The role of effective contingency planning in managing extreme disasters in UAE

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Abstract:

The ability to manage extreme disasters of any type and their aftermath has been observed to be a challenge for government. This is because extreme disasters are known to disrupt and harm social, economic, business, human welfare and the environment when preparation for them are inadequate or ineffective. Complex, extreme or catastrophic events have inherent characteristics which put a considerable demand on time, communication and other forms of resources which are at times limited or unavailable. This shows that inadequate preparation for disasters can have significant impacts on the environment and people. While the scale of disasters and level of their impact are sometimes difficult to determine prior to their occurrence, it is still the responsibility of emergency organisations to prepare to manage them. The UAE and many countries in the world have had their share of difficulties manage extreme disasters. This is because extreme disasters become complicated quickly, unpredictable in scale and can impact many people at once. Thus this paper will analyse case studies of extreme disasters in the UAE. The paper defines extreme disasters and examines the capabilities of current practices in the UAE in responding effectively to them. Challenges, drivers and barriers will also be identified and critically evaluated. This will enable the paper to achieve its aim which emphasises the importance of contingency in UAE to manage disasters. The paper will benefit both academic and professional field of disaster and emergency management.

Keywords:

Contingency planning, Emergency Management, Extreme disasters, Planning, United Arab Emirates

Introduction

Incidents which have occurred across the world including the United Arab Emirates (UAE) in the last decade have put the disaster response arrangements to test. While some of these incidents have recorded fatalities, many had significant impact on the public and livelihood (Sylves, 2006). The response to some of these incidents have shown that it can be challenging to effectively manage and mitigate the impacts of large scale or complex incidents (Perrow, 2011), therefore emphasising the need to improve planning and ensure that response to all types of incidents is more effective

(Renn, 2008). Although many countries can boast of sufficient levels of expertise, equipment, communication and collaborative arrangement to manage any type of incident, the extent of impact some of these incidents have caused have proved that more needs to be done (Neef and Shaw, 2013). According to Neef and Shaw (2013) recent disaster reports have identified that factors such as time pressure, operational issues, and logistical infrastructure and insufficient capacity often hinder response to extreme events (Perrow, 2011). For example even though resources had been allocated and planning had been done for large scale hurricane in form of exercise, when hurricane Katrina made landfall in 2005 in United States of America (USA), the extreme way the disaster occurred overwhelmed all planning and resources (Sylves, 2006). The lessons learnt from Hurricane Katrina disaster suggest the need and importance of being better prepared for any unforeseen or extreme incident which might prove complex to manage or occur in unprecedented scale.

Therefore, the aim of this paper is to develop guidelines based on best practices which have been identified from case studies of extreme disasters evaluated in this research. The guidelines developed as a result of this research is expected to help UAE government authorities to manage extreme disaster through effective contingency planning. To achieve this aim, this paper analyses case studies of extreme disasters in the United States of America (USA), Japan and United Arab Emirates (UAE). The paper draws from existing literatures, reports and accounts of some of the extreme incidents in these three countries. The definition of extreme disasters are identified and clarified in through these literatures, while lessons drawn from these lessons also emphasised the need for contingency planning. In order to achieve the research aim, this paper is divided into four main sections which include a section on disaster management in general, another section on definition and case studies of extreme disaster. Subsequent sections focused on explanation and role of contingency planning in mitigating and improving response arrangement to extreme disaster and ways forward in managing future extreme disasters.

Disaster Management in General

Events which are hazardous are described in different ways and they can be considered as incidents, emergencies, disasters, accidents etc. depending on the number of organisations involves, coping capacities of organisations and the scale of the event (EMA, 1998). This is because disaster can be defined as an unplanned devastating event that causes severe damage to mankind, environment and which exceeds the capacity of local response but requiring external support from other countries to manage (Haddow et al, 2006). This as it may, EMA (1998) define emergency as any event, actual or imminent which endangers or threatens to endanger life, property or the environment and which requires a significant and coordinated level of response by two or more emergency agencies (EMA, 1998). It can also be an unplanned situation arising from accident or error, in which people and/or property are exposed to potential danger from hazards (EMA, 1998; Perrow, 2011). As such for several years, the argument between the difference between disaster and emergency is largely based on scales and impact (Rosenthal *et al.,* 2008) which has caused many countries with good emergency capacities to move more towards the usage of emergencies rather than disasters.

However the scale of some of the disruptive events has brought the term disaster more into frequent use in developed countries to emphasize the significant impacts of some events. This is considered the case in the United States of America (USA) and Japan who have experienced large scale or unprecedented scale of disruptive events in the last two decades. Irrespective of whether the foreseen hazards or imminent events are disasters or emergencies, the process for managing them are subjected to the same management process. This process is called emergency phases which are; mitigation (preventive or reduction), preparedness (readiness), response and recovery (rehabilitation) (Alexander, 2002; EMA, 1998). This phases are important to emergency and disaster management as a whole.

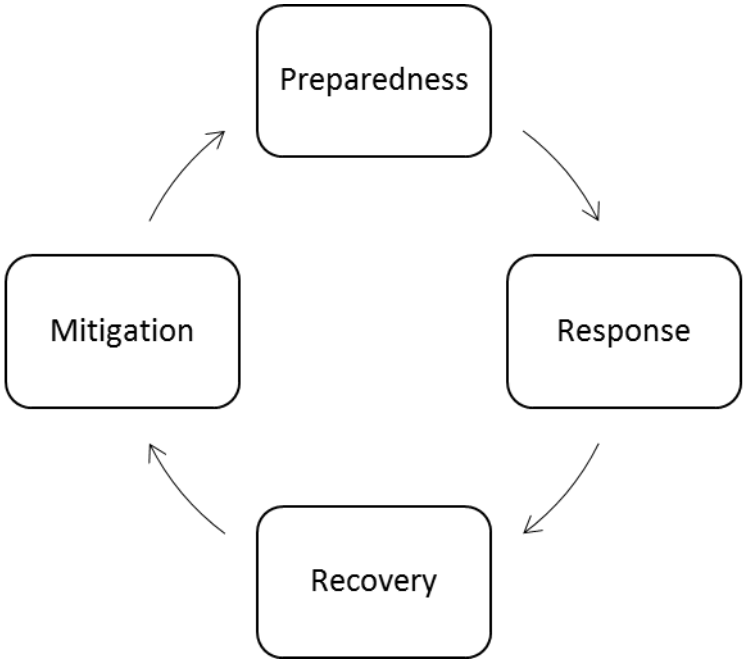

Fig. 1. **Emergency management cycle (adapted from Alexander 2002; Haddow et al 2006)**

This cycle shows that there are four phases which interact as a process that begins at any point in the continuum of the process (Haddow et al. 2006). However, usually measures are taken from the mitigation or preparedness phase to prevent an event or to reduce the impact of event which are foreseen to occur (Lindell et al. 2006). The preparedness phase involves the planning for various emergencies and the documentation of plans, procedures, and test of effectiveness of capacities to respond to foreseen events (Andrew and Carr, 2013). This phase is followed by response phase if the events occur and then the recovery phase will be based on the effort to resume formal activities. The impact of any event often determine if the recovery will be multi-stepped process with several other intermediate steps that will ensure eventual recovery (Alexander, 2002). This is probably why Lindell et al. (2006) states that after every event, the process should be started again with a post event evaluation which can help to improve mitigation and planning efforts.

This explanation suggests that emergency or disaster management cycle usually begins with mitigation and preparedness phase and ends with the need to improve planning efforts. According to Alexander (2002) and Haddow et al. (2006), the preparedness

phase entails a planning process which is collaborative and collective efforts through which agreement are reached and documented between people and organisations to meet their emergency management needs of the community. The preparedness phase also involve the formal documentation of a plan which contains the scheme of required responsibilities, actions and procedures assigned to emergency organisations in the event of any incident (Neef and Shaw, 2013). Thus, the preparedness phase is very important for effective response and for the occurrence of any event to be properly managed and mitigated (Boin and Lagadec, 2002). It can also be inferred that if this phase lacks coordination, which leads to assigning responsibilities, action and procedures for response, then events will have significant impacts (Eiser et al 2012). It is rational to conclude that if any event occurs on a scale which is unplanned for, or if it is unforeseen, or the event escalates rapidly as observed during extreme disasters, then response will be problematic. Therefore the emphasis for contingency planning and its need is influenced by the possibilities and evidence of events occurring in an unprecedented scale, in an extreme manner or unforeseen period of the year.

Extreme Disasters

Extreme disaster can be described as any event with initial physical phenomena like flooding, tsunami, earthquakes, terrorist attack, war, fire, motorway accidents etc. which is escalated by human components other than related to climate change that result in consequential physical impacts with severe outcomes on human, society and ecosystems (Ritchie 2004; Perrow 2011). It can also be described as a rare and usually very severe event with great magnitude which exceeds regular occurrence with impacts that overwhelms capabilities of regular emergency response organisations (EMA 1998). This explanation of extreme disaster eliminates the influence of human factors as the agent of escalation (Coombs, 2009), but emphasises the event itself as one which is rare and with greater magnitude than capacity of emergency organisations. Also, this explanation does not consider vulnerability as the influencing agent of extreme disaster as argued by Wisner et al. (2004), but considers such events as independent ones which occur in great magnitude, beyond expectation and exceeding the response capacity of emergency organisations. This explanation appropriately describes the extreme events such Hurricane Katrina (2005), highway collision (2014, 2013 etc.), Tsunami extreme disaster in Japan (2011) which has occurred in USA and Japan in recent years.

In 2011, an unusual chain of events occurred in Japan which illustrated the potential impact multiple hazardous events can have on a community and in developed economies. On March 11, 2011 a magnitude 9 earthquake shook north-eastern Japan which unleashed a tsunami and then resulted in a level 7 meltdown after the tsunami (Demetriou, 2011). Japan like many countries rely on nuclear power as source of energy, but the meltdown caused by the impact of the tsunami which occurred after the earthquake has left many homeless (Demetriou, 2011). Earthquake of such magnitude and a large scale tsunami were not expected in the northern region of Honshu, but a mere recognition of a big event by a handful of Japanese geologist a decade before the event occurred (Demetriou, 2011). The characteristics of the series of events as they unfolded demonstrates the catastrophic effect of extreme disaster which overwhelmed the capacity of emergency organisations and causing the death of thousands of people who died from drowning (Demetriou, 2011). A situation which emphasises better and more effective planning and response.

In a similar reaction, chain-reaction crash or multi-vehicle collision is motorway accidents involving many vehicles, but caused by bad weather condition (Pearce, 2012). Although chain-reaction crashes usually caused by low visibility conditions, they can also occur when there is good visibility (Pearce, 2012). However, most of the severe accidents have been caused by heavy fog, snow, dust storm, floods and heavy rainfall and have occurred frequently in different scales in USA and in different countries in Europe. In November 22, 2012, there was a chain-reaction crash in Texas USA caused by fog. The event involved over 100 cars, 100 people injured and 2 deaths (Pearce, 2012). While chain-reaction accidents are common in the USA, they occur in unpredictable scale depending on weather conditions and regardless of warning signals put in place.

The characteristics of the two events in Japan and USA suggest the need to have special preparedness arrangements in addition to regular preparedness measures for responding to extreme disasters should they occur and when they occur. These events occur on scales and magnitudes which are unprecedented or their impacts are unforeseen even when they are regular events due to severe weather conditions. While these characteristics indicate the predictable nature of extreme disasters, the difficulties of responding to them is yet to be better prepared for. Furthermore, the rate these events escalate, involving many people and cause vast impacts is generally acknowledged (Moynihan, 2008), but unfortunately the planning for them have not measured up to the required response capacities required.

Extreme Disasters in the UAE

In March 2014, the Abu Dhabi Police (ADP) operations received 2,156 traffic calls with 1,828 incidents in Abu Dhabi and 328 in Al Ain due to incidents caused by flooding from people living in Al Reef, resulting in traffic on Al Samha Bridge (Bell, et al. 2014). Similarly in January 2014, the police command room in Dubai received 2,198 calls between 5am to 2pm on rain-related incidents (KT Team, 2014). Although this incident resulted in the death of one person on Shaikh Mohammed Bin Zayed Road where flood water had accumulated, there were injuries to people and near misses. But more severely, in 2008 and 2011 there were motorway accidents caused by fog and low visibility. The 2008 incident which occurred in March and resulted in 3 deaths, 347 injured people and about 200 cars involved (Alshamsi, 2012). Although, the 2011 incident was less complex as the cars did not catch fire like that of 2008 incident, the 2011 incident however resulted in 1 death, 61 injured people and 127 cars (Alshamsi, 2012). Incidents of this dynamic nature have continued to occur in the UAE since emphasising the importance of contingency planning.

These series of incidents directly caused by bad weather or weather related issues have continued to cause planning and response concern for emergency services in the UAE especially ADP who take a lead on every emergency, crisis and disaster in the UAE. The pattern of extreme disasters in UAE also suggest the need for special preparedness and planning which can increase awareness, warn and response to them. Based on general observation of trends of incidents in UAE, it seems the incidents tend to escalate quickly in similar manner as those in US and Japan. While the disaster in Japan is due to large scale natural disaster which further triggered nuclear emission, and that of US is caused by severe weather such as snow or fog which resulted in multiple collision of cars, the

events in UAE is also caused by severe weather resulting in multiple car collision. Thus, extreme disaster as explained here seems to have similarity in terms of scales, unprecedented occurrence and/or mixture of natural and man-made incidents which make them complex to manage (Perrow, 2011). However, while snow, fog, earthquake and tsunami are common hazard events in US and Japan, rain and flooding are not common events even though fog is a common occurrence. This probably accounts for the high level of incidents which occurred in 2014 January and March due to rain and heavy flooding.

Contingency Planning

Contingency planning provides guidance for managing catastrophic events by defining who possess the capabilities, resources and ability to coordinate response to foreseen, unforeseen and extreme disasters (Knight 2001). Contingency planning is also considered as measures developed to prepare for and to react to possible event change which exceeds normal response efforts but whose impact can severally affect security, resources, assets, human and the society (Schneider 2004). These two definitions indicate the relevance of contingency planning for increasing preparedness for and response to extreme disasters. It also infers that contingency planning needs to be based on realistic parameters for response with detailed planning and preparedness (Choularton, 2007). An understanding of contingency planning is important because lack of understanding of its meaning, application and relevance can potentially lead to in effective response to an extreme event of disaster.

According to Choularton (2007), contingency planning has been confused with emergency preparedness and disaster management and as such, the adequate measures which need to be put in place for managing extreme events are omitted. Emergency preparedness is made up of activities which are put in place in anticipation of a risk, hazard or actual or eventual emergency to expedite effective emergency response (Choularton, 2007:p4). Within the context of this definition, emergency preparedness include contingency planning, but not limited to plans, exercise, training, organise and equip, review of plans, early warning, public education and information, etc. (Knight, 2001, Choularton, 2007). Therefore, contingency planning is often used to determine the scope and mechanisms for preparedness in respect to location, potential emergency and the type of organisations that needs to be partnered with to implement the contingency procedures (Boin and Lagadec, 2002). Consequently, the outcome of the contingency planning process leads to developing a contingency plan which is a document. According to Choularton, (2007) this document describes the procedures, response strategy, implementation process, operational support, and which formalises the commitments of organisations, equipment, and expertise to respond to extreme events.

Thus, the main difference between contingency planning and other types of emergency planning is that while emergency preparedness revolves around planning to respond to known emergency situation and identified risks, contingency planning is planning done based on predictions of previous events and assumptions about potential events which can have significant consequences (Choularton, 2007; UNHCR, 2011). So while emergency preparedness covers normal emergencies and incidents, contingency planning are central to ensuring that extreme events are adequately managed without causing any devastating impacts. The case studies have provided some insights into the characteristics of extreme events which can caused by natural hazards and compounded by human activities due to lack of contingency

planning and response. This lack of contingency planning is also evident in the UAE since many emergency events in the country in the past eight years has either escalated quickly or were extreme events.

Lack of contingency Planning in UAE

According to Knight (2001) and Choularton (2007) contingency planning is most effective when carried out along the parameters of a well-defined and functional emergency preparedness framework. According to FEMA (2015) emergency preparedness or planning frameworks presents an important progressive step which describes how levels of government, the private sector, nongovernmental organisations and the public in general work together to build and sustain the capabilities needed to prevent, protect, mitigate against and respond to the threats and hazards. Furthermore, framework informs processes which can be organised in order to improve a nation's preparedness efforts (FEMA, 2015). This is also called preparedness system which can be used to influence decision, activities and plans which are used as proactive approach to mitigate the impacts of all types of incidents (FEMA, 2015). According to Andrew and Carr (2013) preparedness efforts are ongoing efforts to ensure safety and collaborative planning which can ensure that risks are mitigated.

The emphasis on mitigation and preparedness and ensuring that preparedness efforts, plans, capabilities are effective and appropriate is due to the nature and complexity of incidents, disasters and emergencies (Perrow, 2011). Andrew and Carr (2013) and Perrow (2011) further state that in the current built environment, any incident can be challenging to manage without the back-up of any framework, systems or coordinated arrangement deployed by competent organisations. With this understanding, the legislative framework to guide emergency management practices are evident in the UAE, however there is no type of planning which fits the description of contingency planning in the UAE. While there are preparedness arrangement to respond to normal incidents (Bruins, 2000), the manner in which emergencies have occurred and escalated in the past decade in the UAE indicate the absence of contingency planning. Thus, the need for contingency planning which can be used to mitigate the impact of, prepare for and protect against and respond to the occurrence of extreme incidents when they occur next in the UAE as they have been occurring in the past decade.

The absence of documents referring and outlining the procedures for preparing for emergencies in general confirms the lack of preparedness framework as well as contingency planning. While there is a National Response Framework (NRF) (NCEMA website) which have been developed using the emergency management standard in the United Kingdom, there is no preparedness framework or cycle which guides the planning process. This major gap does not only limit effective planning for normal emergencies or incidents, but ability to initiate effective contingency planning process and develop a contingency plan. Therefore, the importance of contingency planning does not only justify its relevance to ensuring that extreme events are effectively managed, but has also helped to identify the gap with the preparedness phase in the UAE.

Roles of Effective Contingency Planning

In a world filled with ever-changing activities, emergencies and disasters have occurring any time due to a range of human error or factors to extreme acts of natural large scale hazards events (Haimes, 2009). The role of emergency and disaster planning in general

is to reduce the chances of these emergencies happening and if this cannot be done, the aim becomes to reduce their impacts on people and the environment to the minimum. While planning is based on identified and prioritised risks peculiar to certain areas, contingency planning can be generic in view of any emergency occurring on a larger scale or extreme complexity (Knight, 2001). Therefore, effective contingency planning is considered as a dynamic process which helps to determine which organisations to engage and how to engage them for both planning for and response to extreme disasters (Alshamsi, 2012). As explained in previous sections, contingency planning does not exist in isolation, but in relation to foreseen extreme events which may happen. Although UNHCR (2011) states that some scenarios might not occur, scenario-based planning which contingency planning ensures still helps to approach planning from a more operational perspective.

Essentially, contingency plan contains response strategies in addition to some basic concepts which can be activated or used to trigger mechanisms for emergency coordination and to determine what should be prioritised for more effective response to extreme disasters. Hence, contingency planning are process-driven, include regular updates but easy and simple to implement (Choularton, 2007). According to UNHCR (2011:p6), contingency planning process can be conceptualised into four basic steps

1. Preparation
2. Analysis
3. Response planning
4. Implementing preparedness

These basic steps links the role of effective contingency planning with ensuring that preparation involves coordinating and preparing for the process which analyses the context and scenarios which can occur. However, this can only be done by achieving the aim of emergency or disaster preparedness through readiness measures that can expedite response, rehabilitation and recovery based on timely and result-driven assistance for the target people (Alexander, 2002). This expected outcome provides a focus for the entire preparedness phase as a continuous process which is integrated from a wide range of activities and resources and which requires contributions of many different areas, inclusive of contingency planning.

Thus, while concept of preparedness covers measures aimed at enhancing safety when emergency occurs (Haddow et al. 2006), effective contingency planning helps to create a synthesis between preparation and analysis of hazards and risks of extreme events (Choularton, 2007; Alshamsi, 2012). A synthesis which is possible by identifying the triggers and early warning indicators of such events during the planning stage and being able to identify them when they occur (Birkland, 2006). This makes effective contingency planning crucial to response strategies and the coordination of arrangements and implementation of preparedness procedures. It is on the basis of the relationship between concepts of preparedness and contingency planning that response strategies are activated, so that responsibilities of response operations are well carried out in response to specified extreme events ((Birkland, 2006). However, being able to understand this relationship as well as the role of effective contingency planning is based on ability to

learn from patterns and dynamics of past extreme events and in-depth understanding of risks and hazard management in built environment.

Conclusions and way forward

This paper has examined disaster and emergency management in general. It has also drawn in the importance of preparedness phase and its concepts for ensuring public safety. However, the review of extreme disasters in Japan, US and UAE has helped to identify the need for more tactical type of planning for event of such nature and dynamics, hence the relevance of contingency planning. An evaluation of what contingency planning is and explanation of the component and basic concept of contingency has helped to emphasize the role of effective contingency planning for both preparedness and response phase. Although effective contingency planning is not an end in itself, it is a tool for enhancing response to extreme events which can be catastrophic in their impact. This paper has also stated the lack of contingency planning in the UAE, although the continued occurrence of extreme events in the US does not indicate the presence of contingency planning either.

However, this paper has been able to provide an understanding of contingency planning and the importance of having a contingency plan which is developed in anticipation of scenarios which need dynamic response strategy especially in the UAE. In view of progress, this paper has contributed to the field of emergency and disaster preparedness with more focus on better planning for extreme disasters and complex emergencies using contingency planning. It has also influenced the development of guidelines based on best practices which have been identified from case studies of extreme disasters evaluated in this research. The guidelines developed as a result of this research is expected to help the UAE government authorities to manage extreme disaster through effective contingency planning. Therefore the way forward for this research is to embark on the primary data collection which will provide more in-depth explanations of the current emergency preparedness practices in the UAE. Thereafter, a conclusion will be drawn from the research findings to determine the appropriate measures to take in the UAE so that response to future extreme disasters will be more effective and mitigate the impact on people, properties and the environment.

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