A Community-Based Assessment of the Contribution of Various Stakeholders towards Disaster Reduction in the Bamenda City Area, Cameroon

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Abstract:
The aim of this study was to enhance disaster management in the Bamenda City Council and update the Disaster Management Profile of Cameroon by evaluating the likelihood and impact of different disasters in the area. The study found that the most common hazards and disasters in the area were floods, environmental pollution, storms, criminal activities, political unrest, and civil disobedience. Through a field survey, the study analyzed the perceptions of community members and council representatives from indigenous villages and urban settlements, as well as secondary data obtained from relevant institutions in Cameroon. The research proposed management strategies to improve the local council authorities' ability to respond effectively to these disasters, including the use of mobile hospital facilities, activation of emergency transportation, and preparation for emergency reception centers and shelters within the city council area. The study recommended that the Bamenda City Council implement existing disaster management plans while considering potential hazards and providing adequate disaster management facilities within the various Sub Divisional Councils. By doing so, the council can enhance their ability to respond to disasters effectively.

Keywords: Disaster, risk, likelihood, Bamenda city council

1. Introduction

Disaster, as defined by the United Nations International Strategy for Disaster Reduction (UNISDR) (2009), refers to a serious disruption of the functioning of a community or society that involves widespread human, material, or environmental losses and impacts beyond the affected community's ability to cope using its own resources. Natural disasters have become increasingly prevalent, with around 218 million people affected by such events annually between 1994 and 2013, resulting in significant human suffering and economic losses (CRED, 2015). Between 2000 and 2011, natural disasters caused $1.3 trillion in damages and resulted in 1.1 million fatalities globally (International Civil Defense Organisation, 2016).

Disasters have resulted in a significant increase in the number of refugees and displaced people worldwide, with nearly 65 million such individuals in 2016 (Cosgrave et al., 2016). The United Nations held its first-ever world summit on humanitarian assistance in 2016, noting that the scope of human suffering is higher today than at any time since the Second World War (United Nations, 2016). As a result, disaster management policy has received renewed attention (Ismail-Zadeh & Takeuchi, 2007; Birkmann et al., 2010), with the potential to significantly alleviate human suffering (Cutter, 2016; Aka et al., 2017; Singh-Peterson et al., 2015).

According to Ban, Miles, and Gordon's (2019) study, many African nations are vulnerable to a range of dangerous events, which is compounded by the vulnerability of their rapidly expanding populations, leading to frequent disasters with serious financial and developmental repercussions. Despite the common understanding of disaster management

concepts, there is a shrinking sensitivity to these hazards. The high incidence and frequency of risks, emergencies, crises, and disasters frequently threaten the economic and sustainable growth of many African countries.

Natural disasters can be categorized as climate or weather-related, hydrological, geophysical, or meteorological events (Barnes, Dunn and Wilkinson, 2019). Climate-related disasters are the most common type, with hydrological, geophysical, meteorological, and climatological causes. In contrast, artificial disasters are human-caused, with common causes including terrorism, sabotage, viruses, war, theft, arson, and loss of power supply (both electric and gas), among others (Barnes, Dunn and Wilkinson, 2019).

In Cameroon, urban areas have been identified to be particularly vulnerable to flooding, with severe floods causing the loss of lives and destruction of property in Limbe municipality in 2001 and two severe floods in the Nkolbisson neighbourhood in 2008 (Tchindjang, 2012). In recent years, major urban centers such as Yaoundé and Douala have been severely affected by floods at a frequency of 5 to 10 times per annum (Tchindjang, 2012). In rural areas like Maga and Lagdo in Northern Cameroon, the frequency of occurrence ranges from 1 to 5 times per year.

In light of these findings, it is crucial to enhance disaster management in vulnerable areas like the Bamenda City Council in Cameroon. The aim of this study is to evaluate the different disasters and likelihood of occurrence in the Bamenda City Council and propose management strategies to local council authorities to improve their ability to respond to disasters effectively. The study will analyze the perceptions of community members and council representatives from indigenous villages and urban settlements and use secondary data obtained from relevant institutions in Cameroon. The research will identify viable strategies for disaster response, such as mobile hospital facilities, emergency transportation activation, and preparation for emergency reception centers and shelters. By implementing these strategies, the Bamenda City Council can enhance its disaster management plans and better prepare for potential hazards, ultimately minimizing the impact of disasters on its community.

1.1. Statement of the problem

The Bamenda City area in Cameroon is highly vulnerable to natural and artificial disasters, as evidenced by the frequent occurrence of floods, environmental pollution, storms, criminal activities, political unrest, and civil disobedience. According to a study by Tchindjang (2012), major urban centers like Yaoundé and Douala in Cameroon have been severely affected by floods at a frequency of 5 to 10 times per annum. The study also showed that in rural areas like Maga and Lagdo in Northern Cameroon, the frequency of occurrence ranges from 1 to 5 times per year. In 2001, severe floods hit the Limbe municipality, causing the loss of lives and destruction of property. In 2008, the Nkolbisson neighbourhood suffered two severe floods (Tchindjang, 2012).

These disasters have significant economic, social, and environmental consequences, resulting in widespread human suffering and loss. According to the Centre for Research on the Epidemiology of Disasters (CRED) (2015), around 218 million people were affected by natural disasters annually between 1994 and 2013. The study also showed that these disasters resulted in significant economic losses, with $1.3 trillion in damages and 1.1 million fatalities between 2000 and 2011 (International Civil Defense Organisation, 2016).

In Cameroon, disaster management policies and plans have been put in place to address these challenges. However, there is a need to assess the contribution of various stakeholders towards disaster reduction in the Bamenda City area. Despite the efforts made to manage disasters, there are still gaps in the current strategies, particularly in terms of community participation and coordination among various stakeholders. For instance, Ban, Miles, and Gordon (2019) noted that many African countries, including Cameroon, are vulnerable to a range of dangerous events, which is compounded by the vulnerability of their rapidly expanding populations, leading to frequent disasters with serious financial and developmental repercussions.

In light of the above, this study aims to evaluate the role of various stakeholders in disaster reduction efforts in the Bamenda City area. Specifically, the study seeks to assess the level of community participation and coordination among local council authorities, relevant institutions, and community members in disaster management. The study will also identify the gaps in current disaster management plans and strategies and propose management strategies to enhance the ability of stakeholders to respond effectively to disasters.

2. Literature Review

2.1. Risks, Hazards, Disasters and the Likelihood in Bamenda City Council Area

The City of Bamenda has a peculiar physical environment that is susceptible to natural hazards. It is divided into two areas of settlement: the Bamenda station imposing escarpment known as Upstation, which lies at 1455M above sea level and host of administrative and government residential area (GRA) and the lower section, which lies between 1330M above sea level around Sisia quarter and 1200M at Ngomgham quarter. This gives an abrupt gradient difference of 255m between Up-station and Lower Ngomgham, which makes easy and steady discharge of runoff into river courses under natural conditions in the lower sections of the city. The Mezam River, which drains the town, is fed by several other small streams which take their rise from the Up station escarpment. This and the rapid and unplanned growth of the Bamenda urban space make the city vulnerable to natural disasters due to the impact of urbanization. Natural disaster occurrences caused by this include:

- Floods: Floods are one of the most devastating natural disasters as it has serious effects on the population and the environment (Guedjeo et al., 2012; Vinet, 2017; Wisner et al., 2013; Balgah et al., 2015; Chanze, 2017). Its frequency depends on the type of flood, zone of occurrence, and the season of the year. Many factors are responsible for flooding, such as heavy and consistent rainfall, accelerated snowmelt, severe winds over water,

unusually high tides, and tsunamis, and accelerated urbanization, failure of man-made structures such as dams, levees, retention ponds (Nkwunonwo et al., 2019).

The negative impacts of floods are numerous, like loss of human lives, the spread of faecal and vector-borne diseases, mental disorders, psychosocial traumas, etc (Neira et al., 2008). In some of the quarters of Bamenda city, such as Azire, Ntamulung II and III, Nitop I, and Ngomgham, flood events occur annually. This leaves much to be considered if these disaster occurrences are effectively being managed to mitigate or prevent their impact on vulnerable communities. Developing countries often possess little potential for flood prevention and management, justifying the high frequency and vulnerability of such regions to flood disasters (Acho-Chi, 1998; Fogwe, 2008; Afungang et al., 2017).

- Subsidence and collapse of bridges: Many residents of the Atuazire Quarter of Bamenda City have noticed a progressive upsurge of water in the form of springs from underneath their foundations. This causes subsidence, making the walls of their houses tilted and cracked, a condition that has resulted in some deaths when the buildings finally collapse.
- Landslides: Landslides occur in areas of relatively steep topographic slopes underlain by unstable materials. Slides are often the result of high concentrations of soil moisture that lubricate the surface materials. Landslides may cause severe damage to structures and systems (buildings may be buried or villages swept away). Rivers may be blocked, causing flooding, and crops may be affected. Sometimes, areas of crop-producing land may be lost altogether.

Bang et al.'s (2019) study on disaster risk reduction in Cameroon gives guidelines to the Sendai Framework and corresponding resistance elements to their implementation in Cameroon, like in other developing countries, and suggestions for alleviating them.

The city of Bamenda, due to its topography, is a major risk zone for hazards such as landslides, rock falls and floods. The creation of resilient cities capable of maintaining effective disaster management plans to manage disaster events in their communities when they occur is on the rise all over the world. Regrettably, evaluations of different hazards, disasters, and crises that have affected Cameroon in recent times are on the rise. Meanwhile, many city councils neglect the aspect of preparedness and planning against unforeseen disaster-related tragedies that take away lives. Despite the fact that some work has been done and risk zones identified, people still live in these risk zones and suffer the impacts of the resulting disasters. There is a need for effective disaster management planning to be shaped to ensure a comprehensive and continuous process addressing issues such as learning, involvement and commitment. It is against this backdrop that this article is designed to evaluate the different disasters and their likelihood of occurrence in the Bamenda city council area and propose management strategies to local council authorities in order to enhance their ability to respond to disasters effectively in the area. The main question to be answered in this study is about the different disasters in the Bamenda city council area and their likelihood of occurring.

2.2. Study Area

Bamenda is located between longitudes 10o 09" and 10o 11" East of the Greenwich Meridian and between latitudes 5o 56" N and 5o 58" North of the Equator. Bamenda gained the status of a city on the strength of a Presidential Decree of January 17th 2008, which created the Bamenda City Council from the defunct Bamenda Urban Council (Yooil, JOO, Yu-Min, & WON, Soh-Yeon. 2015).

The balkanized former Bamenda Urban Council (BUC) into three sub-divisional councils - Bamenda I (Mendankwe), Bamenda II (Mankon), Bamenda III (Nkwen) and the Bamenda City Council, which is the umbrella council for the three sub-divisional councils, shall be the area of study. These three sub-divisional councils and the city council, and their area of jurisdiction are referred to as the Bamenda City Council and the powers of the council authorities are limited to these areas.

The results of Ndi's (2018) study in Cameroon make clear that Bamenda's natural surroundings, as manifested by its fragile geologic structure, undulating topography, and exceptionally steep slopes, are omni-inviting for a variety of negative environmental imprints. Contrary to these difficulties, Bamenda's urban growth process has neglected the area's natural environment, as anthropization of slopes and marshes is a prevalent idiosyncrasy. The efficiency of decentralization as a response strategy for disaster risk management, however, leaves much to be desired given the current state of circumstances.

Prior to now, Nyambod (2010) demonstrated in his study on the environmental effects of urbanization using the case of Bamenda that the phenomena of rural exodus are the root cause of the declining urban quality. Ineffective land management systems, poverty, general chaos, and a lack of understanding of environmental issues all serve to worsen the situation. In order to address the environmental threats that Bamenda is currently facing, the study urged a multidisciplinary and comprehensive spectrum of measures.

Based on the brief review, it is evident that the Bamenda city council area is vulnerable to disasters, both natural and man-made. The most common natural disasters in the area include floods, landslides, rock falls, and bridge collapses. The most common man-made disasters in the area are terrorism, theft, arson, war, sabotage, etc. Below is a map of the study area.
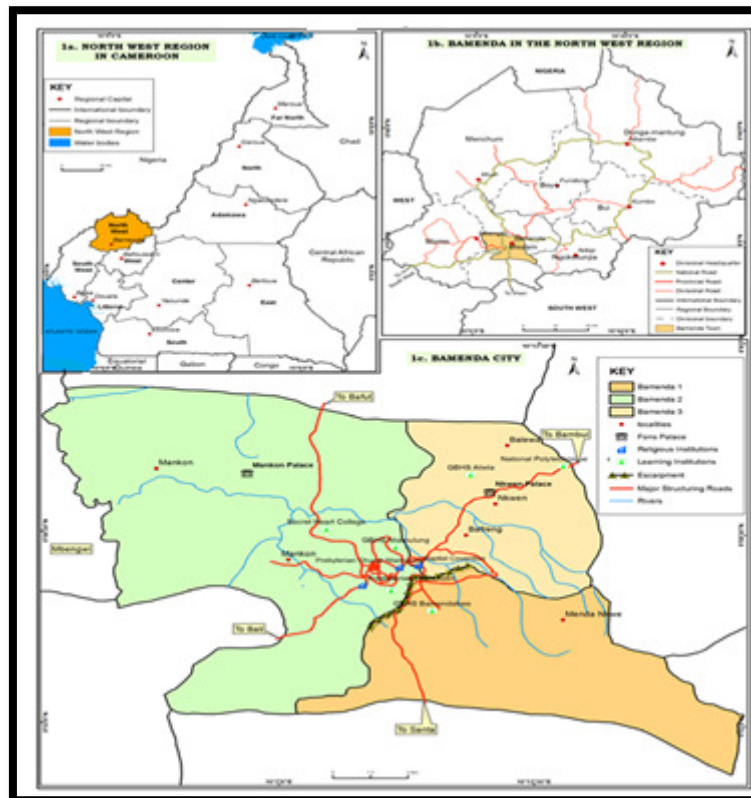
Figure 1: Location of Bamenda in the North West Region
Source: Bamenda City Council (2018)

3. Methodology

This research was pursued through fieldwork. The fieldwork includes the use of the questionnaire on the Management of Disasters in the Bamenda City Council, North West Region of the Republic of Cameroon.

3.1. Research Design

The research was designed in such a way as to evaluate the management of disasters, likelihood of occurrences and severity of impact of disasters in Bamenda City Councils. A structured questionnaire was designed to obtain primary data. It employs a quantitative design method. Quantitative through the use of a semi-structured questionnaire administered to members of the targeted communities cited to be knowledgeable about the disaster occurrences and how it is being managed, and Qualitative involves examining the infrastructures and land deformations and exploitation of valuable literature.

3.2. Population, Sample Size and Sampling Techniques

The targeted population for this research comprised 20 members of the Department of Urban Development of the umbrella Bamenda City Council, 10 members each from the technical department of the Sub Divisional Councils of Bamenda I and Bamenda II, and 13 members from the Bamenda III Sub Divisional Council. This makes a total of 53 targeted individuals within the study area. Based on this known population, the sample size is determined based on the formula (IWSD, 2003 in Macdonald, 2006).

$$n= (N/ (1+N (\alpha 2)$$

Where:

n = the desired sample size

N = the Known Population size

Accordingly, the sample size is determined as thus:

N=53 and α=0.05 – standard deviation.

Hence,

Sample size n = [(53)/ (1 + 53 (0.05)2) = 46.80

Hence = 46.80, approximately equal to 50. Hence, the researcher administered 50 questionnaires for the desired sample size. The sampling technique adopted in the distribution of the questionnaires was a simple random sampling technique.

3.3. Data, Instrument, Methods of Data Collection

Primary data was obtained directly using questionnaires, while secondary data was obtained from literature and other published studies. The main instrument for data collection, a structured questionnaire based on the aim, was designed. Questionnaires were administered to the members of the technical departments of the various councils functioning under the Bamenda City Council. The questionnaire consists of sections A and B. Section A was used to

generate data on the respondents' profile, which included specific information about the villages concerned for the council area and the population size. Sections B to K of the questionnaire were used to gather information on the disaster preparedness in the Bamenda city council area, disaster likelihood and the severity of impact as well as response mechanism and strategies in the Bamenda City Council, availability of evacuating facilities in the event of disaster in any given area within the Council, rescue response expected from different organizations at the event of a disaster, public education and enlightenment, training and other community-based disaster preparedness.

3.4. Data Analysis

The data collected for this study were analyzed using descriptive statistics and presented using statistical tools like tables, frequencies and percentages.

4. Results and Discussion

4.1. Socio-Demographic Profiles of Respondents

Based on the characteristics of the respondents, all the participants were sampled from Bamenda City Council, Medankwe, Chomba, Mbatu, Nsongwa, Mankon, and Nkwen. The study area is optimally populated, with a population size of about 700,000.

4.2. Disaster, Risk and Vulnerability Assessment

The Severity and Likelihood of Occurrence of each potential disaster, as well as areas of vulnerability, were rated using "Low," "Medium," and "High." For each entry, various combinations of likelihood and severity of impact were grouped.

Disasters	Low/Low	Medium/High	Low/Medium	Medium/Medium	High/High	Nil/High	Nil/Low
Floods	36.96%	63.04%					
Environmental pollutions	6.52%			32.61%	60.87%		
Landslides	39.13%			58.70%		2.17%	
Rock falls	80.43%					19.57%	
Subsidence	97.83%		2.17%				
Erosion	8.70%				91.30%		
Thunder/lightning strikes	15.22%			84.78%			
Droughts		2.17%	54.35%				43.%
Storms	34.78%	2.17%		58.70%	2.17%		2.17%
Criminal activities				4.35%	95.65%		
Political unrest / Civil disturbance				2.17%	97.83%		
Fire outbreaks	43.48%	2.17%		54.35%			
Collapse of building structures	32.61%		32.61%				10.87%
Road traffic accidents	60.87%			39.13%			
Arson or act of terrorism	36.96%			56.52%	4.35%	2.17%	
Electric power failure		54.35%			45.65%		

Table 1: The severity and Likelihood of Occurrence of Disaster in the Bamenda City Council Area
Source: Compiled from Field Survey, 2021

The study sought the opinions of participants on 16 types of disasters to uncover their likelihood of occurrence and severity, as presented in table 1. The findings revealed that the likelihood of floods occurring in the study area is medium (63.04%), and when they occur, the severity is high. Environmental pollution was found to have a high probability of occurring with high severity, according to 60.87% of respondents.

Moreover, the likelihood of landslides was found to be medium, with a corresponding medium severity (58.70%). The probability of rockfalls was low, with a low severity as well (80.83%). Erosion was found to have a high likelihood of occurring, with high severity, according to 91.30% of respondents.

In addition, the findings indicate that the likelihood of thunder/lightning is medium, with a corresponding medium severity (84.78%). The likelihood of drought was low, but its intensity was medium, according to 54.35% of respondents. The likelihood of storms was found to be medium, with medium severity, as stated by 58.70% of respondents.

Furthermore, the study found that criminal activities have a high likelihood of occurring in the study area, with very high severity, according to nearly all respondents (95.65%). Similarly, political unrest/civil disturbance was perceived to have a high likelihood and severity, according to 97.83% of respondents. The likelihood of fire outbreaks was found to be medium, with corresponding severity, according to 54.35% of respondents. Additionally, over half of the respondents believed that the likelihood of arson or acts of terrorism was medium, with corresponding severity.

The collapse of building structures was found to be uncommon, and when it happens, the severity is low. Similarly, 60.87% of respondents claimed that road traffic accidents are not very common, and the severity remains low. Lastly, the likelihood of electric power failure was low, and its severity was low as well. Thus, the study highlights the varying likelihood and severity of different types of disasters in the study area, with some disasters having a higher probability of occurrence and severity than others. These findings provide valuable insights into the disaster risk profile of the study area, which can inform disaster management strategies to mitigate the impact of disasters on the community.

Intensity of Effects of the Past Disasters	Dimensions of Disaster Effects				
	Bamenda I (%)	Bamenda II (%)	Bamenda III (%)	Lives (%)	Count of Properties (%)
Extremely significant	2.17%	2.17%	2.17%	2.17%	2.17%
significant	2.17%	2.17%	93.48%	2.17%	56.52%
slightly significant	95.65%	91.30%	4.35%		4.35%
Insignificant		4.35%		15.22%	
Indecisive				80.43%	36.96%

Table 2: The Intensity of Effects of the Past Disasters on the Following Items
Source: Computed From Field Data, 2021

According to the survey as presented in table 2, the intensity of the effects of the past disasters has been more felt in the Bamenda III council area, with 93.48% of the respondents admitting that there is a significant impact of the intensity of the disaster in this area. Generally, the intensity of the effects of past disasters on properties, according to the survey, has been average (56.52%), and the respondents are indecisive on the effects of the disasters on lives (80.43%).

5. Discussion

Our findings suggest that, on average, there is a prospect of the majority of the disasters considered in the study to occur in the Bamenda city council and its environs. From the results, the prospects of environmental pollution occurring in the area are high, likewise its severity. This is primarily due to the activities of the population of the area. One of the key reasons for environmental pollution in a city area is poor waste disposal, and it is commonplace in the study area for dwellers to dump their wastes (agricultural and household wastes) just anywhere. Other disasters that were noticed include flooding, erosion, landslides, and rock falls. It is observed that these disasters are stimulated by anthropogenic causes like subsistence farming, deforestation, plantation agriculture, and dumping of refuse into rivers and waterways. Natural causes include slope steepness, rainfall, groundwater, and gravity, among others, which can provoke erosion and flooding. The city of Bamenda has a peculiar physical environment. Up-station lies at 1455M above sea level, and the lower section lies between 1330M above sea level, which is susceptible to the occurrence of disasters (Chanze, 2017; Vinet, 2017; Nkwunonwo et al., 2019). The findings are supported by the work of Ndi (2018) in Cameroon, who established that the intrinsic physical setting of Bamenda exhibited through its precarious geologic structure, undulating topography, and extremely steep slopes are omni-inviting for a plethora of adverse environmental imprints.

The prospects of disasters like drought, fire outbreaks, storms, and thunder/lightning are moderate. This is probably due to the effect of climate change, which is provoked globally by the emission of greenhouse gases into the atmosphere. The likelihood of the collapse of building structures, road traffic accidents, and electric power failure is low in the area. Climate change is provoked by human and natural actions. Disasters such as drought, fire outbreaks, and storms are not new phenomena; they have been occurring for decades now and have been accelerated due to climate change that the world is battling (Buchanan, 2003; Ngulube, 2005). In addition, Barnes, Dunn and Wilkinson (2019) established that the most frequent disaster types are climate-related as a result of hydrological, geophysical, meteorological and climatological causes.

More so, it was noted that there are high odds of criminal activities, political unrest / civil disturbance, Arson or acts of terrorism happening in the Bamenda city council. The high odds of criminal activities can be attributed to the high population of the area and the shortage of decent jobs in the area, thus forcing offenders to commit crimes. The high prospect of political unrest and acts of terrorism can be attributed to unresolved political grievances that have been in existence for decades. The findings are supported by Nyambod, who established that the deteriorating urban quality stems from the phenomenon of rural exodus. Nyambod attributed the poor handling of the environment in the Bamenda city council area to inadequate land administration practices, poverty, and general disorder and inexperience in dealing with environmental issues (Nyambod, 2010).

6. Conclusion

The study noted that many disasters are likely to occur in the Bamenda city council area. The topmost disasters most likely to occur in the study area include environmental pollution, flooding, erosion, landslides and rock falls, storms, criminal activities, political unrest and civil disobedience. Thus, both natural and man-made disasters are likely to occur in the study area. Bamenda III sub-divisional council area of the Bamenda City council has been the most affected by

disasters. The intensity of the effects of past disasters on properties, according to the survey, has been average, and the respondents are indecisive about the effects of the disasters on lives.

Conclusively, the most common hazards and disasters within the Bamenda city council area are floods, environmental pollution, Erosion, storms, Criminal activities, political unrest, and civil disobedience. The disasters with the most severe effects on lives and property are fire outbreaks, criminal activities, political unrest, civil disobedience, and erosion.

7. Recommendations

The Bamenda city council should develop a Disaster Management plan that is more encompassing, stating and taking into cognizance the various possible hazards and disasters that it is prone to, giving due considerations to the severe nature of the hazards especially in the planning and construction in different areas within the city council and preventive measures taken.

The Bamenda City Council and other stakeholders should put in place strong leadership, coordination, and responsibilities in disaster risk management. This includes effective stakeholder engagement, well-defined policies and strategies, the distribution of tasks, effective lines of communication, and mechanisms that facilitate effective risk management.

It is recommended that the Bamenda City Council should implement the disaster management strategies or plans already put in place by the government policies and other institutions working on the Council Development Plans and then improve on it by stating and taking into cognizance the various possible hazards that it is prone to; the provision and implementation of an adequate disaster management facilities within the various Sub Divisional Councils.

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