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EVALUATING HUMANITARIAN FLOOD RELIEF SUPPLY CHAIN EFFICIENCY

Mazrul Hisyam Ab Malik (a), Emi Normalina Omar (b)*
*Corresponding author

(a) Shah Alam Community College, 40150 Shah Alam, Selangor, Malaysia, hisyam@kksa.edu.my
(b) Faculty of Business and Management, UiTM Cawangan Selangor, Kampus Puncak Alam,42300 Puncak Alam, Selangor, Malaysia, emi128@uitm.edu.my

Abstract

A humanitarian relief supply chain is one that facilitates efficient material, financial value, and information flows for the purpose of planning, implementing, and controlling assistance operations in the wake of a disaster or other crisis. One of the most common natural disasters in Malaysia, flooding can affect both metropolitan and rural areas. During the Klang Valley flash flood in December 2021, more than 100,000 individuals were impacted, and 10,000 volunteers from various NGOs were organised to aid the victims. It was imperative that NGOs cooperated and coordinated with the authorities for distributing assistance, to guarantee that the distribution was carried out in accordance with the National Security Council's standard operation procedure for pandemic Covid-19 humanitarian assistance. This study investigates the difficulties encountered that affected the efficiency of aid distribution in the humanitarian relief supply chain in Malaysia. Based on a case study of humanitarian aid operations carried out during the December 2021 flash flood disaster in the Klang Valley, in-depth interviews with established NGOs and relief agencies were done for this qualitative research study. Content analysis was used to analyse the data gathered from the interviews and observations of flood relief efforts. This study's findings highlight a Cross Case Analysis of the Distribution Process by NGOs in Humanitarian Relief, which shows that most of the processes will be the same for all NGOS, two processes—namely, an established S.A.R Team and an established Humanitarian Relief Team—are lacking for two NGOS to maximise the effectiveness of relief supply distribution.

Keywords: Distribution relief operation, distribution aid relief, humanitarian relief supply chain, humanitarian supply chain, non-governmental organization

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1. Introduction

The International Federation of Red Cross and Red Crescent Societies (IFRCS) states that the breakdown of law and order, looting, attacks on key infrastructure, war, and warfare all contribute to the severity of some disasters. Pandemic situations, food insecurity, violent wars, displaced people, and lack of access to adequate shelter are all instances. Rarely dodisasters come with advance notice, leaving little room for preparation. Humanitarian help is provided in the aftermath of disasters or other situations in an effort to save lives, alleviate suffering, and uphold human rights. Aid provided by humanitarian organisations benefits victims of war, natural disasters, and "silent disasters" (Prasanna & Haavisto, 2018). Natural disasters can take many forms, such as storms, earthquakes, floods, and tsunamis. Major accidents, wars, terrorist attacks, and other forms of human-caused destruction are all instances (Jervelund et al., 2019).

While the goal of the commercial supply chain network is to maximise supply chain excess, the corresponding humanitarian relief supply chain (HRSC) is to deliver the greatest aid possible to victims of unforeseen and unavoidable calamities (Dubey & Gunasekaran, 2016). The particular peculiarities of the disaster relief environment, along with the common issues faced by non-profit organisations, make measuring the success of the disaster assistance chain more difficult. Decision-making inside HOs can aid in this case, improving the efficacy and efficiency of rescue operations while also illuminating supply chain performance and increasing the transparency of process data and disaster response responsibilities. Meanwhile, as stated by Van Wassenhove (2006) it is difficult to have efficient and effective collaboration and coordination, as well as task specialisation among agents, due to the complexity of the agents in a humanitarian supply network, which includes Non-Governmental Organisations (NGOs), the military, the government, and private businesses, in addition to the other items that must be delivered. While most non-governmental organisation (NGO) and other humanitarian organisation (HRO) logistics and supply chain management professionals have expertise and awareness of critical points in humanitarian supply chains, they lack the abilities to cope with issues that may occur during operations (Celik et al., 2014). In addition to contributing expertise and resources, NGOs should also bear some of the associated risks (White et al., 2009).

To lessen the destruction that natural disasters wreak, response techniques need to be both effective and efficient (Starr & Van Wassenhove, 2014). Distribution of aid is crucial to the success of the humanitarian response, with people's lives on the line (Pérez-Rodríguez & Holguín-Veras, 2016). During the distribution of humanitarian aid goods, groups rely on either donated or purchased emergency supplies (Aflaki & Pedraza-Martinez, 2016). These relief items come from all over the country and are consolidated at one location before being shipped to distribution centres for final delivery (Dufour et al., 2018). Decisions about the distribution of these aid goods need to be made within a certain time window (Pérez-Rodríguez & Holguín-Veras, 2016). The researcher in this study focuses on the processes involved in managing disaster response, recovery operations, and the provision of relief to those in need. In the case of a flood disaster, this study examined the many challenges that Malaysia's supply network for humanitarian aid might face. The factors that influence the way NGOs distribute aid after a natural disaster are also examined in this study. Case studies of the disaster relief efforts in the Malaysian Klang Valley in 2021 were developed through in-depth interviews with government agencies and NGOs.

2. Problem Statement

Humanitarian supply chain management (HSCM) is an essential part of any effort to improve the resilience of communities in low-resource settings, such as those in disaster zones (Bhushan & Tirupati, 2013) In addition, building long-term capability with a broad perspective is essential to provide relief to victims in disaster-affected areas in order to improve humanitarian response and effectiveness (Balcik et al., 2008). Indeed, disaster management is crucial for the success of relief activities (Tomasini & Van Wassenhove, 2009). In the aftermath of a disaster, the most pressing question is how to best respond to the situation so that damage is kept to a minimum and rescue operations are maximised (Haghani & Abbas Afshar, 2009).

Bernama (2022) claims that on December 16, 2021, a tropical depression made landfall on the eastern coast of Peninsular Malaysia, resulting in three days of widespread rainfall. At least 54 people were killed and 2 are still missing as the floods swept through eight states on the peninsula. Selangor's Shah Alam and Hulu Langat district are the worst hit. At its height, it forced the concurrent eviction of more than 71,000 Klang Valley populations has affected over 125,000 people overall (Reuters, 2022). It was described as a "once in a century" disaster by government officials, and it resulted in the most displaced citizens since the Malaysia flood of 2014–2015 (Hassan, 2021). It has also been historically compared to the Kuala Lumpur flood of 1971, and it is the biggest tropical cyclone-related disaster to strike Malaysia since Tropical Storm Greg, which struck in 1996 and left 238 people dead and 102 more missing (The Star, 2021). NGO's attempting to provide humanitarian relief in the wake of this tragedy have been met with a number of obstacles. The NGOs must work together and coordinate with one another to allocate tasks and assistance during the December 2021 flood disaster, in addition to following the standard operation procedure (SOP) for the Covid-19 pandemic humanitarian aid in this flood established by the National Security Council (NSC) and the disaster management procedures established by NADMA and the state of Selangor.

When considering how to best distribute aid before, during, and after a disaster, it is important to keep in mind the following issues, which have been documented from prior flood disaster relief efforts in Malaysia and which should not be ignored, as stated by Mohd et al. (2018).

Table 1. Issues on Disaster Relief Operations in Malaysia (Mohd et al., 2018)

1	Evacuation centres become overloaded and clogged with noncritical items resulting in wastage and duplication.
2	A chaotic process of delivering goods to disaster victims.
3	Delay in the decision-making process for resolving immediate needs during a critical situation.
4	Wastage and duplication of donated goods are caused by improper inventory management.
5	Duplication of supply to the same group of disaster victims while other affected disaster victims are left empty-handed.
6	Disaster victims are scattered with low life support on water, food, energy, and healthcare supplies.
7	The negative impact in terms of monetary and other limited resources.

Table 1 lists several issues that arise as a result of slowness in delivering aid in times of crisis. One explanation for these problems is a lack of clear instructions and proper communication between all parties involved. There are a few things to keep in mind to make sure that the delivery of humanitarian aid supplies is coordinated and efficient during a disaster. Cooperation, coordination, and communication with several parties are essential in humanitarian aid missions, particularly in situations that need a large number of specialised groups and personnel. Management of available resources and infrastructure is essential for efficient distribution of humanitarian help in the aftermath of a disaster. As a result of the disaster, all public buildings, roads, and even communications systems in the area will be destroyed. In order to carry out the humanitarian assistance operation efficiently, it is crucial to have command and oversight over all of the available resources, such as personnel, volunteers, vehicles, and emergency relief supplies. As a result, this research aims to better understand the current state of the humanitarian flood relief supply chain in Malaysia and the ways in which NGOs receive and distribute aid during times of disaster.

3. Research Questions

The research questions are:

i. What are the current practices of distribution in humanitarian flood relief supply chain activities in managing flood crises being implemented?

4. Purpose of the Study

This research sheds light on the difficulties faced by NGOs in delivering aid in the wake of natural disasters like floods. Identifying flood-affected areas (remote locations, high-risk areas, etc.), collecting information about the victims, securing financing, donating to those in need, and distributing humanitarian aid are the first steps in the process. In addition, during the December 2021 Klang Valley flash flood disaster crisis, the responders were among the government entities in charge of disaster operations and several NGOs directly involved in disaster relief efforts.

5. Research Methods

This research applied the qualitative and adapting descriptive case study that allows the researcher to explore the phenomenon and the real-life context in which it occurred (Yin, 2003). Humphries and Wilding (2009) as cited Yin (2003) that real-life events such as development and organisational processes could be retained for meaningful characteristics by employing the case study methodology. The researcher will choose a case study relating to humanitarian aid programmes during flood disasters that feature a network of interaction between authorities and NGOs for this study. The case study was chosen for a variety of reasons, including the fact that the case study is the real flood disaster in 2021 and carrying out relief distribution efforts for disaster victims. Furthermore, the research topic of the study is to determine the factors that affect the efficiency of HRSC's distribution operations.

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5.1. Case Study: Klang Valley Flash Flood 2021

The flash flood in the Klang Valley in 2021 was the worst flood to hit the country since the Malaysia flood in 2014-2015, and government officials called it a "once in a century" disaster. It's the worst natural calamity ever caused by a tropical cyclone, and it's been compared to the Kuala Lumpur flood of 1971. Damages from the flooding in Selangor were estimated by the state government to be over RM1.4 billion, with infrastructure repairs accounting for around RM400 millions of that total. The Selangor state chief minister estimated that at least 100,000 households will be affected, with each suffering losses of at least RM10,000. However, the biggest worry is the government's readiness for an unexpected disaster. According to reports, both humanitarian aid and the government's response are moving painfully sluggish, and social media buzzed with the idea that the only early assistance that "appeared" to be supplied came from volunteers or the affected themselves. The issue is the ineffectiveness of HRSC's distribution due to poor planning and coordination among the various NGOs involved non the distribution of humanitarian aid. It also involves the interplay between the federal and state levels of government.

The primary source of information for this study was a series of in-depth, semi-structured interviews. The semi-structured interview was selected as the primary method of data collection because it has been shown to be adaptable to a wide range of contexts and research questions (DiCicco-Bloom & Crabtree, 2006). It can be used in conjunction with both individual and group interview techniques, and the degree to which its structure is rigid can be adjusted accordingly. One of the main benefits of the semi-structured interview method is that it allows for the interviewer to improvise follow-up questions based on the responses of the participant and provides a safe space for the participant's own unique verbal expressions (Polit & Beck, 2010).

This study employed both in-person interviews and virtual video conferences. In-depth interviews were conducted for this study so that researchers could collect first-hand accounts from participants about their experiences and perspectives during emergency operations. In-depth interviews also give respondents a chance to explain the research topic in their own terms. It took about 30–45 minutes per topic throughout the interview.

In addition to in-depth interviews, the researcher also observed relief distribution in many flood-affected areas to learn more about the logistics involved. There are two forms of observation employed in research: organised and unstructured (Ciesielska et al., 2018). Clearly, it is possible to evaluate whether what people say they do and what they actually do match through observation. Unlike interviews, which are static, observation is an ongoing, dynamic activity that is more likely to provide evidence for process, which is something that is constantly moving and evolving (Markovsky & Frederick, 2020). Lastly, observation is helpful because it sheds light on the impact of the physical surroundings, which will have minimal impact on the outcome of a predetermined plan.

As a result, the researcher took part in the study as a participant and completed multiple series of observations, both direct and indirect. Locations for this study's observational component are the Taman Sri Muda Shah Alam, Sections 18, 19, and 24, and the Taman Sri Nanding, Hulu Langat. The area most impacted by the 2021 Klang Valley flash flood was selected for this study because it is home to the largest concentration of victims and the largest number of nongovernmental organisations (NGOs) engaged in humanitarian and disaster relief efforts.

5.2. Data Analysis

Data from primary sources have been obtained. Besides that, secondary data also is gathered such as previous disaster reports, pamphlets, and publications. The researcher applied the content analysis. In qualitative research, content analysis has been defined as a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns (Hsieh & Shannon, 2005). Content analysis enables researchers to sift through large volumes of data with relative ease in a systematic fashion and it can be a useful technique for allowing us to discover and describe the focus of individual, group, institutional, or social attention (Carlson, 1998).

Respondent validation occurs when participants review collected data or data analysis and confirm or challenge their validity. These responses are included in the research findings (Elgin, 2008). For this research, the researcher reviews the emergent themes and makes sure the respondent validates again the interview questions and answers that had been held. Respondent validation may be regarded as a means to establish the dependability of data and credibility of findings, but it also gathers additional original data, which require further analysis.

6. Findings

6.1. Cross-Case Analysis of the Distribution Process by NGOs In Humanitarian Relief

Every organization involved with disaster management needs to have a set work procedure so that they can carry out relief missions well and effectively. In addition, the need for strict work procedures is to avoid shortcomings in management and also when carrying out relief missions or disaster responses. Such as the occurrence of personal accidents, property damage, chaotic or chaotic activities, dumping of humanitarian aid, embezzlement of expenses and other things that contribute to inefficiency in disaster management.

Based on four interviews conducted with NGOs directly involved in the management and implementation of the Klang Valley flash flood disaster relief mission, the researcher was able to identify several forms and processes of this organization's work procedures, how they carry out humanitarian aid missions and responses against disaster. Table 2 below shows the similarities and differences in the work procedures implemented by these organizations.

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Table 2. Cross Case Analysis of The Distribution Process by NGOs In Humanitarian Relief

Organization	*Process 1* Meeting / Group Action	*Process 2* Established S.A.R Team	*Process 3* Established Humanitarian Relief Team	*Process 4* Preparation Of Humanitarian Mission and Aid Supply	*Process 5* Establish Disaster Operation Centre	*Process 6* Execution of Distribution Activities	*Process 7* Distribute To Victims' Location	*Process 8* Distribute To Temporary Evacuation Centre
NGO 1	X	X	X	X	X	X	X	X
NGO 2	X		X	X	X	X	X	X
NGO 3	X	X	X	X	X	X	X	X
NGO 4	X			X	X	X	X	X

Based on table 2 above, the researcher can conclude that these four NGOs have more or less the same work procedures or work processes, only they are distinguished by some more detailed processes. NGO 1 and NGO 2 have eight disaster relief response management processes, NGO 3 has seven processes, while NGO 4 has six disaster relief management processes. The difference between these NGOs is the existence of the S.A.R Unit and the Humanitarian Relief Unit where both units specialize in disaster relief response management.

Figure 1 below is all the processes implemented by the 4 NGOs that have been interviewed. As a consequence of the findings from the outcomes of interviews with these NGOs, and from the observation that have been done, the researcher offers a humanitarian aid management process that covers all components and processes, as illustrated in Figure 1.

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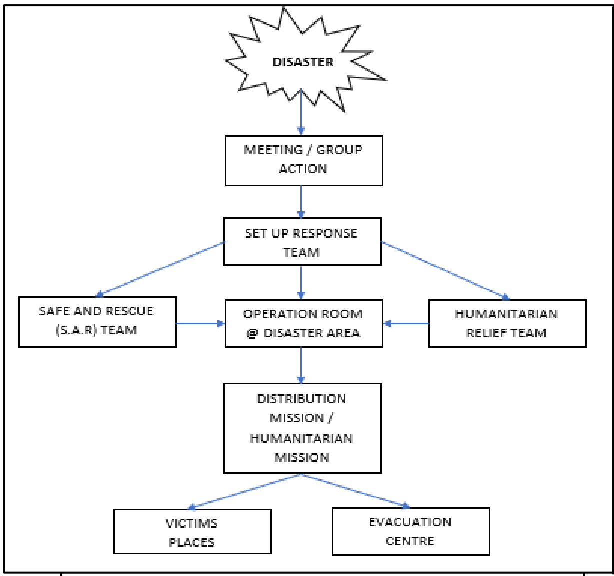
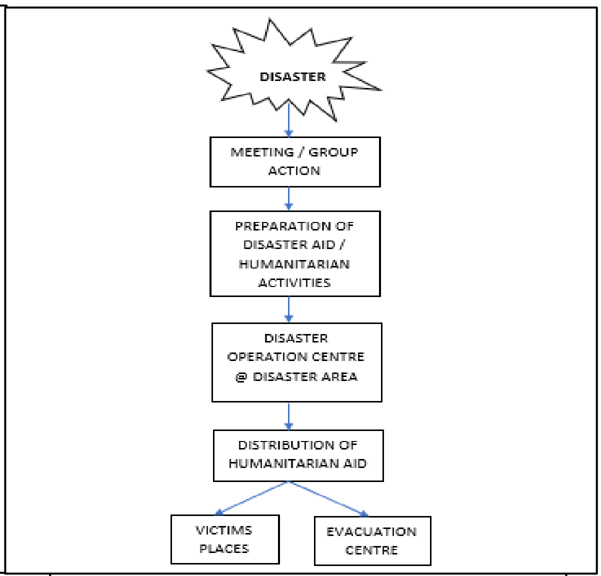
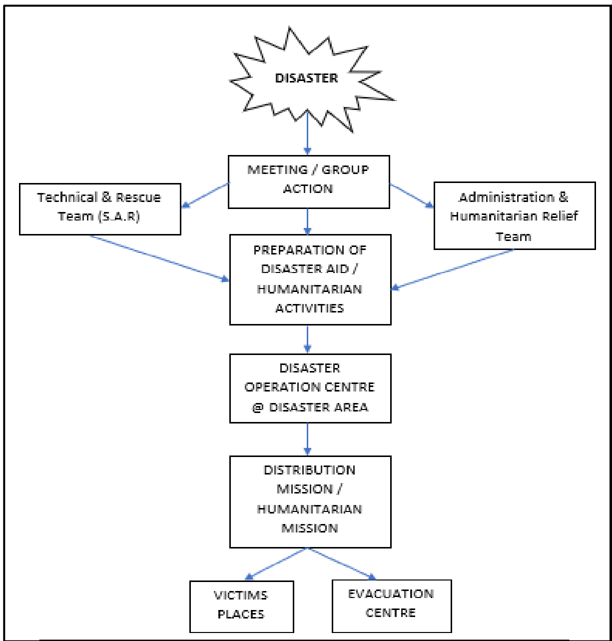


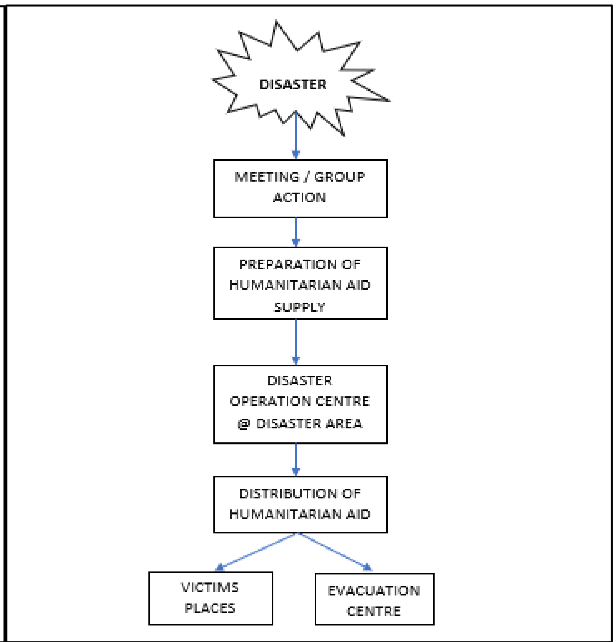
Flow Chart of the Humanitarian Aid Management Process by NGO 1
(a)



Flow Chart of The Humanitarian Aid Management Process by NGO 2
(b)



Flow Chart of the Humanitarian Aid Management Process by NGO 3
(c)



Flow Chart of the Humanitarian Aid Management Process by NGO 4
(d)

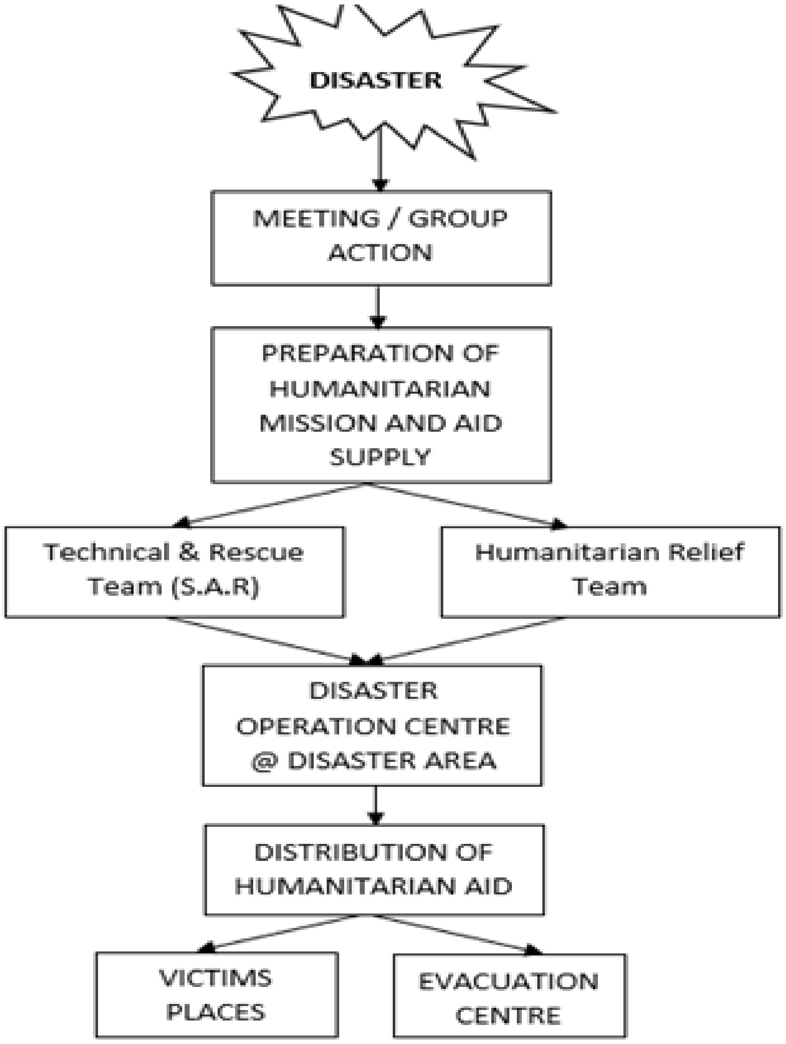


Figure 1. Humanitarian Aid Process of NGOs in Humanitarian Relief

According to the diagram above, the researcher suggests that when a disaster strikes, the first process that NGOs should undertake is to hold a meeting or discussion with members of the organization. All members of the supreme council, as well as units or committee members assigned to response activities and humanitarian assistance, should participate in these talks or meetings. Before organizing operations or performing the disaster response mission, the information obtained about the disaster event must be examined and appraised for dangers. The information acquired must be verified or confirmed by authorities, or a reliable source of information must be identified. This ensures that all planning is based on accurate data and resources. Following the meeting, the following stage is to assemble all of the necessary resources and supplies to prepare for the relief mission and disaster response. Preparations must be conducted accurately and according to the timetable. These humanitarian aid missions' work should be separated into two main units: the S.A.R. Unit and the Humanitarian aid Unit. This is done to guarantee that all preparations are completed correctly and that jobs are assigned throughout the relief operation based on the specialisations of the units. This is to avoid overwork, a labour and volunteer shortage, and confusion in operation implementation. The significance of this S.A.R. unit is that it focuses completely on technical activities during catastrophes, such as rescuing people, evacuating victims, and

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reconstructing infrastructure. While the humanitarian response team prepares to offer aid supplies to victims, humanitarian supplies such as food, medical supplies, basic equipment distribution, health screening support, and other related items are distributed. Humanitarian assistance and relief mission execution might be conducted indirectly.

Following the meeting, the following stage is to assemble all of the necessary resources and supplies to prepare for the relief mission and disaster response. Preparations must be conducted accurately and according to the timetable. These humanitarian aid missions' work should be separated into two main units: the S.A.R. Unit and the Humanitarian aid Unit. This is done to guarantee that all preparations are completed correctly and that jobs are assigned throughout the relief operation based on the specialisations of the units. This is to avoid overwork, a labour and volunteer shortage, and confusion in operation implementation.

Once the two units have received clear information and instructions on how to carry out response and humanitarian aid missions, the NGOs must create a disaster operations centre in a safe disaster zone or neighbouring location. The operations centre coordinates the collecting, sorting, and distribution of aid to those affected by disasters. Humanitarian operations and disaster aid are coordinated from this central location. A strong head of operations is needed here to oversee the smooth execution of all orders and tasks.

Step five involves delivering aid to those who have been affected by the event. The newly constructed operations centre is responsible for receiving and controlling all relevant data and information from which distribution actions can be taken. This will ensure that victims receive the appropriate amount of aid and that there is no waste in the distribution process. In addition, if there is a centralised operations hub, logistics and transportation may be managed effectively. Sixth, once victims have been relocated to safe areas, relief supplies can be sent to them at their houses or in temporary evacuation camps. NGO's must outline the steps that will be taken to ensure victims receive humanitarian relief. This is to avoid the wasteful overstocking or dumping of relief supplies and to guarantee that the right aid reaches the right people. In addition, NGOs need to evaluate their capability and competence in terms of personnel and volunteer availability, inventory levels, and transportation options for distributing help.

7. Conclusion

Three new difficulties were uncovered by the research that have a major impact on the efficiency with which humanitarian supplies are distributed. The first is raising knowledge of HRSC's distribution among the general public. Humanitarian help in the HRSC is most effectively distributed when the public, government, and other stakeholders all work together. This is because it helps to get aid to those who need it if the public knows what to do when a crisis strikes. They are mobile and eager to work with the government and non-governmental organisations. It is important to note that the success of aid distribution efforts is positively impacted by community participation. When non-governmental organisations (NGOs) are engaged in humanitarian relief operations, such as search-and-rescue operations or missions to aid disaster victims, local authorities must provide unwavering support and dedication. Some of these NGOs run on a shoestring budget, therefore it's incumbent upon local governments to

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provide the support they need to thrive. The cooperation and backing of the local government will make life easier for everyone involved.

Leadership is essential in crisis management because of the need to coordinate the efforts of many different people and organisations, as well as because of the necessity of strict adherence to the rules when carrying out one's obligations. The necessity for a competent manager or group with previous expertise in emergency situations. These leaders must exercise prudent command of the situation and the relevant agencies to ensure that neither their own nor the opposing political parties' interests are compromised. Furthermore, there must be an in-depth familiarity with federal and state regulations pertaining to disaster management. In order to improve and adapt these two procedures to the shape of their individual administrative processes, the parties involved need to hone them. This will help the HRSC run more smoothly and reduce the likelihood of mistakes being made during disaster response and distribution.

Coordination, communication and information, resource availability, infrastructure, public awareness, public involvement, and leadership and authority are the final seven aspects that affect the efficiency of distribution in the HRSC.

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