development of agroecological systems (Brazil 2016b).

The key policies in this context are the National Policy on Food and Nutritional Security (PNSAN) and the National Agro-ecology and Organic Production Policy (PNAPO). These have been implemented particularly by the Ministries of Social Development and Agrarian Development. The PNAPO and credit lines to family farmers were seen as adaptation measures for this particular group, to the detriment of the ABC credit (Brasília, May/2019). According to interviewees from the Ministries of Agriculture and Agrarian Development, the high levels of technological, managerial, and financial requirements meant that ABC credit lines were not feasible for family farming (Brasília, May/2019).

Although the NAP considers these to be adaptation strategies, they originated from the ideas of ‘coexisting with semiaridity’ at the regional level, and desertification control at the international level, particularly after the Third Session of the UN Conference against Desertification in 1999. The resulting documents from this conference proposed an end to policies intended to transform semiarid regions into green agro-export landscapes and the concentration of water in large reservoirs. Local civil society entities that gathered around the network ‘Semiarid Articulation’ (*Articulação do Semiárido* [ASA]) played a key role in promoting this paradigm, focusing on stockpiling resources and decentralized access to water. The strategy has been considered a means of promoting the adaptive capacity of family farmers to climate change impacts (Lemos *et al.* 2016, Lindoso *et al.* 2018).

One major divergence from the above framing is to consider promoted agricultural systems and the actors involved. In this strategy, agroecology practices are a means of increasing resilience in food agroecosystems (by increasing agricultural biodiversity and organic matter in the soil). This notion contradicts that of the CSA which relies on agribusiness food production that is dependent on agricultural inputs, machinery, and fossil energy (oil, gas, and chemical fertilizers), responsible for carbon emissions. Agroecology practices are otherwise presented as a means of ‘*valuing traditional knowledge of family farmers and traditional communities through constant networking between farmers and rural-extension and training networks*’ (Brazil 2016b, pp. 195–196). This position criticizes the CSA strategy promoted by agribusiness actors, focusing on agricultural productivity and short-term efficiency. These two conflicting understandings in the NAP reflect inconsistency in the framing of adaptation and selection of policy instruments, owing to the divergent interest groups involved in the design process.

Moreover, a political conflict arose from the establishment of the ‘Water for All Program’ in 2011. This initiative made significant change in the dissemination of water cisterns and promotion of drought-resilient

food systems. Aimed at promoting the universalization of access to water, this new policy framework changed the type of infrastructure for water supply privileged by the government, along with the political actors involved in its implementation. The program adopted plastic-made rather than plate-made cisterns and shifted the implementation approaches. Originally, the installation of plate-made cisterns included training of rural families in self-construction and cistern maintenance, soil conservation, agroecology, and community organization. However, the training component was excluded from the framework with the adoption of plastic-made cisterns. ASA lost its monopoly on implementing this policy to municipal agencies and regional organizations such as the Development Company of São Francisco and Parnaíba Valleys. Strong pressure from ASA instantly emerged and led to the establishment of a new policy framework by the Ministry of Social Development in 2013 – the Cistern Program – combining each group’s preferences. The result was an institutional bricolage and a disconnect with the Ministry of Environment’s climate policy framework, somehow preventing the incorporation of climate projections and risks to the planning process (Nogueira *et al.* 2020).

Environmental services conservation: adaptation of traditional populations in the Amazon region

Finally, the NAP’s Strategy for Vulnerable Populations was developed by the Ministries of Environment and Social Development, the National Indigenous Foundation, and the Brazilian Forum on Climate Change. It addresses the potential impact of climate change on several socially vulnerable groups across Brazil (extractivists, indigenous peoples, fishing and riparian communities, homeless landless people, and family farmers, among others). However, indigenous populations, particularly in the Amazon biome (Figure 1), are under special focus. They comprise over 60% of the vulnerable groups. According to the NAP, their livelihoods strongly rely on the conservation of biodiversity and ecosystem services. Hence, environmental degradation makes them highly sensitive to the impacts of climate change. Their strong identification with the land in combination with land tenure, social insecurity, and the high percentage of settlements in remote areas with poor access to public services and markets, amplifies their vulnerability (Brazil 2016b).

The guidelines proposed by this strategy draw upon the concept of *ecosystem-based adaptation* (EbA) (Brazil 2016b). The concept is defined by the UN Convention of Biological Diversity as the use of biodiversity and ecosystem services (including actions for conservation, recovery, and ecosystems management) as a part of the overall adaptation strategy to help people adapt to the adverse effects of climate change (CBD 2009). In

the NAP, EbA refers to the use of ecosystem services to reduce human vulnerability to climate change. These include maintaining the ecological integrity of ecosystems, carbon sequestration, greater food security, sustainable water-resources management, and an integrated approach to territorial management. Drawing on this perspective, the fragility of the ecosystems and their vulnerability to climate extremes and rapid land use change undermine the livelihoods and cultural practices of traditional populations (Brazil 2016b). Although EbA is more concerned with *ecological resilience*, the perspective presented in the NAP also aligns with *socio-ecological resilience*. Here, the roles of local knowledge, social memory, and learning are key factors in the promotion of adaptive capacity.

The strategy places a special emphasis on the need to direct adaptation measures to indigenous populations, based on the following guidelines: i) recognizing their role in preventing deforestation and climate change; ii) implementing the National Policy for Territorial and Environmental Management of Indigenous Lands (PNGATI), which includes land regularization; and iii) improving participation of indigenous groups in climate policy, including the REDD+ national strategy (Brazil 2016b). Note that the NAP addresses the protection of indigenous groups, the REDD+ mechanism, and other types of payments for environmental services as both mitigation and adaptation measures. Therefore, the Strategy for Vulnerable Populations is closely connected with the mitigation and forest-conservation policy framework presented earlier; hence it also faces the same political issues.

Carbon-based conservation has attracted widespread interest and controversy among policymakers, academics, and potential beneficiaries. As mentioned, Brazil's foreign policy traditionally opposed the idea of carbon market-financed forest conservation and advocated for the creation of voluntary incentives for reducing deforestation. This resulted in the creation of the Amazon Fund in 2008, which manages donor funds from Norway and Germany to implement REDD+ projects. The position was criticized by the governors of nine states in the Amazon region, and the federal government finally dropped its initial position in 2009 to support a restrictive integration of REDD+ into carbon markets. Regarding practical impacts, private landowners were allowed to market carbon credits, which was opposed by several environmental NGOs (Schulz 2020).

Nevertheless, large environmental NGOs led most of the REDD+ initiatives. Among government bodies, the Ministry of Environment played a key role in coordinating dialogue between the government and other sectors. Recent studies argue, however, that the absence of coordination among different actors (private sector, government, and civil society) resulted in disregard for situations with land tenure challenges, a key obstacle to the deforestation control and adaptation goals. The lack of agribusiness involvement also had implications for the strategy, as their territorial expansion

conflicted with rainforest conservation (Gebara *et al.* 2014, Reydon *et al.* 2020, Schulz 2020). Furthermore, several conflicts emerged from the debate regarding REDD+ decentralization to subnational governments, even prior to the NAP launch.

Therefore, problem framing is a political process where actors deliberately frame policy issues in a way that advances their interpretation of the preferred course of action. Moreover, it has a material impact on policy development and outcomes for the goals, tools, and actors involved in framing and implementing adaptation policy. Table 1 summarizes the concepts analyzed in this section with respect to the NAP's strategies for adaptation of rural populations, the main actors involved, policy options, and regional scope.

The policy integration process in the NAP

The institutional trajectories of the Brazilian state, as well as the power asymmetries and coordination issues between institutional actors involved in the design process can explain the divergences in terms of framings and policy instruments found in the NAP's strategies for the rural sector.

The ambition of the actors leading the process, particularly the Ministry of Environment, to promote change by mainstreaming climate adaptation goals into development agendas was well documented in meeting reports (GT Adaptação 2013b, p. 4) and in the NAP's final document:

[The NAP] seeks to influence public policy instruments and/or government programs with the objective of mainstreaming the guidelines and instruments of the National Policy on Climate Change and this Plan in order to increase coherence between public policies (Brazil 2016a, p. 18).

Nevertheless, sector-based priorities prevailed and only soft guidelines for the dissemination of adaptation goals were defined (GT Adaptação 2013b). The debates in the first year discussed the promotion of an integrated policy strategy based, for instance, on a territorial development approach. The design also considered some thematic agendas seen as cross-cutting, such as 'vulnerable populations.' Nevertheless, the document was written based on the argument that each sector had its 'own understanding of vulnerability and appropriate adaptation,' and that each chapter/sector-based strategy should 'seek to define their own vulnerability in terms of exposure, sensitivity, and adaptive capacity and to present their particular territorial and social dimensions of vulnerability and adaptation' (GT Adaptação/MMA 2014, p. 3–4). The debate finally evolved into the opposite question of how cross-cutting initiatives would support the implementation of sector-based strategies. This approach was grounded in the argument that since the National Climate

Table 1. Main concepts, actors, and policy strategies of climate adaptation in Brazil's rural sector.

	Low-carbon agriculture	Agroecology	Environmental services
NAP's Sectoral or Thematic Strategy (Brazil 2016b)	Agriculture	Food and Nutritional Security	Vulnerable Populations
Resilience framings (Folke 2006)	Engineering resilience	Socio-ecological resilience	Socio-ecological, ecological resilience
Adaptation framing (Dupuis and Knoepfel 2013; Vogel and Henstra 2015)	Disaster risk reduction	Vulnerability-centered	Vulnerability-centered
Concept of adaptation pertaining to the rural sector	Climate-smart agriculture, low-carbon agriculture	Living with the semiarid climate, social vulnerability, desertification control	Ecosystem-based adaptation, social vulnerability
Main policies and instruments	Credit lines to diffuse low-carbon technologies (ABC Plan), agricultural climate-risk zoning and insurance.	Promotion of family farming, access to water, and agroecology systems (PNSAN, PNAPO)	Biodiversity conservation, payment for environmental services, and indigenous land titling (REDD+, PNGATI)
Lead actors	Ministry of Agriculture, Embrapa, private agribusiness associations	Ministry of Social Development, Ministry of Agrarian Development, and ASA civil society organizations	Ministry of Environment, indigenous organizations, and national and international NGOs
Main region of implementation	Cerrado (Center-West)	Caatinga (Northeast semiarid region)	Amazon (North)

Source: Authors.

Change Policy referred to sectors, the NAP should adopt the same rationale (GeX-CIM 2013, GT Adaptação/MMA 2015).

Furthermore, at the launch of the NAP, the public budget did not incorporate the climate adaptation goals. Each sector was expected to take the decision separately, as confirmed by the excerpt below:

The multiannual budget plan controls partial deliveries [of the NAP], but it respects the main goals and actions of each sector, with their long-term plans, as observed in the sectoral plans. Each sector will have its own planning horizon, specific to each area and theme. The NAP will be this “patchwork,” respecting the particularities of each thematic field/sector (GT Adaptação 2013b, p. 5).

Lastly, it is important to note that ideas seeking to promote change often have little effect on the crystallized policy frames, historical paths, and frozen landscapes of incentives. In policy process literature, major change is often dependent on alternative factors such as external shocks, political shifts, coalition

building, paradigm shift, etc. (Capano 2009). Additionally, several opposing interest groups such as agribusiness, family farming, and conservationists have shared Brazil's executive power, particularly under the Workers' Party governments (2003–2016). These groups have assumed the head of several ministries, including the Ministries of Agriculture, Agrarian Development, and Environment, respectively (Zanella and Milhorange 2016, Milhorange and Bursztyn 2019). This has not only intensified power struggles inside the state bureaucracy but has created challenges in the integration of sector-based agendas. Hence, an additional factor lies in the power asymmetries between engaged institutional actors and their respective roles in policy framing.

The cases analyzed here showed how these crystallized sectoral asymmetries and divergences over policy solutions to address the adaptation challenges influenced the framing processes of subnational and thematic strategies. The adaptation goals were added to pre-established policies as a function of the actors leading the environmental and agricultural agenda in each region, and their respective policy ideas. The engineering resilience has been promoted by the groups traditionally advocating for technological and economic development in the agricultural sector, while the socio-ecological resilience aligned with a traditional aspiration of Brazil's socio-environmental movements. Moreover, the role of environmental groups in policy design for the Amazon region has been stronger than in the Semiarid region. Insights have been provided on the concrete outcomes of these distinct approaches in the section above; however, more detailed studies with a focus on each region are needed.

Overall, the study shows that the adaptation goals' lack of political power to influence other sector-based agendas hindered their incorporation and subsequent implementation. This was combined with the decline of Brazil's climate policy in the mid 2010s, as explained. The Ministry of Environment's mandate in designing the NAP did not include the prerogative of making substantial changes in the agenda and tools of other sectors, including agriculture. As stated by the ministry's representatives, its leading role was in deforestation control and climate change mitigation. In this context, the adaptation agenda was secondary to the ministry's strategic plan (Brasilia, June/2019). Officers of the Ministry of Agriculture, who stated that mitigation remained a priority for the government even after the launch of the NAP (Brasilia, October/2018), confirmed this perception. In the case of agriculture for instance, the ABC Plan was primarily designed to meet mitigation objectives. Of the Plan's seven programs, six correspond to carbon emission reduction technologies, representing a clear sectoral orientation, thus giving the adaptation program a secondary, poorly integrated role. This perspective started to shift as agribusiness actors identified technological and funding opportunities in the adaptation agenda, as discussed earlier. The interviewees at the Ministry of Agriculture also argued that this plan was institutionally weak as it was based on a ministerial decree (Brasilia,

October/2018). Therefore, the NAP followed a non-binding and essentially informative approach.

Conclusion

Climate adaptation is still an emerging and internationally driven concern for Brazil, consolidated by the launch of the NAP in 2016. Its main purposes were to produce knowledge on climate change vulnerabilities, foster policy and institutional coordination, and serve as a platform to guide international funding. Despite the favorable context and institutional framework established in the late 2000s, the incorporation of these goals into existing sector-based policies and effecting changes in the government's agenda has faced institutional constraints and it lacked political power and financial resources, making the NAP a politically weak strategy composed of instruments layered onto existing policies.

Several factors can explain this result such as path dependence on previous climate policies and established institutions and budgetary rules, the insufficient attention given to climate adaptation in comparison to the goals put forth by previously established sector-based and climate mitigation strategies, the positioning of opposing interest groups in the state's executive power, and coordination issues between institutional actors taking part in the design process. Moreover, the conflicts between those who promote particular frames, their differential engagement in the process, and the way such frames are reshaped at various subnational levels have led to different outcomes regarding pursued goals and selected tools. Our findings align with policy integration studies by arguing that this is a political process, dependent on actors' priorities, resources, and institutional elements (Biesbroek *et al.* 2013). They contribute to this literature by combining the institutional path lens and the notion of policy framing. Shedding light on the established institutional frameworks and conceptual backgrounds in which policy design and framing take place is relevant to understanding the policy outputs and approaches selected to implement internationally driven agendas. The study also provides insight into the challenges of promoting the integration of policy approaches shaped by divergent framing processes. Future research could shed light on the politics of climate adaptation by drawing on policy process studies, such as the advocacy coalition framework, which analyzes in greater detail the mechanisms of policy change and immobility in the context of conflictual policy ideas.

Given the place-based nature of climate adaptation, future studies should analyze adaptation policymaking at the local level. Empirical research should analyze the extent to which existing policies incorporated into the NAP now reflect the response to climate-related risks and promote adaptation to climate change. Finally, not only have environmental policies been dismantled since 2016, but climate policies have also received criticism since

the change in administration in 2019 (Sabourin *et al.* 2020). This has created a new climate-skeptical phase in Brazilian policymaking, requiring further analysis, especially with respect to the outcome of dismantling the resistance mechanisms in place.

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