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## Factors Affecting Effective Flood Disaster Response Operations in The Infantry Corp

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### Abstract

The objective of this study is to examine factors affecting effective flood disaster response operations in the Infantry Corp. The factors examined were command and control, coordination, equipment and logistic, human resources and communication. Data were collected through interviews and focus group discussions with infantry officers from both the operational and tactical levels. The study found that the Infantry Corp is indeed somewhat ready in terms of its preparedness for disaster response. The command and control center was systematically managed. Communication was good. Human resources mobilized for the disaster response missions were sufficient and they were committed towards their responsibilities in saving the lives of the community. It is seen that despite the fact that the Infantry Corp is somewhat ready for effective disaster response, poor inter-agency coordination, inter-agency communication and inter-agency understanding of individual roles and responsibilities mean that it may not be fully effective in its disaster response management, particularly when the flood disaster is of bigger scale compared to previous incidents. The state government and Infantry Corp should be able to understand the issues underlying effective disaster response. Therefore, a systematic operating procedure should be developed and shared with all relevant agencies.

**Keywords:** Command and Control, Coordination, Equipment and Logistic, Human Resources and Communication

### INTRODUCTION

Malaysia has a long history of floods, as the country is exposed to monsoon rainfall all year round. More than 10% of the country is flood-prone. Rapid urbanization of floodplains such as those in Kuala Lumpur, Penang and Sarawak, and upstream development of hill land have rendered many areas vulnerable to hazardous flash floods. Malaysia lies in a geologically stable region which is free from earthquakes, volcanic activities and strong winds, such as the tropical cyclones which periodically affect some of its neighbors. However, Malaysia is often hit by floods, droughts, landslides, haze, tsunamis, and manmade disasters (Parker et al., 1997). Annually, disasters such as floods account for

a significant number of casualties, disease epidemics, damage to property and crops and other intangible losses (Chan et al., 2002). Therefore, of all the disasters in Malaysia, floods are the most frequent and bring the greatest damage annually. Floods are therefore considered as the most severe type of disaster experienced in Malaysia. In addition, Malaysia has an equatorial climate with constant high temperatures and high relative humidity. The climate is influenced by the northeast and southwest monsoons. The former, prevailing between November and February, brings heavy rainfall (as much as 600 mm in 24 hours in extreme cases) predominantly to the east coast of Peninsular Malaysia and to Sabah and Sarawak. Rain-bearing winds also come with the southwest monsoon from April to September, though rainfalls during this period are generally less than during the northeast monsoon. There are, in addition, two transitional periods between the monsoons (inter-monsoon) when convectional thunderstorms are common. The annual average rainfall is 2,420 mm for Peninsular Malaysia, 2,630 mm for Sabah and 3,830 mm for Sarawak, with heavier precipitation recorded on the east coast of Peninsular Malaysia and the coastal regions of Sabah and Sarawak.

With this phenomenon that occurs yearly in Malaysia, well-conceived disaster response operations begin with having a structured command and control center (Haddow et al, 2011) to ensure coordination (Chen et al, 2008) and communication (Fakhruddin, 2007) of all disaster response administrations and organizations are integrated. In addition, the officers involved in disaster response operations should be provided with adequate equipment, logistic support and trained human resources (Lai et al, 2009 and Thomas, 2006). When flood disaster strikes, the Malaysian Infantry personnel are normally instructed to be the first responder and their response must be rapid, coordinated and have a high level of readiness to ensure that disaster casualties and damages are mitigated. However, during the yearly monsoon season when flood disaster normally occurs, issues with effective disaster response operations have always been highlighted in the Military post-disaster reports or operational reports. Moreover, quite a number of studies have been conducted on flood disaster in Malaysia. These studies have looked at the causes, effects, mitigation approaches and general disaster management focusing on community level (Chan, 1995; Sani, Muhd Barzani Gasim, Mohd Ekhwan, and Musa, 2014; Muhammad Muqtada, Nor Ashikin, Arham Muchtar, and Md Azizul, 2014; Zaitun, Nor Siah and Zuraina, 2016). Research on disaster response management from the perspective of the infantry personnel or officers involved as first responder during disaster response is very limited. Therefore, this study is important and timely to examine issues with disaster operations and management and to determine the readiness of infantry personnel in disaster response.

## **LITERATURE REVIEW**

### **Command and control**

Command and control has been defined as the responsibility for the effective use of available resources, planning the employment of, organizing, directing, coordinating, and controlling military forces for the accomplishment of assigned missions. Moreover, it also includes the responsibility for the health, welfare, morale, and discipline of assigned personnel (Albert & Hayers, 2005). It was not until 1978 that the Federal Emergency Management Agency would emerge at the behest of President

Carter, consolidating the risk assessing and disaster management interests of 100 federal agencies. Apart from that, the Central to federal response structure is the National Incident Response System, which requires strict compliance from state and local authorities in order to receive federal grants. One stipulation of this arrangement is that all responders are trained in the Incident Command System (ICS), which details five key elements (command, operations, planning, logistic, finance) to ensure military-style efficiency from all active participants (Haddow et al., 2011). Moreover, the Flood Control Act of 1934 gave authority to Army Corps of Engineers for carrying out and managing flood control projects, signaling a move forward from a “disaster as acts of God” mindset to the idea that humans can control nature (Haddow et al., 2011).

### **Communication**

In responding to an emergency, communication between critical parties such as disaster management teams and support organizations is a key priority in ensuring rapid and accurate access to information. According to Fakhruddin (2007), it is also crucial to allocate task responsibilities in disaster areas, informing the public of critical information, facilitating decision-making processes, and ensuring accurate and timely updates on situational awareness. Information and communication technology deployed to a disaster relief operation promises a high value of coordination efforts (Coyle & Meier, 2009). Moreover, the dynamic and unclear situation at the beginning of a disaster relief operation demands high coordination. Apart from that, the large number of participating organizations in disaster relief operations needs coordination.

### **Coordination**

The life cycle approach framework for disaster is divided into three stages: i.e. pre-incident, during-incident, and post-incident. The pre-incident stage is concerned with activities related to planning, training and organizing the teams involved. Moreover, the response management to the crisis and the coordination of workers are part of the during-incident phase. Furthermore, the during-incident stage is viewed as the composition of two sub-cycles, known as the mini-second and many-second sub-cycles. The mini-second coordination cycle is the onsite organization of teams and front-end emergency workers for rapid intervention and prevention, while the many-second coordination cycle concerns the emergency operations center (EOP). The post-incident or recovery phase focuses on the return to a normal situation. Moreover, the framework also defines five basic elements and applies them to each stage of the coordination phase (Chen et al. 2008). According to Dynes and Quarantelli (1977), coordination can be understood as the degree to which there are adequate networks among the organizational parts for intra-organizational communication or among the organizations for inter-organizational communication to accomplish goals. In routine times, established and standardized procedures are followed. However, in emergencies, internal and/or external factors create so much stress that it is possible to think of responding agencies as being in a state of crisis.

### **Equipment and Logistic**

According to Canton (2007), in the response phase, planning is still an emerging subject in the literature. In practice, only a few tools are presently available to help decision-makers in the first hours following a disaster. However, the rapid deployment of an appropriate distribution network,

as well as the efficient distribution of humanitarian aid, is crucial to save human lives and to alleviate suffering. These observations have motivated the increasing amount of work devoted to emergency management, and several seminal references are now available. The crisis management concept consists of rescue, preparedness, mitigation, and resilience efforts made by governments, volunteer organizations or other local departments (ibid). By referring to Mijoni & Izadkhah (2009), governments should ensure that there is appropriate information and effective consultation with the locals and other stakeholders, since this would assist in the decisions to be made about future effects and outcomes.

### **Human Resources**

Human resources play a key role in disaster response (Meduri, 2014). Well-trained disaster personnel can save more lives (Lai et al., 2009; Thomas, 2006). Hester (2005) indicates that human capital in terms of education and work experience is not a better indicator of organizational performance, but optimized training and minimized employee turnover can better predict performance, as suggested by Delaney and Huselid (1996). Hence, as also recommended by Barney (1991), training for competencies can help to improve their performance. Apart from that, Van Fenema and Vermaesen (2009) suggested that humanitarian organizations commit their resources for a limited period of time depending on their stakeholders' international assessment of mission needs. Humanitarian organizations, on the other hand, are often driven by the 'humanitarian principle'. They are wary of anything interfering with their freedom of action and their relationships with local communities.

### **METHOD**

The research philosophy of this study is epistemology, as it studies the reality and nature of what is actually happening. The research design of this research is exploratory and descriptive (Sekaran & Bougie, 2010). By referring to Sekaran (2003), a descriptive study is designed to describe the characteristics of some problem situation, while exploratory research is used when the topic is not well known or little information is available on the problem or research. This is where there is a need to conduct exclusive interviews with the relevant people to understand the phenomena. The research method of this study is limited to a qualitative design using interviews and focus group discussions. The focus group consisted of participants and a moderator leading the discussions. The sessions were conducted to obtain the infantry personnel's experience and efforts during flood disaster response. In addition, an interview was organized with the higher management officers who lead the region during flood disaster response. The interview aimed to gain additional and precise information on their experience during the flood disaster.

According to Sekaran (2003), the population refers to the entire group, events, or things of interest that the researcher wishes to look into. A purposive sampling technique was used to identify the Infantry Corp Officers who had experience involving in flood disaster response. The target group for this research is the Infantry Corp Officers which consists of three regiments, namely the Royal Malay Regiment, the Royal Ranger Regiment and the Border Regiment.



To ensure the validity of the interviews, a triangulation technique was applied. Triangulation was used in this research in that after every interview and focus group discussion, a summary was made and presented to the participants for confirmation. In addition, research ethics were emphasized in this research, which upheld strict ethical principles, including respecting the rights of respondents, informed consent, explaining the objective of the research to the respondents, assuring confidentiality and anonymity of respondents and getting respondent participation without coercion. All the information gathered by the respondents was treated with confidentiality and anonymity. Only generalized findings were released for report writing. Tape recorders were used with permission from the respondents and the data were interpreted and analyzed using open, axial and selective coding techniques. The data were subsequently analyzed and grouped into themes focusing on major issues pertaining to effective disaster response.

## **FINDINGS**

### **Command and Control**

Command and control is an important function in any disaster management. Command and control during the flood disaster in this paper is discussed in two categories. First, command and control at the military operation room level and upwards is the command and control at the state level. Command and control at the military operation room level was reported to be systematic, despite the many challenges being faced by the military personnel. However, command and control was autocratic and followed the military standard operating procedure. There is a proper leader with the appropriate command and control capabilities and minimal issues were encountered. Indeed, command and control of a disaster relief operation presents many of the same challenges as a combat-related crisis response contingency operation at a level of complexity and uncertainty that cannot be duplicated in a training exercise. The structural complexity created by different types of organizations having to operate, sometimes individually and sometimes jointly, to respond to an emergency in an effective way calls for advanced and adaptable management. In a major emergency, a single commander does not oversee the various resources. Moreover, in such a complex environment, bureaucratic as well as cultural differences come into play when the rescue services, the police, health care personnel, and the military all have to operate side-by-side with other official agencies such as NGOs (non-governmental organizations), politicians, the community, emergent groups, and other relevant agencies.

However, at the state level, command and control were seen to be somewhat unsystematic and lacking the proper leadership as well as command and control capabilities. During the flood that happened, the command center was not properly led by a capable person in charge. In any command and control center, the most powerful and influential leader of the state should be leading and managing the center.

In the military, command and control are more effective where they have the ability to control resources and the organization structure is clear, whereas at the state emergency coordination centre, there is no clear structure. Comments from the affected district indicated that there was no command and control at the state level. At the district level, the command and control was clear;

however, there was no clear structure at the state level. According to the district officials, the responsible department should lead the search and rescue operation; however, the department were confused about their task, roles and responsibilities during the disaster.

### **Communication**

During the recent flood, communication was cut off due to damages caused by the flood water. Effective communication is essential in any situation where people need to work together to solve problems; communication breakdowns can significantly impair this process. The consequences of a failure to achieve communication interoperability or of a breakdown in communication interoperability during disasters can be catastrophic. During disaster, communication problems often arise when dealing with information sharing with other agencies. This is because different agencies have different types of communication channels or systems in disaster situations, so it is very difficult to synchronize all the input and information coming in. Despite the availability of the Government Integrated Radio Network (GIRN), which was introduced by the government, this resource was not used: communications relied on personal phones and high frequency radio. Although communication did happen, for a number of reasons, people had difficulties in communicating with others outside their own organizations. In intra-organization communication, the military had no problems in communicating within itself; however, proper documentation and display of the information received and sent out was not achieved. Moreover, effective action in disaster situations requires the effective sharing and use of information, such as collecting, collating, analyzing, and then deploying it promptly and in a useful form.

### **Coordination**

Coordination plays a vital role in disaster management. During disaster response, no organization can work alone. Good coordination can help to reduce fatalities and economic losses. Flooding is nothing new, but even though the state government has planned ahead for prevention, the recent flash flood was an eye-opener. The military were prepared and ready to take up the task of disaster response; however, there were problems in terms of coordination at the operational level. There were no clear standing instructions and the officers were bewildered. There was no clear coordination between the military and other agencies, and everyone was busy doing their own tasks. For example, it was reported that an agency sent a drone to monitor the affected area, but the information received by this particular agency was not shared with other agencies or with the military. Therefore, the military had to send their own surveillance and equipment to get their own data and information. Effective coordination among various responders is critical to provide a successful disaster response, determine an appropriate division of responsibility and establish a framework for information sharing, policy agreement and joint planning.

### **Equipment and Logistic**

Equipment and logistic support is crucial during disaster response. One of the Army strengths is that it has ample manpower, capabilities and mobilization. However, during the flash flood, equipment, transportation assets, medical aids and relief supplies and others were insufficient. All the roads were underwater and the only modes of transportation accessible were boats and helicopters, which were

in short supply at that point in time. Private companies have a good understanding with the military and are always ready to allow the military to utilize their assets, such as boats, lorries and even helicopters. These assets are available to be used free of charge to carry food and supplies to the community. In one district, cooking utensils and water tanks were insufficient. The military overcame this problem with help from church groups, which provided cooking utensils and other necessary equipment to support the victims in the evacuation center. There was good support from NGOs, businesses, private companies and individuals. This supported the military logistic and assets and also helped to facilitate the flood disaster operations as long as the officers were available to coordinate the logistic. Effective logistic support is crucial in preventing frustration during humanitarian assistance and disaster relief processes. It is important to have strong logistic support so that the implementations are in compliance with regulations.

### **Human Resources**

Basically, the officers were given no formal training, but they were able to perform their tasks, as they were equipped with military training throughout their service and they maximized their knowledge and adapted it to the situation. Similarly, morale was high. While they are trained to fight in war, during peacetime it is their responsibility to assist in humanitarian aid and disaster response. Therefore, this type of operation does not deter their morale. Generally, the officers are motivated because they are helping the community and some of them feel that this is not merely part of their job, but more of a social responsibility to society. Thus, this increases their motivation, even if they have to work for more than 48 hours at a time. Most of them did not leave the flood area for more than a week; yet this did not decrease their motivation. The findings from this research highlight the need for the human resource function to adapt in a disaster, so as to foster prompt and sustainable recovery for individuals and the organization. Training, morale, motivation and safety of the personnel must be taken care of. Sufficient training or skills in disaster management are important to minimize the loss of human life and other assets. Lack of training will result in fears and anxiety among the agencies, as they will not know what to do first when disaster strikes.

### **CONCLUSION**

Effective disaster response and management is critical, as it can save lives and reduce damage. The finding shows that Infantry Corp is indeed somewhat ready in terms of its readiness for disaster response. Its command and control center is systematically managed. Communication was good, even though the military personnel had to use their personal mobile phones due to the failure of the Government's Integrated Radio Network. In addition, human resources mobilized for the disaster response missions were sufficient and they were committed towards their responsibilities in saving the lives of the community. Nevertheless, equipment required for the missions was somewhat insufficient. But, with the support and assistance of the NGOs and other groups, the military were able to effectively manage the flood disaster. However, inter-agency coordination is one of the weakest links in managing the disaster response and this can affect the overall effectiveness of the Infantry Corp's disaster response readiness. Hence, it is seen that despite the fact that the Infantry Corp are highly ready for effective disaster response, poor inter-agency coordination, inter-agency communication and inter-agency understanding of individual roles and responsibilities mean that



Infantry Corp Officers may not be fully effective in disaster response management, particularly in disasters on larger scales than those experienced to date.

The military's involvement in disaster response operations is a function of legal and normative principles, which can vary greatly from country to country. Moreover, recurrent disaster events have provided a historical basis for this engagement, leading to more or less clear acceptance of the following normative points: first, that the armed forces take policy direction from the civilian authority on deployment, activities, tasking, reporting procedures and timetables (including the withdrawal of troops from the site); and second, that disaster response, although a secondary military task, is nevertheless vital in meeting the military's strategic goals in the affected area. Hence, as asserted by Desch (1996) and Goodman (1996), the armed forces' participation in disaster response generates little controversy, largely owing to these normative meeting points. The use of information and communication technologies (ICT) in the form of a Knowledge Management System is recommended to support humanitarian assistance and disaster relief. This system will help decision-makers to make the correct and right decisions in a split second and improve the disaster preparedness, coordination and communication between federal, state and district levels. The provision of special allowances and incentives plays an important part in compliance with the implementation, which involves extra work not only in terms of work scope but also working hours. Monetary incentives play a key role in employee motivation (Rafikul and Ahmad, 2008). Based on the assumption that communication breakdowns in disaster situations are due, in large part, to technological barriers, one potential solution for reducing communication breakdowns might be to supply all agencies responding to a disaster situation with the same type of radio operating over the same frequencies. Hence, the state government and the Infantry Corp should be able to understand the issues underlying effective disaster response, so that a systematic operating procedure can be developed and shared with all relevant agencies.

Previous researches have looked at issues with disaster response and management in general and also focusing at community perception and awareness. The present work is targeting at identifying issues with disaster response focusing at infantry officers. This research introduces the concept that in any disaster response operations, having a structured and strong command and control structure is critical to ensure effective communication and integrated coordination. This is also supported by having skilled human resources, adequate equipment and logistic support for effective disaster response. This finding contributes to the extension in literature on the critical consideration of these factors. The attention on the importance of this results can contribute to policy makers in which policies related to disaster response and management framework can be reviewed and improved. The current MKN 20 framework is substantially not conforming to what is actually being practiced in reality during disaster response operations. Thus, subsequently contribute to improving disaster response management processes and managing officers' motivation and commitment during this critical situation. Ultimately, a structured framework and integrated processes can contribute positively to achieving disaster response goals. this research finding can contribute to national security, recognizing the importance of infantry officers and their roles in disaster response and management.

The limitation of this research is that it is only concentrated on a qualitative approach and focuses only on the flood involving Infantry Corp Officers. It is recommended that future research be conducted quantitatively and also that it should include all military personnel, including other ranks. Furthermore, future research should involve all parties and non-governmental organizations that are involved directly or indirectly in disaster response.

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