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Contribution of Community-Based Disaster Management in Reducing Risks in Rwanda

Aristarque Ngoga, Philbert Mugisha, Rosine Rubuga Mukabarungi, Elisabeth Yambabariye, Lamek Nahayo*

Faculty of Environmental Studies, University of Lay Adventists of Kigali, Kigali, Rwanda

Abstract

This study assessed the contribution of Community-Based Disaster Management (CBDM) in risk reduction in Ngororero district, western Rwanda. The questionnaire was used to collect data from a sample of 100 respondents selected from total households of the district. The results indicated that landslide is the frequent disaster occurring in this area followed by rainstorms and flood. However, there are no locally-based disaster management groups in Ngororero district. The results by 34 and 32 percent of respondents indicated that the local leaders and District Administration Security Support Organ (DASSO) are the major intervention bodies. These are merely formed and operate during disaster occurrence for the response and recovery activities. Only 14 percent confirmed to carry out disaster risk reduction activities by themselves. This expresses the need of empowering community-based disaster reduction ownership and engagement. This, if initiated, as said by 26%, would strengthen locally-based initiative while 20% said that it could enhance information sharing, mobilization and reporting at community level. It is concluded that there are no CBDMs in Ngororero district and hence, their creation is essential. This can enable policy makers to easily reach the community and ensure community-based policy execution. In addition, these CBDM would assist external agencies in recovery and response activities by precisely heading to the right people in need of assistance.

Keywords

Community-Based Disaster Management, Disaster Risk Reduction, Ngororero District, Rwanda

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1. Introduction

A disaster is an event that occurs when significant number of people are exposed to hazards to which they are vulnerable, with resulting injury and loss of life often combined with damage to property [1]. Disasters represent a major source of risk for the poor and can potentially destroy development gains and accumulated wealth [2]. For reducing disaster risk among people, Community-Based Disaster Management (CBDM) operates in several parts of the world. This aims to build the capacity of communities to assess their vulnerability to both human induced and natural hazards and develop strategies and resources necessary to prevent and/or mitigate the impact of identified hazards as well as respond, rehabilitate, and reconstruct following its onset [3, 4].

However, the success of CBDM depends on how local authorities facilitate, coordinate and provide technical assistance to the communities for hazard mitigation and vulnerability reduction [5]. This results from the fact that lack of disaster response capacities among local people can contribute to huge loss of life and property, which expresses the need of involving local communities for effective disaster risk reduction [6, 7].

In Rwanda, since 1970, hazards like flood, mudslides, landslides and drought caused immense losses including

* Corresponding author
E-mail address: lameknahayo@gmail.com (L. Nahayo)

more than one million people affected, 4,573 lost livestock, sixty thousand hectares of cropland and fifty thousand houses damaged. While the areas severely affected are poor and largely inhabited [8]. The main problem is that regardless the increasing loss from disasters in Rwanda and in Ngororero district in particular, the risk management is done at large extent, by local authorities and communities are not empowered and involved at all [9].

Ngororero district is reported to be servery affected by hazards and on the best of the authors' knowledge community-based, there is no current study which has been conducted in this area to assess the role of community-based disaster management in risk reduction. Therefore, this study aimed to assess if there are community-based disaster management (CDBM) and its role in reducing disaster risk among residents of Ngororero district, western Rwanda. The results of this study will help policy makers to better understand the required mechanisms to ensure the existence and functioning of CBM not only in Ngororero district, but also across other parts of Rwanda in order to ensure that the benefits of CDBM are gained by all people countrywide.

2. Materials and Methods

2.1. Description of Study Area

For this study, the authors considered Ngororero district which is one of seven districts (Ngororero, Rubavu, Rusizi, Nyamasheke, Karongi, Rutsiro and Nyabihu) of the western province of Rwanda. The district of Ngororero district is 54 percent rural with a total surface of about 678 Km^2 and a total population of 333,713 [10].

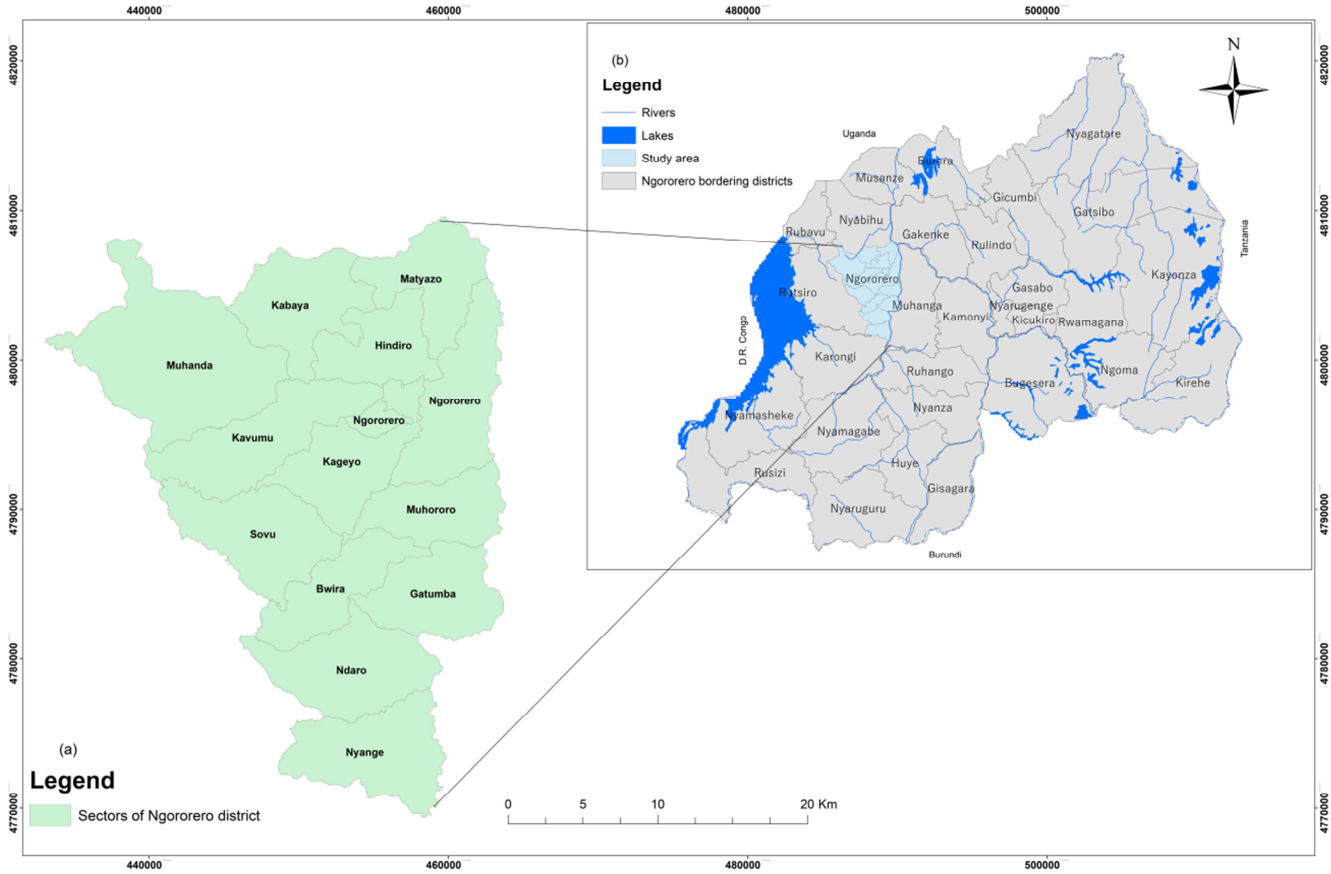

Figure 1. Map indicating sectors of Ngororero district (a) and its bordering districts (b).

The Ngororero district (Figure 1) is composed by thirteen sectors: Bwira, Gatumba, Hindiro, Kabaya, Kageyo, Kavumu, Matyazo, Muhanda, Muhororo, Ndaro, Ngororero, Nyange and Sovu. The district of Ngororero is bordered by the Nyabihu district in north, Karongi district to the south, Muhanga district to the east and Rutsiro district to the west [10]. For this study, the authors chose to indicate if community-based disaster management is operating in this district and its effectiveness in disaster risk reduction. This choice of Ngororero district was made by basing on the fact that previous reports on disaster (Table 1) have highlighted this district among areas on Rwanda which are frequently affected by disasters mainly landslide.

Table 1. Disaster damages in Ngororero district by disaster type from 2016 to 2019.

Disaster type	Deaths	Injured	Damaged houses	Damaged crops in Ha	Lost livestock	Classrooms	Roads and Bridges	Churches	Offices	Water supply	Transmission lines
Fire	0	0	2	0	0	0	0	0	0	0	0
Flood	3	0	7	149.96	0	0	1	0	0	0	0
Hailstorms	0	0	0	84.9	0	0	0	0	0	0	0
Landslides	31	7	995	250.58	38	0	14	0	0	6	0
Lightening	4	27	1	1	7	0	0	0	0	0	0
Mine disaster	5	2	0	0	0	0	0	0	0	0	0
Rainstorm	2	13	1065	139.61	182	35	0	3	5	0	6
Windstorm	0	0	28	0	0	0	0	0	1	0	0
Total	45	49	2098	626.05	227	35	15	3	6	6	6

Source: [11]

2.2. Data Collection and Analysis

For this study, the authors applied the descriptive or survey research design within the study case. The considered study population was the total households of the district which are 78,963 households [10]. The sample was estimated from these households by using the following formula.

$$n = \frac{N}{1+N(e)^2} \quad (1)$$

Where n is the sample size, N is the population size, and e is the level of precision. To minimize the risk that the sample size was not representing the true population of the study, the margin error was fixed at 10%. Thereafter, the sample became:

$$n = \frac{78{,}963}{1+78{,}963\ (0.1)^2} = 99.9 = 100 \quad (2)$$

Thus, as indicated in the above equation 2, the authors employed a sample of one hundred (100) households from thirteen (13) sectors of Ngororero district. In order to ensure that each sector was represented, the proportionate sampling method was adopted as follows:

$$\text{ni} = \frac{Ni*n}{\text{N}} \quad (3)$$

Where *ni* is the sample size proportion to be determined, *Ni* is the population proportion in the sector, *n is* the sample size calculated in equation 2 and N *is t*he total population considered by the study.

Table 2. Respondents per sector.

No.	Name	Population	Sample
1	Bwira	4,421	6
2	Gatumba	5,747	7
3	Hindiro	5,633	7
4	Kabaya	7,754	10
5	Kageyo	5,432	7
6	Kavumu	6,555	8
7	Matyazo	6,113	8
8	Muhanda	6,505	8
9	Muhororo	4,972	6
10	Ndaro	5,593	7
11	Ngororero	8,471	11
12	Nyange	5,508	7
13	Sovu	6,259	8
	Total	78,963	100

The questionnaire was addressed to the heads of households or their substitutes residing in each sector of Ngororero district. The questions were translated in Kinyarwanda for easy understanding of the topic under discussion and this also facilitated the answering process. For this study, data collected were processed and analysed by using the Statistical Package for Social Sciences (SPSS) software.

3. Results

3.1. Description of Respondents

Table 3. Description of respondents by age, sex, education and marital status.

			Age		
Age	**18-24**	**25 - 30**	**31- 55**	**60 and above**	**Total**
Frequency	17	23	39	21	100
Percentage	17	47	39	21	100
			Gender		
Gender	Female	Male			Total
Frequency	41	59			100
Percentage	41	59			100
			Education		
Education	Illiterate	Primary	Secondary	University	
Frequency	9	38	42	11	100
Percentage	9	38	42	11	100
			Status		
Status	Single	Married	Widow(er)	Divorced	
Frequency	19	56	21	4	100
Percentage	19	56	21	4	100

The results on the description of respondents, as shown in Table 3 revealed that 39 percent of respondents are aged between 31 and 55 years old. While those aged between 25-30 years old, and 18-24 years old were represented by 23 and 17 percent, respectively. The same Table 3 showed that the majority of respondents consulted (59 percent) in Ngororero district are male household leaders. Accordingly, in Ngororero district, it was noted that 42 and 38 percent of household leaders attended secondary and primary schools, along with 56 and 21 percent who are married and widow (er), respectively.

3.2. Community Disaster Awareness

Table 4. Types of frequent disasters in Ngororero district.

Frequent disaster	Frequency	Percentage
Landslide	29	29
Rainstorms	24	24
Flood	20	20
Thunderstorm	14	14
Windstorms	9	9
Fire	4	4
Total	100	100

The results in Table 4 indicated that in Ngororero district, landslide is the major disaster frequently recorded among the residents. This was asserted by 29 percent of respondents followed by 24 and 20 percent who mentioned rainstorms and flood, respectively.

3.3. Existence of Community-Based Disaster Management

The results in this Table 5 showed that in Ngororero district, the local leaders and local volunteers are the major disaster management actors operating in Ngororero district. These were mentioned by 26 and 24 percent, respectively. The Army and Police, and DASSOM were also mentioned by 20 and 18 percent, respectively as disaster risk management actors in this area.

Table 5. Types of CBDM working in Ngororero district.

	CBDM types					
Types	**Local leaders**	**Local volunteers**	**Army and Police**	**DASSO**	**External donors and NGOs**	**Total**
Frequency	26	24	20	18	12	100
Percentage	26	24	20	18	12	100
			Group members			
Members	1-10	11-20	21-30	31-40	41+	Total
Frequency	9	89	2	0	0	100
Percentage	9	89	2	0	0	100
			Workload basis			
Workload	Their Agenda	Local leaders decision	Disaster alerts	Prevailing situation		Total
Frequency	4	9	12	75		100
Percentage	4	9	12	75		100

The results in Table 6 indicated that existing CBDM in this district are from outside (69 percent) while 10 percent mentioned that they don't know if CBDM exist in their district. Accordingly, 100 percent (all respondents) confirmed that they don't know whether these CBDM working in their area receive training or not. And 56 percent of them highlighted that CBDM are not paid while 44 percent asserted that they had no information regarding CBDM payment.

Table 6. Training and payment of CBDM in Ngororero district.

	CBDM Source			
CBDM Type	**From outside**	**From community members**	**Don't know**	**Total**
Frequency	69	11	10	100
Percentage	69	11	10	100
		Training		
Training	No	Yes	Don't know	
Frequency	0	0	100	100
Percentage	0	0	100	100
		Payment		
Payment	No	Yes	Don't know	Total
Frequency	56	0	44	100
Percentage	56	0	44	100

The results in Table 7, as by 67 percent of respondent have witnessed these CBMD intervening in disaster risk reduction during the Umuganda scheme. These were followed by 19% who highlighted the role of existing CBDM in building the damaged houses, roads, bridges and water canals. In addition, 13 percent confirmed that the CBMD in their district contribute to the advancement of community disaster awareness through information sharing on disaster record and future occurrence and prone areas.

Table 7. Primary disaster risk reduction tasks conducted by existing CBDM.

Tasks	Frequency	Percentage
Participate in disaster risk reduction through Umuganda scheme	67	67
Build damaged houses, water canals, roads and bridges	19	19
Advance community awareness through information sharing on disaster record and future occurrence and prone areas	14	14
Total	100	100

3.4. Community Suggestions on Creation of CBDM in Their District

The respondents in Table 8, as indicated by 89 percent, raised their need and suggested creation of CBDM in Ngororero district. This high percentage was noted due to the fact that such groups are created from community members, hence people are the actors and decision makers in terms of disaster risk reduction in their own living area. This was certified by 26 percent of respondents who said that creation of such groups would lead to advanced disaster risk reduction ownership and community-based initiatives.

Table 8. Suggestions on creating CBDM from community members.

CBDM from community members	Frequency	Percentage
Yes	89	89
No	11	11
Reasons		
Disaster risk reduction ownership and community-based initiatives	26	26
Conducting visible and goal-oriented activities	25	25
Advanced information sharing, mobilization and reporting	20	20
Easy assistance to the affected	19	19
Community-based decision making and sustainable development	10	10
Total	100	100

4. Discussion

In some parts of the world, Community-based Disaster Management has been prioritized after understanding the fact that local people are the center of managing disaster in their living areas by using local and modern knowledge [5, 12]. However, the results in Table 5 showed that the majority of disaster risk reduction activities in Ngororero district are conducted by the local leaders and District Administration Security Support Organ (DASSO). This likely, expresses that the reduction activities are not locally-based and/or that local people only participate without any sense of ownership yet they are the first recording the consequences. This was previously reported [13, 14] that in many parts, local people act as beneficiaries of disaster risk reduction not participants. Thus, more efforts in enhancing community engagement and ownership in disaster risk reduction are very essential.

In addition, in Ngororero district, the above major disaster management actors are not community-based; they are external agencies (Table 6). This expresses that community-based disaster management is not working in this area. However, there are plenty of examples on the role of CBDM in different locations. For example, in Kenya [15], Bangladesh [12] and Indonesia [16] CBDMs are operating, and significantly contribute to reducing disaster risk among people.

Accordingly, as previously suggested [17, 18] if CBMD are locally-based, the risk is kept low due to the reason that local people are approached, trained and always involved in each disaster risk reduction activity taking place in their region. This can be based on as indicated by residents' willingness of possessing locally-based CBDM groups (Table 8). Such initiatives would lead to disaster risk reduction ownership and community-based initiatives, carrying out visible and goal-oriented activities, advanced information sharing, mobilization and reporting, etc. Therefore, for disaster risk reduction in Ngororero district, it is good to ensure that the operating CBDMs are formed from residents.

5. Conclusion

This study assessed the contribution of Community-based Disaster Management in Risk Reduction with the case of Ngororero district of the western Rwanda. A sample of 100 households was employed to collect data by using a structured questionnaire. The results indicated that there no locally-based disaster management groups among people. The existing groups only operate during disaster occurrence for the response and recovery activities. These include the Army and Police, DASSO, and external donors and NGOs. However, the respondents demonstrated the willingness of possessing their locally-based disaster management groups. These, if created and operate in Ngororero district would lead to advanced disaster risk reduction ownership and community-based initiatives. In addition, there would be enhanced information sharing, mobilization and reporting at community level. The community-based disaster management groups in this area can enable policy makers to easily reach the community and ensure that disaster risk reduction polices are community-based. In addition, these CBDM would assist external agencies in recovery and response activities by precisely heading to the right people in need of assistance. Further analysis of the contributing and limiting factors of successful community-based disaster management is recommended.

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