

Defense Diplomacy cooperation mechanisms as vectors of resilience to extreme climate events

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Executive Summary

The growing intensity of extreme climate events has generated cross-border effects that no state can address effectively on its own. Brazil's strategic environment is particularly exposed: in several areas, the recurrence of natural disasters has begun to outpace the recovery capacity of national infrastructure and response systems, increasing risks to regional security and stability and expanding the demands placed on the defense sector. Against this backdrop, this paper asks how Brazil's defense diplomacy cooperation mechanisms can be strengthened to enhance resilience to extreme climate events. It examines existing cooperation mechanisms and their potential to coordinate military capabilities such as rapid deployment, engineering support, secure communications, and search-and-rescue operations. Drawing on selected literature, the paper argues that these mechanisms remain underused because of structural gaps, including the lack of continuous climate-data sharing, misalignment between military readiness and diplomatic decision-making, delays in post-disaster needs assessment, and the absence of common doctrinal standards, which constrains interoperability. The paper then proposes recommendations to strengthen regional cooperation and collective resilience in the face of extreme climate events. Adopting these measures would improve regional readiness and help reshape international cooperation around a security architecture better suited to the climate challenges of the twenty-first century.

Keywords: climate change; climate resilience; defense diplomacy; international cooperation mechanisms.

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1 PROBLEM STATEMENT AND IMPLICATIONS FOR DEFENSE

The increasing frequency and intensity of extreme climate events has become one of the main contemporary threats to regional and global stability, especially given the asymmetric nature of climate externalities. The 2022 Global Assessment Report (GAR 2022) (UNDRR, 2022) and the IPCC Sixth Assessment Report (2022) identify South America and the South Atlantic as climate vulnerability hotspots, where the intensity of events already exceeds the adaptive capacity of several national infrastructures. At the same time, the Regional Risk Assessment Report of the United Nations Office for Disaster Risk Reduction (UNDRR) notes that Latin America and the Caribbean face difficulties in delivering integrated and coordinated responses, particularly in the initial phase, when rapid decisions can prevent loss of life and permanent damage (UNDRR, 2024).

From a theoretical perspective, this study adopts the concept of resilience as the capacity of a state or regional system to absorb shocks, recover critical functions, and adapt to new challenges (Fjäder, 2014; National Research Council, 2012). It also engages with the literature on risk governance, which emphasizes the need for rapid, evidence-based decision-making processes to address highly complex crises (IRGC, 2005). These frameworks provide the basis for the analyses developed in the following sections. As a research method, the study used desk research.

1.1 THE TRANSBOUNDARY NATURE

Contemporary climate disasters do not respect established political borders, challenging traditional understandings of territorial sovereignty in crisis management. Storms, floods, and droughts can affect multiple countries at the same time and produce cascading impacts across trade routes, migration flows, energy transmission networks, and shared river basins (UNDRR, 2022; IPCC, 2022).

The Sendai Framework¹ emphasizes that the transboundary nature of these risks makes systemic coordination among states and multilateral organizations indispensable (UNDRR, 2015). In the same vein, GAR 2022 shows that interdependence among ports, logistics systems,

¹ The Sendai Framework for Disaster Risk Reduction 2015–2030 was adopted at the Third UN World Conference on Disaster Risk Reduction, held in Japan. It is a voluntary, non-binding agreement that sets out seven global targets to substantially reduce disaster mortality, the number of people affected, and disaster-related economic losses by 2030.

and energy corridors amplifies cascading effects, even when the climate event occurs outside the territory directly affected (UNDRR, 2022). As a result, a localized disaster can quickly become a regional security problem, given the vulnerability of economies and critical infrastructure.

Beyond their broader geographic reach, extreme events have also become more frequent and more complex. The IPCC introduces the concept of compound events, defined as situations in which multiple climate variables (such as a severe drought followed by heatwaves) interact, or in which disasters occur in sequence before recovery from the previous event is complete (IPCC, 2022). This situation generates cascading crises that pose distinct challenges to states:

- The intensity of these events exceeds national response capacity: The scale of extreme events often surpasses the logistical and human resources available to any single state. This creates an asymmetry between the destruction caused and the assets available for response (transport aircraft, field hospitals, engineering capabilities), requiring pre-established mutual cooperation mechanisms to prevent humanitarian collapse.
- Simultaneity makes it difficult to prioritize efforts: In a compound-event scenario, the coordinator of response operations faces the dilemma of allocating scarce resources across multiple simultaneous theaters of operation. The lack of sufficient means to address all fronts creates chaos, in which the decision to prioritize one area may mean leaving another unattended.
- Situational uncertainty challenges traditional protocols: Rigid bureaucratic protocols, designed for predictable scenarios, become obsolete in the face of climate unpredictability. Infrastructure designed on the basis of stationary historical series may fail abruptly, requiring an adaptive-management doctrine in which tactical autonomy and logistical flexibility prevail over hierarchical rigidity (IPCC, 2022; UNDRR, 2022).

In this context, multilateral instruments need to be adjusted. Political willingness to cooperate is not enough; responses must also be rapid, flexible, and interoperable. This requires the establishment of humanitarian logistics corridors² and legal standardization allowing support forces to move swiftly across borders, removing bureaucratic bottlenecks at the critical moment of response (UNDRR, 2022).

² Although the term humanitarian logistics corridors is not used literally in the reference, it corresponds to the operationalization of the transboundary risk governance advocated by UNDRR (2022). According to GAR 2022, the systemic nature of climate disasters requires logistics infrastructure and assistance flows to be treated as interconnected networks, calling for the removal of bureaucratic bottlenecks and the assurance of interoperability so that relief can cross national borders without technical or legal interruption.

1.2 THE EMPLOYMENT OF THE ARMED FORCES AND DEFENSE DIPLOMACY AS A VECTOR OF RESILIENCE

The Armed Forces are being called upon to play an increasingly prominent role in climate disasters because of their distinctive capabilities:

- rapid mobilization;
- heavy logistics (vehicles, aircraft, ships, etc.);
- engineering and reconstruction;
- secure communications (command and control);
- search-and-rescue operations (SAR); and
- field medical support.

UNDRR (2022) recognizes that, in major disasters, the employment of the Armed Forces is important because of their distinctive capabilities in logistics, engineering, and rapid projection. However, for their employment to be effective and legally appropriate, it must take place in close coordination with civilian agencies and the relevant diplomatic mechanisms. In addition, the specialized literature points to important limits on the use of military forces in humanitarian operations, since the systematic militarization of response efforts can create structural dependency and shift responsibilities that should remain under civilian authority (Hofmann; Hudson, 2009; OCHA, 2007). The employment of military forces in disasters therefore requires complex interagency planning, an aspect that falls outside the scope of this paper.

Once the role of the Armed Forces in extreme events has been established, together with the premise that these threats are transboundary in nature, defense diplomacy emerges not merely as a tool of soft power,³ but as a vital instrument for implementing state security policy (Drab, 2018) and, indeed, as a vector of resilience. Unlike traditional diplomacy, which is centered on negotiation, the defense dimension brings expeditionary logistics, engineering, and health capabilities that are crucial when response time determines the safeguarding of lives.

In Latin America, the worsening of these threats requires a shift from isolated responses to integrated platforms. The 2024 Regional Assessment Report on Disaster Risk (RAR24)⁴

³ The concept of soft power, coined by Joseph Nye Jr. (2004), refers to a state's ability to influence the behavior of others and achieve favorable outcomes through cooperation and attraction, rather than coercion or payment.

⁴ The Regional Assessment Report on Disaster Risk Reduction in Latin America and the Caribbean 2024 (RAR24) is a UNDRR report that analyzes trends, vulnerabilities, and institutional capacities related to disaster risk reduction in Latin America and the Caribbean.

shows that the frequency and magnitude of hydrometeorological events (extreme rainfall and droughts) are pushing national civil-protection systems to the breaking point, requiring coordinated supranational strategies (UNDRR, 2024). The effectiveness of this military-civil cooperation has been validated by recent events that exposed the saturation of local response capacities:

- **Transnational Firefighting (Chile Case):** The response to the 2023 wildfires in Chile illustrates the deployment of military assets abroad for disaster response. Overwhelmed by the simultaneity of fire outbreaks, the Chilean government activated its bilateral cooperation mechanism with Brazil. In response, the Brazilian Air Force (FAB) projected aerospace power by deploying C-130 Hercules aircraft equipped with Modular Airborne Fire Fighting Systems (MAFFS) (Brasil, 2023a). This episode shows how defense diplomacy enables the pooling and sharing of high-cost assets,⁵ mitigating crises that a single country would struggle to control on its own.

- **Infrastructure Collapse and Specialized Rescue (Brumadinho Case):** The collapse of the dam in Brumadinho in 2019 highlighted the important role of the Armed Forces in scenarios of total destruction. The rapid mobilization of troops helped stabilize the area and support the search for victims on unstable terrain, with international cooperation from an Israeli rescue brigade that brought advanced search-and-rescue technologies (drones, ground-penetrating radar, cell-phone detectors, etc.). Official communications from the Government of Minas Gerais indicate that the operation was the largest of its kind in Brazil and involved integrated action among multiple agencies and foreign teams, underscoring the importance of interagency coordination and standardized operating procedures in disaster scenarios (Minas Gerais, 2019a; Minas Gerais, 2019b).

- **Extreme Hydrometeorological Events (Rio Grande do Sul Case):** The 2024 floods in Rio Grande do Sul underscored the need for regional cooperation. Given the scale of the disaster, support from neighboring countries was mobilized: Uruguay sent a helicopter and specialized teams for rescue operations, while Argentina offered logistical support, water purifiers, and water-treatment tablets (Brasil, 2024a; Brasil, 2024b). The case reinforces the

⁵ The term pooling and sharing refers to a multilateral cooperation strategy, adopted primarily within the framework of the European Union's Common Security and Defence Policy. The concept aims to increase military efficiency and economic sustainability by pooling financial or material resources to acquire joint capabilities and by sharing existing infrastructure, logistics, or equipment, thereby avoiding the duplication of efforts among nations.

argument that, in extreme climate events, the border ceases to function as a line of separation and becomes a zone of mutual logistical support. Studies on civil-military coordination indicate that, in large-scale disasters, operational borders tend to become humanitarian corridors, provided that prior authorization protocols are in place (OCHA, 2007; United States, 2019).

In this context, defense diplomacy serves as the structuring axis that connects these military capabilities to international legal frameworks. By converting operational readiness into effective disaster-response action, it strengthens a regional security architecture aligned with the risk-governance standards advocated in climate studies (Drab, 2018; IPCC, 2022; UNDRR, 2024).

In the Brazilian case, this role takes on additional relevance because the country participates in multiple security cooperation mechanisms, enabling the coordinated use of joint capabilities with neighboring countries and Lusophone partners, a topic examined in greater depth in the following section.

1.3 MULTILATERAL COOPERATION MECHANISMS IN WHICH BRAZIL TAKES PART

In 2012, following a study by the competent working group, the General Assembly of the Organization of American States (OAS) approved the existing mechanisms for disaster prevention and response and humanitarian assistance among member states through resolution AG/RES. 2750 (OEA, 2012). Later, in 2024, the Inter-American Defense Board (IADB) presented to the Committee on Hemispheric Security (CHS) the Cooperation Mechanism for Disaster Cases (MECODE-CMDA), linked to the Conference of Defense Ministers of the Americas (CDMA). The IADB is currently conducting exercises entitled MECODEX,⁶ aimed at testing and improving that mechanism (JID, 2024).

Outside the OAS framework, Brazil participates in regional forums and mechanisms that also address cooperation in cases of natural disasters with countries in its strategic environment. The South Atlantic Peace and Cooperation Zone (ZOPACAS), through the 2023 Mindelo Action Plan, promotes South-South cooperation related to logistics planning and the effective participation of the Armed Forces in natural disaster response (Brasil, 2023b). In the

⁶ The 2026 edition of the MECODEX exercise will be held at the Brazilian Superior School of Defense in May 2026. The exercise simulates the coordination of international humanitarian assistance in response to catastrophic disasters. The event aims to validate the IADB Cooperation Mechanism by training civil-military interoperability among countries of the Americas.

case of the Community of Portuguese Language Countries (CPLP), the FELINO military exercises are designed to train the interoperability of the Armed Forces of member states in Humanitarian Assistance (HA) scenarios (CPLP, 2011). In addition to these arrangements, Brazil participates in several bilateral cooperation mechanisms with friendly nations, developed through defense diplomacy.

In the context of climate change and its growing impacts on human security, reference should be made to the emergence of Humanitarian Assistance (HA) and Disaster Relief (DR) operations. These operations, often conducted by Armed Forces in coordination with civilian actors, are intended to provide immediate assistance and alleviate human suffering in the face of natural disasters or humanitarian crises. They complement the work of local and international authorities, with a focus on saving lives and ensuring access to essential goods (United States, 2019).

1.4 GAPS IDENTIFIED IN EXISTING MECHANISMS

The gaps described below were identified through a qualitative approach, based on documentary analysis of the main cooperation mechanisms to which Brazil is a party (OAS, IADB, ZOPACAS, and CPLP), a literature review, and the use of a comparative method between their formal guidelines and the practices observed in real disaster events.

1.4.1 Lack of Continuous Climate-Data Sharing among Member States

The absence of a unified regional platform for continuous data sharing undermines risk anticipation, makes it harder to align responses among states, impairs the proper sizing of required assistance, and prevents the development of evidence-based situational models, a key element of complex risk governance (IRGC, 2005). An effective early-warning system depends on integrated, real-time data, a requirement repeatedly emphasized by the IPCC (2022) and UNDRR (2015), which identify information interoperability as an essential condition for reducing loss of life, optimizing resources, and strengthening regional resilience to extreme climate events.

1.4.2 Asynchrony between Operational Readiness and Diplomatic Procedures (state bureaucracy)

Although instruments such as MECODE-CMDA (JID, 2024) and the Mindelo Action Plan (Brasil, 2023b) have been politically approved, their effectiveness is often undermined by

a critical bottleneck: diplomatic and state-bureaucratic timelines do not keep pace with the timeline of disaster.

This gap appears in the mismatch between military mobilization capacity and the speed of political authorization:

- **The sovereignty bottleneck:** The entry of foreign military assets, even when unarmed and equipped solely for humanitarian assistance, touches on sensitivities related to national sovereignty, in accordance with UN General Assembly Resolution 46/182, which requires the express consent of the affected state for the provision of assistance (United Nations, 1991). In the absence of pre-ratified expedited transit protocols, the entry of a relief aircraft requires the same diplomatic and customs authorizations as an ordinary state flight. This involves procedures among Ministries of Defense, Foreign Ministries, and, at times, legislative approval, processes that may take days. Humanitarian relief literature indicates that administrative delays are among the main causes of inefficiency in international operations (IFRC, 2011).

- **Degradation of readiness:** The Armed Forces are trained to respond within hours. However, if overflight or landing authorization takes 48 hours to be issued, the victims' golden window of survival, defined by INSARAG guidelines (2020) as the first 72 hours, may be lost. This creates a paradox in which the asset exists and is ready but remains inoperative in its country of origin because of administrative barriers, turning a potential rescue mission into a delayed body-recovery mission.

1.4.3 Delay in Defining the Type of Assistance Needed after the Disaster

The absence of standardized rapid needs-assessment protocols causes affected states to:

- take longer to identify their greatest vulnerabilities;
- request assistance that is generic, inadequate, or insufficient; and
- receive assistance that does not match emergency needs.

UNDRR (2024) identifies this gap as one of the main causes of inefficiency in international operations.

1.4.4 Lack of doctrinal standardization or insufficiency of existing doctrines to address complex and simultaneous scenarios

The lack of doctrinal standardization among the cooperation mechanisms to which Brazil is a party constitutes one of the main barriers to the effectiveness of Humanitarian Assistance and Disaster Relief (HA/DR) operations. Studies on multinational interoperability show that, without common standards for command and control, communications, and civil-military coordination, operational efficiency is reduced, especially in crisis environments marked by simultaneity and the need for rapid responses (IFRC, 2011; OCHA, 2007).

In the context of the OAS, ZOPACAS, and CPLP, differences among national doctrines create friction in critical areas of combined operations, including command and control (C2), search-and-rescue (SAR) protocols, military engineering, evacuations and humanitarian operations, as well as the employment of naval and air assets.

This operational heterogeneity undermines real-time coordination and reduces the predictability of joint action, both of which are vital in large-scale disaster scenarios. The FELINO Exercises, conducted by the CPLP, identify the need to harmonize procedures, standardize terminology, and align interagency protocols, showing that significant interoperability gaps persist even within a relatively cohesive group of Lusophone countries (CPLP, 2011; CPLP, 2024).

2 RECOMMENDATIONS

Considering the gaps identified in existing multilateral cooperation mechanisms, as well as the sample of literature examined through desk research, the following strategic actions are proposed to improve these mechanisms so that they can operate more efficiently as effective vectors of climate resilience:

- Implementation of Expedited Transit Protocols

Action: Establish prior agreements within the OAS, CPLP, and ZOPACAS that, upon the official declaration of a state of public calamity by a member state, activate priority diplomatic channels for the automatic granting of overflight, landing, and customs-transit authorizations for military assets registered as humanitarian assets, waiving ordinary procedures during the first 48 hours.

Justification: This measure mitigates excessive delays in the activation of international instruments caused by state bureaucracy. Removing conventional procedures during the critical

response phase prevents the Armed Forces' rapid-response capacity from being neutralized by administrative delays, ensuring immediate access to the disaster zone (OEA, 2012; Brasil, 2023b).

- Establishment of a Climate Data Fusion Center

Action: Establish, under the coordination of the Inter-American Defense Board (IADB), a hemispheric monitoring dashboard fed in real time by the meteorological and hydrographic services of the Armed Forces in the region, focused on predictive intelligence for the preventive activation of MECODE-CMDA.

Justification: This recommendation seeks to address the lack of continuous climate-data sharing among member states. The integration of real-time information enables risk anticipation, the pre-positioning of logistical assets, and the transition from a predominantly reactive model to proactive management, in line with international guidelines on early-warning systems (IPCC, 2022; JID, 2024; UNDRR, 2015). Established experiences, such as the Pacific Disaster Center, demonstrate that data-fusion platforms capable of integrating monitoring, forecasting, and preventive activation at the multinational level substantially enhance the effectiveness of regional responses (PDC, 2024).

- Logistical Operationalization of Cooperation Mechanisms (Capability Inventory)

Action: Incorporate a physical inventory of capabilities into the Action Plans of all mechanisms analyzed (OAS, ZOPACAS, and CPLP), creating a registry of “dual-use assets” (such as dock landing ships, field hospitals, and engineering units) available among member states, with clearly defined transport capacity, operational autonomy, and mobilization timelines.

Justification: Prior knowledge of available assets helps compensate for the asymmetry between the destruction caused and the response capacity of the affected nation. Consolidating this information prevents duplication of effort and makes it possible to rapidly address gaps in local infrastructure, promoting regional autonomy and coordination of assets (OEA, 2012; Brasil, 2023b). The European Union uses pooling and sharing models to optimize the employment of assets in humanitarian crises, reducing redundancies and expanding regional coverage (EDA, 2011).

- Doctrinal Harmonization and Interoperability

Action: Direct the FELINO Exercises primarily toward more complex climate-event scenarios, focusing on the unification of Command and Control (C2) protocols and guidelines for humanitarian employment, so as to promote the continuous improvement of the document “Mechanism for the Actions of the Armed Forces of the CPLP for Mutual Cooperation in Disaster Situations” (CPLP, 2021). This action may also be implemented in the other mechanisms.

Justification: Doctrinal diversity creates operational friction and hinders interoperability among the Armed Forces. The standardization of procedures removes linguistic and technical barriers, ensuring that troops from different countries operate cohesively and safely in chaotic environments. This recommendation is particularly important in compound-event scenarios, where the absence of such standardization increases operational uncertainty and reduces the efficiency of combined employment of assets. International civil-military coordination guidelines emphasize that standardized protocols reduce ambiguity and increase operational safety in multi-actor environments (OCHA, 2007).

- Establishment of Rapid Damage Assessment (RDA) teams

Action: Form teams of military and civilian specialists ready to deploy within 24 hours of the event, with the specific mission of conducting on-site needs assessments, producing accurate situational diagnoses, and guiding technical requests for international assistance.

Justification: This measure addresses delays and imprecision in defining the type of assistance needed after a disaster. An accurate technical diagnosis prevents the delivery of inadequate or generic supplies, optimizes transport logistics, and ensures that external assistance effectively meets the population’s emergency needs (UNDRR, 2024).

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