



Patterns of government disaster policy response in Peru

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ABSTRACT

Our study introduces a new quantitative dataset of government disaster responses for 183 disasters in Peru from 1900 to 2020. We examine disaster responses in the form of *relocation* of affected individuals, *restrictions* on movement, *reconstruction* of damaged areas, and *regulations* of third-party disaster relief. Prior analyses of large earthquakes and El Niño events in Peru reveal that government response to hazards shapes the outcomes for social, conflict, and economic outcomes. Our dataset contributes quantitative coding of a much larger sample of disasters to identify useful patterns in disaster response. We show that the Peruvian government is the most active actor in disaster response, although international organizations and non-governmental organizations are active in nearly a third of all disasters. Restrictions and relocation of affected populations occur, but this tends to be temporary, rather than long-term solutions to mitigate risks from future disasters. Relocation of affected people occurs more often for floods and landslides, while regulation of third-party activities occurs more frequently with floods and extreme temperature events; other disaster response policies do not vary across disaster types. Disaster responses have also shifted over time, with the government providing more funds for post-disaster reconstruction and coordinating with outside aid groups more actively in recent decades. The results demonstrate the feasibility and importance of tracking patterns of response across hazard events to fully understand the role of government in disaster response. Our larger data collection project will provide similar data for all countries over time, which will help us situate Peru's patterns of disaster response in the larger disaster management landscape and understand how government policy choices influence political violence, migration, and other political dynamics.

1. Introduction

Natural hazards are becoming more frequent and intense and will likely become even more destructive as the climate changes, contributing to forced environmental migration and civil conflicts (Pachauri et al., 2014). Governmental policy responses are particularly important for shaping the relationship between hazards and conflict (Mitchell & Pizzi, 2021). Policies such as relocation or resettlement of affected individuals and communities, restrictions on disaster affected populations, or restrictions on third party assistance can increase conflict risks. In contrast, policies such as reconstruction of affected areas, relocation with adequate financial provisions, and government cooperation with domestic and international disaster aid groups can increase support for the government and generate cooperation between groups in society.

How do governments respond to natural disasters? Even though there are a wide range of post-disaster policy options, we do not know what policies are most frequently adopted or when governments adopt

some policies over others. If we are to understand the effects of policies on disaster outcomes, such as conflict, environmental migration, inequality, etc., we must first understand the types of policies that governments adopt. In this study, we focus on disaster response in Peru, one of the most disaster affected countries in the world. We draw lessons about the government's response patterns from an original quantitative coding and analysis of 183 disasters in Peru from 1900 to 2020. Our paper contributes to the literature on disasters and politics by demonstrating the feasibility of quantitatively coding different types of government disaster responses. We explore the extent to which the observations from qualitative research of major disasters are part of the broader pattern of disaster response in Peru.

We find that the Peruvian government is the most active actor in immediate disaster response, although long-term reconstruction is less common. Non-governmental organizations are more active in Peruvian disaster response (38 % of cases) than international organizations (24 %). Leaders visit affected areas in close to half of all cases (46 %).

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Restrictions and relocation of affected populations tend to be temporary, not long-term, and are more likely to occur after floods and landslides than other hazard types. Regulation of third-party activities occurs more frequently with floods and extreme temperature events, while other disaster response policies do not vary across disaster types. Disaster responses have also shifted over time, with the government providing more funds for post-disaster reconstruction and coordinating with outside aid groups more actively in recent decades. We show what we can discern about the government's responses to disasters from our newly collected quantitative data, which will help us code this behavior across a larger number of countries, and connect it to migration, political violence, and other disaster consequences.

2. The case of Peru

Our study is exploratory and meant to uncover previously unobserved patterns in disaster response, which makes Peru an excellent country to study. Peru is an extreme case in the sense that, among South American countries, it has the highest number of casualties and the most people affected by natural hazards on a per capita basis (Parodi et al., 2021). Extreme cases can be especially useful for open-ended explorations of the relationship between two variables (e.g., disasters and violence) or, as in this case, for probing the effects of explanatory variables (e.g., disasters and government response) more generally (Seawright & Gerring, 2008). Peru has a high number of hazard events, a history of political turbulence and violence, and variation in disaster response actors, including local governments, the central government under various democratic and authoritarian administrations, civil society, and international actors. This variation and high frequency of events allow us to explore variation in policy choices within a specific country context. We use Peru as a first case to explore our new dataset, assess the feasibility of collecting quantitative data on disaster response, and assess previously unexplored patterns in responses. Our larger project builds on this first country case and codes data across the world for comparative purposes.

In the post-Cold War era, Peru ranks 20th globally in terms of numbers of disasters experienced, with many of those being rapid onset types (e.g., earthquakes, floods, landslides, epidemics).¹ Peru also ranks 13th in terms of risk according to the World Risk Index, which incorporates measures of both exposure and vulnerability.² Considering disaster data years 1913–2020 in Central and South America, Peru ranks 3rd for disaster frequency (363) behind Mexico (449) and Brazil (421). This is not surprising given Peru's geographical position at the boundary of major tectonic plates and periodic hydrometeorological events associated with El Niño and La Niña phenomena. Climate change only exacerbates Peru's vulnerabilities (Bruni, 2015). The country depends on runoff from glaciers that are melting quickly, and conflict over access to water may be a concern for the future (Yli-Hemminki, 2022). The risk of avalanches and glacial lake outburst floods also increases as glaciers become less stable and recede (Carey, 2005).

In addition to frequent disasters, Peru has had a few catastrophes. The worst disaster event in Peru's history was a poorly managed earthquake and avalanche. On May 31, 1970, a 7.7 magnitude earthquake struck the Cordillera Blanca region and triggered an avalanche that buried the provincial capital of Yungay. The earthquake and avalanche destroyed around 86 % of the structures in the region (including 800,000 + homes), killed nearly 70,000 people, and injured 150,000 (Carey, 2005; Sokefeld, 2012). Many of Peru's disasters are associated with the El Niño weather phenomenon. These periodic warm waters in the Pacific shift weather patterns over Peru, increasing the likelihood of floods and droughts. For example, the 1997–98 El Niño

contributed to a series of floods and mudslides caused by excessive rainfall, which affected multiple cities (Cuzco, Lima, Ica, Tumbes), killed 518 people, affected close to 600,000 people, and caused millions of dollars in infrastructure and agricultural losses (Bruni, 2015). This combination of types and size of hazard events allows us to see a range of response needs and choices within the country.

2.1. Politics in Peru

Political factors are important for shaping the regime's policy choices. Peru has experienced varying degrees of democracy, forced migration, and civil conflict violence over time. A civil war fought between the government and two insurgent groups, the *Sendero Luminoso* (Shining Path) and the smaller *Movimiento Revolucionario Tupac Amaru* (1980 to 2000) resulted in nearly 70,000 deaths (Fielding & Shortland, 2012, p. 847). The Shining Path began as a Maoist student organization that operated in the rural highlands of Ayacucho department, while the MRTA evolved from a separate Marxist-Leninist revolutionary movement formed in 1983.³ The civil war was primarily fought in rural areas, but sometimes involved fighting in cities, and engaged both government and paramilitary forces. The war also displaced at least 430,000 people, with two large waves of displacement in 1982–84 and 1988–92 (Segura, 2012). Even after the main conflict with the Shining Path ended, perceptions of violent crime remained high into the mid-2000s (McClintock, 2006).

Politics in Peru over the last several decades have been turbulent, creating strains in state-society relations. In the early 1980s, there was a debt crisis, chronic inflation, an intensification of the Shining Path's brutal guerrilla war against the state, and widespread flooding and drought due to the 1982–83 El Niño. Military dictatorship ended with the 1980 elections. Alan Garcia became president following the 1985 elections in the first peaceful transfer of power for nearly 40 years. Alberto Fujimori won the 1990 election, but dissolved Congress in a self-coup (*autogolpe*) and eliminated the constitution just two years later. While he succeeded in slowing rampant inflation and capturing Abimael Guzmán, the leader of the Shining Path, the Fujimori regime also committed numerous atrocities and failed to reduce high rates of poverty and inequality. Fujimori pushed for decentralization of government services, including disaster relief, which created long-run inefficiencies in disaster response. After a bribery scandal, Fujimori ultimately left Peru for self-imposed exile in Japan before being arrested in Chile in 2005 and extradited to face trial (McClintock, 2006).

The following years saw restored democracy, but in a weakened state. Post-Fujimori Peru suffered high inequality in terms of both economic opportunity and access to justice, a weak and corrupt state, and a weak party system (Levitsky, 2018). Political leaders tend to be outsiders and have short careers. Political parties are similarly weak, and there is always concern that the military will try to interfere in politics once again. Corruption remains extremely problematic; the Odebrecht scandal caught four presidents (Kuczynski, Toledo, Garcia, and Humala) and an opposition leader (Keiko Fujimori) accepting some \$26 million in bribes. According to the Worldwide Governance Indicators, Peru's current score on control of corruption is the lowest since data collection started in 1996.⁴ The ongoing unrest of fall 2022 and into 2023 have also been blamed on corruption (Tegel, 2023). Partly as a result, Peru suffers disaffection with democracy and low trust in government.

The Truth and Reconciliation Commission (2001–2003) addressed some of the key injustices of the Fujimori regime, but reform of the justice and security systems remains incomplete (Balasco, 2016). One legacy of Fujimori's use of police to harass political opponents and efforts to combat terrorism with heavy handed tactics that often directly harmed poor, marginalized, and indigenous populations is distrust of the

¹ This data (1990–2020) is taken from the EM-DAT International Disasters Dataset; <https://www.emdat.be/>.

² See <https://weltrisikobericht.de/en/> for the 2023 report.

³ https://irp.fas.org/world/para/tupac_amaru.htm.

⁴ <https://info.worldbank.org/governance/wgi/>.

state and low levels of confidence in state actors and processes.

In addition, governance in Peru faces several challenges in addressing social changes such as migration and security threats from natural hazards. First, despite some decentralization under the first Garcia administration (1985–1990) and after 2002, power remains effectively centralized in Lima (McNulty, 2011). Lima is the political and economic center while the other two climate regions – the highlands along the Cordilla Blanca and the Amazon region – remain relative backwaters, often feeling ignored and neglected. Second, urbanization and migration to urban centers due to economic drivers and displacement by violence resulted in unregulated growth, the construction of shanty towns, and strained city resources (Crabtree, 2011; Degg & Chester, 2005). These developments exacerbate existing state weaknesses and vulnerabilities to natural hazards.

3. Disaster policy responses

In this section, we briefly explain how disasters and civil conflict relate. We then describe various types of disaster policy responses in Peru and the lessons we can draw from case studies on Peruvian disasters. We then explain the typology of disaster responses we code for the quantitative exploration.⁵

3.1. Connecting disasters, displacement, and conflict

Studies of the effect of natural hazards on conflict risks are divided. The disaster sociology approach contends that natural hazards can reduce risks for intrastate violence by improving social cohesion in disaster affected areas (Drury & Olson, 1998; Slettebak, 2013). In contrast, many political scientists find that natural hazards significantly increase the risks for political violence (Brancati, 2007; Nel & Righarts, 2008), while others find a weak relationship between disasters and conflict (Bergholt & Lujala, 2012; Omelicheva, 2011). Disasters and conflict can both arise from similar vulnerabilities and catalyze social and political change (Peters & Kelman, 2020). Ongoing conflict can also hinder the ability to cope with hazards and can increase exposure and vulnerabilities to natural hazards (Peters, 2021). Governments facing internal security threats may view post-disaster international aid as a source for insurgent funding, which can reduce their willingness to work with outside countries and organizations to assist disaster affected areas and lead to repression and civil war (Gawronski & Olson, 2013). Scholars have sought to explain these disparate findings by comparing rapid and slow onset disasters (Bardsley & Hugo, 2010; Warner et al., 2010), testing for intervening variables like poverty (Slettebak, 2013) or forced migration (Naude, 2009), and using disaggregated geocoded data to better evaluate the disaster-conflict relationship (Raleigh & Urdal, 2007; Theisen et al., 2011). The 5C + A framework focuses on the capabilities, competence, compassion, correctness, credibility, and anticipation demonstrated by government response to disasters (Olson & Gawronski, 2010), but few other studies focus on the critical factor of government response (Mitchell & Pizzi, 2021).

3.2. Disaster response in Peruvian case studies

Much of the literature on Peru's disasters focuses on the most catastrophic events and provides clear lessons about the variation in government response. In particular, studies of major earthquakes and periodic El Niño events illustrate the politics of disaster response in Peru.

In a careful study of disaster prevention and response efforts to the 1970 Yungay earthquake, Carey (2005) argues that the lack of trust and effective communication among local community members, the

scientific community, and policymakers prevented them from learning lessons of past disasters and reducing the destruction of the 1970 earthquake. Demands for government action after three massive glacial lake outbursts between 1941 and 1950 did not result in long-term flood mitigation solutions. Instead, the government gave only intermittent and inconsistent support for research, security, and infrastructure projects. Government officials dismissed warnings from the scientific community as 'alarmist.' At the same time, the public protested efforts to resettle vulnerable populations outside of high-risk zones and to create building codes, not least because there was little financial support or compensation from the government. In the end, the earthquake and avalanche were anticipated, but still devastating.

While reconstruction after disaster events can be an opportunity to break down social barriers and create improved urban spaces, another case study of the 1970 Yungay earthquake and avalanche argues that the opportunity was largely missed (Oliver-Smith, 1990). After Yungay was buried by an avalanche, the government built a new city for the displaced population. The long reconstruction process was punctuated by disagreements between the central government and locals due to deep-rooted distrust. The newly reconstructed city replicated most of the previous city's rigid social stratification and the promised improvements in flood control, water, and sewage did not materialize. The disaster exacerbated rural–urban tensions because many of those affected by the earthquake (*damnificados*) lived in rural areas, while those who survived the avalanches (*sobrevivientes*) lived in urban areas; the latter group argued for (and received) more post-disaster funding due to the severity of the avalanches. Ethnic and rural–urban tensions led to protests over the government's interventions as well, with Yungay survivors protesting and delaying relocation of the city (Sokefeld, 2012).

Further case studies demonstrate that periodic El Niño events are closely intertwined with conflict and politics. The 1982–83 El Niño exacerbated other political problems such as Sendero Luminoso and state violence on weak political institutions and strained state-society relations (Crabtree, 2011).⁶ The disruption led to more than a 10 % contraction in GDP and a spike in violence. In review of response, Olson et al (2001) found little learning or improvement between that event and the 1997–98 El Niño. The national response was directly shaped by politics at the time. As Fujimori was running for reelection in 2000, all government activities became part of the reelection campaign. Fujimori did not trust the existing institutions designed to respond to disasters and instead set up an ad hoc cabinet-level group of ministries to organize response. This duplicated efforts and led to conflict and miscommunication within the response effort.

Regional-central dynamics also shaped the government response. The event brought floods to the city of Ica in the Pacific desert region and drought to the Ayacucho region (Warner & Ore, 2006). When the government in Ica did not provide a robust response, civil society and organizations stepped in to provide support and recovery efforts. However, due to their perceived anti-Fujimori stance, the central government saw these groups as competing with government efforts and inhibited their activities. When the central government did supply support and build temporary housing for the displaced residents of Ica, they did so without gaining public input or trust, and the local population rejected the poorly constructed and designed housing. At the same time, the region of Ayacucho faced different challenges. Shining Path violence and government repression hit Ayacucho especially hard, and the region was still dealing with thousands of deaths and a large population of displaced and returned people. Still, the region was better prepared for the rains, and the government responded more carefully than in Ica. Also, the state was already involved in regional development and supported NGO and international support for recovery efforts.

⁵ This study focuses on coding disaster response and describing patterns observed in Peru. Our other research assesses how these responses influenced conflict dynamics in the country.

⁶ However, we do not have detailed studies of the specific relationship between El Niño and violence or the role that government disaster response to El Niño might have played in fomenting that violence.

Just as politics inhibits effective and efficient government response, public support is shaped by government performance when disasters occur. Poorly handled disasters hurt support for government officials (Katz & Levin, 2016). For example, after an earthquake in Ica in 2007, public satisfaction with officials dropped by 20–40 %. Poor performance by democratically elected leaders is especially worrying in a country with a long tradition of authoritarian rule and justification for that rule based on performance in human security. However, the same survey found that declines in support for democracy after weak disaster response are not long lasting. The negative effect of mismanagement on public satisfaction with the president and other government officials is larger and lasts longer than the negative effect on the overall democratic system. A second survey in the aftermath of the 2007 earthquake confirmed that citizens are highly attuned to the government performance, capacity, and credibility when reflecting on hazard events (Poggione et al., 2012).

The 2007 earthquake response also revealed problems with the decentralized disaster system enacted after the El Niño disasters and 2001 earthquake. That event affected more than 130,000 people in multiple provinces and destroyed over 70 % of buildings in Chincha Alta and Pisco (Polastro, 2009). “Ineffective local emergency committees, hampered by poor leadership and funding, created problems in the field” (Polastro, 2009, p. 200). The government announced a cash for work program for debris clearance and house reconstruction, but the money was never distributed. The Fund for the Reconstruction of the South (FORSUR), which was tasked with managing the post-disaster relief, was viewed as a political and corrupt organization, even though some of the bureaucratic issues stemmed from “strict control systems” that were put in place after the Fujimori regime to address long-standing problems of corruption (Polastro, 2009, p. 201).

3.3. Lessons learned: Qualitative case study literature

The case studies suggest several major lessons and interesting patterns about how the government responds to disasters in Peru.

a. State-society relations

The relationship between the disaster-affected public and the government – and between central and regional governments – is often difficult and exacerbates destructive political dynamics. Generally, urban areas receive more post-disaster aid and support while insurgent controlled areas during the Peruvian civil war receive less aid. Some disasters, like the 1970 earthquake, directly exacerbated rural vs. urban competition for resources (Oliver-Smith, 1990; Sokefeld, 2012). Long-standing distrust was also exacerbated by poor government response. The long-standing civil war in Peru, along with a very repressive and corrupt Fujimori regime, created a great deal of distrust between citizens and the national government, a dynamic that persisted long after Fujimori was removed from office. Furthermore, institutions that were designed to combat corruption later hampered disaster relief efforts (Polastro, 2009). Distrust in the Peruvian government varies by ethnicity, gender, rural/urban residence, and economic class. Case studies of the 1970 earthquake show that government policy responses, such as reconstruction and relocation efforts, are sometimes rejected by local populations through protests or other means.

b. Management and organization

Central-regional dynamics are important for understanding Peruvian politics and disaster response. Early in its history, Peru did not have many disaster-specific institutions to forecast or respond to disasters. That changed dramatically after the 1970 earthquake, although these early institutions were centralized at the national level. Later disasters led to neglect and response failures in some parts of Peru, and this, along with Fujimori’s decentralization of many public services (Carey et al., 2014), prompted a move towards decentralization of disaster response strategies that built disaster response institutions at local levels and allowed for responses at different levels of government. However, many problems emerged through this new structure, including a lack of

coordination across government/committee levels and poor integration of local stakeholders (e.g., women) (Rangel Álvarez, 2016; Reyes, 2002). The country moved back to a more centralized disaster approach after 2014. Another issue that arises regularly in Peru is a lack of coordination across aid actors, stemming in part from the decentralized disaster response structure that the country enacted (Polastro, 2009). Local NGOs, often filling in a disaster response gap, can be ignored through official response agencies, which creates inefficiencies in post-disaster recovery (Schilderman, 1993).

c. Development activities

Peru’s disaster response policies are intertwined with economic development approaches, which are often highly politicized. Development projects such as dams are directed towards areas that support leaders, which creates unequal disaster risks (Carey et al., 2014). For example, urban areas often receive more development funds, which creates excess demand for housing and the building of homes with less disaster resilient materials. Mining and agricultural groups use a great deal of freshwater and can extract development monies in ways that creates later disasters like floods. Peru’s adoption of import substitution industrialization strategies in the 1940s–1970s resulted in large pushes for mining and hydroelectric power and irrigation plans for more water intensive crops, which created negative externalities for water supplies in the country (Carey et al., 2014).

When the Peruvian government responds to hazard events, such as providing relief aid and reconstruction monies to affected areas or helping to move affected populations into temporary shelters, its policy choices are similar to other countries in the world facing hazards. In the next section, we elaborate on our general disaster policy response framework that guides our quantitative data collection.

3.4. Types of disaster policy responses

Disasters occur when communities are overwhelmed and local governments cannot adequately respond to the effects of natural hazards (Paul, 2011). The occurrence of a disaster is typically blamed not on the location or hazard exposure, but on societal conditions and governance quality (Tierney, 2014, p. 125). When we think of disasters in this way, governments and societies can play an important role in exacerbating the effects of natural hazards to the point that they become a disaster and are beyond the community’s ability to cope. There is a wide range of ways governments respond to natural hazards including neglect, active support and reconstruction, and repression. The consequences of these choices are varied, although the effects often depend on the political context. This section explains various types of government policies.

a. Relocation and resettlement of disaster-affected individuals

Displacement after an environmental shock can be temporary as those affected wait to return home (e.g., until flood waters recede) or can be longer term and even permanent. Governments can support the displaced by providing temporary shelters or relocating individuals or whole communities away from disaster-affected areas, as we saw earlier with the Yungay earthquake and avalanche. Relocation and resettlement practices can be forms of mitigation (e.g. see Warner et al., 2010), but these policies are often adopted only after a hazard event has occurred. While these policies can reduce risks, they are usually disruptive in other ways, for example, by disturbing social networks and access to public services or employment (Heming et al., 2001; Raleigh et al., 2008). Moving is also expensive, and these policies can cause harm if there is inadequate compensation for moving expenses, changes in access to resources or markets, and property losses.

Questions about who gains and who loses from relocation policies can be highly politically charged, especially if urban poor must move while wealthy landowners benefit from further development (Van Voorst & Hellman, 2015). For relocation policies to be successful, governments must provide adequate compensation but also carefully plan and implement the development of new settlements, ideally by considering the needs and preferences of those who will be resettled as well as

those already living in the resettlement area. In addition, migration can exacerbate existing tensions between ethnic groups (Fearon & Laitin, 2011) or over scarce resources (Obioha, 2008). While there is mixed evidence of whether environmental migration leads to violent conflict (Hendrix & Glaser, 2007; Reuveny, 2007), we suspect that the support the government gives to those who are displaced is critical to explaining when and why we observe conflict. Relocation policies can be conflict inducing or reduce existing tensions, depending on the affected population's willingness to move and the support they receive for resettlement.

b. Restrictions on movement

In the face of a disaster or after victims have been displaced, the government can facilitate migration or place temporary or permanent restrictions on the movement of people. These restrictions could limit the movement in or out of disaster affected areas or restrict access to other locations. Restrictions can target specific groups in society or entire populations. While individuals may face immobility for several reasons including poverty or lack of access to transportation, we are particularly interested in the kinds of restrictions that the government enacts, especially those policies that target specific populations. For example, after the Indian Ocean tsunami in 2004, the governments of Sri Lanka and Indonesia each limited the return of those displaced (Black et al., 2013). The justification for these restrictions was the vulnerability of coastal areas to future disasters. Still, the victims of the tsunami were also associated (rightly or wrongly) with groups resisting the government, and thus the government found an opportunity to shape the settlement patterns and organizing potential of these groups by limiting their ability to return to their former homes.

c. Reconstruction

Reconstruction activities refers to rebuilding homes and repairing infrastructure that was damaged by the natural hazard. Government support for reconstruction can include aid for rebuilding and replacing damaged buildings and roads, as well as longer-term community planning, regulations for new buildings, and infrastructure construction. Reconstruction is then an opportunity to learn from past mistakes and build more resilient communities by changing (or enforcing) zoning/building regulations and settlement patterns and by improving infrastructure. The need for fast and cheap reconstruction, however, may make these resilience-improving changes difficult to implement. Most government spending is dedicated to relief and post-disaster infrastructure rather than planning and preparedness (McCarthy & Keegan, 2009; Saldan˜a-Zorrilla, 2015).

Government spending on relief and reconstruction is not equally distributed or distributed solely based on damages incurred or to those most in need of support. Instead, reconstruction efforts reflect political inequalities with disproportionate support diverted to those who are wealthier, urban, and more politically influential (Quiroz Flores & Smith, 2013; Raleigh et al., 2008; Warner et al., 2010). Infrastructure can also shift burdens and risks from one area to another, for example by diverting flood waters between neighborhoods. When it comes to funding to support displaced populations, the amount sometimes depends on political connections between the central and regional governments (Bhavnani & Lacina, 2017).

Government performance in reconstruction and response can change the trajectory of ongoing conflicts. Perceived government corruption and failures in the wake of environmental disasters can help fuel conflict, as we see in the Maoist insurgency in India (Vadlamannati, 2011). In contrast, the Philippine government's reconstruction and response efforts after typhoons Bopha (2012) and Haiyan (2013) undermined support for the New People's Army (Walch, 2018). Reconstruction efforts are thus critically important to explaining the longer-term welfare of those affected by disasters and the level of violence that occurs in disaster affected regions.

d. Regulation of third-party support

Civil society groups, non-governmental organizations (NGOs), international organizations (IOs), and other states often offer support to

countries in the wake of extreme hazard events. For example, since 2015, the United States has spent more than \$8.5 billion on international disaster preparedness, prevention, and emergency response aid.⁷ However, this aid is distributed only at the request and with the permission of the host government. After the 2007 Ica earthquake in Peru, the government declared a state of emergency, but it mostly relied on outside aid agencies to take the lead on the disaster response, including the United Nations (UN), Oxfam, and Red Cross. The Peruvian government was criticized for poor planning and response and a failure to coordinate outside actors' actions (Polastro, 2009).

Many governments want external support, but some limit activities by non-governmental groups because they perceive such assistance as a security threat or fear that it will expose weaknesses in the government's overall capacity. State actors may perceive aid given through NGOs or directly to disaster affected populations as supporting potential challengers and therefore restrict and closely regulate the type, quantity, and channels for aid distribution, as was the case after Guatemala's 1976 earthquake (Gawronski & Olson, 2013), or more recently in Syria's blockade and restriction of aid flows to rebel controlled areas following the February 2023 earthquake.⁸ In other cases, regulations on aid can allow the government to target aid to politically important areas and populations. In Ethiopia, strict rules on donors and disaster response organizations means that the government decides who is eligible for assistance as well as the timing and location of aid activities.

The 5C + A framework for assessing the effect of government response on public opinion highlights key tradeoffs for governments when accepting external aid (Olson & Gawronski, 2010). While external assistance can boost capacity to respond, increase competence, and may reflect compassion for victims, governments may also worry that the need to accept outside aid signals poor capability and may damage credibility if external actors disagree about damage assessments or report incorrect, unfair, or corrupt behavior by government actors.

Some of these restrictions are related to government type. Democracies are more open to civil society and non-governmental actors providing aid and relief, even if those funds come from international sources. Autocracies are less likely to tolerate activities that could highlight government weaknesses or poor performance or that could build up alternative organizations and sources of authority. In addition, these regulations can be quite nuanced and simply tailor activities and actor types to the country. For example, as an Islamic country, Iran is likely to allow and support activities by the Red Crescent but not by Christian charities. When countries offering aid are rivals, there may be even more regulation or at least close monitoring of activities. Border tensions between Turkey and Syria, for example, limited the number of international borders aid workers that could cross after the 2023 earthquake.⁹ In all these cases, disaster aid is shaped primarily by political considerations and concerns about the identity of those giving and receiving aid.

e. Neglect

While government policies address the needs of disaster affected and displaced populations through reconstruction, relocation, and regulation, it is also possible that the government will neglect populations either by choice or through incompetence. We expect cases of neglect to reflect preexisting politics. Where bureaucracies cannot deliver public goods in good times, it is unlikely they will be able to respond to crises effectively and efficiently. Where sections of society or regions of the country are ignored by the government, the population may be used to fending for itself without external or official support. Cases of neglect

⁷ See <https://usnwc.edu/college-of-maritime-operational-warfare/Humanitarian-Response-Program>.

⁸ <https://www.vox.com/world/2023/2/12/23594720/earthquake-aid-crisis-syria-united-nations>.

⁹ <https://www.theguardian.com/world/2023/feb/07/syria-earthquake-aft-ermath-aid-politics>.

may result in more displacement – and certainly more harm – and may be an opportunity for alternative organizations or figures of authority to provide aid or take advantage of desperate populations. Poor performance or the failure to respond also exacerbates grievances and provides an opportunity for the escalation of violence by anti-state groups (Ide et al., 2022).

4. Disaster response in Peru: Original quantitative data collection

In the Disasters, Migration, and Violence (DMV) Lab,¹⁰ we code government policy responses to disasters for all countries from 1900 to 2020. In this study, we focus on disaster response in Peru, an extreme case that is helpful for developing our broader coding approach. In the Appendix, we provide more detailed information about the coding approach and variables coded.

We begin by creating a list of hazard events by combining data from EM-DAT Dataset and disasters reported by the UN Office for the Coordination of Humanitarian Affairs (OCHA). We focus on four types of disasters: geophysical (earthquake, rock fall, landslides, volcanic), meteorological (storms, cyclones), hydrological (flooding, landslide, avalanche, wave), and climatological (droughts, wildfire). In Peru, there are 179 disasters that fall within these categories: hydrological (53.1 %), geophysical (32.4 %), meteorological (8.9 %), and climatological (5.6 %). Floods (N = 63) are the most common disasters, followed by earthquakes (N = 53) and landslides (N = 35). Our final dataset includes 183 disasters, including 179 coded in EM-DAT and 4 that were not coded by EM-DAT.¹¹ EM-DAT provides useful information that guides our data search process including hazard dates, locations, total numbers of deaths and people affected, whether a disaster was declared, and the geo-location of the event for more recent disasters.¹² Table 1 summarizes the types of disasters included in our Peru dataset.

For each disaster, we collect information on government and third-party actor policy responses by consulting OCHA reports and conducting searches with Google, the *Historical New York Times*, and Nexis-Uni to gather news stories related to each hazard event. In the Appendix, we provide more detailed information about our information search procedures. We focus on the three years following the disaster, although most official reports stop publishing well before then, except in cases of major catastrophes. We were able to find information on disaster

response for a majority of cases; in our tables, we report the N for each variable coded. Based on the explanation of events in these reports and news stories, we create a code sheet for each disaster that summarizes policy responses and other aspects of disaster relief (see Appendix).¹³ We code the actors involved and the specific type of response, including the level of response where relevant. This section explains our coding, provides examples of each type of response in Peru, and summarizes the patterns observed in our quantitative coding.

4.1. Actors involved in disaster response

a. State actors: Central and regional levels of government, ministries, and agencies

Usually local or regional governments respond to disasters first, and we code when and whether central governments are directly involved in disaster response. Dynamics of decentralization and coordination among various ministries, agencies, and levels of government are particularly important. For example, during the 1997–98 El Niño and after the 2007 Ica earthquake, the central government “bypassed existing structures and organized a parallel response system” thus duplicating and politicizing disaster response efforts (Katz & Levin, 2016, pp. 7–8). Depending on the disasters, different ministries or branches of government may be actively involved. Of particular interest are cases where there are multiple agencies or ministries involved and they do not necessarily have the same capabilities or goals. For example, one of the challenges of addressing potential glacial outburst floods in the Cordillera Blanca region was the creation, dissolution, and inconsistent funding for the Glaciology and Lakes Security Division (Carey, 2005).

While not every organization participates in response, the OCHA reports and news stories regularly name specific organizations that participate. Some of the key ministries and agencies listed as participating in disaster response and recovery include the National Disaster Agency, the Peruvian Civil Defense Institute (INDECI), various ministries (e.g., Economy and Finance, Agriculture, Education, Health, Women and Social Development, Housing, Construction and Sanitation), the Regional Health Directorate, and local Civil Defense committees. For each of these bodies, we are particularly interested when the reports and news stories differentiate between regional and central offices. Our initial coding includes lists of each government actor, and we code the number of government offices and branches identified.

Table 2 summarizes the quantitative coding for actors involved in disaster response for all Peruvian disasters from 1900 to 2020.¹⁴ In terms of government actors that respond, we see that most disasters include only 1–2 distinct government actors involved in the response (38 %), although it is common for 3–4 (30 %) or 5 or more government agencies (21 %) to respond. In only 11 % of the cases does the Peruvian government fail to respond in some way following a disaster.

b. State actors: Political leaders

Leaders can play critical roles in supporting victims and rescue

Table 1
Summary of disasters in Peru, 1900–2020.

Disaster Type (N = 183)	N	Percentage of cases
Flood	63	34 %
Earthquake	53	29 %
Landslide	35	19 %
Extreme temperature	12	7 %
Drought	8	4 %
Volcanic activity	4	2 %
Storm	4	2 %
Mass movement	2	1 %
Wildfire	2	1 %

¹⁰ The data collection is ongoing, but we have collected information on disaster responses for 67 countries to date. Learn more about the project at <https://www.saramitchell.org/dmv.html>.

¹¹ If OCHA reports identify disasters not covered by EM-DAT, we add these cases to our dataset. We have compiled OCHA reports for over 50 countries (to date) and this is a general pattern that we observe, where some disasters are covered in one, but not both sources.

¹² For other research on Peru, we analyze disaster response every year at the department (N=26), province (N=196), and district (N=1873) levels of analysis.

Table 2
Actors involved in disaster response.

Response actors	0	1–2	3–4	5 or more	N
Government Actors	11 %	38 %	30 %	21 %	132
Leaders	54 %	32 %	9 %	5 %	127
NGOs	62 %	26 %	3 %	9 %	125
IOs	76 %	13 %	6 %	5 %	127
Other states	81 %	8 %	4 %	7 %	126

¹³ In addition to a code sheet for each disaster, we also create a country level code sheet (see appendix).

¹⁴ As noted earlier, if we are missing information on disaster response, we do not assign a coding for those variables.

efforts simply by visiting disaster sites as well as explicitly calling for additional assistance. These visits can be considered important displays of compassion for disaster victims (Olson & Gawronski, 2010). Country-level officials' calls for support may have a different effect from those of local leaders and local officials, who are likely to be involved in the response to even minor events. Visits by political leaders are particularly important for political outcomes (e.g., credit and blame) and morale.

For coding purposes, we include all the key actors mentioned. OCHA and news reports include details about leader visits and efforts by specific politicians. For example, President Alberto Fujimori flew to villages in the northern region of San Martín after 250–300 people were buried in mudslides in two villages in 1997.¹⁵ Local leaders also get involved, such as Puno congressman Sierralta calling upon INDECI and other authorities to provide help after a mudslide buried at least 30 people in Carabaya province.¹⁶

In Table 2, we see that leaders fail to visit disaster affected sites in 54 % of Peru's disasters. We observe 1–2 leaders visiting an affected area in 32 % of the cases and 3 or more leaders visiting in 14 % of disasters. If the affected areas are important tourist regions (e.g., Machu Picchu), the president is more likely to visit following a disaster. The government also provides information to the public following disasters in a majority (72 %) of situations (see Table 3). Our quantitative data suggests that leaders are more responsive to disasters than some of the case study literature on Peru's disaster responses implies.

c. Non-state actors: Non-governmental organizations (NGOs)

Similarly, global and regional NGOs often respond quickly to environmental disasters and provide short- and long-term support to victims. These actors may coordinate with official actors or fill in governmental inaction. Most major organizations have offices in disaster-prone countries like Peru.

Regional and local NGOs and community groups are also of interest as they often have local contacts, speak the local languages, and know the region. At the same time, they may be perceived as being more political. After the 1998 El Niño flooding, communities in Ica set up neighborhood organizations to distribute emergency food supplies. However, Fujimori saw local non-governmental organizations as competitors and tried to suppress their activities after the Ica floods in 1998 (J. Warner & Ore, 2006). NGO and civil society contributions will be shaped partly by the larger political environment.

Table 3
Summary of disaster responses and level.

Response level	None	Low	Medium	High	N
Government Information	28 %	34 %	25 %	13 %	170
Relief Goods Provided	34 %	20 %	22 %	24 %	130
Aid Coordination Level	62 %	9 %	15 %	14 %	115
Coordination w/Outside Aid	51 %	21 %	19 %	9 %	114
Reconstruction Resources	58 %	23 %	11 %	7 %	115
Response type	No	Yes	N		
Disaster Declaration	84 %	16 %	183		
Shelters Provided	75 %	25 %	138		
External Aid Requested	86 %	14 %	119		
Restrictions on Aid	99 %	1 %	116		
Response Failure	74 %	26 %	121		
Gov't Meetings w/Outside Aid	78 %	22 %	114		
Temporary Evacuations	60 %	40 %	113		
Permanent Evacuations	96 %	4 %	113		
Temporary Movement Restrict	94 %	6 %	112		
Permanent Movement Restrict	97 %	3 %	112		

¹⁵ 20/2/97 <https://reliefweb.int/report/peru/risk-mudslides-hinders-peru-disaster-work>.

¹⁶ 2/3/09 <https://reliefweb.int/report/peru/per%C3%BA-ocho-muertos-y-22-desaparecidos-deja-el-deslizamiento-de-lodo-y-piedras-en-puno>.

Examples of non-state actors who regularly provide relief in Peru include World Vision, CARE International, Doctors without Borders, Red Cross/Red Crescent (ICRC), and the Chilean, Spanish, and German Red Cross. In our coding, we find that NGOs do not provide aid in most of Peru's disasters (62 %), but we see 1–2 NGOs offering support in 26 % of cases. Some disasters draw in 3–4 (3 %) or 5 or more NGOs (9 %). Not surprisingly, this support tends to occur more frequently when the number of people killed or affected by a disaster is large.

d. Non-state Actors: Intergovernmental organizations (IOs)

Regional and global IOs also respond to disasters to aid affected populations. Various UN agencies often coordinate disaster response, such as the UN Disaster Relief Organization (UNDRO), the UN Office for the Coordination of Humanitarian Affairs (OCHA), the World Food Program (WFP), and the World Health Organization (WHO). Regional IOs are also involved in disaster response, such as the Pan American Health Organization (PAHO).

UN OCHA reports include information about which actors are providing aid and support and often report details about the content of those aid deliveries. For example, in the face of a cold emergency, the UN Population Fund provided the Regional Government of Ayacucho with “kits” of warm clothing for vulnerable populations. Reports note that the “kits” were produced locally and “respected the traditional customs of the population.”¹⁷

Some responses are explicitly multi-agency and highly coordinated. The response to the 1990 drought was “an interagency mission led by UNDRO and consisting of UNICEF, WFP, FAO AND WHO/PAHO.” This drought relief mission also had a specific timetable – 6 months – although many reports do not include an explicit end date for relief activities.

Across the 183 disasters in Peru, IO response is infrequent, occurring in only 24 % of cases (Table 2). In some cases, such as the August 2007 earthquake, IOs take the lead in coordinating disaster response. But in most disasters in Peru, the government is the central actor, providing information and support from various agencies (INDECI, military), and calling for outside aid in only 14 % of disasters (Table 3).

e. Other states

In addition to NGOs and IOs, countries also offer help following disasters, especially those that have close ties to the affected country. For example, Canada, Ecuador, Germany, Japan, and the United States regularly provide support to Peru after disasters. Yet external state support occurs in only 19 % of Peru's disasters (Table 2).

4.2. Response type and level

Disaster response takes a wide range of forms, as summarized in Table 3. The top half of the table rates the level of response on an ordinal scale with four values, while the lower half of the table codes whether the type of response took place or not. These variables capture the typology of disaster responses summarized earlier in the paper including information on *relocation/resettlement* (temporary/permanent evacuations), *restrictions* on movement (temporary/permanent), *reconstruction* (relief goods provided, reconstruction resources), third party *regulation* (aid coordination level, coordination with outside aid, restrictions on aid, government meetings with outside aid), and *neglect* (response failure). We also code the immediate disaster response, including the level of government information, the declaration of a disaster by the national government, and whether shelters were provided.

a. Government information

Often, the only source of information for potential responders and relief organizations come from government sources. Is the government regularly able to identify the locations and people who need immediate support and provide information to IOs, NGOs, and other interested

¹⁷ 15/7/09 <https://reliefweb.int/report/peru/per%C3%BA-unfpa-entrega-4-144-kits-de-ropa-al-gobierno-regional-de-ayacucho>.

parties? This information is usually related to the type of disaster and the amount of damage. In some cases, the government source of information is specifically noted, such as the Ministry of Foreign Affairs¹⁸ or Civil Defense authorities¹⁹ issuing information after a disaster.

Communication in general is often problematic. As Warner and Or'è (2006, p. 115) note, the central government "has rarely communicated with local governments and civil society organizations, let alone listened to their suggestions." In Peru, the government provides some information after disasters in 72 % of events, although the level of information is minimal in 34 % of the cases.

b. Coordination among actors

When multiple groups, states, and organizations are involved in disaster response, coordination and organization of these groups is paramount. Better coordination leads to better coverage and efficiency while reducing redundancy, competition, and neglect. Signals of high levels of coordination by the government include specific requests for types of aid and support, information about access and logistics, and a clear structure of communication and organization for supporting actors. This is often done by the Civil Defense at the local/regional or national levels.

Where the government does not provide leadership sufficient to coordinate the other actors, one of the main NGOs or IOs can step in to coordinate. In Peru, the Red Cross often takes the lead on this coordination. In some cases, Red Cross Societies from different countries coordinate very effectively, even in the absence of leadership from the government (Polastro, 2009). The worst coordination and leadership can simply mean that the government is neglecting an area and leaving response to outside actors. Alternatively, governments may be so overwhelmed that they do not have capacity to coordinate and organize assistance, which is why outside actors may take the lead in disaster relief. However, in only 38 % of Peru's disasters do we observe the government coordinating with aid groups. The government organized meetings with NGOs and IOs providing outside aid in only 22 % of disasters. Coordination is not always needed, however, given the low rate of participation of NGOs and IOs in response to smaller disasters. As noted earlier, the Peruvian government tends to take the lead in most disaster response situations.

c. Disaster declarations

When and where does the government declare a disaster? Disaster declarations are often shaped by politics (Cooperman, 2022; Reeves, 2011), so it is especially useful to note where the government officially declares disasters compared to where international datasets identify disaster and hazard events. Our coding includes disaster declarations and appeals to outside actors for aid. For example, the government declared an agricultural state of emergency in 79 of 183 provinces following a June 1990 drought, with a direct appeal to the UN secretary-general for international emergency assistance.

After Peru established a decentralized approach to disaster management in the Fujimori regime, national disaster declarations became important for local civil defense groups to receive funds to respond to disaster affected areas. Yet disaster declarations occur in only 16 % of cases (Table 3). Some situations are not severe enough to warrant a declaration, but there are many other cases where the government fails to respond to local leaders' requests for disaster declarations.

d. Requests of assistance and type of contribution

In addition to understanding who is involved in disaster response, we are interested in the government's role in requesting and coordinating the assistance provided by both state agencies and non-state actors. We identify the timing and content of requests for assistance. If the disaster is large enough and Peru's capacity to respond is overwhelmed, the

government may ask for support from NGOs, IOs, and other international actors. Few countries or organizations would respond to a disaster without government permission and often an explicit request for support. These requests can be for specific types of support or simply for financial aid. After mudslides occurred in February 1997, INDECI requested outside aid to provide blankets, clothing, food, shelter, etc. for those affected in Apurimac. In other cases, governments may not ask for support but state that they are willing to accept financial donations and allow non-governmental actors to participate independently.

OCHA reports often list the support and contributions from specific countries. For example, reports of responses to flooding in 1986 included several tables with data about the specific contributions made by various international organizations and governments. Assistance was coordinated by the UNDP representative, the National Civil Defense Agency, as well as other agencies, and thus there are clear records of the exact value of contributions and, for agencies like Medecins San Frontières that contributed in a variety of forms, the breakdown of services, equipment, transportation, and other contributions. Yet we see that the Peruvian government does not typically request outside aid following disasters; this occurred in only 14 % of the cases (Table 3).

e. Shelter and other forms of relief

Governments often provide relief in the form of shelter, specific supplies, money, and expertise or specific activities. We gather data on both government funding (from local, regional, and central government sources) and government distribution of funds from external actors. For example, the national response to an earthquake on June 16th, 1991 included "130 tents, 2,740 blankets, 21,412 corrugated iron pieces, medical supplies, tools, and collapsible water tanks." As we see in Table 3, relief aid occurs in 66 % of disasters and the government commits some reconstruction resources to affected areas in 42 % of the cases. Shelters are provided less frequently though, occurring in only 25 % of Peruvian disasters.

f. Evacuation

After a disaster takes place, moving victims to safety is paramount. Evacuation data include the number of people, the locations evacuated, and the destination of those displaced by each disaster. After the Ubinas volcanic eruption in April 2006, Peru's armed forces evacuated 161 people from Querapi to a temporary settlement in Anascapa before evacuating people in other villages such as San Carlos de Titi, Santa Rosa de Phara, and Salinas Moche.²⁰

Some disasters warrant permanent evacuation, but in other cases the government will allow and even facilitate the return of displaced individuals to their homes. We code both temporary and permanent evacuations as well as temporary and permanent restrictions on movement. Permanent evacuation or restrictions are rare, but they do take place. After an avalanche in Huanuquén²¹ a province in April 2010, for example, reports document efforts to relocate those who had been displaced and to restrict their ability to return to the locations of their former homes due to vulnerability.²¹

Some of the case studies note problems with reconstruction and relocation. The people of Ica rejected the government's temporary housing after the 1998 El Niño because the housing was poor quality (Warner & Or'è, 2006) and relocation efforts led to protests after the 1970 earthquake and avalanche (Carey, 2005).

As seen in Table 3, temporary evacuation is common, occurring in 40 % of Peruvian disasters, although permanent evacuation is rare (3 %). Given the frequency with which disasters occur in many parts of the country, this lack of relocation may signal ongoing vulnerability, but also likely reflects a lack of economic resources for resettlement and improved infrastructure development.

¹⁸ 18/7/02 <https://reliefweb.int/report/peru/peru-snowstorms-ocha-situati-on-report-no-2>.

¹⁹ 19/5/10 <https://reliefweb.int/report/peru/peru-sismo-de-62-grados-de-intensidad-sacude-departamento-de-amazonas>

²⁰ 26/4/2006 <https://reliefweb.int/report/peru/peru-ubinas-volcano-ocha-sit-uation-report-no-1>.

²¹ 3/4/10 <https://reliefweb.int/report/peru/per%C3%BA-pueblo-huanuque%C3%B1o-afectado-por-huaico-ser%C3%A1-reubicado>.

g. Response failure and neglect

We interpret the absence of support services and responses as neglect. Neglect can arise from unclear distribution of responsibility, weak capacity to respond, or simply from a failure of those responsible and capable to do anything. We also find some evidence of neglect. Following landslides in the Tacabamba district of Chota province in November 2009, the government failed to respond, provide relief, declare an emergency, or otherwise react.²² The government faced widespread criticism for its failure to respond to extreme cold weather in the Puno region in July 2010, including the lack of a hazard map and failure to send resources to the area, even though more than 400 people had died.²³ More generally, we observe a failure to respond to disasters in 26 % of cases (Table 3).²⁴

4.3. Broader patterns

We have seen that Peru's central government often takes the lead in disaster response and information provision, especially through INDECI, and that it provides short term relief goods and evacuations in many cases. How have disaster policy responses varied across disaster types and over time? In Table 4, we break down our five types of policy responses based on the type of hazard event (flood, earthquake, landslide, extreme temperatures, drought, or other). First, we see that policy responses do vary across disaster types for relocation and regulation. Relocation of affected people occurs more often for floods and landslides, while regulation of third-party activities occurs more frequently with floods and extreme temperature events. On the other hand, there is no significant difference across disaster types for policy responses that involve restrictions on movement, reconstruction, or when the government fails to respond (neglect).

In Fig. 1, we plot how these policy responses have changed over time focusing on the period 1960 to 2020.²⁵ We count the total number of policy responses per year, dichotomizing variables that have four-point ordinal scales (e.g., government information is coded one if it has a value of low, medium, or high, and zero otherwise). First, we see that Peru has provided funds for reconstruction following disasters more regularly in recent decades, and relocation occurs a bit more frequently in more recent disasters. Second, we also observe an uptick in regulation, such that the government is more actively working with NGOs, IOs, and other states to provide post-disaster relief and coordinating those aid efforts more often. Neglect and restrictions on movement do not show specific temporal patterns in Peru, but that could reflect the lower frequency of such responses.

5. Discussion

Our new dataset on disaster policy responses for 183 hazard events in Peru from 1900 to 2020 reveals many interesting patterns. We find that the Peruvian government is the most active actor in disaster response, providing information and relief aid in more than two thirds of cases, although long-term reconstruction is less common; the government provides a large amount of reconstruction funds in only 7 % of disaster cases. Non-governmental organizations are more active in Peruvian disaster response (38 %) than international organizations (24 %), while

leaders visit affected areas in close to half of all cases (46 %). Case studies of Peru's disasters show that active management and organization is critically important for response outcomes, but the government only coordinates actively with outside aid groups 38 % of the time.

Restrictions and relocation of affected populations occur, but this tends to be temporary, rather than long-term solutions to mitigate risks from future disasters. Relocation of affected people occurs more often for floods and landslides, while regulation of third-party activities occurs more frequently with floods and extreme temperature events; other disaster response policies do not vary across disaster types. Disaster responses have also shifted over time, with the government providing more funds for post-disaster reconstruction and coordinating with outside aid groups more actively in recent decades. Our larger data collection project will provide similar data for all countries over time, which will help us situate Peru's patterns of disaster response in the larger disaster management landscape and understand how government policy choices influence political violence, migration, and other political dynamics.

We expect that the types of responses are particularly important for societal outcomes, and our first goal is to understand the general patterns of policy responses. When evaluating government performance, the public is more attentive to the quality and type of performance after a disaster rather than to the hazard event itself (Poggione et al., 2012). We observe that Peru's government provides information and relief aid in nearly half of all disasters. Responses tend to be positive policy responses such as provision of information, leaders visiting affected areas, and provision of relief funding, but long-term reconstruction aid is less common. This is problematic because many disasters (e.g., floods, mudslides) reoccur frequently across time, and the lack of infrastructure spending in disaster affected areas historically failed to mitigate future disaster risks. However, the World Bank provided Peru with more funding to lower these long-term risks by building essential infrastructure.²⁶ This might explain why we see upward trends in reconstruction and regulation of third-party aid over time.

Restrictions on the movement of people or relocation of groups following disasters are used as temporary fixes, rather than long term solutions in Peru. This trend toward short term response is particularly important given the lesson from the qualitative case studies that development activities shape disaster responses. The importance of the need for more careful attention to development and the social dynamics of vulnerability to hazards can be seen in Peru's inept COVID-19 response. While we do not include pandemics or epidemics in our dataset, the same populations tend to suffer the consequences in the case of all types of hazards (Lavell et al., 2023). The same districts that suffer the most from floods, droughts, and earthquakes suffered the most from COVID-19 outbreaks and from poorly supported preventive lockdowns, with the result that Peru was the third most affected country in Latin America.

While at this stage we cannot quantitatively code social vulnerability, we can analyze the types of policy responses the government selects, and we can identify which types of policies are most likely to require intensive cooperation from the community. We find that restrictions on movement and permanent relocation, the two activities that would require the most cooperation from local communities — are uncommon. Instead, we observe policies that are easier for the government to implement without cooperation from local communities, such as information provision, leaders visiting affected areas, and provision of relief or reconstruction funding. These easier to implement policies are also temporary fixes and not longer-term solutions and do

²² 2/12/09 <https://reliefweb.int/report/peru/per%C3%BA-deslizamiento-a-fecta-al-centro-poblado-la-pucara-en-el-departamento-de-cajamarca>.

²³ 26/7/10 <https://reliefweb.int/report/peru/per%C3%BA-ola-de-fr%C3%ADo-en-puno-los-reclamos-del-gobierno-regional>.

²⁴ Coding neglect is difficult. For now, we look for evidence of widespread complaints from local leaders and affected people about the lack of national government assistance.

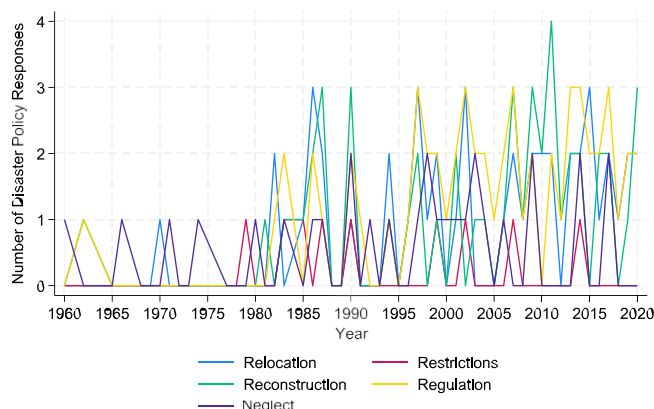
²⁵ Because disasters are less frequent and because information is sparser in earlier decades, we focus on a time-period where we have more information for this graph.

²⁶ Starting in 2010, Peru was one of the first countries to use the Bank's Development Policy Loan with a Catastrophe Deferred Drawdown Option, designed to mitigate long term disaster risks through building essential infrastructure. <https://www.worldbank.org/en/results/2021/11/05/advancing-policy-reforms-in-peru-to-reduce-risk-from-natural-hazards>.

Table 4

Disaster policy responses by disaster type.

Disaster type	N	Relocation	Restrictions	Reconstruction	Regulation	Neglect
Flood	63	37 %	5 %	33 %	30 %	16 %
Earthquake	53	19 %	6 %	21 %	17 %	15 %
Landslide	35	26 %	3 %	26 %	9 %	17 %
Extreme temp.	12	8 %	0 %	25 %	58 %	17 %
Drought	8	0 %	25 %	25 %	13 %	50 %
Other	12	42 %	0 %	17 %	25 %	8 %
χ^2	183	11.2 (0.047)	8.52	3.50	16.03	7.03
(p-value)			(0.130)	(0.692)	(0.007)	(0.219)

**Figure 1.** Disaster policy response in Peru, 1960–2020.

not necessarily incorporate community input.

We have geo-coded each disaster response in Peru at the department (region, $N = 26$), province ($N = 196$), and district ($N = 1873$) level. In related research, we examine how disaster response in various geographical locations of Peru relates to armed conflicts in those areas from 1989 to 2019. Of the seven departments in Peru with the highest rates of civil conflict, five are in the 95th percentile for disasters as well (Ancash, Ayacucho, Huanaco, Junin, Lima).²⁷ Our initial analyses suggest that policies such as neglect and restrictions on movement are associated with higher rates of armed conflict, consistent with the idea that failures in government policy responses to disasters can heighten grievances against the government and aid rebel recruitment. In these analyses, we also control for other political factors that influence disaster response in particular locations, such as political ties with the center, population size, economic productivity, and ethnic composition.

6. Conclusion

Our project builds on existing case studies of government response to specific disasters by contributing a new dataset on post-disaster policy responses in Peru for 183 disasters from 1900 to 2020 and identifying general patterns about the Peruvian government's policy responses to disasters. We find that the government is the most frequent actor to response to disasters, while non-governmental organizations are more active in Peruvian disaster response than international organizations or other countries. Peruvian leaders visited affected areas in over half of all cases. Restrictions and relocation of affected populations occur, but this tends to be temporary, rather than long-term solutions to mitigate risks from future disasters. Peru also tends to eschew efforts to coordinate with outside aid actors unless a disaster is severe.

Our findings point to several avenues for future research. First, while we can quantitatively code the policies adopted, tracking policy implementation is much more difficult. Given that Peru suffers from high levels of corruption and problems with governance in general, especially in rural areas, we should be wary of directly linking policy pronouncements with outcomes. In the future, we would like to explore implementation in more detail. The ability to implement policy also relates to public and community acceptance of government actions. We have seen in some case studies that the public resists some relocation or reconstruction efforts. Future research should explore when and where these incomplete responses take place.

Second, our future research on Peru would also benefit from an examination of gender dynamics in disaster policies. Local stakeholder incorporation is critical to effective disaster response. However, local disaster councils typically exclude or restrict women's participation. More troubling are gendered responses to disaster aid, such as women not being allowed to collect disaster relief as head of households (Reyes, 2002). These gendered disaster response policies may generate more distrust of the government in general among women in Peru (Kreutzer, 2022). While we observe poor disaster response reducing trust in the case study literature, examining this across a larger number of cases will provide more insights about the gender dynamics.

A third avenue for future research is to explore the relationships between interstate conflict and disaster response near contested borders. Peru has historical rivalries with Bolivia and Ecuador that involve contested claims to territories. As we have seen in the recent disaster response following the 2023 earthquake in Syria and Turkey, border tensions can restrict border crossings for aid actors and generate grievances between border displaced populations. Our project is currently coding disaster response in Bolivia and Ecuador, which will allow us to examine how government disaster response policies are influenced by interstate rivalries. We also have geo-coded information for disaster response in these three countries, thus we can assess how disaster response near contested borders differs from response near settled borders. As we collect more disaster policy response data for a larger number of countries (currently underway), we can also compare disaster responses across countries and determine how these choices influence armed conflict, non-violent protests, environmental migration, and other political processes.

CRediT authorship contribution statement

Sara McLaughlin Mitchell: Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Elise Pizzi:** Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence

²⁷ Violent events data come from the Uppsala Conflict Data Program's Georeferenced Event Dataset, which covers organized violence between 1989 and 2019 (Sundberg & Melander, 2013).

the work reported in this paper.

Data availability

Data will be made available on request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.worlddev.2024.106707>.

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