

Policing for Disaster Risk Management in Ethiopia: The Case of Addis Ababa, Dire-Dawa, and Adama

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Abstract

This study examines the effectiveness of the Ethiopian police in managing natural disasters throughout the pre-, during-, and post-disaster phases. Data were collected from 384 respondents using a mixed-methods triangulation design. Both quantitative and qualitative data were collected from community members, police officers, and disaster management personnel using questionnaires and interviews. Quantitative analysis employing descriptive statistics and regression techniques assessed the impact of police actions during the three phases concerning police disaster response performance. The findings indicated that police involvement in disaster preparedness and prevention is very low. Twenty-six percent (26%) of the respondents reported that the police made inadequate contributions in identifying vulnerable populations and evaluating risk-related development strategies. Additionally, 33% the respondents believed that police involvement in the creation of early warning systems was very low, and 26% thought that their involvement in emergency planning was also insufficient. Most respondents perceived the police response to recent disasters as poor: 40.10% stated it was "very ineffective," whereas 29.43% labeled it "ineffective," indicating that nearly 70% were dissatisfied. The regression analysis demonstrated that police roles during all phases of the disaster significantly impact the overall effectiveness, as evidenced by an R^2 value of 0.95. Interview results also confirmed that police actions remain largely reactive, emphasizing evacuation and crowd control over proactive planning. This is attributed to inadequate inter-agency coordination, reactive engagement strategies, lack of resources, poor communication, and limited preparedness. To enhance police effectiveness during all disaster phases, it is recommended to improve training, resources, communication, teamwork, and foster a proactive preparedness culture. This finding, therefore, serves as a milestone for further research, education, and policy reform.

Keywords: Police Effectiveness, Natural Disaster Response, Disaster Phase, Police Challenge, Disaster Management

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1. Introduction

The complexity of the disaster problem worldwide demands a coordinated, multi-sectoral response. Police organizations play an indispensable role within this framework as their fundamental mandate focuses on public safety, law enforcement, and community protection across all phases of disaster risk management, such as mitigation, preparedness, response, and recovery (Wiendy et al., 2022). The effectiveness of police forces is often judged by their ability to maintain order, which depends largely on their level of preparedness, their collaboration with other agencies, and their organized involvement in disaster response

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operations (McEntire, 2023). Evidence from both regional and international contexts shows that when police are well-trained and formally integrated into national disaster response systems, they play a crucial role in reducing both human casualties and property damage during crises (Blaustein et al., 2023).

Ethiopia is among the countries where there is a critical case that helps us examine police integration in disaster risk management (DRM). The country is highly exposed to climate-related hazards, drought, and flooding (Gebrehiwot & Veen, 2013). This high level of vulnerability leads to significant human suffering and substantial economic losses. This needs an urgent, robust, efficient, and cohesive national response system where every capable institution, including police organizations, is optimally utilized. Therefore, responding to these challenges effectively requires integrated joint planning that targets international, national, and regional approaches (Luong, 2021).

By recognizing existing challenges, Ethiopia is developing an evolving policy framework and has established key institutions for Disaster Risk Management (DRM). The pivotal agency is “the Ethiopian Disaster Risk Management Commission (EDRMC)”, which has transitioned to the Prime Minister’s Office in 2022. Normative frameworks have been formulated and updated progressively in 1993, 2013, and 2022. However, the institutional structures for implementation have lagged and, in some areas, deteriorated by creating a gap between policy and practice. The recent DRM roadmap named “Multi-Hazard, Impact-Based Early Warning Early Action System Roadmap (2023-2030)” aims to shift focus from reactive response to a proactive disaster prevention approach (Ethiopian Disaster Risk Management Commission (EDRMC, 2022).

Despite these progressive policy actions, there is a significant implementation gap which is seen in this policy framework. These include a lack of harmonization in strategies and, crucially, a lack of coordination at the operational level across the entire early warning and action cycle. Thus, enforcement of disaster regulations often falls short of expectations without the full, pre-planned engagement of police. Although police are crucial for assisting evacuations and ensuring public safety, problems like coordination, communication, and training continuously hinder their effectiveness (Janković, 2021). To overcome these challenges, police must be involved in effective disaster planning, teamwork, and systemic changes to protect the most at-risk populations (Hine & Bragias, 2021).

The Ethiopian National Policies and the early warning roadmap provide comprehensive frameworks, but fail to explicitly define and institutionalize the police as core, proactive actors across the entire DRM phases. This contrasts with international models like the case in Vietnam's "four-on-the-spot" approach, which deliberately embeds community-based policing into all disaster phases from prevention to recovery (Luong et al., 2024). In Ethiopia, the police role has been largely narrowed to peacekeeping and public order. This, in turn, hinders their effectiveness in comprehensive DRM practice.

The limitation is primarily related to the reactive role that forgot the critical value of the police in the pre-disaster phase. As the most important institution with local community presence, the police are uniquely positioned to contribute and communicate with risks, provide community preparedness training, logistical planning, and vulnerability assessments. Considering the involvement of communities in DRM helps police personnel to respond better and fosters a culture of readiness (Radovanovi et al., 2020). Police involvement in the preparatory stages is essential to build a culture of readiness and to ensure a more effective response at the time of disaster occurrence.

The complexity of the police's responsibilities in Ethiopia is heightened by the frequent overlap of disasters and social instability. Managing disaster response in areas with potential for conflict or civil unrest requires police to navigate a dual mandate that includes providing humanitarian assistance and ensuring public security. These dual realities necessitate a more nuanced and well-defined DRM role for police that accounts for compound crises where humanitarian and security functions are deeply intertwined.

Consequently, there is a significant research gap that exists in Ethiopia. Whereas studies acknowledge general coordination problems in Ethiopian DRM and the universal importance of police in emergencies (Jankovic, 2021; Islam, 2023), there is a lack of empirical, operationally focused research on the effectiveness, challenges, and capacity gaps of the Ethiopian police within the national DRM system. Previous studies have not sufficiently examined how the absence of a clear policy mandate for police across pre-, during, and post-disaster phases affects the overall effectiveness of the responses. This study is, therefore, motivated by the urgent need to generate evidence that can inform policies and protocols to better integrate police as a strategic asset in building national resilience. Hence, this article aims to assess the effectiveness of the police in disaster risk management practice in Ethiopia and to identify the major challenges constraining their performance.

The study is guided by a conceptual framework that examines police involvement across three phases. The process recognizes that DRM is a continuous process with phases that are not strictly linear, but it may overlap (Bly et al., 2021). The central premise is that police effectiveness is contingent upon their active and planned involvement across all three phases rather than being limited to a reactive role during the crisis itself.

This study concentrates on three urban centers: Addis Ababa, Dire Dawa, and Adama. By investigating police DRM practices in these areas, the research aims to provide clear insights into the current state of police integration in DRM, identify the challenges faced, and offer recommendations to improve the effectiveness of the police in protecting communities against disasters in Ethiopia.

2. Methods

This study utilized a triangulation convergent mixed-methods design to comprehensively evaluate police effectiveness in DRM across pre-, during, and post-disaster phases. The research was conducted in three purposively selected urban administrations in Ethiopia: Addis Ababa, Adama, and Dire Dawa, chosen for their exposure to various hazards and their importance as administrative centers. This design facilitated the simultaneous collection of both quantitative and qualitative data, enabling a balanced triangulation that harnesses the strengths of each approach to enhance analysis and validate findings through convergence (Creswell, 2018; Kothari, 2004).

The study population comprised an infinite group including federal and regional police officers, disaster management personnel, and community members from disaster-affected areas of the selected cities. For sample selection, a stratified random sampling technique was used to ensure proportional representation across groups. A sample of 384 respondents was determined from the total population using a standardized formula for infinite populations, at a 95% confidence level and a 5% margin of error (Kothari, 2004).

Qualitative data were gathered from key informants, including disaster management experts and affected households, which were selected via purposive sampling. Data were collected by using structured questionnaires with 5-point Likert scales and semi-structured questions for key informant interviews, and document analysis. Finally, the results of the findings were triangulated by using information from multiple sources.

Quantitative data were analyzed using both descriptive statistics (frequencies, means, and standard deviations) and inferential statistics. The Multiple Linear Regression (MLR) model was used to examine the relationship between police effectiveness (the dependent variable, treated as continuous) and the independent (DRM) activities in the pre-disaster (PR), during-disaster (DU), and post-disaster (PO) phases. The model was expressed as: $EPR = \beta_0 + \beta_1PR + \beta_2DU + \beta_3PO + \varepsilon$. Qualitative data from interviews and documents were analyzed using thematic analysis to provide contextual depth. To ensure data quality, the reliability data test was assessed using Cronbach's Alpha via a pilot test, and validity was strengthened using questionnaire constructed validity, peer review, and expert validation of the research instruments (Golafshani, 2015; Kothari, 2004).

3. Results and Discussions

This section explores the critical aspects of disaster management by focusing on the extent of disasters and the effectiveness of the police in mitigating their impacts. Section 3.1 outlines the prevalence and severity of various disasters; Section 3.2 evaluates police effectiveness across different phases of disaster risk management, broken down into pre-disaster (3.2.1), during-disaster (3.2.2), and post-disaster (3.2.3) phases. The last section, 3.3, addresses the ongoing challenges faced in disaster risk management by highlighting the complexities that law enforcement encounters in safeguarding communities against increasing disaster threats.

3.1. Extent of Drought, Flood, pests, Epidemic, and Earthquake Disaster

3.1.1. Droughts Occurrence

Table 1 shows the cross-tabulation of drought occurrences across three target areas: Addis Ababa, Adama, and Dire-Dawa. Among the total 384 respondents, 349 of them stated that there was no occurrence of drought. These were 104 respondents from Addis Ababa, 120 respondents from Adama, and 125 respondents from Dire-Dawa. Conversely, 35 respondents reported that there are droughts, comprising no respondents from Addis Ababa, 14 respondents from Adama, and 21 respondents from Dire Dawa. The Pearson Chi-square value of $\chi^2 (2) = 15.6103$ with p-value of 0.000 indicates a statistically significant difference in drought occurrences among the three areas, suggesting that regional geographic factors may influence the likelihood of drought occurrence.

Moreover, evidence from document review from Dire Dawa Disaster Risk Preparedness and Mitigation Department (2014) indicated that drought is the primary cause of crop damage, followed by other related both natural and manmade causes like deforestation and soil

erosion. Residents of the region, such as lactating women, children, and the elderly, are among the vulnerable groups. According to the Dire Dawa City Administration, Disaster Risk Management Report (2014), drought, crop and livestock diseases, floods, and pests that harm up to 40% of crops are just a few of the serious environmental risks and socioeconomic limitations that Dire Dawa and the surrounding woredas must deal with. These frequent shocks increase household vulnerability throughout the region by causing crop loss, livestock mortality, water shortages, and a decrease in income.

Interviews indicated that the Oromia Regional State DRM branch was re-established under the traditional system, which is known as “Busa Gonofa,” a community-based social security program in which clan members voluntarily contribute livestock, fodder, or other resources to support households affected by disasters.

Table 1: Tabulation of Occurrence of Droughts by Target Area

Drought	Addis Ababa	Adama	Dire-Dawa	Total
No	104	120	125	349
Yes	0	14	21	35
Total	104	134	146	384

Pearson Chi-square ($\chi^2(2) = 15.6103, p = 0.000$)

The statistically significant variation in drought occurrence across Addis Ababa, Adama, and Dire Dawa observed in this study is consistent with previous research indicating that drought impacts in Ethiopia are spatially uneven and strongly influenced by geographic, climatic, and socio-economic factors.

Urban centers like Addis Ababa are generally less vulnerable to drought due to diversified livelihoods, better infrastructure, and relatively stable water supply systems, whereas semi-arid and lowland areas remain highly exposed to climate disaster risk (Climate Risk Country Profile of Ethiopia, 2021; FAO,2022). The absence of reported drought cases in Addis Ababa is, therefore, aligned with earlier national and international assessments that classify major urban centers as comparatively resilient to climate-induced shocks. The higher frequency of drought occurrences recorded in Dire Dawa and Adama corroborates findings from national disaster risk profiles and climate vulnerability studies.

Ethiopia’s National Disaster Risk Management Policy (NDRMP) identifies eastern and central parts of the country, including Dire Dawa and surrounding woredas, as chronically

drought-prone due to rainfall variability, environmental degradation, and dependence on rain-fed agriculture (FDRE, 2013). Other similar studies focus on the drought impacts in these regions, which are intensified by deforestation, soil erosion, and unsustainable land-use practices, which in turn reduce soil moisture retention and agricultural productivity (FAO,2022). This evidence supports the document review findings from the Dire-Dawa disaster risk management report identify drought as the primary cause of crop damage, followed by both natural and human-induced factors(Dire-Dawa Disaster Risk Management Report, 2015).

Findings related to vulnerable population groups, particularly children, lactating women, and the elderly, are also consistent with previous studies. A research study conducted by FAO(2022) has indicated that these groups face high-level risks during drought periods due to increased nutritional requirements, limited adaptive capacity, and reduced access to resources. The Dire-Dawa Disaster Risk Management Profile Report (2014) further explains that recurrent hazards such as drought, floods, crop and livestock diseases, and pest infestations damage up to 40% of crops, which accelerates food insecurity and livelihood instability. According to the Climate Risk Country Profile of Ethiopia (2021) by the World Bank Group (WBG), repeated shocks are widely recognized as key drivers of chronic vulnerability since they erode household assets, reduce income, and undermine long-term resilience.

Interview findings on the re-establishment of the “*Busa Gonofa*” system in the Oromia Regional State strongly align with existing literature on indigenous and community-based disaster risk management practices in Ethiopia (UN, 2015). Community-based disaster risk reduction studies further suggest that such indigenous systems often complement formal DRM structures by offering locally grounded, culturally accepted, and rapidly mobilized assistance, particularly in rural and semi-urban settings where institutional capacity may be limited (FDRE, 2013).

In conclusion, when compared to previous studies, this study reinforces the common understanding of drought risk in Ethiopia as it is geographically differentiated, environmentally driven, and socially mediated. The results of this study also acknowledge the existing recommendations that effective disaster risk management should integrate formal institutional mechanisms with indigenous knowledge systems and community-based social security arrangements. Strengthening collaboration between formal DRM institutions and

traditional mechanisms like “*Busa Gonofa*” may, therefore, enhance resilience, reduce vulnerability, and improve disaster preparedness and response in drought-prone areas like Dire-Dawa and Adama.

3.1.2. Flood Occurrence

Table 2 presents the tabulation of flood occurrences in the target areas of Addis Ababa, Adama, and Dire Dawa. Out of a total of 384 respondents, 100 respondents reported that there is no flooding, with 14 respondents from Addis Ababa, 50 from Adama, and 36 from Dire Dawa. In contrast, a significant majority, 284 respondents, indicated the occurrence of floods, with 90 respondents from Addis Ababa, 84 in Adama, and 110 in Dire-Dawa. The Pearson Chi-square statistics of $\chi^2(2) = 17.5305$ and p-value of 0.000 indicate that a statistically significant difference in flood occurrences among the three areas.

Interviews with residents, particularly in Adama's Irecha kebele, further emphasize the worsening of flood conditions over the past 30 years. On the other hand, there is frequent flooding in Dire Dawa, which also worsens the lives of the residents. The major contributors to flooding in Dire Dawa include unexpected biannual rainfall, sandy soil type, inadequate drainage, and infrastructure problems. This result was also further confirmed by field observations highlighting poor bridge conditions in Dire-Dawa and insufficient protective measures in Adama. Flood in Adama is mostly associated with the presence of low drainage density, low elevation, and impermeable surface of water flow.

Table 2: Tabulation of flood and Target Area

Flood	Addis Ababa	Adama	Dire-Dawa	Total
No	14	50	36	100
Yes	90	84	110	284
Total	104	134	146	384

Pearson Chi-square ($\chi^2(2) = 17.5305, p = 0.000$)

Results of this study have been consistent with previous studies showing that flood risk in Ethiopia is unevenly distributed and strongly influenced by local geographic and environmental conditions. These include: topography, soil type, and drainage capacity (World Bank Group, 2021; FAO,2022). Urban centers like Addis Ababa are often affected by flash floods in low-lying areas due to rapid urbanization and impervious surfaces. Overall,

well-developed drainage and infrastructure will mitigate large-scale flood impacts compared to semi-arid regions like Dire Dawa (UNISDR, 2015)

This result has also been evidenced from interviews and field observations, which align with prior research highlighting the role of environmental and anthropogenic factors in flood vulnerability. In Dire Dawa, the combined effect of unexpected biannual rainfall, sandy soils, and poorly maintained infrastructure, such as bridges, exacerbates flooding risk, which is related to findings from studies on Eastern Ethiopia's flood-prone areas (Erena & Worku, 2018). Areas with low drainage density, low elevation, and impermeable surfaces contribute to frequent urban flooding in Adama. This result is consistent with previous studies supporting the presence of inadequate urban planning leading to higher flood exposure in Ethiopian towns. Urban flood resilience in Ethiopia further benefits from improved infrastructure, early warning systems, and community participation (Gebrehiwot & Veen, 2013).

In conclusion, flood occurrences are highly prevalent in Addis Ababa, Adama, and Dire Dawa. Among all selected areas, Dire Dawa experienced the highest in terms of its occurrence. These significant variations in flood events are related to both natural factors, such as rainfall patterns, soil type, and elevation, and human-induced factors, which include inadequate drainage, impervious surfaces, and poorly maintained infrastructure. Urban centers like Addis Ababa are comparatively less affected due to better drainage and infrastructure. To reduce exposure, protect vulnerable populations, and enhance urban resilience to flooding, integrating formal disaster risk management with community-based interventions such as early warning systems, infrastructure improvements, and public awareness campaigns is essential.

3.1.3. Pest occurrence and controlling measures

Table 3 below presents the tabulation of insecticide or pest control measures across three study areas. Among a total of 384 respondents, 334 respondents indicated that pest control measures were not used very well; with 97 respondents from Addis Ababa, 105 respondents from Adama, and 132 respondents from Dire Dawa. Conversely, 50 respondents reported the use of insecticides, with 7 respondents from Addis Ababa, 29 respondents from Adama, and 14 respondents from Dire-Dawa. The Pearson Chi-square value of $\chi^2 (2) = 13.9449$, and p-value of 0.001 indicate a statistically significant difference in insecticide usage among the

three areas, suggesting that regional factors may influence the prevalence of insecticide application in pest management.

Table 3: Tabulation of Insecticide and Target Area

Insecticide	Addis Ababa	Adama	Dire-Dawa	Total
No	97	105	132	334
Yes	7	29	14	50
Total	104	134	146	384

Pearson Chi-square ($\chi^2(2) = 13.9449, p = 0.001$)

Source: own computation (2025)

The low level of insecticide usage in these areas aligns with previous studies in Ethiopia and other sub-Saharan regions. Results from these regions highlight that many farmers rely primarily on traditional or apply non-chemical pest management strategies due to limited access to commercial pesticides, high cost, or health and environmental concerns (Erena & Worku, 2019; FAO, 2022). In semi-urban areas like Adama, higher insecticide use may be linked to more intensive vegetable or cash crop farming (Mengistie et al., 2017). Conversely, in urban Addis Ababa, pest management in households and small gardens may rely on non-chemical approaches or professional pest control services. Moreover, as the study's findings show, insecticide use is highly influenced by regional factors such as climate, crop type, pest prevalence, and knowledge of integrated pest management (IPM) techniques. According to FAO(2022), integrating indigenous knowledge with formal agricultural extension services has been shown to improve pest control effectiveness while minimizing negative impacts.

To conclude, insecticide use is generally limited across Addis Ababa, Adama, and Dire Dawa, although noticeable differences exist between these three areas. Adama stands out with relatively higher usage. Addis Ababa records the lowest, suggesting that local conditions such as the type of farming practice, the level of pest pressure, and access to pest control inputs shape insecticide application. These findings support earlier studies indicating that many communities in Ethiopia rely less on chemical pesticides. This is due to high costs, limited availability, and concerns about health and environmental effects. Hence, the results of this study suggest the need for locally appropriate and sustainable pest management practices, especially the promotion of integrated pest management approaches that fit the specific realities of each area.

3.1.4. Epidemic Diseases Occurrence

Table 4 summarizes the cross-tabulation of epidemic disease occurrences across Addis Ababa, Adama, and Dire-Dawa. Out of a total of 384 respondents, 335 respondents reported that there is no occurrence of epidemic diseases, with 98 respondents from Addis Ababa, 128 respondents from Adama, and 109 respondents from Dire-Dawa. In contrast, 49 respondents indicated the presence of epidemic diseases, comprising 6 respondents from Addis Ababa, 6 respondents from Adama, and a notable 37 respondents from Dire-Dawa. The Pearson Chi-square statistic of $\chi^2 (2) = 33.5867$ with a p-value of 0.000 shows a statistically significant difference in epidemic occurrences among the three areas.

The interview result indicates that all selected regions experienced outbreaks of COVID-19–related diseases. At this time, police officers are actively involved in enforcing protective measures, particularly by preventing unauthorized entry into restricted and protected areas, to control the spread of the disease.

Table 4: Tabulation of Epidemic Disease with Target Area

Epidemics	Addis Ababa	Adama	Dire-Dawa	Total
No	98	128	109	335
Yes	6	6	37	49
Total	104	134	146	384

Pearson Chi-square ($\chi^2 (2) = 33.5867, p = 0.000$)

Source: Own computation (2025)

The findings from Table 4 above show that statistically significant variation in epidemic disease occurrence across Addis Ababa, Adama, and Dire Dawa. Dire Dawa exhibits substantially higher reported cases. According to the World Health Organization, urban areas with frequent population movement and limited health infrastructure face increased risks of rapid disease transmission, particularly during epidemic emergencies (World Health Organization (WHO) Regional Office for Africa, 2016). Dire-Dawas, as a center of commercial and transport hub, the combined constraints related to environmental and infrastructure problems likely contribute to its heightened vulnerability compared to Addis Ababa and Adama, where relatively stronger health surveillance and service coverage reduce exposure to epidemic threats.

Interview findings further confirm that all selected regions experienced COVID-19-related outbreaks, as it was the nationwide reach of the pandemic. During this period, police

involvement in enforcing movement restrictions and securing protected areas has played a critical role in controlling disease spread. Therefore, findings of this study have aligned with documented experiences during COVID-19, where law enforcement agencies globally supported public health interventions by ensuring compliance with containment measures, which include access control, lockdown enforcement, and crowd management (United Nations Development Programme (UNDP) and the United Nations Office on Drugs and Crime (UNODC), 2020). The United Nations Development Programme (UNDP) similarly emphasizes that effective epidemic response requires coordinated action between health authorities and security institutions to enhance compliance, maintain public order, and protect vulnerable populations (UNDRR, 2015).

To conclude, this finding, the importance of integrating epidemic preparedness within disaster risk management frameworks and formally recognizing the police role at the time of epidemic as key actors in public health emergency response, particularly in high-risk urban settings, is crucial.

3.1.5. Earthquake Occurrence

Table 5 presents a cross-tabulation of earthquake occurrences across Addis Ababa, Adama, and Dire Dawa. In these regions, earthquake experiences are not evenly distributed. Out of a total of 384 respondents, 353 respondents reported no earthquake events, with 103 from Addis Ababa, 133 from Adama, and 117 from Dire-Dawa. Conversely, only 31 respondents indicated that earthquakes had occurred, with just one from Addis Ababa, another one from Adama, and a significant 29 from Dire Dawa. The Pearson Chi-square statistics of $\chi^2 (2) = 44.1270$ and a p-value of 0.000 indicate a statistically significant difference in earthquake occurrences among the three areas. It suggests that Dire-Dawa is particularly prone to seismic activity compared to Addis Ababa and Adama.

Table 5: Tabulation of Earthquakes with Target Area

Earthquake	Addis Ababa	Adama	Dire Dawa	Total
No	103	133	117	353
Yes	1	1	29	31
Total	104	134	146	384

Pearson Chi-square ($\chi^2(2) = 44.1270, p = 0.000$)

From the geological reality of Ethiopia, Dire-Dawa is closer to the East African Rift System, known as a tectonically active area where the Earth’s crust is stretching and shifting, causing earthquakes more frequently. Recent studies rift part like the Fentale Dofen region experienced earthquake swarms in 2024–2025 due to underground movement and magma intrusions (Lewi et al., 2025). On the other hand, Addis Ababa and Adama are farther away to some extent from these active rift zones, which explains why residents there hardly report any felt earthquakes (Herbert, 2013). In Dire-Dawa, higher reports of earthquakes are related to genuine geological risk, not random variation. Thus, it is important to focus on disaster preparedness and mitigation efforts.

To conclude, earthquake experiences are not the same across all three cities. Among all others, Dire-Dawa stands out as the place where people are much more likely to feel earthquakes. In Addis Ababa and Adama, such events are rarely reported. This makes sense because Dire-Dawa is closer to the active East African Rift Valley, an area where the Earth’s crust is constantly shifting, creating more frequent tremors. These findings remind us that earthquake risk is very much tied to location and highlight the importance of focusing on disaster preparedness and safety measures.

3.2. Effectiveness of Police in Disaster Risk Management

The correlation matrix of Table 4 shows that there is a significant and positive relationship between the perceived effectiveness of police in disaster management and DRM practices across all three phases. The strongest associations during the disaster ($r = .546, p < .001$) and post-disaster ($r = .540, p < .001$) phases indicate that effective response and recovery actions are highly linked to overall police effectiveness. The pre-disaster phase also shows us that there is a significant relationship, though it is moderately weaker and positively correlated ($r = .406, p < .001$). Furthermore, the near-zero and non-significant correlations between the independent phase variables ($r = -.062$ between pre- and during-disaster) suggest that they are distinct constructs, which supports their simultaneous inclusion in the subsequent regression model without multicollinearity concerns.

Table 6: Correlation Matrix of Police Effectiveness and Disaster Management Phases

Variable	1	2	3	4
Effectiveness of Police in DM	1.00			
Pre-Disaster Phase	.406***	1.00		

During-Disaster Phase	.546***	-.062	1.00
Post-Disaster Phase	.540***	-.024	.029 1.00

3.2.1. Model Summary

The model summary, based on 384 observations, presents regression analysis with an exceptionally strong and statistically significant fit. The high R-squared value of 0.9566 indicates that the combined predictors' police mandate in DRM practice in the pre-, during-, and post-disaster phases explain approximately 95.7% of the variance in police effectiveness in disaster management. This is further confirmed by the adjusted R-squared of 0.9562, which accounts for the number of predictors and affirms the model's robust explanatory power, which is not an artifact of its complexity. The overall significance of the model is definitively established by an F-statistic of 2791.03 with a probability value of 0.0000, allowing for the clear rejection of the null hypothesis. Furthermore, the Root Mean Square Error (Root MSE) of 1.4275 suggests that the models' predictions are on average within about 1.43 units of the actual observed values on the scale used. Collectively, these statistics provide powerful empirical evidence that a holistic approach, integrating police roles across all phases of the disaster management cycle, is critical for enhancing their effectiveness.

Table 5: Model Summary

Statistic	Value
Number of observations	384
F-statistic (F(3, 380))	2791.03
Prob > F	0.0000
R-squared	0.9566
Adj. R-squared	0.9562
Root MSE	1.4275

Source: own computation (2025)

The regression table 6 output reveals that all three phases of disaster management have a statistically significant ($p < 0.001$) and substantial positive impact on the effectiveness of police in disaster management (DM). Specifically, a one-unit increase in police activities during the pre-disaster phase (preparedness and mitigation) is associated with a 4.50-unit increase in perceived effectiveness. Similarly, a one-unit increase in the post-disaster phase (recovery) predicts a 4.17-unit increase, while police DRM practice during the disaster

phase (response) predicts a 3.91-unit increase. These results, with remarkably high t-statistics, robustly confirm that police engagement across the entire disaster cycle, not just during the response, is critical. The constant (Cons) of 45.36 represents the baseline police effectiveness in disaster management score when all phase activities are zero. The powerful coefficients for each phase demonstrate that proactive and continuous involvement is too important to enhance police performance in DRM.

Table 6: Regression Output

Effectiveness of Police in DM	Coef.	Std. Err.	t	P > t
Pre-Disaster Phase	4.498438	0.08915	50.46	0.000
Post-Disaster Phase	4.165020	0.0729909	57.06	0.000
During-Disaster Phase	3.911246	0.0731304	53.48	0.000
Cons	45.36238	0.1861786	243.65	0.000

Source: own computation (2025)

3.2.2. Pre-disaster Phase

Theoretical frameworks and international best practices unequivocally position proactive pre-disaster engagement as the cornerstone for effective police disaster risk management. Blaustein et al. (2023) advocate the need for a paradigm shift towards community-based preventative policing and proactive risk reduction. They argue that these activities build societal resilience and drastically improve subsequent response effectiveness. The United States’ National Incident Management System underscores that preparedness activities, including joint planning, inter-agency training, and coordinated resource management, are fundamental to operational readiness (Federal Emergency Management Agency, 2017). Therefore, pre-disaster work establishes the strategic and relational foundation upon which all disaster response is built by directing and monitoring police efforts efficiently during emergencies. However, empirical data from this study indicate the presence of a profound disconnect between this theoretical ideal and what is the ground reality for police in the surveyed cities. The findings expose severe deficits across the spectrum of pre-disaster functions.

Based on survey results, a significant portion of respondents, almost 26%, reported that police involvement is very low in foundational tasks like identifying high-risk areas and auditing development strategies for risk, whereas 33% reported that there is a lack of engagement in critical community resettlement plans. Furthermore, police were perceived as insufficiently involved in raising public disaster awareness, as reported by 35% of

respondents, and addressing urban development risks by 27% of respondents. More importantly, in the core preparedness domain, deficiencies were noted in resource management and backup planning, as it was reported by 26% of respondents, and 33% of them indicated a lack of police integration into early warning systems. Key informants consistently described police participation as predominantly reactive and focused on post-disaster order restoration rather than proactive mitigation.

Ethiopian police exclusion from early warning systems and development planning indicates broader institutional fragmentation. This is because police forces are not formally integrated into the DRM planning architecture led by agencies like the Ethiopian Disaster Risk Management Commission. This marginalization fosters and disseminates a reactive policing culture. Even though the national DRM policy advocates comprehensive risk reduction, clear and functional mechanisms for translating these principles into concrete police practice remain underdeveloped. Hence, closing this gap requires more than immense training. These were initiated with institutional reforms that formally mandate and empower the police to fulfill preventive roles. This has to be achieved by aligning their operational culture with the principles of modern, proactive disaster governance.

3.2.3. During Disaster Phase

The effectiveness of police during the acute disaster response phase is widely recognized as critical for minimizing harm and preserving life in an emergency. Timely actions in communication, crowd control, evacuation management, and search and rescue have a direct, measurable impact on disaster outcomes. This role is supported by international scholars such as Luong (2021) and Blaustein et al.(2023), who stated that police effectiveness is enhanced by prompt deployment and transparent communication, as observed in the context of Nairobi. This is further amplified through structured cooperation with emergency agencies to improve situational control. The response to large-scale disasters that occurred globally indicates this pattern. For instance, during the Wenchuan Earthquake in China and in the case of the United States, Hurricane Katrina, police worked to ensure public safety in the chaotic aftermath despite the existence of severe systemic challenges. The professional integration of police into government has led to community-based response initiatives has been seen in Vietnam's model. The Model further illustrates the potential for police to be a central pillar of coordinated disaster response.

However, the findings from the selected areas of Ethiopia were not as significant, which is attributed to existing gaps between this potential and the reported on-the-ground performance during disasters. The reported survey data indicate substantial public and stakeholder perception of inadequate police engagement in core response functions. Specifically, 27% of respondents reported low police involvement in monitoring ongoing emergency efforts, 23% noted minimal police contribution to timely and comprehensive reporting on disaster progress, and 26% indicated that authorities failed to utilize advanced technology for documenting and publicly disseminating real-time emergency status. These measurements suggest weaknesses in the operational transparency, accountability, and technological integration of police during crisis events. These, in turn, can erode public trust and hinder the overall response coordination in disasters.

As explained by one of the interviewees, police are expected and do engage in fundamental tasks such as upholding security, safeguarding communities, and assisting with emergency operations during diverse crises, including floods, droughts, and public health emergencies like COVID-19. Whereas the police are institutionally present and active during disasters, the quality, scope, and systematic integration of their response are perceived as lacking. The evidence points not to the absence of police, but to significant limitations in the effectiveness and sophistication of their involvement.

The conclusion, therefore, is that the Ethiopian police operational capacity during the disaster phase is constrained by deficiencies in monitoring, reporting, and technological application. This is likely stemming from the pre-disaster challenges of limited training, resource constraints, and weak institutional integration. While police personnel undertake vital life-saving and protective functions, their response remains hindered by these major factors. This in turn prevents police from reaching the high level of coordination, technology-enabled, and transparent force multiplier as observed in international best practices. Enhancing effectiveness during disasters will necessitate addressing these foundational gaps in training, resources, and inter-agency protocols.

3.2.4. Post-Disaster

The importance of police in the post-disaster recovery is well thought out in the previous disaster management literature. It positions police as critical agents for security stabilization, community reassurance, and coordination of humanitarian operations. Scholarly work emphasizes that a community-oriented policing approach during recovery does more than

restore order. It actively rebuilds fractured social ties and institutional trust, which are foundational for long-term resilience (Blaustein et al., 2023; Luong et al., 2024). This theoretical framework underscores that effective recovery is not a passive process, but it is an active, security-conscious endeavor. Therefore, scholars consistently argue that strengthening this role requires targeted improvements in police training and resource allocation. Most crucially, their formal integration into national disaster frameworks is to ensure their capabilities as part of the strategic plan from the outset (Islam, 2023). This position post-disaster engagement is not an additional duty but is considered a core function of modern and resilience-focused policing.

However, empirical findings from this study reveal that there is a significant implementation gap in the three selected Ethiopian regions. In these regions, police involvement in strategic recovery activities is consistently perceived as insufficient. From the total sample taken part in the survey, 22% of the respondents reported limited police engagement in post-crisis planning and implementation, whereas 23% rated their participation in recovery strategy development as very low. Performance in critical evaluative and prioritization tasks, such as conducting post-disaster evaluations and ensuring aid that reaches the most affected communities, was rated as only medium by 22% and 25% of respondents, respectively. This pattern suggests police contributions remain largely operational and reactive, which mainly focus on immediate tasks like organizing search teams (rated as very high by 21%). This disconnect between potential and practice highlights systemic failure to leverage police as strategic partners in rebuilding. The interview results further clarify this gap by pointing to deep-rooted institutional and logistical barriers. Interviewees noted that police are typically engaged only after a disaster strikes and are systematically left out of pre-disaster planning. This exclusion from the foundational planning stages inherently limits their capacity to take proactive, coordinated, and recovery measures. Furthermore, their effectiveness is constrained by pervasive logistical and human resource limitations.

In conclusion, studies underscore that institutional fragmentation and lack of coordinated planning are chronic issues leading to siloed operations where actors like the police are not integrated into the full disaster management cycle. Additionally, assessments of specific hazards, such as flooding in Dire Dawa, confirm that community-level preparedness and response are severely hampered by a lack of resources and weak linkages between different responding agencies, including security bodies. Therefore, enhancing police effectiveness in

post-disaster recovery requires more than intensive efforts, which demand institutional reforms that mandate their inclusion in all phases of disaster governance.

3.3. Challenges of Police Response to Disaster Risk Management

The effectiveness of the police in disaster risk management (DRM) is contingent upon their integration into a proactive, well-resourced, and coherent national system. In Ethiopia, police forces face a compounding set of challenges that severely limit their operational capacity across the disaster cycle. Developing nations share similar hurdles, including Ethiopia. Ethiopian police difficulties are intensified by a specific context of reactive institutional culture and a critical lack of formally defined police roles within the DRM architecture. The most immediate barrier to effective police disaster response is severe resource scarcity. Most shortages are related to personnel, specialized equipment, and interoperable communication technology essential for operations during search and rescue or mass evacuation. For instance, similar studies in Dire-Dawa city, frequently affected by floods, reveal that limited emergency preparedness at the community level is exacerbated by weak linkages with essential services, including security and health sectors (Tigist & Kalyanapu, 2025). Compounding the resource problem is a significant deficit in specialized DRM training. Police officers often lack formal skills in early-warning interpretation, emergency communication protocols, and coordinated search and rescue competencies that are mandatory for effective disaster management. This training gap reflects a systemic failure to integrate DRM into standard police education and continuous professional development.

The consequences related to education failure, as indicated in a related study of public hospitals in Addis Ababa, found that most workers had inadequate knowledge of disaster management plans and faced major challenges in staff training and a persistent shortage of emergency equipment (Firissa et al., 2023). If core response agencies, including hospitals, are under-prepared, a police force without parallel training cannot effectively coordinate with them. This will lead them to disjointed and inefficient responses that fail to leverage multi-agency synergies. Beyond resources and training, the most profound challenge is institutional. The Ethiopian police are frequently excluded from formal DRM planning processes. This limits their influence on policy and pre-disaster strategy. This exclusion further fosters a reactive rather than proactive policing culture focused on post-disaster order maintenance rather than integrated risk reduction.

According to Ethiopia's DRM system analyses, historical emphasis on reactive humanitarian response over proactive prevention with flood management efforts is often poorly integrated into broader health and development systems (Tadesse & Ardalán, 2014). Without police involvement in disaster planning, disaster responses become fragmented. When Police actions are not synchronized with those of the Ethiopian disaster risk management and reduction commission or health authorities, measurements undertaken will lead to confusion, duplicated efforts, and critical gaps in service delivery during crises. Those institutional and operational challenges are set against Ethiopia context of high disaster vulnerability. In this environment, government investment in the proactive, specialized capabilities of security services is often deprioritized in favor of immediate relief needs. This creates a vicious cycle; under-investment in police DRM capacity leads to less effective responses.

The challenges faced by the Ethiopian police are a similar echo globally, but they are distinguished by their severity. Similar resource and training limitations are documented in other low- and middle-income countries like Kenya, Bangladesh, and India, where DRM competes with other pressing priorities for funding. Conversely, high-income countries like Australia and the United States benefit from advanced equipment and the establishment of formal systems like the Incident Command System (ICS) that integrate police into response frameworks. However, international evidence crucially shows that resources and formal structures alone are not sufficient. Failures during large-scale disasters in well-resourced nations often stemmed from poor interagency coordination and rigid traditional policing cultures that hinder adaptation (Blaustein et al., 2023). This comparative view underscores that for Ethiopia, since increased funding sources are essential, the paramount task is expected to be done on institutional reform to ensure that any resources are used within a framework of clear mandates, collaborative planning, and a shift toward proactive community engagement.

4. Conclusions

The objective of this study is to assess police effectiveness in Disaster Risk Management Practice in Ethiopia. When police are actively engaged in tasks of communication, evacuation support, crowd control, and coordination with emergency agencies, the impacts of disasters are reduced, and public order is better maintained. However, the findings of this study underscore that police involvement remains largely reactive and weakly embedded within formal disaster management structures. As a result, the police's potential contribution to risk

reduction and resilience-building is not fully realized. Addressing this gap requires more than short-term training initiatives; rather, it requires clear institutional reforms that formally recognize, mandate, and outsource the police as core actors in disaster management. Therefore, strengthening integration is essential to improving disaster outcomes and building a more resilient response system within police organizations.

Conflict of Interests

The authors have declared that no conflict of interest exists.

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