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Coordination and Disaster Response

A Humanitarian Organizational Network perspective in Uganda

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Abstract: This paper examined the relationship between humanitarian organizational network, coordination and disaster response in Uganda. Contextually, most research in the area of disaster management rotates around the entire disaster management process/stages. There is inadequate

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research that tends to study a single stage in the disaster management cycle especially the response stage. Additionally, there are limited studies that have been conducted in developing countries like Uganda, most studies have been and continue to be conducted in highly disaster-prepared, coordinated and developed states. The study used a cross-sectional survey design in which quantitative methods were applied. Findings indicate that coordination positively influenced disaster response. Based on the literature and findings, the study concludes that disaster response is dependent on coordination. The study recommends that responding organizations should establish clear communication channels, build trust and social capital, and ensure that there is learning and adaptation to complex disaster environments. This will lead to better coordination within the humanitarian organizational networks and in turn successful disaster response operations.

Keywords: Humanitarian organizations; networks; coordination and disaster response

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1. Introduction

There has been a tremendous increase in the number of disasters over the last three decades.[1] A total of over 207,000,000 people have been victims of different disasters per year since 2010[2] and according to the UN Climate & Environment Report of 2021, half of the world's population will be exposed to natural disasters by 2030. Recent disasters, such as the Israel–Palestine war, the Russia–Ukraine war, 2022 Hurricane Ian, the 2023 Hong Kong floods, the oil spill in the Gulf, the Tsunami, the nuclear reactor leak in Japan, the 2005 Hurricane Katrina, the 2013 Typhoon Haiyan in the Philippines, the earthquakes in Haiti, Türkiye, Syria and Morocco and the floods in Libya have all demonstrated the complexity of response operations.[3] In all these disasters, more than 500 humanitarian organizations responded, creating very complex networks of responding organizations. For example, in the 2000 Mozambique flood disaster, over 49 countries and 30 international non-governmental organizations responded to provide humanitarian assistance. However, there were challenges in response efforts among the humanitarian actors.[4]

All disasters stretch responding organizations and pose a challenge to public administrators. These extreme events generate increasing costs in terms of loss of lives, damage to infrastructure, property, and disruption of

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social and economic operations.[5] Because of the dynamic context of disasters, disaster response requires coordination of actions among the multiple responding organizations, as well as the integration of multiple sectors and jurisdictions into a functioning system.[5] During the process of interactions, an organizational network is created[6] and responding organizations will frequently develop formal and informal relationships in order to develop a "common operating picture" and to devise strategies for collective actions during disaster response. Organizational networks assist in responding to complex disaster events, which require the engagement of multiple stakeholders for effective results.[6] Despite these networks, response to disasters continues to be problematic.

According to Brown and Robinson,[7] the overall effectiveness of a disaster response operation is a difficult exercise to ascertain since every disaster is different because every response is different. Disaster response largely aims at saving lives and property and returning the affected community to normalcy in the shortest time possible which is not always the case especially in developing countries like Uganda.[8,9] Because disaster response is highly complex and chaotic, coordination among the different responding organizations is critical since each organization focuses on its own actions.[10] Coordination plays a central role in disaster and it is through coordination that actions of the responding organizations are guided.[11]

In Uganda, over 200,000 people are affected by various types of disasters each year.[12] For example, in August 2022 there were heavy rains in the Elgon sub region leading to devastating floods in the districts of Mbale, Manafwa, Bududa, Bulambuli and Kapchorwa. The same year 2022 saw more heavy rains in Western Uganda, triggering multiple massive landslides in *Kasese and Bundibugyo* Districts. This coupled with the Karamoja Locust disaster, COVID-19 pandemic and the 2021 Ebola outbreak in Mubende which greatly impacted the nation negatively and stretched response initiatives. Further still, in May 2013, Kasese District experienced the most devastating floods since 1976, River Nyamwamba burst its banks and nine sub-counties were flooded, killing eight people and affecting 25,445.[13] In March 2010, the biggest landslide disaster in the history of Uganda hit Bududa district leaving over 120 people dead and over 500 homes destroyed in three villages of Nametsi, Kubewo, and Bukalasa.[14,15] While in October 2007, heavy rains caused the worst floods in the Teso Sub-region affecting a total of 25 districts and

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prompting a flash appeal of approximately 20 million USD in emergency relief and forcing the Government to declare a state of emergency.

The three disasters above sparked off one of the biggest disaster response efforts in the history of Uganda by attracting a large number of humanitarian actors who dispatched response teams to assist in assessment, search and rescue services, providing first aid, and evacuation of those injured among others. However, the disaster response efforts were largely ineffective because of poor coordination, role duplication, information asymmetry, logistical challenges and poor infrastructure among others.[16,17]

Because of the large number of actors during a disaster, different actors take a different perspective on humanitarian response operations, it is therefore critical for them to build consensus and coordinate both vertically and horizontally to ensure effective disaster response in terms of saving lives, sharing information, building public confidence, assessment accuracy, stability and safety.[18–21]

Effective disaster response is not improvised — it must be well coordinated in terms of good communication systems, effective and efficient resource management, logistics coordination and employment of good expertise among others.[22] Coordination acts as a link between disaster response and humanitarian organizational networks in a way that facilitates the logistics aspects of response, information sharing, resources management and partnerships among responding organizations. Coordination of the disaster response efforts is important within the humanitarian system and any mistakes of incoordination will be greatly felt by the field workers/responders and the victims.[23]

2. Literature

2.1. *Humanitarian Organizational Network*

According to Castells[24] (p. 171), a network "is constituted by the intersection of segments of autonomous systems of goals" and is a conduit for information and a network is complex.[25] Networks are multi-functional and often lead to networking "the act of creating and maintaining a cluster of organizations for the purpose of responding to given phenomena.[26,27] Just like other networks, humanitarian networks always develop at various levels[28] depending on the vision, processes and goals that bind the humanitarian organizations.[29,30] Chisholm[29] assumes that the first feature of networks is their attachment to a common purpose, voluntarism[31] and

diversity[32] are created as result of dyadic relationships which can be formal or informal.[30]

According to Gulaati,[33] network structure and network formation relationship/objective are the key variables that must be considered when talking about humanitarian organizational networks. Humanitarian organizational networks have been widely used in response to complex disaster events, which require the engagement of multiple stakeholders for effective results.[34] The primary objective of inter-organizational networks is to ensure that there are efficient and effective humanitarian response efforts that meet the needs of the affected population to the maximum extent possible.[35,36] As a result, there is growing academic interest in humanitarian organizational networks. However, theoretical perspectives on humanitarian organizational networks and disaster response have remained relatively modest and confined to developing basic typologies of coordination arrangements and identifying the challenges encountered in the entire disaster management process.[37,38]

2.2. *Coordination and Disaster Response*

The Humanitarianism and War Project defines coordination as: "The systematic use of policy instruments to deliver humanitarian assistance in a cohesive and effective manner". These instruments include; strategic planning, gathering data and information management, mobilizing resources and assuring accountability, orchestrating a functional division of labor in the field, negotiating and maintaining a serviceable framework with host political authorities and providing leadership (p. 20).[39] On the other hand, disaster response is the organization of all activities used in responding to a disaster event and its aftermath and it is the actual implementation phase of the disaster management plan Herrmann.[40] Rajagopalan and Warfield[41] asserts that disaster response focuses primarily on emergency relief and the main objective is to provide immediate assistance, rescue life, improve health and support the morale of the affected population, restoration of basic infrastructure among others. Disaster response aims at meeting the basic needs of the people until more permanent and sustainable solutions are found and that there are many humanitarian organizations at this stage, each with its own objective.[41,42]

According to Chatterjee,[42] high costs of human lives, property damage and economic devastation brought by natural disasters over the past two

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decades have spurred the governments and humanitarian institutions to take several important measures to strengthen their disaster management systems. Within the last decade, organizations have increasingly realized the value of having a coordinated response to humanitarian emergencies. For example, in 1991, the United Nations created the Office for Coordination of Humanitarian Affairs (OCHA) with the main objective of providing coordination among the various UN bodies responding to humanitarian emergencies. Reviews on post-disaster scenarios and other complex humanitarian emergencies point out that lack of coordinated responses is the major limitation to the overall effectiveness of disaster response.[8,43] In order to improve the flow of resources among agencies and increase the accountability and effectiveness of disaster response operations, coordination among humanitarian organizations is very critical.[4] The ever-increasing number of humanitarian aid organizations, the wide of range of resources and the complexity of disasters have made coordination a rather challenging exercise.[44] A coordinated disaster response leads to a quality humanitarian response by providing a platform for partnerships among key actors.[42]

Scholars like Moore *et al.*[4] assert that the success of humanitarian aid operations depends on the ability of organizations to work together through sharing information, stakeholder partnerships, expertise and above all logistical coordination. Through logistical coordination, it is easy to make an inventory of the available aid, identify the type of aid needed and in what quantities including storage and distribution. On the other hand, stakeholder coordination ensures that there are stakeholder partnerships which ensure aid is distributed effectively and equitably in order to avoid the violation of the fundamental humanitarian principle of impartiality. Establishing relationships during times of non-disasters will help in this process. Also, through coordination, information sharing takes place and information is critical for as it serves as a means of building trust between the affected communities and civil society organizations. Trust building is extremely important for NGOs, and affected communities.

The importance of coordination in effective disaster response has been highlighted by many analysts and scholars.[39,45] In emergency situations, coordination aims at reducing duplication of roles among humanitarian organizations involved in the response efforts.[46]

The importance of coordination in effectiveness of disaster is further highlighted in the Hurricane Katrina disaster that attracted over 500 actors.

Such a large number meant that there needed to be coordination however that was not the case to the extent the House Report of 2006 termed the response efforts as "A Failure of Initiative" while Senate Report of 2006 summarized the entire response efforts of the United States as "A Nation Still Unprepared".[47] According to Zhao[48] coordination among humanitarian organizations during the response stage leads to the attainment of both short-term and long-term organizational goals.

Hypothesis: *Coordination leads to effective disaster response.*

3. Methods

The study used a cross sectional research design in which quantitative research methods were applied in line with Refs. 49, 50. The study population comprised 86 organizations that took part in the response operations of the three cited disaster scenarios.[51–54] The 86 organizations that responded to three disasters were grouped in relation to the specialty of their activities. Out of the 86 organizations, 70 organizations were sampled using the Krejcie and Morgan[55] sample size determination table. After obtaining the list of humanitarian organizations, a kth number (1.23) was derived, by dividing the total population with the sample size. Then, the number of organizations $\{1, 3, 5, \ldots, k\text{th}\}$ was selected. Following the selected number, the name of each organization was traced on the list, and subsequently located in the respective strata where the organizations fell so as to be able to deliver the questionnaires. From the 70 organizations, 6 respondents from each organization and with knowledge of the response operations of the three disasters were purposively selected. Data were gathered through administration of structured questionnaires and data were entered into Statistical Package for Social Sciences (SPSS Version 21.0) for analysis.

4. Findings and Discussion

First, a confirmatory factor analysis was conducted in AMOS software in order to derive the measurement model for coordination. Table 1 below presents the results.

Coordination had been initially measured by three constructs including Logistics and Resources Coordination (LRC), Stakeholder Coordination

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Table 1. Model fit summary for coordination.

χ^2	DF	P	χ^2/DF	GFI	AGFI	NFI	RFI	IFI	TLI	CFI	RMSEA
13.811	8	0.087	1.726	0.983	0.956	0.984	0.970	0.993	0.987	0.993	0.052
				Estimate		S.E.	C.R.	P	Beta	AVE	R^2
VHC1	←	VHC		1.000					0.893	0.694	0.091
VHC2	←	VHC		1.035		0.051	20.251	***	0.965		
VHC3	←	VHC		0.780		0.055	14.166	***	0.712		
IM2	←	IM		1.000					0.701		
IM3	←	IM		1.479		0.139	10.679	***	0.992		
IM4	←	IM		1.111		0.104	10.724	***	0.670		

Source: Primary data.

(VHC) and Information Management (IM). A confirmatory test retained only two constructs as seen above.

The model statistics i.e., χ^2, degree of freedom and P values show that the model was fit. The $\chi^2 = 13.811$, DF $= 8$, $P = 0.087$, $\chi^2/\text{DF} = 1.726$ indicate that data were not significantly different from the model. The retained observed variables significantly measured the latent variable ($P < 0.05$). Further, the fitness indices including GFI, AGFI, NFI, RFI, IFI, TLI, and CFI were all above minimum of 0.9 indicating that the model was fit. Further still, a RMSEA of 0.052 was below the required maximum of 0.08 hence also indicating that this model was fit.

The model had an Average Variable Extracted (AVE) of 0.694 which is above the minimum required 0.5, indicating that convergent validity was attained. However, the squared correlation coefficient of the two constructs ($R^2 = 0.091$) is below the AVE, implying that discriminant validity was attained.

Confirmatory factor analysis was conducted in AMOS software in order to derive the measurement model for disaster response. Table 2 presents the results.

Disaster response had been initially measured by six constructs including Saved Lives and Property (SLP) which had five items, Timely Response (TR) which had four items, Assessment Accuracy (AA) which had four items, Information Dissemination (ID) which had three items, and Safety and Stability (SS) which had three items. A confirmatory test retained only two constructs each with items as seen in Fig. 11.

The model statistics i.e., χ^2, degree of freedom and P values show that the model was fit. The $\chi^2 = 34.843$, DF $= 6$, $P = 0.000$, $\chi^2/\text{DF} = 5.807$

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Table 2. Model fit summary for disaster response.

χ^2	DF	P	χ^2/DF	GFI	AGFI	NFI	RFI	IFI	TLI	CFI	RMSEA
34.843	6	0.000	5.807	0.959	0.856	0.945	0.862	0.954	0.883	0.953	0.135
				Estimate		S.E.	C.R.	P	Beta	AVE	R^2
PC2	←	PC		1.000					0.784	0.638	0.579
PC3	←	PC		1.261		0.109	11.541	***	0.903		
SS1	←	SS		1.000					0.716		
SS2	←	SS		0.930		0.130	7.128	***	0.676		
TR1	←	TR		1.000					0.801		
TR2	←	TR		1.190		0.119	9.968	***	0.887		

Source: Primary data.

indicate that data were significantly different from the model. However, retained observed variables significantly measured the latent variable ($P < 0.05$). Further, the fitness indices including GFI, AGFI, NFI, RFI, IFI, TLI, and CFI were all above or close to the minimum of 0.9 indicating that the model was fit. Further still, a RMSEA of 0.135 was close to the required maximum of 0.08 hence also indicating that this model was moderately fit. The model had an AVE of 0.638 which is above the minimum required 0.5, indicating that convergent validity was attained. However, the squared correlation coefficient of the two constructs ($R^2 = 0.579$) is below the AVE, implying that discriminant validity was attained.

Second, Pearson Correlation coefficients were used to analyze the relationship between coordination and disaster response and results revealed that there is a significant and positive relationship between coordination and disaster response ($r = 0.547$).

When regression analysis was performed, results indicated that coordination significantly predicted disaster response (Beta $= 0.104$**). Coordination had a prediction power of approximately 0.6% (R^2 Change $= 0.006$) of disaster response and was significant (Sig. $= 0$), implying that the hypothesis that stated that coordination positively improves disaster response was supported.

5. Discussion

The above findings are consistent with literature that suggests that a good humanitarian organizational network fosters better coordination during disaster response and leads to "economic efficiencies, greater service quality, organizational learning, access to new skills, diffusion of

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risk, improved public accountability, ability to buffer external uncertainties, and conflict avoidance".[56] Further, these findings are in line with literature that states that for the organizations to be well coordinated, a well-structured network is a prerequisite and that a well-coordinated disaster response initiative depends on the nature of the nature of organizational networks.[57] This would therefore mean that to have a better disaster response, coordination is of paramount importance which also depends on the humanitarian organizational networks. For example, a more central or connected organization in the network is better suited to influence the coordination mechanisms of other participating organizations which in turn affects disaster response. This is further supported by Moore *et al.*[4] who assert that the successful humanitarian aid operations depend on the ability of organizations to work together through sharing information, stakeholder partnerships and expertise. However, literature suggests that because disasters are complex and chaotic, coordination too may be complex hence making disaster response a complex and difficult task.[58,59] Humanitarian organizational networks therefore need to adapt to the complex disaster environment if they are to have effective and efficient disaster response initiatives[60] since they are usually united in common purpose.[31,33] It can therefore be said that to have better disaster response, there should be coordination among responding humanitarian organizations.

6. Conclusion

To have a better disaster response, coordination is of importance which also depends on how the humanitarian organizational network is structured. Usually, organizations are united in common purpose during disaster response which leads to network relationships forming naturally through adaptation leading to better coordination among the many different. Coordination is always at the center of any disaster response efforts because of the shared sense of responsibility which makes organizations to jointly prepare for possible disaster occurrence in terms of joint planning, resource mobilization and resource usage, communication. Therefore without coordination, no responding actor is adequately prepared enough to respond to a disaster since each humanitarian organization is unique and overly focused on its core objective.

7. Recommendation

The study recommends that responding organizations should establish clear communication channels, build trust and social capital, and ensure that there is learning and adaptation to complex disaster environments. This will lead to better humanitarian organizational networks and in turn successful disaster response operations. Further, because of the complex nature of disaster response, responding organizations should work towards better coordination by creating a "central command post or Incident command center". This will ensure that there is accountability, common purpose, shared risk, responsibility and avoidance of role duplication. Humanitarian organizations should work towards improving the quality of network relationships because good relationships foster trust and are critical in coordination and disaster response. Additionally, humanitarian organizations should plan in advance and create a culture of reliability among themselves and this is possible if the humanitarian organizations institute well-defined roles for all participants to enable them to make quick decisions so that response is effective. A well-coordinated disaster response will alternatively contribute towards the attainment of SDG 11.5 which aims at significantly reducing the number of deaths and the number of people affected by disasters.

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