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# When evacuation becomes a disaster: governance failure and household crisis response in Goma, DR Congo[1]

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## Abstract

*Disaster mortality remains high in low-income countries, where limited state capacity weakens early warning and evacuation planning. In such settings, households rely on their own judgments and resources when hazards occur. We examine evacuation during the 2021 volcanic eruption near Goma, using survey data from 619 households, pre-eruption institutional trust measures, and 17 qualitative interviews. Most evacuation occurred immediately after the eruption, before any official instruction. Prior experience shaped these early decisions in opposite ways: surviving the 2002 eruption without major loss was associated with lower evacuation in 2021, while losing relatives or one's home was associated with higher evacuation. Evacuation unfolded under harsh conditions, marked by shortages of transport, water, and shelter; only 2% of households reported receiving government support. This experience led to widespread regret and was associated with lower responsiveness to the belated official evacuation order. Communication failures further weakened the order's effectiveness: fewer than half of respondents living inside the evacuation zone correctly identified that they were included in it. Trust in authorities appears to have supported compliance only among respondents who believed the order applied to their neighbourhood. The findings highlight the importance of state capacity, clear communication, and evacuation planning adapted to fragile settings.*

**Key words:** Disaster preparedness; Evacuation behaviour; Governance failure; Institutional trust; Fragile settings; Democratic Republic of Congo.

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# 1 Introduction

Over the past century, deaths from natural disasters have declined markedly, from an average of about 500,000 deaths per year in the early 1900s to fewer than 100,000 in the early 2000s (Ritchie & Rosado, 2022). A key reason is the expansion of state capacity: investments in risk monitoring, early warning systems, infrastructure, and organized evacuation planning have enabled timely and life-saving responses to natural hazards (Onuma et al., 2017; Pierce et al., 2017; Thompson et al., 2017). Yet these gains have been highly uneven. Disaster mortality remains disproportionately high in low-income countries, where governments often face severe constraints in delivering basic public goods before and during crises (Ambraseys & Bilham, 2011; He et al., 2021; Hussain et al., 2023). In such settings, households must largely rely on their own judgments and resources when deciding whether to flee and how to evacuate (Bettin & Zazzaro, 2018; Shoji & Murata, 2021). Yet we know relatively little about how households behave under such conditions of weak preparedness.

We study this behaviour in Goma, eastern DRC, where the 2021 eruption of Nyiragongo exposed how households respond to disaster risk when state preparedness is limited. Goma is located in one of the poorest and most fragile regions in the world, and the DRC government ranks among the least effective globally (World Bank, 2020a, 2023a). The eruption began on the evening of 22 May 2021. Residents started self-evacuating that same night, without any official evacuation instruction or government support. City authorities issued an official evacuation order only four days later, in the night of 26–27 May. The order applied to 10 out of Goma's 18 city areas and advised inhabitants to flee to Sake, a rural town 25 km away, but did not provide transport or shelter (OCHA, 2021). In this context, we ask: How, lacking any official cue or plan, did people navigate their evacuation decisions upon the eruption? Under what conditions did evacuation take place and what coping strategies did households develop? And, when the official evacuation order finally came, how did people respond?

These questions matter. While it is unrealistic to expect fully fledged evacuation plans in fragile low-income countries in the short term, incremental improvements can be achieved by better understanding how people decide and cope when disasters strike in the near absence of preparedness.

We contribute to this understanding using data from 619 households in Goma, surveyed in July 2021 when most evacuees had returned. The sample covers two city areas, one included in the

evacuation order and one not, allowing comparison across differently exposed neighbourhoods. Crucially, the same households had been surveyed in 2019 for an unrelated project, providing pre-disaster measures of trust in state actors. We complement these data with semi-structured interviews with 17 respondents, which we use to interpret and contextualize the quantitative findings. Together, these data allow us to make three contributions.

First, we examine evacuation behaviour in a fragile low-income country, a context that remains largely absent from the evacuation literature despite being especially vulnerable to disasters (e.g., Ayeb-Karlsson et al., 2019; Doyle et al., 2014; Saha & James, 2017; Walch, 2018). In a review of 83 evacuation studies, Thompson et al. (2017) find that 71 focus on the United States and none on Africa. This gap matters because evacuation decisions are likely to operate differently where state capacity is weak, with households relying more on personal experience and informal information than on official guidance.

Second, while the limited literature on low-income settings has focused mainly on the decision to evacuate (e.g., Maombi et al., 2025; Mafuko Nyandwi et al., 2023; Paul, 2012*)*, we move beyond the evacuation decision itself to document the conditions under which evacuation unfolds and show that evacuation can become a source of harm. Severe shortages of transport, water, shelter, and assistance led to asset losses, sickness, family separation, and widespread regret. We show that these experiences shaped subsequent behaviour: individuals who had self-evacuated earlier were less likely to comply with the later official order. This suggests that poorly managed evacuations may discourage future compliance and weaken evacuation as a risk-reduction strategy, as households come to perceive fleeing as more costly—or even riskier—than staying.

Third, we provide new evidence on how communication failures and institutional trust jointly shape responses to official evacuation orders. Prior work emphasizes the importance of clear warning communication (e.g., Dash & Gladwin, 2007). In our case, fewer than half of respondents living inside the zone correctly understood that the order applied to their area. Consequently, perceived inclusion in the evacuation zone predicted evacuation more strongly than actual residence within it. Following a large literature emphasizing the importance of trust in the issuing authority (e.g., Eiser et al., 2012; Elliott & Pais, 2006; Paton, 2008; Saha & James, 2017), we also examine whether institutional trust strengthened responses to the order, using a pre-eruption trust measure. The evidence suggests that trust may have supported compliance primarily among respondents who perceived themselves as covered by the order,

but not among those actually covered. Together, these findings show that official warnings depend not only on credibility, but also on citizens clearly understanding whether they are being targeted.

The remainder of the paper proceeds as follows. Section 2 reviews the literature on evacuation decisions and conditions. Section 3 outlines the context. Section 4 introduces the data and empirical approach. Section 5 presents our results in three parts: the patterns and timing of evacuation in the days following the eruption, the conditions under which evacuation unfolded, and the determinants of evacuation behaviour. Section 6 concludes.

## 2 Literature

Evacuation behaviour has been widely studied, but most evidence comes from middle- and high-income settings, leaving less known about how evacuation unfolds in low-income and fragile contexts. In such settings, three mechanisms are likely to be particularly important. First, weak institutions may affect both the credibility of official warnings and the clarity with which they are communicated. Second, in the absence of reliable guidance, households may rely more strongly on their own experiences to interpret risk. Third, limited public support may increase the costs of evacuation, shaping both immediate decisions and future willingness to comply with official orders. We therefore organize the literature around these three themes—trust and communication, past disaster experience, and evacuation conditions—which also structure our empirical analysis.

### *2.1 Institutional trust and communication*

A growing body of work shows that citizens are more likely to evacuate in response to official warnings when they trust the issuing authority. Trust matters both because it increases the perceived credibility of the message and because it assures people that compliance will lead to better—not worse—outcomes (Eiser et al., 2012; Elliott & Pais, 2006; Ha et al., 2025; Paton, 2008; Tan et al., 2024; Taylor-Clark et al., 2010). Conversely, when institutions are weak or untrusted, people often rely on their own assessments or social cues rather than official instructions (Connolly et al., 2020; Dow & Cutter, 2000; Saha & James, 2017). In low-income contexts in particular, distrust may stem from histories of inaccurate warnings, perceived government neglect, or broader political grievances (Ahsan et al., 2016; Elliott & Pais, 2006; Saha & James, 2017). As one study notes for Kenya and the Philippines, ‘it would not have

mattered if more warnings had been issued as people did not trust them' (Ayeb-Karlsson et al., 2019, p. 759). Beyond trust in the messenger, research also emphasizes that the message itself must be clear, specific, and accurately understood (Dash & Gladwin, 2007). In fragile settings, both institutional trust and communication capacity may be limited, making official warnings particularly difficult to translate into action.

### *2.2 Past disaster experience*

Past disaster experience is widely recognized as an important determinant of evacuation behaviour, but its effects are theoretically ambiguous and empirically mixed. One line of research argues that people who have directly experienced natural disasters tend to perceive risks more accurately and respond more promptly to early warning signals (Cameron & Shah, 2015; Seebauer & Winkler, 2020; Walch, 2018). Another perspective highlights the normalization effect: individuals who have lived through earlier hazards without major harm may downplay future risk or delay evacuation (Cheong, 2022; Doyle et al., 2014; Goodie et al., 2019; Seebauer & Winkler, 2020). A third set of studies emphasizes trauma pathways, where severe losses—such as the death of relatives or destruction of homes—lead to heightened caution and a greater likelihood of fleeing in subsequent disasters (Demuth et al., 2016; Ersing et al., 2020; Huang et al., 2012; Whitehead et al., 2000). Taken together, this literature suggests that the influence of past disaster experience depends on the nature of the earlier event: mild experiences may encourage complacency, whereas severe experiences may intensify perceived risk. These dynamics may be especially important where households cannot rely on credible official guidance and instead interpret risks through the lens of their own past experiences.

### *2.3 Evacuation conditions*

Evacuation research has largely focused on the decision of whether to leave, while devoting far less attention to the conditions under which evacuation unfolds or to the consequences of those conditions for affected households. Yet a growing body of work shows that evacuation and disaster-induced displacement can impose substantial physical, economic, and psychological burdens (Jang et al., 2021; Munro et al., 2017). Recent work also highlights important inequalities in evacuation experiences, with vulnerable groups facing difficulties securing transport, accessing short-term shelter, and obtaining adequate support (Grajdura & Niemeier, 2022; Matsuo et al., 2025). These burdens are likely to be more severe in low-income

and fragile settings where public assistance is limited and households must depend largely on private resources and informal networks. To the best of our knowledge, no study quantitatively links evacuation experience to later responsiveness to official warnings. This leaves open whether poorly managed evacuations undermine future compliance by increasing the perceived costs of leaving.

### *2.4 Evacuation in volcanic contexts*

Volcanic evacuation studies are comparatively rare, reflecting the fact that volcanic eruptions account for only around 1.3% of disasters globally (UNDRR, 2020). Yet volcanic crises share features with more frequently studied hazards, especially wildfires: lava flows may evolve gradually, creating scope for residents to 'wait and see,' while at the same time observable cues such as seismic vibrations, ash fall, or visible lava can also prompt spontaneous protective action before official warnings are issued. At the same time, uncertainty often remains high about hazard trajectories, exposure, and warning timing (McCaffrey et al., 2018; Strahan & Gilbert, 2021; Strahan et al., 2018). These characteristics make volcanic settings particularly informative for studying how households balance personal observations against official guidance.

## 3 Context

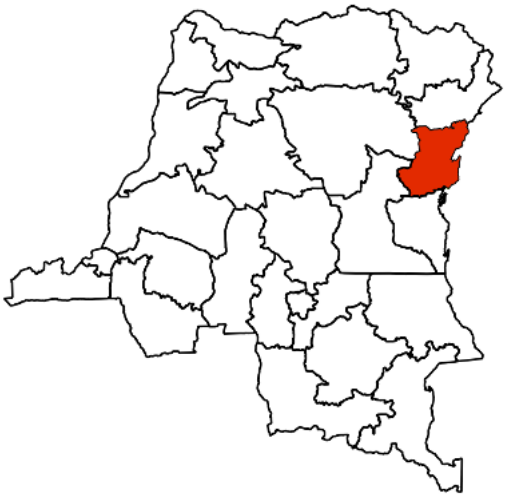
The DRC ranks near the bottom of most internationally comparable indicators, including poverty, human development, and governance quality (World Bank, 2023a; UNDP, 2024; World Bank, 2023b; Kaufmann & Kraay, 2023). Our research takes place in Goma, the capital of North Kivu—the country's most conflict-affected province. Persistent insecurity in the surrounding areas has generated inflows of internally displaced persons, contributing to Goma's rapid expansion from under 0.5 million inhabitants in the late 1990s to an estimated 2 million today (World Bank, 2020b).

Situated on the border with Rwanda and Lake Kivu, the city lies approximately 20 km south of the Nyiragongo volcano (Figure 1). The name 'Goma' is commonly interpreted as a misspelling of the Swahili word Ngoma (drum), referring to the deep rumbling of the volcano—a reminder of the city's long-standing exposure to volcanic risk. Nyiragongo, located within the boundaries of Virunga National Park, is one of eight volcanoes that form the Virunga volcanic chain (Tedesco et al., 2007). It is considered one of the most active and dangerous volcanoes on earth (Smets et al., 2017).

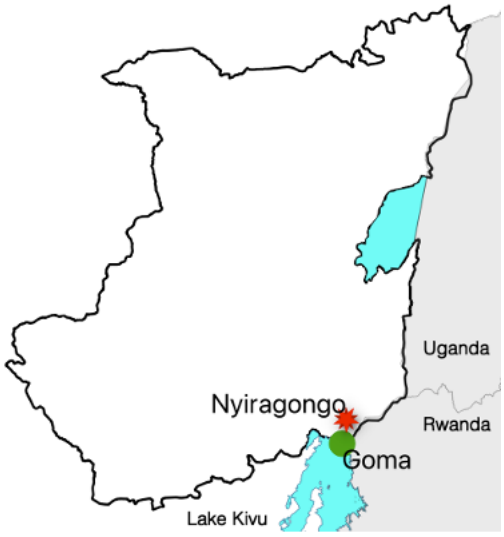
In 1977, Nyiragongo experienced its first well-documented eruption in recent history. A fast-moving lava flow descended from the summit, covering several villages and killing about 70 people, though it did not reach the city of Goma (Allard et al., 2002; Tedesco et al., 2007). The subsequent eruption in 2002 did: the lava flow ran through Goma's city centre, killing more than 200 people, rendering approximately 120,000 homeless, and prompting the evacuation of roughly 400,000 residents—about 80 percent of the city's population at the time (Allard et al., 2002; Michellier et al., 2020).

**Figure 1**. Goma

**Panel A.** North-Kivu in DRC



**Panel B.** Goma in North-Kivu




***Notes:*** Panel A indicates the province of North-Kivu within the DRC (in red). Panel B shows the location of Goma and the Nyiragongo volcano within North-Kivu. Source: authors' compilation.

Monitoring the Virunga volcanic chain is the responsibility of the Goma Volcanic Observatory (GVO), a research centre under the Congolese Ministry of Scientific Research. Prior to the 2002 eruption, the GVO had recorded increased seismicity and volcanic gas emissions for several months and issued alerts about a potential eruption (Allard et al., 2002). Before the 2021 eruption, however, the GVO did not detect clear precursory signals, and no early warning was issued. Whether the absence of an early warning reflected constraints in GVO's monitoring capacity or the intrinsically hard-to-forecast nature of the 2021 eruption remains debated.[2]

[2] According to the GVO's scientific leadership, funding from a World Bank project had ended in June 2020 following allegations of financial mismanagement, which resulted in a loss of internet connectivity between October 2020 and April 2021 and disrupted data transmission and monitoring capacity (Rigaud, 2021; Radio

The eruption on 22 May 2021 produced two lava flows that engulfed three villages and one of Goma's 18 neighbourhoods. Close to 4,000 houses, 12 schools, and four health centres were destroyed, and 32 people died from burns or asphyxiation (Andrews, 2021; OCHA, 2021; UNICEF, 2021). The lava also damaged the electricity network and a major water tank, depriving an estimated 550,000 people of access to electricity and water (Smittarello et al., 2022; UNICEF, 2021).

On the evening of 22 May, alarmed by visible lava flows and the red glow above the volcano, residents began fleeing spontaneously. People moved toward the Rwandan border city of Gisenyi, across Lake Kivu to Bukavu, or to nearby towns such as Sake, located 25 km from Goma. Although the lava flow stopped on 23 May, seismicity remained high, with frequent earthquakes generating widespread anxiety and further damage to buildings (Mafuko et al., 2023; OCHA, 2021).

Because sustained seismic activity can signal an impending second eruption or trigger a gas explosion from Lake Kivu[3], the city authorities issued an evacuation order for 10 neighbourhoods in the night of 26–27 May 2021, advising residents to evacuate toward Sake. The order was communicated live on national radio and television by the military governor, who stressed that the evacuation was compulsory (Deutschs Welle, 2021). This occurred two weeks after the imposition of a 'state of siege' in North Kivu, under which the province was administered jointly by military and civilian authorities (Le Liberal Presse, 2021).[4] An estimated 234,000 people fled Goma following the announcement (UNICEF, 2021).

News outlets and international organizations reported extremely difficult evacuation conditions. Most residents lacked access to transport, and those with vehicles encountered severe traffic congestion. Facilities at the designated destinations were insufficient or absent,

Okapi, 2021a; Pease, 2021). Internet connectivity was restored in May 2021, allowing monitoring to resume, but the lack of continuous data from the preceding months reportedly complicated the identification of abnormal volcanic patterns (Pease, 2021). Other accounts contest this interpretation, arguing that monitoring systems were largely operational and that the 2021 eruption was not preceded by the usual signals that would have enabled reliable short-term prediction (Smets, 2021; Smittarello et al., 2022). From this perspective, the 2021 eruption is viewed as having been intrinsically difficult to forecast, even under well-functioning monitoring conditions.

[3] Lake Kivu contains large quantities of carbon dioxide and methane (Deena, 2024). If these gases would explode, it would present an enormous threat to the surrounding population.

[4] On May 6, 2021, the DRC president declared a 'state of siege' in North Kivu to address rising violence from armed groups, placing the province under military rule. After an initial hybrid transition period, three weeks post-eruption, the civilian authorities were entirely replaced by military and police officers (Actualité.cd, 2021).

and many evacuees lacked food, water, and medical care despite community solidarity efforts (Radio Okapi, 2021b). Conditions in Sake were particularly challenging, with cases of cholera reported among the displaced (UNICEF, 2021).

# 4 Materials and Methods

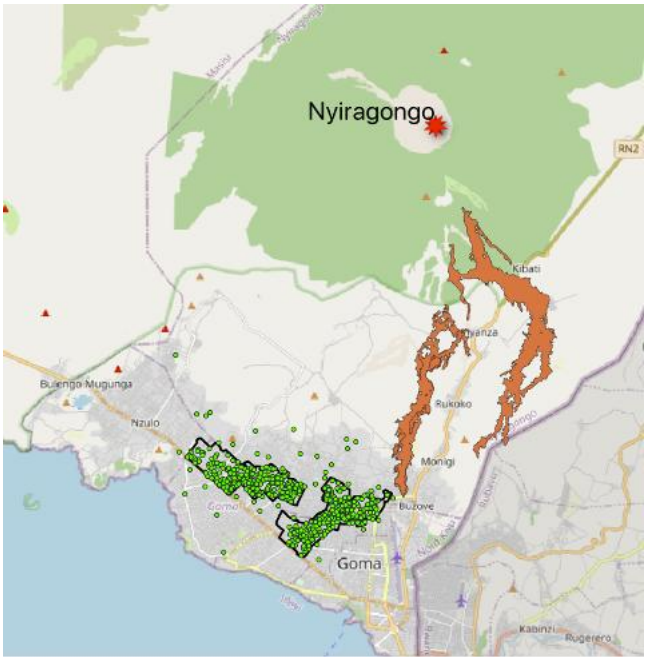
## *4.1. Data collection and sample*

We designed a structured household survey to systematically document evacuation decisions, experiences, and coping strategies during the 2021 Nyiragongo eruption. The survey received ethical clearance[5] and was implemented in July 2021, five weeks after the event. Respondents had originally been sampled in 2019 for a study on electricity access (Lunanga et al.,2026). At that time, we conducted a full census of parcels in two adjacent city areas of Goma (Figure 2), recording the location and construction characteristics of 29,570 households and 1,140 small businesses. Appendix A details the sampling frame and process. The two study areas were located close to the 2021 lava flow but were not engulfed by it. One area fell inside the official evacuation zone, while the other did not, capturing variation in whether the evacuation order applied and in proximity to the lava flow.

Of the 797 respondents interviewed in 2019, we successfully re-interviewed 637 in 2021[6], corresponding to an attrition rate of 20%. Most attritors (86%) had moved away from Goma before the eruption, while only five had not yet returned from evacuating. This pattern suggests that attrition is unlikely to bias our analysis of evacuation behaviour.[7] Because our focus is on evacuation decisions, we exclude 18 respondents who were not in Goma at the time of the eruption. The analytical sample therefore contains 619 households.

[5] Ethical clearance was obtained from the University's Ethical Advice Committee.
[6] Informed consent was obtained from all respondents. Enumerators presented a consent form explaining the study objectives, the purpose and use of individual data, and that participation conferred no direct personal benefit. The survey proceeded only after respondents voluntarily agreed to participate.
[7] Appendix A compares baseline characteristics of re-interviewed and attrited households. Wealthier households were more likely to be traced. In Appendix H we address this by re-estimating the main models based on weighted observations, accounting for our original sampling strategy and survey attrition. Results remain qualitatively unchanged.

**Figure 2.** Location of households and lava flow




***Notes:*** This map shows the location of the two study areas in 2019 (black contours). Green dots indicate the 2021 location of households interviewed for this study. The extent of the lava flow is indicated in orange. Source: Authors' compilation based on data from the United Nations Satellite Centre and OpenStreetMap.

To complement the structured survey, we conducted 17 semi-structured interviews two months later. Respondents were randomly drawn from a subsample of 292 individuals identified by enumerators as likely to provide rich qualitative detail. Interviews continued until thematic saturation was reached. Among the 17 participants, 9 were female; most male interviewees were household heads, whereas most female interviewees were spouses.

### *4.2. Survey measures on evacuation patterns, conditions, and coping strategies*

Respondents were asked whether and when they evacuated, as well as the motivations behind their decision. For evacuees, we collected data on mode of transport, type of shelter, access to water, losses incurred, and assistance received. Respondents were also asked whether they regretted evacuating or staying, followed by open questions probing the main reasons.

To capture households' adaptive responses to the crisis, we recorded whether they used any common coping strategies—such as using savings, borrowing, selling assets, reducing consumption, or seeking assistance from relatives, NGOs, or authorities. The exact wording of questions is provided in Appendix B.

### *4.3. Regression analysis*

To analyse correlates of evacuation behaviour, we estimate binary logit models and report average marginal effects[8]. All models use robust standard errors. We look at two distinct decision points households faced: evacuating immediately after the eruption and evacuating after the official order four days later. We model the two decisions separately because they occurred at distinct points in time and under different information conditions: the first before any official order, the second after most early evacuees had already returned. The second model conditions on being present in Goma when the order was issued and includes prior self-evacuation as a predictor.

Equation (1) examines evacuation immediately after the eruption:

$$logit[P(EE_i = 1)] = \beta_0 + \beta_1 E_i + \beta_2 T_i + \beta_3 X_i \quad (1)$$

Here, $EE_i$ equals one if respondent $i$ evacuated immediately after the eruption, i.e., before the official order. $E_i$ captures prior exposure to the 2002 eruption (living in Goma; experiencing loss), $T_i$ is pre-eruption trust in city authorities, and $X_i$ is a vector of individual and household covariates.

Equation (2) analyses evacuation after the official order:

$$logit[P(EO_i = 1)] = \delta_0 + \delta_1 E_i + \delta_2 Z_i + \delta_3 T_i + \delta_4 X_i \quad (2)$$

Here, $EO_i$ takes one if respondent $i$ evacuated after the official evacuation order. $E_i$, $T_i$, and $X_i$ are as in equation (1), but $E_i$ now additionally includes an indicator for self-evacuation earlier in the week (i.e. $EE_i$ in equation 1). $Z_i$ captures whether the evacuation order applied to the respondent, using both an objective measure (actual residence in the evacuation zone) and a subjective measure (whether the respondent believes their neighbourhood is included).

To test whether trust matters only when respondents perceived the order as applicable to them, we augment Equation (2) with an interaction, yielding Equation (3) below.

$$logit[P(EO_i = 1)] = \delta_0 + \delta_1 E_i + \delta_2 Z_i + \delta_3 T_i + \delta_4 X_i + \delta_5 (Z_i * T_i) \quad (3)$$

[8] Results are similar when we estimate the equations using the Linear Probability Model.

### *4.4. Variable measurement and descriptive statistics*

Table 1 summarizes the explanatory variables used in Equations (1) and (2). Prior experience with the Nyiragongo eruption is captured through two indicators: whether the respondent lived in Goma during the 2002 eruption (54%), and whether they experienced a severe loss at that time—defined as the death of a household member or the destruction of their home (16%).

We measure whether the 2021 evacuation order applied to respondents using both actual and perceived residence in the evacuation zone. Based on household GPS coordinates, 37% lived inside the official zone. By contrast, only 27% believed their neighbourhood was included, comprising 17% who correctly identified that they lived inside the zone, while 10% incorrectly believed they were included.

Institutional trust is captured using a pre-eruption measure from the 2019 survey. Because Goma was governed under a 'state of siege' in May 2021—led jointly by a military governor and civilian authorities—trust in both military and civilian authorities is relevant. Levels of trust were similar across the two categories, at around 30% each. In our baseline analysis, we use a combined indicator equal to one if the respondent trusted either type of authority, which applies to about 40% of respondents. Later, we show that the results are robust when trust in military and civilian authorities is considered separately.

**Table 1.** Descriptive statistics of main explanatory variables

| | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| ***Previous experience*** | | | | | |
| Was in Goma during 2002 eruption | 619 | 0.54 | 0.50 | 0 | 1 |
| Member lost or house destroyed during 2002 eruption | 619 | 0.16 | 0.36 | 0 | 1 |
| ***Official warning*** | | | | | |
| Resided in evacuation zone | 619 | 0.37 | 0.48 | 0 | 1 |
| Believed to reside in evacuation zone | 619 | 0.27 | 0.44 | 0 | 1 |
| Correctly believed to reside inside evacuation zone | 619 | 0.17 | 0.38 | 0 | 1 |
| ***Institutional trust*** | | | | | |
| Trust in military city authorities | 619 | 0.27 | 0.45 | 0 | 1 |
| Trust in civilian city authorities | 619 | 0.28 | 0.45 | 0 | 1 |
| Trust in either one of the city authorities | 619 | 0.39 | 0.49 | 0 | 1 |
| ***Control variables*** | | | | | |
| Household distance to the lava (km) | 619 | 3.89 | 1.67 | 0.32 | 7.78 |
| Respondent's age | 619 | 39.71 | 12.10 | 18 | 77 |
| Secondary education or higher | 619 | 0.45 | 0.50 | 0 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| Female respondent | 619 | 0.56 | 0.50 | 0 | 1 |
| Household head | 619 | 0.49 | 0.50 | 0 | 1 |
| (Very) High propensity to take risk | 619 | 0.25 | 0.44 | 0 | 1 |
| Was sick or disabled at time of 2021 eruption | 619 | 0.18 | 0.38 | 0 | 1 |

***Notes:*** This table is based on information from 619 respondents. Appendix B provides detailed variable descriptions.

We further control for key individual and household characteristics, including distance to the lava flow (mean 3.9 km), age (mean 39.7 years), secondary education or higher (45%), female gender (56%), household head status (49%), self-reported risk-loving preferences (25%)[9], and being sick or disabled at the time of the eruption (18%).

# 5 Results

## *5.1. Evacuation patterns and timing*

Figure 3 shows that evacuation unfolded in two distinct phases. On the evening of 22 May, 35% of respondents evacuated immediately, without any official instruction. Only a further 3% left in the following four days. Returns were rapid: 68% of those who fled on the first day had returned by the next day, and by the time the official evacuation order was issued, 81% of early evacuees were already back in Goma. Only 15% of respondents evacuated after the official order.[10] This corresponds to 40% of those actually living in the designated evacuation zone and 55% of those who believed their neighbourhood was included in it. Half of respondents never evacuated.

The qualitative interviews help interpret these patterns. Respondents consistently described the first wave of evacuation as a spontaneous reaction to visible danger, followed by widespread disappointment and early returns once people encountered dire conditions in their places of refuge. As information about these experiences circulated rapidly through social networks, it discouraged those who had initially stayed behind from evacuating later.

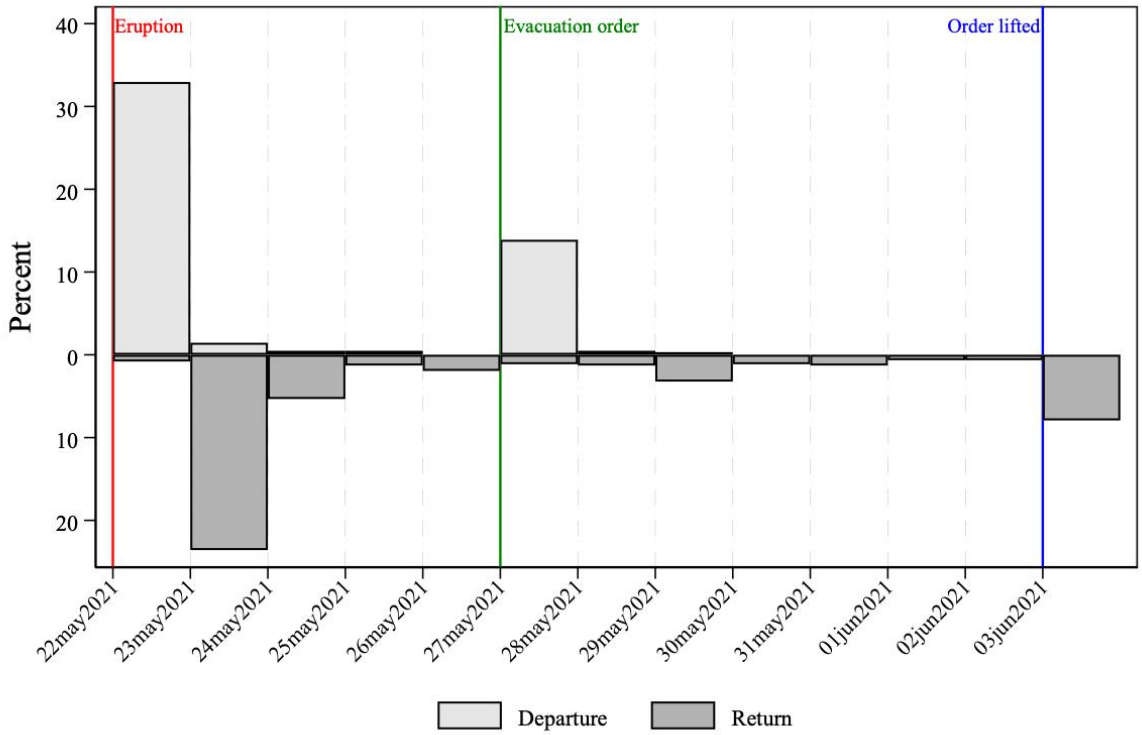
[9] Respondents were presented a scale from 0-10, where 0 represents individuals seeking to avoid as many risks as possible and 10 represents individuals prepared to take as many risks as possible. Respondents were asked to place themselves on this scale based on their attitude toward risk. Those selecting a value of 6 or higher were classified as risk loving.

[10] Our survey did not directly ask whether respondents evacuated during both waves. We therefore infer double evacuation from respondents' reported timing and stated reasons for leaving. Respondents who reported evacuating before the official order but also cited compliance with the order as a reason for evacuation are classified as having evacuated in both waves. Using this definition, 3% of respondents evacuated twice; they are included in the 15% mentioned in the text. If we instead use a broader classification that includes respondents who returned only after 30 May—that is, at least three days after the order—the share rises to 5.5%. Even under this broader classification, results remain qualitatively unchanged.

One respondent described how hunger, illness and poor living conditions made the evacuation short-lived:

N1. *'Many fled, but only for one or two days. The reason for this was that people were too hungry at their destination, and others fell ill - in the Sake area there was cholera at the time. Also, living conditions were not good. These were conditions that people who are used to living in the city would find really hard to bear.'* (Male household head, 47 years old)

**Figure 3**. Departure and return dates.




***Notes***: This figure is based on the sample of respondents present in Goma at the time of eruption and/or evacuation order (N=619). The horizontal axis displays the departure and return dates, starting on May 22nd, the eruption day (red line), and ending on June 3rd (blue line). While 47 respondents returned between June 3 and July 1, we include them in the group of those who returned on June 3rd to make the figure easier to read.

Another respondent emphasized how the quick return of early evacuees reshaped perceptions among those who had stayed:

N2. *'Those who left returned too quickly because of the poor living conditions. Some told us that they couldn't even find toilets. This encouraged those of us who stayed to stop thinking about leaving.'* (Male household head, 54 years old)

Respondents also pointed to the lack of accompanying measures, which made the evacuation order appear unrealistic:

N3. *'They asked us to leave without even telling us where we were going to stay and without making any means of transport available. Transport was already expensive as there was already a shortage of fuel in the town. They didn't prepare anything for the refugees. Those who had left before told us that there was no place to rest in Sake. After analyzing all this, and given that my friends who could host me lived a long way from Goma, I couldn't take the risk of leaving'* (Male household head, 47 years old)

Together, these accounts demonstrate how early evacuation experiences—both lived and communicated— prompted rapid returns and reduced willingness to comply with the later evacuation order. They point to the importance of evacuation conditions and logistical constraints, which we examine in detail in the next section.

### *5.2. Evacuation conditions and coping strategies*

Table 2 summarizes key aspects of evacuation conditions for all evacuees and separately for those who left immediately after the eruption and those who evacuated after the official order, excluding the small group (3%) who evacuated in both waves. The evidence indicates that evacuation occurred largely without institutional support.

No respondents reported using government-provided transport, even after the official order. Most people left Goma on foot (68%), especially those who fled directly after the eruption (81%). Overall, 43% of evacuees lacked access to drinking water and 25% reported water-related health problems. Conditions were somewhat better for those who evacuated after the order—81% reported access to water, compared with 50% among early evacuees. Communication services remained largely functional (83% reported access), but assistance from external actors was rare: only 6% received aid, mostly from NGOs or private donors. Shelter arrangements further illustrate the difficult conditions. Among those who evacuated after the eruption, 46% stayed with relatives or friends, whereas 33% slept on the streets. Later evacuees relied more on social networks (74%) and only 8% slept on the streets. In both waves, around 11% took refuge in churches or schools. Human and material losses were substantial: 29% reported losing assets, 12% experienced family separation, 9% became sick or injured, and 1% lost a relative. As shown in Appendix C, these losses from evacuation itself exceeded direct losses from the lava.

**Table 2.** Evacuation conditions

| | (1) Evacuated | (2) After eruption | (3) After evacuation order | (4) Diff (2)-(3) | (5) sig. |
|---|---|---|---|---|---|
| ***Means of evacuation transport*** | | | | | |
| on foot | 0.68 | 0.81 | 0.27 | 0.538 | *** |
| commercial vehicle | 0.20 | 0.11 | 0.49 | -0.371 | *** |
| own private vehicle | 0.09 | 0.06 | 0.16 | -0.098 | * |
| government-provided transport | 0.00 | 0.00 | 0.00 | 0.00 | |
| ***Access*** | | | | | |
| access to water during refuge | 0.57 | 0.50 | 0.81 | -0.31 | *** |
| health issues caused by water | 0.25 | 0.25 | 0.27 | -0.02 | |
| access to communication during evacuation | 0.83 | 0.82 | 0.88 | -0.06 | |
| received aid from donors during evacuation | 0.06 | 0.05 | 0.14 | -0.09 | ** |
| ***Shelter*** | | | | | |
| relatives/friends | 0.52 | 0.46 | 0.74 | -0.282 | *** |
| on the street | 0.27 | 0.33 | 0.08 | 0.252 | *** |
| public places (churches, schools) | 0.11 | 0.11 | 0.11 | -0.003 | |
| unknown families | 0.07 | 0.08 | 0.03 | 0.051 | * |
| ***Losses during evacuation*** | | | | | |
| lost assets during the evacuation | 0.29 | 0.33 | 0.19 | 0.14 | ** |
| separated from relatives during evacuation | 0.12 | 0.14 | 0.07 | 0.074 | * |
| injured or sick during evacuation | 0.09 | 0.10 | 0.07 | 0.028 | |
| lost relatives during evacuation | 0.01 | 0.01 | 0.00 | 0.009 | |

***Notes:*** Column 1 is based on the sample of evacuees (N=311) while columns 2 and 3 are based on the sample of those who evacuated after the eruption (N=219) and those who evacuated upon the evacuation order (N=74), respectively. Respondents who evacuated after the eruption and then evacuated again after the evacuation order (18) are excluded from both subgroups. Columns 4 and 5 represent the difference in means between both groups and its statistical significance based on a t-test. ***p<0.01, ** p<0.05, * p<0.1

The relatively better conditions reported by those who evacuated after the official order likely reflect both improved individual preparedness over time and selection into later evacuation, rather than effective institutional support. Households evacuating later had more time to gather information, mobilize resources, and arrange transport or shelter, in contrast to the spontaneous flight that followed the eruption. Moreover, evacuation after the order involved a much smaller and selective group of households: those who ultimately complied were likely better resourced or had stronger social networks outside Goma, enabling them to evacuate under comparatively better conditions.

The poor evacuation conditions translated into widespread regret. Table 3 shows that 83% of evacuees regretted their decision to leave, whereas only 13% of non-evacuees regretted staying. Among those regretting evacuation, 71% reported that ‘fleeing proved more difficult than staying’ and 66% mentioned ‘poor living conditions during refuge’ as their main reasons. Others referred to loss of possessions (13%), looting of their home (6%), separation from a household member (6%), injuries (5%), or high expenses incurred during the evacuation (6%).

**Table 3.** Attitudes of evacuees and non-evacuees

| **Panel A. Attitudes of evacuees** | | |
|---|---|---|
| | **Freq.** | **%** |
| Regret to have evacuated | 258 | 0.83 |
| ***Reasons to regret the evacuation*** | | |
| Fleeing proved more difficult than staying | 183 | 0.71 |
| The poor living conditions during the refuge | 171 | 0.66 |
| Household lost possessions during evacuation | 33 | 0.13 |
| My home was looted after I left | 15 | 0.06 |
| Spent lot of money during the refuge | 15 | 0.06 |
| I was injured during the evacuation | 12 | 0.05 |
| The household split up / lost a member | 12 | 0.05 |
| I faced insecurity on the way during the refuge | 8 | 0.03 |
| Other reasons | 21 | 0.08 |
| **Panel B. Attitudes of non-evacuees** | | |
| | **Freq.** | **%** |
| Regret to have stayed | 40 | 0.13 |
| ***Reasons to stay*** | | |
| Had to look after the household property | 147 | 0.48 |
| I wasn't afraid; I knew nothing was going to happen | 140 | 0.46 |
| The area where I live was not affected by the evacuation order | 105 | 0.34 |
| I couldn't give up my business | 80 | 0.26 |
| I thought it was more dangerous to go than to stay | 64 | 0.21 |
| I was ill/a member in my family was ill | 29 | 0.09 |
| I had no means (money/transportation) to flee | 18 | 0.06 |
| I had nowhere to go | 16 | 0.05 |
| Other reasons | 22 | 0.07 |

***Notes:*** Panel A reports the reasons to regret the evacuation decision and is based on information from respondents who reported they regret to have evacuated (N=258). Panel B reports the reasons to stay and is based on information from respondents who did not evacuate (N=308).

Non-evacuees' explanations for staying further reflect the absence of effective and credible institutional support. Nearly half (48%) reported that they stayed to look after property, and 46% stated that they did not think they were in danger. A third (34%) reported that their area was not covered by the evacuation order (although about a third of these respondents in fact lived inside the evacuation zone), and 26% stayed because they could not give up their business. Others indicated that they believed leaving to be more dangerous than staying (21%), that illness in the household prevented them from leaving (9%), or that they had nowhere to go (5%) or no money or transport to evacuate (6%).

Coping strategies relied overwhelmingly on households' own resources and social networks (Table 4). A large majority used savings (76%), reduced consumption to stretch their stocks (54%) or received support from family members (44%). About a third (32%) borrowed money from someone outside the family, and 21% sold household assets to raise cash. Only 2% reported receiving help from the government, and 6% reported aid from donors.

**Table 4.** Coping strategies

| | Freq. | % |
|---|---|---|
| Used household savings | 472 | 0.76 |
| Reduced consumption to last longer with the stock available | 332 | 0.54 |
| Asked support from family members | 270 | 0.44 |
| Borrowed from someone outside my family | 197 | 0.32 |
| Sold household assets to raise cash | 127 | 0.21 |
| Let each adult member go their own way | 60 | 0.10 |
| Got help from donors (foundations, NGOs, etc.) | 36 | 0.06 |
| Broke the contract with domestic worker to reduce costs | 17 | 0.03 |
| Sold my house for fear of losing everything because of lava | 15 | 0.02 |
| Got help from the government | 13 | 0.02 |
| Other | 17 | 0.03 |

***Notes:*** This table is based on information from 619 respondents. Appendix B provides detailed variable descriptions.

Appendix D further illustrates the government's shortcomings in managing the crisis. While more than a third of respondents rated NGOs (0.35) and church authorities (0.39) as able to address the population's needs, fewer than one in five considered state actors able to do so: the national army (0.19), local authorities (0.17), and national policymakers (0.17).[11] These evaluations reinforce the perception that government institutions under-performed during both the eruption and the evacuation.

In short, evacuation decisions were made under severe constraints and limited institutional support. To formally assess how experience, trust, and communication shaped these decisions, we now turn to the regression analysis.

### *5.3. Determinants of evacuation behaviour*

Table 5 reports marginal effects from the logit models specified in Equations (1) and (2).[12] Column 1 examines the decision to evacuate immediately after the eruption, while Columns 2 and 3 focus on evacuation following the official order.

Prior experience with the Nyiragongo eruption played a nuanced role in shaping early self-evacuation. Respondents who had lived in Goma during the 2002 eruption were 8 percentage points less likely to evacuate after the 2021 eruption, consistent with a normalization effect. By contrast, those who reported traumatic experiences in 2002—losing a household member or having their house destroyed—were 13 percentage points more likely to evacuate in 2021.

[11] Respondents were asked to assess the ability of different actors to respond to their needs during the eruption and the associated evacuation crisis, using a five-point scale ranging from 1 ("very able") to 5 ("very unable") (see Figure A3). The reported figures correspond to the share of respondents who rated each actor as "very able" or "able" (see Table A4).

[12] Estimates from the logit models are presented in Appendix E.

The interviews deepen our understanding of the dual role of past eruptions. Some saw the volcano as familiar and manageable:

N4. *'Those who fled the most were young people and people who had never seen the volcano. Also, people who hadn't lived long in Goma, especially the boys from Bukavu, were in disarray and panic. They were the first to flee because for them it was something new. While we, the people with experience of the volcano, thought it was normal.'* (Male household head, 53 years old)

Others, by contrast, recalled near-death experiences that motivated them to leave quickly:

N5. *'My husband wanted me and the children to go ahead. I didn't want to oppose because, having seen the volcano in 2002 where I almost died, I understood that he was right, and I wanted to distance myself.'* (Head's wife, 42 years old)

Moreover, some respondents emphasized traumatic past evacuations as a reason not to flee again:

N6. *'The evacuation order would never have changed my decision to flee. I had a very bad experience of the 2002 volcano. We suffered too much during our escape and for me to flee now, the danger must be close at hand and really real. In fact, even in 2002, I left because I was still a child. We regretted it enormously. Now I can't run away until I feel the heat of the volcano myself, just a few meters from my house.'* (Male household head, 37 years old)

**Table 5.** Determinants of evacuation after the eruption and the order

| VARIABLES | Evacuation after the eruption | Evacuation after the order | Evacuation after the order |
|---|---|---|---|
| | (1) | (2) | (3) |
| ***Previous experience*** | | | |
| Was in Goma during 2002 eruption | -0.082** | -0.031 | -0.038 |
| | (0.041) | (0.032) | (0.033) |
| Member lost or house destroyed during 2002 eruption | 0.131** | 0.036 | 0.039 |
| | (0.055) | (0.044) | (0.043) |
| Self-evacuated after the 2021 eruption | | -0.148*** | -0.143*** |
| | | (0.038) | (0.038) |
| ***Evacuation order and trust*** | | | |
| Believes to reside in evacuation zone | | 0.102*** | |
| | | (0.032) | |
| Resides in evacuation zone | | | 0.019 |
| | | | (0.032) |
| Trust in government authorities | 0.026 | 0.016 | 0.012 |

| | | | |
|---|---|---|---|
| | (0.038) | (0.029) | (0.030) |
| ***Control variables*** | | | |
| (Very) high propensity to take risk | -0.078* | -0.046 | -0.043 |
| | (0.044) | (0.037) | (0.037) |
| Logarithm of household distance to the lava | -0.098** | -0.041 | -0.087** |
| | (0.050) | (0.040) | (0.042) |
| Age | -0.003 | -0.005*** | -0.004*** |
| | (0.002) | (0.002) | (0.002) |
| Female | 0.056 | 0.102*** | 0.111*** |
| | (0.055) | (0.038) | (0.040) |
| Secondary education or higher | -0.161*** | 0.000 | -0.002 |
| | (0.039) | (0.033) | (0.033) |
| Household chief | -0.041 | 0.033 | 0.035 |
| | (0.055) | (0.036) | (0.038) |
| Was sick at the time of the eruption | 0.110** | -0.027 | -0.031 |
| | (0.048) | (0.042) | (0.043) |
| Observations | 619 | 574 | 574 |

*Notes*: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. This table presents marginal effects from logit regressions as specified in eq. (1) and (2). Column (1) is based on the full sample of respondents who were in Goma at the time of the eruption. Columns (2) & (3) are based on the sample of respondents who were in Goma when the official order was issued.

Columns 2 and 3 turn to evacuation after the official order. In line with the narrative above, respondents who had self-evacuated earlier in the week and returned before the order were about 15 percentage points less likely to evacuate after the order. This is consistent with the interpretation that difficult early evacuation experiences discouraged later compliance.

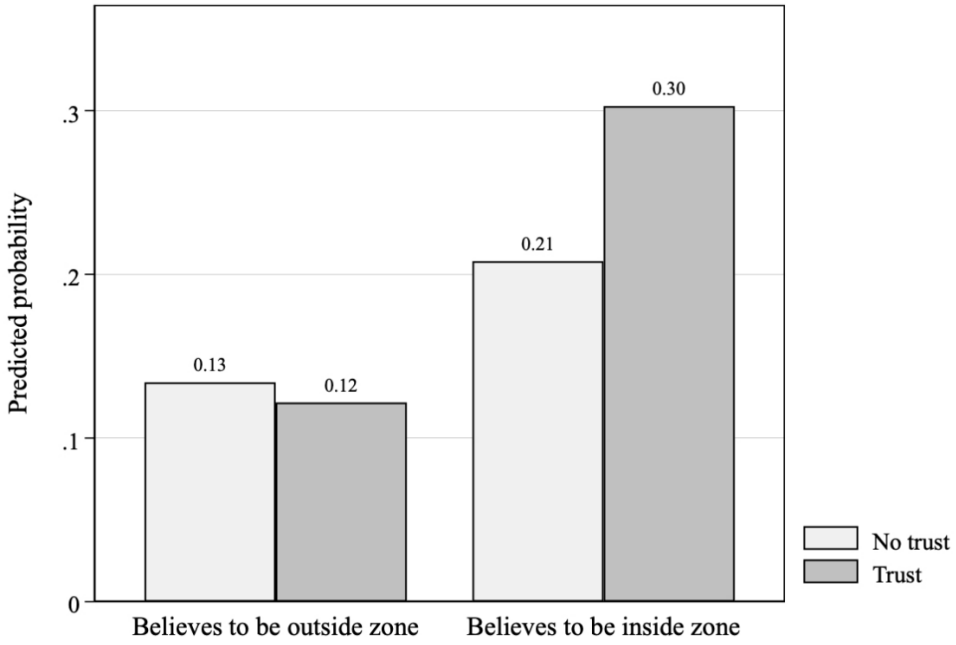
Turning to the official order and institutional trust, we find that beliefs about residing in the evacuation zone are strongly predictive of compliance. Respondents who believed that their neighbourhood was included were 10 percentage points more likely to evacuate, irrespective of whether this belief was correct (column 2). By contrast, actual residence within the evacuation zone has no significant effect on compliance (column 3). This suggests that the effectiveness of the official warning depended critically on communication and public comprehension of zone boundaries.

Trust in city authorities is not significantly associated with evacuation after the order. This is not surprising: trust may operate differently depending on whether people believed the order applied to them. Figure 4 explores this possibility. Panel A plots predicted probabilities from Equation (3), which interacts institutional trust with perceived residence in the evacuation zone. Among respondents who believed they were outside the evacuation zone, trust is unrelated to

evacuation. Among those who believed they were inside the zone, trust is associated with a higher predicted probability of evacuation: 30%, compared with 21% among those who did not trust authorities. This difference is imprecisely estimated and should therefore be interpreted with caution.[13] When actual rather than perceived residence in the evacuation zone is used, the pattern disappears (Panel B). Overall, these results suggest that perceived inclusion in the evacuation zone—rather than actual residence—shaped responses to the order, with trust potentially reinforcing compliance within this group.[14]

**Figure 4**. Predicted probability of fleeing after the evacuation order

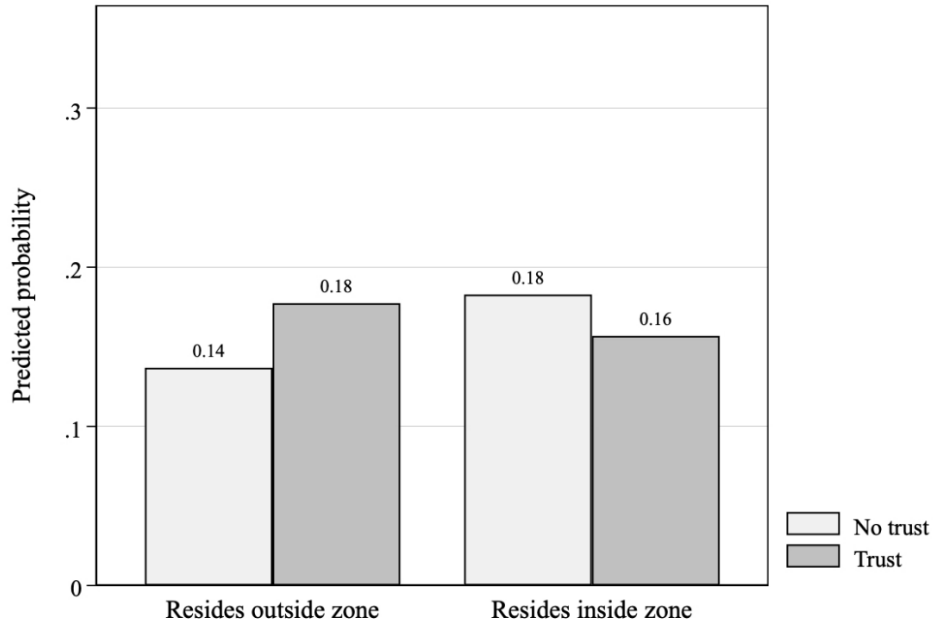
**Panel A**. By institutional trust and perceived residence in evacuation zone




**Panel B**. By institutional trust and actual residence in evacuation zone

[13] The imprecise estimate likely reflects the relatively small size of the subsample who believes the evacuation order applies to them and the low overall incidence of fleeing behaviour after the evacuation order. See Appendix F.

[14] In this analysis, we are considering trust in both military and civilian authorities because both co-managed the crisis (cf. background section). In Appendix G we show that results hold when we consider trust in each of the two kinds of authorities, separately.




***Notes:*** This figure displays the predicted probabilities of fleeing after the evacuation order by (perceived) residence in the evacuation zone and institutional trust. It is based on marginal effects from logit regression as specified in Equation (3), zooming in on the interaction between institutional trust and (perceived) residence in the evacuation zone. Detailed results are presented in Appendix F.

The narratives complement the quantitative findings by illuminating the mechanisms through which trust and communication influenced evacuation decisions.

First, several respondents explained why they did not follow the official order, highlighting a loss of credibility due to the authorities' failure to warn about the first eruption:

N7. *'Our neighbourhood wasn't affected by the evacuation order, but even if it had been, I wouldn't have fled anymore…. The authorities didn't know that it was going to erupt the first time, so how could they have been informed that it might erupt the second time? They didn't inform us when we needed the information the most.'* (Male household head, 60 years old)

Others went further, questioning the intentions behind the order:

N8. *'Can you imagine that the volcano has already spewed lava and stabilized, and it's only then that the authorities give the order to evacuate? It didn't make much sense to me, because the evacuation order should be given before the disaster, not afterwards. In those conditions, I couldn't evacuate, it was just a distraction. In any case, I think it was a way of increasing the number of evacuees to attract help and assistance.'* (Male Household head, 64 years old)

Still others described confusion around the evacuation zone, which led some to flee unnecessarily and others to ignore the order:

N9. *'As far as the evacuation order is concerned, even the Bible says it: 'my people perish for lack of knowledge'. For example, Mikeno was one of the 10 districts cited for evacuating the town. However, here at home in Ndosho, we have a school called Mikeno. Some people who couldn't tell the difference between Mikeno as a district and Mikeno as a school had to flee just by hearing the name Mikeno. There was a terrible communication and information problem. So some people fled without really knowing why.'* (Male household head, 52 years old)

N10. *'Even if they'd said that our neighbourhood wasn't affected by the evacuation order, I'd still have evacuated. Imagine being told that the gas could explode, but in the meantime being told that the neighbourhoods near the lake are not affected by the evacuation order, even though they are the most vulnerable in this case because it's the lake that houses the gas... It was just trial and error, nothing more.'* (Female household head, 42 years old)

These narratives illustrate how trust and the order's perceived relevance interacted: people who had little faith in the authorities or doubted their technical competence saw little reason to alter their behaviour in response to the order.

Finally, several individual and household characteristics also influenced early evacuation. Respondents who reported a (very) high propensity to take risks were 8 percentage points less likely to evacuate. Greater distance from the lava reduced the likelihood of evacuation: a higher log-distance to the lava was associated with a 10-percentage point lower evacuation probability. Those who were sick or disabled at the time of the eruption were 11 percentage points more likely to leave, suggesting that perceived vulnerability increased responsiveness. Respondents with at least secondary education were 16 percentage points less likely to evacuate than those with lower education. Age and gender are associated with compliance with the official evacuation order. Women were about 10 percentage points more likely to evacuate after the order[15], while each additional year of age reduced the likelihood of evacuation by around 0.5 percentage points.

[15] Drawing on the same survey data, a study showed that women's higher likelihood of evacuation reflected intra-household labour division rather than gender differences in risk aversion [Anonymous, 2025].

# 6 Conclusion

We examined evacuation behaviour and conditions among Goma residents following the 2021 Nyiragongo eruption, in a setting marked by weak state capacity, limited preparedness, and a belated evacuation order. Drawing on survey data from 619 households, pre-eruption measures of institutional trust, and qualitative interviews, we studied how households navigated evacuation in the absence of official guidance, under what conditions evacuation unfolded, and how people responded when an official order was finally issued.

The findings show that, when public preparedness is weak, households rely heavily on their own risk assessments, past experiences, resources, and social networks. Prior disaster experience shaped early evacuation in opposite directions. Residents who had lived through the 2002 eruption without major loss were less likely to flee in 2021, consistent with a "wait-and-see" response. By contrast, those who had experienced traumatic losses in 2002 were more likely to evacuate immediately. Qualitative interviews further suggest that difficult evacuation experiences generated reluctance to flee again for some residents.

Evacuation itself imposed substantial costs. Most evacuees fled on foot, often without adequate access to water, shelter, or assistance; many slept on the street, fell sick, lost assets, or were separated from relatives. Government support was nearly absent, and households coped mainly through savings, reduced consumption, borrowing, asset sales, and family networks. These conditions generated widespread regret: 83% of evacuees reported wishing they had not left. The fact that earlier self-evacuees were significantly less likely to comply with the later official order is consistent with the interpretation that difficult evacuation experiences can reduce subsequent willingness to flee.

Responses to the official order also reveal the importance of communication. Fewer than half of those living inside the designated evacuation area correctly identified their status, and perceived inclusion in the evacuation zone predicted evacuation more strongly than actual residence. Trust in authorities was not associated with compliance in the full sample, but the pattern of predicted probabilities suggests that trust supported compliance among respondents who believed the order applied to their neighbourhood. This underscores a broader point: trust can only translate into protective behaviour when official instructions are clearly communicated and understood.

These findings are concerning because poorly supported evacuations may weaken the credibility of future warnings. If evacuation is experienced as more dangerous, costly, or uncertain than staying, households may become less willing to flee even when future risks are severe. In fragile settings, disaster response failures can therefore generate behavioural legacies that undermine later crisis management.

The policy implications are practical. Authorities in Goma and similar fragile urban settings need credible, low-cost evacuation planning that reflects how households cope. This includes clear communication about evacuation zones, designated collection points for those fleeing on foot, basic transport support, and pre-identified shelters with minimum water and sanitation capacity. Because many residents rely on family networks, churches, schools, and neighbourhood leaders, preparedness plans should incorporate these actors rather than treating evacuation as a purely state-led process. Risk communication should also acknowledge heterogeneous prior experiences, addressing both risk normalization among residents who have "survived before" and trauma-driven reluctance among those who associate evacuation with hardship.

More broadly, the mechanisms documented here—private coping under weak public provision, reliance on personal risk assessment, costly evacuation experiences, and communication failures—are likely relevant beyond Goma. They speak to a wider development problem: when states lack the capacity to provide credible information and basic protective infrastructure, households must make life-saving decisions under uncertainty and at high private cost. The findings align with the Sendai Framework's emphasis on preparedness and context-specific evacuation planning, while showing how far fragile low-income settings remain from realizing these principles in practice. Grounding disaster preparedness in the lived realities and coping strategies of affected communities is therefore essential for designing evacuation systems that are feasible, credible, and protective.

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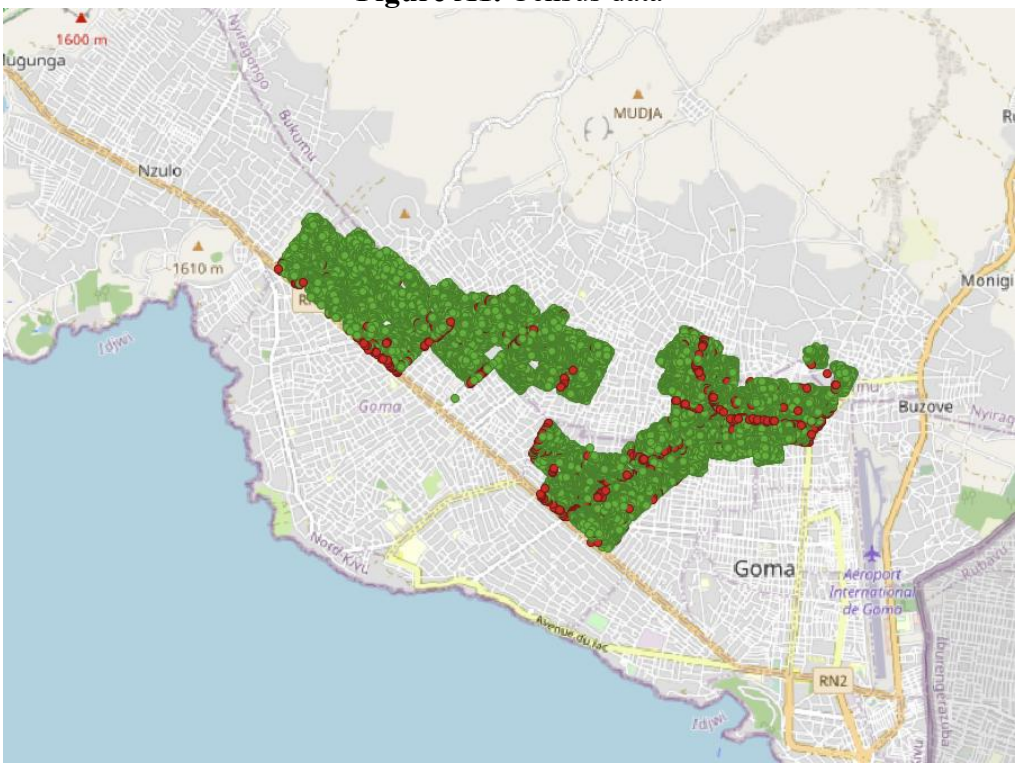
# Appendix

## A. Sampling and attrition

Our study presents findings based on in-person surveys conducted between July and August 2021. Obtaining a relevant sample in the aftermath of a disaster is often challenging. Therefore, we relied on a sample of respondents initially interviewed in 2019. At that time, we carried out a full census of dwellings in two city areas of Goma, recording information on the location and construction quality of 29,570 households and 1,140 small businesses (see Figure A1). These two city areas were selected for a research project on the impact of electricity provision in communities near Virunga National Park. One of these areas was scheduled to be connected to electricity grid, while the other area was selected for its similarities in population size, number of businesses, and quality of construction but would not receive access to electricity (Lunange et al., 2026.

**Figure A1.** Census data



*Notes:* This map illustrates the 2019 census data for our two study areas in Goma. In total, we display the locations of 29,570 households (indicated in green) and 1,140 small businesses (indicated in red).
Source: Authors' compilation based on the census data and OpenStreetMap.

Based on the census, we drew a random sample of 600 households and 200 businesses. In the treatment area (the area to be connected to the grid), we oversampled households and businesses that were more likely to get connected to the electricity grid when the electrification program was rolled out (i.e. those with 'very good' or 'rather good' quality of construction). For households and businesses in the control area, we drew a random sample stratified by construction quality. Our sample is therefore biased towards wealthier households who are more likely to pay electricity connection and consumption fees.

Three selected respondents could not be reached, and the final database from 2019 contained information on 599 households and 198 businesses. Table A1 compares the construction quality of houses in the census and the sample. It shows that all levels of construction quality are represented in the sample, but unweighted data indicates that households in the "very bad" category are underrepresented, and those in the "rather good" and "very good" categories are overrepresented. To address this issue, we used the census data to calculate sampling weights as the inverse probability of being selected. When applying these weights, the distribution of construction quality in the households' sample closely aligns with that of the census.

**Table A1.** Comparing the construction quality of houses in the 2019 census and sample

| | 2019 households | | | 2019 SMEs | | |
|---|---|---|---|---|---|---|
| | census | sample unweighted | sample weighted | census | sample unweighted | sample weighted |
| Very bad | 35.36% | 14.86% | 31.89% | 17.98% | 15.15% | 13.26% |
| Rather bad | 47.11% | 46.74% | 51.93% | 36.14% | 36.87% | 38.00% |
| Rather good | 14.90% | 31.89% | 13.78% | 30.18% | 30.30% | 32.89% |
| Very good | 2.62% | 6.51% | 2.40% | 15.70% | 17.68% | 15.85% |

For our 2021 survey on evacuation behaviour after the Nyiragongo eruption, we set out to re-interview all 599 households and 198 small business respondents. In total, we were able to interview 500 households and 137 small businesses, while 142 respondents could not be reached and 18 refused to participate resulting in a 20% attrition rate. After talking with neighbours and relatives, it emerged that only five of the respondents we could not reach had not yet returned from the evacuation, while the remaining 137 moved away from Goma before the eruption, reducing concerns about the attrition's impact on our findings regarding disaster evacuation behaviour.

In 2021, we administered the same survey to all respondents, regardless of whether they were interviewed as households or small businesses in 2019. As such, we do not have initial characteristics

of households that were administered a business survey in 2019, making it impossible to consider them in any further attrition-related analysis. Therefore, we focus on the subsample of 599 initially surveyed as households to demonstrate that this attrition does not undermine our results.

In Table A2 we compare the 99 households that were part of the original 2019 survey but were not interviewed in 2021 ('attritors') with the 500 households interviewed ('non-attritors'). We find that relatively smaller and poorer households were more likely to drop out of the sample. Then in appendix H, we re-estimate our main model, but now based on weighted observations, accounting for our original sampling strategy and survey attrition, and find that our results remain qualitatively the same.

**Table A2.** Comparing attritors and non-attritors

| **Households' characteristics** | **Attritors** | **Non-attritors** | **Diff.** | **sig** |
|---|---|---|---|---|
| observations | 99 | 500 | | |
| Age household head (in years) | 36.45 | 43.91 | 7.45 | *** |
| Female household head (0/1) | 0.10 | 0.12 | 0.02 | |
| Number of household members | 6.28 | 7.92 | 1.64 | *** |
| Number of children | 3.10 | 3.92 | 0.82 | *** |
| Number of working age members | 3.06 | 3.78 | 0.72 | *** |
| Number of elderly | 0.06 | 0.16 | 0.10 | * |
| House owner (0/1) | 0.45 | 0.84 | 0.39 | *** |
| House of (very) high quality construction (0/1) | 0.23 | 0.41 | 0.18 | *** |
| Owns a car (0/1) | 0.03 | 0.05 | 0.02 | |

*Notes*: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; significance levels are obtained from a two-sample t-test that compares main characteristics of households surveyed in 2019 that we were able to find and survey in 2021 and those that we could not.

## B. Variable Descriptions

Table A3 describes all variables used in the study.

**Table A3.** Variable Descriptions

| Variable | Description |
|---|---|
| **Outcome variables** | |
| Respondent evacuated after the eruption | Binary. Measured based on the question: "When did you evacuate from your house"? One if evacuation time is before the evacuation order (May 26th, 2021). |
| Respondent evacuated after official evacuation order | Binary. Measured based on the question: "When did you evacuate from your house"? One if evacuation occurred after the official order (May 26, 2021). |
| **Explanatory variables of evacuation behaviour** | |
| Respondent was in Goma during 2002 eruption | Binary. Measured based on the question "Since which year have you been living in Goma?" One if the date is before or equal to the time Nyiragongo erupted in 2002. |
| Respondent lost member or had its house destroyed during 2002 eruption | Binary. Measured based on two questions: "have you lost a household member during the 2002 eruption" and "was you house destructed with the 2002 eruption? One if one of both equals one. |
| Respondent resides in evacuation zone | Binary. Measured based on the household GPS coordinates. The enumerator recorded the GPS coordinates in the parcel where the household parcel at the end of the interview. One if the household location is situated inside the evacuation zone limits (QGIS). |
| Respondent assumes to reside in evacuation zone | Binary. Measured based on the question: "Was your neighbourhood concerned by the mandatory evacuation order?" One if yes. |
| Rightly assumes to reside in evacuation zone | Binary. One if respondent resides in the evacuation and assumes to reside in the evacuation zone. |
| Wrongly assume to reside in evacuation zone | Binary. One if respondent does not reside in the evacuation zone but assumes to reside in the evacuation zone |
| Trust in military authorities | Binary. Derived from the 2019 survey question "Generally speaking, would you say that the army authorities can be trusted, or should we be wary of the army authorities?" One if respondent says the authorities can be trusted. |
| Trust in civilian authorities | Binary. Derived from the 2019 survey question "Generally speaking, would you say that the local authorities can be trusted, or should we be wary of the local authorities?" One if respondent says the authorities can be trusted. |
| Trust in government authorities | Binary. Combination of trust in army authorities and trust in local authorities. 'One' if at least one is 'one'. |
| (Very) high propensity to take risk | Binary. Derived from the question: "Assuming we have a scale of 11 levels (i.e. from 0 to 10). The first level of the scale (0) represents individuals seeking to avoid as many risks as possible (i.e. is never prepared to take risks), and the last level (10) represents individuals prepared to take as many risks as possible. Considering your attitude to risk, where on this scale would you situate yourself?" One (risk loving) if respondent selects a value equal to 6 or more. |
| Household distance to the lava | Continuous. Interviewer recorded the GPS coordinates of the household's dwelling at the end of each survey. Using the shapefile of the lava flow, we computed the distance (in kilometres) between the lava flow and the household's dwelling and took its logarithmic transformation. |
| Respondent's age | Continuous. What is your age (in years). |
| Female respondent | Binary. The interviewer recorded the gender without asking. One if female. |
| Secondary education or higher | Binary. What is your level of education? 1) No education 2) Primary level – year 1 3) Primary level – year 2 4) Primary level – year 3 5) Primary level – year 4 6) Primary level – year 5 7) Primary level – year 6 8) Secondary level - year 1 9) Secondary level -year 2 10) Secondary level -year 3 11) Secondary |

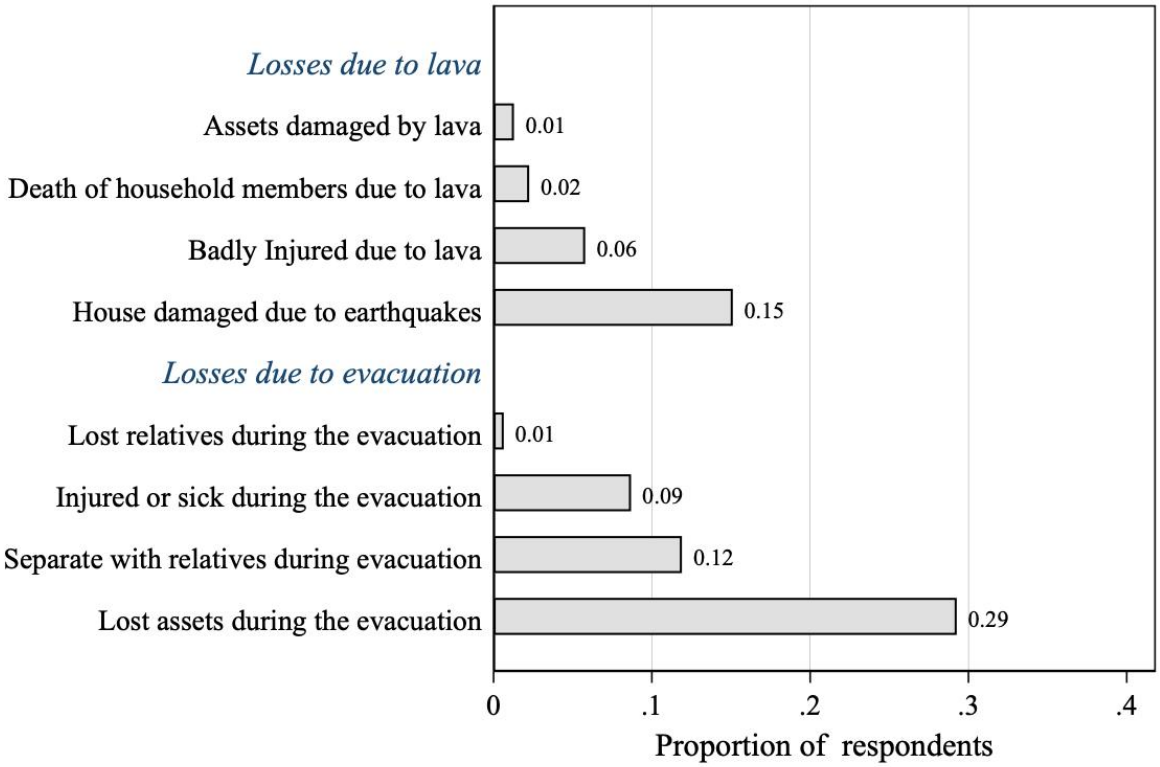
| | |
|---|---|
| | level -year 4 12) Secondary level -year 5 13) Secondary level -year 6 14) Graduate 1 15) Graduate 2 16) Graduate 3 17) Bachelor 1 18) Bachelor 2 . One if response equals 13 or more |
| Respondent is household head | Binary. Derived from the question: "What is your relationship with the household head?" 1) Household head 2) Spouse 3) Son/daughter 4) Son/daughter-in-law 5) Adopted son/daughter 6) Grandson 7) brother/sister 8) nephew 9) father/mother 10) brother/sister-in-law 11) parents-in-law 12) no relationship 96) other. One if response equals one |
| Respondent was sick at eruption | Binary. Were you sick or unable to walk without difficulties at the time of the eruption? 1) yes 0) No. One if the response is yes |
| **Evacuation conditions** | |
| Means of transport to evacuate | Categorical. "What was the main means of transport used to reach the final evacuation point?" 1) Private vehicle 2) Public transport 3) Humanitarian transport 4) Government transport 5) Boat 6) On foot 7) Motorbike 8) Other to be specified. |
| Means of transport to return from evacuation | Categorical. "What was the main means of transport used to return from evacuation?" 1) Private vehicle 2) Public transport 3) Humanitarian transport 4) Government transport 5) Boat 6) On foot 7) Motorbike 8) Other to be specified. |
| Access to water during evacuation | Binary. "Did you have permanent access to water at your evacuation point?" |
| Health issues caused by water or bad conditions | Binary. "Have you or anyone in your household had any health problems caused by drinking unclean water or living in conditions during evacuation?" |
| Access to communication during evacuation | Binary. "Did you have access to communication (internet, telephone network, etc.) during the evacuation?" |
| Have received aid from donors during evacuation | Binary. "Did you receive any assistance (in kind or in cash) from donors during at the evacuation point?" |
| Host type | Categorical. 1) family 2) friends 3) on the street 4) in unknown families 5) church 6) ONGs (humanitarian organization) 7) Hotel 8) Refugee camps 9) Schools 10) other to specify. |
| Separate with relatives during evacuation | Binary. "Have any members of the household been separated during the evacuation?" One if respondent says 'yes'. |
| Lost relatives during the evacuation | Binary. "Did any household members pass away during the evacuation?" One if respondent says 'yes'. |
| Lost assets during the evacuation | Binary. "Did the household lose any property (assets or house) during the evacuation?" One if respondent says 'yes'. |
| Injured or sick during the evacuation | Binary. "Was anyone in the household seriously injured during the evacuation?" One if respondent says 'yes'. |
| Abandoned assets on the road during evacuation | Binary. "Has your household abandoned goods along the way because they got tired of carrying them?" One if respondent says 'yes'. |
| (Very) Bad hygienic conditions | Binary. Derived from the question: "How would you describe the sanitary conditions during your evacuation?" 1) very good 2) good 3) acceptable 4) bad 5) very bad. One if response is less or equal to 2. |
| (Very) Bad general living conditions | Binary. Derived from the question: "Generally speaking, how would you describe the living conditions during the evacuation?" 1) very good 2) good 3) acceptable 4) bad 5) very bad. One if response is less or equal to 2. |
| Regret to have evacuated | Binary. "Do you regret fleeing your home?" One if respondent says 'yes'. |
| Reason to regret evacuation | Binary. "What are the reasons for regretting leaving your home?" 1) My home was looted after I left 2) Household lost possessions during evacuation 3) The household split up / lost a member 4) I was injured during the evacuation 5) The poor living conditions during my refuge could have negative consequences on my health 6) Fleeing proved more difficult than staying 7) I faced insecurity on the way during my escape 8) Other to specify. |

| | |
|---|---|
| Regret to have stayed | Binary. "Do you regret your decision to stay in Goma?" One if respondent says 'yes'. |
| Reason to stay | Binary. 1) The area where I live was not affected by the evacuation 2) I had to stay there to look after the household goods 3) I wasn't afraid of anything, 4) I knew nothing was going to happen 5) I thought it was more dangerous to go than to stay 6) I had nowhere to go 7) I couldn't give up my business 8) I saw it as an opportunity to be the only one to continue trading for others who might decide to stay 8) I was ill 9) Other to specify. |
| **Coping strategies** | |
| Coping strategies | Binary. "During this period, some households use several strategies to cope with the situation. Please indicate whether or not your household has used any of the following strategies : a) use household savings, b) ask support from family members, c) reduce consumption to last longer with the stock available, d) borrow from someone outside my family, f) sell household assets to raise cash, g) let each adult member go their own way, h) get help from other donors (foundations, NGOs, etc), i) break the contract with the housekeeper to reduce household costs, j) sell their house for fear of losing everything because of lava, k) get help from the government, l) any other strategies to be specified" |
| **Perceived ability of actors** | |
| Perceived ability of actors | Categorical. Considering the situation that has arisen in the city of Goma over the past few days, please indicate to what extent the following actors have been able to meet the needs of the population. Actors: national army, local authorities, national authorities, NGOs, media, church authorities. Response categories: 1) Very able 2) able 3) Neither able nor unable 4) unable 5) very unable. |

## C. Comparing losses due to lava and evacuation

Figure A2 displays the losses due to the lava flow and those incurred during the evacuation. It shows that proportionally more people incurred losses during the evacuation.

**Figure A2. Comparing losses due to lava and evacuation**

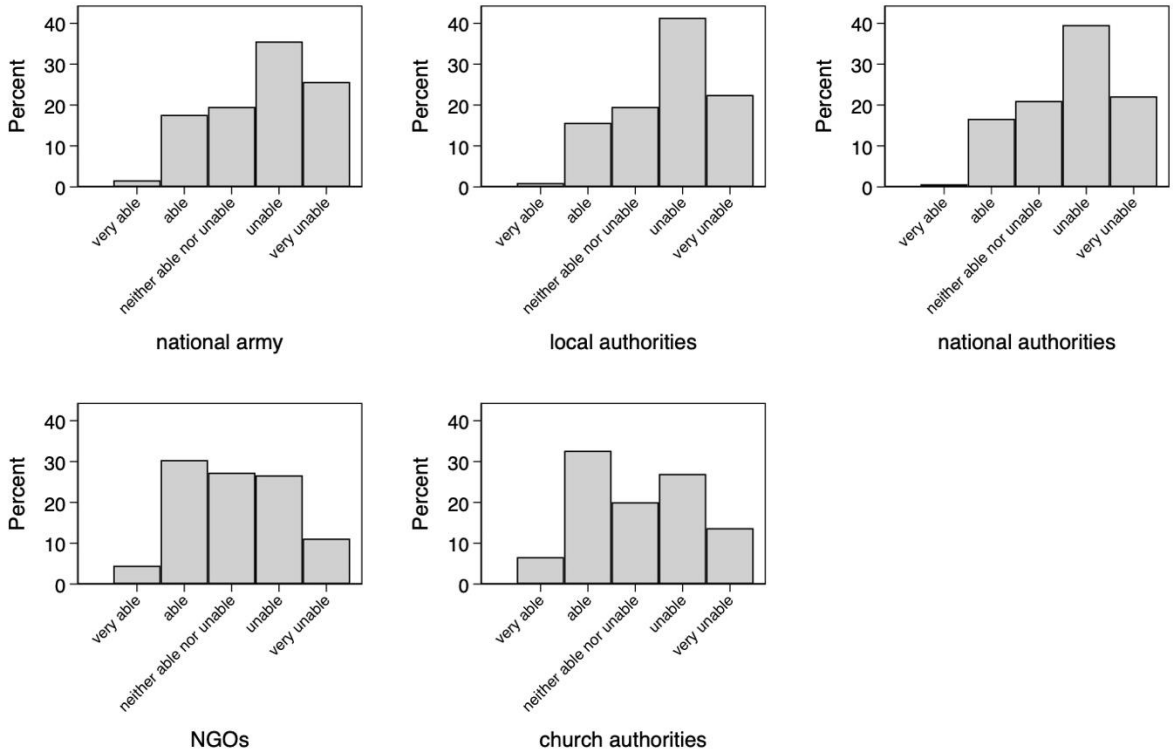



*Notes:* The figure compares the type of losses due to the lava and those related to the evacuation. It is based on the sample of evacuees (N=311).

## D. Comparing actors' ability to respond to the needs of the population

Figure A3 displays the respondents' perception of the ability of various actors to respond to their needs in response to the eruption and the related evacuation crisis. It reveals an overall underperformance of the Congolese government (army, policy, local and national authorities) compared to other actors (church and NGOs).

**Figure A3:** Actors' ability to respond to the needs of the population




*Notes:* This figure is based on the information of all the respondents (N=619). It displays the respondents' perception of different actors' ability to respond to the needs of the population following the eruption and evacuation crisis. Respondents' perception is measured on a 5-level scale ranging from very capable to very unable. A detailed description of this variable is provided in Appendix B.

From this, we derive binary variables taking the value 1 if the actor is rated as very able or able, to formally compute the proportion of respondents who considered that each actor performed well in managing the crisis. Summary statistics are presented in the table below.

**Table A4.** Proportion of respondents perceiving each actor as (very) able to respond to their need during the crisis

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Church authorities | 619 | .393 | .489 | 0 | 1 |
| NGOs | 619 | .349 | .477 | 0 | 1 |
| National army | 619 | .192 | .394 | 0 | 1 |
| National policymakers | 619 | .173 | .378 | 0 | 1 |
| Local authorities | 619 | .166 | .373 | 0 | 1 |

## E. Determinants of evacuation behaviour

Table 5 in the main text reports marginal effects from the logit models specified in Equations (1) and (2). Table A5 presents the corresponding logit coefficients. The results show a clear contrast. In Column (2), believing that one resided in the evacuation zone is positively and significantly associated with evacuation after the official order. In Column (3), actual residence in the evacuation zone is small and statistically insignificant.

This suggests that responses to the evacuation order were shaped less by objective exposure and more by whether households understood the order to apply to them. In other words, the effectiveness of the official warning depended critically on communication and public comprehension of zone boundaries.

**Table A5.** Determinants of the evacuation behaviour: logit regression

| VARIABLES | Evacuation after the eruption (1) | Evacuation after the order (2) | Evacuation after the order (3) |
|---|---|---|---|
| ***Previous experience*** | | | |
| Was in Goma during 2002 eruption | -0.378** | -0.251 | -0.309 |
| | (0.192) | (0.262) | (0.264) |
| Member lost or house destroyed during 2002 eruption | 0.604** | 0.295 | 0.310 |
| | (0.259) | (0.364) | (0.351) |
| Self-evacuated upon the 2021 eruption | | -1.215*** | -1.152*** |
| | | (0.333) | (0.325) |
| ***Evacuation order and trust*** | | | |
| Believes to reside in evacuation zone | | 0.835*** | |
| | | (0.277) | |
| Resides in evacuation zone | | | 0.152 |
| | | | (0.260) |
| Trust in government authorities | 0.120 | 0.130 | 0.100 |
| | (0.178) | (0.240) | (0.239) |
| ***Control variables*** | | | |
| (very) high propensity to take risk | -0.358* | -0.380 | -0.346 |
| | (0.206) | (0.307) | (0.303) |
| Logarithm of household distance to the lava | -0.453* | -0.334 | -0.702** |
| | (0.232) | (0.324) | (0.341) |
| Age | -0.012 | -0.038*** | -0.035*** |
| | (0.008) | (0.013) | (0.012) |
| Female | 0.260 | 0.834*** | 0.893*** |
| | (0.254) | (0.322) | (0.327) |
| Secondary education or higher | -0.745*** | 0.003 | -0.018 |
| | (0.188) | (0.270) | (0.268) |
| Household chief | -0.188 | 0.272 | 0.285 |
| | (0.254) | (0.298) | (0.302) |
| Was sick at the time of the eruption | 0.509** | -0.220 | -0.247 |
| | (0.227) | (0.347) | (0.346) |
| Observations | 619 | 574 | 574 |

*Notes*: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. This table presents results from logit regressions as specified in eq. (1) and (2) where the dependent variable is a dummy capturing whether the respondent evacuated after the eruption (column 1) or evacuated after the official order (columns 2-3). The regression in column (1) is based on the full sample of respondents who were in Goma at the time of eruption. Columns (2) & (3) are based on the subsample of respondents who were in Goma when the official order was issued. In column (3), we run regression as specified in eq. (2) but we replace the variable "believes to reside in evacuation zone" with "resides in evacuation zone".

## F. Role of the institutional trust

Table A6 reports logit regressions corresponding to Equation (3), where the dependent variable equals one if the respondent evacuated after the official order. Column (1) interacts institutional trust with perceived residence in the evacuation zone, while Column (2) interacts trust with actual residence in the evacuation zone.

Figure 4 and Table A7 show pairwise differences in predicted probabilities of fleeing, using post-estimation margins based on the estimates presented in Table A6. The results suggest that the association between trust and evacuation behaviour may depend on whether respondents believed the order applied to their neighbourhood (panels A of Figure 4 and Table A7).

Among respondents who believed they lived outside the evacuation zone, the predicted probability of evacuation differs little between those who trusted and distrusted authorities (difference = -1.2 percentage points; $p = 0.708$). Among respondents who believed they lived inside the evacuation zone, trust is associated with a 9.5 percentage point higher predicted probability of evacuation relative to mistrust. However, this contrast is estimated imprecisely and is not statistically significant at conventional levels ($p = 0.165$; see final row of Table A7, panel A).

These estimates should therefore be interpreted cautiously. They are based on a relatively small subgroup of respondents who believed the evacuation order applied to them, combined with a low overall rate of evacuation after the order. Nonetheless, the pattern is consistent with the idea that trust may matter more when individuals believe the order applies to them.

When actual rather than perceived residence in the evacuation zone is used (panels B of Figure 4 and Table A7), this conditional pattern is not observed. Taken together, the appendix results reinforce the finding from the main text that perceived inclusion in the evacuation zone was more closely associated with evacuation behaviour than actual residence, while providing suggestive evidence that trust may have reinforced responsiveness among those who believed the order applied to them.

**Table A6.** Institutional trust and evacuation after the official order: interaction models

| | Evacuation after the order (1) | Evacuation after the order (2) |
|---|---|---|
| ***Previous experience*** | | |
| Was in Goma during 2002 eruption | -0.263 | -0.306 |

| | | |
|---|---|---|
| | (0.263) | (0.265) |
| Member lost or house destroyed during 2002 eruption | 0.322 | 0.310 |
| | (0.363) | (0.352) |
| Self-evacuated upon the 2021 eruption | -1.184*** | -1.147*** |
| | (0.335) | (0.324) |
| ***Evacuation order and trust*** | | |
| Trust in government authorities | -0.117 | 0.332 |
| | (0.315) | (0.323) |
| Believes to reside in evacuation zone | 0.568 | |
| | (0.356) | |
| *Trust in government authorities*believes to reside in evacuation zone* | 0.670 | |
| | (0.502) | |
| Resides in evacuation zone | | 0.372 |
| | | (0.345) |
| Trust in government authorities*Resides in evacuation zone | | -0.531 |
| | | (0.485) |
| ***Control variables*** | | |
| (Very) high propensity to take risk | -0.354 | -0.351 |
| | (0.308) | (0.302) |
| Logarithm of household distance to the lava | -0.307 | -0.698** |
| | (0.329) | (0.342) |
| Age | -0.038*** | -0.035*** |
| | (0.013) | (0.013) |
| Female | 0.789** | 0.928*** |
| | (0.323) | (0.330) |
| Secondary education or higher | 0.011 | -0.006 |
| | (0.274) | (0.274) |
| Household chief | 0.227 | 0.309 |
| | (0.294) | (0.306) |
| Was sick at the time of the eruption | -0.193 | -0.269 |
| | (0.348) | (0.346) |
| Observations | 574 | 574 |

*Notes*: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. This table presents results from logit regressions as specified in eq. (3) where the dependent variable is a dummy capturing whether respondents evacuated after the official order. In column (1), we interact institutional trust with perceived residence in the evacuation zone while column (2) interacts it with actual residence in the evacuation zone.

**Table A7.** Pairwise differences in predicted probability of evacuation

| Panel A. Believing to be inside/outside the evacuation zone and trust | | | |
|---|---|---|---|
| | Contrast | std. err. | p-value |
| (believes to be outside zone#trust) vs (believes to be outside zone#mistrust) | -0.012 | 0.033 | 0.708 |
| (believes to be inside zone#mistrust) vs (believes to be outside zone#mistrust) | 0.074 | 0.048 | 0.126 |

| | | | |
|---|---|---|---|
| (believes to be inside zone#trust) vs (believes to be outside zone#mistrust) | 0.169 | 0.064 | 0.009 |
| (believes to be inside zone#mistrust) vs (believes to be outside zone#trust) | 0.086 | 0.047 | 0.068 |
| (believes to be inside zone#trust) vs (believes to be outside zone#trust) | 0.181 | 0.064 | 0.005 |
| (believes to be inside zone#trust) vs (believes to be inside zone#mistrust) | 0.095 | 0.068 | 0.165 |

Panel B. Residing inside/outside the evacuation zone and trust

| | Contrast | std. err. | p-value |
|---|---|---|---|
| (resides outside zone#trust) vs (resides outside zone#mistrust) | 0.041 | 0.040 | 0.310 |
| (resides inside zone#mistrust) vs (resides outside zone#mistrust) | 0.046 | 0.044 | 0.290 |
| (resides inside zone#trust) vs (resides outside zone#mistrust) | 0.020 | 0.043 | 0.644 |
| (resides inside zone#mistrust) vs (resides outside zone#trust) | 0.005 | 0.046 | 0.905 |
| (resides inside zone#trust) vs (resides outside zone#trust) | -0.021 | 0.046 | 0.658 |
| (resides inside zone#trust) vs (resides inside zone#mistrust) | 0.026 | 0.046 | 0.574 |

*Notes*: This table is based on post-estimation margins computed from logit model presented in Table A6, column 1 (for panel A) and column 2 (for panel B).

## G. Trust in military city authority vs trust in civilian authorities

As discussed in the main text, Goma was governed under a state of siege during the crisis, with military and civilian authorities jointly involved in public administration. Our baseline specification therefore uses a combined trust indicator equal to one if respondents reported trust in either authority.

Table A8 assesses whether the results are sensitive to this aggregation by estimating Equations (2) and (3) separately using trust in civilian authorities (Columns 1–3) and trust in military authorities (Columns 4–6).

The results are broadly consistent with the main specification. In all models, perceived residence in the evacuation zone remains more strongly associated with evacuation after the order than actual residence in the zone. Coefficients on the separate trust variables and their interaction terms are imprecisely estimated and do not reach conventional significance levels.

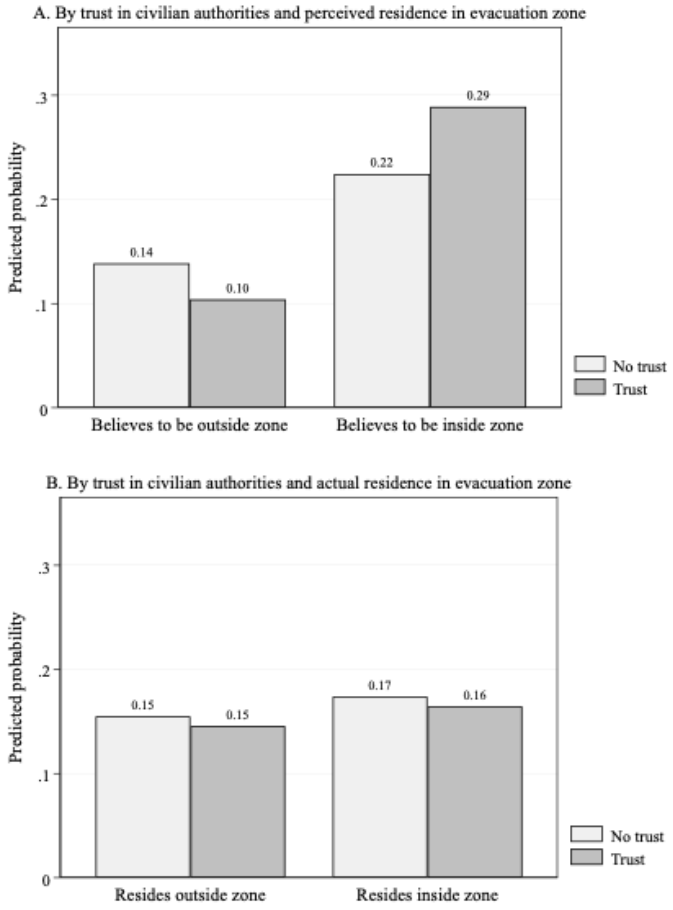
Figures A4 and A5 present corresponding predicted probabilities. While the patterns are directionally similar to those shown in the main text, they should be interpreted cautiously given limited precision. Overall, these results suggest that the main findings do not depend on whether trust is measured jointly or separately by type of authority.

**Table A8.** Evacuation after the official order: separate measures of trust in civilian and military authorities

| | Evacuation after the order | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ***Previous experience*** | | | | | | |
| Was in Goma during 2002 eruption | -0.264 | -0.277 | -0.322 | -0.252 | -0.256 | -0.317 |
| | (0.261) | (0.261) | (0.264) | (0.261) | (0.261) | (0.264) |
| Member lost or house destroyed during 2002 eruption | 0.286 | 0.322 | 0.300 | 0.286 | 0.294 | 0.306 |
| | (0.367) | (0.365) | (0.353) | (0.363) | (0.363) | (0.350) |
| Self-evacuated upon the 2021 eruption | -1.208*** | -1.205*** | -1.142*** | -1.214*** | -1.210*** | -1.130*** |
| | (0.333) | (0.334) | (0.324) | (0.333) | (0.333) | (0.324) |
| ***Evacuation order and trust*** | | | | | | |
| Believes to reside in evacuation zone | 0.827*** | 0.634** | | 0.840*** | 0.652** | |
| | (0.276) | (0.316) | | (0.277) | (0.320) | |
| Resides in evacuation zone | | | 0.150 | | | 0.356 |
| | | | (0.310) | | | (0.309) |
| *Trust in civilian authorities* | | | | | | |
| Trust in civilian authorities | -0.057 | -0.346 | -0.078 | | | |
| | (0.270) | (0.370) | (0.377) | | | |
| *Trust in civilian authorities*believes to reside in evacuation zone* | | 0.720 | | | | |
| | | (0.558) | | | | |
| Trust in civilian authorities*resides in evacuation zone | | | 0.006 | | | |
| | | | (0.541) | | | |
| *Trust in military authority* | | | | | | |
| Trust in military authorities | | | | 0.190 | -0.063 | 0.454 |
| | | | | (0.257) | (0.341) | (0.338) |
| *Trust in military authorities*believes to reside in evacuation zone* | | | | | 0.692 | |
| | | | | | (0.538) | |
| Trust in military authorities*resides in evacuation zone | | | | | | -0.703 |
| | | | | | | (0.515) |
| ***Control variables*** | | | | | | |
| (Very) high propensity to take risk | -0.387 | -0.371 | -0.352 | -0.383 | -0.375 | -0.348 |
| | (0.308) | (0.308) | (0.303) | (0.308) | (0.308) | (0.302) |
| Logarithm of household distance to the lava | -0.361 | -0.338 | -0.723** | -0.327 | -0.289 | -0.706** |
| | (0.323) | (0.327) | (0.344) | (0.322) | (0.329) | (0.340) |
| Age | -0.038*** | -0.038*** | -0.035*** | -0.038*** | -0.038*** | -0.034*** |
| | (0.013) | (0.013) | (0.013) | (0.013) | (0.013) | (0.012) |
| Female | 0.825** | 0.784** | 0.882*** | 0.836*** | 0.816** | 0.927*** |
| | (0.325) | (0.326) | (0.331) | (0.323) | (0.323) | (0.329) |
| Secondary education or higher | -0.005 | 0.009 | 0.019 | -0.001 | 0.017 | -0.008 |
| | (0.271) | (0.274) | (0.274) | (0.270) | (0.273) | (0.273) |
| Household chief | 0.265 | 0.221 | 0.277 | 0.273 | 0.242 | 0.315 |
| | (0.301) | (0.298) | (0.306) | (0.298) | (0.297) | (0.304) |
| Was sick at the time of the eruption | -0.230 | -0.176 | -0.252 | -0.219 | -0.226 | -0.257 |
| | (0.346) | (0.352) | (0.345) | (0.349) | (0.351) | (0.347) |
| Observations | 574 | 574 | 574 | 574 | 574 | 574 |

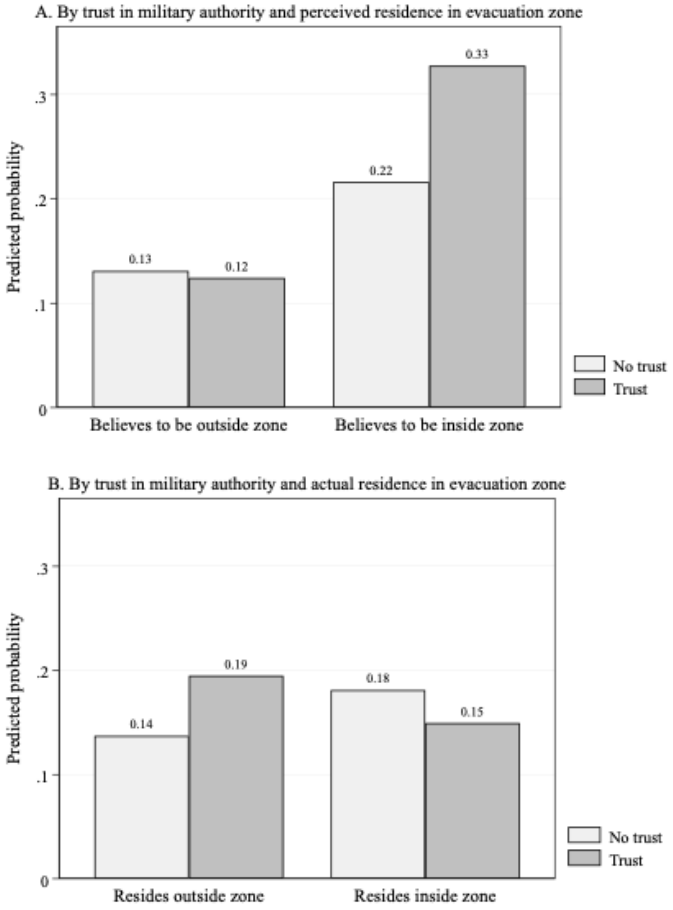
*Notes*: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. This table presents results from logit regressions as specified in eq. (2) & (3) where we separately interact trust in civilian and military authorities with both evacuation order related variables. In columns (1-3), we focus on the trust in civilian authorities, while in columns (4-6) we focus on trust in military authority.

**Figure A4**. Predicted probability of evacuation after the official order by trust in civilian authorities and perceived/actual zone residence.




*Notes*: This figure is based on estimated margins from logit regression in Table A8, columns (2) & (3) for panel A & B respectively.

**Figure A5.** Predicted probability of evacuation after the official order by trust in military authorities and perceived/actual zone residence.




*Notes*: This figure is based on estimated margins from logit regression in Table A8, columns (5) & (6) for panel A & B respectively.

## H. Accounting for sampling strategy and attrition

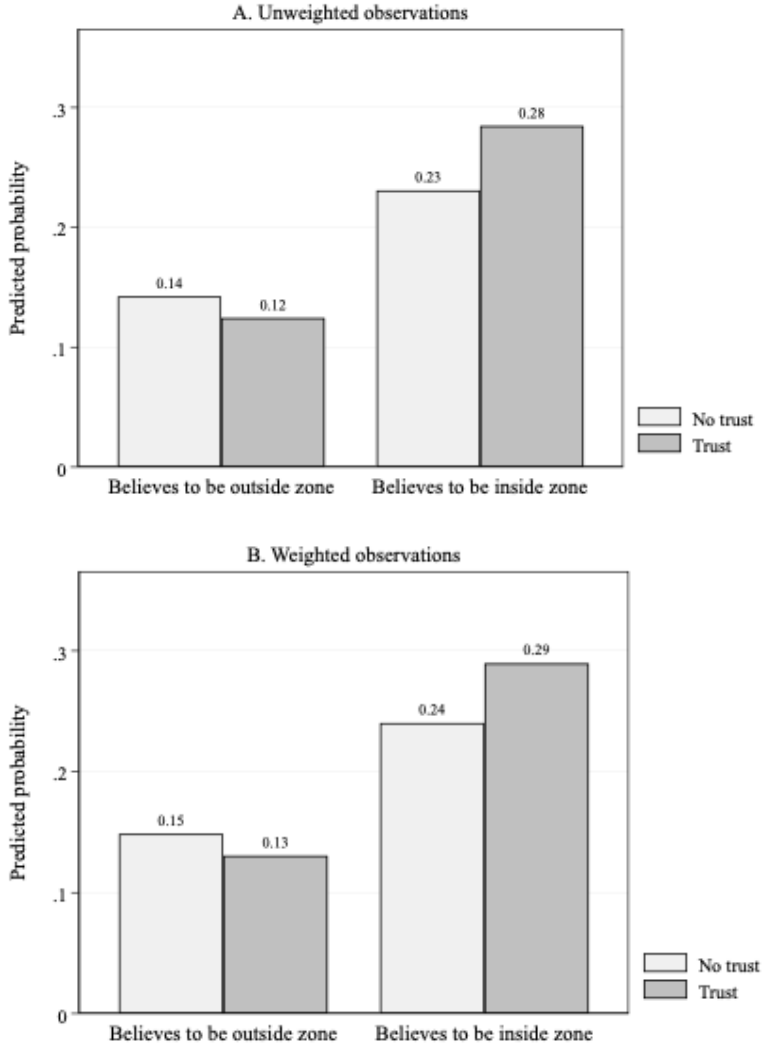
In appendix A, we have shown that our sample of Goma inhabitants is biased towards the upper class, because we oversampled wealthier households, and these were more likely to be tracked. We now re-estimate our main models using weighted observations, accounting for our original sampling strategy and survey attrition. Results are presented in Table A9. This analysis is based on the subsample of respondents surveyed as households in 2019 (not SMEs) and may therefore arguably not mirror those based on the full sample. Therefore, we first re-estimate unweighted results (Table 5 in the main text) focusing only on this subsample of initial households and show that results are similar to those using the full sample (Col 1-3 of Table A9). Then, we apply survey and attrition weights to this analysis and show that results remain qualitatively the same (Col 4-6). In addition, based on estimated margins from logit regressions in columns 3 and 6, we replicate Figure 4 (in the main text) and show that the conditional trust pattern remains unchanged even when we apply survey and attrition weights (see Figure A6). This reassures us that the attrition observed in this study is not affecting our results.

**Table A9.** Determinants of evacuation behaviour accounting for the initial sampling strategy and attrition

| | Without attrition weights | | | With attrition weights | | |
|---|---|---|---|---|---|---|
| VARIABLES | Evacuation after the eruption (1) | Evacuation after the order (2) | Evacuation after the order (3) | Evacuation after the eruption (4) | Evacuation after the order (5) | Evacuation after the order (6) |
| ***Previous experience*** | | | | | | |
| Was in Goma during 2002 eruption | -0.375* | -0.151 | -0.167 | -0.416* | -0.218 | -0.232 |
| | (0.217) | (0.300) | (0.300) | (0.221) | (0.308) | (0.307) |
| Member lost or house destroyed during 2002 eruption | 0.475* | 0.215 | 0.228 | 0.540* | 0.259 | 0.271 |
| | (0.289) | (0.395) | (0.396) | (0.290) | (0.395) | (0.396) |
| Self-evacuated upon the 2021 eruption | | -1.762*** | -1.740*** | | -1.925*** | -1.907*** |
| | | (0.406) | (0.406) | | (0.408) | (0.409) |
| ***Evacuation order and trust*** | | | | | | |
| Trust in government authorities | -0.032 | 0.015 | -0.174 | -0.072 | 0.003 | -0.171 |
| | (0.201) | (0.270) | (0.353) | (0.205) | (0.273) | (0.356) |
| Believes to reside in evacuation zone | | 0.876*** | 0.679* | | 0.885*** | 0.699* |
| | | (0.315) | (0.399) | | (0.317) | (0.399) |
| Trust in government authorities*Believes to reside in evacuation zone | | | 0.508 | | | 0.481 |
| | | | (0.544) | | | (0.549) |
| ***Control variables*** | | | | | | |
| (very) high propensity to take risk | -0.300 | -0.563 | -0.566 | -0.283 | -0.673* | -0.675* |
| | (0.235) | (0.373) | (0.374) | (0.238) | (0.380) | (0.380) |
| Logarithm of household distance to the lava | -0.680** | -0.394 | -0.360 | -0.630** | -0.360 | -0.325 |
| | (0.274) | (0.384) | (0.388) | (0.276) | (0.387) | (0.392) |
| Age | -0.017* | -0.056*** | -0.056*** | -0.018* | -0.057*** | -0.057*** |
| | (0.010) | (0.018) | (0.018) | (0.010) | (0.017) | (0.018) |
| Female | 0.277 | 1.093** | 1.050** | 0.217 | 1.154*** | 1.117** |
| | (0.317) | (0.432) | (0.434) | (0.327) | (0.443) | (0.446) |
| Secondary education or higher | 0.825*** | -0.154 | -0.147 | 0.747*** | -0.255 | -0.258 |
| | (0.218) | (0.296) | (0.298) | (0.222) | (0.299) | (0.300) |
| Household chief | -0.237 | 0.495 | 0.454 | -0.246 | 0.480 | 0.442 |
| | (0.321) | (0.419) | (0.418) | (0.329) | (0.423) | (0.422) |
| Was sick at the time of the eruption | 0.575** | -0.197 | -0.173 | 0.519** | -0.244 | -0.221 |
| | (0.252) | (0.401) | (0.401) | (0.255) | (0.406) | (0.405) |
| Observations | 484 | 446 | 446 | 484 | 446 | 446 |

*Notes*: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses. This table presents results from logit regressions as specified in eq. (1) and (2) where the dependent variable is a dummy capturing whether the respondent evacuated after the eruption or evacuated after the official order (as in Table 6 in the main text). It is based on the subsample of respondents initially surveyed as households in 2019 to account for attrition. In regressions (1)-(3), we present results without attrition weights, while in (4)-(6), we have results accounting for attrition weights. Columns (3) and (6) are based on eq. (3) where institutional trust is interacted with perceived residence in the evacuation zone, as in Table A6

**Figure A6.** Predicted probability of fleeing after the evacuation order by institutional trust and perceived residence in the evacuation zone: weighted vs unweighted observation




*Notes*: This figure is based on estimated margins from logit regression in Table A9, columns (3) & (6) for panel A & B respectively.

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