IMPLEMENTATION OF NATIONAL POLICIES ON DISASTER RISK MANAGEMENT AT A SUB-NATIONAL SCALE: AN OVERVIEW OF BRAZILIAN STATES

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ABSTRACT

The Sendai Framework for Disaster Risk Reduction has influenced countries to formulate national plans on disaster risk management (DRM), highlighting the need to invest in their implementation at the municipal level, where disasters occur frequently. However, climate change has intensified extreme weather events, increasing the onset, size, and duration of socionatural hazards, affecting not only entire cities, but also regions, and sometimes states/provinces and countries. This article analyzes the institutional capacities of DRM at a subnational scale, looking at the technical-administrative and political-relational capacities of State Agencies of Civil Protection and Defense in Brazil. The research adopted a mixed-method approach that included a) quantitative analysis of state and municipal databases on DRM implementation, and b) a content analysis of the State Civil Protection and Defense plans. The results emphasize the need to strengthen the coordination and implementation of the National Policy on Civil Protection and Defense at the state level. By May 2024, only six (23%) of 26 Brazilian states developed and made available a state plan on DRM. Most state plans are not aligned with the national policy.

KEYWORDS

Policy capacity; Public Policies; Governance; State Governments; Disasters; Brazil

IMPLEMENTACIÓN DE POLÍTICAS NACIONALES DE GESTIÓN DEL RIESGO DE DESASTRES A ESCALA SUBNACIONAL: UNA VISIÓN GENERAL DE LOS ESTADOS BRASILEÑOS

RESUMEN

El Marco de Sendai ha influido en los países para formular planes nacionales de gestión del riesgo de desastres (GRD), destacando la necesidad de invertir en su implementación a nivel local, donde los desastres ocurren con mayor frecuencia. Sin embargo, el cambio climático ha intensificado los eventos extremos, aumentando la ocurrencia, magnitud y duración de las amenazas socionaturales, y afectando ciudades enteras y, en algunos casos, estados/provincias y países. Este artículo analiza las capacidades institucionales a escala subnacional, centrándose en las capacidades técnico-administrativas y político-relacionales de los Organismos Estatales de Protección y Defensa Civil en Brasil. La investigación adoptó un enfoque de métodos mixtos: a) análisis cuantitativo de bases de datos estatales y municipales sobre la implementación de la GRD, y b) análisis de contenido de los planes estatales de Protección y Defensa Civil. Los resultados enfatizan la necesidad de fortalecer la coordinación y la implementación de la Política Nacional de Protección y Defensa Civil en el nivel estatal. Hasta mayo de 2024, solo seis (23 %) de los 26 estados brasileños habían elaborado y divulgado un plan estatal de GRD. La mayoría de los planes estatales no están alineados con la política nacional.

PALABRAS CLAVES

Capacidad de políticas; Políticas públicas; Gobernanza; Gobiernos estatales; Desastres; Brasil

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INTRODUCTION

Disaster Risk Management (DRM) requires strong institutional capacities to address complex and multi-scale risks. Catastrophes with extensive geographical impact have affected entire states or provinces, revealing common challenges related to intergovernmental coordination failures, delays in implementation, and insufficient infrastructure. Examples include the severe drought in Yunnan Province, China, between 2009 and 2010, which affected millions of people and caused significant agricultural losses (Pradhan et al., 2017); floods, droughts, and storms in KwaZulu-Natal, South Africa, between 2014 and 2017 (Adom et al., 2024); the 2015 floods in Malawi (Dewa et al., 2021); and the collapse of dams in the Derna Valley, eastern Libya, in 2023 (Armon et al., 2025). These cases underscore the need to critically assess and strengthen institutional capacities for DRM at broader territorial scales. However, few studies have analyzed DRM at the subnational scale, looking at the institutional capacities of states or provinces. Moreover, studies on DRM institutional capacities tend to focus on disaster response, analyzing the role of national governments in these situations (Libanda, 2021; Papathoma-Köhle et al., 2021; Persson and Granberg, 2021; Falola and Agbola, 2022; Oda et al., 2025), ignoring other DRM phases.

Studies analyzing institutional capacities for DRM in the Latin American and Caribbean (LAC) are scarce (Ruiz-Rivera and Melgarejo-Rodríguez, 2017; Rivas et al., 2024). Brazil is a relevant case for examining subnational DRM capacities. The National Policy on Civil Defense and Protection (PNPDEC) was established by Law No. 12,608/2012 (Brazil, 2012), following the January 2011 catastrophe in the Serrana Region of Rio de Janeiro state, where more than 1,000 people died due to floods and landslides (Marchezini et al., 2017). This law assigns specific responsibilities to each level of government: national, state, and municipal.

According to Law No. 12,608/2012, the federal government is responsible for coordinating and planning national-level DRM actions, formulating the National Civil Protection and Defense Plan (PN-PDC), promoting the development of science and education related to DRM, and supporting municipalities. The same law establishes that states are responsible for intermediating actions between the federal government and the country's 5,570 municipalities, establishing State Civil Protection and Defense Plans (PE-PDC), monitoring risk areas, and providing technical support to municipalities (Brazil, 2012). However, little is known about how the national policy is effectively implemented across the country's federative units. Although subnational governments, especially states, play a key role in coordinating disaster response and supporting municipalities, few studies have analyzed their institutional capacities for implementing DRM (Lin and Lee, 2023; Marchezini et al., 2025). This gap is problematic, as it obscures a critical level of government responsibility for translating national policy into practice and ensuring vertical coordination within the Brazilian federative system.

Law No. 14,750/2023 (Brazil, 2023) formally established the formulation of the PN-PDC and outlined only brief thematic topics to be addressed in both national and state-level plans, marking the beginning of the national plan's elaboration process in 2023. The first version of PN-PDC was officially published in 2025, launched in November of that year at the 30th Conference of the Parties (COP 30), held in Belém, Pará. This document went beyond the legal guidelines by defining implementation indicators to achieve its goals and objectives, detailing actions and programs, and presenting recommendations for standardizing the State Civil Protection and Defense Plan (PE-PDC). Importantly, some Brazilian states had already developed State Civil Protection and Defense Plans prior to the publication of the PN-PDC, based on their local risk profiles and contextual demands, plans that constitute the empirical focus of this study.

This study addresses the following research question: What are the institutional capacities of states or provinces for DRM actions? To address this question, this study undertakes a comparative analysis of state-level DRM capacities in Brazil, examining their DRM plans and data from the Brazilian Institute of Geography and Statistics (IBGE). The analytical framework for the comparative research, explained in the following section, considers technical-administrative and political-relational capacities (Pires and Gomide, 2016). The first refers to the internal conditions that enable institutions to operate effectively, including the availability of qualified human resources, financial means, scientific and technological support, organizational arrangements, and autonomy in decision-making. The second concerns the ability to engage and coordinate with other actors, encompassing intersectoral collaboration and inter-federative relations. By examining these state

plans, the study seeks to analyze these DRM capacities and assess their alignment with the national policy framework. Secondary data from IBGE were used to complement the analysis of these plans, as IBGE data helped understand the implementation capacities of these states.

Although the original goal was to conduct a nationwide analysis covering all 26 states and the Federal District, by May 2024, only six states responded to our formal request to send us their DRM plans. As a result, this article analyzes the DRM plans and IBGE data of the following states: Acre, Pernambuco, Amazonas, Sergipe, Espírito Santo, and Santa Catarina. The next sections present the research framework and methods used to carry out this comparative analysis.

INSTITUTIONAL CAPACITIES FOR DISASTER RISK MANAGEMENT

Implementation takes place when a political decision, generally based on law (public policy), is materialized into products or services to transform intentions into results that benefit people (Souza, 2006; Lima and D'Ascenzi, 2013; Hammerschmid et al., 2018; Gasco-Hernandez et al., 2022). However, as political science literature points out, implementation is not a linear process (Gomes et al., 2019; Sager et al., 2024). It requires financial, human, and technological resources, as well as specific competencies, which constitute what is called institutional capacity — the ability that institutions have to mobilize resources and efforts to achieve collective interests (Cingolani, 2013; Martins, 2021; Lotta and Santos, 2024).

Clear definitions of institutional capacities in DRM remain missing (Oda et al., 2025). Based on a systematic scoping review of 74 scientific articles, published between 2012 and 2023, Oda et al. (2025) identified that studies on this topic have increased since the Covid-19 pandemic. Despite the growing number of studies, approaches, and types of capacity identified, there is no consensus on what institutional capacity means (Oda et al., 2025). Laeni et al. (2020), for instance, framed institutional capacity as the capacity of urban governance to enhance the qualities of places, and emphasized the importance of relational dimension and coordination of actors to improve urban governance. Fan et al. (2019) associate institutional capacity with the degree to which existing laws and regulations are effectively implemented, highlighting the role of normative structures and enforcement mechanisms. Hamin et al. (2018) conceptualize institutional capacity as the alignment between governmental and non-governmental forces, attributes, and resources capable of reducing impacts, mitigating damages, and ensuring future resilience. Taken together, these definitions show that institutional capacity, in the DRM field, has been predominantly understood in terms of its practical functionality.

Some studies in political science categorize institutional capacity according to different dimensions, such as coercive, administrative, etc. (Cingolani, 2013; Lotta and Santos, 2024). Pires and Gomide (2016) grouped them into two main dimensions: technical-administrative and political-relational. *Technical-administrative* capacity translates state action as a reflection of a technical body that, with human, organizational, financial, and technological resources, has administrative autonomy. The political-relational capacity refers to the ability of a particular institution or organization to interact, negotiate, and include different actors in political processes, aiming to build consensus and coalitions (Pires and Gomide, 2016; Gomes, 2019; Segatto et al., 2021). While technical-administrative is more associated with efficiency and effectiveness, the political-relational is associated with legitimacy, learning, and innovation (Pires and Gomide, 2016).

These two dimensions are fundamental for DRM policies, where multiple organizations and actors need to work together at different levels of government (national, state, and municipal) through DRM phases (prevention, mitigation, preparedness, response, and recovery). The significance of this topic has informed the development of various international frameworks, such as the Sendai Framework for Disaster Risk Reduction (2015-2030), which emphasizes the importance of strengthening capacities to ensure effective DRM (UNDRR, 2015). However, studies analyzing DRM institutional capacities at the subnational scale are scarce (Oda et al., 2025).

DATA AND METHODOLOGY

The analysis of the institutional capacity of state civil protection agencies was based on different sources: a) official websites of state governments; b) electronic contact in May 2024 with state civil protection and defense bodies (contact was made with all the state civil protection and defense bodies, except Rio Grande do Sul, which was facing the floods and landslides in May 2024); and

c) database of the State Basic Information Survey (Estadic) and the Municipal Basic Information Survey (Munic), both from the IBGE(2020; 2021). It is important to highlight that the data collected through electronic contact (b) were analyzed for the entire country, including states that did not provide information or did not have an established State Civil Protection and Defense Plan (PE-PDC).

Analysis of State Government Plans

This study employed content analysis to examine the states' civil defense plans. Content analysis is a tool for describing and interpreting messages, documents, and texts to identify patterns (Bardin, 2011; Caregnato and Mutti, 2006; Sampaio et al., 2022). The methodological procedures for content analysis were divided into four main steps: 1. Obtaining the analysis materials; 2. Exploratory reading; 3. Coding and grouping of categories; and 4. Interpretation and description of the results.

The State Civil Defense Plans (PE-PDC) were obtained from official state government websites and electronic contact with the civil protection bodies (step 1) in May 2024. Once the documents were gathered, an exploratory reading was conducted to understand their content structure and the general approaches of the plans (step 2). The documents analyzed did not follow a standardized structure or cover uniform topics.

The third step was the textual content segmented into "codes", textual units (words or expressions) representing the most relevant themes for analysis. These codes were grouped into two dimensions of institutional capacity: technical-administrative and political-relational capacities (Pires and Gomide, 2016).

The technical-administrative capacities, which relate to internal aspects of the institution, were identified by the presence of:

a. human resources and training;

b. financing;

c. scientific and technological resources;

d. organizational structures; and,

e. autonomy.

Political-relational capacities, which relate to external processes, were recognized by references to the state's intersectoral and inter-federative relations with other institutions or organizations.

This third step classified the information to facilitate the identification of patterns and recurring themes across the analyzed documents. The classification scheme was adapted by the authors based on Pires and Gomide (2016), and the codes created by the research team are presented in Table 1. These codes served as the textual elements for identifying the capacities of the states.

Finally, the predefined categories (technical-administrative and political-relational capacities) were interpreted and analyzed qualitatively to identify patterns and relationships in the state plans. They highlighted each state's institutional capacities and gaps concerning DRM. The contextual analysis also identified the DRM phases mentioned in the plans (prevention, mitigation, preparedness, response, and recovery).

Data analysis of Munic (IBGE)

The IBGE has conducted the Estadic survey in the 26 states to understand the country's realities and improve diverse public policies at the state level. The thematic sections of Estadic cover topics such as human resources, education, health, social assistance, environment, and agriculture. The most updated version of Estadic was published in 2021. Despite catastrophes in the Rio de Janeiro Mountain region (2011), Mariana (2015), and Brumadinho (2019) dam collapses, the DRM topic has never been addressed in Estadic.

I. Technical-Administrative Capacity
1.1 Human Resources and Training: *technicians; public servants; agents; response teams; duty shift schedule; agent training; volunteer training; simulation exercises.*
1.2 Financing: *fund allocation; emergency financial support; financial transfer; agreements; fund-to-fund transfer; federal assistance; Civil Protection Payment Card; funding sources; State Civil Protection and Defense Fund (FUNPDEC); "Program 2218 – Disaster Risk Management" (Multi-Year Plan - PPA 2020-2023); Investment Project Financing (IPF); Catastrophe Deferred Drawdown Option (Cat DDO); Program-for-Results (PforR).*
1.3 Scientific and technological resources: *monitoring system; alert issuance; technology; meteorological information system; hydrometeorological monitoring; implementation of a database; S2iD registry; risk maps; vulnerability map; Stormwater Master Plans; PMRR; State Vulnerability Atlas; municipal indicators; impact survey; damage assessment; risk scenario; technical document; State Plan for Disaster Risk Reduction.*
1.4 Organizational structures: *operationalization; internal protocols; Incident Command System; Operational Command System; situation room; management tool; emergency management tool; institutional arrangement.*
1.5 Autonomy: *resource mobilization; temporary shelters; vehicles; local availability; infrastructure.*
II. Political-Relational Capacity
1.1 Intersectoral: *Coordination system; Response system; Crisis cabinet; Coordinated Action Group; Joint work; Integrated actions; Coordination/to coordinate; Hub municipalities; Mayors; Chief Executive Officer; Municipal Coordinators; Mobilized Agencies; State Committee for Institutional Coordination in Civil Protection and Defense.*
1.2 Inter-federative: *Ministry of National Integration; State Secretariats; National Secretariat of Civil Protection and Defense; Municipal Health Department; State Institute for the Environment; National Water Agency (ANA); Regulatory Agency for Sanitation and Water Resources of the State of Espírito Santo (AGERH); Espírito Santo Sanitation Company (CESAN); Geological Survey of Brazil (CPRM); National Center for Monitoring and Early Warning of Natural Disasters (Cemaden); Center for Studies and Prevention of Flood-Related Disasters (CEPDEC); National Center for Risk and Disaster Management (Cenad); State Civil Protection and Defense Fund (FUNPDEC); State Fire Department; Municipal Civil Defense; Declaration of Emergency Situation; Declaration of State of Public Calamity; Duties; Responsibilities; Humanitarian aid; Logistical support; Assistance, "Program 2218 – Disaster Risk Management" (Multi-Year Plan - PPA 2020-2023); Investment Project Financing (IPF); Catastrophe Deferred Drawdown Option (Cat DDO); Program-for-Results (PforR).*

Table 1. Textual coding of the State Protection and Civil Defense Plans (PE-PDC) provided by Brazilian State Governments.
Source: Authors, 2026.

Conversely, Munic is a survey conducted with municipal governments to understand local realities and improve municipal public policies. Munic covers themes similar to Estadic's and includes others like DRM. Compared to Estadic, Munic has more questions, providing a detailed overview of municipal administrations. For this reason, some studies have already used Munic to monitor and evaluate public policies (Pacheco, 2020; Queiroz et al., 2023).

Brazil has 5,570 municipalities distributed across 26 states and one Federal District, organized into five regions (North, Northeast, Midwest, Southeast, and South). In this article, the municipal data from Munic were grouped by the six states analyzed. The following data from MUNIC were considered:

- existence of landslide and/or flood hazard maps in municipalities
- existence of contingency plans for floods and/or landslides in municipalities

Finally, the data from the *Digital Atlas of Disasters in Brazil* (2024) were used to support the analysis of the Munic data. The analysis period was 2012 to 2020[1].

RESULTS

Confusing terminologies, lack of plans and other gaps

The availability and accessibility of plans are important for transparency and can be essential for political-relational capacities in DRM. The search on the official websites of state governments in May 2024 identified that only three Brazilian states (11,5%) — Santa Catarina (SC), Espírito Santo

1. This data is available at: https://atlasdigital.mdr.gov.br/paginas/index.xhtml

(ES), and Sergipe (SE) — have and make available online a document titled Plano Estadual de Proteção e Defesa Civil (PE-PDC) (State Plan on Civil Protection and Defense). Contact was made electronically to check the existence of plans in the other 23 states. Fifteen governments (58%) did not respond to our email, while seven (27%) did: Acre (AC), Amazonas (AM), Paraíba (PB), Pernambuco (PE), Rio Grande do Norte (RN), Rondônia (RO), and Tocantins (TO).

Two types of responses were obtained from states. Four states (PB, RN, RO, and TO) responded in a “defensive” way. They affirmed they do not have a PE-PDC and cited that Article 7, Paragraph 2, Item II of the PNPDEC, “requires that the PE-PDC must be aligned with the PN-PDC within 24 months of the publication of the law”. In these cases, the absence of the National Plan was seen as an impediment to creating a State Plan. Moreover, two states (AC and PE) responded that they have a "contingency plan or technical manual," which they considered equivalent to the PE-PDC. Among the responding states, AM was the only one to provide a document titled PE-PDC via e-mail. However, according to Law No. 12,608, these two plans — contingency plan and civil defense plan — are not equivalent documents (Brasil, 2012; 2023), and require different technical-administrative and political-relational capacities:

> "VII - Contingency Plan: a set of procedures and actions planned to prevent or minimize the effects of a specific accident or disaster or to respond to emergencies, including the definition of human and material resources for prevention, preparation, response, and recovery. "
>
> "Art. 7º § 1 The State Civil Protection and Defense Plan will contain, at a minimum:
>
> I - identification of river basins at risk of disasters;
>
> II - guidelines for government action on civil protection and defense at the state level, particularly concerning the implementation of the meteorological, hydrological, and geological monitoring network for basins at risk of disaster."

These varying interpretations underscore how the national policy has generated multiple understandings, ultimately undermining the effectiveness of public policy in reducing disaster risks in the country. According to Matland (2009), the greater the ambiguity in the decision-making process, the greater the margin for discretionary action in implementing public policy. This phenomenon is evident in the case of the PNPDEC, where the regulatory gap allows for varied interpretations and different approaches across the country, leading to considerable differences in policy implementation.

Analyzing institutional capacities in States Plans

The content analysis of these State plans identified two groups of institutional capacities: technical-administrative and political-relational (Pires and Gomide, 2016). Technical-administrative capacities — such as human resources and training, financing, scientific and technological resources, organizational structures, and autonomy — are somewhat intertwined with political-relational capacities since these documents coordinate actions among various actors. Under the PNPDEC, the legal framework assigns state governments the ongoing responsibility to coordinate actions, linking different levels of government and sectors involved in DRM. While there are relatively well-defined guidelines for the political and relational coordination of state actions, the technical-administrative aspects, especially human and financial resources, receive little regulatory attention (Table 2). The same limitations were identified in the municipal civil defense units (Marchezini et al., 2025).

Capacities are often highlighted in PE-PDCs to support state-level action during emergencies. Human resources are explicitly mentioned in the formation of coordinated action groups during emergencies, where organizations are responsible for providing technicians to join response teams and establish duty rosters. Sergipe, Amazonas, Espírito Santo, and Santa Catarina consider training and capacity-building essential in disaster preparedness. Only Sergipe and Santa Catarina support the formation of the Community Civil Defense Nuclei (NUDEC), which can be an important political-relational capacity for DRM activities, especially for coordinating volunteers during disasters.

State	Document Title (year of publication, pages)	Is the document publicly available online?	I - Identifies hydrographic basins at risk of disasters?	II - Contains governmental action guidelines for civil protection and defense, and a network for meteorological, hydrological, and geological monitoring of risk-prone basins?
Acre (AC)	State Flood Contingency Plan (2024, 54 pages)	No	Yes	Yes
Amazonas (AM)	State Civil Protection and Defense Plan (2023, 80 pages)	No	Yes	Yes
Pernambuco (PE)	Technical Manual of Civil Protection and Defense for DRR related to Intense Rainfall (2024, 31 pages)	No	No	Yes
Sergipe (SE)	State Civil Protection and Defense Plan (2023, 190 pages)	Yes	Yes	Yes
Espírito Santo (ES)	State Civil Protection and Defense Plan (2020, 82 pages)	Yes	No	Yes
Santa Catarina (SC)	State Civil Protection and Defense Plan (2022, 44 pages)	Yes	Yes	Yes

Table 2. Documents used by the Brazilian states
Source: Authors, 2026.
Note: Acre (AC), Amazonas (AM), Pernambuco (PE), Sergipe (SE), Espírito Santo (ES), and Santa Catarina (SC) as State Civil Protection and Defense Plan (PE-PDC).

The financing of Civil Protection and Defense actions outlined in the PE-PDCs relies on multiple sources, including state, federal, and even international funds. The National Fund for Public Calamities (FUNCAP, Law No. 12.340/2010), which describes the transfer of financial resources for prevention, response, and recovery actions to state, federal district, and municipal agencies and entities (Brazil, 2010), was mentioned in the plans of SE, ES, and SC, despite FUNCAP has never been implemented (Damacena et al., 2023). To address this limitation, some states have created their own State Civil Protection and Defense Fund (FUNPDEC), as referenced in the plans of AM (Amazonas, 2022) and SC (Santa Catarina, 2014).

States adopt different scientific and technological systems for disaster monitoring and warning. All have hydrometeorological, fluviometric, and pluviometric networks, with alert and overflow thresholds. However, only Acre, Amazonas, and Sergipe mention establishing emergency monitoring rooms. The plans of Amazonas, Sergipe, and Espírito Santo mention the Public Alert Dissemination Interface (IDAP), a federal platform that sends alerts via SMS, subscription TV, and Google Alerts. Lastly, although Santa Catarina does not specify its monitoring tools, its PE-PDC is based on scientific data from the state's territory.

Regarding the organizational aspect, Amazonas and Sergipe adopt the Incident Command System (SCI), while Espírito Santo uses the Operations Command System (SCO). Although Acre does not mention a specific system, its contingency plan assigns responsibilities to different sectors of public administration, demonstrating a defined organizational structure. Santa Catarina, on the other hand, does not reference a command system but emphasizes the implementation of the State Plan for Disaster Risk Reduction (PERRD), which promotes municipal integration and includes an indicator system to monitor the state's progress concerning the Sendai Framework.

Intersectoral and inter-federative relations were the most prominent aspects of the plans. Except for SC, the other states detailed the distribution of responsibilities among various state sectors, but only in emergency situations. All states emphasized the joint efforts of organizations across different federal levels, with the Military Fire Department, the Ministry of Integration and Regional Development, the National Center for Monitoring and Early Warning of Natural Disasters (CEMADEN), the National Center for Risk and Disaster Management (CENAD), and the National Institute of Meteorology (INMET) being the most frequently mentioned organizations. This network of connections between State Civil Defense agencies and institutions, which is associated with political-relational capacities, is illustrated in Figure 1.

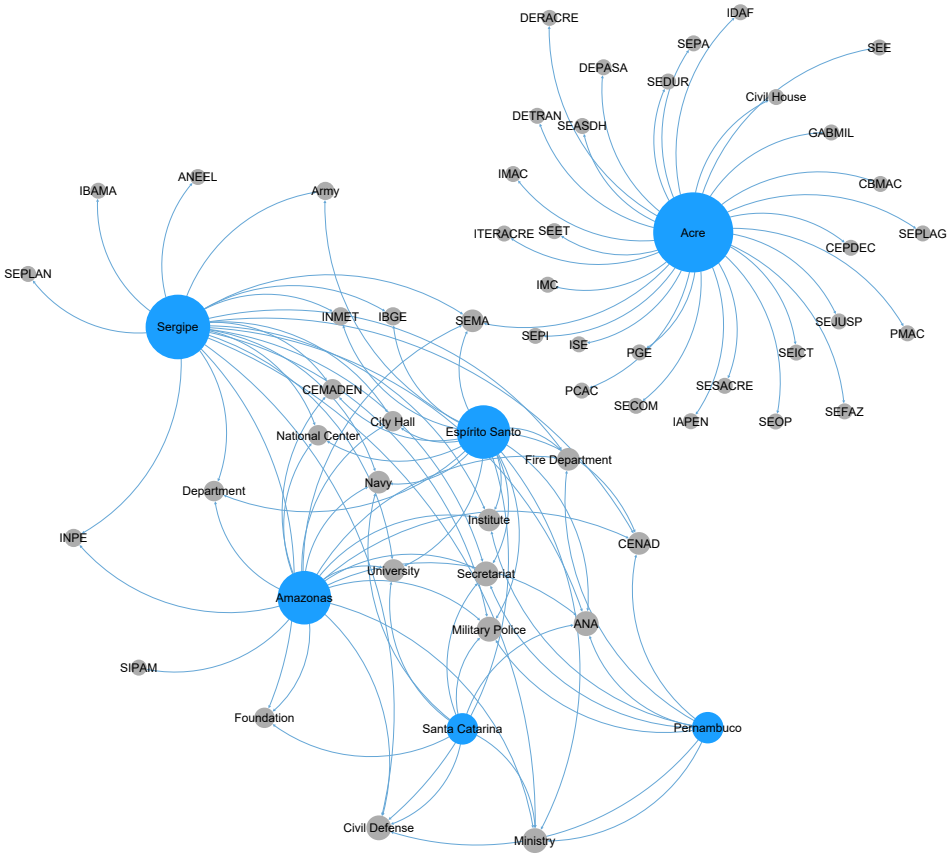

Figure I. Network diagram of connections between states and institutions
Source: Authors, 2026, based on the context analysis of state civil defense plans.
Note: The blue circles represent the states (AC, AM, PE, SE, ES, and SC), while the gray circles denote the institutions. The lines indicate direct operational, technical, or financial connections between states and institutions.

The states' plans focused on DRM activities in different ways (Table 3). The states of PE and SE distribute their responsibilities across DRM measures: prevention, mitigation, preparedness, response, and recovery. AM and ES distribute responsibilities between prevention, preparedness, and response measures.

DRR Phase	Analyzed Aspect	Document Information
Prevention and Mitigation	Identification of watersheds	Most states have identified their major basins, but do not consistently use them as a unit for disaster risk reduction (DRR) planning (AC, AM, PE ES, SC).
	Risk and vulnerability mapping	There is disaster recurrence mapping (AC, AM, PE, SE, ES, SC), and specific preventive plans (SE, SC).
	Mitigation infrastructure (drainage, containment, etc.)	Only SC has advanced drainage and slope stabilization policies; others lack planning (AC, AM, PE, ES).
Preparedness	Development of contingency plans	All states mentioned contingency plans. Some states (SC, AC, SE) have more detailed contingency plans, while others (ES, PE, AM) have more generic and less developed plans.
	Training and simulations	Training is conducted, but the frequency and integration with the population are inconsistent (AC, AM, PE, SE, ES, SC).
	Early warning systems	The IDAP platform is used for SMS and TV alerts (ES, SE), but other states (AC, AM, PE, SC) do not mention or specify its use.

Continúa en la siguiente página.

Continuación.

DRR Phase	Analyzed Aspect	Document Information
Response	Activation of the Incident Command System (ICS)	The ICS is activated in critical situations (SC, SE), but standardizing operations remains a challenge.
	Deployment of response teams	Civil Defense, Firefighters, and Armed Forces are mobilized according to the disaster scenario (AC, AM, PE, SE, ES, SC).
	Emergency assistance (shelter, health, logistics)	Shelters, humanitarian aid, and logistical support are mentioned, but they face operational challenges (AC, AM, PE, SE, ES, SC).
Recovery	Infrastructure rehabilitation	Infrastructure reconstruction is a priority, but there are delays and challenges in securing resources (AC, AM, PE, SE, ES, SC).
	Financial support for recovery	States receive federal and state support for recovery, but bureaucratic processes can slow down aid (AC, AM, PE, SE, ES, SC).
		Plan revisions occur, but there are not always structured mechanisms to learn from past events (AC, AM, PE, SE, ES, SC).

Table 3. Overview of Actions and Strategies by Phase of Disaster Risk Management (DRM) Identified in the State Plans
Source: Authors, 2026.

What the IBGE Data Say: technical-administrative capacities

The Munic survey covers issues related to hydrological disasters, mass movements, and droughts, but Munic and PNPDEC do not address forest fires, heatwaves, and other hazards.

Considering the responsibility of states to assist municipalities in civil protection and defense issues (supplementary material 1), the Munic information allows for a better understanding of two of the States' responsibilities in the PNPDEC: *identifying and mapping risk areas* and *supporting the preparation for contingency plans* (Figure 2).

The comparative analysis of state-level DRM instruments reveals marked heterogeneity in coverage across the six states examined. Espírito Santo and Santa Catarina have the highest levels of institutionalization, particularly in flood risk mapping (91% and 77% of their municipalities, respectively) and in flood contingency plans (71% and 45%). Espírito Santo also stands out for its landslide mapping (85%) and contingency planning for landslides (63%). Santa Catarina has the highest number of recorded disasters among the six states analyzed, totaling 2,559 occurrences in the period. Espírito Santo ranks third, with 649 records between 2012 and 2020. In other words, the two states that have developed the largest number of mapping and contingency planning instruments are also those that have recorded the highest incidence of disasters

In contrast, Acre and Sergipe consistently exhibit the lowest coverage of DRM instruments, with fewer than 30% of municipalities presenting flood contingency plans and fewer than 25% for landslide plans. These findings indicate significant institutional gaps that may limit these states' capacity to manage high-impact events. Both states also recorded the lowest number of disasters, with Sergipe registering 327 events and Acre 85 events. Amazonas, with 475 recorded disasters, shows relatively strong performance in flood risk mapping (74%) and drought contingency planning (50%), reflecting the regional relevance of these hazards, but remains deficient in the adoption of mitigation and risk reduction plans (11%). Pernambuco occupies an intermediate position, with moderate coverage in most DRM instruments but limited performance in risk reduction plans (24%); however, between 2012 and 2020, a total of 1,179 disasters were recorded within its territory.

Across all states, flood risk mapping shows broader coverage than landslide mapping, a pattern likely associated with the greater recurrence and visibility of flood events in national disaster records. Mitigation and risk reduction plans (PMRR) display the lowest adoption rates overall, with no state surpassing 41%, suggesting a prevailing focus on preparedness and response instruments over long-term vulnerability reduction strategies. These disparities underscore the need for targeted capacity-building initiatives and for enhancing the alignment of state-level instruments with the principles of integrated DRM.

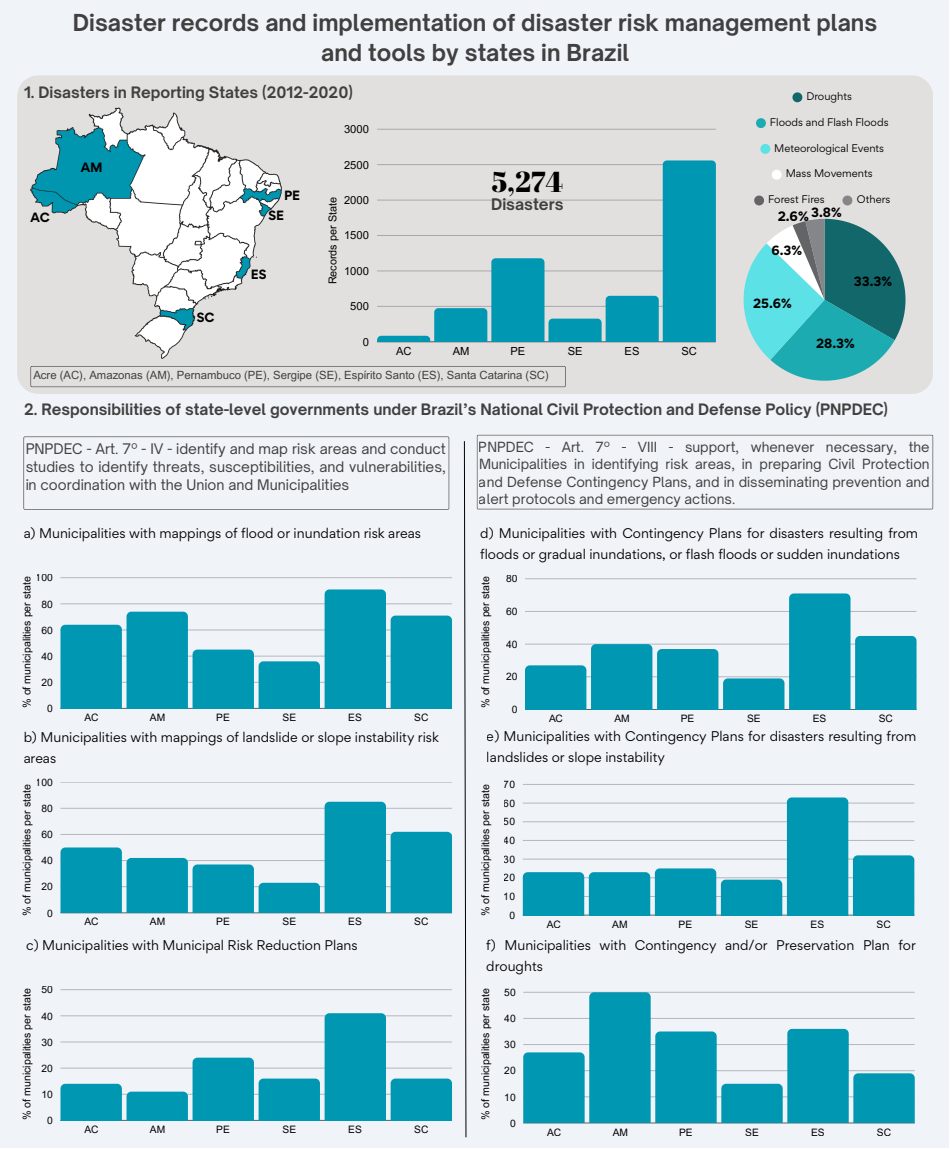

Figure 2. Disaster percentages by state (2012–2020) and municipal coverage of risk mapping, Risk Reduction Plans, and Contingency Plans in AM, AC, PE, SE, ES, and SC
Source: Authors, 2026, based on data from IBGE (2020) and Brasil (2024).

DISCUSSIONS AND CONCLUSIONS

Analyses of institutional capacities for DRM are scarce in disaster studies. In Africa, for example, Busell and Colligan (2013) identify that countries with larger-scale disasters tend to invest more in preparedness, as do countries with better economies. In Zambia, Libanda (2021) noted that, despite the existence of a government program focused on drought preparedness, institutional support capacity remains insufficient. The lack of local producer training and access to resilient technologies and seeds has weakened the country's institutional capacity to cope with droughts.

Similar challenges were reported in Europe and South America. Papathoma-Köhle et al. (2021) linked vulnerability scenarios in Greece, the United Kingdom, and Austria to each government's institutional capacity. The authors identified the need to enhance bureaucratic structures, encourage public participation, increase awareness and accountability among stakeholders, and ensure adequate funding for DRR measures. In South America, Rivas et al. (2024) observed that Chile's state capacity in DRM is characterized by a centralized and reactive approach, with a strong presence of the Armed Forces. Although the country has an interinstitutional coordination protocol for emergencies, the effectiveness of these actions is limited by administrative discontinuity and the lack of technical training for local authorities (Rivas et al., 2024).

While the aforementioned studies provide findings and insights on technical-administrative and political-relational capacities at the country level, few studies focus on subnational capacities

for DRM implementation, highlighting unequal capacities among states. This article contributes to this debate by focusing on the institutional capacities of state civil protection and defense agencies in Brazil. Despite 24,268 disasters reported in Brazil between 2012 and 2020, Estadic (IBGE, 2021) still does not address DRM. Data from MUNIC (IBGE, 2020) showed a high percentage of municipalities lacking DRM instruments in most Brazilian states, with the exception of Espírito Santo (ES) and Rio de Janeiro (RJ). Among Brazilian states, the Rio Grande do Sul (RS), where 96% of municipalities were affected by floods, flash floods, and landslides between April and May 2024, has more than half of its municipalities lacking DRM instruments such as risk mapping, contingency plans, and municipal risk reduction plans.

By May 2024, only six (23%) of Brazil's 26 states have civil defense plans. The comparative analysis of these documents reveals important insights regarding the technical-administrative and political-relational capacities of subnational governments in DRM.

Some states demonstrate distinct institutional efforts. For example, Amazonas has developed a territorial approach by appointing regional civil protection coordinators for each river basin, suggesting a decentralized strategy aligned with geographic and hydrological realities. Santa Catarina stands out for having defined its own set of indicators to monitor DRM implementation across municipalities, indicating a move toward internal evaluation and performance tracking. Meanwhile, Espírito Santo has structured its response actions based on the alert levels issued by Cemaden, showing an attempt to link early warning systems to operational planning.

Efforts to improve command and coordination mechanisms are also present. In Acre, Amazonas, Sergipe, and Espírito Santo, a Unified Command System is used in disaster response. This system is described as standardized, trained, and tested, indicating a proactive institutionalization of command structures. While the depth of implementation varies, all six states explicitly highlight the importance of intersectoral coordination, especially to ensure that different state departments are mobilized to support municipalities during the disaster response.

Additionally, the PNPDEC's hazard framing is limited, with hydrological disasters (such as floods) identified as the main state-level concern. Other recurrent hazards — such as droughts and forest fires — are largely absent from the national policy, despite their increasing frequency and impact in several regions (Anderson et al., 2019).

Regarding financing and resource issues, the plans require municipalities to request external resources (from the federal government and international sources). Generally, municipalities are assigned numerous responsibilities under the PNPDEC and in the state plans. While the state provides support for civil protection and defense activities, the state plans do not specify how state resources are allocated across different DRM phases. An example of how these challenges are addressed in the United States is the State Mitigation Planning Policy Guide, released by FEMA in 2022. FEMA addresses institutional capacities both in the technical-administrative and political-relational domains (FEMA, 2022).

Historically, most states in Brazil lacked a formal DRM plan, and there was considerable confusion regarding planning terminology, particularly the distinction between contingency plans and other strategic or operational planning instruments. Even among states that have developed some form of plan, many did not make these documents publicly available online, indicating limited transparency. Moreover, the existence of a plan does not ensure compliance with the responsibilities established under the National Policy, revealing substantial heterogeneity in state-level DRM practices.

The analysis also identified persistent weaknesses in the national institutional framework. Prior to the launch of the National Plan during the COP-30 (November, 2025) the PNPDEC provided limited guidance on the content, structure, and scope of state-level plans. This lack of detailed direction led to poor standardization of key concepts, terminology, and protocols across states, producing fragmented and inconsistent planning instruments.

The launch of the National Plan in November 2025 represents a first step toward addressing these institutional gaps. The new framework establishes standardized guidelines for the formulation of state-level plans and introduces indicators to monitor the implementation of national DRM objectives. However, the effectiveness of this advance depends critically on the institutional

capacity of states and their municipalities to design their own plans, implement them consistently, and monitor their execution over time.

In addition, the PN-PDC still exhibits important limitations. Notably, it does not recognize river basins as a unit of geographical analysis and planning, despite their central relevance for understanding and managing risks associated with floods, droughts, and other hydrometeorological hazards. The absence of this integrated territorial perspective may constrain intermunicipal and interstate coordination and limit the effectiveness of prevention and adaptation strategies grounded in shared physical and environmental processes.

This study analyzed the content of six State Civil Protection and Defense Plans (PE-PDC) in Brazil. However, the research faced some limitations. First, access to documents was limited to publicly available plans or those directly provided by state governments, which means the findings cannot be generalized to all Brazilian states. Second, the study relied on documentary analysis, without investigating how these plans are actually implemented in practice. Additionally, this research was conducted prior to the publication of the updated National Civil Protection and Defense Plan (PN-PDC) in November 2025. Once the new national plan is released, states will be expected to revise or create new versions of their PE-PDCs. This provides an important opportunity for future studies to revisit this analysis, comparing older and newer versions of the plans to assess changes in institutional capacity and policy orientation.

For future research, we recommend expanding the methodological approach to include interviews, surveys, and other qualitative techniques in order to gain a deeper understanding of the institutional and organizational capacities behind state-level DRM. It is also important to advance the development of state-level indicators that can capture these capacities more systematically. In this regard, we suggest that IBGE incorporate DRM-related questions into the Estadic survey, as it already does in the Munic/IBGE, enabling regular monitoring of the role states play in implementing the PNPDEC. Furthermore, because the current IBGE data allow monitoring only a limited set of state capacities, we recommend that future editions of both Estadic and Munic also include categories used in our comparative analysis. This would make it possible to monitor and evaluate DRM more systematically.

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