

Conference Paper

Flood-Related Disaster Communication and Humanitarian Logistics

Puteri Fadzline Tamyez, Natalie Christiane Isabella Gerth, and Khairul Firdaus bin Anuar

Faculty of Industrial Management, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia

Abstract

During the annual monsoon season, Malaysia is often affected severely by floods as a result of heavy rainfall and poor irrigation. Every year, thousands of people have to be relocated and be evacuated from their homes. Thus, this research is aimed to look at two central aspects of disaster management in the context of flood disaster management in Kuantan, Pahang. Using a mixed-method approach, first, the effectiveness of communication mechanisms in the case of floods is investigated with quantitative analysis using descriptive design. Secondly, this research takes a closer look at the underlying logistical framework found in flood disaster contexts and identifies its critical success factors. For this, a qualitative research approach is taken. Using thematic analysis, in-depth semi-structured interviews are analyzed to arrive at conclusions regarding the critical success factors. Investigating in the effectiveness of disaster communication, it has become apparent that communication between authorities, agencies, non-government organizations or NGOs and flood victims are still in need of improvement, as the suggestions made by participants of the study suggests, both in regard to emergency updates as well as to heightening community awareness on the right actions to take in preparation of upcoming floods. The critical success factors for humanitarian response in the case of flood management include coordination, communication, knowledge, and preparedness. In it crucial to safeguard communities, thus, the unambiguous and clear standard of procedures or SOPs need to be in place at the integrated agencies for them to be understood and known by the individuals who execute them.

Keywords: flood, disaster, flood management, disaster communication, humanitarian logistics.

Corresponding Author:

Puteri Fadzline Tamyez
 fadzline@ump.edu.my

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1. Introduction

Flash floods are most prominently affect small but densely populated and urbanized areas in Malaysia. However, the effects are different in the state of Pahang. There, the affected areas are usually rural, and floods cover vast stretches of land so that the damage suffered can still be high even though the value of properties is lower (Zakaria et al., 2017). The steady growth of industries such as transportation has led

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to the comparably rapid growth of urbanization. Especially the petrochemical industry has become a major industry in the area (Shakir et al., 2015). This urban development with the building of roads and buildings consequently led to fewer stretches of land covered by vegetation, which is an important factor causing rapid river flow (Chan, 1997; Gupta, 2010). During the most recent monsoon at the beginning of 2018, 9,000 residents had to be evacuated in the state of Pahang alone (Malay Mail Online, 2018). Looking at the history of Kuantan with floods, its location in the Kuantan River Basin and its low laying nature are important factors (Zaidi, Akbari, & Ishak, 2014). During the North-East monsoon season, massive precipitation between November and March is to be expected in the area. The Kuantan River starts from Sungai Lembing, passing through Kuantan City and is then drained into the South China Sea, covering an area of approximately 1630 km² (Shakir et al., 2015; Zaidi et al., 2014). Due to the tropical climate, torrential rains have regularly led to spilling over of the river surface in the past decades. Runoffs also inundate low laying areas, always affecting the social and economic life of the societies residing there. In 2001, three decades after the latest large-scale flood incident in Pahang floods as a result of over spilling rivers affected 18,000 residents and 22,940 km² of land. (Zaidi et al., 2014). The floods of 2011/2012 affected nearly 6,000 residents in Kuantan after continuous rainfall caused sudden flooding of residential areas. Roads and vehicles were left in bad condition, reportedly due to the lacking drainage system in place during that time (Zaidi et al., 2014).

The worst flood to date, however, was experienced by Pahang in 2013, following heavy rainfall and the shift in land-use that took place around that time (Zaidi et al., 2014). Kuantan in particular, with its low laying nature, was in severe distress: more citizens than in the previous years had to evacuate their homes, and the city suffered major damages to roads, buildings and other structures (Jamaludin, Jaafar & Abdullah, 2013). Throughout the state of Pahang, where approximately 38,000 Malaysians in Pahang were evacuated from their homes to shelters. Thirty-two thousand of these evacuees sought refuge at the shelters set up in Kuantan (Malay Mail, 2013).

1.1. Research problem

According to the Department of Irrigation and Drainage (DID), the estimated area vulnerable to the flood disaster in Malaysia is approximately 29,800 km² or an equivalent of 9 percent of the country's total area. Affecting almost 4.82 million people, this amount is equivalent to around 21 percent of the country's total population. Losses and damages per year accumulate to approximately RM 915 million (Department of Irrigation and

Drainage (DID) Malaysia, 2009). The fact is that floods are unavoidable and occur annually. Future cases of flooding in the region will be even more monumental, both in terms of dimension and impact (Chan, 2012). A reconsideration of the current strategy is therefore essential to improve the preparedness, mitigation, response, and recovery for Malaysia and its citizens in the face of a natural disaster.

Current literature identifies several critical areas related to the management of natural disasters and in particular flood events (Chan, 2012; Khalid & Shafiai, 2015; Saifulsyahira, Edre, Ahmad Farhan, & Muhamad Hanafiah, 2016; Shafiai, 2016). Due to the decentralized nature of flood management in Malaysia, lack of coordination is a prevailing issue (Saifulsyahira et al., 2016). Furthermore, the large number of government agencies and other organizations involved in evacuation and aid distribution contributes to this coordination issue (Shafiai, 2016). In addition to this, the approach is taken towards disaster and flood management in Malaysia as of now is still a highly reactive one and not one that is centered around proactive action (Chan, 2012; Khalid & Shafiai, 2015). The government agency in charge of coordinating flood management, the engineering-based DID, focuses on structural measures and not on non-structural, interdisciplinary solutions (Chan, 2012).

The realization of this research is aimed at improving the situation for the residents and providing solutions and ideas for a prevailing and pressing issue. Thus, the objectives of this research are to evaluate the satisfaction of the communication mechanism among flood victims and to determine the critical success factors in managing humanitarian logistics in the case of flood events.

2. Literature Review

2.1. Disaster communication

Disaster communication can be categorized under crisis and risk emergency communication (CERC) and describes what takes place once an event has taken place, in its immediate aftermath, and sometimes as preventive action when it is about to happen (Manuel, 2014). Figure 1 shows the CERC lifecycle, adapted from the Centre of Disease Control and Prevention (CDC), of the U.S. Department of Health and Human Services, which is a tool utilized to break down the different stages of a disaster event regarding the communication that relates to it (CDC, 2014).

Taking the disaster event into the pictured phases assists those responsible for communicating with the public, media, other agencies, and organizations. It helps

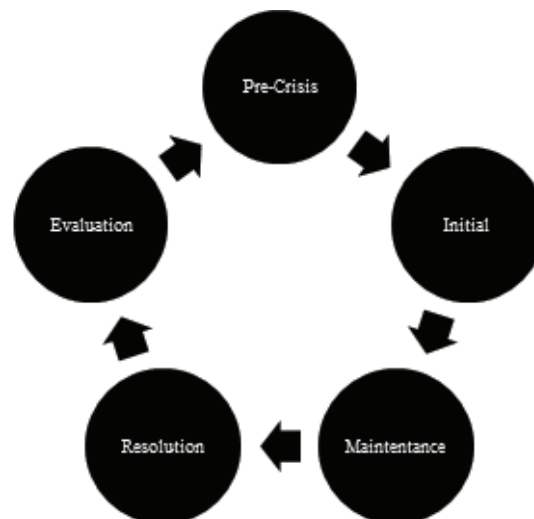


Figure 1: Communication Lifecycle. (Adapted from CDC (2014))

anticipate the information needs that will arise, identifying both the source as well as the time frame of its appearance. Each phase requires specific information (CDC, 2014; Reynolds & Shenhar, 2009). The pre-crisis phase takes on the task of preparing the general public for potential disaster events and similarly provides information to educate the public about the risks. In the initial phase, it is important to recognize that communication should reduce any uncertainties and help the public understand the various organizations involved in handling the disaster, including the specific responsibilities each has. Most importantly, in this phase, official communication channels and methods should be established for future interaction between the information providing organization and the public (CDC, 2014). While the initial phase is centered around rapid initial communication, the maintenance phase seeks to keep the general public updated about current developments, ongoing risks, and possible tools for mitigation, and also to correct any circulating information that is incorrect or unclear (CDC, 2014) and to prevent issues with mixed messages provided to the public (Reynolds, 2004). Following the immediate disaster events, during the resolution phase in the CER lifecycle communication should be centered on providing information about the ongoing reconstruction and rebuilding activities to keep the communities informed. At the same time, this leaves room for the promotion of risk mitigation and risk avoidance tools, and personal preparedness for residents (CDC, 2014). Concluding the communication lifecycle, the evaluation phase serves as a time stretch during which lessons learned can be collected, categorized, and documented for future reference. The lessons learned can then serve as a base for improvements in the current crisis communication strategy and help in evaluating the performance of the crisis communication plan. Elements of successful communication, as identified in the CDC-publication, relate to the credibility

of the information provided and the trust the recipient feels towards the source of information, as shown in Table 1.

TABLE 1: Factors of Successful Crisis Communication.

Credibility	Trust
Accuracy of information	Empathy
Speed of release	Openness
Source: Adapted from CDC (2014)	

Accuracy of information is crucial, especially because of the unstable circumstances that prevail (Reynolds, 2004). The general public will depend on the information handed to them and in order to provide reliable information, information management should ensure that information is factually correct; that communication uses simple, non-technical terms; that the information is repeated frequently and in different media contexts; and that all communication outlets share the same source (CDC, 2014). Speed of information release is of equal importance in moments of crisis and can indicate that the source of information has disaster handling plans in place (CDC, 2014). However, it is important to notice that first information leave a lasting impression on the recipients – delivering wrong or conflicting narratives in times of crisis can affect the credibility of the information provider.

Empathy and caring should also be included in the message (Reynolds, 2004), if appropriate, as this leads to better responsiveness towards the message from recipients. Similarly, it is important not to convey insincerity, or put on a show as this discredits the source (CDC, 2014). Openness about the information available helps to establish trust. Trustworthiness is achieved by an honest and open attitude. Honesty entails that the realities of the situation are faced and responded to in a quick and appropriate manner. It should not lead to the premature release of information. For a flood disaster, as is the focus of this research, the CERC lifecycle with its embedded activities applies to the communication needs that arise from such an event. Similarly, the elements of successful communication identified can be used for improving communication in a disaster, where evacuations are necessary. In the scope of this study, the communication among victims in case of floods focuses primarily on the immediate response phase. Relatively little research has been conducted to address specifically the communication needs during flood disasters. However, a list of five common key characteristics of effective communication has been collected by Steelman and McCaffrey (2013), in their study centered around natural hazards risk and crisis communication. Engaging in interactive processes is the first key communication characteristic, enabling the dialogue and

providing clarification of questions, tightly connected to the action of needs assessment (Burton & Ovadiya, 2014); the result can be better support for prevention and interventions (Steelman & McCaffrey, 2013). Furthermore, the local context has to be considered, the prevailing condition of the situation and environment from the point of view of those affected and involved, especially since “relating explanations of action to why they are needed and how they will make a difference given local conditions[,] can facilitate understanding and action” (Steelman & McCaffrey, 2013, p. 688). Another key characteristic they identified is the provision of information which is timely, accurate, and useful, and done so in a reliable and honest manner. The messenger who conveys the message to the recipient is also of importance: their credibility, in particular, can affect how information is received and whether or not it is accepted. The final common characteristic of effective crisis communication is to establish a working relationship by providing regular communication (Nour et al., 2017; Steelman & McCaffrey, 2013).

2.2. Humanitarian logistics

2.2.1. Concept of humanitarian logistics

Humanitarian relief is the act of providing humanitarian aid in the face of a, most often, natural disaster, to the affected community. This is realized in the form of emergency supplies provision to those in need (Shafiai & Khalid, 2016). Humanitarian logistics is, therefore, a mix of different kinds of operations that are involved in disaster relief and continuous support for developing regions. Generally, a distinction can thus be made between continuous aid work and disaster relief, which usually entails a limited time scope. Humanitarian logistics operations can be placed in the disaster management cycle between disaster preparedness and disaster response. Historically, logistics has always been a central element in humanitarian aid, seeing that efforts linked to transportation and other logistics services or operations make up a majority of activities involved in disaster relief (Kovács & Spens, 2007).

2.2.2. Success factors of humanitarian logistics

In their study, Scarpin and De Oliveira Silva (2014) extract information from various publications and research articles to establish the critical factors that assist logistics processes related to the occurrence of natural disasters. These success factors are related to the various parties involved in the humanitarian logistics processes, based on a model by Balcik, Beamon, Krejci, Muramatsu, and Ramirez (2010). The humanitarian

supply chain model in Figure 2 includes suppliers, donors, distribution centers, and beneficiaries and takes into consideration both pre-disaster and post-disaster flows of supply (Scarpin & De Oliveira Silva, 2014).

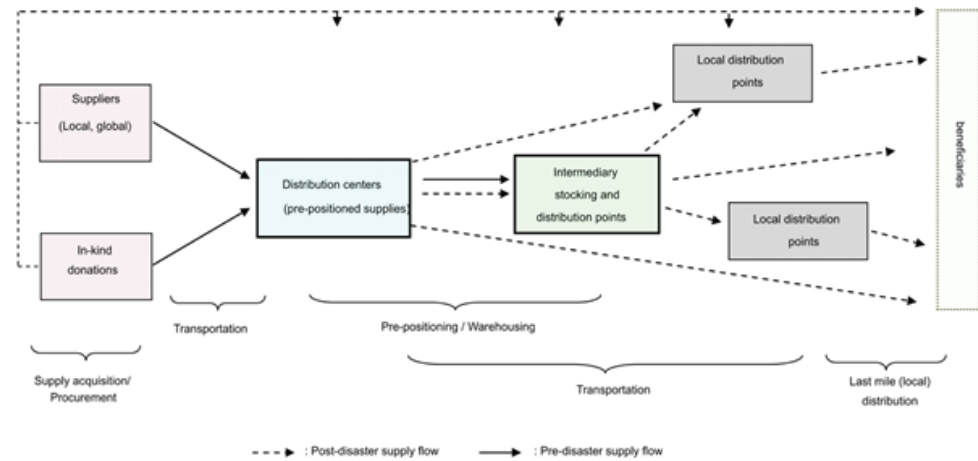


Figure 2: Humanitarian Supply Chain Model. (Source: (Balcik et al., 2010))

To represent the individual needs of the parties involved, a differentiation is made between three different types of activities related to distribution centers: resources, transportation, and warehousing. The supply chain stakeholders and their respective success factors that as Scarpin and De Oliveira Silva (2014) gathered them from literature and further confirmed with expert interviews are shown in Table 2. However, the category of beneficiaries was not considered, as the critical success factors found to relate more to the activities of the other parties involved.

TABLE 2: Success Factors in Humanitarian Logistics.

Stakeholder	Critical Success Factors
Suppliers	Reliability Relationship
Donors	Communication Consideration
Distribution Centre – Resources	Preparedness
Distribution Centre – Transportation	Agility Safety
Distribution Centre – Warehousing	Location Organization Information

Source: Adapted from Scarpin & De Oliveira Silva (2014)

The critical success factors demanded of suppliers include reliability in emergencies so that in a situation of crisis, it can be guaranteed that the needs of the affected community are met. This factor is closely related to the aspect of the relationship, as a network of trusted suppliers needs to be in place when disaster strikes. While donations can come from donors that are not close to the affected area, more crucial than location

or proximity is the communication in terms of the far reach of information and sufficient media coverage, as this helps generate large amounts of donations. Consideration means that donors bear in mind that donation contributions ought to help the affected citizens in the first place and should thus be in an acceptable condition.

Preparedness as a critical success factor for resources refers to initial disaster kits with basic needs being made readily available before the first stages of a disaster event (Scarpin & De Oliveira Silva, 2014). While emergency shelters are set up for the affected, the resources must be stored appropriately and ready for distribution to the shelters (Van Wassenhove & Pedraza Martinez, 2012). When it comes to transportation, nearly everyone who has the means and appropriate vehicles and time can aid with transportation, which is often realized by civilians during disasters as Scarpin and De Oliveira Silva found in their interviews (2014). To ensure safety, however, usually, government bodies will be in control and oversee these activities. Important factors for warehousing of the donations and other supplies needed are a well-organized system of storing of goods and accurate information at all times. The location of a warehouse (centralized or decentralized) needs to be chosen based on the local context and needs (Balcik et al., 2010; Scarpin & De Oliveira Silva, 2014).

3. Methodology

To satisfy the first research objective, descriptive design was utilized to identify communication effectiveness in disaster management through an online survey. Based on the data collected, descriptive design can present the findings to provide an overall picture of the impressions participants had regarding current operations (Creswell, 2014). This study used a purposive sampling design. The criteria on which participants were selected were their being affected by the most recent floods in Kuantan, Pahang. The advantage of purposive sampling lies in the comparatively easy way in which generalizations can be made about the sample since participants have undergone a pre-selection (Punch, 2005).

The information to be obtained from the participants was mostly centered on the aspects of logistics and distribution of aid to satisfy the second research objective. However, since the units of analysis were associated with different organizations and held very different positions, a semi-structured interview approach was chosen so that the areas of expertise of the participants could be highlighted during the interviews, while at the same time ensuring that the general flow of interview questions was followed. Target respondents were identified as individuals representing a government

agency, an NGO, or another organization which is involved in flood management activities in Kuantan.

Target respondents were selected by researching the government agencies identified in Directive No. 20 and NGOs actively involved in flood relief operations in the Kuantan area. The organizations were then approached via telephone to try and reach a person in charge that could provide information regarding flood management. Initial contact with the interview participants was usually either established via a phone call or WhatsApp message. Before the interview sessions, the respondents were informed about the approximate time frame needed to conduct the interview, which was about one hour. The interviews were then conducted in person, usually one-to-one, at the organization the respondent represented. The questions for the interviews were divided into eight sections: flood events, process flow, information and communication, aid distribution, evacuation, flood handling, preparedness, and expertise, as depicted in Table 3.

TABLE 3: Interview Question Categories.

Section	Category
A	Flood events
B	Process flow
C	Information and communication
D	Aid distribution
E	Evacuation
F	Flood handling
G	Preparedness
H	Expertise

In formulating the questions, the wording was chosen carefully so that the questions were open and not closed, to encourage lengthy answers from the participants. Each section held 1-5 questions.

4. Results

4.1. Preliminary study results

In a preliminary study conducted at the beginning of the research with the coordinator for the Universiti Malaysia Pahang (UMP) Alumni volunteers, information was gathered

regarding the structure of organizations found locally that are involved in the humanitarian response following a flood. By the findings from the literature review, three stages of emergency response were identified: pre-disaster, during disaster, and post-disaster. The organizations of relevance are shown in Table 4.

TABLE 4: Results from Preliminary Study.

Pre-Disaster	During Disaster	Post-Disaster
National	Department of Welfare	Volunteers
Firefighters	NGOs*	
Police	i-Bantu	
Soldiers	UMP	
National Defence Department of Welfare		
*NGOs: Non-Government Organization		

The activities that are at the core of the pre-disaster phase mainly include preparations which are carried out in terms of humanitarian logistics and organization. On the national level, starting 2016, one central government agency is entrusted with the coordinating activities leading the preparations and serves as the central coordinator for other government agencies as well as organizations. The primary actions relate to the setting up and stocking of the flood shelters and the planning, organization, and actual carrying out of the transfer of flood victims during a flood event. During this preparation stage, as indicated during the preliminary meeting, those parties involved are firefighters, police, soldiers, and national defense, as well as the Department of Social Welfare. While the latter is mainly concerned with organizational aspects of managing the shelter sites, the previous four forces are involved in transferring residents from high-risk areas before a flood event. The main participating parties during a flood occurrence particularly in Kuantan include the Department of Welfare, the NGO I-Bantu, higher education institutions, such as UMP and the NGO collective BBNGO, as stated by the respondent. The main involvement of the NGOs and higher education institutions is connected to sending goods of humanitarian aid relief once the flood has occurred and providing help in taking care of flood victims at the shelters.

In the post-disaster stage of a flood, the remaining activities center on cleaning up the areas that were affected by the flood. This includes repairing, and reconstruction of public means and infrastructure such as streets and buildings works also need to be carried out at the shelters provided. As these are mostly public buildings such as schools or mosques and also city halls and assembly halls, efforts will have to be put

into restoring these locations to a state that they are ready to be used for their primary purposes again. With the Department of Social Welfare being in charge of the flood victim shelters, it is its responsibility to oversee their cleaning in the post-disaster phase. Only after the waters have completely retracted can the cleaning activities begin for the private properties of those citizens whose residential areas were affected by floods. These cleaning activities are carried out by volunteers. Although not specified during the preliminary meeting, these volunteers are sent from a wide range of organizations and institutions, such as higher education institutions, schools, or NGOs. They will usually also provide initial care kits containing essential foodstuffs and staple foods such as rice, noodles, and sugar.

4.1.1. Results for research objective 1: To identify the effectiveness of the communication mechanism among flood victims

Starting with the questions from section A relating to the flood events, participants described their experience and emotional state as anxious and worrisome (21.4 percent), normal or accepting and calm (39.3 percent), shocked (32.1 percent), or happy (7.1 percent), as shown in Table 5.

TABLE 5: Experience and Emotional State.

Experience and Emotional State	Percentage (%)
Worrisome	22
Normal/Accepting & Calm	39
Shocked	32
Happy	7

The majority of participants stated that they received the information about the flood via WhatsApp (86.4 percent). The second most selected answer was television (36.4 percent), followed by Facebook (22 percent), radio (13.6 percent), SMS and personal interaction with neighbors and friends (both 9.1 percent) and finally Twitter (4.5 percent). Another participant was only made aware of the flood through observation of rising water levels in front of their house (4.5 percent), as shown in Table 6.

When asked about suggestions on improving communication between flood victims, NGOs, and the government, 14.3 percent asked for more regular communication either via phone, WhatsApp or SMS and for more honest, clearer and accurate information, respectively. 10.7 percent state that they would like to have meetings in flood-affected area between victims and agencies and parties involved. The remaining suggestions

TABLE 6: Source of Information.

Source of Information	Percentage (%)
Whatsapp	82
Television	29
Facebook	21
Radio	14
SMS	4
Personal Interaction	4
Twitter	2
Eye Witness	2

were backed by 3.6 percent each, including the request for an official flood website; information flow through *Rukun Tetangga* (Malaysian neighbourhood watch); information flow via *JKKK Kampung*; request for more volunteers and equipment during the flood; better coordination; increasing awareness; and more comfortable relief centres, as referred to Table 7.

TABLE 7: Suggested Improvements.

Suggested Improvements	Percentage (%)
Regular communication	13
Honest, clear, accurate information	13
In-person meetings	11
Official flood website	3
Information via neighborhood watch	3
Information via JKKK	3
More volunteers and equipment	3

Aid supplies received by participants include food and beverages, bedding, transportation, toiletries, money, and medication. From 28 respondents, only 22 had received aid in any one of the forms mentioned above. 13.6 percent of these respondents stated that the aid supplies were not sufficient to fulfill their needs, 18.2 percent were unsure whether this was the case and the rest (68.2 percent) felt that the supplies met their needs and were sufficient. The goods were supplied by JKM or Social Welfare Department (30.8 percent), the government (15.4 percent), an NGO (15.4 percent), *Rukun Tetangga* (6.7 percent), a political party (6.7 percent), SRS or *Skim Rondaan Sukarela* (6.7

percent), villagers (6.7 percent) and JKKK or *Jawatankuasa Kemajuan dan Keselamatan Kampung* (6.7 percent). When asked how aid supplies are given to the community of the participants, 33.3 percent identified the emergency shelters, another 18.5 percent stated that no aid was received at all, and 7.4 percent were unsure. Another 7.4 percent said that the village chief distributed the aid, while 7.4 percent more stated that aid was received in the village and another 7.4 percent said that aid reached their community vial land aid. Other sources of aid identified include NGOs, political parties, patrols, volunteers, representatives, and JKKK (all 3.7 percent). These are shown in Table 8.

TABLE 8: Received Aid Supplies.

Received Aid Supplies	Percentage (%)
Insufficient	13.6
Sufficient	68.2
Unsure	18

76.2 percent of participants felt that the relocation of flood victims was handled right on time. 14.3 percent disagree with this, and 9.5 percent of the respondents were not sure about this. 66.6 percent had the impression that the relocation of victims was smooth and orderly. While 9.5 percent remain unsure about this, 23.3 percent of respondents disagree and were not satisfied with the proceeding. Finally, regarding the efficiency of relocation activities, 66.6 percent felt that these were efficiently handled. 14.3 percent remain unsure about the efficiency, and 19.1 percent felt that the process was not handled efficiently, as shown in Table 9.

TABLE 9: Timeliness of Relocation.

Timeliness of Relocation	Percentage (%)
Timely	8.2
Untimely	3.2
Unsure	1.4

Respondents were asked to name the agencies or organizations that are usually active in disaster management activities of their residential area. Most participants identified the fire department, police department and ATM or *Angkatan Tentera Malaysia* (28.6 percent), followed by RELA or *Jabatan Sukarelawan Malaysia* (17.9 percent), JKM or *Jabatan Kebajikan Masyarakat* (14.3 percent), MPK or *Majlis Perbandaran Kuantan* (10.7 percent). NGOs, residents, and local schools were each named by 7.1 percent. APM or Malaysia Civil Defence Department, SRS or *Skim Rondaan Sukarela*, volunteers and

JKKK were each named by 3.6 percent of respondents. Another 3.6 percent stated that they knew no agency, as illustrated in Figure 8., 67.9 percent of the respondents felt satisfied or highly satisfied with the government’s actions in the process of flood disaster management. 14.3 percent remained undecided, and 17.8 percent expressed that they were not satisfied with the processes of the government’s flood management, as shown in Table 10.

TABLE 10: Organizations Active in Local Disaster Relief.

Organizations Active in Local Disaster Relief	Percentage (%)
Police, Fire Department	28
Jabatan Kebajikan Masyarakat	14
NGOs	6
Schools	6
SRS	4
JKKK	4
RELA	19
MPK	11
Local Residents	6
APM	3
Volunteers	3
None	3

Asked about the improvements, if any, they had experienced over recent years, 14.3 percent of the respondents commented on the more systematic nature of flood management. 17.9 percent responded that they were not sure whether improvements had taken place or not. Twenty-five percent had the impression that the handling was unchanged and had remained the same over the past years, while 10.7 percent expressed that they felt general improvement overall. 7.1 percent of respondents commented that shelters and aid distribution were better now. 3.6 percent stated that drainage and river management had improved and another 3.6 percent found that help was employed in a faster way, as illustrated in Table 11.

Asked, whether they had the feeling that their residential area was well-prepared in a comprehensive manner for future flood incidents, 60.7 percent of respondents agreed. 17.9 percent were unsure about the issue, and 21.5 percent felt that their communities were not entirely prepared for upcoming floods in the future, as stated in Table 12.

TABLE 11: Areas of Improvement.

Areas of Improvement	Percentage (%)
More systematic	14
Better drainage/river management	4
General improvement	11
Unsure	18
Better shelters and aid	7
Faster help	4
No improvement	25

TABLE 12: Local Preparedness for Future Floods.

Local Preparedness for Future Floods	Percentage (%)
Well-prepared	60.7
Not prepared	21.5
Unsure	17.9

Regarding steps to take which participants were notified about before and during the flood, 21.4 percent named being careful or taking care of themselves as one. Related to this, 17.9 percent stated they were told to stay alert on updates and developments, and 10.7 percent said they were informed to pack or be ready to move. 7.1 percent remembered they were told to keep off electrical goods and to save their valuables respectively. Steps identified by 3.6 percent of participants include keeping enough food supplies, providing assistance to others who are in need, instructions to move, remaining in the safe area during floods, saving family first, moving things in the house to a higher level, going to the emergency shelters, and following instructions from authorities and the government, as illustrated in Table 13.

4.1.2. Results for research objective 2: To determine the critical success factors in managing humanitarian logistics in the case of flood events

Categories that arose in the interviews and were used as codes for content analysis:

The most common codes from the transcribed interviews as can be seen in the table above include communication, shelters, supplies, coordination, and transportation.

TABLE 13: Steps for Flood Preparation and Event.

Steps for Flood Preparation and Event	Percentage (%)
Being careful/taking care of themselves	22
Being ready for evacuation	11
Safekeeping of valuables	6
Providing assistance	3
Remaining in safe areas	3
Moving things to the upper level	3
Following authorities' instructions	3
Staying alert	18
Switching off electrical goods	6
Keeping off sufficient food supplies	3
Keeping of moving instructions	3
Saving family first	3
Seeking emergency shelters	3

None of the codes were identified in all interactions. Figure 3 shows the abstract distribution of the codes.

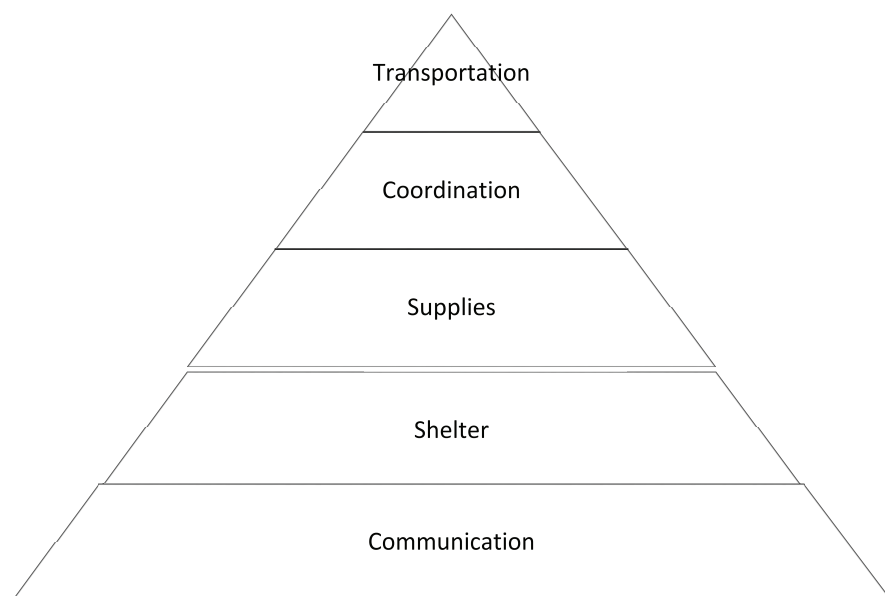


Figure 3: Distribution of Codes.

TABLE 14: Codes Identified In Content Analysis.

Section	Code
A	Coordination
B	Transportation
C	Expenses
D	Warning
E	Communication
F	Shelter
G	Rescue
H	Delays
I	Post-Disaster
J	Preparedness
K	Awareness
L	Improvements
M	Mindset
N	Supplies
O	Technology
P	Manpower
Q	Knowledge

5. Discussion

5.1. Discussion on the effectiveness of the communication mechanism among flood victims (Research objective 1)

It is interesting to see the development of communication channels in recent years. The majority of participants expressed that they received information about the flood incidents and updates about its development via WhatsApp Messenger. This indicates that official channels of communication authorized by local authorities or the government, such as broadcasts on the radio or television are not the primary source of information for residents anymore, even, or perhaps especially, in emergencies. Messenger apps convey the most information to residents, even though it should be kept in mind that television as a source of information came in second behind WhatsApp and before Facebook.

TABLE 15: Occurrence of Codes Per Interview.

	1	2	3	4	5	6	7	SUM
A	14	9	10	-	5	-	2	40
B	6	12	13	-	1	2	-	34
C	1	-	-	-	-	-	1	2
D	5	-	-	-	-	-	-	5
E	7	26	24	5	14	-	15	91
F	4	6	12	15	4	7	4	52
G	5	-	3	-	2	1	2	13
H	5	1	-	-	1	-	1	8
I	5	3	-	-	1	2	1	12
J	1	2	1	4	1	2	-	11
K	1	2	-	2	2	-	-	7
L	1	5	1	2	2	-	2	13
M	1	3	3	6	1	-	4	18
N	-	26	2	3	6	2	2	41
O	-	1	-	-	4	-	-	5
P	-	-	2	1	3	-	-	6
Q	-	-	1	1	7	1	3	13

Thirteen percent of participants also use the radio as a source for updates also indicate that it still is a relevant medium. While a few participants refrained from suggesting improvements for the communication across the stakeholders related to a disaster event, many respondents do have ideas on how to make the interaction better. The desire for more regular communication implies that currently, information is handed out in irregular intervals, or at least appears this way to the affected flood victims. It is important to notice that the channel of communication-related to this suggestion is always tied to a mobile device (phone, WhatsApp, or SMS). This strongly correlates with the findings of Reynolds (2009), that crisis communication has to be clear to avoid mixed messages, but also controlled and fast.

Especially during times of crisis, mobile devices provide access to information instantaneously, so the responsible agencies should pursue to present accurate updates

to the public and to be the first to give out information. Furthermore, participants expressed that they wished for more honest, clearer, and accurate information. In these cases, the source of information needs to be investigated further, however. Whether the inaccurate, unclear information originated from official sources remains unclear. Nevertheless, the expressed wish for clearer communication is an indicator of the still unsorted communication field that has yet to receive clean-cut instructions and a direction. One participant called for an official website for information on the flood updates as a central place of refuge. This either means that the respondent is unaware of the existence of such a site, or that the information provided is not of use to them, are not updated fast enough, or are in some other way faulty or unreliable.

The effectiveness of the underlying disaster communication mechanisms in place is, therefore, questionable. An aspect that stands out in the results of the survey regarding disaster communication is that in a range of suggestions, participants sought after personal connection and interaction for their suggestions, when clustering together those who wish to meet in person with responsible agencies in the affected area, and those who wish for information to reach them via *Rukun Tetangga*, or JKKK. In advancing the communication mechanisms, the factor of personal interaction should be considered, perhaps realizing such meetings, so that especially in disaster or emergency contexts the residents and flood victims feel safe and taken care of. As pointed out in the literature review, empathy, as well as honesty, are considered important factors in disaster communication (CDC, 2014); taking the time to meet residents would show them a sincere interest in their lives and situation.

As a result, the public feel respected and heard and can then, in turn, listen to instructions and new information. The express wishes from the participants reflect Reynolds' (2004) states that an audience can take away from such an interaction, whether or not the speaker can truly understand what they are going through; in a sense, this will give the public a chance to know for certain. Personal interaction can also be achieved by meeting another suggestion, which is the raising of awareness. Even though the resources may exist for residents, if nobody is aware of them, they remain useless, as it perhaps holds for the *infobanjir* website – as stated before, either it is not updated as it should be, or perhaps residents in affected areas have not been made aware of its existence yet. Similarly, flood preparedness information and risk awareness should be communicated and even promoted in affected areas. This way, information can be shared in communities more easily, and official channels can make sure that truthful and honest information is passed on to the people.

When asked about the steps they should take as residents in a flood-prone area, many answers were given that reflect the content of the guidelines issued by DID for flood preparedness of the community. It is worth noticing that many of these measures were named only once by participants in the survey. This indicates on one hand that the guiding principles of DID flood preparedness are accessible in some way to residents in flood-affected areas, as they still remembered some aspects of flood preparedness, disregarding its origination. Communication between authorities, agencies, NGOs and flood victims is still in need of improvements, as the suggestions made by participants of the study suggests, both regarding emergency updates as well as to heightening community awareness on the right actions to take in preparation of upcoming floods. The lack of the public's satisfaction with current disaster communication reflects the need to create platforms and dialogue to increase its effectiveness in the face of flood events.

5.2. Discussion for the critical success factors in managing humanitarian logistics in the case of flood events (Research objective 2)

The respondents participating in the interview commonly agreed that overall, disaster management has improved in Malaysia in the years following the 2014 flood. One participant concerns were expressed particularly on vehicles. Four of the respondents commented on the lack of vehicles that are available to their organization or in general, for executing rescue activities. Due to flood incident which makes evacuation necessary, a participant from interview 1 pointed out that *"4x4 vehicles, big lorries are necessary to enter flooded areas, but [are] not available to NGOs"*. Many government agencies, respondent one remarks, do not possess their 4x4 or 6x6 transportation. In the case of the welfare department, this means dependency on rental vehicles, other organizations, or private volunteers who lend their vehicles to the agency.

In the past, this has resulted in the department not being able to meet delivery schedules, since several shelters need to be serviced by them. Delays in receiving supplies at the shelters are the result. Through the course of the interviews, the information provided by the respondents has been similar and not contradictory regarding the agencies involved in the processes of flood management, and the responsibilities held by each institution and organization. In terms of improvements from the past years, the term coordination has been brought up with relative frequency. All respondents that were met reported that the establishment of the organization NADMA last year has

contributed to an improvement of coordination matters. As respondent 2 shared during the interview, previously, aid organizations worked by themselves in general and served their own assigned areas in times of need.

As this provision of aid was not controlled centrally, however, representatives of more than one aid organization would turn up at the same place and at more or less the same time, leading to chaos and confusion of both the volunteering staff as well as the flood victims in need. With NADMA, these unnecessary hurdles are overcome, and resources can be maximized, as respondent 1 pointed out. Respondent 2 is happy about this development since now there are *“meetings and exchange of ideas for the next floods with NGOs that have all different specializations, all different knowledge in flood.”* Communication now takes place centrally, via WhatsApp and organizations can post their need, e.g., a 4x4 to pick up donations in the group, and the network of people responding to this request is now bigger due to the central connectedness of the government agencies and NGOs under the control of NADMA.

Looking at the codes identified in the interview transcripts and the information offered during these interviews, critical success factors relating to humanitarian logistics can be established. The two central aspects the interviews initially aimed to investigate in detail were evacuation activities and transport of aid supplies. However, the participants of the study who responded to the interview request were only remotely connected to these activities. While evacuation and distribution of aid supplies were still relevant and pursued as a topic during the interviews, other areas were sometimes discussed at greater length, to gain a better understanding of the topic of disaster and flood management in general. Very closely related to one another are the first two success factors, communication, and coordination. Especially due to the time constraint related to humanitarian relief operations, proper coordination of resources forms the core of good humanitarian logistics.

However, without communication, even the most elaborate coordination plan will not be successful, and therefore also needs to be a priority in managing and structuring the disaster management activities. Knowledge comprises not only having experts on critical topics on board but also to implement this knowledge effectively, as respondent 5 pointed out: Application of knowledge thus also belongs to the success factors of relief operations. Preparedness of the agencies and also individuals working on the scene is the last crucial factor in humanitarian relief operations. As with the unpredictable aspect of their nature, disasters can occur without warning and prior planning for it. To safeguard communities, unambiguous and clear SOPs need to be in place at the

integrated agencies, and they need to be understood and known by the individuals who execute them.

6. Conclusion and Implications

Fulfilling the research objective, this research has succeeded in highlighting and identifying the critical success factors for humanitarian response in the case of flood management in Kuantan. The core factors include coordination, communication, knowledge, and preparedness. Because a large number of government agencies, NGOs, and other stakeholders are involved in the disaster management activities in Malaysia, it is not surprising that the coordination in such an environment is more crucial. Communication additionally provides support and gives its voice to coordination, since clear, reliable, fast, and accurate information needs to be conveyed when dealing with any disaster incident. Knowledge comprises not only having experts on critical topics on board but also to implement this knowledge effectively. Preparedness of the agencies and also individuals working on the scene is the last crucial factor in humanitarian relief operations. As with the unpredictable aspect of their nature, disasters can occur without warning and prior planning for it. To safeguard communities, unambiguous and clear SOPs need to be in place at the integrated agencies, and they need to be understood and known by the individuals who execute them. To further develop NADMA or National Disaster Management Agency, which was established as coordinating control for disaster management only in 2016, an expansion of the staff seems a feasible idea. By establishing local NADMA officers and permanent staff, communication on the ground is simplified. A dialogue is then possible, where lessons learned can be reflected on common ground and feedback can be expressed from both sides regarding what went well and what did not during the latest disaster incident. Furthermore, three specialized teams could be integrated into the team of NADMA in the future; one is focussing on the technical and technological advancement of drainage and irrigation development; another comprising expert in the field of disaster management; and a third team that is focussed around community outreach.

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