UNIVERSITY OF SALFORD MANCHESTER

SCHOOL OF THE BUILT ENVIRONMENT

Ph.D. Research

Developing an Improved Disaster Management Framework to Enhance Resilience in Kuwait

Main Supervisor: Dr. Chika Udeaja

Co-Supervisor: Dr. Damilola Ekundayo

Local Supervisor: Dr. Hanouf Alhumaidi

A thesis submitted in partial fulfilment of the requirements of the University of Salford - Manchester for the degree of Doctoral of Philosophy

By / Meshari Alfaras

No. @00404802

May, 2020

Abstract

Disaster management is considered as a priority worldwide where the aim of national governments has been to reduce the loss of life and properties. Different researchers and experts have tried over decades to develop several disaster management models, which is also known as disaster management life cycle (the phases). This has been used to support the emergency planners in understanding disaster management requirements for each phase. Despite all the efforts spent on developing a comprehensive disaster management model, disasters still cause severe damage globally. In Kuwait, the strategic disaster management committee lacks any clear disaster management standards and guidelines. This has resulted in citizens being exposed to different types of hazards and life threatening dangers. There are several factors which have caused the poor performance of crises management in Kuwait and some of the major factors include; a poor disaster management framework, lack of coordination, communication between key stackeholders, and outdated disaster management acts. The aim of this research is to improve the current disaster management framework in Kuwait, with a view to enhancing the government's preparedness throughout a comprehensive disaster management practices.

To better understand how this research will improve the current disaster management framework, it was thought necessary to scrutinise the experience from the strategic disaster management committee perspectives in uncompromised detail, which led to the use of interpretivism approach to develop theory from practice. Also, to this end a qualitative methodology was adopted with the aim of exploring how disaster management practices can be improved. The data collection mechanism used was a semi-structured interview carried out with 26 particpants from the strategic disaster management committee in Kuwait. The data analysis procedure was performed by combining the review of documentary evidence, cognitive mapping along with content analysis. In addition, a focus group technique was used for validating the final framework. These results showed that the current disaster management framework was limited because it lacked the following: acceptable disaster management model, scientific support, accountability of stakeholders in the disaster management and, most importantly, lack of any unified disaster management act. The author argues that this research has added significant empirical guidelines within the disaster management field. As a consequence of this, the study also formulated a theoretical understanding of disaster management by taking into account all phases of the disaster

management life cycle. It also incoporates the strengths of the local government through engaging with key strategic stakeholders who are able to understand disaster management models and needs. Finaly, this reseach can be used as a road map for emergency planning that can integrate theoretical factors in the disaster management model such as; the disaste management life cycle.

Acknowledgements

I would like to express my profound gratitude to the following persons for their contributions to this project:

The main supervisor of the research, Dr Chika Udeaja; the co-supervisor, Dr. Damilola Ekundayo; and the local supervisor, Dr Hanouf Alhumaidi, for their dedicated efforts, constructive criticism, guidance, support, thoughtful comments and encouragement, all of which led to the completion of this thesis. In addition, I would like to thank Dr Furat AlFaraj for his dedicated efforts and assistance in the thesis. I also appreciate and thank Lt. General Khaled Almekrad, the General Manager of the Kuwait Fire Service Directorate, for his continuous support during this research. As well, I would like to thank all the participants of the Civil Defence Committee for their help and time during the construction of this research and for providing information whenever requested. Finally, I would like to thank my family, especially my great mom and my wife for offering me a pleasant studying climate at all times.

Contents Page No.

List of Figures

List of Tables

Chapter 1: Introduction

1.1 Introduction to the Research

Disasters can be either naturally induced or caused by human activities. Naturally, disasters can happen anywhere and while their occurrence cannot be prevented, their impacts can be mitigated. Natural disasters can lead to the loss of life, the destruction of property and an economic loss to a country as a whole. The vulnerability factors of the affected areas and people increases the impact of these hazards. Therefore, there is a requirement for a way to effectively manage disasters that occur due to the results of natural hazards (e.g., earthquakes, floods, vegetation fires and storms). Governments and institutions have developed various ways to identify these hazards and form structures for mitigating their impact. This is done through risk assessment procedures and various Acts that enforce these procedures. These procedures vary from country to country.

According to the World Disaster Report (2014), the number of natural and manmade disasters for the years between 2004 and 2013 is estimated to be more than six thousand. These disasters have killed 1,059,072 people while 1,997,932 more were affected causing $1,669,626 million (US dollars) in economic losses (World Disaster Report, 2014). In previous years, the report from the United States Agency for International Development (US-Aid, 2011) mentioned that emergency leaders and communities were dealing with disasters during and after their occurrence (US-Aid, 2011). Today, a new culture has been introduced and more development has been accrued through the science of disaster and emergency management.

To enable communities to prepare for emergencies, this requires identifying resources and planning how these resources can help during disasters. However, preparedness is only one phase of disaster management. According to Nojavan et al. (2018), researchers and agencies proposed different models for disaster management. These models provided efficiency in some locations, for instance, a model or a theory proposed by the Federal Emergency Management Agency (FEMA, 2014) which consists of four different phases of disaster management: mitigation, preparedness, response and recovery. All of these can be used to minimize loss caused by disasters and promote resilience for the communities who have suffered from a disaster. These four phases (Figure 1) comprise what is known as “the disaster management life cycle (FEMA, 2014)” and is used by different countries/agencies when preparing for disasters and emergency management, Nojavan et al. (2018).

Figure 1. The Disaster Management Life Cycle. From (FEMA, 2014)

According to the Federal Emergency Management Agency (FEMA, 2018), mitigation includes activities that either prevent an emergency, minimizes the probability of an emergency, a disaster occurring, or that reduces the effects of unavoidable disasters. The preparedness phase includes planning or preparing to save lives and to assess response and rescue missions. Bronfman et al., (2019) state that the response phase includes actions to provide emergency assistance which saves lives and reduces damage to properties during a disaster. The response phase, according to Alexander (2016) takes place immediately before, during and directly after a disaster and it includes activities such as warning, searching and rescuing, dealing with fires or hazardous materials as well as dealing with casualties and survivors.

FEMA (2018) notes that the recovery phase takes place after the emergency and includes the actions taken to return the area back to normal after a disaster. It includes two phases: immediate phases (damage assessment, debris managing, investigation, the restoration of essential supplies and services) and long-term recovery (continuing treatment for survivors, reconstruction of infrastructure, buildings and services; and identifying actions that could reduce the effects of future disasters).

According to Coetzee & Niekerk (2012), the 'phases' concept has been used by researchers since the 1930s to describe, examine and understand disasters and help organise the practice of disaster management. Before the four phases (Figure 1) became the standard, Carr (1932) had used and described various disaster phases such as; the preliminary period phase, the dislocation and

disorganisation phase, the readjustment and reorganisation phase and the confusion-delay phase (Coetzee & Niekerk, 2012). Powell (1954) used seven different phases to describe the disaster management life cycle: pre-disaster phase, warning phase, impact phase, inventory phase, rescue phase, remedy phase and recovery phase. Stoddard (1968) also used seven different phases: pre-emergency phase, emergency phase, warning phase, threat and evacuation phase, dislocation phase, relocation phase and post-emergency phase. Inspite of all legislations enacted with regards to disaster management in the Kuwait, the disaster management system is still dire due to many factors including but not limited to: improper fund allocation, lack of an 'identifying' phase pinpointing the types of disasters, and reactionary rather than precautionary measures that actually prevent or reduce impacts of disasters (Satish, 2013).

The author has seen existing models with the term 'pre-disaster phase', developed by Powell (1954), which can be described as 'identifying' existing hazards which could threaten a specific location. Neal (1997) suggested that disaster researchers and disaster planners needed to reconsider the use of disaster phases, which furthers McEntire's (2014) argument that disaster research needs further theoretical development. If disaster life cycle is added to the current Disaster Management Framework in Kuwait, planners would be able to immediately opt for proper measures in a particular disaster if and when it takes place. Furthermore the current Disaster Management Framework in Kuwait does not highlight any specific procedure or action, such as risk assessment, that should be carried out to identify hazards which could cause harm to the country. There is also a lack in terms of using a specific disaster management standard, such as the disaster management life cycle, which would be used to manage and address each phase of a disaster.

Moreover, the author of this research believes that the model shown in (Figure 1) cannot support the emergency planners in Kuwait due to the lack of guidance that illustrates the importance of identifying the hazards which could cause harm to a nation or a community. Therefore, the author of this research has revised the current disaster management life cycle as shown in figure (2), to examine how it will function in term of identifying all hazards compared to the existing one (Figure 1), and it will be illustrated in more details in the next chapter (2). The revised 'identifying' phase in (Figure 2) shall pinpoint all types of disasters; natural and manmade. The previous narrative is a diagnosis of the status of the disaster management lifecycle based on the researchers experience as an emergency planner in Kuwait. The following (Figure 2) highlights the revised disaster management model/ life cycle described in this research.

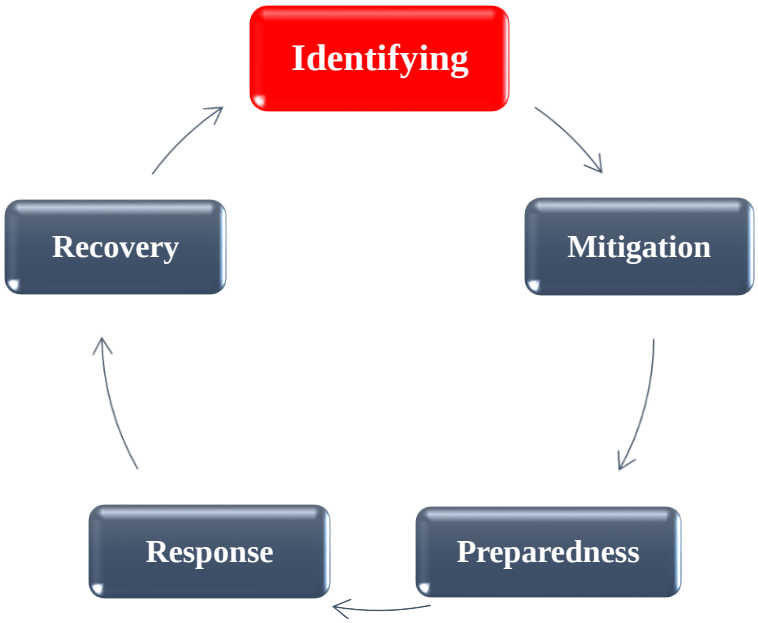


Figure 2: The Disaster Management Life Cycle Improved in this Research

In the researcher's view – and as observed from the initial review of Hamza's (2013) work, entitled "A role model for the Middle-East and beyond", that due to the rise of regional and sectarian conflicts in the Middle East, there are vital factors which need to be addressed and improved (e.g., the need for identifying regional hazards). According to a United States Agency for International Development (US-Aid, 2014) report, the US-Aid had come up with a five-year country development cooperation strategy. Part of this strategy provides assistance for middle-income countries to prepare a five-year development plan which is aimed at enhancing their ernegy production through nuclear power plants. These strategies, however, did not provide agendas to deal with adverse effects of technological hazardous risks related to nuclear power plants and hazardous material released from factories, which could affect countries in the region as well as Kuwait . In addition, Irfandhi (2016) noted that only some technological risks can be identified and, with the rapid development of technology in the industrial sectors of most countries, this needs better planning along with aldditional rules to help minimize risks involved with technological advancements. The globalization of technological hazards will produce a higher-risk-driven society (Gencer, 2013).

The author's main purpose of the research is to identify the different and evolving types of hazards and disasters, in the country of Kuwait in order to avail comprehensive Disaster Management

Framework that is readily available for use by planners and emergency responding teams alike, and that lessens the impact of such hazards if and when they take place.

Without any necessary details of resilience that would enable planners to properly prepare and emergency teams to properly respond to such hazards, there would always be a deficit in terms of suitable hazard risk assessment, preparedness, up-to-date disaster management acts, and suitable disaster management frameworks all of which are necessary for proper planning and action taking.

1.2 Background of the Research

Haddow et al., (2011) noted that there is no country in the world that is immune to and safe from possible disasters. All countries, and Kuwait in particular, need to be able to mitigate disaster risks and have sound critical emergency management strategies. Zanon (2014) states that there is a major trend of disasters in the Middle East region in general, due to rapid urbanization rates. At the same time, Hamza (2013) states that Middle-Eastern countries lack disaster management plans and disaster resilience. In reviewing the current distribution of the urbanisation areas in Kuwait, there is a lack of action or planning that addresses the land use in the country with only four per cent of the entire land considered as an urban area. This accommodates 96% of the total population density in the country (PACI Report, 2011). This situation is now highlighting a new crisis in Kuwait due to the high density of the population living in small urban areas, which has caused roads to be shut down due to over-crowding (KUNA, 2018). Lima et al., (2013) argued that the amount of impact due to a disaster is linked with the amount of people living in the same vulnerable area, taking into account the emergency response time with these overcrowded roads. This confirms that the current disaster management is not suitable and needs to be improved due to the lack of continuous assessment being conducted by the emergency planners in the country. Therefore, (the International Atomic Energy Agency IAEA, 2015; The United Nation Office for Disaster Risk Reduction UNISDR Report, 2015; and the World Bank, 2013) are offering assistance to enhance Kuwait's knowledge of disaster and emergency management science.

According to the Natural Disasters in the Middle East and North Africa report (2014), the main reason the number of disasters can increase in Kuwait is that the country does not carry out hazard risk assessments, which are designed to identify hazards, risks and vulnerabilities that could threaten citizen welfare, property and the environment. This was also confirmed in January 2017

when Kuwait assigned and nominated the author of this research to be a representative with the UNSDR, tofollow up and implement the Sendai Framework for Disaster Risk Reduction in Kuwait. This happened after the third international conference on disaster risk reduction in March 2015, in Sendai, Japan, which was attended by more than 170 countries worldwide. The main requirements of the Sendai Framework is that the countries participating in the international conference, should improve the disaster management processes to reduce the impact of a disaster. This was to include: establishing a national disaster management strategy, national disaster management plan, disaster management framework, disaster statistics and disaster risk management plan or plans.

Unfortunately, there is a lack of evidence that shows Kuwait has such documents, or sufficient documents to reduce the impact of a disaster. Therefore, the author of this research is focusing time and effort with different stakeholders from government and non-government agncies in Kuwait in order to fill this gap. Moreover, Kuwait lacks knowledge in terms of disaster and emergency policies and legislation. For instance, in May 1979, the Act No. (21/1979) was established by His Royal Highness Sheikh Jaber Alahmad Alsabah; this Act forced the Ministry of Interior in Kuwait to establish the Civil Defence Department Act (21/1979).

According to Raikes and McBean (2016), all levels of government must be involved in emergency management. The (21/1979) Act consists of (14) articles which describe the aims and objectives of establishing the Civil Defence Department. Article 4 of the (21/1979) Act requires the minister of interior to establish a committee to manage all disasters which should consist of representatives from 13 local authorities in Kuwait. In November 1997, approximately 20 years after the 1979 Act, Order (897/1997) was established by the minister of interior in Kuwait. This order was to set up the Civil Defence Committee (Table 1) and it described the formation of the Civil Defence Committee which specializes in the arrangement, planning and preparedness for all disasters in Kuwait, chaired by the minister of interior. This Committee identified (13) disaster scenarios that are labelled 'disaster hazards' in Kuwait (Table 2).

Table 1: The Civil Defence Committee Members (Order 897/1997)

No	The Agencies	No	The Agencies
1	Ministry of Interior	8	Ministry of Public Works
2	Ministry of Commerce and Industry	9	Kuwait National Guards
3	Ministry of Defence	10	Environment Public Authority
4	Ministry of Water and Electricity	11	Ministry of Municipal
5	Ministry of Health	12	Kuwait Fire Service Directorate
6	Ministry of Transport	13	Kuwait Red Crescent
7	Ministry of Media	-	----------

Table 2: The Nominated Disaster Scenarios in Kuwait. (Order 897/1997)

No	The Emergency and Disaster Case	The Arrangements
1	Military Aggression	Not Available
2	Limited Military Attack	Not Available
3	Rocket Attack	Not Available
4	Chemical Weapons Attack	Not Available
5	Aeroplane Crash	Not Available
6	Building Collapse Trapping People	Not Available
7	Earthquakes	Not Available
8	Full or Partial Interruption of Electricity	Not Available
9	Full or Partial Interruption of Water	Not Available

10	Large Petrol Ship Fires	Not Available
11	Leakage of Toxic Gases	Not Available
12	Epidemic	Not Available
13	Floods, Storms and Heavy Rains	Not Available

As shown in (Table 2) above, technological hazards, such as a Nuclear Power Plant, were not considered as a disaster hazards. In addition, terrorism in the Middle-East is another important manmade hazard which was not considered.

According to the Global Risk Identification Programme (GRIP, 2009) report, the European Commission adopted a communication on a community approach to the prevention of natural and manmade disasters in February 2009; this sets out an overall disaster prevention framework and proposed measures to minimize the impact of disasters. The communication advocated the development of the European Union and national policies using aspects of the disaster management life cycle: prevention, preparedness, response and recovery. The council concluded that a community framework on disaster prevention were adopted by the European Union in November 2009. It emphasized that hazard risk identification and assessment, disaster impact analysis, risk scenario development, risk management measures and regular reviews of disaster risk reduction should all be major components of the European Union disaster prevention framework, and of prevention policies at all levels of government (GRIP, 2009). Accordingly, the European Commission has worked on an agenda for action and published the European Union Guidelines for National Risk Assessment and Mapping in 2010. It has become mandatory for European Commission member states to conduct national risk assessments and create comparable national risk profiles.

The European Commission recommended the identification of all major natural and manmade disaster risks which the European Union may face in the future. This should take into account (where possible) future impacts and identifications on the basis of the overview of risks or types of risks that are shared by member states or regions in different member states (GRIP, 2009). Therefore, it is highly recommended that countries in the Middle East adopt a unified system, similar to the one adopted by the EU, in order to identify and share information regarding regional hazards.

According to the Guide to Risk Assessment in Major Emergency Management (2010), risk assessment refers to finding the best practice to be used nationally and internationally when preparing for a disaster. The Framework for Major Emergency Management (2006) adds the terms 'hazard analysis' and 'risk assessment' to the emergency management life cycle to ensure an integrated approach to emergency management. This is the process by which the hazards facing a community are identified, analysed and assessed in terms of threat and risk level. However, the long-term national and international hazard management is not considered in the Framework for Major Emergency Management (2006). Unfortunately, Kuwait's lack of suitable risk assessment procedure or standard is considered a priority for starting the disaster management process. At the same time, the current Disaster Management Framework and Acts did not include or mention the term 'risk assessment' or which agency or agencies should be enforced by the Act to conduct disaster or hazard risk assessment. This currently leads to the hazards identification process running randomly.

In 1982, Act (36/1982) was established by the Council of Ministers in Kuwait with announcing that the Kuwait Fire Service Directorate was to be an official agency responsible for the protection of lives and properties from fire and natural disasters in Kuwait. Article 1 of the (36/1982) Act states that the Kuwait Fire Service shall provide protection for civilians and properties from fires and natural disasters only; the term 'technological manmade disasters' is not mentioned. The Kuwait Fire Service, however, has a professional station called "Mubarak Alkabeer" which is responsible for responding to all hazardous material accidents Kuwait Fire Service Directorate (KFSD, 2015).

Moreover, the 1982 Act does not require the Kuwait Fire Service to conduct hazard risk assessments or to identify hazards, risks and vulnerabilities which could affect the public, properties and the environment in Kuwait. The overlap and the duplication of disaster management regulations between the Civil Defence Department in the Ministry of Interior and the Kuwait Fire Service Directorate causes confusion in terms of which the agency should have the right to manage a disaster in Kuwait. Anajar (2015), however, mentions that the Civil Defence Department has less capability than the Kuwait Fire Service in terms of manpower and logistics, having only 40 police officers, which is insufficient in providing adequate services during major emergencies or disasters in Kuwait.

Therefore, the Civil Defence Department, along with different agencies, such as the Ministry of Defence, the Kuwaiti National Guards and the Kuwait Petroleum Company, all serve as a backup for the Kuwait Fire Service Directorate during major natural and manmade disasters in Kuwait. This confirms, what Man Ha & Mun Oh (2014) stated in their research that emergency agencies focus only on the response phase of a disaster, resulting in poor overall disaster management.

In general, there is a lack of understanding why the government in Kuwait established different Disaster Management acts such as the Fire Service Act, the Civil Defence Act and the Environment Act, and why these Acts are not linked to the current Disaster Management Framework. At the same time, none of these Acts enforce a specific agency or agencies to conduct hazard risk assessments. Therefore, this research investigates different practices with the ai m of improving the current Disaster Management Framework and Acts in Kuwait.

1.3 Research Problem

As discussed in the research background above, there is a lack of up-to-date disaster management legislation in Kuwait, along with poor hazard identification process and a lack of risk assessment procedures. This, in addition to, the major 'identifying' gap in the Disaster Management Lifecycle has left the population of Kuwait susceptible to disastrous technological hazards, such as a Nuclear Power Plant and other natural ones such as earthquakes due to lack of proper building codes, Al-Fahad (2012), as well as terrorism hazards. The author of this research attempts to add an 'identifying' phase that includes all types of disasters and hazards, natural and technological, to the current Disaster Management Lifecycle. Should this model prove successful, it could be carried out in other regional countries to improve their disaster management response. One of the major technological threats bordering the country of Kuwait is the Iranian Nuclear Power Plant, located approximately 270 km from the Kuwaiti Capital, across the Gulf Coast (Figure 3). This technological hazard needs to be addressed by the Kuwait Government to reduce potential risks associated with it. This is especially important when considering the number of terrorist activities in the Middle East and Gulf Cooperative Countries, as well as the rapid urbanization and the increase in population density within the region.

According to the Nuclear Threat Initiative (NTI, 2013; the Ayatollah's Nuclear Gamble report, 2012; and Peterson, 2012), the Iran Nuclear Power Plant at Bushehr is considered to be a

disasterous hazard for the overall region and has caused several problems since its establishment (and even caused some problems during its construction). The NTI report (2013) notes that, during the Iran-Iraq War from 1980 to 1988, the plant's reactors suffered severe damage from Iraqi bombing air raids. After the war, the German construction company responsible for the rebuilding of the plant refused to rectify the damage due to extreme diplomatic pressure exerted on Germany from the United States. Later, Russia agreed to rebuild the reactor and between 2007 and 2008, Iran received a lot of fuel from Russia for the initial fuel-loading of the Bushehr Nuclear Power Plant; the pre-start tests took place in 2009 and 2010.

Figure 3: Distance between Kuwait and the Iranian Nuclear Power Plant. (Google Earth, 2015)

As stated by (Ayatollah's Nuclear Gamble, 2012; and Peterson, 2012) , in 2011 the International Atomic Energy Agency informed Iran that the Nuclear Power Plant's fuel would have to be removed due to damage that had occurred in the cooling pump which was affecting the cooling system. It was also speculated that a computer virus had caused damage within the facility. During April 2011, the fuel was reloaded into the reactor. As noted in an NTI report (2013) the Iranian Nuclear Power plant was generating 700 megawatts of electricity in 2012. The NTI report (2013) also states that, in 2013 an earthquake with a 6.3 magnitude on the Richter scale hit the southwest region of Iran, close to the Bushehr region. An electric generator malfunctioned and "long cracks" in one section of the power plant structure were reported. Moreover, the same NTI report notes that the reactor was found to be shut down during an inspection by the International Atomic Energy Agency in May 2013. This raises the argument that the shutdown was due to the earthquake, (NTI, 2013).

Peterson (2012) describes the nuclear power plant at Bushehr as a risk of catastrophic proportions, which could affect the whole region, similar to the Chernobyl disaster in 1986, due to a lack in safety . Peterson also states that casualties in the region could easily exceed tens of thousands, with financial damage between 200 and 300 billion US dollars. The wind direction from east to west in the Arabian Gulf, along with the coastal currents that circle counter-clockwise, would spread the damage to most of the Gulf Cooperation countries. All of this means that Kuwait is currently facing a possible major external disaster hazard. Different hazards were presented, for instance (Bou-Rabee and Nur, 2002; Nissen et al., 2011) who stated that the Zagros folded belt (Figure 4) and the Makran subduction zone (Figure 5) in south-western Iran can introduce high earthquake activity that could reach a magnitude of 7 or greater on the Richter scale, increasing the level of risk for most of the Gulf Cooperation Countries and Kuwait in particular.

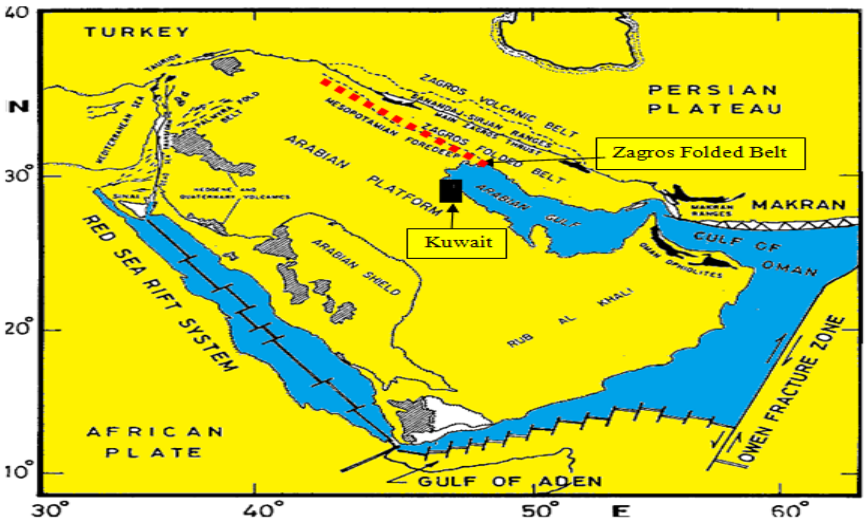


Figure 4: Location of Zagros Folded Belt. From (Sadek, 2004)

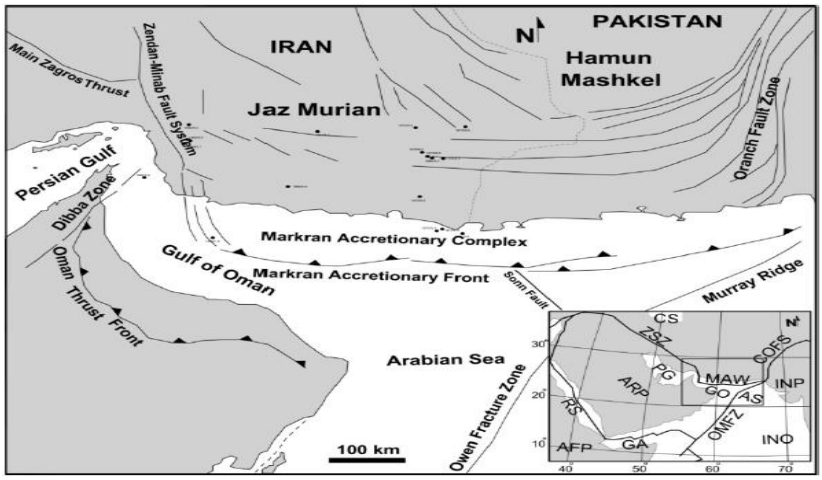


Figure 5: Makran Seduction Zone. From (Mokhtari, 2011)

In terms of manmade disasters, Hamza (2013) states that the world views the Middle East as a region flooded with terrorism. According to the British Broadcasting Company (BBC News, 2015), the last terrorist attacks in Kuwait occurred on 26 June 2015. The attack was in a Shia mosque in Kuwait, when a suicide bomber killed 27 people and injured 227 more. This attack was linked to the Islamic State extremists, (BBC News, 2015).

In light of the impact of the Chernobyl Nuclear Power Plant disaster in 1986, which affected most of the European countries, if a strong earthquake, terrorist activity, or war breaks out near to the Bushehr Nuclear Power Plant, most of the Gulf Cooperatione Countries, and Kuwait in particular, would be at serious risk. There have been many research and publications concerning disaster management published by different organisations. Previous publications within the field of emergency management, for instance, (Wisner et al., 2003; Alexander, 2016) have pointed out to aspects of the emergency management life cycle. A UNDP report (2010) highlighted disaster hazard, risk, risk assessment, impact, vulnerability and the likelihood of determining emergency management priorities.

The *Hyogo Framework for Action Plan (2005/2015*) (HFA) also, aims to reduce disaster risks. National and local priorities should be given to identifying, assessing and monitoring disaster risks; enhancing and implementing early warnings; using knowledge, innovation and education to build a culture of safety and resilience at all levels. The integrating of organisations into action relating to emergency management has been studied by Fiedrich (2013). With regards to publications on the situation in Kuwait, a survey carried out by the World Bank (2013) identified that risk management profiles in Kuwait were insufficient due to a lack of risk management procedures.

In the other hand, the need for seismic risk and vulnerability assessment in Kuwait and other Arabian Gulf countries has been recommended bymany organizations such as Joint Research Centre (Bou-Rabee, 2004; Joint Research Centre, 2016). Some kind of long-term planning methodology, such as the *Hyogo Framework for Action Plan 2005/2015*, has been followed by most countries in the world to mitigate the impact of disasters (Hyogo Framework for Action Plan, 2005/2015). However, the development of plans concerning regional hazards, such as the Iranian Nuclear Power Plant at Bushehr, has not been considered in many countries, nor has the management of the random and fast urbanisation in Kuwait.

Hence, the author will adopt the "identifying phase" within the disaster management life cycle aforementioned in (Figure 2) to diagnosis the current status of the disaster management, in term of the lack unidentified hazards, and to examine how identification will enable the author in validating a hazard data base for Kuwait. Most of the emergency management procedures used worldwide have involved only mitigation, preparedness, response and recovery. Very little consideration has been given to the specific identification and study of external hazards (FEMA, 2018), especially those that have arisen from the development of technology (e.g., the Iranian Nuclear Power Plant, which put most of the Arabian Gulf Region at risk). This research, therefore, attempts to fill this knowledge gap with providing a recommended methodology for identifying disaster hazards, as well as improving the current Disaster Management Framework in Kuwait. The first research problem investigated in this study is to capture the existing exposure and vulnerability to hazards affecting Kuwait. In addition, this study attempts to improve the current Disaster Management Framework for Kuwait, which can meet the emergency management goals. Furthermore, the research provides a recommended process for achieving the integration of a Disaster Management Framework in Kuwait along with integrating policies as per the disaster management life cycle.

1.4 Research Questions, Aim and Objectives

1.4.1 Research Questions

Section 1.2 above described the background of the research in which pertinent issues were raised and discussed. Based on that, the following research questions were raised:

1. Why are the current Disaster Management Acts and framework inappropriate in Kuwait?
2. How can the improvement of the current disaster management framework support the local government in Kuwait with risk reduction?

1.4.2 Aim

The aim of this research is to improve the current disaster management framework in Kuwait, with a view to enhance the government's preparedness and response using comprehensive disaster management practices.

1.4.3 Research Objectives

To achieve the aim of this research, this includes the following objectives:

1. To explore disaster management concepts and principles and to establish existing disaster management life cycles
2. To design a conceptual framework which will explore the current policies and evaluate strengths and weaknesses of the disaster risk management in Kuwait.
3. To formulate a strategy for improving the disaster management life cycle for Kuwait.
4. To develop an improved Disaster Management Framework for Kuwait.
5. The validate the framework of objective (4)

1.5 Research Methodology - General

To better understand how this research will improve the current disaster management framework, it was thought necessary to scrutinise the experience from the strategic disaster management committee perspectives in uncompromised detail, which led to the use of interpretivism approach to develop theory from practice. Also, to this end a qualitative methodology was adopted with the aim of exploring disaster management practices can be improved. The data collection mechanism used was a semi-structured interview carried out with 26 particpants from the strategic disaster management committee in Kuwait. The data analysis procedure was performed by combining the review of documentary evidence, cognitive mapping along with content analysis. In addition, a focus group technique was used for validating the final framework. The author analysed this data through a cognitive mapping, content and gap analyses.

The data gathered from the interviews, along with the results, are analysed throughout the content analysis process. In order to answer the research questions, the method adopts an archival strategy that evaluates the current disaster hazards identification procedure, disaster management background, policies, risk assessment policies and the Disaster Management Framework in Kuwait. In order to illustrate the research methodology, the author applied the onion research model, which was originally developed by Sanders et al. (2009). The onion model is discussed and illustrated in more detail in the research method section (Chapter 5).

1.6 Scope of the Research

This research focuses mainly on the process that enables and assists with disaster management in Kuwait at a strategic level, for instance the Civil Defence Committee, to improve the country's current Disaster Management Framework while using a systematic risk assessment procedure which is supported by policy and is required for identifying and managing disasters.

The focus of this research also capitalizes on improving the disaster management life cycle, or the different phases of the disaster management. In addition, this research contributes to the improvement of the current disaster management life cycle by adding an 'identifying' phase, which is aimed at enhancing and clarifying how all types of disaster hazards can be determined more effectively.

1.7 Structure of the Research Chapters

Chapter 2 includes a general literature review focusing mainly on disaster management and which defines terms used in disaster management, highlights the disaster management life cycle and the terms used (e.g., mitigation, preparedness, response and recovery). In addition, this chapter discusses different Disaster Management Frameworks that have been used in different countries, as well as stressing the importance of disaster education.

Chapter 3 includes a further literature review, focusing mainly on the current disaster management processes and procedures in Kuwait, highlighting current disaster management stakeholders and the existing Disaster Management Acts and policies. The chapter also reviews the disaster response procedure in Kuwait, evaluating how the current disaster management processes operate, their outcomes and, finally, whether they are suitable for ensuring that all hazards are identified and managed properly.

Chapter 4 highlights the developed conceptual framework for this research, illustrating the author's processes that were used to answer the research questions. The developed conceptual framework consists of three different parts. Part one covers the areas being evaluated, for example, current disaster management processes and procedures.

In addition, this chapter highlights the existing Disaster Management Acts in Kuwait and examines how the current Disaster Management Framework supports the country's disaster management practices and outcomes. In addition, this chapter explores the effectiveness of Kuwait's hazard

identification procedures. Part two of the conceptual framework highlights the generation processes used by the author to achieve the outcome of this research.

The different terms that the researcher hopes will improve the current Disaster Management Framework and practices in Kuwait are discussed. Part three of the framework discusses the outcomes of this research and how the research can be applied to improve the current Disaster Management Framework in Kuwait.

Chapter 5 discusses the research methodology and data collection procedure used. The data collected was mainly secondary data such as scientific books, journals, published works on the research area, etc. Furthermore, the author conducted twenty six interviews with all the participants of the Civil Defence Committee, which is the highest strategic disaster management body in Kuwait. This was to acquire unpublished data on the research area and to test the validation and verification of the final framework in this research. The data analysis procedure was performed by a deep review of literature, cognitive mapping and by content analysis.

Chapter 6 focuses on the analysis process which contains both the analysis of the data gained throughout the pilot study (which was conducted by the author to test aspects of the interview, such as time and procedure) and the analysis of the data observed throughout the 26 interviews with the Civil Defence Committee members who participated in this research. The data gained from the pilot study was analysed by a cognitive mapping analysis procedure and the data gathered from the interviews with the Civil Defence Committee members was analysed throughout the content analysis process.

Chapter 7 illustrates the final framework, including a brief which highlights the rights of managing disasters in each country. The chapter also discusses the terms used by the author in the designed conceptual framework and how it helps to validate the final framework. Chapter 8 discusses the validation of the recommended framework, highlighting the process used to validate the recommended framework through different methods, such as local and international support.

Chapter 8 also highlights the verification process, which was carried out primarily through the interviews with the 26 members of the Civil Defence Committee in Kuwait.

Chapter 9, the final chapter, includes research conclusions, which highlight the summary of this research, the work undertaken by the author, the researchers contribution to the knowledge, its

limitations and a discussion of recommended work for the future. Figure 6 overleaf illustrates the research flow chart.

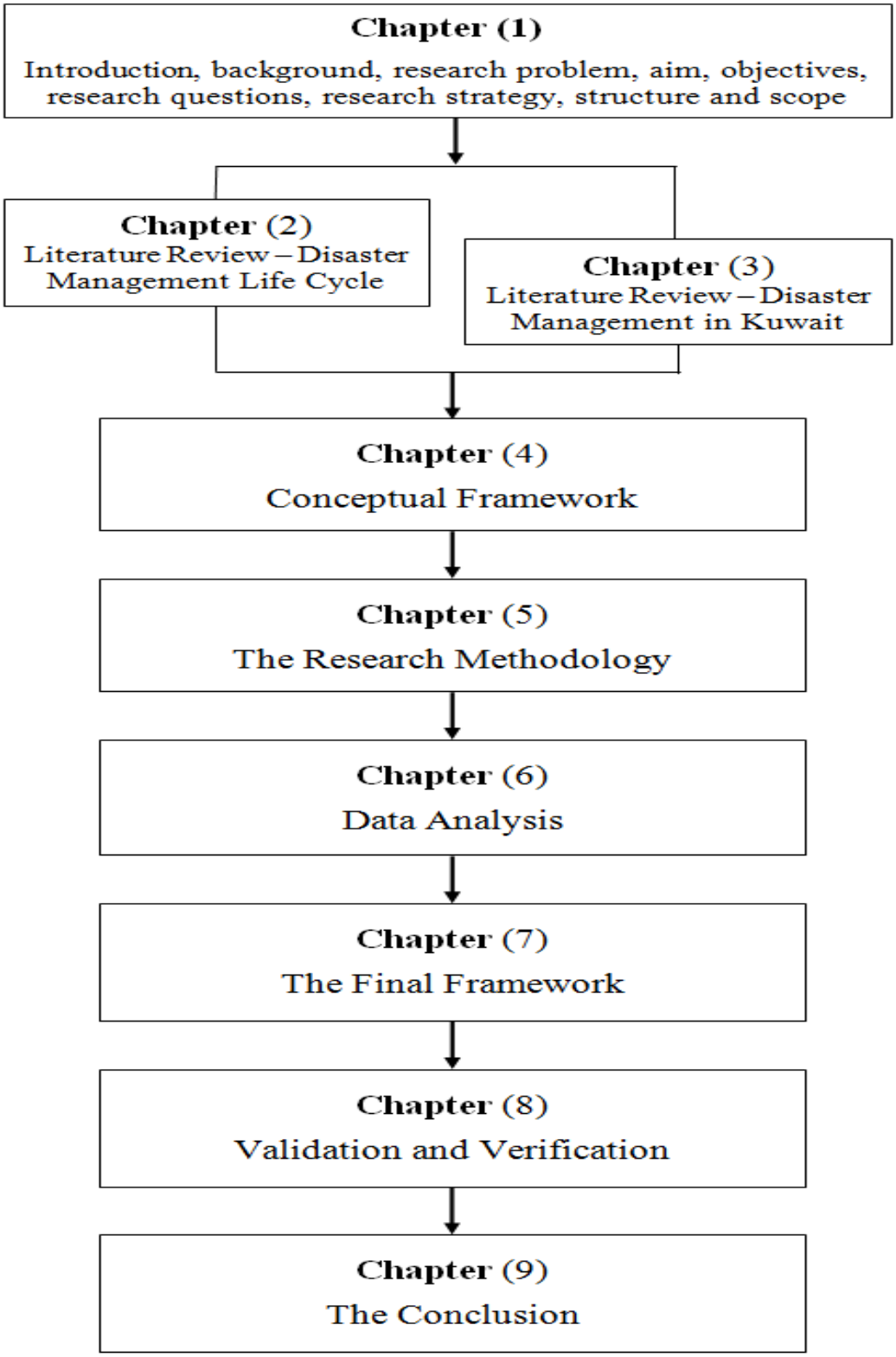


Figure 6: The Research Flow Chart and Structure.

1.8 Chapter 1 Summary

Disaster management has been a priority in most countries worldwide which is used to mitigate and reduce the impact of disasters. It is believed that all countries and communities dream to be free from the effect of disasters. This dream can be worked towards through a comprehensive disaster risk management activity (Heinz, 2010). The author of this research believes that one of the most important aspects of any suitable and sufficient disaster risk management policy is education.

As discussed previously, different disaster management life cycles have been developed and used to explain disasters since World War II. For instance, different researchers has suggested that disaster researchers and planners need to reconsider the current use of the disaster phases (which were discussed previously). In addition, some researches argued that disaster research needs further theoretical development. Therefore, the information provided in each section of the research provides emergency planners with valuable information, enabling them to mitigate, prepare for, respond to and recover from a disaster by using a systematic process, such as the use of the disaster management life cycle.

However, the author of this research is concerned about what will happen when emergency planners in any country do not have sufficient disaster risk management procedures in place at a strategic level This case can be an example of what the disaster management procedure is in Kuwait. The Civil Defence Committee, which represents the strategic level for the management of disasters in Kuwait, identified the hazards randomly. Also, there is lack of information regarding vulnerability, risk and possible impacts of possible disasters. Moreover, the author found that obvious hazards, such as the Iranian Nuclear Power Plant and the recent increase in terrorist activities (especially in the Middle East region), were not considered as a hazard in Kuwait.

Therefore, the author is trying to fill this gap by improving the current Disaster Management Framework in Kuwait and to increase the awareness level for disaster planners at the strategic level in Kuwait. This has been achieved by using a suitable disaster management life cycle to identify and manage all hazards that could pose a threat to Kuwait. The next chapter, Chapter 2, includes a literature review that focuses mainly on the disaster management background.

Chapter 2: Critical Review of the Focal Literature

2.1 General

The previous chapter highlighted the research introduction and covered the research background, problems, aim, objectives, questions and structure. This chapter explores the disaster management procedures used today by different countries to mitigate the impact of a disaster, such as the disaster management life cycle. It focuses on terms such as mitigation, preparedness, response and recovery. It also highlights the importance of classifying hazards and explains how a hazards classification process enables emergency planners to better understand and identify all hazards that could pose a threat to a specific community.

Chapter 2 also explores the risk assessment procedure. examining how it can help the emergency planners to identify the emergency response capabilities required for each type of hazard. It covers the importance of Disaster Management Acts and policies and how they can support the disaster management process which are also discussed in this chapter. It also explores different Disaster Management Frameworks that are used in different countries (e.g., India, America, Pakistan and Australia) to identify how these frameworks serve as systematic guides for emergency planners when dealing with disasters.

The importance of establishing disaster or emergency institutes is also discussed and how these institutes can enhance an emergency planners' approach to hazards scientifically, along with the importance of conducting disaster management research. The importance of disaster education will also be discussed as well as how it can help, not only emergency planners but also the general public in reducing the impact of disasters. Finally, the chapter highlights advanced technology, especially Early Warning Systems that are used today in different countries to help emergency planners with mitigating the impact of disasters (e.g., the geographic information system).

2.2 Disaster Management

This section notes important definitions of the terms used in the field of disaster management. Each country in the world has the right to prepare for its own disaster management process, as well as to clarify and define the definition of terms used in the disaster management field. However, there is a lack of publications or Acts that define the term 'disaster' or 'disaster management' in

Kuwait. Therefore, the author of this research is highlighting some important definitions throughout the following paragraphs.

There are different definitions for a disaster, for instance, according to The International Federation of Red Cross and Red Crescent National Societies (IFRC, 2015) which defines a disaster as "a sudden event that disrupts the functioning of a society or a community and produces an impact on humans, the economy or the environment, which exceeds the community's or society's capabilities to deal with using its own resources." Ronald (2017) defines a disaster as an event or situation that threatens a serious impact to human welfare or an event or situation which threatens a serious impact to the environment." Disaster can also be defined as "war or terrorist activities which threaten serious damage to security." The following (Figure 7) is an example that gives a better illustration of what a disaster is.

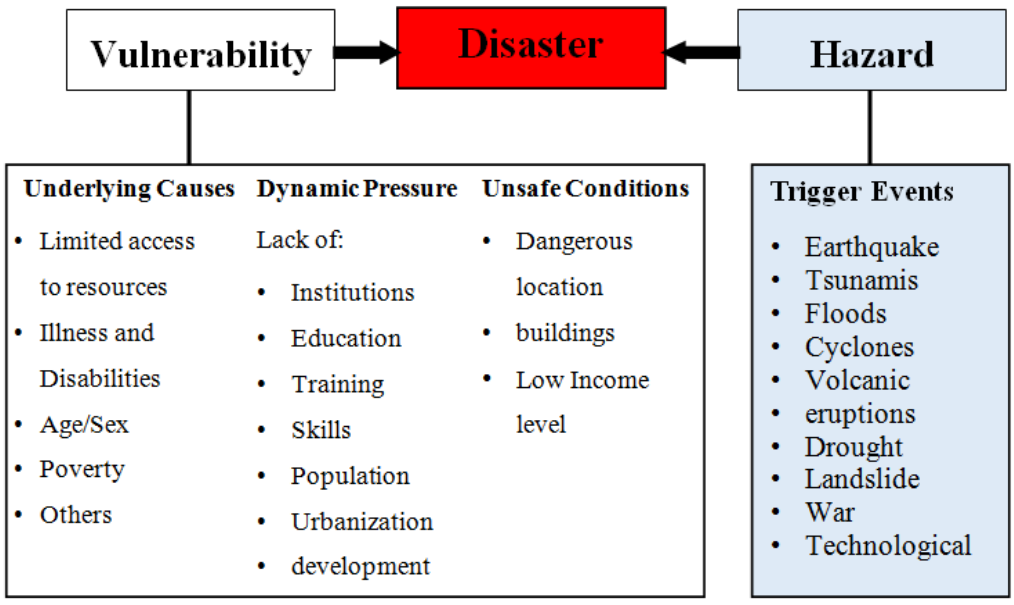


Figure 7. What is a Disaster? From (Khan et al., 2008)

However, the author of this research defines a disaster as a situation that can cause damage to or threaten a vulnerable society, or an event that threatens national security. Disaster can also be defined as an unpredicted hazard that causes damage to a vulnerable group or to the environment. This is the most appropriate definition for this research. According to Alexander (2016), the term "disaster management" is defined as the process of dealing with disasters and mitigating risks by

preparing for a disaster before it happens (for instance, by preparing for a disaster response). This should include rebuilding society after disasters have occurred.

IFRC stated that disaster management is the organization, management of resources and responsibilities for dealing with all humanitarian aspects of emergencies and includes preparedness, response and recovery in order to lessen the impact of disasters (IFRC, 2015). The primary aim of disaster management is to avoid, mitigate and reduce the impact of natural or manmade disasters. Another good example of defining disaster management is that all measures should be taken so that hazards cannot take the form of disaster (Nojavan et al. 2018). The most appropriate definition of disaster management which fits this research was validated by the Asian Disaster Preparedness Centre (ADPC, 2014). This defined disaster management as the administrative decisions and operational activities that involve prevention, mitigation, preparedness, response, recovery and rehabilitation (ADPC, 2014). Also, the author of this research took the initiative to define disaster management as a scientific process that does the following:

1. Identifies and locate hazards.
2. Assess the hazards.
3. Identifies how a hazard affects the security of a society, infrastracture or the environment.
4. Evaluates or predicts the possible impact of any damage that could be caused by a hazard.
5. Avoids, mitigates and reduces the possible impact of a hazard.
6. Performs ongoing and continuous process of hazard identification. The author believes this is the most suitable definition for this research.

The Sendai Framework for Disaster Risk Reduction (2015/2030) stated that a disaster can be caused by the combination of hazards, vulnerability and low capacity for measuring and eliminating potential risks. A disaster occurs when a hazard affects a vulnerable group of people and causes loss, casualties and disruption. Disasters usually occur when a vulnerable group of people living in hazard-prone area/s, without any awareness, mitigation or prevention measures, and these people are considered a vulnerable group. Nouri et al. (2011) defines vulnerability as the degree of fragility of a person, group, community or area towards hazards. Vulnerability is also defined as a set of conditions and processes resulting from physical, social, economic and

environmental factors that increase the susceptibility of a community to the impact of hazards (Nouri et al., 2011).

According to the International Institute for Applied Knowledge Management (2015), the risk concept is important in a number of scientific fields. At the same time, risk definitions are varied with different situations. For instance, Adams (2014) mentioned that the term 'risk' is a word that has different meanings to different people. One example of risk definition include the combination of the probability and scope of the consequences (ISO, 2002). Risk is also defined as an uncertain consequence of an event related to something of human value (International Risk Governance Council - IRGC, 2005). Cox (2012) stated that Risk equals expected damage. The author of this research found that the best definition of the term 'risk' is defined by the Law relationg to Safety and Health at Work (2005), which is the likelihood of an injury, disease or damage to the human and environment due to hazards. The author of this research defines risk as the probability of damage and/or losses to any one or all of humans, environment, or infrastructure, due to insufficient hazard risk management .

Defining the terms used in disaster management, this is considered vital to clarify the concepts clearly for the emergency practitioners or leaders. It is also very important that the Acts or policy makers seek help from experts within the disaster management fields before formulating any Disaster Management act. This is because each agent who wishes to establish a new Act in the disaster management field requires to clarify the terms used in this act to ensure that the formulation of the Act is clearly understandable by all other agencies. Another important aspect in terms of defining or establishing a new Act is to ensure that it will not cause duplication or overlap with different or existing acts.

Unfortunately, there is a lack of publications or Acts in Kuwait that define or clarify the terms used in disaster management. This causes the emergency leaders, such as the Civil Defence Committee, to misunderstand the comprehensive disaster management process. Therefore, the author of this research highlighted different definitions in the disaster management field that can be used to improve the disaster management process and practices in Kuwait. However, defining terms used in disaster management are not enough, hence, there is a vital need for clarifying the different phenomena that could produce or cause a disaster, for instance; natural phenomena such as earthquakes, droughts, floods, flash floods, landslides, sand storms which can all cause disasters

when they hit a vulnerable group of people. At the same time, it is inapplicable for the emergency leaders to identify such kinds of phenomena due to their experience.

Therefore, the most important step that can help the emergency planners and leaders in understanding and identifying the different phenomena that could produce harm to society is to classify these phenomena into different classifications. This would also require seeking assistance through joining specialists or stakeholders from different ministries or agencies to determine what kind of phenomena they should prepare for and mitigate their impact. The next paragraph highlights in more detail the hazards classification process.

2.3 Disaster Classifications

As clarified and stated in the previous paragraph, disasters can be caused by different phenomena, such as natural or manmade, and these phenomena are varied. Understanding these phenomena is considered important to mitigate the impact of them in order to protect civilians. At the same time, it is very unfair that one agency withstands or looks after all these different phenomena, especially when conducting a hazard risk assessment. Therefore, the recent disaster management strategies focus on involving different stakeholders to perform the disaster management process, Strategic Plan (2013/2018). This is mainly because the contribution of each agency will provide a robust base, especially when conducting the hazard risk assessment, giving each agency the authority to determine the hazards associated with their background or specialist, UK Aid (2012).

The present formulation of the Civil Defence Committee as previously highlighted in (Chapter 1, Table 1) cannot exist due to the current need for a comprehensive hazard risk assessment in Kuwait. Therefore, it is important that the Civil Defence Committee classifies the hazards. Disasters can be divided into classes of natural and man-made. At the same time, manmade disasters are further classified into technological disasters and attacks (Bradford, 2009). Natural hazards are divided into six different disaster groups:

1. Biological hazards caused by the exposure of living organisms to germs and toxic substances such as epidemics, insect infestations and animal stampedes.
2. Geophysical hazards originating from solid earth and include earthquakes, volcanoes and mass movement (dry).

3. Meteorological hazards caused by short-lived, small-to-meso-scale atmospheric processes, such as storms.
4. Hydrological hazards caused by deviations in the normal water cycle and/or overflow of bodies of water caused by wind set-up; these include floods and mass movement (wet).
5. Climatological hazards caused by long-lived meso-to-macro-scale processes (in the spectrum from intra-seasonal to multi-decadal climate variability), such as extreme temperatures, droughts and wildfires.
6. Extra-terrestrial hazards caused by meteorites and asteroids. The Emergency Events Database (EM-DAT, 2009).

One of the best natural disaster classifications found by the author was that of Below et al. (2009), who divided natural hazards into six different disasters groups: biological, geophysical, meteorological, hydrological, climatological and extra-terrestrial with each of the groups being further sub-divided into disaster sub-types (See Appendix D). According to Bartholdson and Schreeb (2018), disasters are caused by different hazards or events. Therefore, by classifying them, this will enable emergency planners to view hazards from different angles. However, classifying hazards requires a scientific expert from each field (e.g., a scientific expert in geology). Classifying hazards could help validate predicted hazards that may harm specific communities and then enable emergency planners to make the right decisions at the right time. This would assist them avoid using the random hazard identification process that is currently being used by the Civil Defence Committee in Kuwait.

Classifying or grouping hazards enables different participants, such as scientists, emergency service workers, utility service workers and disaster planners, to understand what type of hazard they will have to deal with and which agencies or organisations are responsible for evaluating, analysing and managing the impact of each individual hazard (EM-DAT, 2009). For example, in Kuwait, the agency responsible for predicting meteorological and climatological hazards is the Meteorological Department of the Directorate General of Civil Aviation, Metrological Department, (2017). However, this department does not participate in matters governed by the Civil Defence Committee, which is currently responsible for managing and planning for disasters for all classifications within Kuwait. Similarly, the Institute for Scientific Research is responsible

for predicting and alerting people to geophysical disasters (e.g., earthquakes). This institute is not a member of the Civil Defence Committee.

Moreover, the author of this research argues that natural hazards or phenomena are not the only unique cause of disasters as there are different types of hazards produced by the development of technology such as; oil refinery fires, hazardous material incidents, nuclear power plant incidents, oil spill in the sea, large ship fires etc. Such hazards are known as manmade technological hazards. The impact of such hazards can produce more damage and loss in life, properties, economy and the environment, than that of the natural phenomena or hazards. One good example is the explosion of Chernobyl Reactor in Ukraine, 1986. Therefore, classifying hazards should provide a suitable solution in terms of knowing which agencies or organisations are responsible for carrying out hazard risk assessments. This would allow evaluation of risks arising from each type of hazard and mapping vulnerable locations or groups of people at risk from such hazards within Kuwait.

2.3.1 The Use of Disaster Scenario

A scenario is defined as "a model of conditions and circumstances used to illustrate the link between two aspects, how conditions influence circumstances and how circumstances of disaster impacts" (Alexander, 2009, p. 42). It is beneficial that the Civil Defence Committee of Kuwait predict different scenarios (Table 2) as these can help determine what is required for each scenario in compliance with Order 817 to build sufficient emergency plans. This can help reduce the impact of disasters and assist in arranging responses to major disasters. However, there are also negative aspects of the Civil Defence Committee. Arrangements are confidential and the committee is unopposed. It is important that the arrangements for disaster and emergency responses are realistic and achievable, while providing recommendations and creating public awareness regarding hazards that could harm the country. According to Alexander (2015), the best way to prepare for a disaster is to start before it happens using the following steps:

1. Identify the hazards.
2. Identify the vulnerability of the area.
3. Identify the risks.
4. Evaluate the possible impact.
5. Prepare for emergency response and recovery.

Figure 8 highlights the data, information and processes which must be made available when conducting scenario methods (i.e., vulnerability, risk, impact and response).

Figure 8. Missing Information in the Disaster Scenario Method in Kuwait (Alexander, 2009)

The Civil Defence Committee has identified 13 different disaster scenarios (see Chapter 1, Table 2). However, various data were missing (e.g., vulnerability, risk, possible impact and response procedure against each scenario). which showed an obvious lack of preparedness for a disaster in Kuwait. In terms of risk, the Civil Defence Committee did not outline risks for any scenario. However, outlining risks is an important part of disaster management. Also, information regarding the impact of each scenario is not available and this would assist the committee in understanding the country's capacity to deal with each type of disaster as they would know what resources and logistics are needed for each type of disaster. These issues will be discussed in more detail in the next chapter, Chapter 3.

According to (Alexander, 2000; Alexander, 2009; and Alexander, 2015), scenario methodology and disaster prevention procedures can be carried out in five phases:

1. The Mitigation Phase:

- Training emergency planners using a scenario method.
- Assessing the vulnerability of structures and communities by exploring their susceptibility to damage and destruction.
- Considering a case study of past disasters to use as lessons learned for the future.

2. The Preparedness Phase:

- Developing scenario methods used to train the response personnel for emergencies.
- Studying or predicting future impacts of probable hazards on response.
- Carrying out scenarios to inspect the alarm equipments.
- Carrying out scenarios on warnings and evacuations to alleviate failures.

3. The Response Phase:

- Determining the progress of future post-disaster emergency operations by reviewing the sufficiency of current emergency responses and disaster plans.
- Carrying out scenarios to test logistics in order to estimate operation needs.
- Carrying out scenarios for post-disaster situations in order to provide a debriefing for emergency personnel.

4. Recovery Phase:

- Carrying out scenarios to estimate damages, their locations and to calculate the repair needs.

5. Reconstruction Phase:

- Modelling social and economic conditions through a proper scenario to inhibit or facilitate reconstruction.
- Using economic scenarios to test financial and fiscal planning.

The use of scenario methods in disaster management enables emergency leaders to prepare for capacity building and logistic evaluations as well as to scientifically validate the predicted impact of disasters and the requirements for reducing impact (Jafari et al., 2019). Additionally, this method provides support for decision-makers during a disaster. Unfortunately, none of the five phases mentioned above have been adopted in Kuwait due to the country's misunderstanding of its disaster management needs.

2.3.2 Technological Hazards

Technological hazards mean any technologies which are produced by humans to enhance development needs, such as aeroplanes, trains, ships, nuclear power plants etc. Technological hazards are caused mainly by errors created through the continuous development of technology

(e.g., aeroplane crashes, railway incidents, large ships incidents, nuclear power plant disasters, etc.). To avoid technological disasters, one must increase and improve safety acts, measures and awareness Zhang et al. (2017). According to Shaw et al., (2016), technological hazards are an increasing source of risk to people and the environment. Galvani et al., (2016) noted that technological hazards are the result of human interactions with the environment, for example exposure to hazardous substances such as radon, mercury, asbestos fibres and coal dust (Bradford, 2009).

To survive possible technological hazards, Kuwait must take into account any risks, especially those arising from the nearby Iranian Nuclear Power Plant, which is one of the most hazardous scenarios. The reason why it has been mentioned by name is due to its potentital to cause harm to the surrounding countries. Some technological hazards have been addressed, such as aeroplane crashes and large ship fires. However, information regarding matters such as vulnerability, risk and possible impact, all terms used throughout the hazard identification process, was not validated by the Civil Defence Committee. Therefore, this research will address these issues and provide a systematic process and procedure which can be used to enable emergency planners to deal with emergencies at the strategic level, be aware of and integrate all necessary steps after the identification process. The most suitable procedure to minimise the impact of the technological hazards is by concentrating on the safety regulations, awareness and preparing national emergency response plans.

In fact, hazards can also be produced by different types of human activities such as terrorism, which is considered as the highest threat today which can cause damages and loss anywhere. Unfortunately, the Civil Defence Committee in Kuwait did not consider such activities as a hazard (Table 1, Chapter 1). Therefore, the author of this research is attempting to improve the current Disaster Management Framework in Kuwait through the process of identifying all hazards that could pose harm to the country.

2.3.3 Terrorism Hazards

This paragraph highlights different types of manmade hazards known as “terrorism hazards,” which pose threats to most countries in the world.

The most current hazard in modern life is terrorism, which can produce a destructive threat to any society, (Greenberg et al., 2012; Richards, 2015). Unlike any other type of disaster, terrorism is a real threat to all nations in the world. One of the best definitions of the term 'terrorism' is given by the Federal Bureau of Investigation (FBI 1988; Richards, 2015). This defines terrorism as the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment for the furtherance of political or social objectives.

Different publications, such as (Raj and Tony, 2004; the Fire and Rescue Service Act, 2004; the Civil Contingencies Act, 2004; the Management of Health and Safety Regulations, 1999) etc. have highlighted or covered the control of fire risks associated with bomb threats but have not provided a definition for terrorism (Croner, 2009). Suicide bombers are also a version of modern threat and are a different type terrorism that is currently creating a lot of concern in different countries around the world, Horowitz (2015). On 26 June 2015, Kuwait was affected by a suicide bomb attack that killed 28 people and injured around 227 more at a mosque in the Kuwaiti capital of Kuwait City, Global Terrorism Index (2016). An issue that needs to be emphasized is that terrorism was not considered a hazard by the Civil Defence Committee (see Chapter 1, Table 2). This solidifies the notion that the disaster management process in Kuwait focuses only on the response phase of a disaster.

Cyber terrorism is also a modern threat which can produce massive amounts of damage to different sectors, such as markets, international banking, air transport etc. Gross et al., (2017). According to Williams and Sizemore (2019), terrorist groups, specifically target military hardware, such as chemical, biological, radiological, nuclear and explosive (CBRNE) weapons of mass destruction. Terrorists may be capable of attaining and using biological weapons, like anthrax and other weapons, which could be as deadly as a nuclear explosion. Some countries are also attempting to use nuclear power as a way of exhibiting their supremacy over other countries. Nuclear explosion scenarios are extreme and the devastating effects in Japan during the Second World War, and more recently following the tsunami of 2015 and Chernobyl in 1986, have all been well documented and catalogued, (Williams and Sizemore, 2019).

Hence, disasters are not a new phenomenon with the planning efforts of reducing their impact and losses beginning years ago. Scientists from different fields divide the disasters into different phases

to understand the need for each stage of a disaster Today these are known as the disaster management life cycle. The next section explores the disaster management life cycle.

2.4 Disaster Management Life Cycle

Coetzee (2009) mentions that, since the early 1970s, increases in the incidence of disasters has led to the emergence of a new concept within the disaster management field. This concept is known as the disaster management life cycle (Figure 1, Chapter 1). It was developed to illustrate the continuous process by which businesses, governments and society can plan for and reduce the impact and losses caused by disasters through outlining the best actions for people to take during and after a disaster. The disaster management life cycle includes four phases: mitigation, preparedness, response and recovery, (FEMA report, 2014).

Gustin (2004) and Shimura et al., (2015), note that the mitigation phase includes activities that prevent disasters, thus minimizing the probability of an emergency situation and reducing the effects of unavoidable disasters. The preparedness phase takes place before an emergency or disaster strikes, Alexander (2015). It includes preparations for saving lives along with assessing response and rescue operations. Creating evacuation plans and stocking food and water are examples of preparedness. The preparedness phase includes the following:

- Preparation of emergency plans.
- Development of response arrangements.
- Building capacity for better emergency response.
- Education and training of staff who will respond to an emergency.
- Evaluation of emergency systems, plans and procedures.
- Auditing preparedness.

According to (Alexander, 2009; Nojavan et al., 2018), the response phase includes actions meant to provide disaster assistance during a disaster (e.g., saving lives and reducing property damages). The response phase takes place immediately before, during and directly after a disaster and includes activities such as early warning, search and rescue, emergency medical assistance, dealing with fires or hazardous materials and dealing with casualties and survivors.

Rubin (2009) stated that the recovery phase takes place after a disaster. It is defined as the actions taken to return an affected area to normal after a disaster and includes two parts: immediate recovery and long-term recovery.

- The immediate recovery stage includes damage assessment, managing of debris, investigations and the restoration of essential supplies and services.
- Long-term recovery includes the ongoing treatment of survivors; reconstruction of infrastructure, buildings and services and identifying any actions that could reduce the effects of future disasters.

The design of the disaster management life cycle provides a comprehensive understanding of how disaster management practitioners or leaders should manage any specific disaster by focusing mainly on known hazards, Hans et al., (2015). The author of this research highly recommends the use of the disaster management life cycle with the addition of the term 'identifying', as shown in (Figure 2, Chapter 1). This additional phase could draw the attention of disaster management practitioners to hidden hazards. For instance, more than 96% of the population in Kuwait live on the Arabian Gulf Coast. This trend of urbanization, taken together with the establishment of new cities in Kuwait, could be identified as a factor that is putting people at risk.

This proposed phase of the disaster management life cycle could take place throughout the process of risk assessment. This should be carried out at the stage before mitigation, preparedness, response and recovery. Therefore, the researcher wishes to add the term “identifying” to the disaster management life cycle to alert disaster management planners and practitioners to the importance of starting the disaster management process with a risk assessment procedure that identifies potential hazards.

2.5 Disaster Management Life Cycle - Background

The previous paragraph highlighted the current disaster management life cycle and the four phases such as mitigation, preparedness, response and recovery. In addition, the paragraph explained the contribution of the researcher with integrating the term “identifying” to the disaster management life cycle, so that planners, practitioners and researchers can understand how to approach a

comprehensive disaster management process. The following paragraph illustrates the background and the development of the current disaster management life cycle.

Various researchers (e.g., Neal, 1997; Baird et al., 1975; Kellman, 2007; and Lewis, 2007) have confirmed that the disaster management life cycle has been a vital instrument for at least thirty years, having been used for managing disaster events and their effects. Coetzee (2009) stated that there are many practitioners and scientists within the disaster management field still debating its origins, thus causing confusion in disaster management research. This has led to an unclear understanding of the field. The first researchers noted, for instance, that the response, mitigation and preparedness phases of the disaster management cycle, were concepts originally constructed by (Prince 1920; Carr, 1932; and Powell, 1954), respectively. According to Richardson (2005), these scientists developed the phase system to assign order and rationalise the reality of natural, technological and human responses to a disaster.

According to (Quarantelli, 1986; Quarantelli, 1997; Tierney, 1998; Coetzee, 2012), different disciplines have influenced the disaster management cycle. With this reasoning, Cebulla (2004), states that, due to the variation of works carried out in these disciplines, the disaster management life cycle has become a complex system, and one which is difficult to be adopted in different locations. In addition, Carter (1991) has stated that different countries implement disaster management life cycles to suit their needs. Due to the unclear system, practices and the existing problems in disaster management, it is important to identify a suitable risk-management method that can be used by all disaster managers and leaders, especially those in Kuwait.

According to (Quarantelli, 1986; Quarantelli, 1997; and Tierney, 1998) disaster phase research received more funding following World War II than it has at any other time. Moreover, (Dombrowsky, 1981; and Tierney, 1998) have noted that military institutions were the largest of these funding researches into the disaster phases. These circumstances likely led to a greater focus on the emergency response phase than the other phases within disaster phase research. Quarantelli (1986), states that early research on disaster phases was focused on the practical orientation of disaster management at the time, (i.e., it was oriented more towards reactions to disasters rather than to the prevention of or recovery from them. Therefore, (Dynes and Quarantelli, 1992; and Chapman, 1962) state that the work of Prince (1920) is used as the basis for disaster and emergency

research. This background has shown the historical development of the disaster management life cycle and has highlighted the importance of using it to survive or mitigate the impact of disasters.

2.6 Disaster Risk Assessment

The loss that comes with the disruption cannot be defined with certainty but it can be speculated. The disaster risks are therefore, the losses that could potentially occur at some point in time following the occurrence of a disaster. If there is any risk of a disaster occurring, there is a need to try and identify what the risks are, as far as possible, to assist with the increase of preparedness within the community and reduce the impact of any loss, Sendai Framework for Disaster Risk Reduction (2015/2030).

The Department of Homeland Security in the United States of America describes the risk assessment process as a procedure through which potential hazards are identified and the potential impact analysed, should they occur. The extent of the impact, however, depends on the vulnerability of the community and where within that community it occurs, as both factors affect a community's susceptibility to loss, Willis et al., (2018). The risk assessment process, therefore, includes the identification of the nature and the impact of a hazard, as well as its potential severity and probability of occurring (Rout and Sikdar, 2017). The risk assessment process also entails an examination of the community's vulnerability to disasters and its capacity to deal with them (Gov. UK, 2013). Therefore, the procedure includes an assessment of previous hazards, an assessment of the vulnerability of those at risk and an assessment of the capacity of the vulnerable areas in reducing risks associated with a hazard (CRS Report for Congress, 2007).

According to the *Hyogo Framework for Action Plan (2005-2015*), knowledge of the hazards, as well as of the physical, social, economic and environmental vulnerabilities of a community leads to the reduction of disaster risks. A United Nation Development Programme (UNDP, 2010) report defines risk assessment as a process to determine the nature and extent of a risk by analysing hazards and evaluating existing conditions of vulnerability that could potentially cause harm to people, property, infrastructure, livelihoods and the environment. Risk assessment aims not only to evaluate the magnitude or likelihood of losses, but it can provide a full understanding of the causes and impacts of these losses. Therefore, risk assessment is an integral part of decision and policy-making processes and thus requires the close collaboration among various parts of society

(UNDP, 2010). The most important part of risk assessment in the management process is identifying the hazard itself. A hazard analysis includes an analysis of the geography of the area, the frequency with which a particular hazard occurs, the typical intensity of that hazard and the probability that it will occur again (European Commission, 2010). Hazard identification has also been identified by the European Union Conclusions Community Framework to be one of the most important elements of the disaster prevention procedure (European Commission, 2010, p. 4).

As highlighted previously, hazards can be caused by man or nature. Identification and analysis of hazards require a good deal of data and research. In the United Kingdom, this mandate is given to the National Hazards Partnership (NHP), led by the Cabinet Office that works with the National Risks Assessment. The NHP is formed by experts from various government sectors who are responsible for advising the United Kingdom government on the preparation, response and review of natural disasters (British Geological Survey, 2016). The NHP provides daily assessments of various natural hazards. Every year the United Kingdom government initiates a study on the various hazards that might affect the country, thus increasing the preparedness and effectiveness of the NHP. Moreover, the NHP provides the National Risk Assessment with recommendations on current possible risks that could affect the country, British Geological Survey (2016). The NHP also works with the British Geological Survey in developing the geo-hazard notes and assists other United Kingdom agencies with building the country's resilience to disasters. In the United States, the mandate to identify risks is headed by the Department of Homeland Security.

Once the hazards have been identified, analysis will reveal what risks these hazards pose to the community. Risks could be given in terms of their impact (i.e. can be categorized into human, environmental and political impacts) (European Commission, 2010, p. 17). These impacts can then be evaluated based on the extent of the risk they pose to the affected area, should they occur. The mapping of these risks is done on the risk matrix, which is based on the relative impact and likelihood of a hazard (European Commission, 2010, p. 19). The matrix contributes in determining the extent and probability of the occurrence of a hazard and is essential with helping mitigation of risks and control of a hazard's occurrence. The potential severity of an occurrence indicates the extent of damage that could be caused if no steps were taken to avert it and if the current conditions could increase an areas susceptibility to the hazard, if they are not changed, (Rout and Sikdar, 2017).

This information was obtained from the various assessments that the NHP has carried out in collaboration with the National Risk Register and the National Risk Assessment. The level of risk associated with a hazard is thus found as the product of the probability of the hazard happening and its severity. A hazard can thus be categorized as low, medium, or high in terms of risk. Severity is categorized from catastrophic (the highest level) to negligible (the lowest level) while probability ranges from likely to unlikely within the various categories of human, economic, political and environmental impacts (European Commission, 2010, p. 19).

A catastrophic hazard with a high level of risk, therefore, is likely to occur. The level of risk can be mitigated by reducing either its probability or its severity, both of which comprise the risk mitigation process, (Rout and Sikdar, 2017). The National Risk Assessment is, in the medium- and long-term, expected to identify, assess and rank the risks that the United Kingdom is likely to face, if a natural hazard were to occur (Lisk, 2014, p. 5).

The guide to risk assessment in major emergency management (2010) recommends that each local emergency response agency should carry out risk assessments and use the outcomes of the assessments to formulate their own major emergency plans. The Civil Defence Committee has nominated 13 disaster scenarios. This procedure was based on each committee representative suggesting one or two hazards. In the author's view, this procedure led to many hazards, risks, exposures, impacts and vulnerabilities going unidentified in Kuwait. Therefore, the research will address these issues and provide recommended guidelines and procedures on how to carry out risk assessments and to identify current and future hazards, which could threaten Kuwait.

A UNDP (2010) report notes seven steps for comprehensive risk assessment:

1. Understanding of the current situation, needs and gaps to assess what already exists, the avoidance of duplication of efforts and to build on existing information and capacities. This can be done through a systematic inventory and evaluation of existing risk assessment studies, including available data, information and current institutional frameworks and capabilities.
2. Assess hazards to identify the nature, location, intensity and likelihood of major hazards prevailing in a community.

3. Assess exposure to identify populations and assets that are at risk and to delineate disaster-prone areas.
4. Analyse vulnerability to determine the capacity of at-risk elements to withstand the given hazard scenarios.
5. Analyse impact to estimate potential losses of exposed populations, properties, services, livelihoods and the environment, as well as to assess the potential impact which these losses might have on society.
6. Profile and evaluate risk to identify cost-effective risk reduction options in terms of the socio-economic concerns of a society and its capacity for risk reduction.
7. Formulate or revise disaster risk reduction strategies and action plans, including setting priorities, allocating resources (financial or human) and initiating disaster risk reduction programmes (UNDP report, 2010).

The major tool which illustrates the roadmap for disaster management in all countries is the Disaster Management Framework. The framework in Kuwait does not mention or specify any organisation or ministry as being responsible for conducting hazard risk assessments, therefore, the author feels that the entire disaster management process in Kuwait must improve.

2.6.1 Risk Assessment Process

According to the Guide to Risk Assessment in Major Emergency Management (2010), it is recommended that each local emergency response agency carries out risk assessment procedures using the following process:

1. Establish the context.
2. Hazard Identification.
3. Risk Assessment.
4. Recording potential hazards on a risk matrix.

Stage 1: Establishing the Context

The main reason for this stage is to illustrate the characteristics of the area in which the risk assessment is being carried out. This stage examines both the likelihood and the impact of a major emergency. Establishing local regional contexts provides a clear understanding of the vulnerability

and resilience to emergencies of the area (Gov. UK, 2013). Figure 9 illustrates the different stages of risk assessment.

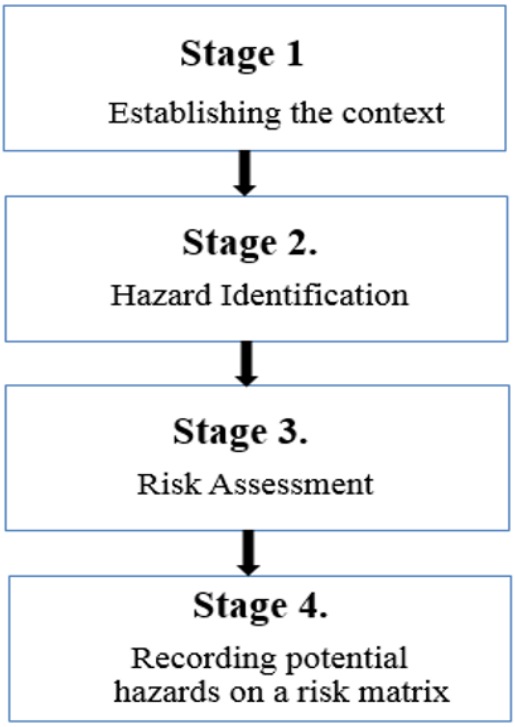


Figure 9: Schematic Risk Assessment Process (Guide to Risk Assessment in Major Emergency Management, 2010).

Establishing the Context Methodology

The team that carries out the risk assessment should consider national, regional and local contexts which influence disaster management in their area. The results need to be recorded in a series of short summaries. To enhance this process, the risk assessment team should provide relevant aspects of their area, taking into account current and future trends (Gov. UK, 2017). According to Homeland Security Affairs (2018), it is recommended that the team coordinates with agencies or authorities that could provide important data or information for input into the risk assessment (e.g., the Environmental Protection Agency, the Health and Safety Authority, airport authorities). The assessment should include information on the following types of contexts:

- **Social**

1. Identify the demographic, ethnic and socio-economic factors of the community.
2. Evaluate the geographical distribution of various communities.

3. Identify the vulnerability of the community.
4. Identify events during which there is an influx of people into the area, such as festivals and celebrations, as well as how experienced the community is in coping with different types of disasters.

- **Environmental**

1. Illustrate the type of area (urban, rural, or both).
2. Determine if there is any geographical aspect that contribute to vulnerabilities.
3. Determine if there is a high-density concentration.
4. Determine if there is a specific environmental hazard present in the region.
5. Explore the history of events that have affected the area.

- **Infrastructural**

1. Identify the types of infrastructure present (transport, utilities, businesses, etc.)
2. Identify the type of telecommunications, power supplies, fuel and energy types, medical and educational facilities, etc. in the area.
3. Identify the main economy in the area.

- **Hazardous sites**

1. Identify the sites that are potentially hazardous to the area.
2. Identify the hazardous sites in relation to nearby communities or sensitive environmental areas (Gov. UK, 2013).

The Regional Context

The regional context will be identified throughout the integration of the risk assessment results for all the local emergency response agencies, with the relevant details gained from regional processes on an appropriately-scaled map (Gov. UK, 2013; Homeland Security Affairs, 2018). Table (3) is an example of a generic output, which should be used when carrying out a risk assessment.

Table 3. Example to Illustrate Establishing the Context (Guide to Risk Assessment in Major Emergency Management, 2010)

Social Population-major centres	Region 350,000 City 1 100,000 Town 1 20,000 Town 2 10,000	Demography summary % Elderly % Children % Ethnic minority/immigrant workers
Primary economic drivers	Tourism Industry	Express in Euros/% of local economy List industries with relevant comments
Local Emergency Services	Police Fire Service Ambulance	Number and location of stations Location, number of fire stations Ambulance, Hospital capacity
Environment Geographical characteristics	Area over 3,000 m^2 Forests, Sea, Rivers, Parks	% Urban % Rural % Commercial List-show on map List-show on map % area covered
Adjacent counties	County A County B	Relevant details
Infrastructure Transport Types	Roads Rail Airport	Major routes Significant congestion points All land transport of hazardous material takes place by road Mainly passenger traffic Major international/minor terminal
Water Supply	Local Authority supply schemes Treatment plants	Relevant details
Power Supply	Generating stations	Location and relevant details
Gas Supply	Pressure Stations	Oil, Pipeline location
Hazardous Sites	Radioactive	Details

Chemical Factory	Nuclear	

Stage 2: Hazard Identification

Generic threats, such as fires, road traffic accidents, accidents in public transport, hazardous materials and building collapses, etc., which occur in all communities are sometimes taken for granted. Therefore, the purpose at this stage is to review and note the generic hazards' features in the region and to then add the hazards that are specific to the local area (Gov. UK, 2017). According to the Homeland Security Affairs (2018), hazards fall into different commonly-used categories, such as:

1. Natural.
2. Transportation.
3. Technological.
4. Civil.

Hazard Identification Methodology

The "Guide to Risk Assessment in Major Emergency Management" (2010) notes that each local emergency response agency shall list the hazards that are present in its area.

Tables (4 to 7) below illustrate how local emergency agencies can identify all hazards. All hazards not relevant to the area should be deleted from the table, and for each identified hazard, the communities that are at risk should be identified. At this stage, the hazards to the community and their likely level of impact should emerge.

Table 4. Natural Hazard Identification Template (The Guide to Risk Assessment in Major Emergency Management, 2010)

Category	Type	Sub-type	Local Hazard
Meteorological			
Hydrological			
Geological			
Other			

Table 5. Transport Hazard Identification Template (The Guide to Risk Assessment in Major Emergency Management, 2010)

Category	Type	Sub-type	Local Hazard
Aviation			
Rail			
Road			
Water			

Table 6. Technological Hazard Identification Template (The Guide to Risk Assessment in Major Emergency Management, 2010)

Category	Type	Sub-type	Local Hazard
Industrial Accidents			
Fires			
Building Collapse			
Aeroplane Crash			

Table 7. Civil Hazard Identification Template. (The Guide to Risk Assessment in Major Emergency Management, 2010)

Category	Type	Sub-type	Local Hazard
Civil Disorder/ Disturbance			
Major Crowd Safety			
Mass Shooting			
Loss of Critical Infrastructure			
Food Situation Crisis			
Water Supply			
Epidemics and Pandemic			
Animal Disease			
Missing Persons			

Stage 3: Risk Assessment

At the risk assessment stage, all risks and possible hazards must be considered. The initial part of the stage must examine the impact of identified hazards (i.e., the severity of consequences to life, property, infrastructure and the environment (The Guide to Risk Assessment in Major Emergency Management, 2010). Analysing a hazards probability or likelihood along with the results recorded on a risk matrix, should be the focus. These controlled measures should be mapped out on individual hazard record sheets, which should include sources that influence these measures (e.g., national or local agencies, data from risk holders or risk regulators) Canadian Centre for Occupational Health and Safety, (CCOHS, 2019).

One of the best pieces of research that illustrates how to measure the terms that are used in risk assessment is the "Guidelines for Evaluation and Research in the Utstein Style" (2016). The research defined the terms of the qualitative method as the following:

$$H = H_{nat} + H_{man}$$

Where H is the total number hazards, H_{nat} is the number of hazards caused by nature and H_{man} is the number of hazards caused by human actions. In terms of risk, there are two risks or probabilities associated with the presence of a hazard – the risk that a hazard will become an event and the risk that damage will occur. The term "damage probability (P_D) is used to describe the latter and "risk" (R_H) is used to represent the probability that a hazard will turn into a real event. The term "disaster" represents the possible result of a hazard that becomes an event which provides damage beyond the coping mechanisms of the group of people affected (Guidelines for Evaluation and Research in the Utstein Style, 2016).

Vulnerability is denoted as V_{nat} and V_{man} for the probability (P_D) of being affected by a natural event or a manmade event, respectively. Thus, combining the above, damage probability (P_D) can be expressed as:

$$P_D = \mathrm{f}(\mathrm{R_H})(\mathrm{H_{nat}} + \mathrm{H_{man}})(\mathrm{V_{nat}} + \mathrm{V_{man}})$$. (Guidelines for Evaluation and Research in the Utstein Style, 2016)

Where P_D represents the probability that damage will occur from a specific event, f is a function of the relationship between all of the variables contained within and between the brackets, R_H is the probability (risk) that the hazard will become an event, H represents the hazard, V_{nat} is the vulnerability caused by natural events and V_{man} is the vulnerability caused by human actions or human error (Guidelines for Evaluation and Research in the Utstein Style, 2016) .

Human activities may change the vulnerability of a specific society in different ways before an event occurs (a) and can result with an increase of the areas vulnerability to damage; this notion is defined as "vulnerability augmentation," and is indicated by the term (a1). Alterations that are achieved before an event occurs that decrease the vulnerability or potential damage are defined as "vulnerability mitigation" and are given as the term (a2). When an event has occurred, the emergency actions constituting the response are defined as (b). While response actions are meant to be productive (b2), they can be counter-productive (b1). Therefore, the total vulnerability of a manmade event can be calculated using the following equation:

$$V_{man} = a_1 + a_2 + b_1 + b_2.$$

The total vulnerability of natural event or a disaster can be calculated using:

$$V_{nat} = a_1 + a_2 + b_1 + b_2.$$

The damage probability can be calculated using the following:

$$P_D = \mathrm{f}\,(\mathrm{H_{nat}} + \mathrm{H_{man}})(\mathrm{R_H})(\mathrm{V_{nat}} + \mathrm{a_1} + \mathrm{a_2} + \mathrm{b_1} + \mathrm{b_2}).$$

Where P_D represents the probability that an event will produce damage to the society and/or the environment at risk, f is a function of the relationship between all the variables contained within brackets, H is a hazard, R_H is the probability (risk) that the hazard will be translated into an event, H_{man} is the human component responsible for the hazard, H_{nat} is the hazard dictated by nature, V_{nat} represents the resultant vulnerability to the event as determined by nature, a is the sum of the actions taken before an event occurs, a_1 is the vulnerability augmentation, a_2 is the vulnerability mitigation, b is the sum of the actions taken during or after an event occurs, b_1 is the counter-productive disaster response and b_2 is the productive disaster response (Guidelines for Evaluation and Research in the Utstein Style, 2016).

The following scale (Figure 10 and Table 8) consists of five points and is used to categorize the impact and likelihood of a potential disaster. The ranging is shown in the risk matrix below.

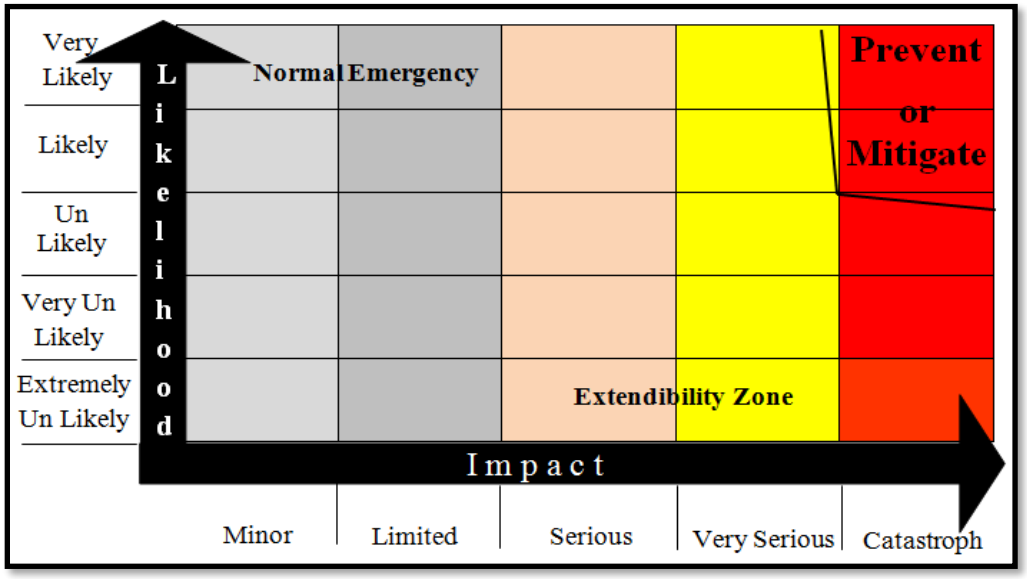


Figure 10. The Risk Matrix. From (The Guide to Risk Assessment in Major Emergency Management, 2010)

When considering the impact of a hazard, three factors need to be taken into account: type, nature and the scale. The nature of the impact may be considered in three different areas:

1. Impact on life, health and the residual welfare of a community
2. Impact on society and the environment (i.e., the disruption or displacement of people affected by the event and the impact on the physical area).
3. Impact on the economy, for example, the cost of property and infrastructure damage, as well as the cost of recovery. (The Guide to Risk Assessment in Major Emergency Management, 2010).

Table 8. Classification of Likelihood. From (The Guide to Risk Assessment in Major Emergency Management, 2010)

Ranking	Classification	Likelihood
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years
2	Very Unlikely	Is not expected to occur. There are no recorded incidents or anecdotal evidence; and/or very few incidents have occurred in associated organisations, facilities or communities; and/or there is little opportunity, reason, or means for the disaster to occur. May occur once every 100-500 years.
3	Unlikely	May occur at some time. There are few, infrequent, random recorded incidents or little anecdotal evidence; and/or some incidents in associated or comparable organisations worldwide have occurred; and/or there is some opportunity, reason, or means for the disaster to occur. May occur once every 10-100 years.
4	Likely	Likely to or may occur. Incidents are recorded regularly and there is strong anecdotal evidence. Will probably occur once every 1-10 years
5	Very Likely	Very likely to occur. There is a high level of recorded incidents and there is strong anecdotal evidence. Will probably occur more than once a year.

Risk Assessment Methodology

All local emergency service providers should provide a hazard record sheet for all hazards, Chen at al., (2018), which is identified in stage two. The hazard record sheet clarifies information about the hazards, including their potential impact and likelihood, as well as the identification of its proper location on the risk matrix.

Table (9) illustrates a classification of impact guide, which is used to understand the impact on humans, environment and infrastructure. After finalizing the hazard record sheets (see Figures 11 and 12), local agencies who carry out this work should identify areas of uncertainty where expert technical advice will need to be sought. However, it must be remembered that the assessment does not need to be a detailed technical analysis.

Table 9. Classification of Impact (The Guide to Risk Assessment in Major Emergency Management, 2010)

Rank	Class	Impact	Description
1	**Minor**	Life, Health, Welfare	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment
		Environment	No contamination; localised effects
		Infrastructure	<0.5M Euros
		Social	Minor localised disruption to community services or infrastructure (<6 hours).
2	**Limited**	Life, Health, Welfare	Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required.
		Environment	Localised displacement of a small number of people for 6-24 hours; personal support satisfied through local arrangements
		Infrastructure	Simple contamination; localised effects of short duration
			0.5-3M Euros
		Social	Normal community functioning with some inconvenience

3	**Serious**	Life, Health, Welfare Environment Infrastructure Social	Significant number of people in affected area impacted with multiple fatalities (<5); multiple serious or extensive injuries (20); significant hospitalisation Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated; external resources required for personal support Simple contamination; widespread effects or extended duration 3-10M Euros Community only partially functioning, some services available
4	**Very serious**	Life, Health, Welfare Environment Infrastructure Social	5 to 50 fatalities; up to 100 serious injuries; up to 2000 evacuated Heavy contamination; localised effects or extended duration 10-25M Euros Community functioning poorly; minimal services available
5	**Catastrophic**	Life, Health, Welfare Environment Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50); injuries in the hundreds; more than 2000 evacuated Very heavy contamination, widespread effects of extended duration >25M Euros; serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period Community unable to function without significant support

HAZARD CATEGORY	**SUB-CATEGORY**
Hazard Description	**Hazard Location**
Date	**Review Date:**

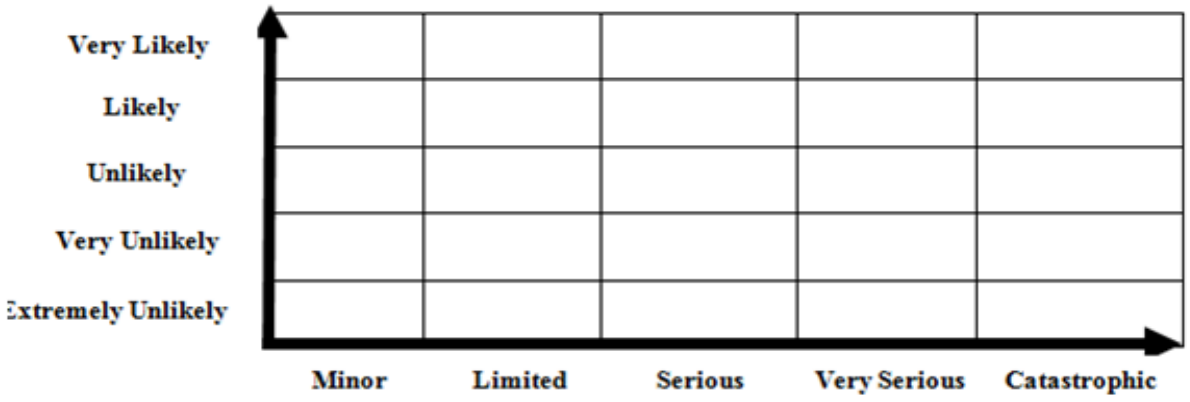
1. Overview of Hazard
2. Key Historical Evidence

Figure 11. Individual Hazard Record Sheet No. 1 (The Guide to Risk Assessment in Major Emergency Management, 2010)

3. Assessment of Impact and Likelihood

Hazard	Impact				Likelihood
	Human Welfare	Environment	Physical Infrastructure	Speed of Development	
	Minor	Minor	Minor	Minor	Very Likely
	Limited	Limited	Limited	Limited	Likely
	Serious	Serious	Serious	Serious	Unlikely
	Very Serious	Very Serious	Very Serious	Very Serious	Very Likely
	Catastrophic	Catastrophic	Catastrophic	Catastrophic	Extremely Unlikely

4. Position on Risk Matrix



5. Prevention/Control/Mitigation Measures in Place

6. Risk Management Approach: Prevention/Control/Mitigation Measures Required

Figure 12: Individual Hazard Record Sheet No. 2 (The Guide to Risk Assessment in Major Emergency Management, 2010)

All measures of control, prevention and mitigation – which are already considered to be recorded are taken into account so that a decision can be made regarding the position of the hazard on the risk matrix. This process is primarily undertaken at the individual agency level and then repeated at regional level in small multi-agency teams of three or four individuals. Hazard record sheets provided at the inter-agency level should include as much information as is available in relation to the hazard. If quantitative data is available, it should be used in support of the risk assessment.

Stage 4: Recording Potential Hazards on a Risk Matrix

The steps proposed for writing a risk assessment is considered at this stage. In Figure (10) above, a 5x5 matrix, using the scales shown in the Tables (8 and 9) for the impact and likelihood presented is used to provide the results.

Recording Potential Hazards on a Risk Matrix Methodology

The criteria for the impact and likelihood shown in Tables (8 and 9) are used to position all the identified hazards on the risk matrix.

Using the Risk Assessment

Another advantage of risk assessment is that it provides a sound basis for identifying a range of steps to be used during later stages of the disaster management life cycle, especially during the mitigation, planning and preparedness phases (Rout and Sikdar, 2017). The outcomes of the risk matrix can be used as a template to show how risk assessment can place a potential hazard into the normal or major emergency zone. The extremities of these two areas are noted as follows:

1. A prevention and mitigation area, in which the hazard is required to be prevented or mitigated.
2. A disaster/extendibility area, in which the hazard is most unlikely and therefore, does not warrant any specific preparations but can be responded to by extending inter-agency arrangements of the major emergency.

Using the Risk Assessment Methodology

An inter-agency team, consisting of representatives from different agencies such as the police, health services and local authorities, should select a range of six disaster or emergency scenarios, which will produce a basis for the development of a robust, major emergency plan that involves all potential hazards. In the extendibility zone (catastrophic impact, very unlikely), one scenario should be included in the process. It is recommended that a more likely event is chosen for this purpose, rather than a potential "freak" or "bizarre" incident. Following identification of appropriate scenarios, they should be tested in terms of the response dimensions and logistics that would be needed (Rout and Sikdar, 2017).

Defining Local Response Dimensions

Each local response agency should use the nominated scenario as a basis for determining the primary response requirements for major emergencies (The Guide to Risk Assessment in Major Emergency Management, 2010). The response dimensions can be a qualitative or quantitative statement of the performance required of a system or resource to deliver a reasonable response to minimize the impact of an emergency Garbarino and Holland (2009). These responses can cover topics such as:

1. The need of resources and specific equipment.
2. Number and quality of local responders.
3. Situations where special operating procedures or plans are required for specific risks.
4. The need for training/exercising.
5. The need for the coordination of third parties, such as utility companies, for instance at specific sites or situations.
6. The need for specific arrangements with the private sector.

Hazard mapping of potential damages will let the community know its level of vulnerability and will enhance the emergency response procedure. Rebuilding disaster-stricken communities, including rebuilding by individual homeowners and businesses post-disaster, as soon as possible. The enforcement of strict building codes and standards is to be ensured during this stage Al-Fahad (2012). Adequate and fair monetary compensation to victims allows people to rebuild their

dwellings and replace other losses. Resuming economic functions is very important for the physical survival and the emotional healing process after a disaster, Du et al., (2015).

Community participation is another vital aspect of disaster reconstruction. If members of the affected community take part in the reconstruction process, it will help the affected community members to restore their mental stability. Sometimes huge disasters cause people to move from their homes and land, as they consider future vulnerabilities. For example, Sumatra, Indonesia is renowned for frequent relocations due to continuous natural calamities (USAID, 2002). When all this reconstructive work is completed, the relevant response actions should be carried out to inform individual agencies of the best steps to be taken in the planning and preparedness stages. If gaps are discovered, there is a need to identify additional resources which could be obtained in an emergency as part of the preparedness cycle, ensuring that arrangements are carried out effectively, if and when they are needed (Guide to Risk Assessment in Major Emergency Management, 2010).

This section highlights a holistic risk assessment approach and illustrates how disasters can be managed. Nominating hazards randomly cannot accomplish the beneficial outcomes of a modern disaster management process. When there are no policies or Acts enforcing the use of a risk assessment by local authorities, no local agency will conduct one. On this note, the next paragraph highlights the importance of disaster management policies and acts.

2.7 Disaster Management Policies/Act

Gupta and Nair (2012) noted that policy is the key area in disaster risk management. The International Federation of Red Cross and Red Crescent Societies states that appropriate disaster management legislation increases the resilience of people against disasters. This view is enforced by the *Hyogo Framework for Action Plan (2005-2015*) which has been adopted by the UNISDR. The framework was created to fill the gap between governance and the participation of governments in the reduction of risks, both at local and national levels. The report further claims that policies, legal frameworks and compliance to the strategies involved, increases the capacity of a country to deal with disasters. Legislation can be used to create a new organisation in risk with of reduction measures and to assist already-existing bodies in their undertakings. Zodrow & Llosa (2011) stated that a law in action increases the incidence of responsibility on all agencies and obligates them to take action in disaster management.

Every country is guided by different legislation in their endeavours to reducing disaster risk with the responsibility of all relevant agencies. For example, in the United States, FEMA are given the authority to coordinate disaster responses all over the United States. However, FEMA only responds to emergency requests as per the governors of the various localities in which a disaster has occurred (except when a federal property is affected). FEMA also facilitates the preparation of citizens and the relief given to "affected people".

Since 2003, FEMA has been under the authority of the Department of Homeland Security. The authority of FEMA is reinforced by the Disaster Mitigation Act of 2000. This Act is an amendment to the previous Stafford Disaster Relief and Emergency Assistance Act. The Act also demands coordination between the various levels of government in the mitigation process. The most important amendment to the Act was that of including aspects of mitigation, planning and implementation.

The Mitigation act in the United States provides provisions on the rules and regulations to be followed for a state to receive aid via the Hazard Mitigation Grant Program in the event of a disaster (for both standard and enhanced plans). The Act amends the previous mitigation plan and rules that a minimum of 7% are made available for each state. The Act makes available a minimum of 7.5% of the hazard mitigation grant program funds for states that have standard state mitigation plans. Moreover, the rules require each state should have a strategy to mitigate disasters, including determining a states vulnerability status and performing risk assessments. The Act also requires that the state demonstrates an already-working mitigation plan. In cases where the state has enhanced mitigation plans in place, the Act allows the state to receive up to 20% of the allowable amount of disaster relief (FEMA, 2016).

The mitigation requirements are different for local and district governments. Of these smaller branches of government, the Act requires that local jurisdictions show plans that have incorporated the capability of the residents; district governments can only pursue the plans as either grantee or sub-grantee. The Act also makes it mandatory for local and district governments to have in place a mitigation plan approved by FEMA in order to receive grants. These mitigation plans must be reviewed and approved every three years (for district) and every five years (for local governments). Furthermore, FEMA requires, under the act, each government to provide plan updates, as per predetermined timelines, to show the progress that has been made over the required period of time.

The Act has also provided procedures for state, local and district governments to follow in the review and update process .

Unlike the United Kingdom, India is more vulnerable to disasters mainly because of its geographical and climatic conditions; disasters in India range from floods to droughts to earthquakes. Its vulnerability makes it a country that urgently needs a good governance structure and strong legal authority for better disaster management practices. Furthermore, as most of the country's population is poor, there is a need for a disaster relief program which the government has in place. The Disaster Management Act of 2005, seeks to outline preparation and prevention procedures for natural disasters. This Act gives overall authority when dealing with disasters to the National Disaster Management Authority, State Disaster Management Authority and the District Disaster Management Authority (The Disaster Management Act, 2005).

The National Disaster Management Authority has the power to draw up policies and plans that are applicable to disaster management. The Act also gives central government the power to set up the National Institute of Disaster Management, which is responsible for the training of personnel and the documentation of disaster management policies. The national policy on disaster management has also been established and its objectives include improving disaster preparedness, prevention and mitigation measures such as developing and incorporating disaster management practices and creating awareness of disaster management through partnerships with the media (National Policy on Disaster Management, 2005).

In each of these countries, the legal framework sets the precedent and the grounds for the operations of the various agencies that enforce the disaster management policies in that country. In the United States, FEMA operates under the guidelines of the Disaster Mitigation Act of 2000, especially regarding the relief measures of state, local and district governments. In India, the national authorities on disaster management are set up under the Disaster Management Act of 2005 and consequently, the National Policy Disaster Management.

According to Gupta and Nair (2012), developing a legal framework to manage a disaster is an urgent need for all countries. Also, sufficient legal policies and institutional support are key aspects of the effective implementation of any disaster risk management plan. For instance, in Australia, the Queensland Disaster Management Act (2003) forms the legislative basis for Disaster

Management activities within all levels of government. The main responsibilities outlined in the Queensland Disaster Management Act are for the establishment of a state disaster management group whose main functions are to provide a strategic policy framework for disaster management for the state. The next section discusses the Disaster Management Framework.

2.8 Disaster Management Framework

Disaster management involves the coordination and integration of all activities required to prepare, prevent and protect against any harmful threats that could result from natural disasters. The process of managing a disaster risk is a complex affair that needs the participation of various sectors, organisations and individuals. Therefore, to ensure the success of the process, there needs to be mechanisms through which these various participants are coordinated. A Disaster Management Framework provides these mechanisms that foster cooperation between the various institutions mandated to undertake various disaster management duties. The framework in disaster management is used to assist organisations with integrating disaster management into its management system. The Disaster Management Framework assists in effectively managing risks through the application of the risk management process (Risk Management, 2009). According to the Disaster Management Strategic Policy Framework (2005), a Disaster Management Framework provides a comprehensive all-hazards, all-agencies approach and achieves the right balance of prevention, preparedness, response and recovery. As different countries have different legislation and institutions in order to discharge the responsibility of mitigating occurrence and impact of disaster, this results in different frameworks existing in each country. Therefore, the next paragraph provides different examples of Disaster Management Frameworks, such as in India, America, Pakistan and Australia. This highlight how these countries approach the process of disaster management.

The reason that the author of this research specified these countries as an example in this research as a reference points to compare different disaster management frameworks, both in developed and developing countries. Furthermore, the selected geographical locations are all susceptible to natural and man-made hazards and have indeed encountered disasters recently. These choices highlight and clarify the efforts and what the disaster management framework includes in different countries. Moreover, the finding or key issues and elements of these frameworks will be compared with the current Kuwaiti disaster management framework. This comparation will be validated in

the next Chapter (3). The main targets that the author of this research aims to highlight from the different disaster management framework examples are to clarify the following:

1. Whether or not the framework is supported by an Act.
2. Agency/Agencies specified to ensure the adaptation of the framework.
3. The framework highlights all the phases of the disaster management life cycle.
4. The framework highlights the risk assessment and priorities of the work.

2.8.1 Disaster Management Framework in India

The susceptibility of India to natural disasters cannot be emphasized enough. The need for the efficient coordination of the activities for all stakeholders in the disaster management structure is paramount. The Disaster Management Act (2005) in India, which was assented by the Prime Minister in 2006, formulated various institutions that are considered to be stakeholders in the disaster management projects to being part of the National Disaster Management Authority. The Ministry of Home Affairs has therefore, come up with a National Disaster Management Framework to streamline the responsibilities of The National Disaster Management Authority in accordance with the requirements of the Act.

At national level is the National Disaster Management Authority, which has the legislative and financial powers to undertake its responsibilities, as stipulated in the Disaster Management Act. This mandate covers all disasters, except drought (National Disaster Management Framework, 2016). As part of the identification of risk and vulnerability assessment, mandates to carry out zonal risk assessments are given to districts every five years, which represents the first factor of the disaster management life cycle theory (Figure 2). In this regard, the structure outlines the awareness campaigns that are to be carried out by research institutes and universities. Preventive measures in all private and public initiatives are also critical in the disaster management process and therefore, there is a need to develop guidelines and manuals that are written in easy-to-understand and vernacular languages.

The National Disaster Management Framework in India also includes an early warning structure that seeks to warn citizens of any impending natural disasters at national, district and local levels, which represents (mitigation) the second factor of the disaster management life cycle theory

(Figure 2). At the national level, the National Disaster Management Authority is expected to use different modelling techniques for early warnings and to use the Geographic Information System for determining which areas are likely to be affected by hazards. At the state level, the framework orders the departments of irrigation and agriculture to come up with warning strategies. At both the district and the local levels, warning measures are taken up by district Emergency Operations Centres and village groups, respectively.

Disaster preparedness, mitigation and response are also distributed among the state, national, district and local levels. The most important of these is the local level and each village is to have disaster management committees present, especially in very vulnerable areas, complete with response plans that include relief materials, evacuation strategy and emergency housing facilities. Communities are also responsible for the training of the Panchayats (Indian caste) and carrying out of various drills, at given time periods, which represents the third factor of the disaster management life cycle theory (Figure 2).

The same organisational structure is replicated at the district level, while at the state level there is a need for the formation of a State Rapid Disaster Action Force, which includes members of various agencies. At national level the National Disaster Management Framework is responsible for the setting up of special paramilitary forces. This framework is enforced by a Disaster Management Act, which specifies specific agencies responsible for identifying hazards, vulnerabilities and risks, as well as for ensuring that sufficient early warning procedures are in place. The framework also requires the establishment of a committee in each area to train and educate the public in how to survive a disaster (National Disaster Management Guidelines, 2017).

The disaster management framewok in India validate a solid road map to the National Disaster Management Authority to perform the different factors of the disaster management life cycle (Figure 2), howerver, the last factor (recovery phase) was not considered, which could delay the recovery process of the citizen, infrastructure, economic and government after a disaster. Therefore, the National Disaster Management Authority in India needs to consider and integrates the final phase (recovery) of the disaster management into the disaster management framework.

2.8.2 Disaster Management Framework in America

The Federal Emergency Management Authority (FEMA) is charged with the mandate of driving Disaster Management activities within the country in line with the requirements stated in the Robert T. Stafford Disaster Relief and Emergency Assistance Act and the Disaster Mitigation Act of 2000. FEMA has also developed different frameworks for the National Prevention Framework, such as the National Protection Framework, the National Mitigation Framework, the National Response Framework and the National Disaster Recovery framework. These frameworks are based on the areas of prevention, protection, mitigation, response and recovery (FEMA National Planning Frameworks, 2016) .

The different frameworks therefore coordinate and depend on each other to achieve the goals of the national preparedness for disasters. The national prevention framework describes the steps and actions that communities, territories, states and the nation at large should take, should there be reports of an imminent disaster. This framework ensures that the community is well-prepared for the disaster to reduce its overall impact on the nation as well as on individual communities. Some leaders are given responsibility of progressing and improving their capabilities in sidelining disasters, through being given important roles and responsibilities. This is an attempt to lay the foundation and coordinate stakeholders for further operations and planning (Homeland Security, 2014).

The prevention goal, based on the seven pillars of capability as defined by Homeland Security in 2014, includes intelligence, public information, coordination and interactions. To achieve this goal the framework includes the participation of various stakeholders who are responsible for carrying out different capabilities including the Federal Bureau of Investigation, the National Operations Centre of the Department of Homeland Security and the Strategic Information Operations Centre, among other strategic institutions. The National Protection Framework describes the steps that the country, as a whole, is taking to safeguard against hazards or threats. This framework also contributes to the preparedness of the country for imminent disasters and outlines the capabilities of each practitioner to include planning, public warning, protective measures and risk management programs (Homeland Security, 2014, p.5). The effectiveness of delivering these capabilities is dependent on the information centres, law enforcers, operations centres and other stakeholders. The protection framework further strengthens the prevention framework with achieving overall

preparedness. The National Mitigation Framework focuses on understanding risks and how to minimize their outcome. Thus, the framework outlines the core capabilities that the country needs in preventing loss of life and the destruction of property (Homeland Security, 2014).

Through planning, operations coordination, public awareness, hazard identification and disaster resilience assessments, the responses of all stakeholders to disaster occurrences are encapsulated by the National Response Framework (FEMA Mitigation Core Capabilities, 2018). The framework outlines the practices that need to be undertaken by the various authorities to effectively deal with incidents of injury. The area needs structures that are scalable, flexible and adaptable in order to achieve and deliver its core capabilities, given the different factors that influence vulnerability, such as area, frequency of hazards, structures and culture. This ensures that the country is equipped in dealing with attacks as they come. The last area of focus is covered by the National Recovery Framework, which focuses on how the country deals with the aftermath of a hazard and utilises the mechanisms put into place in affected areas. The framework also outlines how best to restore, redevelop and revitalise the area in terms of health and its social, economic, natural and environmental aspects (Homeland Security, 2014, p.7).

Within the recovery framework, there are federal, state and district state, or disaster recovery coordinators, local disaster recovery managers and recovery support functions that are responsible for the restoration of the country after a disaster. The underlying basis for developing a Disaster Management Framework is to help organisations build policy objectives which enhance governance and accountability and to help the government come up with solutions to complex issues. The Disaster Management Framework can also:

1. Strengthen the governments accountability and transparency by establishing strategic priorities to guide the application of resources and the reporting the achievements of priorities and outcomes.
2. Provide guidance to all levels of government, apply effective corporate governance and to commit to the continuous improvement of policies, programs, practices and service delivery to improve community safety.
3. Promote a transparent, systematic and consistent approach to disaster risk assessment and management (Strategic Policy Framework, 2005).

The Disaster Management Act (2015), notes that the main functions of a disaster management committee are to develop strategic frameworks for disaster management for the state and to clarify paths of action for disaster management practitioners. As seen in this section, the United States of America has developed different Disaster Management Frameworks, which aspire to mitigate the impact of disasters and each framework specifies which agencies are responsible for specific tasks. The framework achieves the objectives of the disaster management (National Disaster Recovery Framework, 2018).

However, the author of this research found the discussed framework of the United States of America need to be improved, because the disaster management life cycle which addressed in their framework does not include the (identification of hazards phase, Figure 2), which could confuses the emergency planners in identifying all hazards.

2.8.3 Disaster Management Framework in Pakistan

The National Disaster Management Framework report (2007), mentions that after the 2005 earthquake which killed more than 100,000 people in Pakistan, the government of Pakistan raised the need of establishing an appropriate Disaster Management Frameworks, policies and institutional arrangements, to reduce future losses caused by disasters .

The establishment of a Disaster Management Framework in Pakistan involved multiple stakeholders and included the participation of the Pakistani Government, serving as a vision document for leading the way towards a safer Pakistan. The Pakistani Disaster Management Framework provides guidelines for the coordination of the various stakeholders' activities. It also lists priorities for managing and mobilising resources from donors and development partners in Pakistan, to implement strategic activities over the next five years; this requires the cooperation of all concerned ministries, armed forces groups, departments, technical agencies, provincial governments, media, NGOs, UN agencies, donors, and most of all, the vulnerable communities.

The Disaster Management Framework project was created under the supervision of the National Disaster Management Commission and the National Disaster Management Authority in Pakistan (Maqbool et al., 2017). The National Disaster Management Authority in Pakistan is responsible for coordinating and facilitating the implementation of strategies and programs for disaster risk

reduction, response and rehabilitation, (National Disaster Management Authority, 2007). The National Disaster Management Framework (2007), states that there are nine priorities for establishing and strengthening policies, institutions and capacities over the next five years:

1. Institutional and legal arrangements for disaster risk management.
2. Hazard and vulnerability assessment.
3. Training, education and awareness.
4. Disaster risk management planning.
5. Community and local level programming.
6. Multi-hazard Early Warning Systems
7. Mainstreaming disaster risk reduction into development.
8. Emergency response systems.
9. Capacity development for post-disaster recovery.

The Pakistani Disaster Management Framework also defines which tasks key national, provincial and local stakeholders are to undertake in the promotion of disaster risk management (Maqbool et al., 2017). These tasks are as follows:

1. Risk assessment in the planning and design stages of all new infrastructure and projects.
2. Assess vulnerability of both people and infrastructure.
3. Develop disaster risk management plans.
4. Take into account vulnerability reduction measures in new projects.
5. Develop and validate technical capacities of departments/sectors to implement disaster risk management strategies.
6. Allocate funds for disaster risk management in annual development budgets.
7. Conduct post-disaster damage and loss assessments.
8. Organize emergency responses as per the mandate of the department.
9. Organize recovery and rehabilitation programs as per the mandate.

The National Disaster Management Framework (2007) states that the principles established in the Pakistani Disaster Management Framework are as follows:

1. Promoting multi-stakeholder, multi-sectional and multi-disciplinary approaches and reducing vulnerability for the most vulnerable people.
2. Strengthening the community; local level risk reductions along with a scientific and common knowledge, ensuring sustainable livelihood practices.
3. Acquiring specific knowledge of the hazard-risk profile of the area and country and working with other countries to promote disaster risk reduction.

The author of this research found that the disaster management framework in Pakistan is one of the best frameworks which specifies a specific agencies to performs different tasks in the disaster management. However, there is a lack in term of an obvouse theory or a model that can demonstrates the curriculum of the disaster management processes in Pakistan, such as the disaster management life cycle (Figure 2). The following (Table 10) is an example of a five-year set of guidelines and priorities, as used in Pakistan.

Table 10. Five Years Guidelines and Priorities for Disaster Management in Pakistan (The National Disaster Management Framework, 2007)

Priorities	Time Frame - Year			Cost -Year $ million		
1. Institutions and Legal Arrangements (Authorities)	1					
2. National Hazard and Vulnerability Assessment	1-2			2		
3. Training, Education and Awareness		2-3		2.5		
4. Promoting Disaster Risk Management Planning		2-3		.075		
5. Community- and Local-Level Risk Reduction Programming	1-2				.02	
6. Multi-Hazard Early Warning System			3-5			14

7. Mainstreaming Disaster Risk Reduction into Development	1-5			.011		
8. Emergency Response System			1-5			4
9. Capacity Development for Post-Disaster Recovery		2-3				16

2.8.4 Disaster Management Framework in Australia

According to the State Disaster Management Group report (2010), the Disaster Management Framework in Australia was developed in 2005, based on the principles and requirements given by the Council of Australian Government's report, "Natural Disasters in Australia: Reforming Mitigation, Relief and Recovery Arrangements" (2002). The 2002 report identified the need for a comprehensive all-hazards, all-agencies approach to disaster management, including new threats to Australia (and the world), such as terrorism. The report also outlined important disaster management elements and definitions in developing the current Disaster Management Framework.

The Disaster Management Framework now reflects the outcomes of the review of Queensland disaster management legislation and policy, as well as the Disaster Management Act of 2003, which forms the basis for disaster management legislation within all levels of government (State Disaster Management Group Report, 2010).

The Disaster Management Act (2003) outlines the establishment of the State Disaster Management Group, which is considered one of the key organisations responsible for developing Australia's Disaster Management Framework. The function of this group is to develop a strategic policy framework for disaster management in Australia. This framework:

1. Articulates the policies, principles and objectives for disaster management for the state in line with the guiding principles and objectives of the Disaster Management Act (2003)
2. Supports the development and introduction of climate change adaptation and sustainability initiatives (State Disaster Management Group report, 2010).

The Disaster Management Framework in Australia is based on the elements of disaster management given in the Council of Australian Governments report, "Natural Disasters in Australia: Reforming Mitigation, Relief and Recovery Arrangements" (2002) and it builds upon the four guiding principles outlined in the Disaster Management Act 2003:

1. Disaster management should be planned across the four phases – prevention, preparation, response and recovery.
2. All disasters, natural or manmade acts or omissions, should be managed in accordance with the strategic policy framework, the state disaster management plan and any disaster management guidelines.
3. Local governments should be primarily responsible for managing events in their local government area.
4. District groups and the State group should provide local governments with appropriate resources and support to help local governments carry out disaster operations.

The Australian Disaster Management Framework also:

1. Provides a comprehensive all-hazards, all-agencies approach to achieving the right balance of prevention, preparedness, response and recovery.
2. Supports the mainstreaming of disaster preparedness and mitigation into relevant areas of activity of the government, non-government, small business and corporations.
3. Aligns disaster risk reduction, disaster mitigation, disaster resilience and climate change adaptation policy and actions with international and national reforms.

To enhance governance and accountability, and to promote integrated government solutions to complex issues, effective policies and tools are considered as vital (State Disaster Management Group Report, 2010). The Australian Disaster Management Framework also:

1. Increases the accountability and transparency of government by establishing strategic priorities to guide the application of resources and the reporting of the achievement of priorities and outcomes.
2. Provides guidance to all levels of government to apply effective corporate governance and commitment and to continually improve policies, programs, practices and service delivery to promote community safety.

3. Promotes a transparent, systematic and consistent approach to disaster risk assessment and management based on the National Emergency Risk Assessment Guidelines and the Australian/New Zealand Standard Risk Management – Principles and Guidelines (AS/NZS ISO 31000, 2009).

In terms of the stakeholders in the framework, they include those who contribute to risk management and those who are responsible for mitigating risk, preparing communities to respond to events and supporting recovery from disasters (State Disaster Management Group report, 2010). Therefore, the Australian Disaster Management Framework also:

1. Acknowledges the relationship between Queensland and other states and between countries in major disaster events.
2. Recognizes the commitment of stakeholders and the need for collaboration across all levels of government, community, industry, commerce, government-owned corporations, private and volunteer organisations and local communities in all aspects of disaster management.
3. Emphasizes the building and maintenance of sincere relationships, trust, teamwork, consultative decision-making and shared responsibilities among stakeholders.

Resilience is considered one of the key factors of disaster management, and therefore, learning from recent world disasters continues to reinforce the current principles of disaster management and the importance of prepared, resilient communities/resilience within the framework:

1. Represents a key component of Queensland's commitment to the Council of Australian Governments' resilience program, including the National Strategy for Disaster Resilience and ongoing reforms for natural disaster mitigation, relief and recovery arrangements.
2. Promotes community resilience and economic sustainability through disaster risk reduction.
3. Promotes prepared, resilient communities that understand their roles in disaster management arrangements (State Disaster Management Group Report, 2010).

According to the State Disaster Management Group Report (2010), the following elements represent the Disaster Management Framework of Australia:

1. Research: Systematic inquiries used before and after disasters in order to reveal any management problems. There is a high investment in disaster research within Australia to provide continuous improvement, including the use of lessons learned from previous disasters. Using research can inform disaster management and improve the effectiveness of management principles, policy development and practices.
2. Policy and governance: to ensure the clear direction of disaster priorities, resource allocation and accountability, supported through business continuity, performance management reporting and corporate risk management processes.
3. Risk assessment: to determine risk management priorities by evaluating and comparing the level of risk against predetermined standards .
4. Mitigation: to eliminate a disasters impact.
5. Preparedness: includes arrangements to ensure that a community is aware of and prepared for any disaster.
6. Response: includes the activities taken in anticipation of, during and immediately after an event to ensure that its effects are minimized.
7. Relief and recovery: includes the life support and human needs to persons affected by, or responding to, a disaster. All activities undertaken during disaster operations.
8. Post-disaster assessment: To "evaluate performance before, during and after a disaster event" (State Disaster Management Group Report, 2010, p.4).

The aforementioned Disaster Management Framework elements can guide the government of Australia towards planning for disasters as the framework entails that all government and non-government agencies cooperate to educate the public and protect them from disasters. The author also found that the Disaster Management Framework in Australia is one of the best frameworks in the world for the following reasons:

1. It is enforced by an Act and the Act defines all important definitions.
2. The framework covers all four phases of disaster management (mitigation, preparedness, response and recovery).
3. Specific tasks to be carried out by different participants are outlined in the framework.
4. The supervision agency is defined in the framework.

However, the disaster management framework in Australia also lach of an obvouse theory or a model that can demonstrates the stages, or curriculum of the disaster management processes in, such as the disaster management life cycle (Figure 2).

The author of this research highlighted in the previous paragraphs different Disaster Management Frameworks that are used in different countries such as India, America, Pakistan and Australia. These frameworks, considered as private national frameworks, are designed to exist in a specific country, which means that the discussed frameworks may not work or exist in other countries. At the same time, there are international disaster risk management frameworks designed by experts from different countries which work under the umbrella of The UNISDR. These international frameworks helps the countries worldwide to strengthen their own disaster risk management process and provides guidelines to reduce the impact of disasters. The next section discusses the aim of establishing the UNISDR and the international frameworks.

2.9 United Nations Office for Disaster Risk Reduction

According to the United Nations General Assembly Resolution (56/195), the United Nations Office for Disaster Risk Reduction's (UNISDR) mandate has been defined by a number of United Nations General Assembly Resolutions, the most notable of which is "to serve as the focal point in the United Nations system for the coordination of emergency or disaster mitigation and to ensure cooperation against the disaster mitigation process of the United Nations system, regional agencies and activities in socio-economic and humanitarian fields" (UN General Assembly Resolution, 56/195).

The main aims of UNISDR is to coordinate international efforts in disaster risk reduction and to guide, monitor and report regularly on the progress of the implementation of the disaster risk reduction framework. Examples of the work done by UNISDR are the *Hyogo Framework for Action Plan 2005-2015* and the recent *Sendai Framework for Disaster Risk Reduction (2015/2030)*. UNISDR chairs international meetings, like the World Conference on Disaster Risk Reduction (WCDRR) and the Global Platform on Disaster Risk Reduction, which are attended by different stakeholders within the disaster management field, such as decision-makers and leaders, in the preparation of risk mitigation policies and strategies. UNISDR also manages seven regional platforms every two years and helps with the preparation of the establishment of national

coordination mechanisms (e.g., the National Platforms for Disaster Risk Reduction), which are nationally-owned. UNISDR also leads multi-stakeholder forums on preparing for disaster risk mitigation and these forums reflect the commitment of a country's government to the implementation of national and local disaster risk reduction agendas.

The International Strategy for Disaster Reduction (ISDR) represents a major shift from the traditional focus of disaster response to disaster mitigation and reduction strategies, as it aims to create a culture of prevention against disasters (UN General Assembly Resolution, 56/195). Therefore, UNISDR is the secretariat of the ISDR and is mandated by the United Nations General Assembly to ensure its implementation. The ISDR was validated after the experience of the International Decade for Natural Disaster Reduction (1990-1999), which was launched by the United Nations General Assembly in 1989. The ISDR outlines the principles followed during the decade in a number of different documents (e.g., *Yokohama Strategy and Plan of Action for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation*) (UNISDR, 2015).

2.9.1 The Yokohama Strategy

The *Yokohama Strategy and Plan of Action for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation* represents the outcome of the World Conference on Natural Disaster Reduction, held in Yokohama, Japan from 23 May to 27 May 1994. The document serves as a guide for natural disaster prevention, preparedness and mitigation. The strategy consists of three parts. The first part discusses the principles on which a disaster reduction and mitigation strategy should be based. The second part provides a plan of action agreed by all member states of the United Nations. The third part gives guidelines concerning the follow-up action (Yokohama Strategy, 1994) .

The Yokohama Strategy aims to increase global awareness in terms of disaster prevention, as well as to improve the risk assessment process and set up proper warning and communication systems. The Strategy provides an assessment of disaster reduction practices since the beginning of the decade, as well as a strategy for the year 2000 and beyond. This includes a plan of action for missions at the international, national, regional and sub-regional level, including recommendations for follow-up (Yokohama Strategy, 1994).

The following elements represent the main issues that led the United Nations member states to lunch the Yokohama Strategy. These issues represent specific gaps and challenges that were identified in five main areas:

1. Organisational, legal and policy frameworks.
2. Risk identification, assessment, monitoring and early warning.
3. Knowledge management and education.
4. Reducing underlying risk factors.
5. Preparedness for effective response and recovery.

2.9.2 The Hyogo Framework

The previous section highlighted the *Yokohama Strategy and Plan of Action* while this section highlights the *Hyogo Framework for Action Plan 2005-2015*. The HFA is a ten-year plan intended to make the world safer against natural hazards. It was adopted by the United Nations General Assembly following the World Disaster Reduction Conference which took place from 18 January to 22 January 2005 in Kobe, Hyogo, Japan.

According to the HFA, in 2005, governments around the world were committed to taking actions to reduce disaster risks and adopt guidelines for mitigating their vulnerability against natural hazards. These guidelines were inserted into the HFA. The HFA supports the efforts of nations and communities in becoming more resilient to and preparing better for hazards that threaten their development. The main outcome of the Hyogo conference was the commitment of international governments to address disaster reduction and to engage in a results-based plan of action for the next decade (i.e., from 2005-2015) (Hyogo Framework, 2005).

The HFA objectives are to:

1. Review the Yokohama Strategy and its Plan of Action, updating the guiding framework on disaster reduction for the 21st century.
2. Identify specific process aims to ensure the implementation of relevant plans, such as plans for improving vulnerability, risk assessment and disaster management.
3. Share a suitable process of lessons learned regarding further disaster reduction practices, identifying gaps and challenges in the field of disaster management.

4. Increase general awareness of the importance of disaster reduction policies.
5. Increase the availability of suitable disaster information to the public and disaster management agencies.

2.9.3 The Sendai Framework

The *Sendai Framework for Disaster Risk Reduction (2015/2030)* is the first major agreement of the post-2015 development agenda. The framework highlights seven tasks and four priorities for action and was confirmed by the United Nation General Assembly after the 2015 United Nations World Conference on Disaster Risk Reduction (WCDRR, 2016).

The *Sendai Framework* was adopted at the third United Nations World Conference on Disaster Risk Reduction in Sendai in Japan on 18 March 2015. The framework is a 15-year voluntary agreement which considers that the state has the primary responsibility to mitigate the impact of disasters. This responsibility must be shared with other stakeholders, such as local governments and the private sector. The main intended outcomes of the *Sendai Framework* are substantial reduction of disaster risks and of the loss of lives and the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries (WCDRR, 2016). The *Sendai Framework* has four priorities:

1. Understanding disaster risk.
2. Strengthening disaster risk governance to manage disaster risks.
3. Investing in disaster mitigation for resilience.
4. Enhancing disaster preparedness for effective responses and to "build back better" in recovery, rehabilitation and reconstruction (WCDRR, 2016).

The seven *Sendai Framework* targets are to:

1. Reduce global disaster mortality by 2030, aiming to reduce the average global mortality rate per 100,000 people during the decade of 2020-2030 compared to 2005-2015.
2. Mitigate the number of impacted people globally by 2030, aiming to reduce the average global figure per 100,000 people during the decade of 2020-2030 compared to 2005-2015.
3. Reduce the direct disaster economic loss in relation to global gross domestic product GDP by 2030.

4. Mitigate disaster damage to the critical infrastructure and disruption of basic services, such as health and educational facilities, through developing their resilience to disasters by 2030.
5. Increase the number of countries with national and local disaster risk reduction strategies by 2020.
6. Enhance the international cooperation between developing countries to compliment their national actions for the implementation of this framework by 2030.
7. Increase access to multi-hazard Early Warning Systems and to disaster risk information and assessments for the general public by 2030 (WCDRR, 2016).

The author of this research attended and participated in this third world conference on disaster risk reduction in Sendai, Japan, along with another official delegate members of Kuwait. In January 2017, the Minister of Foreign Affairs in Kuwait nominated the author of this research to be the focal point for the state of Kuwait in the International Office for Disaster Risk Reduction, after receiving a recommendation letter from the general management of the Kuwait Fire Service Directorate. Therefore, the author of this research is following up with UNISDR on all of the international disaster risk reduction frameworks to ensure their adaptation within the state of Kuwait.

At the same time, establishing a Disaster Management Framework only will not reduce the impact of the disasters. However, disaster management process requires a wide range of participants, stakeholders and institutes from different fields. For instance, disaster management institutes can provide different research that could support the emergency planners in the decision making process. The next section discusses the benefits of establishing disaster management institutes and how such institutes can support the disaster risk management processes .

2.10 Disaster Management Institutes

According to the National Institute of Disaster Management NIDM (2015), the benefits of establishing disaster management institutes are to help local authorities with establishing policies, providing a scientific guideline on disaster mitigation, providing training programmes, research on disaster risk reduction, developing emergency plans, providing disaster consultants, and other relevant policies and processes.

Kuwait's lack of emergency and disaster management institutes has led local authorities to prepare for disasters separately and randomly, without the assistance of the scientific procedure. Establishing a disaster management institute will increase the local authorities' knowledge in terms of hazards, risks and vulnerability by providing disaster research. Therefore, there is a need for establishing a disaster management institute in Kuwait which could cooperate with national and international emergency institutes to gain up-to-date information regarding local and regional hazards and risks.

The author has seen that the lack of disaster or emergency institutes within Kuwait is due to the fact that the government does not consider disaster management process a priority. Moreover, the Civil Defence Committee, which represents the highest strategic level of disaster management in Kuwait, does not acknowledge the importance of establishing a disaster management institute even though such an institute could provide guidance in terms of improving the current Disaster Management Framework through identifying hazards and preparing disaster risk reduction plans.

Therefore, the author encourages with the Kuwaiti Government to support the establishment of an emergency, disaster management institute. Alternatively, the Civil Defence Committee could sign a cooperative protocol with international disaster management institutes in order to enhance the current state of disaster management in Kuwait. At the same time, establishing disaster management institutes is not enough and will not provide the entire solutions for a reasonable disaster risk management process, especially when there is a lack of education in terms of disaster hazards and risk management. Therefore, the next section highlights the importance of education in the disaster management field .

2.11 Disaster Education

According to a UNISDR Report (2016), education is a key element in disaster risk reduction. Therefore, the first step in the management process is to educate people by providing an applicable atmosphere. Education should be provided at individual level along with family and community level. Disaster education must not be an event (such as an evacuation drill); it should be a process, linked to the community and family. Different countries (e.g., Japan) provide disaster education programmes in schools to support civilian awareness and to increase their knowledge of disaster management (UNISDR, 2016).

According to the International Network for Education in Emergencies, in order to cultivate qualified emergency workers and ensure their accountability, they must be properly educated to the minimum level required for them not only to respond to a disaster but also to use disaster technology (e.g., the Geographic Information System) and to map hazards and vulnerabilities (INEE Report, 2015) .

In Kuwait, there is a lack of education programmes which would provide the population with appropriate awareness. There is also a lack of qualified professionals. For example, there is only one professional group in the country that is qualified in disasters management. At the same time, the educational institutes are not providing courses for anyone wishing to develop his or her knowledge in this field. Therefore, the government must reconsider the validation of providing courses on disaster and emergency management, as such courses would increase the awareness of emergency workers and the general public in terms of disaster risk reduction and management. Hence, such courses and training programmes would support the emergency practitioners in using different technologies, for instance, the Geographic Information System (GIS), which can support the emergency planners in viewing a wide range of information, such as locations of vulnerable group. The next section discusses the advantages of the GIS in the disaster risk management.

2.12 The Geographic Information System GIS

According to the ESRI Report (2012), a GIS is a system that has been designed to observe, acquire, store, manage, analyse, present and manipulate all known types of data that are geographically referenced. A GIS is said to be a system that entails the merging of databases, technology, statistical analyses and cartography. Such a system digitally creates and manipulates spatial or geographical areas that are either application, purpose, or jurisdictional-based. These systems are usually custom-designed for particular organisations depending on the organisation's activities.

The Kuwait Institute of Scientific Research (KISR) has established the Kuwait Geographic Information Centre – one of the country's top research institutes on geographical information management and research. This Institute has completed different GIS projects over several years. The GIS projects in Kuwait were implemented under different platforms and software, meaning that most of them did not conform to GIS standards. This means that Kuwait still needs to work towards ensuring that it can use and share its useful geographic information and resources with

other important stakeholders. Kuwait mainly uses GIS in scientific research, resource management and city planning. The Kuwaiti Geographic Information Centre has launched more than 10 GIS projects since 1990 .

Currently, GIS is used for disaster management in developed countries, providing emergency leaders, managers and planners with solid information to share, and the ability to gain information needed for a specific land or area (Johnson, 2000). In Kuwait, the Civil Defence Committee should be encouraged to participate in the science and technology institutes sector; this would give the committee sufficient information and geographic maps (e.g., hazard and vulnerability maps of Kuwait) that could be useful for disaster management. Another part of technology that can exist in the mitigation phase and to reduce the impact of a disaster is the use of an Early Warning System (EWS). However, the choice of the required Early Warning System/s depends on the hazards which are identified by a comprehensive risk assessment. The next section discusses the aims and advantages of an Early Warning System.

2.13 Early Warning System

According to the IFRC (2015), an Early Warning System is defined as a set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organisations against a specific risk so that they can prepare and act appropriately in sufficient time, reducing harm and loss. A warning system is a complete set of components that connects those who need to hear messages, and others who compile and track hazard information from which messages are composed.

The different Disaster Management Frameworks, such as in India, America, Pakistan and Australia, discussed earlier in this chapter, were considered and highlighted the use of the Early Warning System in their Disaster Management Framework and which agent or agencies are responsible for managing such systems. In Kuwait, an Early Warning System is available, whose responsibility for its use is with the Civil Defence Department in the Ministry of Interior, who can operate sirens heard in all police stations throughout Kuwait. This allowed the police to warn the public before and during a specific hazard that is likely to affect a specific location. The main purpose of the Early Warning System in Kuwait is to warn the public of possible rocket attacks or wars that could affect the entire Kuwaiti region (Civil Defence Department, 2014).

However, during the Iraqi invasion of Kuwait, the Civil Defence Department did not generate the sirens, nor did the Early Warning System warn the public of the invasion. Moreover, the Early Warning System has never warned the citizens of Kuwait of any specific hazard, showing that there is a lack of a systematic, disaster mitigation framework or plan outlining when the Civil Defence Department should operate the system to alert the public to a possible hazard that could harm the country.

In Kuwait, there are different sensing systems. For instance, the Public Authority for Environment in Kuwait has a sensing system for a specific hazard (e.g. a nuclear and radiation discharge) across the country. However, government agencies and emergency workers in Kuwait are not aware of this system. There is also no framework or obvious procedures regarding how the public authority for environment should warn the public when a leak of harmful radiation is detected. Finally, the Meteorological Agency in Kuwait is responsible for establishing an Early Warning System to warn the public and local authorities about hazards that could occur, such as dust storms, heavy rain, etc., throughout the local news and media during unstable weather conditions.

However, there is a lack of a framework or guidance illustrating criteria to be used by the Meteorological Agency in Kuwait. For instance, there are no guidelines for wind speeds at which an area is determined to be at risk, or what quantity of heavy rain is considered to be a hazard. Moreover, there are no clear procedures for informing the public what to do before, during and after the warning has been given.

2.14 Key Findings

In this chapter, the author of this research highlighted different processes such as disaster management standard, risk assessment and Disaster Management Framework to clarify how disasters can be managed nowadays. The main aim of this research is to improve the current Disaster Management Framework in Kuwait. Therefore, different examples from different geographic locations worldwide were discussed in this chapter such as in India, America, Pakistan and Australia to explore how these countries are approaching and preparing for disaster to reduce its impact. The key points observed by the author of this research from these Disaster Management Frameworks examples, are that all of the frameworks are supported by an Act, as well as different stakeholders who are responsible for the adaptation of the frameworks, articles and requirements.

Another important issue found is that all of the countries highlighted the term 'risk assessment' to identify the disaster hazards, although the frameworks vary from each other. For instance, there is a framework for each phase of disaster in the United States of America which exists and at the same time, there is one framework in the other countries. This means that each country has the right to build and establish its own Disaster Management Framework. Moreover, there are different stakeholders participating in the adaptation of these frameworks along with the tasks. The accountabilities for the adaptation of each part of the framework are delegated clearly to the relevant agency. Some of the countries also prioritise the framework tasks and provided strategies for the disaster risk reduction to ensure the level of risk is reduced. In addition, disaster awareness was considered in the discussed frameworks to increase the civilian's capability and capacity to cope with different disasters. Also, the discussed frameworks in this chapter show that these countries considered different components in the framework, such as the use of the Early Warning System, education, awareness and the different institutes or ministries that are responsible for adopting a specific task of the framework. Hence, the author of this research, at this stage, has gained a solid base of information in terms of what component and practices would be needed for improving the current Disaster Management Framework in Kuwait.

Therefore, to prepare for suitable disaster management practices, different factors need to be considered and these factors vary from country or emergency planner. As the disaster management science is still under studied, many researchers are still trying to validate a comprehensive model for disaster management, Nojavan et al., (2018). However, disaster statistics still show that disasters are a key tool for the loss of life worldwide. Better preparedness of a country gain better results and help in minimising loss of lives and properties. The validation of a disaster management framework will not stop the occurrence of the disasters. Nonethless, the most important factor is the government's initiative and belief that disasters can occur anywhere and anytime. Therefore, the author of this research is reviewing different disaster management researches to identify gap/s in the field of study, and reviewing the disaster management practices used in different countries to come up with a developed disaster management framework which can enhance the resilience of the strategic disaster management body in the State of Kuwait. The following (Table 11) concludes the key findings of this chapter, which will be taken into account by the author during the establishment of the conceptual framework in this research.

Table 11. Key finding of literature review

Key Finding	Author's comments	Literature
Disaster Management Life Cycle	Is the most important standard that guides the emergency planners to understand what is required for each phase of a disaster	Baird et al., 1975; Neal, 1997; Kellman, 2007 and Lewis, 2007, Nojavan et al., 2018.
Ensuring the adaptation of legal framework	Disaster management framework should be supported by an Act. This is because a legal framework gives organisations legal authority to undertake certain duties	The Disaster Management Act, 2005; Homeland Security, 2014; The National Disaster Management Framework report, 2007; State Disaster Management Group report, 2010; Zodrow & Llosa, 2011.
Stakeholders responsible for the adaptation of the frameworks	Tasks and the accountabilities for the adaptation of each part of the framework are delegated clearly to the corresponded Agency.	The National Disaster Management Framework, 2007.
Risk assessment	Should be conducted to identify disaster hazards	Strategic Policy Framework, 2005; National Disaster Management Framework, 2016.
Terms and definitions are very important	To enable the government in their understanding with the emergency planners	Nouri et al., 2011; Adams, 2014; Cox, 2012; Alexander, 2016.
International disaster risk	To ensure the countries are following up-to-date disaster management practices. It is very important that all governments need to participate	The Sendai Framework for Disaster Risk Reduction 2015-2030. World Conference on

reduction framework	throughout an international disaster risk reduction framework	Disaster Risk Reduction. WCDRR, 2016.
Disaster Education	Education is a key element in disaster risk reduction.	UNISDR Report (2016)
Disaster Management Institutes	Helps the local authorities with establishing policies, providing guidelines on disaster mitigation, training, research, developing emergency plans, provides disaster consultants	National Institute of Disaster Management NIDM (2015)

2.15 Chapter 2 Summary

In this chapter, the author focused on defining important terminologies used in current disaster management strategies and practices, such as 'a disaster', 'disaster management', 'hazard', 'risk', and 'vulnerability'. and also discussed the disaster management life cycle in more detail. The author also explained the different terms of the current disaster management life cycle, such as 'mitigation', 'preparedness', 'response', and 'recovery', which are the main phases in managing disasters. The author also wishes to contribute to disaster management by adding an important term to the current disaster management life cycle, 'identifying'. This is to illustrate that the first step in the disaster management process should be to identify which hazards need to be managed.

Different Disaster Management Frameworks used in different countries were discussed in this chapter, namely: India, America, Pakistan and Australia, to highlight how Disaster Management Frameworks help these countries manage disasters and reduce their impact and loss. This chapter also discussed and explained in more detail the importance of conducting risk assessments, which can be used to help emergency planners and managers achieve a sufficient level of risk management and disaster management that will lead to the reduction of the impact of disasters and the mitigation of their risks and loss. Its subsections provided a range of useful information necessary for explaining the current advanced disaster management process and practices across the globe. This chapter highlights ways in which disasters can be managed today and illustrates important factors that lead to successful disaster management and disaster risk reduction practices.

The next chapter will include a literature review, i.e. one focusing specifically on the current disaster management processes and procedures being used in the state of Kuwait.

Chapter 3: Critical Review of Focal Literature – Kuwait

3.1 General

The previous chapter highlighted the historical background of the disaster management life cycle, its different components (identification, mitigation, preparedness, response and recovery) and how it has, for decades, been the standard model for managing disasters. This chapter will focus specifically on the current disaster management processes and procedures in Kuwait, beginning with outlining general information about Kuwait which will include its land, culture and population. Chapter 3 will also give a general background of the disasters that have affected Kuwait in the past, in order to explore the types that could expose any harm to the country in the future.

Furthermore, this chapter will examine the vulnerability of the state of Kuwait against different types of hazards: such as earthquakes and tsunamis (natural hazards), the Iranian Nuclear Power Plant (a technological hazard), and the recent threat that faces all countries in the world today which is terrorism (manmade hazard). This will highlight the level and types of threats and hazards that could affect Kuwait in the future. The chapter will also discuss the current Disaster Management Framework used in Kuwait to examine if this Framework does support emergency planners at the strategic level through managing all types of hazards that could affect the country. In this chapter, the author will also explore the current Disaster Management Acts and policies in Kuwait to evaluate and clarify how these Acts and policies support the disaster management process in Kuwait. This will include highlighting the agencies that are responsible for managing disasters in Kuwait .

It will also highlight the tasks of the different government committees, established by the Civil Defence Department within the Ministry of Interior for managing disasters in the country, as well as evaluating the processes of these committees and how they can help in achieving the outcomes for a suitable disaster management plan. This chapter will also highlight the disaster or emergency response procedures in Kuwait to identify the participants or agencies that respond to disasters in Kuwait and how current disaster management policies and Acts support emergency planners and responders. The main aims of this chapter are to examine the methods used for identifying hazards in Kuwait and to highlight those that have gone undetected by the Civil Defence Committee to-date. It will also explore the current Disaster Management Framework to evaluate its strengths and

weaknesses and examine how this supports suitable disaster management practices and goals. Finally, it will explore the factors that led the author to validate this research, outlining the reasons why the author feels there is a need to improve the current Disaster Management Framework in Kuwait. It will explore the issue that the phases of the disaster management life cycle are ignored by the Civil Defence Committee, explain there is an overlap in the disaster management legislation of the different agencies in Kuwait and that several unconsidered hazards that could threaten the country have gone undetected. The results of this chapter will be used by the author to design the conceptual framework for this research, which will be validated in Chapter 4.

3.2 The State of Kuwait – General Background

According to the United Nation Development Programme (UNDP, 2019), Kuwait is a sovereign Arab state located in western Asia on the northeast side of the Arabian Peninsula (Mohamedzein & AbdelWahab, 2001). Kuwait is bordered by Saudi Arabia (to the south and west) and Iraq (to the north) (Figure 13). The total area covered by the country is 17,820 square kilometres. Kuwait lies in the north-eastern corner of the Arabian Peninsula and in terms of land area, it is one of the smallest countries in the world. Kuwait lies between the longitudes of 46° and 49° E and latitudes of 28° and 31° N, (UNDP, 2019). The border shared between Kuwait and Saudi Arabia is 250 kilometres long to the south and west. The longest distant points in Kuwait are 170 kilometres (east to west) and 200 kilometres (north to south) and it has 195 kilometres of sandy coastline (Talebian & Jackson, 2004).

Figure 13. The State of Kuwait Map and Neighbouring Countries

The country is mostly covered by the sandy and flat Arabian Desert. The capital city of Kuwait is known as Kuwait City. Generally, the country is very low-lying with the highest point just 306 meters above sea level. The latitudes and longitudes of the country makes it experience very hot summers between June and September, while winters are usually cool and wet. The geographic location of Kuwait makes it a hot and dry desert climate. Annual rainfall ranges from 75 to 150 millimetres across the whole country. Average daily temperatures in summer range from 42° to 46°C, (UNDP, 2019). Kuwait's income depends on exporting the country's oil. The World Bank rates Kuwait as a strong economy due to its rich oil reserves that were discovered in the twentieth century (Yang, 2008).

The state of Kuwait was established as a British colony in the 18th century and became an independent state in 1961. After 1961, Kuwait started to re-organize most roles pertaining to the management and structure of the country (Kuwait Government. 2016).

The types of buildings in Kuwait are usually of the Arabic architectural style. Kuwait is also renowned for having some of the tallest buildings in the world and some of which consist of the most intriguing, admirable and state-of-the-art designs (Tavakoli & Ashtiany, 1999).

All the buildings require to be approved by the Municipal Council before being constructed. Approval is given after a series of tests to determine the viability having been conducted. Most buildings in Kuwait (Figure 14), including the international airport, are built with state-of-the-art technology and equipment.

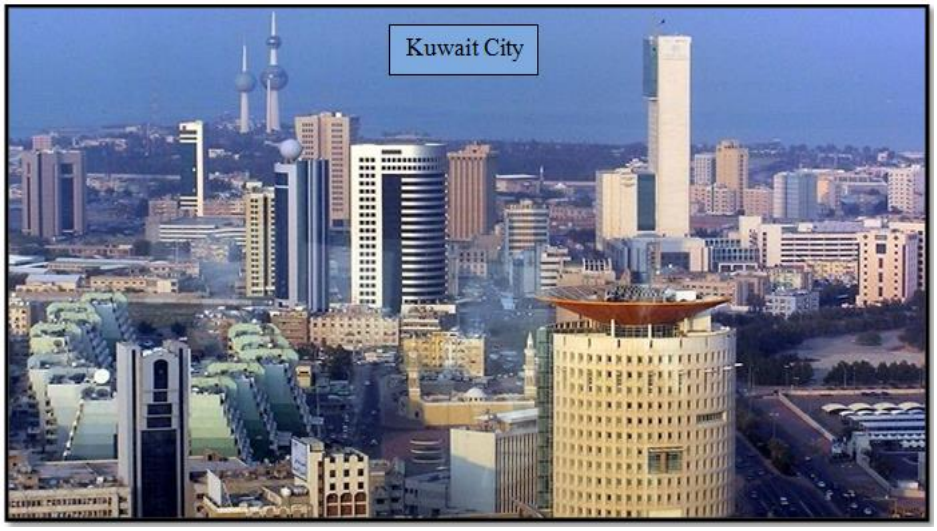


Figure 14. Depiction of Some of the Buildings in Kuwait City.

3.3 The Civil Defence Act of Kuwait

In 1976, the Minister of Interior established the Civil Defence Department in the Ministry of Interior Act No. (21/1979) and this was issued by the Kuwaiti government. This Act contains 16 articles aimed at securing civil protection in Kuwait and providing business continuity in cases of disasters, emergencies and any other factors that could harm the civil security of Kuwait.

The Act highlights the purpose of establishing the Civil Defence Department and includes preparedness and provides details of the resources required to achieve civil protection, for instance;

1. To prepare and validate plans that protect the infrastructure of Kuwait.
2. Validate plans to provide all resources needed.
3. Provide prevention plans (and their requirements) related to the risk of war.

The Act also highlights that the Minister of the Ministry of Interior has the most responsibility regarding the establishment of civil defence activities; through establishing and leading the civil Defence committee. The (21/1979) Act also highlighted some rules of the civil defence during wars, disasters and emergencies, as well as the Minister of the Ministry of Interior which established extra committees that could support critical decisions relating to disaster management and co-operate to establish policies which coordinate civil defence practices during a disaster. The final articles of the Act stated that the Chair of the Council of Ministers should enforce this Act.

Act No. (21/1979) does not define the term "disaster," nor does it mention the most important part of the disaster management practices, which is the risk assessment, nor does it outline methods for identifying disaster hazards. It delineates which agencies have the responsibility of identifying disaster hazards. This caused the Civil Defence Committee to randomly nominate the disaster hazards scenarios that were shown in (Chapter 1, Table 2). Amending the Acts is considered important to enable the country to cover the recent issues in a particular area, (Disaster Management Amendment Act 2015). The Act (21/1979) is almost 40 years old and disaster Acts or legislation require to be updated regularly. This results in, Act 21 being considered to be inadequate due to recent developments in Kuwait (e.g., climate change, urbanizations, land use planning and technological developments) which can create vulnerable areas in the country, putting the population at risk. Therefore, the author feels that this Act must be improved. Since 1979, there has been no amendment conducted on the Civil Defence Act in Kuwait, which has led to the recent threats, which are not considered by the government .

3.3.1 The Civil Defence Committee

On 16 November 1997, the (Order 897/1997) was established by The Minister of the Ministry of Interior. Order 817 aims to establish the Civil Defence Committee in Kuwait under the power of Article 4 of the 1979 Act. Order 897 consists of eight articles and highlights the formation of the Civil Defence Committee, which is to specialise in the arrangement, planning and preparedness for a disaster as described in Article 1. The Civil Defence Committee consists of 13 members from different agencies, as stated in (Chapter 1, Table 1), (Order 897, 1997).

The members of this committee should be chiefs or deputy chiefs of their respective agencies; the committee is to be chaired by the Minister of the Ministry of Interior. The order highlights the aims and objectives of the Civil Defence Committee, namely, to provide a general disaster management plan for the state of Kuwait and to adopt the plan after gaining the authorization of the Council of Ministers. The (Order 897, 1997) also highlights the meeting times for the committee, which is "when there is an emergency situation" as stated in Article 3.

Another article in the (Order 897/1997) mentions that the Chair can invite other participants into the committee, if and when the committee needs further assistance. The order states that the committee shall establish more committees after identifying their missions; these committees shall validate the results of the work of the Civil Defence Committee and provide all agencies in Kuwait with recommendations and orders. The main objectives of the Civil Defence Committee were to validate general disaster management plans and to make the public in Kuwait safe from all hazards and disasters. Unfortunately, there is a lack of published disaster management plans in Kuwait and as noted in the above literature, the public must be made aware of all disaster management plans in order to know what to do and where to go during a disaster. This shows that either the Civil Defence Committee has misunderstood the Disaster Management Act or the Act does not enforce or enable the Civil Defence Committee to accommodate Kuwait's disaster management needs.

In the author's view, and as observed in the above literature, the Civil Defence Committee cannot meet the disaster management needs in Kuwait, especially when compared to the number of people and agencies participating in disaster management in Australia or Pakistan. For instance, the Civil Defence Committee in Kuwait has not yet recognized that all sectors must participate in Disaster Management activities through a systematic and organised framework.

It is noted that current practices start with managing and preparing for disasters prior to them occurring (Bergstrand et al., 2015). However, Order 897 shows that The Civil Defence Committee focuses exclusively on the response phase of a disaster, without considering other phases of the disaster management life cycle (i.e., preparedness, mitigation, response and recovery). Moreover, the Civil Defence Committee has established, specifically relating to Article 5 of the Order 897 (1997), two different committees to support its strategic objectives and to follow up on its recommendations: the technical committee for dangerous aspects and the supervision committee for implementing the radiation and nuclear emergency plan. These two committees will be discussed in detail in the following sections.

3.3.2 The Technical Committee for Dangerous Aspects

In 2007, 10 years after the establishment of The Civil Defence Committee, the technical committee for dangers aspects was established, as enforced by the (Order 1564, 2007), which was published by the Minister of Ministry of the Interior. This committee is chaired by the General Manager of the Department of Civil Defence in the Ministry of Interior and consists of eight different participants:

1. The Department of Civil Defence.
2. Kuwait Fire Service Directorate.
3. Ministry of Health.
4. The Environment Public Authority.
5. Ministry of Water and Electricity.
6. Kuwait Institute for Scientific Research.
7. The Public Authority for Industry.
8. The Civil Aviation Department. (Order 1564/2007).

This committee has 11 objectives; the most relevant to the disaster management relates to the studying and assessing environmental hazards, validating plans and procedures for dealing with environmental disasters, studying the need to establish emergency control rooms and assessing the resources and logistics available with different agencies to deal with the environmental hazards in Kuwait . However, none of this preparedness was validated by the committee.

It is important to note that the order does not define the term "disaster," and risk assessment is not referred to. As such, this committee has no clear starting point for its work. For instance, the first aim is to study and identify the security procedures for various environmental hazards but there is no procedure on how the committee should to go about this. At the same time, it is limited in coming up with procedures for these hazards which have been identified or nominated by the High Civil Defence Committee. Moreover, since its creation in 2007 the technical committee for dangerous aspects has not validated any security assessment or plans for environmental hazards.

3.3.3 The Supervision Committee on Implementing the Radiation and Nuclear Emergency Plan

The supervision committee on implementing the radiation and nuclear emergency plan was established in 2007, supported by an Order No. (2066/2007), and published by the Minister of Ministry of Interior. It is chaired by the Deputy Director General for Operation, within the Ministry of Interior. The committee is chaired by the Deputy Director-General for Operations of the Ministry of Interior. This committee consist of 13 different participants/ members as follows:

1. The Department of Civil Defence.
2. Kuwait Fire Service Directorate.
3. Ministry of Health.
4. Ministry of Defence.
5. Ministry of Oil.
6. Ministry of Commercial and Industry.
7. Ministry of Water and Electricity.
8. Kuwait National Guard.
9. The Environment Public Authority.
10. General Department of Customs.
11. Kuwait Institute for Scientific Research.
12. The Civil Aviation Department.
13. The Public Authority of Agriculture and Fisheries.

The supervision committee on implementing the radiation and nuclear emergency plan has three main objectives:

1. Supervising and implementing the nuclear radiation emergency plan.

2. Carrying out training for the nuclear and radiation emergency plan.
3. Communicating with the Civil Defence Committee and relevant agencies.

If there is any confusion regarding the aims and objectives of the supervision committee on implementing the radiation and nuclear emergency plan, the committee does not confirm these. Therefore, it is unclear which hazards the committee requires to implement in the emergency plan. Moreover, if the hazard source is identified, the committee will be able to evaluate the consequences of each hazard and identify the vulnerable areas or people so they can manage and protect this area or group in order to minimize the risks associated with the hazard. Another important aspect to be considered by the supervision committee on implementing the radiation and nuclear emergency plan, is the invitation of the Ministry of Media and Ministry of Education which requires to establish the awareness of programs in providing information to the public regarding safe procedures to be carried out if and when radiation or nuclear hazards threaten them. Without public awareness and education, the plan cannot work.

All the relevant committees are aware of the disaster scenarios that have been identified by the Civil Defence Committee (Table 2). However, the supervision committee when implementing the radiation and nuclear emergency plan, deals with radiation and nuclear hazards only. The use of scenario method (Figure 15), which was discussed earlier in Chapter 2, is described as invaluable to people who are planning for emergencies. It can be used to clarify two aspects of an emergency: "the conditions which necessitate planning and the preparedness on hazard and risk mitigation" (Alexander, 2009 p. 42). The study of a hazard, its weakness and a populations exposure to hazard-associated risks can help in the development of scenarios for disaster and emergency planning (Bergstrand et al., 2015).

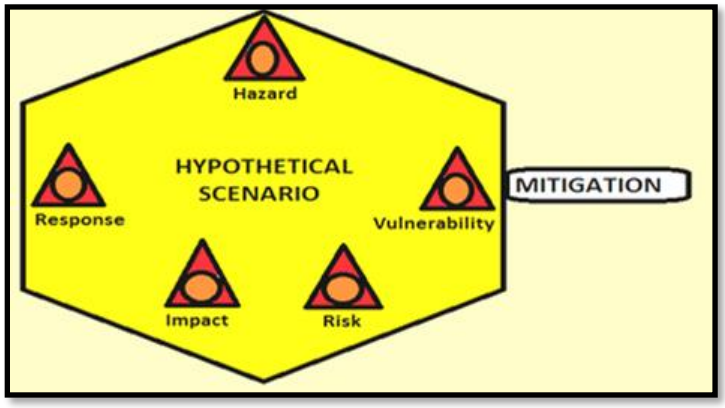


Figure 15. Use of Scenario Methodology in the Mitigation of Hazards (Alexander, 2009, p. 43)

3.4 Disasters Background in Kuwait

Kuwait has faced a small number of disasters since its independence; the most major disaster was the invasion of Iraq in 1990. In August 2009, there was a second major incident when a fire occurred, causing the death of 43 women and children and injured another 99 people (Piazza, 2007; KFSD Report, 2015). The third was the leakage of methane and natural gas in a residential area called Alahmadi, which lies 40 kilometres south of Kuwait City. The Alahmadi area was built in 1950 for the oil companies' employees and their families. According to an Alqabas newspaper (2010), 88 families were forced to evacuate their homes, while others refused evacuation until the government provided them with appropriate accommodations. Finally, on 26 June 2015, a suicide bomber attacked a Shia mosque in Kuwait, killing 27 people and injuring 227 (BBC, 2015).

Unfortunately, there is a lack in terms of comprehensive disaster statistics record in Kuwait which can support the emergency planners with understanding what types of disasters they should plan and prepare for. Disaster records can be used during the risk assessment process to clarify the vulnerability and impact of each disaster on the human, environment and economic aspects along with providing an estimated figure for future disasters. It is said that Kuwait has been affected in the past by different natural disasters, such as heavy rain and sandstorms, which caused severe damage to people and their properties Alshahed Newspaper (2011). However, there is a lack in terms of official figures and records that shows the losses and impact of these disasters.

Therefore, as a part of implementing the requirement of the Sendai framework for disaster risk reduction in Kuwait, which was discussed in (Chapter 2), the author of this research is currently coordinating with the UNISDR and a national team consisting of different stakeholders from different ministries. This is to build up a database of all the disasters that have affected Kuwait since 1980 and to validate this information using a software name Des-Inventar. This was designed by a group of academics, researchers and institutional personnel who conceptualised a system of acquisition, consultation and display of information regarding disasters of different scales, based on pre-existing information for instance, newspaper and institutional reports in nine countries within Latin America. Des-Inventar is now used by different countries worldwide, (Des-Inventar, 2016).

To improve the current disaster management process and framework in Kuwait different factors must be considered. One of the most important is the disaster statistics (Yan, 2010; Sendai Framework, 2015/2030), which represent the risk assessment for the identifying phase (see Figure 2, in Chapter 1), as well as the distribution of the population in the country. This will help the emergency planners in understanding the needs for future preparedness and planning to reduce the impact on any vulnerable group of people. Moreover, disaster records can help the emergency planners with the decision-making process as well as in the design and improving the Disaster Management Framework (Bergstrand et al., 2015). The next paragraph discusses the distribution of the population in Kuwait.

3.5 Vulnerability and Disaster Threats in Kuwait

According to (Cutter, 1996; and Kelman et al., (2016), vulnerability is defined as a potential for loss. Cutter has found three distinct themes in vulnerability:

- Vulnerability as hazard exposure: distribution of hazardous conditions on human occupancy within a given area, along with the degree of loss associated with such a hazardous event.
- Vulnerability as a social response: concentrates on response and coping capacities, including societal resistance and resilience to hazards, as well as recovery from a hazardous event.
- Vulnerability of places: a combination of hazard exposure and social response within a specific geographic area.

Kelman et al., (2016) noted that 'exposure' refers to the number of people located within areas where hazardous events occur, combined with the frequency of hazard events. According to (Sadigh et al., 1997; Haerifard et al., 2018), there are various active earthquake faults in Iran. These include the Mosha, North Tehran and Ipak fault zones. There are many active faults under the Zagros Mountains and in Central Iran as well. The Iranian plateau is also characterized by the presence of very active fault lines. Iran is said to be one of the worlds most seismically active countries. This is due to the major fault lines that cross over more than 90% of the country's surface. This makes the occurrence of earthquakes very frequent and their magnitudes usually disastrous. Most of the recorded earthquakes in Iran are known to have magnitudes of above 6.0 on the Richter scale. This means that the earthquakes in Iran are disastrous and can spread to their

neighbours (e.g., Kuwait), especially if they are of an extremely high magnitude (i.e., above 6.0). It has also been documented that Kuwait lacks proper building codes which could reduce the effects of serious earthquakes. However, a study conducted by the National Seismic Network in 2010 revealed that if an earthquake of a magnitude of 7.5 occurred in Iran, it would have little impact in Kuwait (Sadigh et al., 1997).

In terms of building codes which demand buildings to be resistant to earthquakes, the state of Kuwait has been criticised severely. The country has a lack of regulatory codes to monitor the physical conditions of residential buildings. A Kuwaiti seismologist name Abdulla Al-Enezi, stated that more than 800 earthquakes occurred in Kuwait since. Al-Enezi also noted that Kuwait does not have proper building codes that resist earthquakes (Al-Fahad, 2012) and only recently has the country begun making efforts to come up with building codes that deal with such problems. Therefore, this research will address these issues and will recommend guidelines which could reduce Kuwait's vulnerability and exposure to hazards in the future. Moreover, there is a lack of a comprehensive national risk register, which can highlight the possible disasters and threats that could produce harm to the public in Kuwait. The disaster scenarios shown in (Table 2, Chapter 1) were created in 1997. This disaster scenario cannot address the recent threats or hazards due to lack of up-to-date information and no obvious risk assessment procedures that are used to determine such hazards. To improve this issue some countries, for instance the United Kingdom, have a National risk register which is updated every five years, to ensure that all recent hazards are included in the hazards database (Gov.uk, 2017). Therefore, the Civil Defence Committee needs to review such issues to improve and update the disaster scenarios.

According to Roy et al. (2015) current land use planning is considered as one of the best practices in the Disaster Risk Management, which can support and improve the resilience for the civilians. In terms of planning land use, there is a lack of Act or legislations that can clarify issues and ensure that any related land use is planned and management in Kuwait. One of the obvious arguments is that the locations of some dangerous industries, such as Alshuaiba Oil Refineries which produces 200,000 barrels per day (Figure 16), are built very close to different urban areas. According to Kuwait Times (2018), Alshuaiba Oil Refineries have experienced several fires and explosions The last fire disaster was in 2015 and caused severe economic loss in the Oil industry. Hence, this led to a huge number of the citizens in Kuwait to become vulnerable and face different types of hazards, such as dangerous toxic gasses emissions and fire, explosion risks.

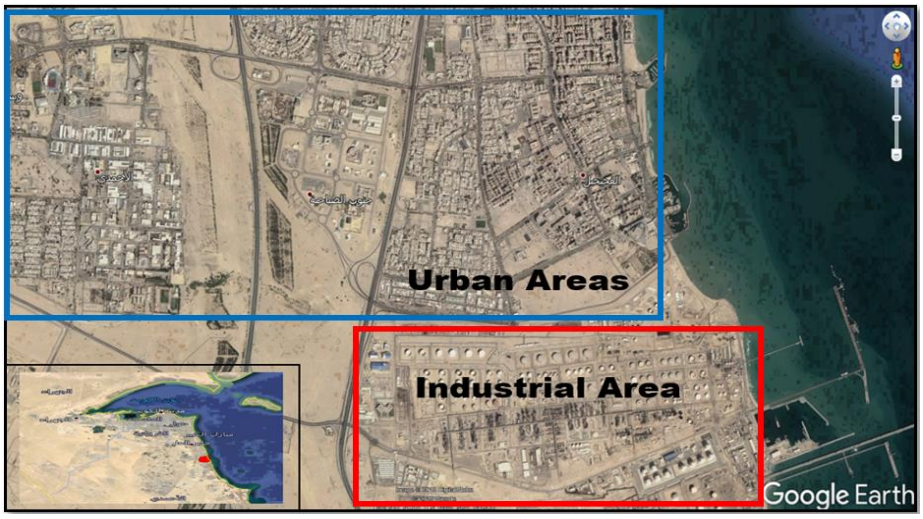


Figure 16.The distance between the urban and industrial areas in Kuwait.

Nowadays, there is an obvious care and focus in terms of building better to reduce the disaster risk, UNISDR (2017). Therefore, the emergency planners in Kuwait must take into account such factors that can mitigate the risk to the citizens arising from the oil industries. This is another factor which led the author of this research to improve the current Disaster Management Framework in Kuwait. Also, there are different challenges that could reduce the impact and loss due to a disaster. For instance, the validation of a national disaster management plan, national disaster risk reduction strategy, and an up-to-date national risk register (Sendai Framework, 2015/2030), as well as to follow up with an international disaster risk reduction strategies, such as *Hyogo Framework for Disaster Risk Reduction (2005/2015)* and the recent Sendai Framework for Disaster Risk Reduction 2015/2030, which were discussed earlier in the previous Chapter 2. However, Kuwaits lack of such strategies and the disaster management process, their current focuses on the response phase, along with the other disaster management phases discussed in Chapter 2, such as identifying, mitigation, preparedness and recovery, are not considered by the Civil Defence Committee. Therefore, the author is trying to improve the current Disaster Management Framework in Kuwait with suitable disaster management practices.

From the above review, most of the population in Kuwait are found to be vulnerable against different disaster hazards, such as the Iranian Nuclear Power Plant at Bushehr, earthquakes, terrorism hazards. All of these hazards are not included in the disaster scenarios (Table 2, Chapter 1), or the national risk register which was developed by the Civil Defence Committee in Kuwait in 1997. In addition, there is a lack of (e.g., disaster management policies, frameworks and risk assessments) which could be used before, during and after a disaster to reduce its impact.

3.6 The Disaster Management Framework in Kuwait

Different Disaster Management Frameworks were discussed and reviewed earlier in Chapter 2, for instance, in India, Pakistan, United States and Australia. These frameworks illustrate how these countries prepare and account to reduce the impact of disasters that could affect the safety and security of the civilians, as well as highlighting the accountability of the stakeholders in the frameworks.

The current Disaster Management Framework in Kuwait consists of and is represented by the three committees, as discussed in the previous paragraphs. The Civil Defence Committee identifies a specific hazard and sends information to either the technical committee for dangerous aspects or the supervision committee on implementing the radiation and nuclear emergency plan, which aims to prepare for any hazards that could affect Kuwait. Figure (17) illustrates the current Disaster Management Framework in Kuwait.

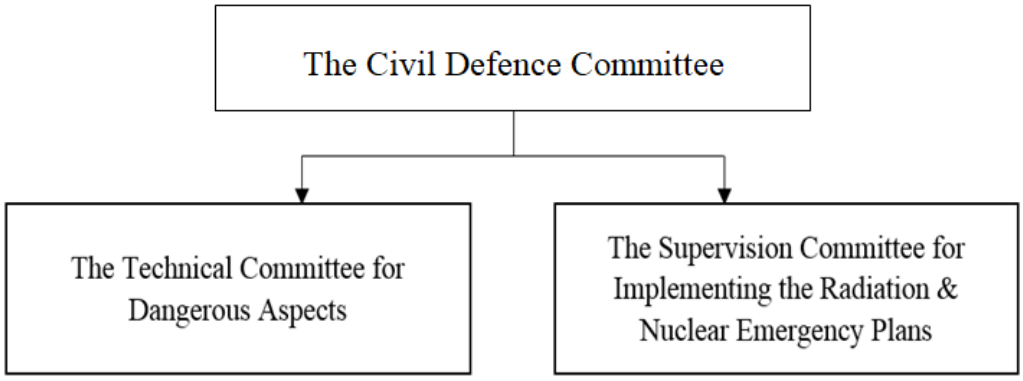


Figure 17. Disaster Management Framework in Kuwait (Order 897/2007)

This framework shows a lack of disaster management, especially as there is no clear hazard identification procedure, no specific time required for the two committees to validate the required task and no clear evidence of processes that cover the different phases of the disaster management life cycle. This suggests there is a weak chain of command in the work of all the committees. Moreover, there is no evidence that the framework enforces the validated plans by the different Committees. In addition, the Disaster Management Framework in Kuwait does not describe an early warning process to reduce the impact of a disaster. Finally, the Disaster Management Act (21/1979) gives reasonable power to the Civil Defence Department within the Ministry of Interior although the main focus of the Act was originally on air raid activities. Therefore, the author of

this research will address the overall need for a disaster management process in Kuwait. The author also attempts to improve the country's current Disaster Management Framework.

According to Order (897/1997), the Civil Defence Committee consists of 13 members from different agencies (see Chapter 1, Table 1). This committee represents the strategic authority in terms of disaster management in Kuwait. The committee is small in comparison to the participants involved. For instance, in Pakistan's disaster management authority network, this includes all ministries, departments, technical agencies, provincial governments, media groups, NGOs, UN agencies and donors. In Kuwait, the Civil Defence committee has nominated 13 disaster scenarios (Chapter 1, Table 2).

However, there are no visible model, theory, or arrangements carried out by the Civil Defence Committee in managing or highlighting the hazards identification procedure, nor are there any strategic plans to prepare for future disasters. Meanwhile, in Pakistan, the framework visions were aimed at achieving sustainable social, economic and environmental development through minimizing risks and vulnerabilities and through effectively responding to and recovering from disaster. Another aspect that could have affected the validation of an effective disaster management arrangement in Kuwait, is there are no obvious supervision for the duties of the Civil Defence Committee, whereas the National Disaster Management Commission and the National Disaster Management Authority supervise the disaster management process in Pakistan.

All of the principles, roles and responsibilities mentioned above are not covered in Kuwaiti's Order (897/1997), which means that the Civil Defence Committee in Kuwait is not familiar with disaster management process and planning, etc. Moreover, there is a lack in term of adopting a disaster management life cycle (Figure 2, in Chapter 1), which can demonstrates the phases or the different factors that should be considered during a disaster management in the country, such as identifying hazards, mitigation, preparedness, response and recovery.

Therefore, the Civil Defence Committee, broadly speaking, needs to seek help from disaster management experts in order to strengthen disaster management practices in Kuwait. The following (Table 12) highlights the strengths and weaknesses of the different Disaster Management Frameworks used in different countries that have been discussed earlier in Chapter 2.

Table 12 . Strengths and Weaknesses of Different Disaster Management Frameworks

Country	Enforced by an Act		Different agencies specified		Highlights the phases of the disaster		Highlights priorities of the work	
	Yes	No	Yes	No	Yes	No	Yes	No
India	√		√		√		√	
America	√		√		√		√	
Pakistan	√		√		√		√	
Australia	√		√		√		√	
Kuwait	√			√		√		√

3.7 Kuwait Fire Service Directorate: Historical Background

The main Disaster Management Framework of Kuwait was discussed in the previous paragraph. This section illustrates the setup and preparedness of the main emergency responder agency in Kuwait, the Fire Service Directorate. Before 1947, when most of the buildings in Kuwait were made of mud, Kuwaiti people responded to fires using donkeys and mules to carry water needed for fighting fires. In 1947, the first water carriers were imported to Kuwait; these were supported by a water pump and used by volunteers. In 1949 another water carrier was imported. In 1950, the first fire station was established in a garage and was equipped with four water carriers which were used by 30 fire fighters. In late 1950s, the first group of fire fighters were sent to the United Kingdom for training (KFSD, 2015).

Due to the oil industry, the Kuwait Fire Service expanded quickly. Today, there are 40 fire stations serving the state of Kuwait, including three water rescue stations which respond to both water rescue and ship fires, one technical rescue team which responds to different rescue missions and one hazardous materials team. These fire stations operate 24 hours per day, 7 days per week. Each shift consists of around 20 to 30 fire fighters, including between 2 and 5 officers. Fire fighters receive emergency calls via three methods. The first method by a wireless alarm system (Bell), which can be sent from the operation and control room to the fire station nearest to the incident. The second is by a phone call from the operation and control room to the fire station, to be deployed

if the wireless alarm fails. The last method is by a phone call directly from the public to a fire station, in which case the response can be made after informing the operation and control room (KFSD Website, 2016).

3.7.1 Kuwait Fire Service Act

The establishment of the Kuwait Fire Service was the responsibility of two ministries: the Ministry of Municipal and the Ministry of Public Works. In 1982, an Act (36/1982) was established, under the Minister of State for Cabinet Affairs, to transform the Kuwait Fire Service Directorate into an independent department, Act (36/1982). Act (36/1982) consists of 59 Articles. Article 1 states that the firemen shall prepare and make all arrangements needed to prevent the occurrence of fires, to fight fires, to provide applicable protection for saving lives and property from fires, collapses, accidents, disasters and to provide applicable prevention measures. All other articles describe the formation of the Kuwait Fire Service Directorate, the ranks, employment and other management issues. Figure (18) illustrates the Kuwait Fire Service sectors.

Comparing the Fire Service Act with the practices of managing the fire service shows that there is a misunderstanding in terms of how the disaster management process should be adopted by the current fire service sectors. It shows that there is no sector in the Fire Service that relates to disaster management. In addition, there is an overlap between the Civil Defence Act and the Fire Service Directorate Act in terms of disaster management, (Act 21/1979; Act 36/1982). This overlap causes various problems between the agencies regarding who is responsible for managing a disaster. Neither Act provides clear definition of terms that are used in the disaster management process. In addition, neither Act mentions the use of risk assessment to identify hazards.

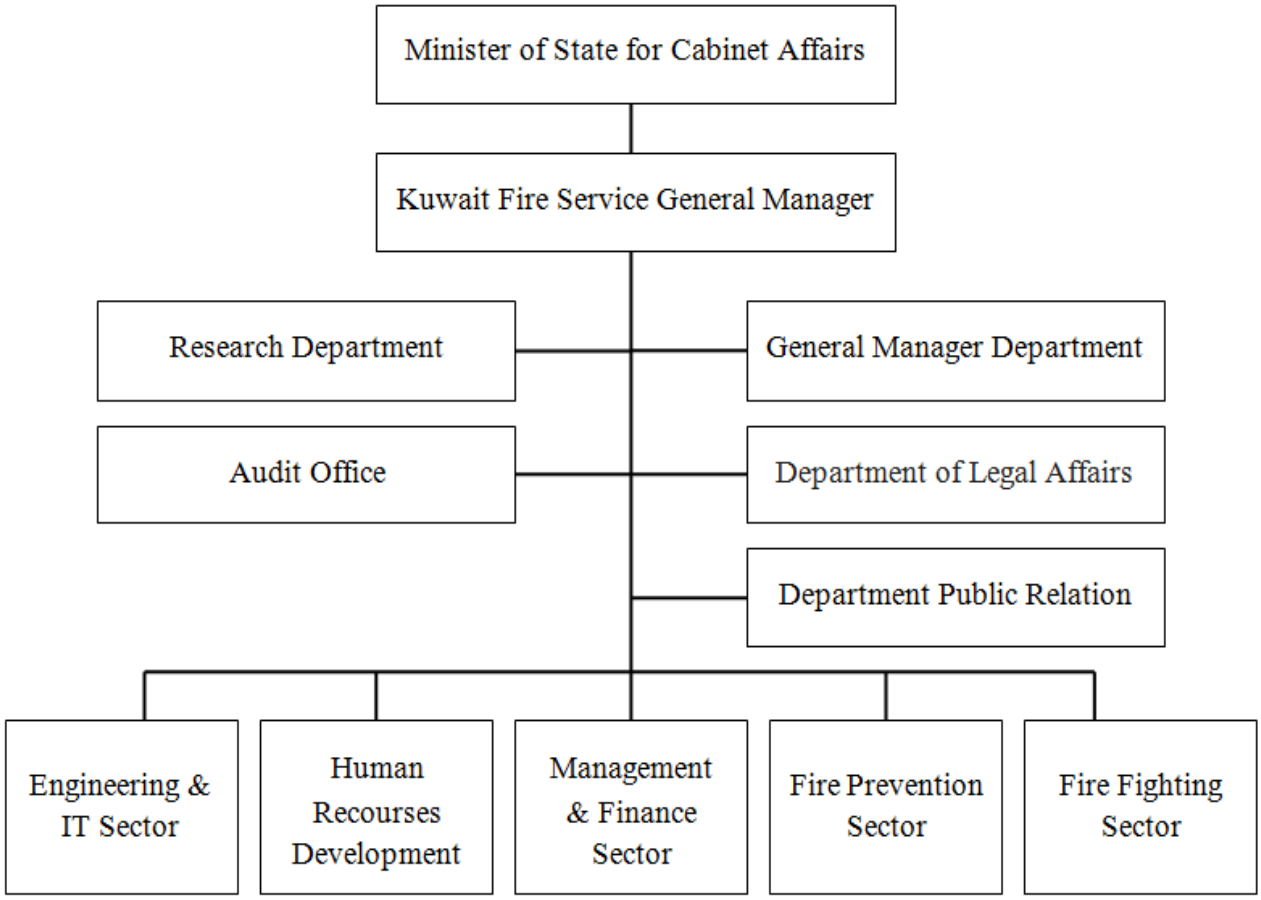


Figure 18. Kuwait Fire Service Sectors (KFSD, 2016)

3.7.2 Disaster Management Arrangements

The main focus of the Kuwait Fire Service Directorate in terms of disaster arrangements and preparedness is carried out using random training sessions and different disaster scenarios (e.g., high-rise building fires, major electricity transformer fires and road traffic accidents). These training sessions are designed to examine two main points: the time taken to arrive at the scene of an incident (which is nearly four to five minutes) and to examine the working procedures of the fire fighters. This training is usually carried out every year with different emergency agencies (e.g., police, ambulance, Kuwait National Guards, the Electrical Emergency Unit). In addition, the Kuwait Fire Service has signed a contract with the Fire Service College of the United Kingdom to train fire officers from Kuwait (KFSD Report, 2015). At the same time, the human resources sector in the Kuwait Fire Service Directorate provides various disaster management training for all its fire officers. The directorate also prepares and coordinates disaster management conferences so that officers can gain experience and share information.

However, these officers are unable to use what they learn from these conferences due to the lack of a Disaster Management Framework in Kuwait. Consequently, the staff of the Kuwait Fire Service Directorate focus mainly on the response phase of the disaster management life cycle, overlooking all the other phases. Finally, the Fire Service is a unique emergency service in Kuwait in that it has the highly-developed logistics and resources needed to deal with different types of disasters during the response phase (KFSD Report, 2015).

3.7.3 Kuwait Fire Service - Response Procedure

The formation of the Kuwait Fire Service Directorate was discussed earlier in the previous paragraphs. This paragraph highlights the response procedure in the Fire Service.

The emergency calls from the public, usually received by the Emergency Dispatch Centre in the Fire Service, is known as the operation and control centre. When the operation and control centre receives an emergency call, there is a procedure for dividing the level of the emergency response into three different classes before dispatching the fire station to an incident: high-risk, medium-risk and low-risk. Table (13) illustrates the response procedures by risk class.

Table 13. The Emergency Response System for the Fire Service (Operation & Control, 2015)

Risk Class	First Response	Second Response
High Risk	-------	Operation Mobile Room Breathing Apparatus Track Portable Ladders HazMat Fire Station Technical Rescue Team Health & Safety Officer Fire Prevention Officer Fire Investigation Officer National Guards Military Fire Unit Oil Company Fire Unit Fire Service Area Manager Water Carriers
Hospitals	3 Fire Stations	
Buildings Taller than Four Stories	3 Fire Stations	
Oil Refineries	2 Fire Stations	
Schools & Colleges	2 Fire Stations	
All Factories	2 Fire Stations	
Paint Stores	2 Fire Stations & HazMat Team	
Hazardous Materials	1 Fire Stations & HazMat Team	
Chemical Labs	1 Fire Stations & HazMat Team	
Air Plane Accident	4 Fire Stations	
Medium Risk	-------	

Buildings Shorter than Four Stories	2 Fire Stations	Marshall Officer Deputy General Manager General Manager
All Supermarkets	2 Fire Stations	
Iron Stores	1 Fire Stations	
Brick Factories	1 Fire Stations	
Hazardous Materials Tracks	2 Fire Stations & HazMat Team	
Low Risk	--------	
House Fire	2 Fire Stations	
Small Shops Fire	2 Fire Stations	
Cars Accident	1 Fire Station	

3.8 The Environment Act in Kuwait

In 2014, the Environment Act (44/2014) was established by the Environment Public Authority (EPA). This Act consists of nine Chapters and includes 181 Articles. Chapter 1 of the Act includes all the important definitions and clarifications of the agents who are responsible in enforcing the Act. Chapter 2 illustrates how the Act will be adopted and outlines the objectives of the Act, the departments and committees of the EPA, as well as how to protect the environment of Kuwait which includes practices for the management of hazardous and public waste. Chapter 3 explains how to protect the air from pollution. Chapter 4 illustrates how to prevent the sea and coasts from pollution. Chapter 5 illustrates biological hazards. Chapter 6 highlights the rules of the environmental police, as well as strategies, disasters and environmental awareness. Chapter 7 outlines punishments for those who fail to follow the act. Chapter 8 illustrates civil environmental responsibilities. Chapter 9 offers conclusions and an Act (44/2014).

The Environment Act (44/2014) gives some responsibility to the Environment Agency in terms of crisis and disaster management. Article 118 states that the Environment Agency will, in cooperation with relevant agencies, validate emergency plans for the country which will include plans for dealing with natural disasters (e.g., sandstorms, heavy rains, floods and earthquakes) and human-caused environmental hazards. As is the case with prior acts, the Environment Act (44/2014) does not give a framework for disaster management and does not provide a clear understanding for the participants in disaster management. For instance, the Act does not say who is responsible for creating disaster management plans, who leads which participants, who

undertakes risk assessments, or who is responsible with identifying hazards that are not mentioned in the Environment Act (44/2014). The following are the negative aspects of the Disaster Management Acts:

1. None of the Acts define the important terms used in disaster management, or give responsibility to the Head of the Council of Ministers in Kuwait to supervise the disaster management process.
2. None of the Acts highlight the risk assessment procedure, or provide a clear framework for disaster management in Kuwait.
3. There is an overlap between the Disaster Management Acts in terms of responsibilities given to different agencies. This overlap leads these agencies to work separately, with each agency providing its own plan.
4. The Acts were established and formulated without the support of a qualified disaster management practitioner.

It is obvious to the author that in order for disaster management to work, all of the existing Acts must be re-formulated into one unified Disaster Management Act that enforces all participants to carry out their tasks.

3.9 The Gulf Cooperated Countries Emergency Centre

According to a Gulf Cooperative Council (GCC) report (2013), the GCC countries agreed to establish the GCC Emergency Management Centre after a meeting of the Ministers' Council, No. 21 on 18 December 2011. As an outcome of this meeting, an Act was established by the GCC to formulate the GCC Emergency Management Centre. This Act consists of 18 articles.

Article 1 highlights important definitions. Article 2 highlights the centre's name. Article 3 discusses the location of the centre (which is in Kuwait). Article 4 highlights the goal of establishing the centre, namely to enable, enhance and coordinate activities among the GCC countries during disasters. Article 5 highlights the 13 tasks of the GCC Emergency Management Centre, such as identifying and evaluating all hazards in GCC countries. This includes regional hazards that could harm any GCC countries in order to recommend and provide scientific and practical solutions to minimize risks, receive important calls regarding emergencies and to provide early warnings to GCC countries. Some of the thirteen tasks are to formulate acts, policies and procedures to enhance the aid process between GCC countries and to validate safety awareness

programs on how to validate disaster management plans, to contribute in providing plans, programs and projects relevant to emergencies and to provide technical information, consultants and support for GCC countries, to coordinate the sharing of logistics and resources between GCC countries during international emergency responses and to establish links with international early warning and prediction centres. However, to-date, none of these tasks are validated by the GCC Emergency Management Centre (GCC report, 2013).

Articles 6, 7, 8 and 9 highlight the centre's chain of command and employee tasks. Article 10 illustrates the emergency centre's budget. Article 11 highlights the emergency centre's database. Article 12 illustrates the focal point for each of the GCC countries and states that the emergency centre is to provide assistance when any GCC country asks for help. Article 13 highlights the interests of the employees. Article 14 describes the auditors for the centre. Articles 15, 16, 17 and 18 highlight the emergency centre's main language (which is Arabic) and the modification process in the act. In terms of risk assessment, the GCC Emergency Management Centre formed a contract with an international company to identify all hazards in all the GCC countries in 2013, (Altimimy, 2016). This company highlighted 12 disaster hazards, such as:

1. Major earthquakes.
2. Water system failures.
3. Sudden or mass expatriates.
4. Water shortages or droughts.
5. Severe weather (e.g., storms, floods, heat waves).
6. Mass displacement of individuals.
7. Public health incidents (e.g., animal, bacterial, parasitic, viral and food diseases).
8. Cyber incidents.
9. Chemical, biological, radiological and nuclear incidents that may result from acts of terrorism.
10. Tropical cyclones.
11. Radiological contamination.
12. Hazardous material incidents (GCC, 2013).

However, the methods used to identify the above hazards were not illustrated. In addition and as discussed earlier in the scenario method paragraph in Chapter 2, identifying hazards is step one in the overall risk assessment process. Therefore, an evaluation of these hazards, their impact, the

vulnerability of the potentially affected populations, etc. is still missing, not only in Kuwait, but in all the GCC countries. This again confirms that the emergency agencies in the GCC countries are not aware of the disaster management life cycle. At the same time, the overlap of disaster management legislation and Acts lead emergency and disaster management agencies in Kuwait to work separately, with each agency identifying its own hazards.

Finally, in terms of poor legislation, some Articles have noted that the GCC Emergency Management Centre should be based on the disaster management life cycle. However, it is stated that the GCC Centre for Emergency Management works "when any country of The Gulf Cooperative Council needs help," Gulf Cooperative Council report (2013). The main aim of the GCC Emergency Management Centre is to manage external disaster responses between GCC countries and that it is not responsible for participating in any disaster that may occur solely inside Kuwait. Therefore, this research aims to improve the current Disaster Management Framework, supported by a unified Disaster Management Act for disasters that occur in Kuwait.

3.10 Population Density and Distribution

According to a Country Meters report (2015), the population of Kuwait is estimated to be 3,497,700. The population density, as of July 2015, is 194.2 people per square kilometre. The total area, defined by Country Meters as the sum of land and water within international boundaries and coastlines, of Kuwait as 17.820 km^2 (Country Meters report (2015). It is approximated that more than 96% of the population of Kuwait live in urban areas. Four per cent of the entire population is said to be semi-nomadic or nomadic. In Kuwait, 1,164,448 people are Kuwaiti and 2,467,561 people are foreign (PACI Report, 2011).

Kuwait is one of the few countries in the world where the foreign population is greater than the local population. It is estimated that only one out of every three to four people in Kuwait is a registered Kuwaiti citizen (Tavakoli & Ashtiany, 1999; Kuwait Country Report, 2018). This issue must be considered by the emergency planners in Kuwait, mainly when addressing the disaster awareness programmes, as well as when developing a specific Early Warning System, to make sure that all the disaster information provided to the public can be clearly understood by the different populations who speak different languages - other than Arabic. Reports on Kuwait's population density (i.e., the number of people per square kilometre) show that the country's population density has been on the rise in recent years, Kuwait Country Report (2018).

A World Bank report released in 2009, reported that the population density of Kuwait was 143.01. According to the World Bank report (2014), the population stood at 148.50. In 2011, the population density was reported to stand at 153.58 (World Bank, 2014). These figures were arrived at by dividing the midyear population with the area of Kuwait into square kilometres.

The first official population census in Kuwait was conducted in 1965 and the nation's population was 206,473. Since then, Kuwait has been conducting its census every five years and the trends show that numbers have risen with each subsequent count. Most of the population are known to reside in Kuwait City and its suburbs: most in areas that overlook the Arabian Gulf coast (Tavakoli & Ghafory, 1999; Kuwait Country Report, 2018).

Other demographics show that the official language of the population is Arabic. English is also used as a second and business language. The population in Kuwait is made up of Kuwaiti Arabs, other Arabs and Asians from the south and east, Iranians, Europeans and Americans. (Talebian & Jackson, 2004; Dashti, 2015). The Country Meters report (2015), also mentioned that the population will increase to 6.3 million by the year 2050. Therefore, the emergency planners in Kuwait must take into account the future distribution of the population within the country. Figures (19 & 20) show the distribution of the population in Kuwait and the flat land of the urban area near the coast.

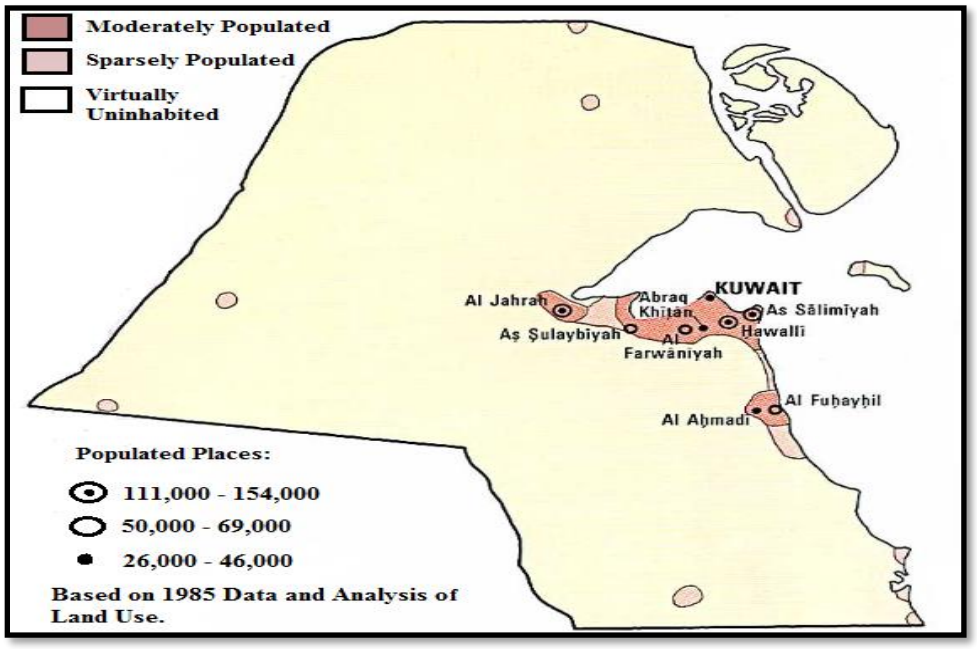


Figure 19. Kuwait's Population Distributed (NationMaster.com, 2003-2012)

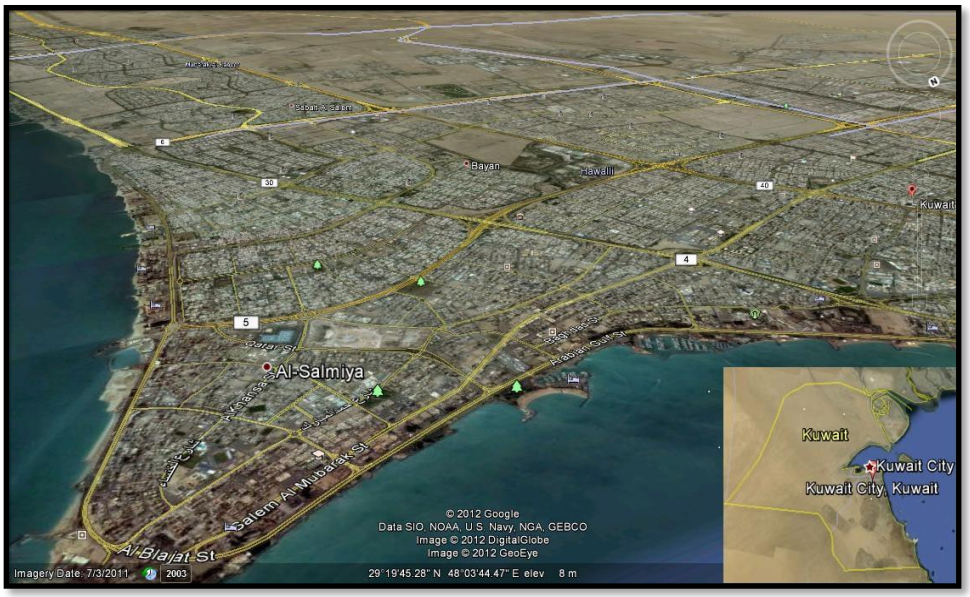


Figure 20. The Urban Areas near the Coast of the Arabian Gulf – Kuwait

There are six different governorates in Kuwait: Hawalli, Al Asema, Al Ahmadi, Al Farwaniya, Mubarak Al-Kabeer and Al Jahra, Kuwait Government (2016). The population density, as stated previously, is considered to be one of the most important factors of data for risk assessment, especially when evaluating a disaster's impact and a population's vulnerability. Other important factors that the emergency planners need to consider are the number of people in each area or governorate, as well as their gender, culture and ages. This will help emergency planners in understanding the required prevention, preparedness, response and recovery needs, before, during and after a disaster.

Unfortunately, there is a lack of software or a system such as the Geographic Information System (GIS), which can provide critical information to the emergency planners and responders in terms of, for example the effected people, and can support the decision making process, for instance, in the evaluation and analysis of the risk and vulnerability. Hence, this factor also confirms that there is a vital need to improve the current disaster management process and framework in the country. Therefore, the author of this research attempted to clarify the census information (Table 14) in each governorate, to illustrate important factors for the emergency planners, to know what should be considered when planning and preparing for managing a disaster Behbehani (2013).

Table 14. Population Density of all Governorates in Kuwait. (Central Statistic Beareau CSB, 2012)

Gov.	Sex	Total	Age														
			65+	64-60	59-55	54-50	49-45	44-40	39-35	34-30	29-25	24-20	19-15	14-10	9-5	4-1	> 1
ASM	M	170,663	5,062	3,073	5,671	9,895	12,787	17,357	21,115	24,873	21,066	12,748	8,946	8,762	9,075	7,749	2,484
	F	155,850	5,987	3,154	4,519	6,639	10,197	15,909	16,746	21,464	21,578	14,186	8,369	8,416	8,920	7,495	2,271
	Tot	326,513	11,049	6,227	10,190	16,534	22,984	33,266	37,861	46,337	42,644	26,934	17,315	17,178	17,995	15,244	4,755
HAW	M	346,255	8,333	7,577	12,524	18,245	25,871	33,392	35,694	43,616	37,081	22,467	20,830	23,935	26,882	23,382	6,426
	F	326,655	7,189	5,619	8,447	12,557	20,847	27,023	35,087	41,824	44,256	28,991	18,612	22,876	25,204	22,134	5,989
	Tot	672,910	15,522	13,196	20,971	30,802	46,718	60,415	70,781	85,440	81,337	51,458	39,442	46,811	52,086	45,516	12,415
AHM	M	356,963	4,940	3,746	8,683	14,022	24,152	36,188	44,404	54,204	49,395	25,916	17,491	20,531	23,804	20,758	8,729
	F	231,105	4,231	2,572	4,120	6,065	11,757	18,355	23,705	28,118	29,425	19,038	15,810	19,242	22,363	19,702	6,602
	Tot	588,068	9,171	6,318	12,803	20,087	35,909	54,543	68,109	82,322	78,820	44,954	33,301	39,773	46,167	40,460	15,331
JAH	M	215,171	3,367	2,677	4,406	6,886	10,981	16,242	18,429	24,674	24,438	22,937	17,898	18,960	20,077	17,240	5,959
	F	185,804	3,292	2,085	2,860	4,868	9,169	11,269	15,147	18,751	21,483	22,039	16,868	17,912	18,529	16,260	5,272
	Tot	400,975	6,659	4,762	7,266	11,754	20,150	27,511	33,576	43,425	45,921	44,976	34,766	36,872	38,606	33,500	11,231
FAR	M	527,337	5,769	6,464	14,289	25,371	39,621	59,030	70,981	88,900	71,076	35,928	21,247	23,543	28,755	26,857	9,506
	F	291,234	4,530	3,393	5,751	9,793	14,406	21,880	29,832	34,985	37,662	28,661	18,053	21,850	27,343	25,385	7,710
	Tot	818,571	10,299	9,857	20,040	35,164	54,027	80,910	100,813	123,885	108,738	64,589	39,300	45,393	56,098	52,242	17,216
MUK	M	121,983	1,796	1,725	4,248	8,603	8,198	8,553	10,837	13,678	16,375	12,665	9,719	8,303	7,685	7,367	2,231
	F	136,830	1,994	1,865	4,541	8,587	10,428	13,649	13,009	14,350	18,905	15,125	9,689	7,805	7,438	7,156	2,289
	Tot	258,813	3,790	3,590	8,789	17,190	18,626	22,202	23,846	28,028	35,280	27,790	19,408	16,108	15,123	14,523	4,520
TOT	M	1,738,372	29,267	25,262	49,821	83,022	121,610	170,762	201,460	249,945	219,431	132,661	96,131	104,034	116,278	103,353	35,335
	F	1,327,478	27,223	18,688	30,238	48,509	76,804	108,085	133,526	159,492	173,309	128,040	87,401	98,101	109,797	98,132	30,133
	Tot	3,065,850	56,490	43,950	80,059	131,531	198,414	278,847	334,986	409,437	392,740	260,701	183,532	202,135	226,075	201,485	65,468

3.11 Kuwait's National Seismic Network

The Kuwait National Seismic Network was formed in 1996 under the supervision of the Council of Ministers. The Kuwait National Seismic Network was established, installed and commissioned by the Kuwait Institute of Scientific Research (KISR) in 1996, and started its official functions in March 1997. The KISR runs and manages the Kuwait National Seismic Network.

The main functions and duties of the Kuwait National Seismic Network include for instance; monitoring seismic activities that occur in and around Kuwait, recording earthquake events that take place inside Kuwait and in surrounding areas of the country (local, regional and teleseismic events), research and study activities that are relevant to seismology, characterizing the status of seismic activity in and around the state of Kuwait and come up with local seismic hazard maps, cooperating with government authorities to establish seismic codes for structures and buildings, exchanging seismic information and data with other international seismological networks, and creating a well-trained and qualified national workforce in the field of seismology. The Kuwait National Seismic Network is a department under the KISR that is well-stocked with some of the latest international materials and techniques in the field of seismography. The National Seismic Network is made up of eight seismic field stations that are permanently established. These seismic

field stations are evenly distributed across the state of Kuwait (see Figure 21 and Table 15), depending on the tectonic setting of the country. Seven of these field stations are short-period centres and only one is a broadband station with the ability to detect and broadcast seismic activities over long ranges, (KNSN, 2009).

Figure 21. Distribution of Seismic Stations of Kuwait National Seismic Network (KNSN, 2009)

Table 15. Seismic Field Stations Locations (KNSN, 2009)

Code	Station Name	Latitude °	Longitude °	Altitude (m)
KBD	Al Kabd	29 10.533	47 41.600	124
QRN	Al-Qurayn	28 44.665	47 55.063	135
RDF	Ar Redifah	28 55.553	47 32.983	180
NAY	An Na`ayim	29 14.935	47 14.527	218
RST	Umm ar Ruwaysat	29 30.017	46 59.833	218
MIB	Mutribah	29 48.191	47 20.326	125
UMR	Umm Ar' Rimam	29 33.115	47 42.950	082
FKI	Faylakah	29 26.825	48 18.790	006

Each of these stations of the National Seismic Network is made up of three sections. The first one is an observatory unit that consists of several seismometers to measure, observe and monitor the seismic activities of the areas that the stations are mandated to cover. The second unit, called the recording and digitising section, is responsible for amplifying, digitising and recording the data that has been observed and collected. The third and final unit, the communication section, is made up of transmitters, antennae and full duplex units that are mounted on top of communication towers found at each station (KNSN, 2009).

To date, no warning or safety guides have been published by the National Seismic Network to educate the public as to what they should do before, during and after an earthquake. In addition, one of the main reasons for establishing the National Seismic Network is to update building codes which mandate that buildings should withstand earthquakes; this task, however, is considered a dream, Arab Times (2018). Generally, the Kuwait National Seismic Network is mandated to monitor, observe and record all seismic activities in the seismic zones (Figure 22) in the state of Kuwait as well as in nearby countries.

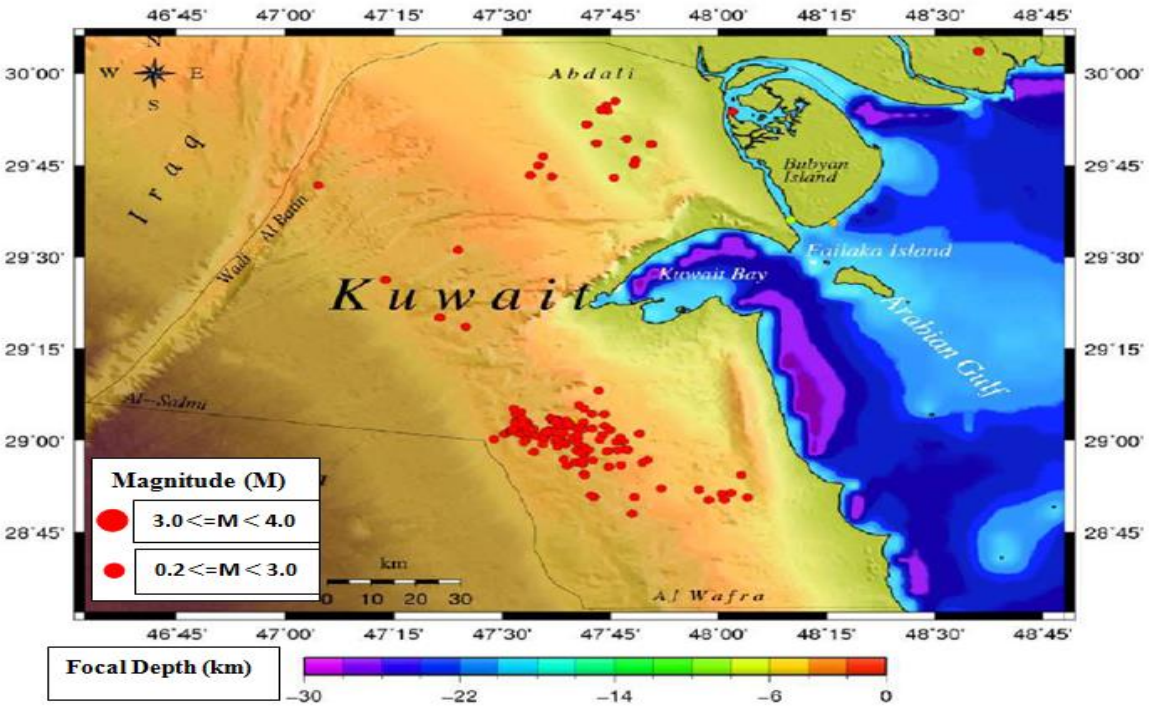


Figure 22. Kuwait Local Seismicity Map (KNSN, 2009)

The aim is to detect seismic activities and to be prepared,should earthquakes occur. Seismic activities are generally an indicator of earthquakes and the National Seismic Network is well-

equipped to monitor such activities and to advise the nation accordingly. This National Seismic Network was initiated to deal with earthquake-related disasters by helping people to monitor and notice possible earthquakes so that proper and timely action can be taken to reduce these impacts and effects (Nettles & Ekström, 2010; Arab Times, 2018).

In recent times, there have been many announcements that an earthquake will occur in Kuwait. The announcements were based on the fact that, in 2008 an earthquake of 6.0 on the Richter scale was felt in the region. Experts have presumed that a future earthquake will reach the 7.0 mark and that it will cause a tsunami as well (Bou-Rabee & Nur, 2002; Arab Times, 2018). This clarifies calls for earthquake preparedness and has also been made by experts who have stated bluntly that an earthquake will occur very soon in Kuwait. They are basing their predictions on the current generation of nuclear power stations in many Arab states. The experts state that it is with notable concern, that countries in the Arab world are embracing nuclear power as an alternative source of energy, Arab Times (2018).

This is despite the fact that negative environmental repercussions are felt and observed all over the world. The current predictions on the earthquake situation state that if an earthquake were to occur, it could be of a magnitude of 8.0 or higher. This will sweep through all the Arab nations due to them dumping hazardous toxins into the atmosphere. This generally precipitates the formation of an earthquake in any region in the world. To make their predictions, experts are relying on a comparison of the conditions in Kuwait with factors that caused the earthquake and tsunami in Japan in the past (Bou-Rabee & Nur, 2002; Arab Times, 2018).

3.12 Chapter 3 Summary

In Chapter 3, the researcher highlighted the disaster management background of and the disaster management procedure in Kuwait, including the disaster scenarios that have been nominated and identified by the Civil Defence Committee, as well as the hazards that have been nominated and identified by the GCC Emergency Management Centre. Chapter 3 also highlighted the importance of co-operation when it comes to establishing disaster management institutes in Kuwait, as well as the vital need to provide disaster management courses in Kuwaiti universities and colleges. Chapter 3 also discussed the different Disaster Management Acts and outlined the agencies that are responsible to manage particular aspects of disasters in Kuwait, highlighting any obvious duplications and overlaps in the disaster management process in the country. As mentioned earlier

in Chapter 2, the first step in disaster management is to carry out a risk assessments to identify any potential hazards.

Chapter 3 highlighted risk assessment procedures used in Kuwait when identifying hazards. Chapter 3 also provided technical information on the response procedure of the emergency services, which showed that all the emergency services in Kuwait focus mainly on the response phase of a disaster, ignoring other important phases of the disaster management life cycle. Finally, Chapter 3 highlighted all the disaster management legislation, policies and Acts that currently exist within the state of Kuwait. The author found that the Civil Defence Department was established to comply with the 1979 Act. From the above literature, it was shown that the Fire Service in Kuwait is comparatively highly-developed in terms of logistics, manpower, training, response and geographic distribution; the Fire Service's emergency response arrangements for fire and rescue services were found to be reasonable. At the same time, The Civil Defence Department and Civil Defence Committee have more powerful Acts in terms of disaster management.

There are however, no plans, resources, or logistics that have been validated to enable and support these agencies in managing disasters. One positive note derived from the author's research, is that the state of Kuwait has not experienced many disasters due it being a relatively new and still developing country. The geographic location of Kuwait makes it almost free of natural disasters. However, disasters can occur suddenly and global warming plays a major role in the changing climate. For these reasons alone, disaster management and proper risk assessment procedures need to be adopted to identify all hazards that could affect Kuwait and its surrounding areas, to reduce any impact and to arrange for more resources which can help the country respond more effectively. Terrorism is a new phenomenon which threatens all parts of the world. Unfortunately, terrorism is currently not considered a hazard in Kuwait.

Therefore, suitable arrangements must be carried out by the Civil Defence Committee to reduce the possible impact and damage of terrorism and to test the response procedures for the emergency services, in the event of a disaster happening. In terms of technological hazards, the Kuwaiti Government shall enforce all companies, factories and, any other places which store hazardous materials to establish their own emergency plans, and for the Civil Defence Committee to review these plans. Therefore, the establishment of a new Act by the Kuwaiti government is considered vital for the mitigation of possible threats that could do harm to the country from technological

hazards (e.g., chemicals in Kuwaiti factories) and all sectors involved shall adhere to the Disaster Management Framework for the country.

As discussed earlier in Chapter 3, to-date, more than a thousand earthquakes have occurred in Kuwait. However, historical documents have never mentioned any high-magnitude earthquakes and because of that, the Kuwaiti National Seismic Network was established in 1997. The United States Geological Survey (USGS) and the European Mediterranean Seismological Centre have also recorded a number of medium-magnitude earthquakes inside Kuwait. The first earthquake which occurred in Kuwait was detected by international networks in 1931; it had a magnitude of 4.8. This was followed by a further number of earthquakes in the years 1973, 1976, 1977, 1993 and 1997 (KNSN, 2009). Chapter 3 also discussed and highlighted some regional natural hazards. For example, the Zagros Folded Built was predicted by some researchers to pose a severe threat to Kuwait. Table (16) highlights the strongest earthquakes that have occurred in Kuwait.

Table 16. Top 6 Earthquakes Recorded in the State of Kuwait (KNSN, 2009)

Date	Longitude(East)	Latitude (North)	Depth (km)	Magnitude
30/12/1997	47.5	28.7	10	4.3
18/09/1997	47.5	28.9	10	3.9
02/06/1993	47.6	29.0	10	4.8
16/01/1977	48.1	28.8	Unknown	4.5
27/09/1976	48.2	28.9	33	3.8
26/09/1976	47.3	29.9	33	3.2

It has been noted that the current Disaster Management Framework in Kuwait cannot exist and achieve its aims and objectives until there is a reasonable and applicable disaster management process. The author considers the following as important improvements that need to be made to the current disaster management process and framework in Kuwait.

1. Disaster Management Act: should be one unified Disaster Management Act enforced by the Head of the Council of Ministers in Kuwait.
2. Disaster Management Center: should take over the overall process of disaster management in Kuwait.
3. Risk assessment: should be followed by the participants of the disaster management process in Kuwait.
4. Emergency procedure: should validate emergency plans for all identified hazards.
5. Emergency education: to increase the number of qualified disaster practitioners in the country and increase public awareness.
6. Emergency institutes: should provide support for decision-makers, provide scientific research on disaster management and support in the establishment of new Disaster Management Acts.
7. International framework focal point: should share information and follow the international trend in disaster risk reduction strategies.

The review of the disaster management process in Kuwait shows a lack in term of the adaptation of a spicific disaster management model or a theary, such as the disaster management life cycle (Figure 2, in Chapter 1), which led the disaster management process in Kuwait conducted randomlt, without any concern of an important factors to prepare for a disaster for instance, identifying, mitigation, preparedeness, response, and recovery. The key finding that discussed in (Section 2.4, in Chapter 2), thgether with the seven points stated in this section will be used by the author throughout this research as a knowledge base process for improving the current Disaster Management Framework in Kuwait. These points will be discussed in more detail in Chapter 4, as will the design of the conceptual framework for this research, the initial terms and the study areas that could improve the current Disaster Management Framework for Kuwait.

Chapter 4: The Conceptual Framework

4.1 General

The previous chapter (Chapter 3) covered a literature review of the current disaster management procedures in Kuwait and the country's current Disaster Management Acts. This chapter will illustrate the conceptual framework for this research, which aims to enable the author to improve the current Disaster Management Framework in Kuwait.

The processes and procedures used in Kuwait were discussed in detail in the previous chapter and the author found that there is a huge gap in the disaster management process due to several factors, most notably, poor management acts and a weak Disaster Management Framework, plus a lack of qualified personnel in disaster management science. Therefore, this chapter aims to produce a systematic conceptual framework to illustrate the important factors that can improve the current Disaster Management Framework in Kuwait.

According to (Miles and Huberman, 1994; and Vaughan, 2008), the conceptual framework illustrates, graphically or in narrative form, the main things to be studied (e.g., key factors, concepts and variables and the presumed relationships amongst them). It also enables researchers to find out what they need to know and how an answer may be found. The conceptual framework is flexible as it enables researchers to borrow pieces from the framework, and at the same time provide a structure.

According to Jabareen (2009), the conceptual framework highlights the main issues to be studied. Section (4.3) below illustrates the proposed conceptual framework for this research. The framework has been developed based on the preliminary literature reviewed with knowledge taken from the current disaster management procedures in the state of Kuwait. Based on this, the discussion focuses on the development and components of the framework.

The conceptual framework shown in (Section 4.3) consists of three different parts. Part one represents the areas and the factors that the author studied and discussed in the previous chapters. Part two represents the main concepts and terminologies that the author believes will improve the current Disaster Management Framework. Part three represents the outcome of this research. Finally, the results of this chapter will be used by the author to build the final framework, which represents the main outcome of this research.

4.2 Aim of Disaster Management Framework

The term ‘framework’, is well defined in Chapter 2 and provides an example of different Disaster Management Frameworks that are used in various countries. Each country has its own and all are used to achieve a particular aim: to reduce the impact of a disaster. Speaking generally, the aim of a framework is to ensure the success of the process by creating mechanisms which coordinate the activities of the various groups of participants that are involved in the management processes. A Disaster Management Framework provides this through legal frameworks and various institutions that are mandated to undertake disaster management roles.

The current framework in Kuwait has been well documented in Chapter 3. However, the literature in Chapter 3 showed that the current framework needs to undergo major improvements due to it being currently ineffective with delivering the services required to adequately face a disaster.

4.3 Designing the Conceptual Framework

The conceptual framework for this research consists of three parts. Part one illustrates the current procedures and practices used by the Kuwaiti Government for managing disasters, including a review of the current legislation and acts, the disaster plans that currently exist, the capabilities of the emergency services and the risk assessment methods used to identify hazards in Kuwait (which have been illustrated and discussed in detail in Chapter 3). Part two of the conceptual framework represents the author’s knowledge-generation process which will be used to improve the Disaster Management Framework for Kuwait and to illustrate the benefits of establishing different factors such as, disaster management institutes, providing education programs and updated disaster management procedures. This component also highlights the benefits of establishing training processes which include the disaster management life cycle.

The main sources of the information gathered by the author to develop this part of the conceptual framework, were from the critical review of the literature in (Chpter 2) and the gap identified in the current disaster management process in Kuwait which demonstrated in (Chapetr 3), For instance, the unpredicted hazards that could affect or already have affected Kuwait, such as terrorism and oil spills in the sea. The unclear risk assessment process by the Civil Defence Committee, the lack of disaster statistics, lack of disaster mitigation processes, such as validating reasonable Building Codes which could aid construction with new or refurbished buildings

resisting an earthquake Al-Fahad (2012). This also includes the poor planning of land use that can increase the vulnerability of the population who are facing a threat of an explosion and toxic gases that could leak from the nearby oil refineries, the lack of disaster risk reduction strategies and national disaster management plans and the overlap in terms of different Disaster Management Acts with different agencies.

The terms used in part two of the conceptual framework (Figure 23) were derived from the key findings of the literature (Chapter 2, Section 2.14, and Table 11), as well as the discussion of the disaster management process in Kuwait (Section 3.12, in chapter 3). For instance: hazard risk assessment, the important of an up-to-date disaster management act, the standard operating procedure for the emergency services, the disaster management life cycle (Figure 2, in Chapter 1), as well as the importance of education, which can validate an understanding for educated people in the disaster management field, to understand the terms, requirements, and processes needed to facilitate the disaster management practices. Part three of the conceptual framework represents the predicted outcome of this research, which is to improve the current Disaster Management Framework. The following figure (Figure 23) illustrates the Conceptual Framework for this research.

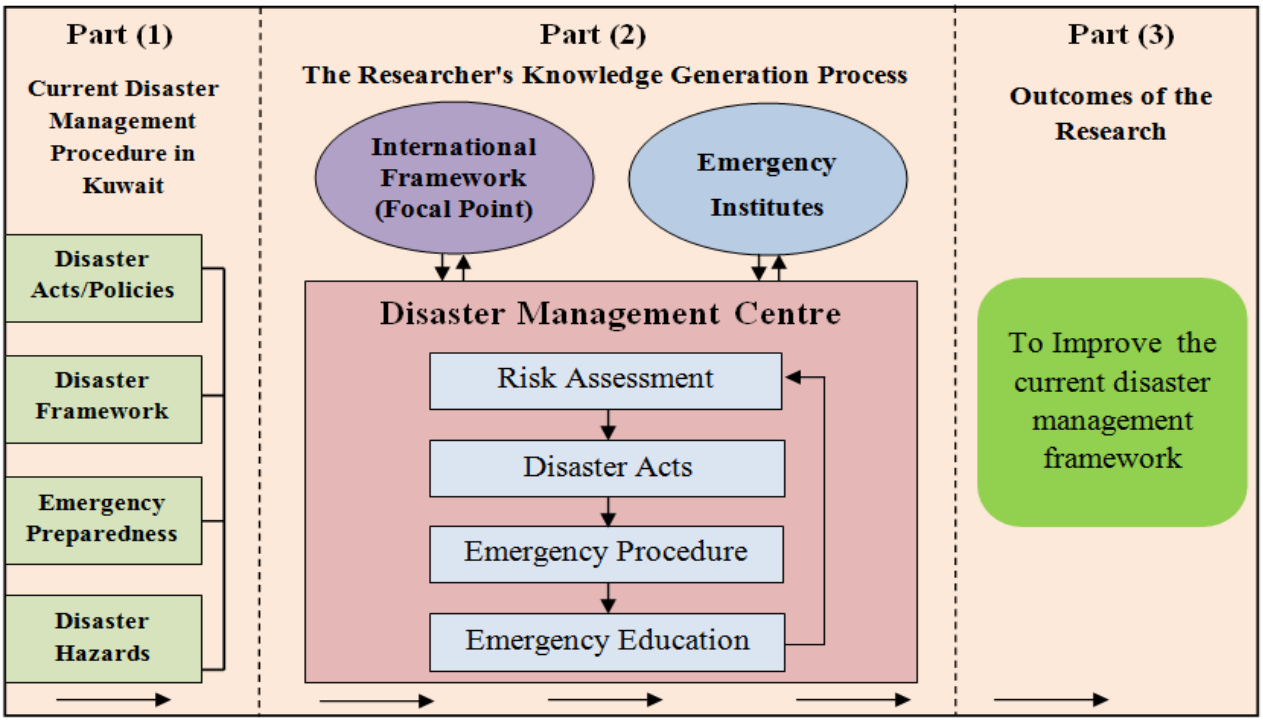


Figure 23. The Conceptual Framework

4.4 The Conceptual Framework Components

Based on previously studied elements, the literature on Disaster Management Frameworks in other nations and the researcher's knowledge, the following seven elements are considered as crucial for the improvement of the current Disaster Management Framework in Kuwait.

1. International Framework - Focal Point.
2. Disaster Education.
3. Disaster Institutes.
4. Unified Disaster Management Act.
5. Risk Assessment, national risk register
6. Emergency Procedure, or a disaster management life cycle (the 5 phases).
7. Disaster Management Center, all Agencies working under one umbrella.

4.5 International Framework Focal Point

The most famous international conferences on disaster risk reduction were discussed in the literature review in Chapter 2 (Section 2.13) and the focal point of Kuwait with the regional office of UNISDR was highlighted. Unfortunately, as explained in the literature reviewed in Chapter 2, Kuwait was not present at the Yokohama Strategy of 1994 or *the Hyogo Framework for Action Plan (2005/2015)*. Both these conferences provided guidelines for all the countries of the world to use when preparing for disasters. The author took the opportunity to attend the latest UN conference on disaster risk reduction, which came up with the recent *Sendai Framework* in May 2015. The author has also tried to follow up with UNISDR regarding the reduction of disaster risks in Kuwait.

The aim of attending was to ensure Kuwait will have some background knowledge to help understand international trends and strategies on disaster risk reduction. This can enable disaster managers and planners in Kuwait to follow the international direction and to draw a roadmap for managing disasters at local, regional and international levels. Therefore, the focal point is considered important for the management framework as it can support all the participants in the disaster management centre (which will be illustrated later in this chapter) with international guidelines and targets that will be useful for the adaptations of the disaster risk reduction strategies.

At the same time, this can be used to gain and share knowledge and information with international professional bodies.

4.6 Disaster Education

As illustrated in (Chapter 2, section 2.11), education is vital for the development of a disaster risk reduction process. To bring more qualified people into the disaster management field in Kuwait, the government should encourage and support universities and colleges with providing disaster management courses. The establishment of disaster management courses would also increase the awareness level of the public in Kuwait.

As observed from the current Disaster Management Framework in Kuwait (see Chapter 3), the Disaster Management Framework does not recognise the importance of educating people about disasters. The result of this is that the civilian population in Kuwait is without any awareness in terms of hazards that could cause harm to the country. This leaves the public in Kuwait without any disaster hazards culture and with high susceptibility to loss when a disaster does occur. Therefore, the author is aware of the lack of education which represents a large hole in Kuwait's Disaster Management Framework.

4.7 Disaster Institutes

The benefits of establishing a disaster institute were outlined in Chapter 2 (Section 2.9). Institutes can assist the government with certain aspects of managing disasters. For instance, they can aid in the process of validating scientific research on disaster management and can design training programmes. Disaster institutes can also enable the government to establish policies and legislation. As discussed in Chapter 2 (Section 2.8.4), some countries (e.g., Australia) use research to formulate and prepare their Disaster Management Acts and legislation.

Therefore, disaster institutes will add value to the framework, especially in determining future hazards and formulating Disaster Management Acts. Kuwait can also sign different cooperation protocols with other management institutes, at both regional and international levels, to validate different approaches in terms of management, disaster risk reduction and the Disaster Management Framework.

4.8 Disaster Management Acts

Whereas the previous paragraph highlighted the importance of establishing disaster management institutes, this section highlights the importance of establishing reasonable and applicable Acts and legislation which can support the framework and enforce the disaster management process.

Different Acts were studied in Chapter 2 and the current ones were discussed in Chapter 3. To achieve desirable outcomes, the author strongly believes there is a need for a new Disaster Management Act. This new Act should unify and revise all of the current Disaster Management Acts in Kuwait. Moreover, the new Act must be established by the Head of The Council Of Ministers in Kuwait, rather than a single ministry; otherwise the overlap problem that currently exists will continue. Establishing a new Act, one that is established by the Head of the Council of Ministers, will unify all the current disaster management efforts, meaning there would be one single piece of legislation for the overall country. Improving the current framework cannot be achieved without establishing a new Act. The new recommended Act will be illustrated in Chapter 7, in the final framework.

4.9 Risk Assessment

Risk assessment is a key to the success of any Disaster Management Framework. Risk assessment was defined and discussed in (Chapter 2, Section 2.6). It is used to identify and reduce vulnerability, to improve preparedness and resilience, to protect and mitigate the impact of disasters and to identify all hazards that could cause harm.

The role of risk assessments in disaster management is to assist in validating the priorities of disaster management planners. As discussed in the research introduction in Chapter 1, there is a lack of risk assessment procedures carried out by the Civil Defence Committee: this was shown in Table 2, that hazards nominated by the committee are identified randomly. Therefore, the use of risk assessment is considered important for identifying all hazards that could threaten Kuwait.

4.10 Emergency Procedure

Emergency procedures represent the curriculum and are used to define the overall disaster management process and needs. The disaster management life cycle which was mentioned in the

introduction of this research in Chapter 2 (Section 2.4) and illustrated in more detail in Chapter 2, where the different phases of the disaster management life cycle (i.e., mitigation, preparedness, response and recovery) were explained. The researcher also explained his wish to integrate the term ‘identifying’ to the current disaster management life cycle.

The reason for integrating ‘identifying’ into the current disaster management life cycle is that the researcher believes that identifying hazards accurately represents a key factor in the management process and that it will help practitioners to take into account how hazards can be identified. Generally, the disaster management life cycle is used to enable governments to evaluate the performance before, during and after a disaster event. Unfortunately, disaster management leaders and the Civil Defence Committee were found to focus only on the response phase of a disaster. Therefore, the researcher aims to improve the current Disaster Management Framework in Kuwait and to illustrate the overall disaster management life cycle process in a systematic context.

4.11 The Disaster Management Centre

Most modern frameworks (such as those in India, Pakistan, the United States and Australia) do not specify which ministry or agency is to carry out the disaster management process. This is because disaster management should include different participants (the government, civilians, local authorities, the private sector, non-government organisations, etc.).

In Kuwait, the Disaster Management Act, which was established in 1979, mentions that the civil department shall prepare and coordinate all disaster management needs and invite all relevant agencies to participate in disaster management planning through the Civil Defence Committee. Moreover, as illustrated in (Chapter 1, Table 1), the Civil Defence Committee does not include all the agencies that should participate in the disaster management process. This has led the country to misidentifing hazards which can affect it. In addition, the disaster management life cycle has not been adopted by the Civil Defence Committee in Kuwait as the present process focuses only on the response phase of a disaster.

The Civil Defence Committee process was covered in more details in Chapter 3. The Civil Defence Committee also established two different disaster management committees, which were discussed in Chapter 3. These committees were created to prepare for a specific hazard (e.g., radiation). However, there is no obvious or standard process used in these committees. Therefore, the current

management process cannot achieve the desired outcomes for Kuwait. Moreover, there is no obvious chain of command to coordinate any management processes in Kuwait. This is due to random management and different Acts that have been published by different agencies in the country (see Chapter 3). Therefore, the author recommends that Kuwait should establish a Disaster Management Centre in order to unify the disaster management process. The process should be enforced by one unified Disaster Management Act. The following (Figure 24) illustrates the structure of the recommended disaster management centre.

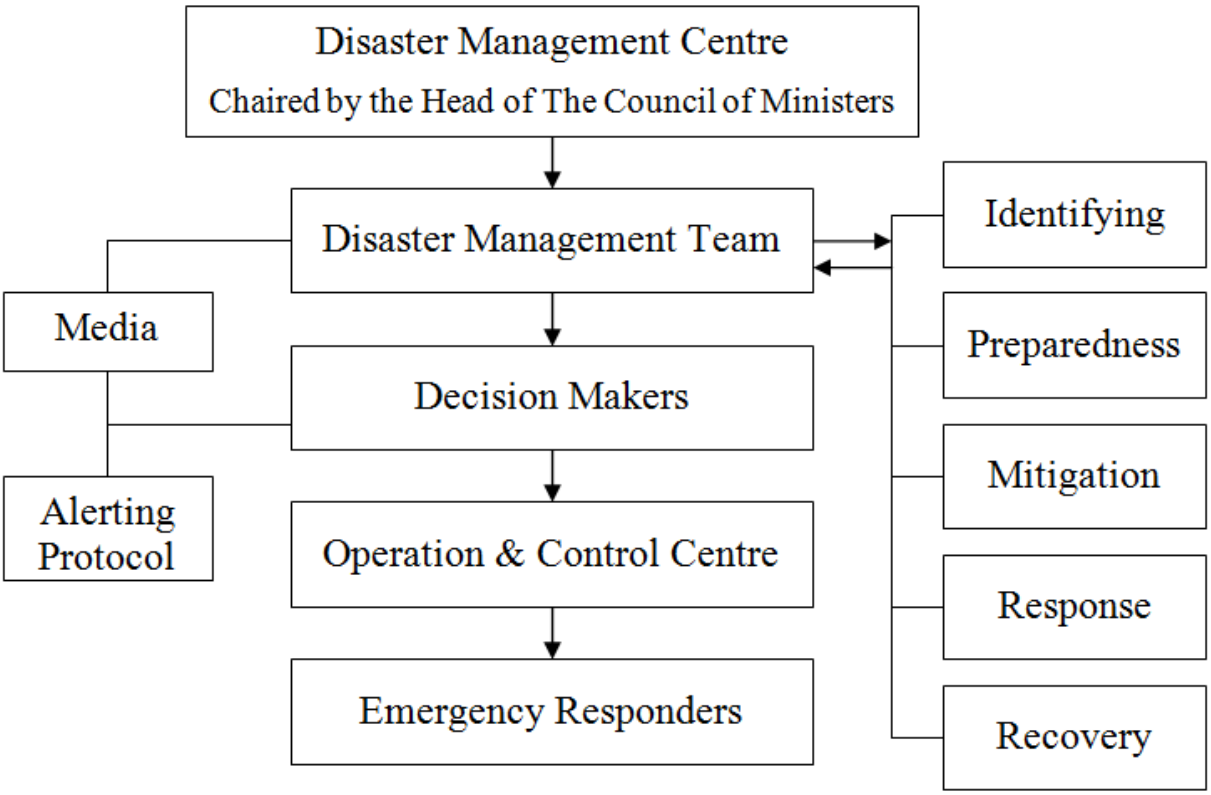


Figure 24. The Structure of the Recommended Disaster Management Centre for Kuwait

4.11.1 The Disaster Management Centre Chief

The previous paragraph highlighted the need for and discussed the importance of establishing a disaster management centre. The author believes it will improve the current Disaster Management Framework and process within the country. In this chapter, the author highlights the initial work and integration of the important terminology used. The following paragraph illustrates the role of the Disaster Management Centre chief. The recommended centre shows that the Chair should be

the Head of the Council of Ministers due to the Head Minister having overall responsibility over all ministers in Kuwait.

A major reason that the Head of the Council of Ministers should chair the recommended Disaster Management Centre is that this will fix the current overlap problems, in terms of disaster management responsibilities and legislation that currently exists between the country's various committees. Also, giving the lead to the Head of the Council of Ministers will provide a suitable audit on the work required by the centre and it will encourage all the ministries, private sectors, non-government agencies and any other participant groups to show their results and achievements to his department. Therefore, all participants and employees in the Disaster Management Centre will work under the control of the Head of the Council of Ministers . The role of the Head of the Centre will be illustrated and discussed in more detail in Chapter 7, being the final framework chapter.

4.11.2 The Disaster Management Team

The disaster management team represents the heart of the Centre and it consists of three different sub-teams (see Figure 25). One team will validate the requirements of the overall disaster management life cycle. Another team will be the legal team. The third team will be the GIS team. The main tasks of the teams are to carry out risk assessments and to adopt all practices according to the disaster management life cycle (see Chapter 1 and Chapter 2).

A team should consist of an academic participant, leaders and top management representatives from all ministries, private sectors and non-government organisations in Kuwait, who will work continually before, during and after a disaster. The aim of the team is to cooperate and identify all hazards that could threaten the state of Kuwait. Appropriate groups must work together to manage any given hazard. For instance, if a dust storm is a hazard, the environmental and meteorological agencies should work together to identify how Kuwait will be affected by such a hazard and what the impact of the storm might be. When all hazards are identified, the next step is to prioritise them, based on their possible impact. When they have all been identified and prioritised, the team shall prepare a national plan for each type of hazard.

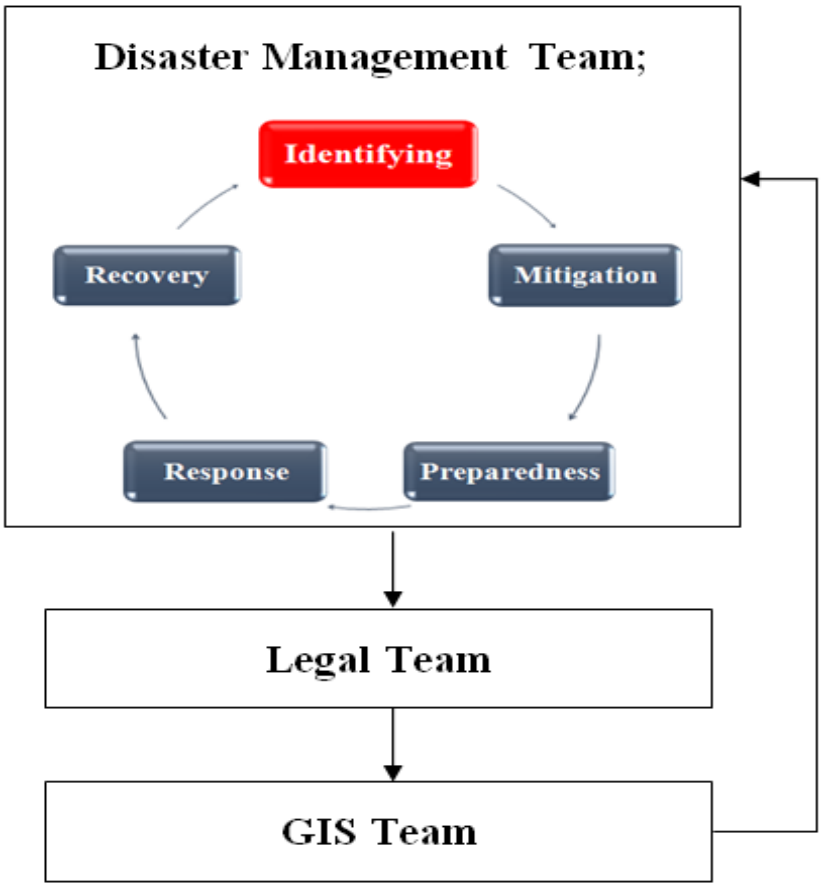


Figure 25. Disaster Management Team Framework

In addition, the team shall coordinate regional-level activities to identify, share and extend their knowledge of the external hazards and to share hazard and risk information with national-level disaster management groups. The team should also encourage the validation of research and support the establishment of disaster management institutes in Kuwait. Attending regional and international conferences on disaster management will add value to the teams and will help extend their knowledge of how different countries manage disasters. Finally, the disaster management team must highlight and map the vulnerabilities, risks and possible impacts associated with different disasters in order to enable the team to obtain an adequate level of emergency capacity and to import and validate required resources and logistics.

The following points are also important roles of the disaster management team:

1. To validate a standard operation procedures for all identified hazards.
2. To review the development plans in and out of Kuwait (to identify future hazards).

3. To validate a disaster management database for hazards, risks and vulnerabilities, using GIS.
4. To validate a disaster early warning procedure and alerting system.
5. To recommend types of training.

4.11.3 The Legal Team

The second team is the legal team. This team will consist of staff which have experience with legislation (e.g., lawyers from different ministries and non-government agencies). The main aims of the legal team are to formulate the legal processes for specific identified hazards, as well as the following:

1. Reviewing the current local Disaster Management Act.
2. Reviewing all regional Disaster Management Acts.
3. Preparing for the drawing up of a future Disaster Management Act that will close all the gaps in the current disaster management legislation and Acts.
4. Ensuring or enforcing that the rules outlined in the Disaster Management Act are followed**.**

4.11.4 GIS Team

The Geographic Information System (GIS) and its uses were illustrated in (Chapter 2, Section 2.12). It was shown that most developed countries use GIS technology for disaster management due to the benefits that the system can provide. The GIS team roles in Kuwait would be carried out when hazards have been identified and well-studied by both the disaster management team and the legal team, at which point the hazard information shall be sent to the GIS team so that it can carry out the following:

1. Conduct hazard modelling to estimate the hazard's potential impact.
2. Validate a hazards map for Kuwait.
3. Validate a vulnerability map that shows specific vulnerable locations or groups of people.
4. Map out available resources with emergency services, etc.

When the database for all the identified hazards have been validated, the hazard information will be sent back to the disaster management team for review and then to the media so they can give

any relevant and necessary information to the public. Hazards information would also be sent to the decision-makers team.

4.11.5 The Decision-Makers Team

The decision-makers team consists of all the representatives identified by the Civil Defence Committee (as shown in Table 1) and have the responsibility of making decisions before, during and after a disaster. The decision-makers must manage any disaster when the chair of the council of minister orders it, either before or during a disaster. The decision-makers shall also prepare training exercises based on the recommendations of the disaster management team, study and evaluate the field training needs in term of resources and logistics required to deal with all types of disasters, and adopt and review the standard operating procedure as prepared for each disaster by the disaster management team.

Furthermore, the decision-makers team shall direct and inform the operation and control centre with all the disaster objectives, including the resources and logistics required for each disaster. All the information, directions, instructions, pre-disaster and post-disaster information shall be prepared by the decision-makers team and sent to the media, as well as to the alerting team, which will provide the public with the required early warning protocols. The decision-makers team should also attend to the needs of the Disaster Management Centre any time when the operation and control room systems or workers have observed any approaching hazards that could affect Kuwait, Operation and Control (2015).

4.11.6 The Operation and Control Centre

The operation and control centre consists of all representatives of the emergency services in Kuwait. This centre works continuously, 24 hours a day, 7 days a week. Its main tasks are to receive emergency calls and dispatch the required emergency needs to the public and all people of Kuwait. The operation and control centre is the link between the emergency responders and the public. The individuals in the operation and control centre must coordinate with each other to achieve and adopt all the requirements received from the decision-makers team. The centre should include all necessary sensing devices and systems (e.g., the National Seismic Network) which can provide information on hazards in and around Kuwait (see Chapter 3) to allow the centre to provide early warnings.

The operation and control centre should also have links to operation and control centres in other countries so that they can share information on disasters and predicted hazards. The centre should also have an integrated database detailing population density throughout each area in Kuwait. Before a disaster, the operation and control centre can increase emergency preparedness and can inform decision-making teams whether the existing logistics and resources are adequate for dealing with an impending disaster. This will enable the teams to summon external emergency response resources when they are required. Therefore, the centre shall be aware of the emergency capacity, resources and logistics in Kuwait at all times.

4.11.7 The Emergency Responders

The previous section highlighted the roles of the Operation and Control Centre. This paragraph illustrates and defines the responsibilities of emergency responders; groups who work in the disaster field. Emergency responders include the police, fire services, civil defence, ambulances, electricity and water utilities, water and air rescue. Emergency responders are trained to deal with all types of disasters and shall be capable in adopting the standard operating procedures (SOPs) which will have been given for each type of hazard. Responders work 24 hours a day, 7 days a week, responding to any incidents or disasters that occur in the regions of Kuwait. The responders receive emergency calls from the operation and control centre and provide the centre with all the results and information regarding any emergency they respond to.

4.11.8 The Media

The Media Team works closely with all other teams of the Disaster Management Centre to study and observe the safety information and instructions that are required to be given to the public before, during and after a specific disaster. They should also be able to prepare press conferences for the chair of the centre or for the head of the decision-making team before, during and after a disaster. Provide resilience for both the public and the emergency responders and to clarify the alerting protocol for the public.

4.11.9 Alerting Protocol

Recently, various countries have been using a common alerting protocol or procedure to inform the public when any hazard has been noticed or approaching using specific messages, colours, or symbols to illustrate the type of hazard and the probability of its occurrence. This information, along with all relevant safety instructions, will be sent to the media so they can prepare for an announcement with the aim of minimizing loss and instructing people how to act during a disaster. The alerting protocol team shall also coordinate and validate appropriate links with regional and international alerting protocol centres to provide more information about any hazards that could harm the country and to share important information. Figure (26) is an example of an international alerting protocol.

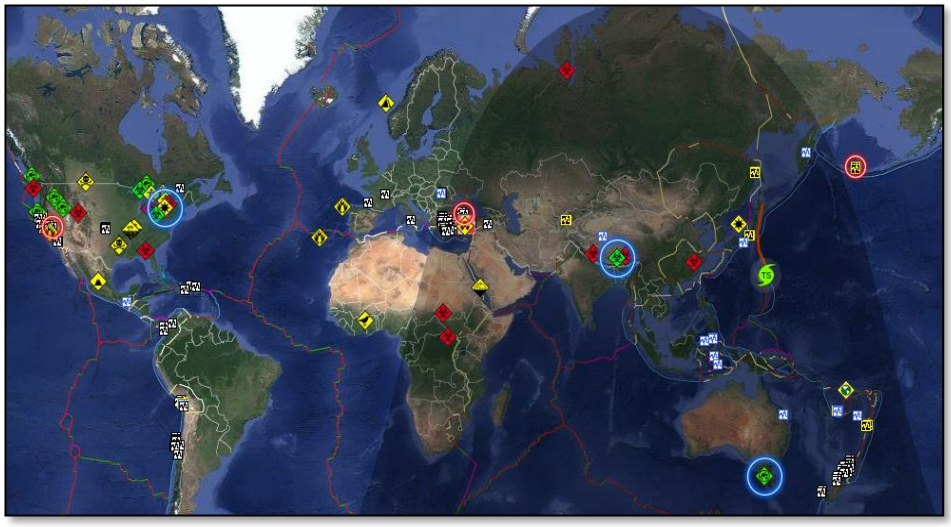


Figure 26. Example of an International Alerting Protocol (RSOE EDIS, 2016)

4.12 Chapter 4 Summary

Chapter 4 highlighted the roadmap for improving the current Disaster Management Framework and included the achieved conceptual framework of this research, which illustrated the importance of improving the current framework in Kuwait. The chapter focused on the roles and responsibilities of all the participants in the proposed disaster management centre. In previous chapters, the author studied the current disaster management process in more detail, discussing current Acts, the Civil Defence Committee, etc. The results of the study illustrate that the current process is ineffective.

The author has highlighted important terms that could improve the current framework and has also developed a conceptual framework to explain the initial steps that should be taken to improve the current Disaster Management Framework. All the information presented in Chapter 4 is based on both the author's evaluation of Kuwait’s current procedures, practices, acts, etc. and the international best practices in the disaster management field, which were discussed and illustrated in previous chapters, such as the disaster management life cycle and frameworks.

The author has concluded that there is a vital need to update the current Disaster Management Act and to improve the current framework. The final framework for this research will be discussed in Chapter 7. Chapter 5 includes and highlights the research methodology for this research.

Chapter 5: Research Methodology and Data Collection

5.1 General

The previous chapter illustrated the conceptual framework for this research and highlighted the issues that the author of this research believes will improve the current Disaster Management Framework in Kuwait. Chapter 4 of this research integrated the initial results and findings, which were observed from the previous three chapters. The discussion in Chapter 4 included a variety of terms, as illustrated in Figure 23 (refer to Chapter 4), such as: international focal point, disaster management centre, risk assessment, emergency procedure, emergency education and emergency institute.

The results and discussions of the previous chapters were gained throughout different literatures such as books, journals, scientific papers, Disaster Management Acts and archives of the Emergency Services in Kuwait. To gain more important data that would help the author in improving the current Disaster Management Framework, twenty-six (26) interviews were conducted, with participants from the high Civil Defence Committee, which represents the highest strategic committee responsible for disaster management in Kuwait.

This chapter illustrates and discusses the methodology of this research and explains the analysis procedures and techniques used. The results of the data analyses will be presented and discussed in Chapter 6.

5.2 Research Methodology

Research methodology refers to the various mechanisms through which information and data that inform strategic decisions have been collected. There is also a need to find the rationale for the choice of procedures applied in the analysis and interpretation of the data. The field of disaster management requires a methodology that includes both qualitative and quantitative methods of research along with analysis that could lead to the formation of policies, directives and guidelines, resulting with efficient disaster management programs (Rajasekar *et al*., 2013).

According to Rajasekar *et al*. (2013), **"**Research is defined as a logical and systematic search for new and useful information on a particular topic." Research is also defined as an investigation aimed at finding solutions to problems through objective and systematic analyses with a view to provide knowledge or discoveries of previously unobvious truths. The term 'knowledge' means

information collected from different sources (human beings, books, journals, nature, etc.). The final output is that the research has led to new contributions which add to our existing knowledge.

Rajasekar *et al*. (2013), also defines 'research methodology' as a systematic method for problem-solving and it is considered as the science of studying how research should be carried out and what procedures should be used by researchers. Research methodology is also defined as the study of methods by which knowledge is gained. Research methods cover various procedures, schemes and algorithms and include theoretical procedures, experimental data, numerical schemes and statistical approaches which help researchers to collect samples and data along with finding solutions to problems, (MacDonald and Headlam, 2015).

In order to illustrate the research methodology for this research, the author has applied the research 'onion model' (Figure 27), which was developed by Saunders *et al*. (2012).

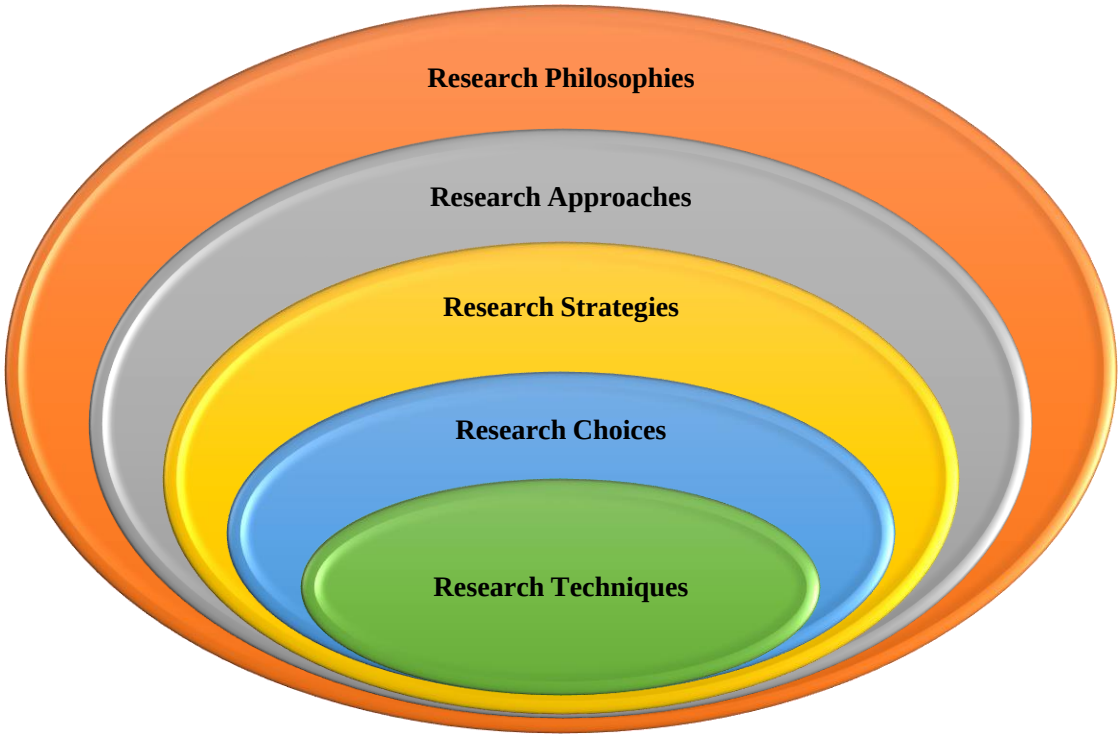


Figure 27.The Research 'Onion' (Saunders et al., 2012)

Figure 27 illustrates the research process step-by-step, beginning from a philosophical stance through to the very core of research techniques. This provides an easy illustration of the data collection and analysis used in this research through the different layers in the model. Therefore, each layer of the model is considered as a research activity. However, the author of this research observed that the onion model does not provide sufficient flexibility in terms of research structure;

therefore, the researcher will have limited choices on how to approach the research activities. The 'onion model' was also used to justify the rationale for the research design and the suitability of the methods for this research.

Saunders *et al.*, (2016) illustrated two different examples of researchers, namely the 'resources researcher' and the 'feelings researcher'. The 'resources researcher' believes that data are the resources needed and the researcher feels more comfortable with the collection and analysis of 'facts'. This researcher can argue that the data collected are more 'objective'. On the other hand, the 'feelings researcher' places more authority on the data collected than the 'resources' researcher. This is due to the feelings researcher having concerns themselves with feelings and attitudes, for instance, the attitudes of the workers against their supervisors. The 'resources' researcher considers the study of the 'feelings' researcher as social phenomena, which has no external reality; in addition, the data of the 'feelings' researcher cannot be measured, modified, or seen. At the same time, the 'resources' researcher can provide more authority on the collected data, which tends to be presented in the form of a table of statistical data.

In this research, the author attempts to be a 'feelings researcher' rather than a 'resources researcher'. This is because that author will examine the current reality in Kuwait in terms of the Disaster Management Framework, the disaster risk management plans and the hazards identification procedure in existence. As illustrated previously in the literature review (Chapters 2 and 3), as well as in the introduction chapter, the Civil Defence Committee in Kuwait identified 13 disaster or hazards scenarios, which they believe could affect and pose harm to the country.

However, there is a specific hazard that was not identified by The Civil Defence Committee in Kuwait, namely the terrorism hazard, which has since occurred in Kuwait (see Chapter 2). Therefore, this research investigated the current Disaster Management Framework in Kuwait with a view to examining the gap of the framework, and provide resilience to the emergency planners at the strategic level in terms of sufficient disaster risk management.

Hence, the investigation focused on the current reality in areas such as Disaster Management Acts/Legislations, Disaster Management Framework, as well as the international best practices in the study area. Moreover, the author conducted interviews with 26 participants of the Civil Defence Committee to gain and collect more data in the research area, especially the non-published data.

In social science, Collis and Hussey (2013) stated that there are two philosophies, positivistic or objectivist and interpretivist. The positivistic philosophy represents a theory testing of phenomena. The interpretivist philosophy is associated with subjectivism, which links the data process to qualitative research while the investigation of such research focuses on meaning, awareness and language, which leads to clarification of phenomena in the social science (Collis and Hussey, 2013).

Due to the author's experience and background as an emergency planner, which is related to the study area, the interpretivist philosophy was adopted for this research. This is because in the positivistic philosophy, the researcher or the observer acts independently and explains the research using, for instance, numbers and causality, while the research process includes hypotheses and deduction, as well as an analysis process that is usually reduced to its simplest form.

On the other hand, the interpretivist philosophy allows the author to act as a part of what is being observed and the aim is to increase general understanding on a specific area of study, collecting deep data from all ideas induced. The concept in the interpretivist philosophy should include stakeholders' perspectives, while the analysis units include complex situations (Easterby-Smith *et al*., 2002). Finally, both positivistic and interpretivist philosophies are formed from philosophical assumptions, namely epistemology, axiology and ontology assumptions (Saunders *et al*., 2016).

Based on the categories used by Saunders *et al*., (2016), the '*resources researcher*' follows a 'positivist' philosophy to the development of knowledge, while the '*feelings'* researcher follows a interpretivist philosophy, due to experience in the research area. Generally, for the 'resources' researcher, only phenomena which can be observed will lead to the generation of credible data. To establish a research strategy in order to collect data, the researcher uses existing theory to develop hypotheses, which should be tested as a whole or in part, leading the researcher to further development of theory, which could then be tested through different research.

The author of this research identified the research problem stated in Chapter 1 based on previous work-experience in the disaster management field in Kuwait; this research problem influenced the design of this research. Punch (2005) clarified different guidelines that need to be considered in addition to the research problem, such as the need to determine the research strategy, or as illustrated previously in Chapter 4 (the conceptual framework), the methods, tools and procedures that the author used for collecting data, as well as the analysis process and techniques (Punch, 2005).

Therefore, this research is considered as interpretivist philosophy, due to the obvious concept of the study, which incorporates major achievement factors and features from international best practices. In addition, the main focus of the research was to improve the current Disaster Management Framework used in Kuwait and enhance the disaster resilience within the country. To achieve this aim, the researcher needed to establish a wide understanding of the existing knowledge in the disaster management field, together with a deep review of the literature in the study area (Saunders et al., 2016).

5.3 Research Philosophy

Research philosophy is the idea of how data should be collected and analysed and represents the backbone of any research. Galliers (1991) identifies positivism as an extreme research philosophy, while Saunders (2009) noted phenomenology. These two philosophies are considered to be the extreme opposites of each other. Positivism promotes objective methods in research on the basis that knowledge should be based on facts, as illustrated by Comte in his 1853 work, whereas phenomenology is based on the idea that the world derives meaning from people and not the other way around.

Saunders *et al*. (2012) defines 'research philosophy' as an overarching term which relates to the development of knowledge and the nature of that knowledge. According to Easterby-Smith *et al*., (2002), there are three different reasons which underscore the understanding of research philosophical issues. Firstly, it can enable researchers to clarify research designs. Secondly, the knowledge of philosophy can enable researchers to decide which design will work and which will not. Finally, knowledge of philosophy helps researchers in identifying and creating designs with which the researcher may have no prior experience.

In the research of Saunders *et al*. (2012), three different perspectives were identified: ontology, epistemology and axiology. Ontology refers to the nature of reality; Goertz & Mahoney (2012) defined ontology as the philosophy of the worldview. Saunders *et al*., (2012) stated that epistemology is what constitutes acceptable knowledge in a field of study, while Audi (2000) stated that epistemology is the philosophy of knowledge and justification. For instance, can real or objective relations between social phenomena be identified? (And, if so, how?) Axiology is considered as the branch of philosophy which studies judgments referring to their value. Goertz & Mahoney (2012) noted that ontology and epistemology deal with truth while axiology deals with

values and ethics. Goertz & Mahoney (2012) also mentioned that the reason for valuing knowledge is that it can be used to inform, transform or enable positive changes. Saunders *et al*. (2016) stated that epistemology is the study of the nature and scope of knowledge and justified belief as it analyses the nature of knowledge and how it relates to similar notions such as truth, belief and justification.

Therefore, the philosophy of this research is considered as research of both epistemology and axiology. The epistemology in this research is to study the nature and scope of knowledge (such as Kuwait's Disaster Management act, disaster preparedness procedures, disaster mitigation plans), to evaluate current emergency practices, to identify if these practices exist and to evaluate if these practices aid emergency planners in achieving the desired disaster management outcomes for the country.

According to Collis and Hussey (2013), axiology represents the role of value. Axiology values knowledge to inform, transform or to enable positive changes (Mingers, 2003). Therefore, in this research, the researcher will value and illustrate different factors related to disaster management, such as the people at risk and their vulnerability against different types of hazards by evaluating the hazards which can cause harm to Kuwait and by studying the current emergency legislation and hazard identification procedures in Kuwait. This will enable the author to achieve the outcomes of this research, which are mainly to improve the current Disaster Management Framework, to enable positive changes in the disaster management field in Kuwait, as well as to introduce the disaster management life cycle and disaster risk assessment methodology so that agencies can effectively identify and manage all hazards and threats that could affect Kuwait.

Moreover, to provide better understanding of the axiological perspective of this research, the interaction with participants in this research was through interviews. This was due to the requirement that the selected participants would be able to provide valuable knowledge to the research area, especially within the disaster management field. The aim of this research, as well as the philosophical stances, both enabled and guided the research design to achieve this aim, whereas the following paragraphs in this chapter focus on and illustrate the different layers of the onion model developed by Saunders *et al*., (2012), to justify and clarify the selected research methodology.

5.4 Research Approach

According to Saunders *et al*. (2012), there are two research approaches: deductive and inductive. The deductive approach leads the researcher to provide or develop a theory and hypothesis, and to develop a research strategy to evaluate the hypothesis.

The deductive research approach is considered the dominant approach in the natural sciences. For example, where laws of science are the basis of explanation, this allows for the anticipation of phenomena and predictions of its occurrence, and then permits them to be controlled. According to Gilner *et al*. (2009), a deductive research approach begins with theory development which relates to the assumptions.

According to Bryman (2004), inductive research represents the process whereby the researcher collects data to develop a theory based on the analysis of the data collected. Saunders *et al*. (2012), stated that inductive research starts with observing the phenomena, which leads the researcher to develop a theory. On the other hand, a deductive approach relates to or guides the researcher through a theory testing process.

According to Collis and Hussey (2009), understanding the difference between inductive and deductive approaches enables researchers to determine the best method for conducting a research. Saunders *et al*. (2016) provided different examples to illustrate the difference between deductive and inductive approaches. For instance, in deductive research, the use of scientific principles are considered more often to illustrate and test the hypothesis, while inductive approaches focus on the understanding of the phenomena following a flexible process. In addition, the deductive approach is constant and different factors must be determined, whereas the inductive approach highlights themes or patterns to clarify the relationship between them.

In addition, the deductive approach uses the application of control to ensure validity of data, while the inductive approach applies a more flexible structure which enables the discovery of new ideas or findings. The deductive approach is also considered as a restricted format in terms of data collection, while the inductive approach enables the researcher to be engaged and more interactive with the data collection process. Finally, deductive research is common within natural science disciplines, whereas inductive approaches are considered to be more common within social sciences (Saunders *et al*. 2016).

Therefore, the inductive approach represents the best approach for this research; it was considered more suitable for the scope of this research and in supporting the author to build a theory. There is a lack of published research related to disaster management procedures in Kuwait, including the hazard risk assessment procedures used by The Civil Defence Committee to identify hazards.

Therefore, the interaction with the participants of this research enabled the author to build a theory based on the perception of human beings against the social field. In addition, the author will review the Civil Defence Committee archives, including the minutes of meetings of this strategic committee, with a view to identifying how the strategic disaster planners identify the disaster hazards in Kuwait. Such kind of archival documents are confidential and not publicly available; however, the author is a member in the emergency service in Kuwait and therefore has full authority to access all the documents required to answer the research question, which aims to improve the current Disaster Management Framework in Kuwait. The inductive approach will be adopted during the interview part and will be demonstrated in the next chapter, Chapter 6 .

5.5 Research Strategy

Remenyi *et al*. (1998) have stated that research strategy introduces the overall direction of the research, such as the process by which the research is conducted. Saunders *et al*. (2012) stated that the choice of research strategy should be guided by research questions, objectives, existing knowledge, time and available resources.

According to Yin (2003), there are five different research strategies: survey, experiments, history, case study and archival analysis. Yin (2003) also states that to determine which strategy to use, there are three different conditions that need to be considered: the type of research question posed, the amount of control the researcher has over events and the degree of focus on contemporary events, as well as apposition to historical events. Therefore, this research adopted the archival analysis strategy. The adopted strategy for research was in line with the objectives and thereby enabled the study to effectively answer the questions of the research (Saunders, 2012). Saunders *et al*. (2012), noted that the selected research strategy will reflect the resources, time and finances available, as well as the philosophical beliefs of the researcher, through available information on the subject matter and research objectives.

White (2009) and Saunders (2016), highlighted and clarified the different research strategies, so as to help researchers in justifying the best strategy that is relevant or fits with their research. This

clarification includes the form of the research questions used, the required control of behavioural events and the focus in terms of contemporary events. Therefore, White (2009) and Saunders (2016) noted that when using an experiment as a research strategy, the form of the research questions includes for instance; how and why. The control of behavioural events is essential and the focus is on contemporary events. In the survey strategy, the form of the research questions includes for example; who, why, where, how many and how much. The research does not require control of behavioural events; however, the focus of a survey strategy is on contemporary events.

When employing a historical or archival strategy, the research questions may take the form of how and why and there is no need for controlling behavioural events; in addition, the strategy does not focus on contemporary events. In a case study research strategy, the form of the research questions also includes how and why and there is no need for controlling behavioural events, but a focus on contemporary events is essential Wedawatta & Ingirige (2011). In a documentation strategy, the form of the research questions includes who, what, where and how. However, a documentation strategy does not require the control of behavioural events and sometimes focuses on contemporary events (Saunders, 2016).

The present research has adopted interpretivism and with local, national and international data and information readily available will use qualitative methods which will be illustrated in more detail later in the research, under the choices section of this chapter. The most common methods that will be used in this research will include archival research (Wedawatta & Ingirige, 2011)

5.5.1 Archival Analysis Strategy

Ventresca, and Mohr, (2001) note that the archival analysis strategy consists of a broad range of activities that are applied to facilitate the investigation of documents, as well as the textual materials produced by and about organisations. The archival analysis strategy was used in this research due to lack of publications on the research area, and this was used to collect data such as meeting minutes of the Civil Defence Committee.

Archival analysis methods involve the study of historical documents (i.e., documents created at some point in the relatively distant past), providing access that we might not otherwise have to the organisations, individuals and events of that earlier time. However, archival methods are also used by scholars who are engaged in non-historical investigations of documents and texts produced by and about contemporary organisations, often as tools to supplement other research strategies, such

as field methods and survey methods, Marc and John (2001). The examination of archival materials is also considered important because such materials are ubiquitous, consequential and strategically useful (Marc and John, 2001).

According to Toh et al., (2008), investigating the organisational practices which occurred at a different time enables researchers to gain a sense of perspective of how shifting social and historical conditions affect the character of organisational life. Therefore, the researcher of the present study investigates the emergency service practices and procedures in Kuwait. This strategy applies the use of archival sources of data, including archives that have been kept by the government, organization or institution. It involves the analysis of previously collected data on the subject. Denscombe (2014) noted that the research strategy must be selected and justified in terms of the availability of data related to the aim of the research.

The use of an archival research strategy included the collection of data on different natural and manmade disasters, the hazards identified by the Civil Defence Committee in the minutes of meetings from the organisations that are responsible for Disaster Management Framework development. Data was collected from the Fire Service, the Civil Defence Committee and other national disaster management agencies. The benefit of using this kind of data is that it is not subject to change and its validity is already confirmed since it has already been used in research by the institution. The most common sources of these data were public records, research institutions and academic institutions. An additional advantage of this kind of data is that they provide information on specific objects, populations, locations or phenomena.

Some of the institutions from which the research derived its data included the World Bank (for data on total costs incurred in disaster management), The United Nations Office for Disaster Risk Reduction, UNISDR (2015), (for data on the number of casualties, deaths, etc. caused by natural hazards) and international agencies that are responsible for disaster management, such as The Federal Emergency Management Agency (FEMA) in the United States. However, this strategy is constrained by the amount of available data and in cases where a disaster has occurred for the first time, there is no data available.

The current Disaster Management Framework in Kuwait, which was illustrated in Chapter 3, is not published or publicly available, for instance, on the official website of the Civil Defence Department, due to it being classified as a confidential document. In addition, all the plans related to disaster management are not published either, due to the same confidentiality requirements of

the Civil Defence Committee. Therefore, all of these types of data are kept in the form of records, such as the Civil Defence records and the minutes of meetings of the Civil Defence Committee. The author of this research gained all the required archival data from the Civil Defence Committee and these included the current Disaster Management Framework, the disaster management plans and the hazards identification procedure. To collect more data required to answer the research questions for this study, the author conducted 26 interviews with the disaster management decision makers in Kuwait, who are members of the High Civil Defence Committee.

As discussed in the previous section, archival strategy is suitable for situations where the form of the research questions includes how and why questions, where there is no need for controlling behavioural events and there is no focus on contemporary events. Therefore, the author employed an archival strategy which was deemed suitable for this studies research questions. This was complemented by interviews with 26 participants of the strategic Civil Defence Committee in Kuwait, to enable the author with collecting the required data which helps in the development of the required Disaster Management Framework for Kuwait, to improve the disaster management process and provide resilience in the country. The archival data also included the investigation of the meetings minutes of the Civil Defence Committee, The Disaster Management Framework, the disaster records in Kuwait and census records. The next section discusses the research choice.

5.5.2 Case Study

According to Zainal (2007), a case study considered as an approach used for collecting data and it is widely used in many social science studies to enable the researchers with exploring complex issues. In this research, a case study was used by the researcher to illustrate some gaps that affect the disaster risk management and to highlight the weakness of the current Disaster Management Framework in Kuwait. Yin (2014) defined two types of case studies, first, a single case study, when the study conducted on one organisation and secondly, a multiple case study, which means the study was conducted on different or more than one unique organisation. A case study was used in this research to examine the strengths of the current disaster management framework as the aim of this research was to improve the current disaster management framework in Kuwait.

In Kuwait, there is a lack in preparing case studies of disasters that occurred in the country, affecting the improvement process in terms of learning from lessons or previous disasters. However, the author gained a report of a previous disaster, which was on a flammable gas leak (methane and natural gas) in a residential area, to be used in this research and examine the strengths

of the current Disaster Management Framework in Kuwait. The disaster's information and the analysis process are covered in more in the next chapter, Chapter 6.

5.6 Research Choice

According to Saunders *et al*. (2012) the term 'research choices' refers to the combination of quantitative and qualitative techniques and procedures that are used. These techniques are frequently used in management and business research to differentiate data collection techniques and data analysis processes.

Researchers can identify the different methods – for instance, single data collection techniques and a corresponding analysis method. This is known as the mono-method research design. Researchers can also use more than one data collection technique and analysis methods to enable them to answer their research questions more accurately. Saunders *et al*. (2012) also noted that this process is known as the multi-methods research design. According to Saunders *et al*., (2012), the mono-method consists of either a single quantitative data collection technique, such as a questionnaire and quantitative data analyses or a single qualitative data collection technique, such as interviews, supported by a qualitative data analysis technique. The multi-methods research design is where more than one data collection technique is used in the research. This method consists of two different formats namely, multi-method and mixed methods.

'Multi-method' means a combination of two or more data gathering methods, with their associated analysis techniques being used in the same study. This means that researchers can use a quantitative technique, for instance, by using questionnaires and, at the same time, use quantitative analysis techniques. A study using this method would be referred to as a 'multi-method quantitative study'. At the same time, a researcher can gather qualitative data through interviews and analyse the data by using a qualitative procedure. This is known as a 'multi-method qualitative study'. In the mixed-methods research design, the researcher uses quantitative and qualitative techniques and analysis methods, either at the same time or one after the other, without combining them. The present research will adopt a multi-method design, using qualitative data collection and analysis techniques.

Research choices include the choice of which research methods are most appropriate for answering the research questions. The methods can be from multiple methods or from a single method. Saunders *et al*. (2012) notes that a multiple-methods design can use multiple qualitative methods

or multiple quantitative data, or it can use mixed methods. These choices relate to the research themes of triangulation, complementarity to generalisability choices. Triangulation includes the use of two or more sources of data for the entire study. Alternatively, facilitation involves the use of a single data source and research strategy to conduct the whole study. Given the complexities of the data that are available on disaster management, it would be prudent to apply triangulation methods for data collection and research strategy to the present study.

Moreover, data collected on the incidents or disasters will be collected from various publications, and, therefore, the sources of information for these areas will differ significantly from each other. The international organisations also provide a different set of data not provided by the various agencies for the countries in question. To distinguish between qualitative and quantitative research methods, Creswell *et al*., (2011) stated that the role of quantitative methods are to present facts, with findings are based on the evidence, whereas qualitative methods involve the measurement of the attitude based on opinion, perception measures and views. The relationship between the researcher and the subject in the quantitative research is distant, whereas it is close in qualitative research. The scope of findings from quantitative research methods is nomothetic, compared to the idiographic nature of those obtained from qualitative methods. The nature of data in quantitative research is deemed to be hard and reliable, while data from qualitative research is said to be rich and deep (Creswell *et al*., 2011). Therefore, this research was based on a qualitative research design.

5.7 Research Techniques

In research, the data collected is at least as important as the project itself. The data collection method determines the credibility and reliability of the data analysis. The data collected is usually cut to fit into the research objectives with questions that prompt the research, hence the importance of the data analysis procedure. The term ‘data collection’ implies the full operation of the research design. This includes the recording, organising and grouping of the data collected to establish what is applicable to the research and what is not. The choice of the data collection scheme usually depends on the defined variables and the information the researcher intends to derive from the research. The research design and the expected output from the research also informs the choice of data collection and analysis techniques that are applied to the research (Mar Iman, n.d.). Moreover, the method that is used to collect data is constrained by the type and amount of resources available to the researcher. These criteria have informed the selection of interviews, archival

records and gap analyses as the main sources of data that were used in the present research. The author collected data from archival records of the Civil Defence Committee, gap analysis and from various pieces of research, all of which were used in the subsequent data analyses.

The term ‘research techniques’ refers to the various tools used in the collection of the specific data that are needed. The present research adopted a qualitative research method to obtain the data needed. However, these data were not obtained from a single source but rather by using a multi method design that was based on qualitative methods. Therefore, the research techniques used were based on the secondary data gathered from the archival data analysis, gap analysis, as well as primary data obtained from interviews. Figure (28) illustrates the research methodology, data collection methods and data analysis techniques used in this research. The archival analysis (i.e. data gathered from Civil Defence records, disaster management legislation, plans etc.) were examined to explore the current Disaster Management Framework, legislations and practices in Kuwait. The evaluation of the Kuwaiti disaster management practices (by exploring current policies, hazard identification procedures and Disaster Management Framework). The author also set out to formulate a strategy for identifying disaster hazards that incorporate policy guidelines and risk assessments, with a view to ultimately proposing improvements to the current Disaster Management Framework for Kuwait.

These objectives were all approached using different research techniques (e.g., interviews with the 26 participants of the High Civil Defence Committee) and the author’s personal experience in the disaster management field. Figure (29) illustrates how the objectives of this research were investigated, as well as how they are linked to the research techniques. Figure (30) highlights the research gap and illustrates how the current study sets out to address it.

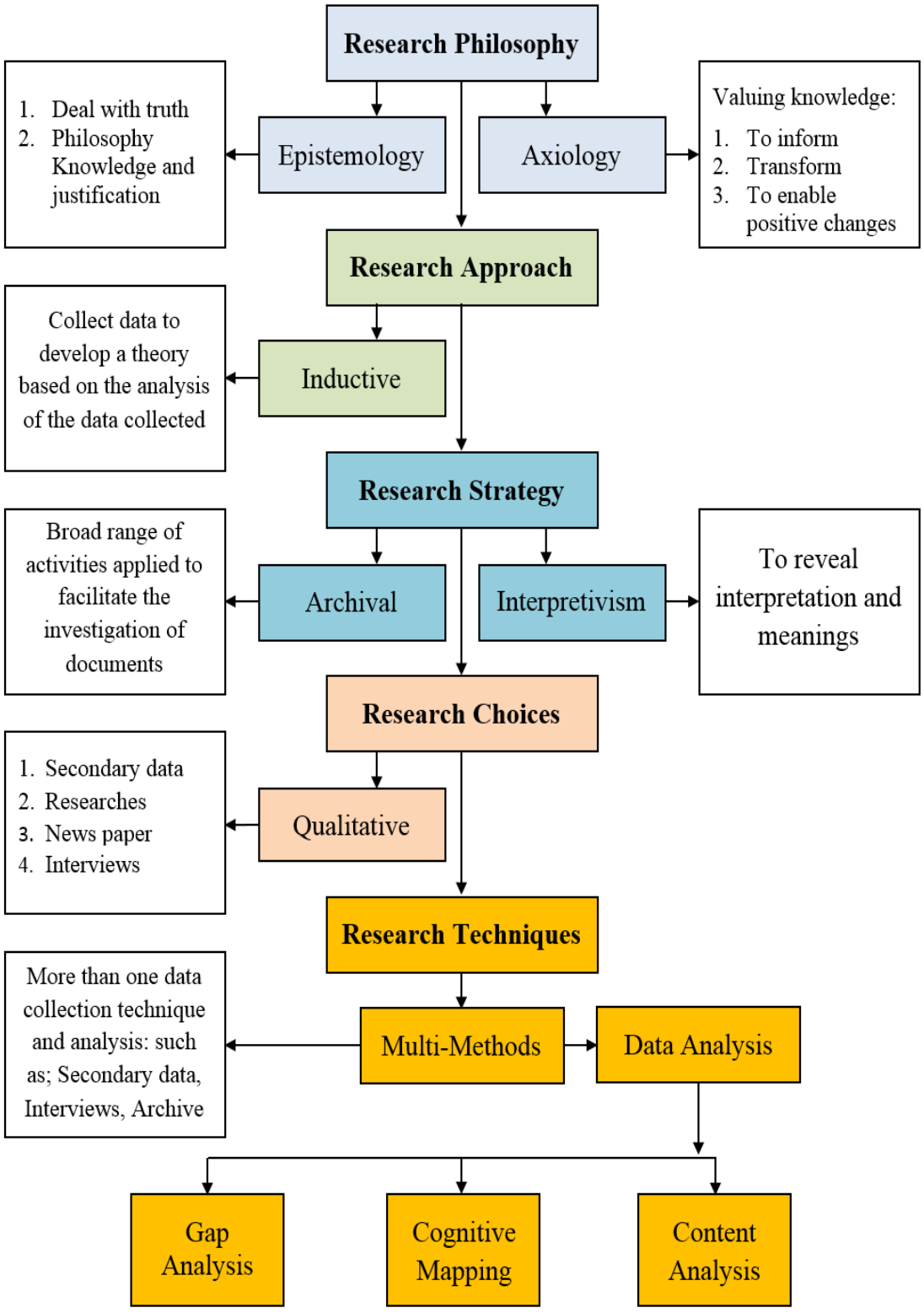


Figure 28: Research Methodology, Data Collection and Analysis Techniques

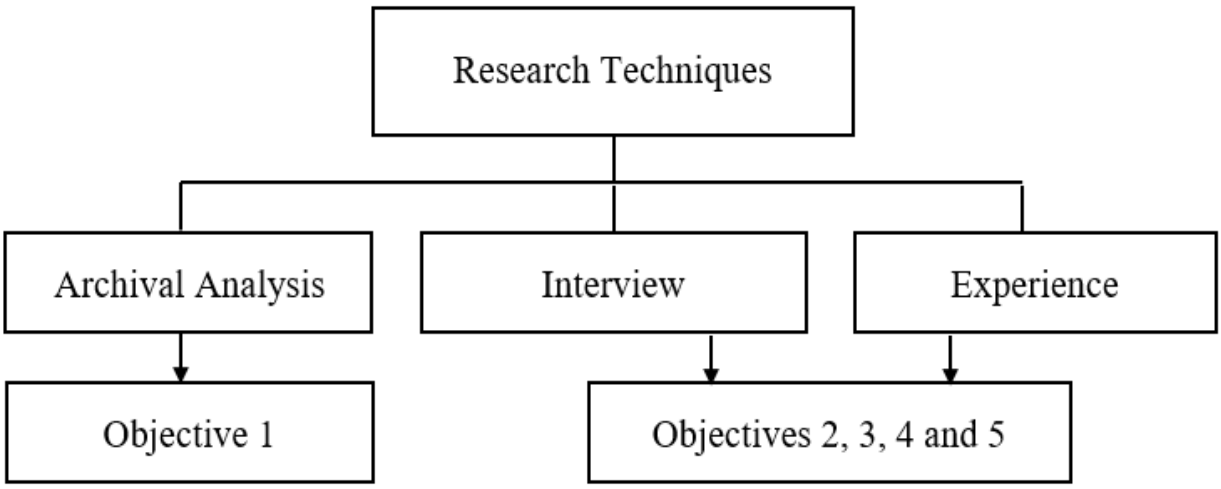


Figure 29: The Research Techniques Links with the Research Objectives

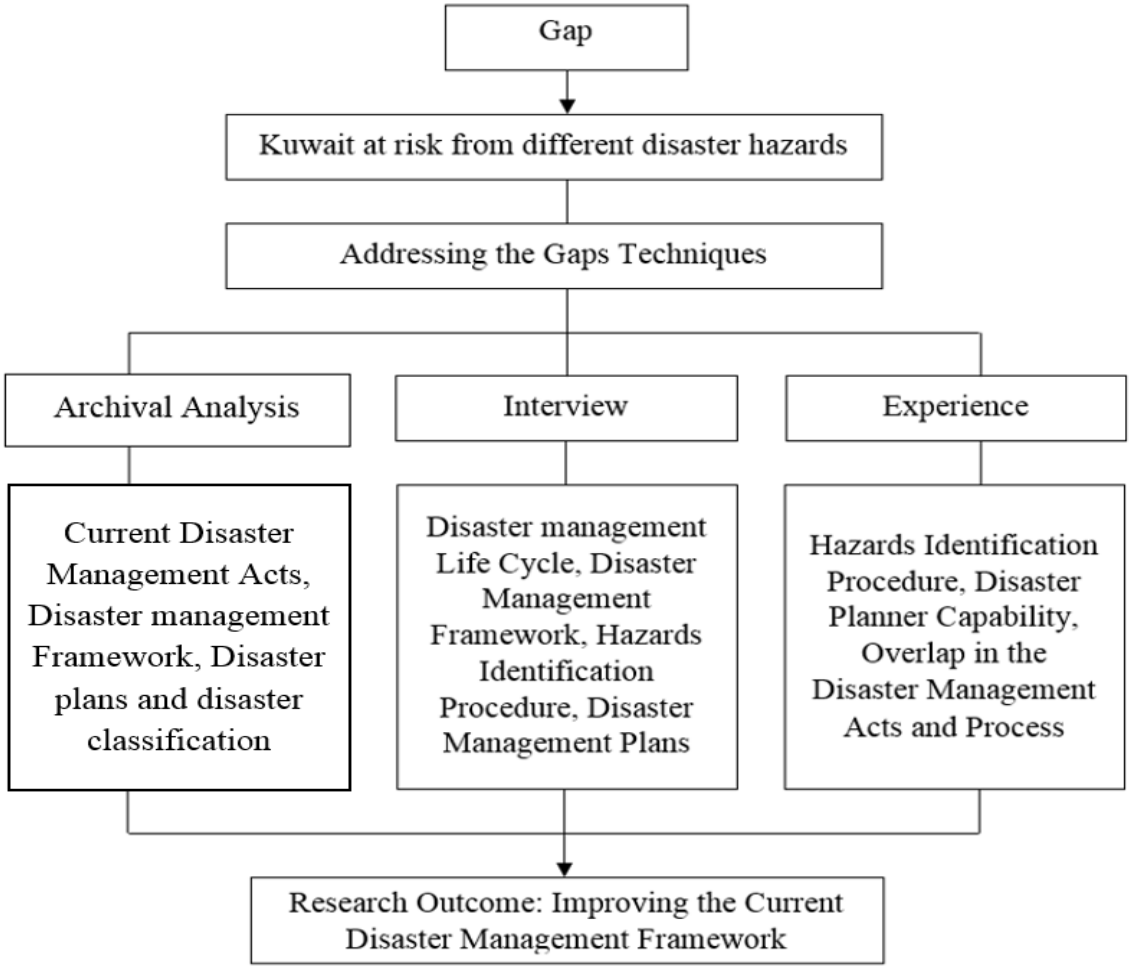


Figure 30: Addressing the Gaps Techniques

Based on the previous clarification on the research choices, this research adopted a multi-method qualitative study. The data collected through interviews with the 26 participants of The Civil Defence Committee in Kuwait was analysed using a qualitative technique, namely content analysis technique. The analysis process was informed by a variety of international best practices in the disaster management field. The data collected from the pilot study was analysed using the cognitive analysis technique. Finally, the data gathered from the Civil Defence archive was analysed through a gap analysis technique.

According to the Advance in Knowledge Discovery and Data Mining (2013) report, time is the main factor which affects the type or quality of the collected data for research. There are two time horizons, namely short or cross-section and longitudinal or long period research (Saunders *et al*., 2012). This research was conducted on a short (cross-section) time horizon rather than a longitudinal one.

5.8 The Participants in This Research

To collect qualitative data regarding disaster management in Kuwait, especially the non-published data, such as that on disaster mitigation, preparedness, response and recovery plans, the study received approval for 26 different interviews to be conducted with each member of the Civil Defence Committee in Kuwait (Table 17), a body responsible for the country's Disaster Management Framework at the strategic level as well as managing all disasters in Kuwait.

The 26 participants are all members of the strategic Civil Defence Committee, who were sampled due to them having the most responsibilities regarding issuing strategic decisions and policies which are related to disaster management in Kuwait. The type of data collected was qualitative using a semi-structured interview form, which the author prepared. Before interviewing the participants, the author conducted a pilot study with five fire officers in order to determine the strengths and weaknesses of the designed interview form (see Appendix C) and to determine the time required for each interview.

Table 17: The Participants in this Research

No.	Ministry/Agency	No. of Interviewees
1	Ministry of Defence	2
2	Ministry of Interior	2
3	Kuwait National Guards	2
4	Kuwait Fire Service Directorate	2
5	Ministry of Commerce and Industry	2
6	Ministry of Water and Electricity	2
7	Ministry of Health	2
8	Ministry of Transport	2
9	Ministry of Media	2
10	Ministry of Municipal	2
11	Ministry of Public Works	2
12	Environment Public Authority	2
13	Kuwait Red Crescent	2
Total		26

Saunders *et al*. (2009) classified research interviews into three different categories, namely structured, semi-structured and unstructured interviews. In structured interviews, the author uses the same instruction and phrasing of questions for all interviewees, which leads the researcher to gain uniform information (Oppenheim 2005). However, in unstructured interviews, the researcher presents the questions randomly during the interviews (Sekaran, 2003). In such interviews, the

interviewee usually asks for clear ideas to answer the questions (Saunders *et al*. 2009). In semi-structured interviews, the researcher can use features from both structured and unstructured techniques during the interview (Turner, 2010). This research adopted semi-structured face-to-face interviews (see Appendix C) in order to enable the author to gain experience and the required information on the current Disaster Management Framework, Disaster Management Acts and the adaptation process for the disaster management plans, including the strengths and weaknesses of the framework and plans prepared by the Civil Defence Committee in Kuwait.

5. 8.1 Triangulation

Mertens & Biber (2012) defined the term triangulation as a method of cross-checking data from different sources to search for similarities and differences in the research data. The triangulation technique is used to verify the results of one with the same subject. The technique is also considered as a powerful means for validation of data through cross-verification from two or more sources of information (Mertens & Biber, 2012). Bekhet & Zauszniewski (2012) noted that triangulation is a combination of different research methods in the study of the same phenomenon. According to Bekhet & Zauszniewski (2012), triangulation techniques is recommend in the social sciences. The main reason for using the triangulation technique in qualitative research is to enhance and increase the credibility and validity of the results.

Roberta & Dorothy (2013) stated that there are four different types of triangulation techniques, namely, data triangulation, investigator triangulation, theory triangulation and methodological triangulation. The technique used in data triangulation usually includes time, space and persons. In the investigator triangulation, the technique includes more than one researcher. The theory triangulation technique includes more than one theoretical scheme in the interpretation of the phenomenon. Alternatively, methodological triangulation involves more than one technique for collecting data and information, such as interviews, questionnaires, observations and documents. Therefore, the author of this research applied methodological triangulation, to gain sufficient information regarding the current Disaster Management Framework, disaster management legislations and disaster management procedure in Kuwait. The main sources of data in this research were the Civil Defence archive, semi-structured interviews with the 26 participants of the High Civil Defence Committee in Kuwait and a focus group with experts and decision makers for disaster management in Kuwait.

5. 8.2 Focus Group

According to Liamputtong (2011), a focus group is one of the oldest data collection techniques used for collecting qualitative information or data. The technique involves gaining data on a specific topic from the opinions of a group of approximately 4 to 12 different participants. Nyumba et al., (2017) noted that the focus group technique could add value to the research when the researcher conducts triangulation in terms of data collection, as part of the validation process for the research. The focus group technique can also be used to explore concepts, evaluate ideas, share opinions, increase the understanding on a particular topic and to locate gaps between various groups Nyumba et al., (2017). Therefore, the author of this research applied the focus group technique to validate the data obtained for this research.

In this research, the author conducted a focus group technique with four experts, who specialize in the planning process for disaster information and management in the Kuwait Fire Service. The reason for using only four experts in the validation process is that this represents the total number of staff employed by the Kuwait Fire Service as experts whose task and role is to study and review the current disaster management situation in Kuwait, with a view to highlighting the strategic requirements in terms of disaster management and legislation. Their qualifications are related to disaster management.

The four experts were provided with a specific task to explore nine study areas highlighted in the Semi-Structured Interview Guideline (Appendix C), namely:

1. The current disaster risk assessment procedures in Kuwait.
2. The current Disaster Management Framework.
3. The current early warning procedure and system in Kuwait.
4. The emergency shelters.
5. The current communication procedure for the emergency services during disasters.
6. The current Disaster Management Act(s).
7. The strengths and weaknesses of the disaster awareness in the country.
8. External disaster response.
9. The validity of disaster management competences within the emergency services in Kuwait.

Before the start of this focus group, the author clarified for the participants the main aim of this research, as well as the expected outcomes of the research.

5. 8.3 Pilot Study

A pilot study is a mini-version or trial run (also known as a feasibility study) of a full-scale study that is carried out in preparation for the full study. A pilot study also gives the researcher an opportunity to test the research instruments (e.g., interviews and questionnaires) (Teijlingen at al., (2002). Therefore, a pilot study should be carried out after the researcher has a clear vision of the research topic, questions, techniques and methods. A pilot study is a 're-assessment without tears' which includes testing all research techniques and methods to determine how well they work in practice (Ismail et al., 2018).

The pilot study applied to this research was mainly a trial of the planned semi-structured interviews. The author carried out five different interviews to examine the interview duration, the illustration of the questions, participants' reactions to the questions and the method of data collection. The results and analyses of the pilot study for this research will be discussed and illustrated in Chapter 6 .

The main aim of the interview is to gain and collect important data that helps the researcher in answering the research questions. In this research, the collected data was qualitative in nature, as this would give detailed description of disaster management in Kuwait and will more fully explore the knowledge of emergency services employees and leaders with respect to the country's current disaster management process (disaster Acts, risk assessments, frameworks, awareness, early warning procedures, etc.). The author displayed the results of the pilot study as yes or no answers as a means of tracking answers.

5.9 Chapter 5 Summary

Chapter 5 highlighted the research methodology for this research, including the research philosophy, approach and strategy, as well as the research choices and techniques used by the author to achieve the outcomes of this research. In addition, this chapter discussed the participants in this research, as well as the pilot study which was conducted by the author prior to the full-scale interviews. Various types of data were obtained from a variety of sources, namely, archival records, a focus group and from semi-structured interviews; these data provide a solid base for the validation of the outcomes of this research. The analysis techniques for the data were also illustrated in this chapter. The analysis techniques consist of gap analysis techniques, cognitive mapping and content analysis techniques.

The analysis process and results have been presented in the next chapter, (Chapter 6), together with a gap analysis obtained from evaluating the current best practices compared with the current disaster management process in Kuwait. The ultimate aim of this research is to recommend some solutions for improving the disaster management process in Kuwait. The results of the data analyses in the next chapter, Chapter 6, were used to design the final framework for this research, which aims to improve the current Disaster Management Framework.

Chapter 6: Data Analyses

6.1 General

The previous chapter, Chapter 5 highlighted and discussed the research methodology for this research along with the research process and analysis techniques. Chapter 6 discusses and highlights the results of the data analyses gained throughout the literature review, focus group and the interviews with the participants of this research (Table 17, Chapter 5). This chapter also highlights the data gained from the pilot study with the 26 members of the Civil Defence Committee in Kuwait, conducted prior to the main interviews. The main aim of analysing the data in this research was to evaluate and examine two different factors: first, to identify and highlight some hazards that could threaten security and have a negative impact on Kuwait and second, to highlight the vulnerability of the people in Kuwait against some of the hazards identified by the Civil Defence Committee.

This chapter will also illustrate a gap in the disaster management and planning processes in Kuwait, through the use of a gap analysis technique. The ultimate aim of all the analyses is to inform the proposals which will assist with improving the current Disaster Management Framework in Kuwait.

6.2 Vulnerability in Kuwait

As discussed in Chapter 2, vulnerability is the degree of fragility of a person, group, community or area. Vulnerability is also defined as a set of conditions and processes that result from physical, social, economic and environmental factors that increases the susceptibility of a community to the impact of hazards (Schmidt-Thomé, 2003). Therefore, this section examines the vulnerability of the population in Kuwait against obvious hazards, such as earthquakes and the Iranian Nuclear Power Plant.

The step-by-step method used by the author, is to determine whether or not the population in Kuwait are vulnerable to different hazards as highlighted and discussed earlier in (Chapter 3). To identify vulnerability, the author of this research considers the use of a disaster management standard, namely, the disaster management life cycle, to be crucial. Therefore, the following section illustrates the process of identifying vulnerability levels throughout Kuwait.

6.2.1 Identifying the Hazard

The author defines 'identifying hazards' as the process by which a researcher locates or predicts any potential for harm to be done to people, the environment or infrastructure. Therefore, the author considered natural hazards, which have been identified by different researchers (e.g., Nowroozi, 1987; Bou-Rabee & Nur, 2002). These researchers discovered the dangers of the Zagros Folded Belt (see Chapter 1, Figure 4) and the Makran Subduction Zone (see Chapter 1, Figure 5). These areas located in southwest Iran could introduce high earthquake activity reaching a magnitude of 7.0 or greater on the Richter scale which can, in turn, increase the level of risk for most of the GCC countries, including Kuwait. A positive aspect of this is that earthquakes were also identified as hazards by Kuwait's Civil Defence Committee (see Chapter 1, Table 2). Therefore, these potential earthquakes represent hazards have also been identified scientifically by multiple researchers.

In terms of manmade hazards, the study identified the Iranian Nuclear Power Plant, which is located approximately 270km from the Kuwaiti capital, across the Gulf Coast (see Chapter 1, Figure 3). This is one of the most potentially disastrous hazards in the region, with its risks having been highlighted by multiple researchers and official reports (Peterson, 2012; NTI Report, 2013). It is concerning that the Iranian Nuclear Power Plant was not considered a hazard by Kuwait's Civil Defence Committee.

6.2.2 The Mitigation Phase

Mitigation was illustrated in detail in (Chapter 2, section 2.4). In short, mitigation includes activities that prevent a disaster, minimize the probability of an emergency situation occurring, or reduce the effects of unavoidable disasters. The main aim of mitigation is to prevent or avoid a disaster; if a disaster cannot be prevented, mitigation aims to eliminate or reduce the impacts of the disaster through proactive measures that are taken before the disaster occurs.

As observed in the literature that was reviewed in this research, Kuwait does not currently have any mitigation plans or frameworks, despite these being considered as vital for disaster management, as well as the fact that mitigation is cheaper than disaster response and recovery. Although earthquakes were identified as hazards by The Civil Committee in Kuwait, the information and plans for mitigating earthquake-related hazards are classified as confidential, as

illustrated in (Table 2 in Chapter 1). The author believes that the reason for this 'confidentiality' is that there are no mitigation plans for disasters in Kuwait. For instance, when the Canadian government launched Canada's National Disaster Mitigation Strategy (Public Safety Canada, 2015) in January 2008, they made the information available to the public. Kuwaits lack of such publicly available information that outlines strategies for preventing and mitigating the impact of disasters, strongly suggests that the country has no such strategies.

Moreover, the Kuwaiti National Seismic Network started its official functions in March 1997, one of which is to establish seismic codes for structures and buildings in Kuwait (KNSN, 2008). However, this task is largely considered a dream, as it has not been carried out.

As earlier observed, the Iranian Nuclear Power Plant has not been officially identified as a hazard by the Civil Committee in Kuwait, as illustrated in (Table 2 in Chapter 1). However, based on the literature that was reviewed in Chapter 1 (specifically, in the research introduction and research problem sections), the Iranian Nuclear Power Plant clearly represents a hazard for Kuwait. Unfortunately, the lack of mitigation activities and plans in Kuwait, leaves the population vulnerable to one of the most disastrous hazards in the world. This hazard is especially dangerous to the Kuwaiti population where more than 96% of the population lives in urban areas that are near to the coast of the Arabian Gulf (see Figures 19, Chapter 3, Section 3.10) and which are, therefore, vulnerable to hazards associated with the Iranian Nuclear Power Plant (PACI Report, 2015).

6.2.3 The Preparedness Phase

As discussed in Chapter 2 (Section 2.4), the preparedness phase of the disaster management life cycle includes arrangements which ensures that a community is aware of and prepared for, any disaster (Disaster Management Group Report, 2010). The preparedness phase takes place before an emergency or disaster strikes and includes plans for saving lives and assessing the response and rescue operations. Drawing up evacuation plans and stocking food and water are examples of disaster preparedness. Gustin (2004) also notes that the preparedness phase includes the following:

- Preparation of emergency plans.
- Development of response arrangements.
- Assessment of building capacities.
- Education and training of staff who will respond to an emergency.

- Evaluation of emergency systems, plans and procedures.
- Analysing the effectiveness of preparedness practices.

As illustrated in Chapter 1 (Table 2), the arrangements for each type of hazard that was identified by the Civil Defence Committee are confidential. As observed in the literature that was reviewed in Chapter 3 (Section 3.4), Kuwait lacks regulatory codes that monitor all the physical conditions of residential buildings, despite the fact that seismologist Dr Abdullah Al-Enezi is said to have detected the occurrence of more than 800 earthquakes in Kuwait (Arab Times, 2018). In addition, there are no published documents or official reports that highlight the capacity of the emergency services in Kuwait, to deal with the hazards that have been identified. Therefore, there is a large gap in the disaster preparedness process in Kuwait.

6.2.4 The Response Phase

The response phase of the disaster management life cycle was illustrated and discussed in detail in (Chapter 2). This phase includes actions meant to provide disaster assistance during a disaster, including saving lives and reducing property damage. The response phase takes place immediately before, during and immediately after a disaster. This phase includes activities such as giving early warnings, performing search and rescue duties and providing emergency medical assistance.

A good way to examine and evaluate the capacity of the emergency services in Kuwait against different hazards that have been identified (which is indicative of the quality of Kuwait's disaster response preparedness) is to use a scenario method as was discussed in Chapter 3 (Section 3.3.3). When using the scenario method, different elements must be validated after identifying any hazard scenario; these include vulnerability, risk, possible impact and required response capacity. A positive aspect of this is that the Civil Defence Committee in Kuwait has adopted and used the scenario method to identify 13 different scenarios that could threaten Kuwait (see Chapter 1, Table 2). However, a negative aspect is that the Civil Defence Committee did not consider all the elements that are required when using the scenario method. Therefore, the level of preparedness for emergency responses in Kuwait is not clear. In addition, there is no obvious response plan or procedure to be used for disasters that requires regional or international responses. Therefore, in order to be better prepared for different hazards or disasters, the entire hazards scenario process must be utilised.

6.2.5 The Recovery Phase

The recovery phase was illustrated in detail in (Chapter 1, Section 1.1, Chapter 2, Section 2.3.1 and Section 2.4). This phase takes place after a disaster and includes any actions taken to return an area to normal after a disaster. It includes two phases, namely, immediate recovery and long-term recovery. Immediate recovery includes assessing damage, managing debris, investigating causes and restoring essential supplies and services to the affected area. Long-term recovery includes giving ongoing treatment to survivors, which includes reconstructing infrastructure, buildings and services, as well as identifying any actions that could reduce the effects of future disasters.

Unfortunately, none of these recovery activities have been validated by the Civil Defence Committee in Kuwait. Therefore, when a disaster occurs in Kuwait, it will inevitably become a crisis due to the lack of short-term disaster recovery plans in place.

Therefore, as discussed in Chapter 2 (Section 2.6.1), consideration must be given to a wide range of factors during the identification of disaster scenarios. The chosen scenarios should test the response dimensions and logistics needed within the emergency regime.

6.3 Analysing Alahmadi Disaster Case Study

In 2010, a ‘methane and natural gas’ leak in a residential area called Alahmadi, 40km south of Kuwait City and specifically in block number 1. The Alahmadi area was built in 1950 for the oil industry companies’ employees and their families (Piazza, 2007). 88 families were forced to evacuate their houses, while the remaining residents refused to evacuate, until the government provided them with appropriate accommodation, rather than the small flats offered by the government as a shelter, (Alqabas News Paper, 2010). The accident was discovered in the beginning of the year 2010, when an explosion occurred in a house in the mentioned area, causing a severe burn to a Kuwaiti girl. This disaster caused damage to four houses (KFSD Report, 2015).

Recently and by the information from the local newspapers, the cause of leaking is due to the Kuwait Oil Company when they had renewed the ‘Gas Network’ underground and neglected the old Net under the ground, which led to leakage of the remaining gas to be discharged under the ground and through to the houses, across the sewages pipes under the ground, which caused the gas reading to reach more than 50% in some houses (Alqabas News Paper, 2010).

The discussion in this paragraph will be the analyses of the emergency planning and response to the Alahmadi Disaster. To date, there is no sufficient information issued by the emergency agencies which responded to the scene, and the statements in the media remained limited on reassuring the public in describing the situation as 'safe'. However, four houses exploded resulting in one death and three injured persons. Firstly, these statements by the emergency agencies show the impact of poor emergency arrangements by the Civil Defence Committee, which can cause an increase of the injuries because they reassure the public the dangerous situation will be safe, while the gas reading shows the amount of gas inside some houses is more than 50%, (KFSD Report, 2015). The second problem is that when the emergency agencies forced the residents of the affected area due to the gas leaking to evacuate their houses, there were no prefabricated shelters to house the population of the affected area, whose number had reached 400 houses. Thirdly, the Emergency Agencies needs to provide a 'Framework', to enable them in organizing the work, as well as to develop a response plan.

To reduce the impact of the Alahmadi disaster, the Civil Defence Committee should divide the level of command to three levels. First is the *'Operation Level'*, which are the agencies of '*hands-on work'*, for example the Fire Service and the Police. Second is the '*Tactical Level'*, to ensure that the Operation Level is working properly in order to achieve the maximum tasks. Third is the '*Strategic Level'* to plan for the long term, in term of the risks and impact of the disaster (HM Government, 2009).

The above case study confirms that the current Disaster Management Framework in Kuwait must be improved to minimize the effect of a disaster. It also highlights the poor emergency planning process. Therefore, this research aims to improve the current Disaster Management Framework, to provide resilience for the emergency planners at strategic level in term of providing suitable disaster risk management. There is a case study of a major oil fire in Kuwait in 1990, however, the response procedure remains unclear as at the time Kuwait was under attack from Iraq.

6.4 The Pilot Study

The researcher conducted five different interviews as part of a pilot study (see Table 18). This piloting process allowed the researcher to improve the way in which the interview questions were

presented to participants in the main study. All the pilot study interviews were conducted with Kuwaiti Fire Service officers as shown in Table 18.

Table 18. The Participants in the Pilot Study

Case	Rank	Experience	Interview Duration
1	Colonel	14 Years	30 min.
2	Major	11 Years	45 min.
3	Major	11 Years	34 min.
4	Captain	9 Years	32 min.
5	1st Let.	4 Years	35 min.

The interview form consisted of 10 sections and each section represented questions for a specific area. The semi-structured interview form is available in Appendix C. The pilot study supported the researcher's capability to provide fast and logical explanations of the research questions. Some questions, such as those regarding the Disaster Management Framework in Kuwait, were not understood by the interviewees. Therefore, the researcher attempted to provide examples of frameworks used in other countries, which enabled the interviewees to understand the question. In addition, some interviewees were unfamiliar with disaster risk assessment, especially Case 5. Therefore, the researcher considered how to explain the question more effectively and what examples could be provided to illustrate the information the researcher needed.

In terms of time management, some delay occurred with Case 2 due to an important phone call. Apart from this, all the interviews of the pilot study were conducted smoothly. Once the data was collected, the researcher used the interview analysis methodology recommended by Folkestad (2008) to analyse all the interview questions from the pilot study. The analysis starts from Section 2 of the semi-structured interview form. Section 1 was more general, focusing on the interviewees' experience as well as general questions about the participants, all of which were aimed at keeping the participants relaxed to answer the rest of the questions honestly.

The author of this research analysed the pilot study using a cognitive mapping technique. According to Colin (2004), the use of cognitive mapping or cause maps aims to map a person's thinking about a problem or an issue. The cognitive mapping technique is described as a network of nodes and arrows as links, where the direction of the arrow denotes perceived causality (Harary, 1972) .

Also, Colin (2004) noted that cognitive mapping techniques are usually used on interviews as a way of representing the subjective world of the interviewee (Colin, 2004). Therefore, the author of this research applied the cognitive mapping technique to represent the interview data obtained during the pilot study.

6.4.1 Analysing the Risk Assessment Process

Section 2 of the interview form consists of eight questions, whose aim was to allow the researcher to evaluate the interviewees' knowledge regarding the following:

1. Local disaster management legislations.
2. Disaster risk assessment.
3. Improvement and training needed.
4. Disaster management stakeholders.

From the five participants during the pilot phase, the researcher discovered the following:

1. The participants were not familiar with all the local Disaster Management Acts.
2. The participants were not familiar with the disaster risk assessment procedure.
3. All the participants agreed that more disaster training, culture and awareness is required.
4. All the participants thought that only emergency workers could participate in the disaster management process.

Therefore, there is little knowledge of local Disaster Management Acts and there is a poor understanding of what a disaster risk assessment is. This strongly indicates that the disaster management procedure in Kuwait is insufficient. In addition, the participants agreed that more training is needed for emergency workers in order for them to understand how disasters can be managed. The participants also thought that emergency workers are the only stakeholders in the

disaster management process. Figure 31 illustrates the analysis process for Section 2 of the interviews.

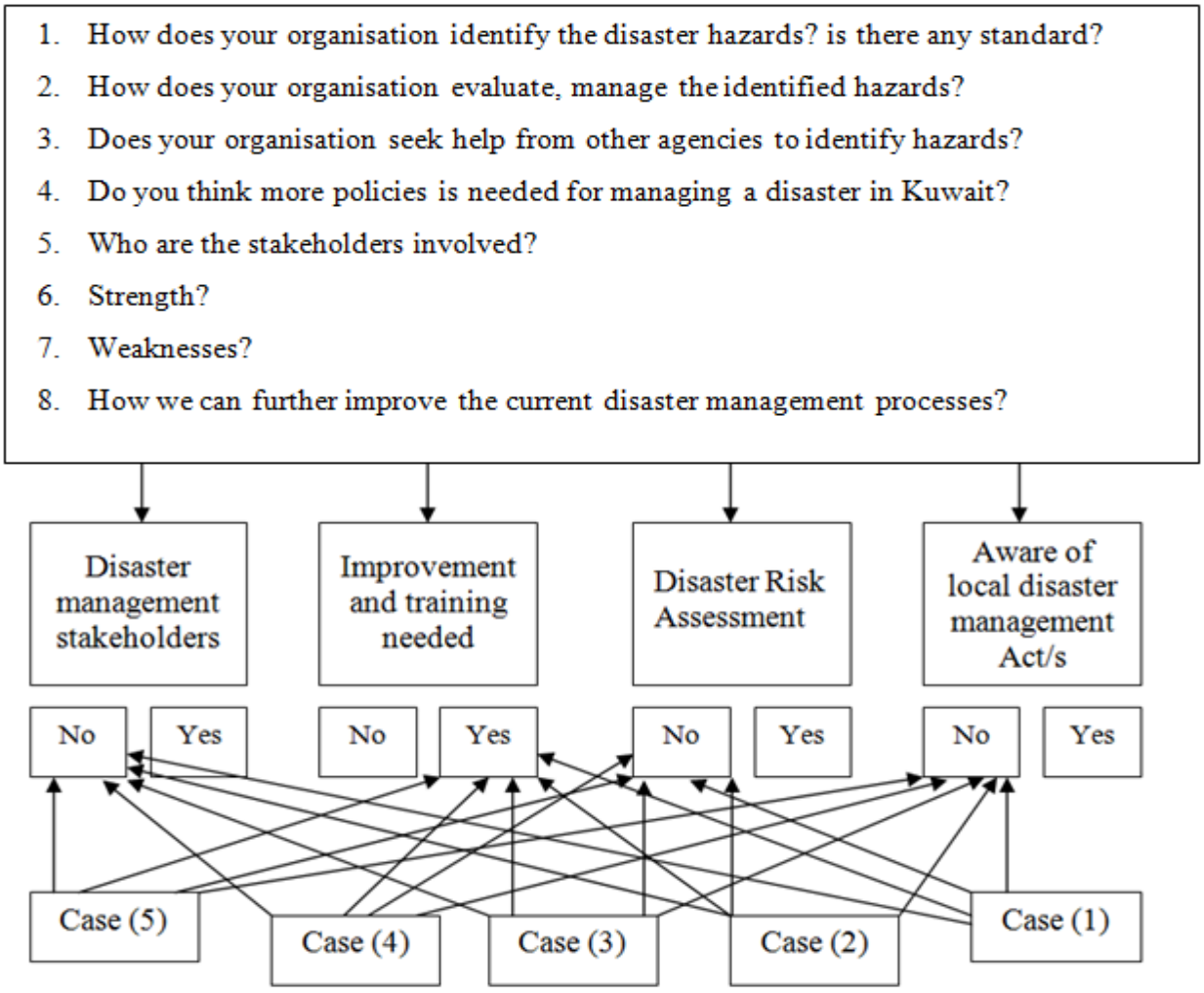


Figure 31. Analysis of the Risk Assessment Process

6.4.2 Awareness of the Disaster Management Framework

Section 3 of the interview form consists of six questions (see Figure 32). The main purpose of this section was for the researcher to evaluate the interviewees' knowledge, as emergency workers, in terms of the following:

1. Local Disaster Management Frameworks.
2. Stakeholders' involvement in the framework.
3. Improvements and training needed.

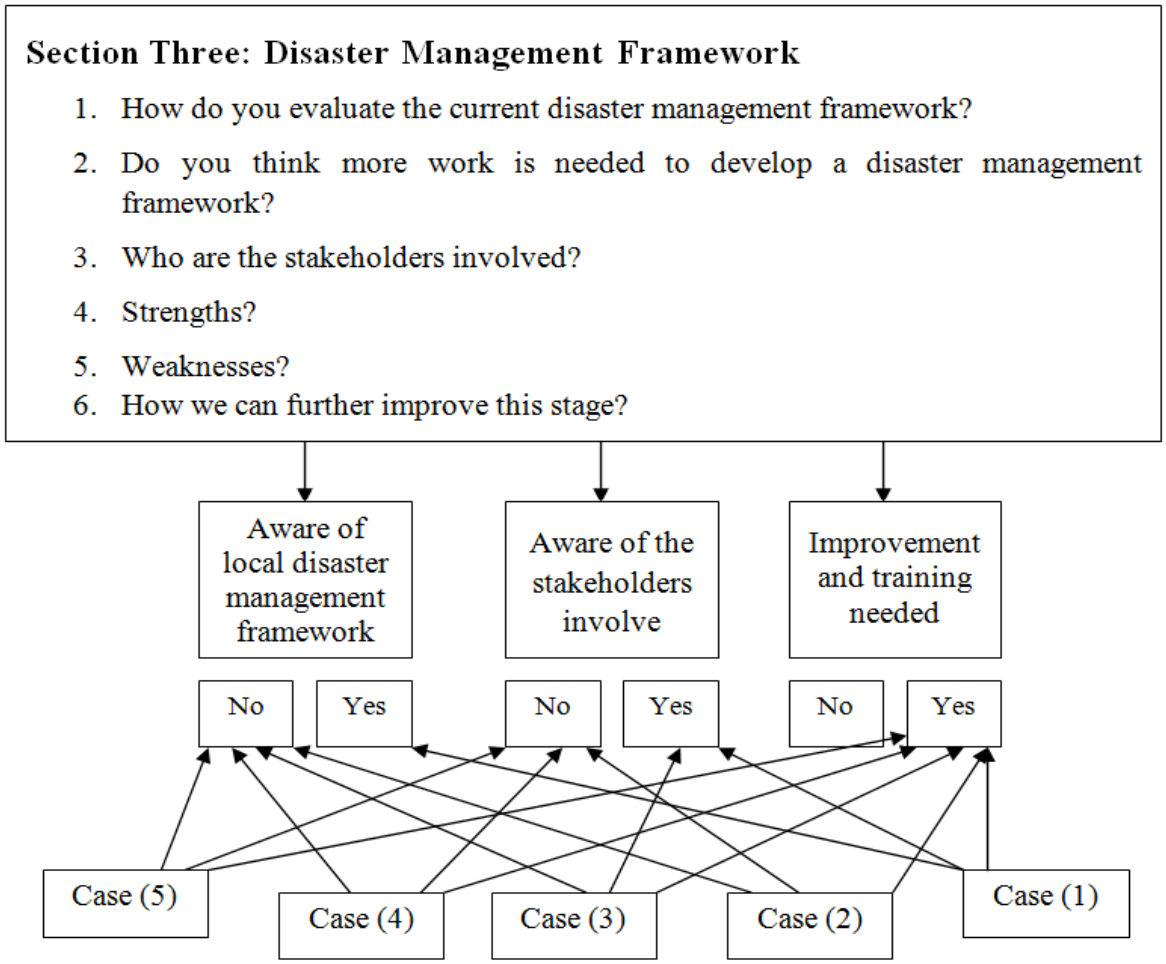


Figure 32. Analysis at the Disaster Awareness Level

From the answers given, the researcher arrived at the following conclusions:

1. Most of the participants were unfamiliar with the entire local Disaster Management Framework and only one participant (Case 1) was aware of the framework because he attended one of the Civil Defence Committee meetings. This shows that there is little awareness of the disaster management process in Kuwait and that most of the emergency workers are doing their jobs randomly due to the lack of disaster management awareness, training and culture.
2. Only two participants were aware of the stakeholders involved in disaster management in Kuwait. However, this is not enough for a fully integrated disaster management process; as described in the literature review, all agencies and the general public must be involved in the disaster management process for it to be effective.

3. All participants agreed that more disaster management training and awareness programs are needed. This shows that there is a limited knowledge of disaster management among emergency workers in Kuwait.
4. There is poor communication between emergency officers who attend Civil Defence Committee meetings and the rest of the emergency workers who are not on the committee. This illustrates that the Civil Defence Committee works are in isolation from the rest of the emergency services.

6.4.3 Evaluation of the Early Warning Procedure

Section 4 of the interview form consists of seven questions. The main purpose of Section 4 is for the researcher to evaluate the interviewees' knowledge with regards to the following:

1. The early warning procedure in Kuwait.
2. The agencies responsible for giving early warnings in Kuwait.
3. The importance of early warnings in Kuwait.

From the data obtained through the pilot study, the researcher found the following:

1. Most of the participants were unfamiliar with the early warning procedure in Kuwait, even Case 1, who is a member of the Civil Defence Committee and attends their meetings. The Civil Defence Department in Kuwait sound the Sirens every six months for maintenance purposes and before they do, an announcement is made through the media regarding the specific day and time, as well as tones that will be used. The researcher is aware that one of the tones is designed to warn the public in Kuwait before a specific disaster occurs or when a predicted, specific hazard is approaching Kuwait. The second tone is used to warn the public that a hazard has already occurred and has affected a specific location in Kuwait. The third tone is used to inform the public that a hazard has occurred but outside of Kuwait.
2. All the participants were unaware of the agencies responsible for managing and providing the Early Warning System in Kuwait. This confirms the need to establish a Disaster Management Center in Kuwait.
3. All the participants agreed that the Early Warning System is important in Kuwait due to the different hazard locations.

The main aim of any early warning procedure or system is to warn the public, the government and insurance companies about specific hazards. (Chapter 2, Section 2.13) provides a more detailed explanation of Early Warning Systems. It also describes the current Early Warning System in Kuwait. Figure 33 illustrates the analysis process for Section 4 of the interviews conducted during the pilot study phase.

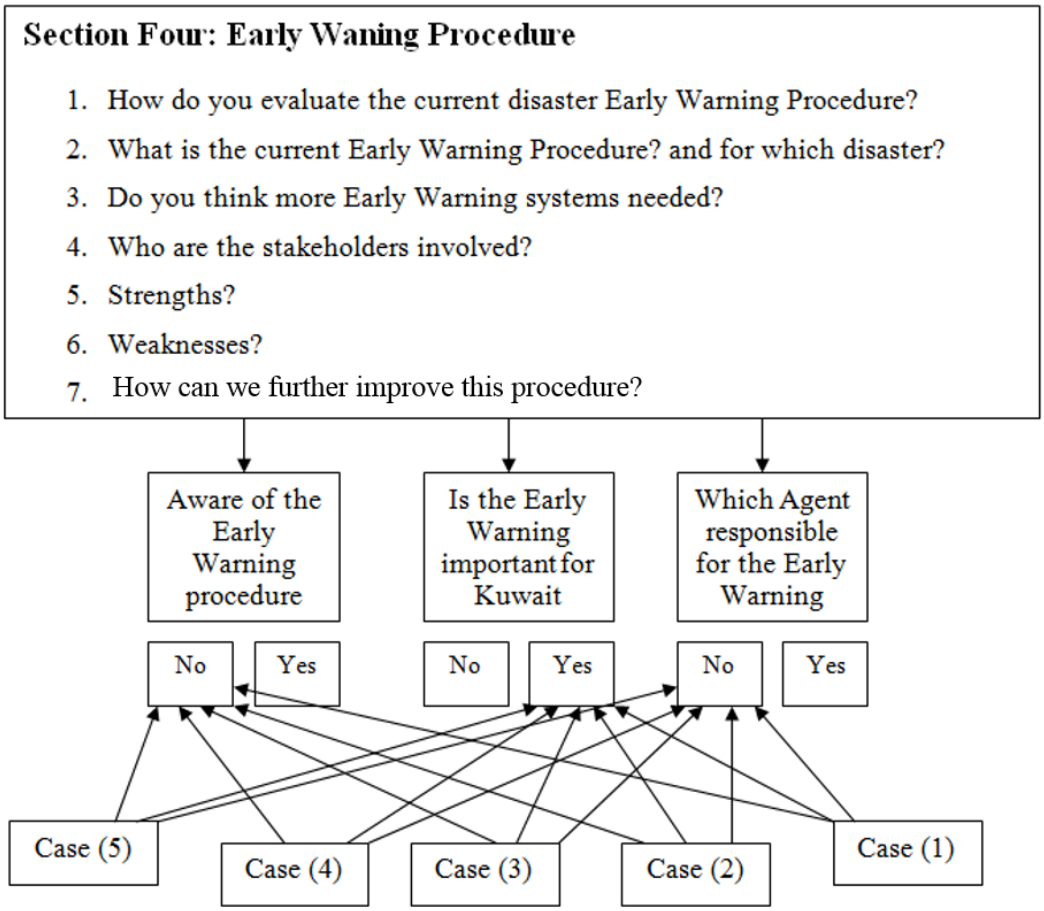


Figure 33. Analysis of the Current Early Warning Procedure

There is a lack of knowledge of the Early Warning System and procedures in Kuwait, which shows that each agency in Kuwait works separately. This is due to lack of an effective Disaster Management Framework and associated acts.

6.4.4 Evaluation of the Current Shelters

Section 5 of the interview form consists of five questions. The main purpose of this section was for the researcher to evaluate the interviewees' knowledge in terms of the following:

1. The number of emergency shelters in Kuwait.
2. The importance of emergency shelters in Kuwait.

From the pilot study data, the researcher found the following:

1. Most of the participants were unfamiliar with the number of emergency shelters in Kuwait. This is because the agency responsible for providing the shelters in Kuwait is the Department of Civil Defence in The Ministry of Interior in Kuwait. However, during a disaster event there are multiple agencies that respond to the emergency, for example, both the fire and ambulance services.

   It is not clear who coordinates the mobilisation of citizens to emergency shelters. Therefore, the emergency responders need to be aware of the location of emergency shelters, the type and capacity of each shelter. The main cause of the problem is that each emergency agency works separately, without any collective disaster management objectives in mind.

   Moreover, if emergency responders are unaware of the shelters in Kuwait, then surely, citizens are also largely unaware of them. This confirms the urgent need to review and improve the disaster management system in Kuwait.
2. At the same time, all participants agreed that shelters are important, especially due to the Iranian Nuclear Power Plant and the unstable security of Kuwaiti. Figure (34) illustrates the analysis process of the questions in Section 5 of the interview form.

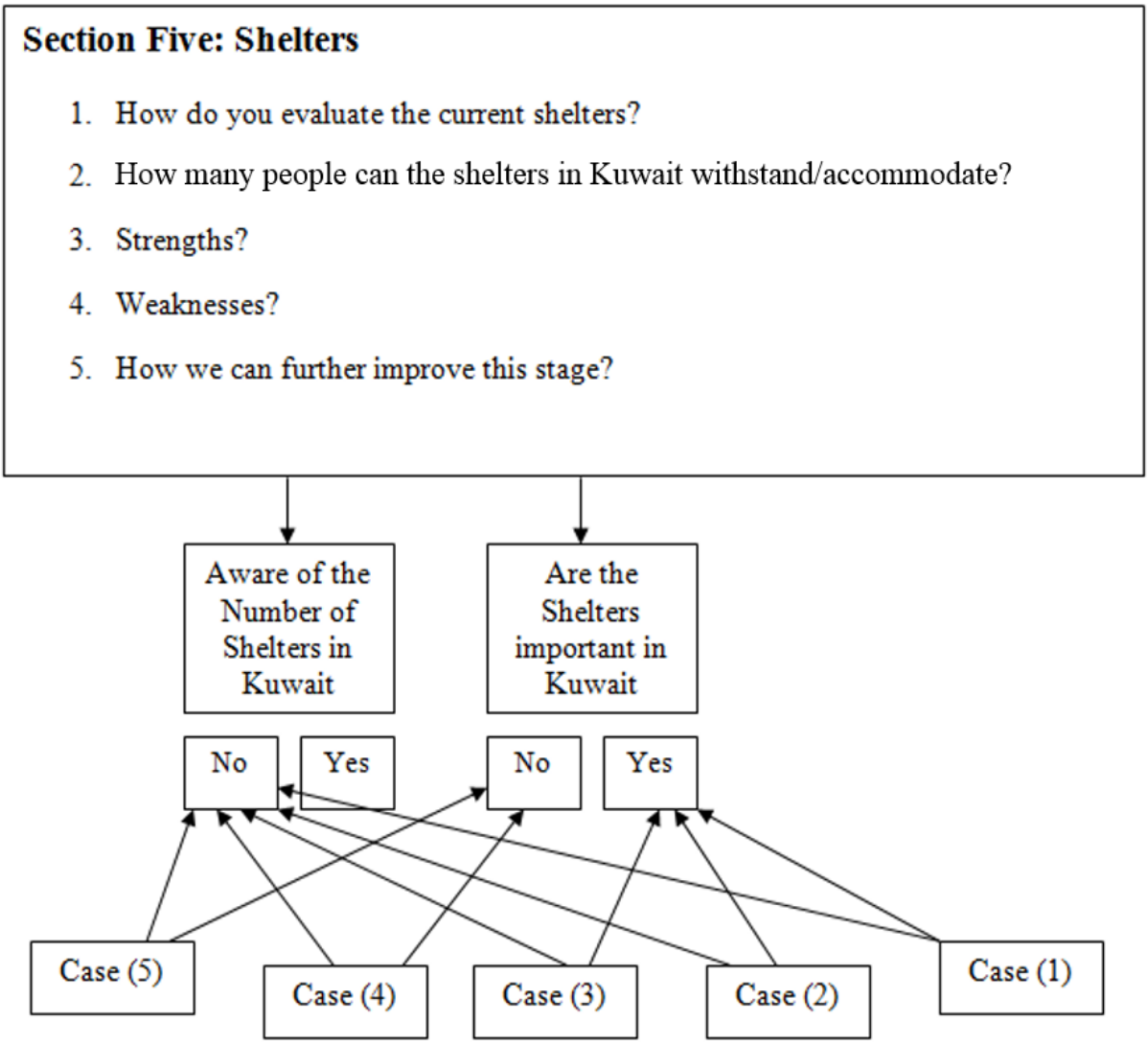


Figure 34. Analysis of the Current Shelters

6.4.5 Communication during a Disaster

Section 6 of the interview form consists of four questions. The main purpose of the Section 6 questions was for the researcher to evaluate the interviewees' perceptions of the following:

1. The communication systems used during a disaster.
2. Whether the communication systems need updating.

From the pilot study data, the researcher found the following:

1. Most of the participants were familiar with the communication system used during an emergency situation which they described as the Tetra system. The Tetra communication system provides a unified communication process among all the emergency services in Kuwait. The communication system is managed by the Ministry of Interior.
2. Cases 1, 2 and 3 stated that the communication system needs updating because it sometimes has a very poor signal.

Figure 35 illustrates the analysis process of Section 6 of the interview.

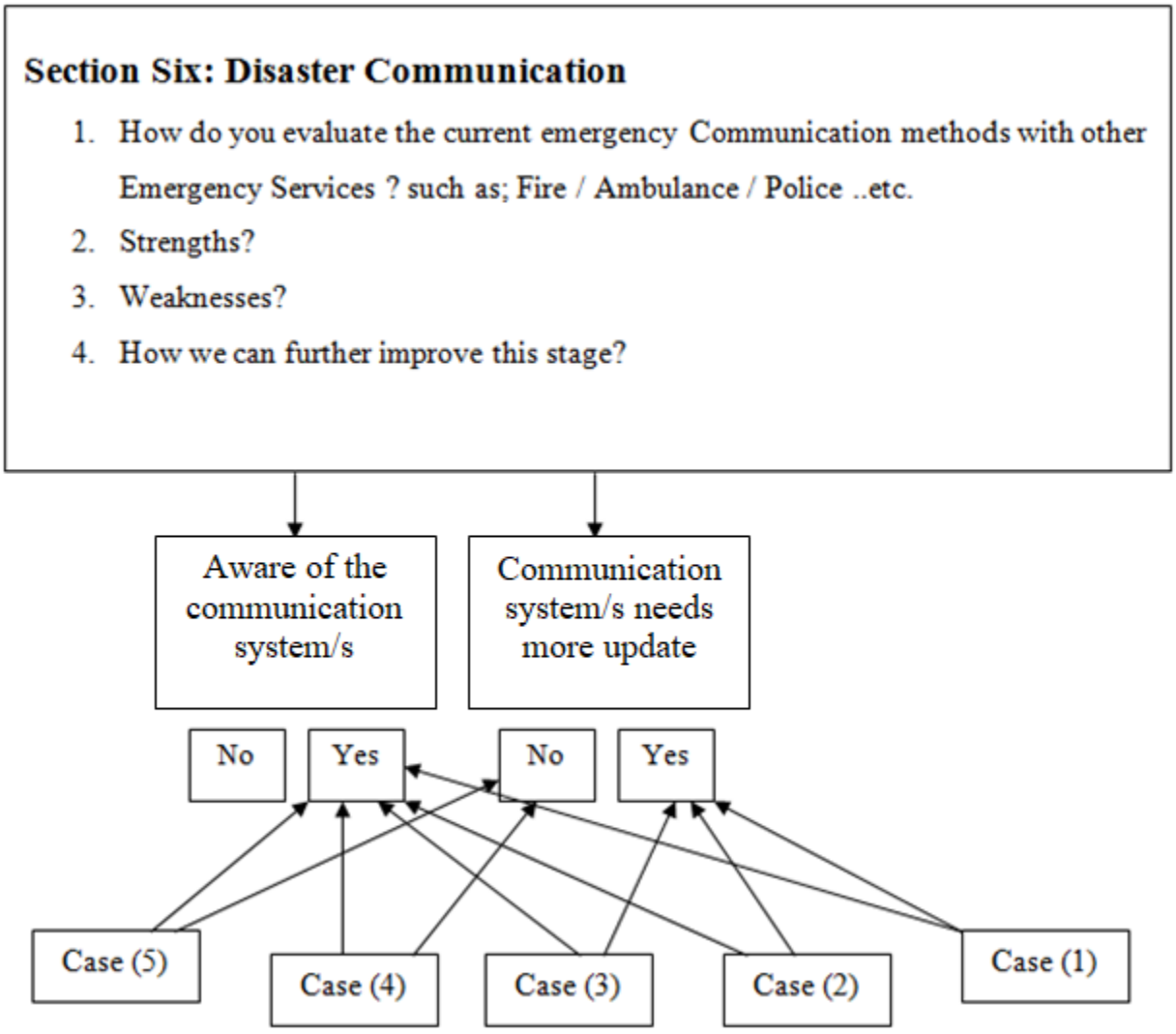


Figure 35. Analysis of the Current Communication System

The communication among the emergency services during a disaster represents the core of the disaster management process; when there is poor communication, a disaster may needlessly turn

into a crisis. Therefore, ensuring that an effective communication system exists is very important and will help in achieving the aims and tasks of the Disaster Management Framework.

During the interviews with the pilot study participants, the researcher observed that there is a lack of training regarding communication among the various emergency services. Again, this confirms the need to establish a Disaster Management Centre which would lead all the emergency services working under a clear and unified communication system.

6.4.6 The Local Disaster Management Act

Section 7 of the interview form consists of seven questions. The main purpose of these questions was for the researcher to evaluate the interviewees' knowledge with regards to the following:

1. The current local Disaster Management Acts and legislation.
2. Any existing regional Disaster Management Acts and legislation.
3. To determine whether or not the current Disaster Management Acts are sufficient.

From the pilot study data, the researcher found the following:

1. Most of the participants were unaware of the local Disaster Management Acts. As Disaster Management Acts represent the concrete basis for the roles of all emergency services participants, this finding shows that the disaster management process in Kuwait needs reconstruction and there is a vital need to establish a unified Disaster Management Centre which can clearly enable staff from emergency services to work under a unified Disaster Management Framework.
2. There is a lack of training for emergency workers to learn about the Disaster Management Acts and their organisational roles and responsibilities during a disaster, as outlined by the Acts. It is evident that there is a lack of regional Disaster Management Acts in Kuwait. In cases where external responses are required, emergency workers will find it difficult to coordinate the external response.
3. The participants agreed that there is a need to update the Disaster Management Acts.

Figure (36) illustrates the analysis process of the data obtained from Section 7 of the pilot interviews.

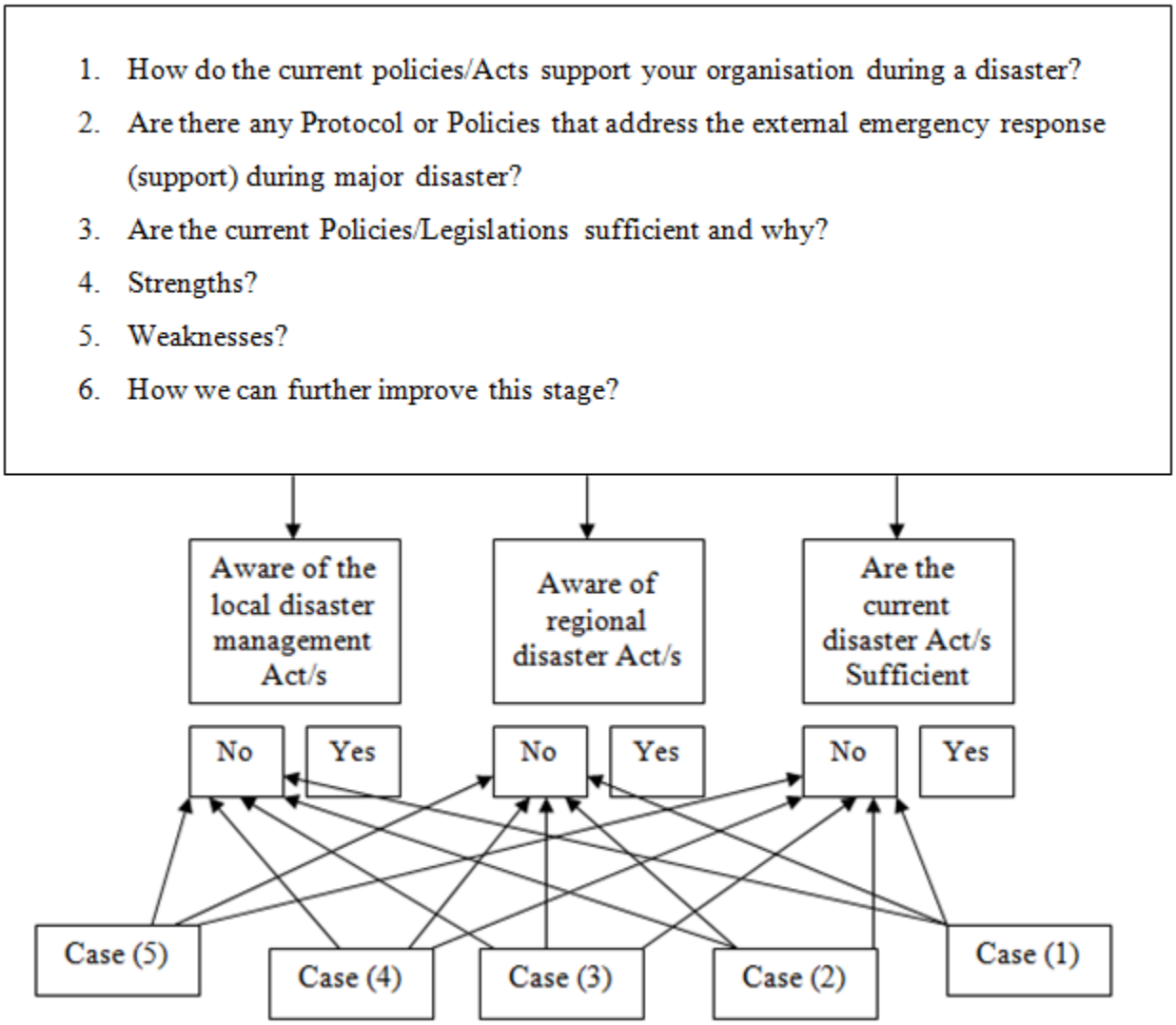


Figure 36. Analysis of the Current Acts and Policies in Kuwait

The data gathered in this part of the pilot study confirms that there is a need to establish a new Disaster Management Act which dictates that all emergency services would work from one location, such as the proposed Kuwaiti Disaster Management Centre.

6.4.7 Evaluating Disaster Awareness

Section 8 of the interview form consists of five questions. The main purpose of this section was for the researcher to evaluate the interviewees' knowledge and perceptions regarding the following:

1. Local disaster management awareness programs.

2. Whether or not the Kuwaiti public is aware of the hazards that could affect the nation.

From the pilot study data, the researcher found the following:

1. Most of the participants agreed that there is a lack of disaster management awareness in Kuwait, with most people in Kuwait being unaware of the types of hazards they may face. This shows that there is essentially no disaster management process in Kuwait because the purpose of a disaster management is to protect the lives of the public and properties. However, if the public are lifted without any hazard or risk awareness, then emergency services workers will have a very difficult time instructing and guiding the public before, during and after a disaster . The following figure, Figure (37), illustrates the analysis process of this part of the interview.

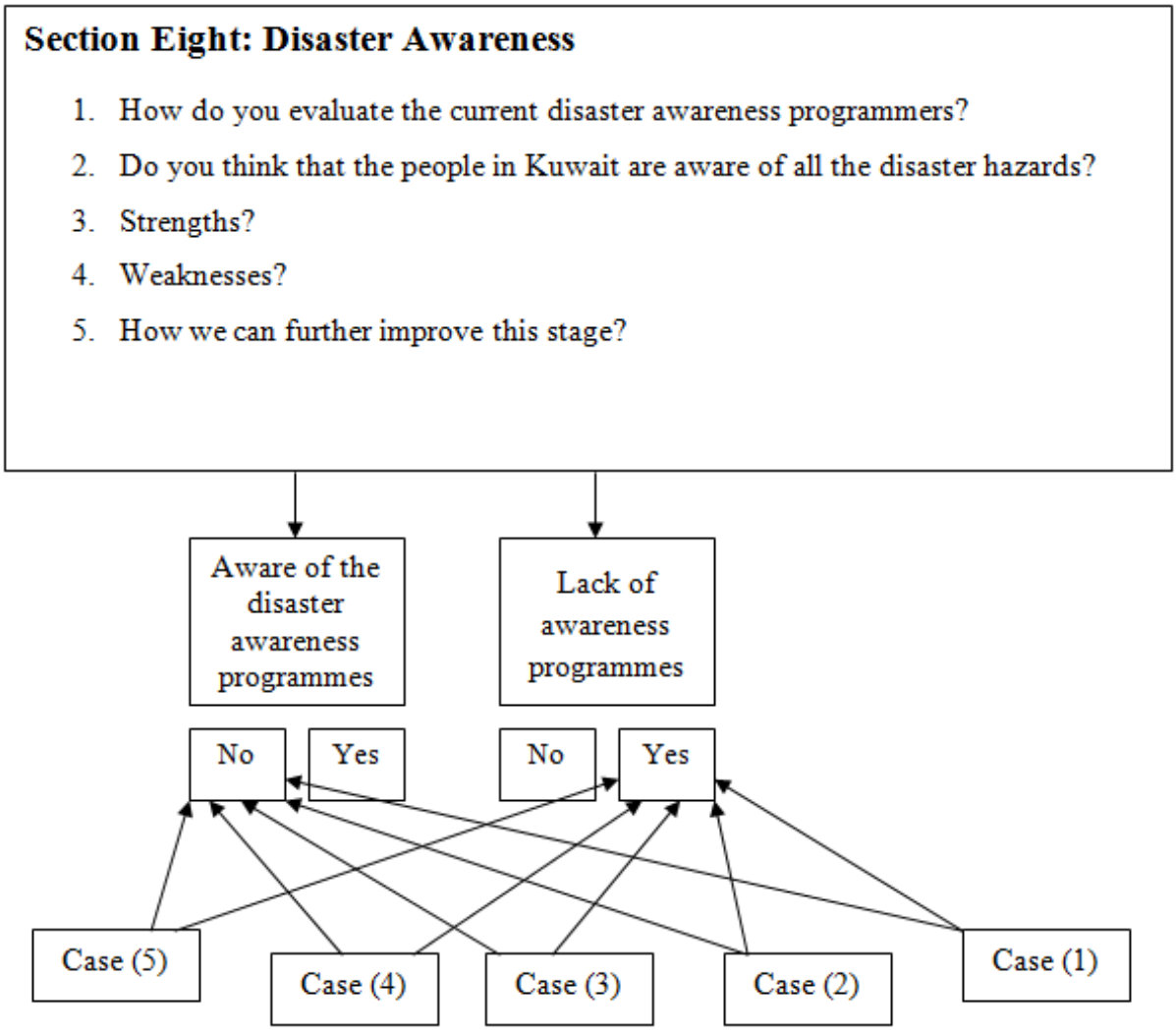


Figure 37. Analysis of Disaster Awareness in Kuwait

As mentioned in Chapter 2 (Sections 2.2), everybody, not only emergency services participants and the local governments, should participate in the disaster management process. The results of this part of the pilot study show that there is a need for recognizing the importance of the disaster management process in Kuwait, especifically in terms of providing disaster education, as was discussed in (Chapter 2, section 2.11) and (chapter 4, Section 4.6). Doing so would enhance public knowledge of what to do in the event of a disaster.

6.4.8 External Disaster Response Preparedness

Section 9 of the interview form consists of six questions. The main purpose of this section was for the researcher to evaluate the interviewees' knowledge and perceptions of the following:

1. Preparations of emergency services' regional disaster response plans, and
2. Whether or not employees in the emergency services are aware of all external disaster hazards.

From the pilot study data, the researcher found the following:

1. All the participants mentioned that there is a lack of regional disaster management plans.
2. All the participants were unaware of most the external hazards that could affect Kuwait.

The only external hazard which the participants were aware of is the Iranian Nuclear Power Plant. Different disaster hazards, such as earthquakes, were not identified as hazards by the participants. In addition, despite the unstable security of the Middle East, current terrorism acts were not mentioned by the interviewees. This suggests that the risk assessment procedure has not been adopted properly.

Therefore, this research provides a recommended risk assessment procedure which can enable emergency service workers in Kuwait to identify and evaluate all hazards, within and outside of Kuwait. Figure 38 illustrates the analysis of this section of the interview data.

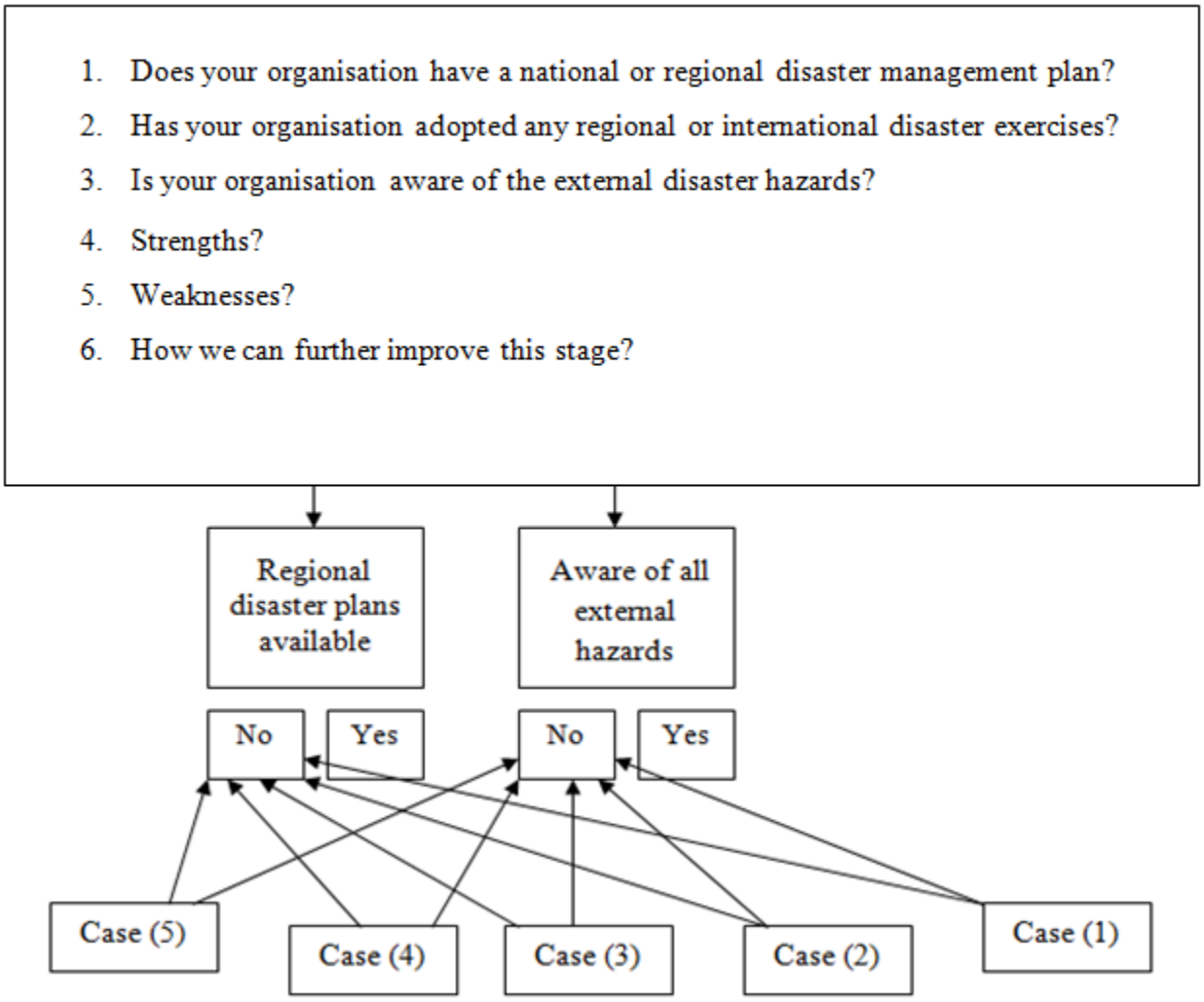


Figure 38. Analysing the External Disaster Response Preparedness

6.4.9 Competence in Disaster Management

Section 10 of the interview form consists of six questions, which were aimed at evaluating the interviewees' knowledge and perceptions of the following:

1. The existence of any qualified disaster management personnel in Kuwait.
2. Whether or not there is need to employ qualified disaster management personnel.

From the pilot study data, the researcher found the following:

1. In the Kuwait Fire Service, there is only one employee who has a Master's Degree in Crisis and Disaster Management.

2. All the participants agree that there is a need for more qualified disaster management employees in Kuwait.

Disaster management is considered to be a science. As such, the people who need to implement disaster management science must be qualified. Unfortunately, there is a lack of institutes that provide disaster management education and training. Therefore, anyone wishing to study disaster management must study at an institution or university outside of Kuwait.

Most the participants mentioned that the fire service usually sends its fire officers to the United Kingdom or United States for emergency training courses, which teach skills such as incident commands and fire fighting. The only emergency services qualification that can be acquired in Kuwait is a Diploma in Fire fighting. Figure 39 overleaf illustrates the data analysis of this section of the pilot interviews.

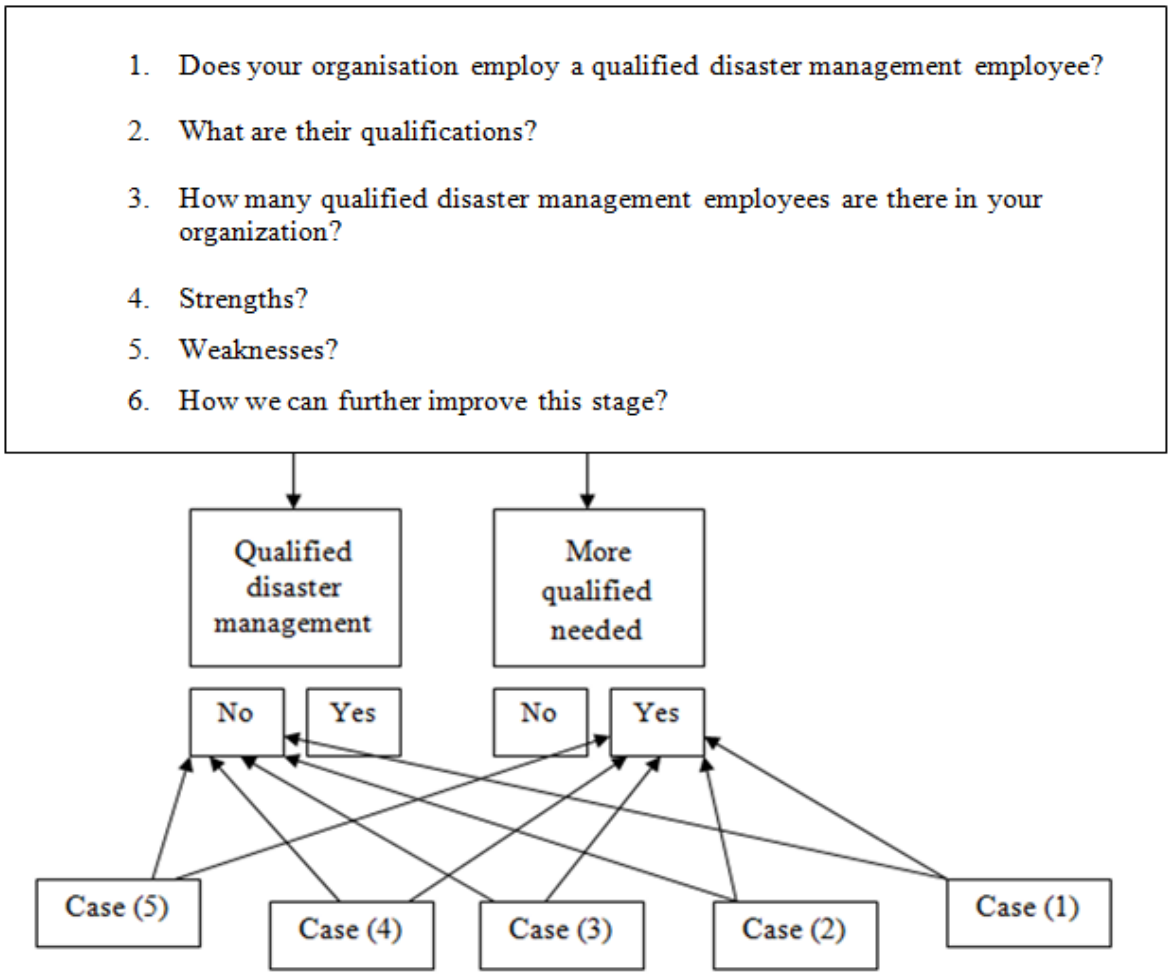


Figure 39. Analysis of Qualified People in Disaster Management

The results of this part of the pilot study confirms that there is misunderstanding among emergency workers in Kuwait regarding how disasters can be managed scientifically. The results also show that there is an urgent need to design a new Disaster Management Framework and to draw up a new Disaster Management Act so that all emergency planning and its implementation would be delivered from a central location, such as the proposed disaster management centre.

6.5 The Participants in this Research

In addition to the five interviews during the pilot phase, 26 interviews were conducted for the main study, with each member of the High Civil Defence Committee in Kuwait (see Chapter 1, Table 1). The Civil Defence Committee includes members from 13 ministries and agencies, and the researcher had the opportunity to interview two members from each of these agencies, one being the main member and the other being the alternative (see Chapter 5, Table 17).

6.6 The Analysis Technique

Content analysis was the technique used to analyse the main research interviews. Downe-Wambolt (1992) stated that the term 'content analysis' is more than a counting process; it aims to link the results to the context in which they were produced. Content analysis, then, is a research method that validates systematic, objective means to make valid inferences from visual, verbal, or written data in order to describe and quantify specific phenomena. Content analysis can be used on all types of written texts, no matter where the material comes from, and no specific rules that must be followed, (Berg, 2001).

6.7 The Analysis Process

The previous section highlighted the analysis technique for the main interviews, including a definition of the content analysis technique. This section outlines the analysis criteria and techniques used by the researcher to analyse the data gathered from interviews with the 26 participants in this research, as follows:

1. Managing units: the general criteria of the information needed by the researcher
2. Condensed managing Units: the terms used for the examination process
3. Code: a summary of the data required by the researcher

4. Sub-headings and sub-categories: summaries of the overall section in one sentence for the main subject of information required
5. Category: the consensus of the interviewees

6.7.1 Analyzing the Risk Assessment Process

Section 1 of the semi-structured interview form is not included in the analysis process because it contains general questions on the participant, such as experience and title.

Table 19 illustrates the analysis process of the main data that the author is trying to gain and observe from the participants throughout the semi-structured interview, namely, to identify the risk assessment procedure or standards used in identifying hazards in Kuwait, the strengths and weaknesses of the current disaster management legislation and the participants' feedback in terms of improving the current local disaster management legislation.

Table 19. Evaluation of the Current Risk Assessment Procedure

Managing Units	Condensed Managing Units	Code	Sub-headings Sub-categories	Category
Aware of the local Disaster Management Acts, disaster risk assessment, improvement and training needed and disaster management stakeholders	Aware of: ▪ Disaster Acts ▪ Stakeholders ▪ Risk assessment	▪ Aware ▪ Acts ▪ Risk assessment ▪ Strengths ▪ Weaknesses	▪ Evaluate leaders competent	Personal satisfaction

Section 2 in the interview form consists of eight questions. The main purpose of Section 2 was for the researcher to evaluate the interviewees' knowledge and awareness of the disaster risk

assessment procedure and standards that are used to identify hazards in Kuwait, to evaluate how the local disaster management legislation or Acts in Kuwait support and enforce risk assessment, to evaluate the strengths and weaknesses of the current disaster risk assessment process in Kuwait and, finally, to examine the participants' satisfaction with the current disaster risk assessment practices in the country. From the interviews with the 26 participants, the researcher observed the following findings:

1. Most of the participants were not familiar with all local Disaster Management Acts.
2. All the identified hazards (Chapter 1, Table 2) were based on the participants' experience and were agreed upon during a meeting conducted by the Civil Defence Committee.
3. None of the participants were familiar with the term 'disaster risk assessment'.
4. All the participants agreed that more disaster training, culture and awareness are needed.
5. The Civil Defence Committee focuses mainly on the response phase of a disaster.
6. Good relationships and communication between the Civil Defence Committee members are needed.

The analysis of the 26 participants' responses shows that there is lack of awareness by most of the participants in terms of local disaster management Acts and legislation. In addition, there is a poor understanding amongst most of the participants as to what a disaster risk assessment is. This means that the disaster management procedure in Kuwait is inappropriate and insufficient and that risk assessment is not enforced by the Disaster Management Act in Kuwait.

In addition, the participants agreed that more training and awareness is needed in order for them to understand the risk assessment process. Furthermore, the interview participants erroneously thought that the Civil Defence Committee are only the stakeholders involved in the overall disaster management process in Kuwait.

A strength identified by the analyses is that all the participants of the Civil Defence Committee have good communication and relationships. However, a weakness is that the Civil Defence Committee focuses only on the response phase of the disaster.

6.7.2 The Local Disaster Management Framework

The main aim of the researcher is to evaluate the current Disaster Management Framework in Kuwait, including its strengths and weaknesses. Table 20 shows the analysis process and criteria for this section of the interview.

Table 20. Evolution of the Local Disaster Management Framework

Managing Units	Condensed Managing Units	Code	Sub-headings Sub-categories	Category
Aware of the local Disaster Management Framework, improvement needed and stakeholders in the framework.	Aware of: ▪ Disaster Management Framework ▪ Stakeholders	Framework Strengths Weaknesses	▪ Evaluate local Disaster Management Framework	Personal satisfaction

Section 3 of the interview form consists of six questions. The main purpose for this section was for the researcher to evaluate participants' levels of satisfaction with and their knowledge of the current local Disaster Management Framework, the stakeholders involved and the strengths and weaknesses of the current Disaster Management Framework in Kuwait.

From the interview data obtained from the 26 participants, the researcher found the following:

1. The Disaster Management Framework was hurriedly established without much consultation.
2. The Disaster Management Framework lacks guidance in terms of the work required by each agency.
3. All participants agreed that the current Disaster Management Framework must be improved.
4. Most of the participants were not aware of the Disaster Management Framework.

The analysis of the responses of the 26 participants shows that participants have limited knowledge regarding the current local Disaster Management Framework in Kuwait. Therefore, the current Disaster Management Framework was found to be ineffective. In addition, all participants agreed that the current Disaster Management Framework must be improved to ensure its effectiveness. While it is good that the current Disaster Management Framework in Kuwait is supported by an Act, the Civil Defence Committee focuses only on the response phase of the disaster and the Act only permits the Ministry of Interior to carry out the coordination, but without any clear aims or guidance for the participants in the Disaster Management Framework. As a result, the disaster management process in Kuwait lacks integration of a management process during disasters. Most of the participants agreed that the current Disaster Management Framework must be improved. However, the participants from The Ministry of Interior were happy with the current framework.

6.7.3 Early Warning Procedures in Kuwait

In section 4 of the semi-structured interview form, the main aim of the author was to evaluate the current early warning procedure in Kuwait, including its strengths and weaknesses. Section 4 of the interview form consists of seven questions. The main purpose of this section was for the researcher to evaluate the participants' satisfaction with and their knowledge of the current early warning procedure in Kuwait, along with the stakeholders who are participating in the early warning process and the system's strengths and weaknesses. From the 26 participants, the researcher found the following:

1. The current early warning procedure was thought to be primeval or non-existent.
2. The current Early Warning System in Kuwait is a siren located on the roof of each police station in Kuwait.
3. The early warning process in Kuwait is run by different agencies; however, only the Ministry of Interior is required by an Act to establish the Early Warning System.
4. The main aim of establishing the Early Warning System was to warn the public against air raids during wars.
5. Different agencies establish warning notifications when there are impending natural hazards to the country.
6. All participants agreed that the current Early Warning System must be improved. Table (21) shows the analysis process and criteria for this section.

Table 21: The Current Early Warning Procedure in Kuwait

Managing Units	Condensed Managing Units	Code	Sub-headings Sub-categories	Category
Aware of the current Early Warning System, improvements needed and stakeholders in the early warning process.	Aware of: ▪ the current early warning procedure ▪ Stakeholders	▪ Early warning ▪ Strengths ▪ Weaknesses	▪ Evaluate the current early warning procedure	Personal satisfaction

The analysis of the interview responses shows that there is a lack of knowledge of the current Early Warning System in Kuwait. In addition, there is a poor understanding among the participants in terms of which disasters the Ministry of Interior will warn the public against, using the sirens. Most of the participants agreed that the public in Kuwait are unaware of the current early warning procedures and which disasters the Early Warning System was established to warn them against. The most concerning finding was that all the participants agreed that there is no clear guidance as to how the public should act when the early warning sirens are sounded.

Some agencies in Kuwait have a remote sensing system to discover different types of hazards; however, they do not have any procedure to warn the public against these hazards. In addition, the Kuwait Institute for Scientific Research has a sensing system that can sense dust and rain storms but the Metrological Department is responsible for warning the public against such hazards; this poses some communication challenges between these agencies. These Agencies, along with the fire service, establish warning notifications for such hazards through the use of short text messages which appear on social media programmes or apps but this is done without any coordination between these agencies (Metrological Department, 2017).

Therefore, the current early warning procedure in Kuwait was found to be inappropriate and ineffective. In addition, all the participants agreed that the current Early Warning System must be

improved for it to be more effective. Some institutions in Kuwait are equipped with good sensing systems that can detect hazards such as radiation, dust storms and rainstorms. However, there is a lack of coordination between these institutions and the agencies responsible for operating the warning systems. In addition, the public are not aware of what to do when any type of hazard is detected. All participants agreed that the current early warning procedure in Kuwait must be improved.

6.7.4 Evacuation Shelters in Kuwait

Section 5 of the interview form consists of five questions. Table (22) illustrates the criteria and the analysis process for this section.

Table 22. Evaluation of the Current Shelters in Kuwait

Managing Units	Condensed Managing Units	Code	Sub-headings Sub-categories	Category
Aware of the current shelters, the number of shelters, the stakeholders, the types of hazards shelters are designed for, the readiness of the shelters ready, public awareness of the shelters locations	Aware of: ▪ Number and location of the shelters ▪ Types of shelters ▪ Stakeholders	▪ Shelters ▪ Strengths ▪ Weaknesses	▪ Evaluate current shelters	Personal satisfaction

From the analysis of the participants' responses, the researcher found the following:

1. The current shelters are technically redundant and may not serve their purpose.

2. Most of the participants were not aware of the number of shelters or their locations.
3. There is no maintenance contract for the current shelters.
4. The shelters are the responsibility of the Ministry of Interior.
5. The people of Kuwait are unaware of the shelters' locations.

The analysis of the participants' responses shows that there is a lack of knowledge in terms of current shelters and their locations in Kuwait. Additionally, there are no maintenance procedures for these shelters. The shelters were built mainly to protect people from air raids in the event of a war. Most of the participants, including those from the Ministry of Interior, agreed that the shelters in Kuwait must be improved to protect the public from different hazards that may affect the country. At the same time, the public must be made aware of the locations of the nearest shelter and of the circumstances under which they would need to evacuate to these shelters. In addition, The Ministry of Interior should establish maintenance contracts for all shelters to ensure they are kept in good condition.

6.7.5 Emergency Communication

In Section 6 of the semi-structured interview form, the main aims were to evaluate the current communication procedure between the participants during a disaster in Kuwait – including the strengths and weaknesses of the communication process – and to examine the participants' satisfaction with the current communication procedures. Section 6 of the interview form consists of five questions. Table (23) illustrates the criteria and the analysis process for this section.

Table 23. Criteria to Evaluate the Current Emergency Communication Procedure

Managing Units	Condensed Managing Units	Code	Sub-headings Sub-categories	Category
Aware of the current communication procedure, the communication system, whether participants use	Aware of: ▪ Communication system ▪ Types of communication ▪ Stakeholders use the same	▪ Communication ▪ Strengths ▪ Weaknesses	▪ Evaluate the current communication procedure	Personal satisfaction

the same communication system.	communication system			

From the interview participants' responses, the researcher found the following:

1. The current communication system used among emergency service workers is called the 'Tetra Radio System', designed in Finland.
2. Only emergency services agencies use the Tetra Radio System.
3. Communication between emergency services and other agencies (e.g., utility services) is conducted via phone calls.
4. All emergency services participants are happy with the Tetra Radio System because it is secure and provides a clear signal.

The analysis of the responses shows that there is a good communication system used by emergency service workers. However, there is no backup system in case of a system failure or shutdown. At the same time, communication using phone calls during an emergency or a disaster is not appropriate because the signal may not be working properly during a disaster. All the participants agreed that a backup communication system or procedure is needed in Kuwait.

The current communication system used for emergencies or disasters is considered to be an advanced and secure system. However, when there is a disaster, the communication may fail due to the huge load that may occur when all the emergency services attempt to use the system at the same time.

Communication is very important, especially during a disaster. Since different agencies are required to provide specific support, establishing a Disaster Management Centre would facilitate and serve as a unified call centre for all agencies required to provide a specific emergency response during a disaster.

6.7.6 Evaluating the Current Disaster Management Acts

Section 7 of the semi-structured interview form was designed to evaluate the current Disaster Management Acts and policies in Kuwait. The main aim of the researcher was to identify and evaluate the current disaster policies which provide support to the Civil Defence Committee,

including the Committee's level of organisation during a disaster, the strengths and weaknesses of these policies and the participants' overall satisfaction with the current disaster management policies.

Section 7 of the interview form consists of seven questions. From the responses given by the 26 interviewees, the researcher found the following:

1. The current disaster management policy was established without much consultation.
2. Only three ministries/departments are supported by a disaster management policy (the police force, fire service and the environment agency).
3. The current policies do not support all the phases of disaster management.
4. Emergency service roles overlap with each other in terms of disaster management responsibilities.
5. The participants from the emergency services were only aware of their own organization's policies.
6. Not all of the participants were aware of local disaster management policies or legislation.

Table 24 illustrates the criteria and the analysis process for Section 7 of the interview.

Table 24. Criteria Used to Evaluate Current Disaster Management Acts

Managing Units	Condensed Managing Units	Code	Sub-headings Sub-categories	Category
Aware of the current disaster management policy in your organisation, whether policies exist for disaster management, strengths and weaknesses of the policies, whether	Aware of: ▪ Current policies of all local organisations ▪ Stakeholders adopting the same policy ▪ Existence of policies' existence?	▪ Policy ▪ Support ▪ Strengths ▪ Weaknesses	▪ Evaluate current disaster management policies with all participants	Personal satisfaction

more policies are needed.				

The analysis of the responses show that there is a lack of knowledge among the participants from the Civil Defence Committee in terms of current local disaster management policies. Additionally, there is an overlap between the responsibilities of the fire service, police force, the Civil Defence and the environment agency. All participants mentioned that they participate in disasters without policies to support their work and this could allow them refuse to carry out the work required in the event of a disaster scenario. Most of the participants also agreed that the current disaster management policies are poor and lack guidance. None of the current disaster management policies include or define the term 'disaster', nor do they mention the different phases of the disaster management life cycle. Furthermore, the current disaster management policies were outlined by people who had no disaster management expertise. Therefore, the current disaster management policies were found to be insufficient and unsupportive of the disaster management process. In addition, all participants agreed that the current disaster management policies must be improved.

6.7.7 Disaster Awareness and Culture in Kuwait

The previous section highlighted the analysis process on the current disaster Acts. This section illustrates the analysis process used for Section 8 of the Semi-Structured Interview form. The main aim of the researcher was to evaluate the current disaster awareness programmes for the public and the culture of the Kuwaiti people in terms of disaster hazards, including the strengths and weaknesses of the current awareness programmes. Table (25) shows the analysis process and criteria applied to analysing Section 8.

Table 25. The Analysis Process and Criteria to Evaluate the Disaster Awareness

Managing Units	Condensed Managing Units	Code	Sub-headings Sub-categories	Category
▪ Evaluation of the current disaster awareness programmers, whether people in Kuwait are aware of all disaster hazards ▪ Whether there is a sufficient awareness programme	Aware of: ▪ Disaster Management Framework ▪ Stakeholders	▪ Public awareness ▪ Strengths ▪ Weaknesses	▪ Evaluate the public awareness level in term of disaster hazards	Personal satisfaction

Section 8 of the interview form consists of five questions. The main aim of this section was to evaluate the participants' satisfaction with and their knowledge of current local Disaster Management awareness programmes for the public, the stakeholders in these awareness programmes and the strengths and weaknesses of the disaster awareness programmes in Kuwait. From the responses, the researcher found the following:

1. There are no disaster hazards awareness programmes in Kuwait.
2. Participants from emergency services stated that they 'don't want to scare the public'.
3. All other participants stated that "there is no Act that requires a specific agent to carry out the awareness programs".
4. All participants agreed that the people in Kuwait are unaware of hazards that could affect the country.

The analysis of the responses shows that there is a lack of awareness programmes in Kuwait, as all participants stated that the people in Kuwait are not aware of the hazards they may face in the future, which greatly increases the risk to the public. Recently, the Kuwait Fire Service has started to publish weekly short awareness videos on social media. However, the awareness programmes only focus on fire safety. No other hazards are considered. All participants from the Civil Defence

Committee agreed that awareness programmes should be integrated into schools to enhance childrens knowledge of the safety measures to be taken in the event of each type of disaster. However, the people in Kuwait are currently unaware of the hazards that they may face in the future, which increases the risk and potential losses associated with disasters. Therefore, there is a huge vulnerability in Kuwait against different disasters and the public in Kuwait will likely act haphazardly during a disaster – especially if there is any radiation or technical errors involved with the disaster.

6.7.8 Major Disaster Preparedness in Kuwait

The previous section highlighted the analysis procedure to evaluate the disaster awareness in Kuwait. This section illustrates the analysis process for Section 9 of the semi-structured interview form. The main aim of the research was to evaluate the level of preparedness of the Civil Defence Committee in terms of validating disaster management plans, including the perceived strengths and weaknesses of these plans and the participants' satisfaction with the plans. Section 9 of the interview form consists of six questions. Table (26) illustrates the criteria and the analysis process for this section of the interview.

Table 26. The Analysis Criteria to Evaluate Major Disaster Preparedness

Managing Units	Condensed Managing Units	Code	Sub-headings Sub-categories	Category
Whether the organisation has disaster management plans, whether the organisation has adopted disaster exercises, whether the organisation is	▪ External disaster hazards ▪ Plans in place ▪ Stakeholders in the plans ▪ External disaster response plans in place.	▪ External disaster hazards ▪ Strengths ▪ Weaknesses	▪ Evaluate the current coordination for external disaster response	Preparedness

aware of external disaster hazards.				

From the interview responses to Section 9, the researcher found the following:

1. Some of the participants were aware of external disaster hazards.
2. Members of emergency services are not aware of their capacity to deal with regional hazards.
3. There are no regional or international disaster management plans.
4. The emergency services participants agreed that their organisations focus only on the response phase of the disaster.

The analysis of the interview responses show that there is little or no effort taken by the participants in terms of validating regional or international disaster response plans. Additionally, all the participants stated that they focus mainly on the response phase of a disaster and that most of the emergency services are kept fully-prepared with most equipment needed for the response phase of disaster. All the participants mentioned that they are unaware of the losses that could occur following any major disaster, which shows that the disaster management process in Kuwait is managed randomly and that the emergency services in Kuwait are not aware of their capacity to deal with any type of major disaster. It is good that the emergency services are equipped with more developed tools and equipment; however, none of the participants are aware of the possible losses that could occur following a major disaster. Therefore, there is a lack of knowledge of the participants in terms of estimating or predicting possible losses.

The conclusions drawn from this are that there is no clear or applicable disaster management process in Kuwait and that the participants in the Civil Defence Committee have no background in disaster management.

6.7.9 Qualified Disaster Planners

In Section 10 of the semi-structured interview form, the main aim of the researcher was to determine how many workers involved in disaster management are qualified or educated with a degree in disaster management and to find out the scientific background of the participants in the

Civil Defence Committee. Section 10 of the interview form consists of six questions. From the responses given by the participants, the researcher found the following:

1. None of the participants have a degree in disaster management.
2. Some of the participants attend short courses in disaster response.
3. There is no institute or university that provides disaster management courses in Kuwait.
4. The Civil Defence Committee participants use their own experience to deal with any disaster.

The following (Table 27) illustrates the criteria and the analysis process for Section 9 of the interviews

Table 27. The Analysis Criteria for Determining Qualified Disaster Planners

Managing Units	Condensed Managing Units	Code	Sub-headings Sub-categories	Category
Whether the organisation employs qualified disaster management employees, what the emergency services qualifications are.	▪ Degree in disaster management ▪ Qualified disaster management practitioners	▪ Qualifications ▪ Strengths ▪ Weaknesses	▪ Evaluate the current qualifications in disaster management	Disaster management

The analysis of the responses shows that there is little attention given by the Kuwaiti government and local universities, in terms of providing degree-level education in disaster management. The participants from the police force are trained and qualified with a Police Science Diploma, while the participants from the fire service hold a Fire fighting Diploma and typically receive training through short courses in responding to and managing incidents. The participants from the army and the National Guard had armed forces training qualifications. All other participants had degrees that are not relevant to disaster management.

All participants agreed that there is a lack of institutes and universities that provide degrees in disaster management. They also agreed that all training that has been conducted in the past has focused only on the response phase of disasters.

Two years ago, the fire service started to sponsor some fire officers to pursue university degrees in disaster management in institutions outside Kuwait, which is a strength in terms of education. However, the disaster management process in Kuwait is run poorly and is based on personal experiences with disaster response rather than any scientific approach. As such, the Kuwaiti Disaster Management Framework ignores almost all of the phases of the disaster management life cycle. Therefore, there is a large gap in the disaster management process and practices in Kuwait; one which makes the people in Kuwait vulnerable to most disasters.

6.8 Disaster Risk Management in Kuwait

This section provides different information which would enable the author to suggest improvements to the current Disaster Management Framework in Kuwait. It describes the main gap analysis of the current disaster management procedure in Kuwait. This process illustrates various processes and terms as listed below:

1. Elements: the factors or the area that will be assessed by the author.
2. Current conditions and practices: illustrates the current procedures used in the disaster risk management in Kuwait.
3. International best practices: provides the best disaster risk management practices used in various countries that can potentially reduce the impact of disasters and improve the disaster framework.
4. Recommendations and potential solutions: includes the author's proposed solutions and recommendations to improve the current Disaster Management Framework for Kuwait.

Gap analysis technique is defined as the process of finding the gap and illustrating, for instance, the difference between the current statutes of the management system/process (ISO14001, 2005). The gap analysis technique enables the clarification of gaps, in order to formulate actions required to achieve a positive solid and strategic outcome. The author of this research conducted gap analysis to highlight the current gap in the disaster management in Kuwait in comparison to international best practices in the disaster management field. The outcomes of the gap analysis process was then used by the author, together with the data gathered through the different

techniques used by the author in this research, to build and develop an improved Disaster Management Framework for Kuwait. Table (28) provides and explains the gap analysis process that was used to explore disaster risk management.

Table 28. Disaster Risk Management - Gap Analysis in Kuwait

Elements	Current Condition & Practices in Kuwait	International Best Practices	Recommendations & Potential Solutions
Disaster Management Acts/Policies	▪ The Civil Defence Act (1970) ▪ The Fire Service Act (1884) ▪ The Environment Act (2014) ▪ Poor Disaster Management Acts did not define terms such as 'disaster', 'risk assessment', 'mitigation', 'preparedness', 'response', and 'recovery' ▪ There is an overlap in the legislation between different agencies ▪ The Acts were designed mainly for air raids and only discuss the term 'disaster' generally	▪ The Executive Order 12148 of July 20, 1979, USA Code, in order to transfer emergency functions to FEMA and supported by the Federal Civil Defence Act of 1950 ▪ Title I establishes a Federal Civil Defence Administration to be headed by an administrator, appointed by the president ▪ A Civil Defence Advisory Council is created to advise and consult with the administrator on general or basic policy matters relating to Civil Defence ▪ Aims to provide a plan of Civil Defence for the	▪ The Kuwaiti government must establish a new Disaster Management Act that covers and defines important terms used in disaster management ▪ The Act must specify which representative will coordinate and provide advice in terms of hazards and policymaking ▪ The Act should also require all government, non-government, NGO, private and voluntary agencies to create a business continuity plan ▪ The Act should highlight the establishment of the

	▪ Did not identify a specific agency to carry out risk assessment	protection of life and property ▪ Section 3 of the Act of 1950 defines important terms used in Civil Defence, including measures to be taken following an attack, such as rescue, emergency medical, health and sanitation services, monitoring for specific hazards of special weapons and emergency welfare measures ▪ The Act highlighted all types of disasters	National Disaster Management Center for Kuwait, to be chaired by the head of the Council of Ministers ▪ The Act should require the head of the Council of Ministers to establish a committee which is aimed at adopting the disaster management life cycle to protect the people in Kuwait against natural and manmade disasters ▪ The new Act must withdraw all previous disaster Acts in Kuwait in order to avoid overlap
Disaster Management Framework	▪ Random framework which could not enable disaster planners to achieve the disaster management outcomes ▪ The framework is inapplicable and does not provide a specific time to	▪ The Disaster Management Framework in Australia developed in 2005 ▪ Based on the principles and requirements of the Council of Australian Governments' report, 'Natural Disasters in Australia: Reforming Mitigation, Relief and	▪ The head of Council of Ministers in Kuwait should require the National Disaster Management Committee to prepare a Disaster Management Framework for each phase of each disaster .

	follow up with agencies that are required to carry out specific tasks ▪ The processes of the framework focus only on the response phase of a disaster. ▪ The framework does not highlight the agencies required to carry out specific tasks.	Recovery Arrangements' (2002) ▪ The Framework now reflects the outcomes of the review of Queensland's Disaster Management Legislation and Policy, as well as the Disaster Management Act of 2003, which forms the basis for disaster management legislation within all levels of Government and the Queensland disaster management arrangements ▪ The Disaster Management Act (2003) outlines the establishment of the State Disaster Management Group, which has the responsibility to develop the country's Disaster Management Framework ▪ The function of this group is to develop a strategic policy framework of disaster	▪ The National Disaster Management Committee should classify the hazards as illustrated in Chapter 2 (Section 2.3) ▪ The committee should develop disaster risk management plans for Kuwait in coordination with regional and international disaster institutes and organisations ▪ The committee should comply with all the information provided in the Pakistani Disaster Management Framework as illustrated in Chapter 2 (Section 2.8.3) ▪ The National Disaster Management Committee should coordinate with different disaster institutes as illustrated in Chapter 2 (Section 2.9)

		management for Australia ▪ Chapter 2 (Section 2.8.4) covers the entire Australian Disaster Management Framework	▪ The national committee should encourage disaster education as illustrated in Chapter 2 (Section 2.10) ▪ The committee should apply the CAP system as illustrated in Chapter 4 Section 4.11.9) ▪ The National Disaster Management Committee should take into account international disaster risk reduction strategies as illustrated in Chapter 2 (Sections 2.13 to 2.13.3)
Identifying the Hazard Phase & Risk Assessment	▪ Random hazard identification process ▪ Lack of scientific support in the process ▪ Not enforced by the Disaster Management Act ▪ Lack of harard risk assessment standard	▪ The author wishes to integrate the term "identification" into the disaster management life cycle (Chapter 1, Figure 2) in order to increase the focus of the emergency planners on identifying hazards, which is the first step in disaster management	▪ The National Disaster Management Committee, after classifying hazards as illustrated in Chapter 2 (Section 2.3), should conduct a disaster risk assessment to identify important factors, such as vulnerability, risks,

		▪ To identify all hazards that could cause harm to the country, the author highlighted, in Chapter 2 (Section 2.3), the importance of classifying disasters into different groups as this will help the relevant agencies to identify relevant hazards and the appropriate response ▪ The author also provided different approaches on conducting disaster risk assessments, such as the "Guide to Risk Assessment in Major Emergency Management" (2010) and the work of Utstein Style (2016) which were both discussed in Chapter 2 (Section 2.6.1)	possible impact and the capacity required to respond to each hazard ▪ The Author gives an example of risk assessment that can be used for all types of hazards in Chapter 2 (Section 2.6.1) ▪ The committee should require all agencies to conduct proper risk assessments according to their jurisdictions, taking into account disaster statistics and scientific research and cooperating with relevant experts, both locally and internationally

Mitigation Phase	▪ Lack of mitigation plans in the country ▪ Lack of mitigation framework ▪ Not enforced by the Disaster Management Act ▪ Poor shelters ▪ Poor early warning procedure ▪ Poor awareness in terms of possible impact that could be produced by different hazards both in and out of Kuwait	▪ Disaster Mitigation Act of 2000, USA ▪ The national mitigation framework in the USA describes the benefits of being prepared by understanding risks and what actions can help address those risks ▪ The Framework covers one preparedness mission area ▪ The framework focuses on prevention, protection, mitigation, response and recovery ▪ Focuses on resilient communities and the capabilities necessary to reduce the loss of life and property	▪ The National Disaster Management Committee should prepare a disaster mitigation framework and plan ▪ The committee should prepare a mitigation policy to be signed by the head of the Council of Ministers in Kuwait ▪ The committee should also make the public aware of all hazards that could harm the country, as well as provide safety guidance and awareness ▪ The committee should establish a suitable Early Warning System for all hazards ▪ The committee should establish a website which promotes resilience in the country

Preparedness Phase	▪ Poor early warning procedures ▪ Poor shelters ▪ Lack of preparedness plans and frameworks ▪ Lack of awareness ▪ Not enforced by the Disaster Management Act	▪ Presidential Policy Directive/PPD-8: National Preparedness (FEMA, USA) ▪ The policy aims to strengthen the security and resilience in the USA through systematic preparation for the threats that pose the greatest risk to the security of the nation, including terrorism, cyber-attacks, pandemics and natural disasters National preparedness responsibilities are shared by all levels of government, private and nonprofit sectors and individual citizens (FEMA, 2011)	▪ The preparedness phase takes place before an emergency or disaster strikes . The National Disaster Management Committee should prepare emergency plans, response arrangements and build capacity (see Chapter 2, Section 2.4)
Response Phase	▪ Random capacity building process ▪ Lack of national response plans ▪ Lack of international response plans and frameworks ▪ Poor communication process during a disaster	▪ The National Response Framework (USA), updated in 2016 ▪ The Framework describes how the federal government organizes itself to respond to disasters, terrorist attacks and catastrophic events and illustrates the	▪ The National Disaster Management Committee in Kuwait should outline all the elements required for each hazard, such as vulnerability, risk and possible impact to determine the country's capacity to deal with each type of

		importance of the whole community in assisting with response efforts (FEMA, 2011)	hazard, to prepare a national response framework and to adopt a unified Incident Command System, such as the ICS in the USA
Recovery Phase	▪ Lack of recovery plans and frameworks ▪ Not enforced by the Disaster Management Act	▪ The National Disaster Recovery Framework (USA) is a guide that enables effective recoveries from disasters and provides a flexible structure that enables disaster recovery managers to operate in a unified and collaborative manner ▪ Focuses on how best to redevelop, restore and revitalise the health, social, economic, natural and environmental fabric of the community and build a more resilient nation (FEMA, 2017)	▪ The National Disaster Management Committee in Kuwait shall prepare a recovery framework to be supported by policy ▪ The recovery framework shall be tested to ensure its effectiveness in different disasters and the framework shall be shared with different institutes and emergency services both in and outside of Kuwait

6.9 Focus Group Results

As illustrated in (Chapter 5) the focus group technique is a common qualitative technique used for data collection. In this research, the author conducted a focus group with four experts in disaster management, whose main role is to provide solid information on the strategic needs in terms of

disaster management in Kuwait and to promote disaster management best practices. Before conducting the focus group, the author illustrated to the participants the aims, objectives and the anticipated research outcomes. The participants were all very happy to participate in the research. The main aim of the focus group was to validate and verify the results of this research gained by the author, with a view to support the final framework of this research. The aim is to provide greater resilience through an improved Disaster Management Framework for Kuwait.

The author of this research provided these experts with specific tasks aimed at exploring nine study areas, namely:

1. The current disaster risk assessment procedure in Kuwait.
2. The current Disaster Management Framework.
3. The current early warning procedure and system in Kuwait.
4. The emergency shelters.
5. The current communication procedure for the emergency service during disasters.
6. The current Disaster Management Act(s).
7. The strength and weakness of the disaster awareness in the country.
8. External disaster response.
9. The disaster management competence within the emergency service in Kuwait.

In discussing the first factor (the current disaster risk assessment procedure in Kuwait), the participants agreed that there is no Act or legislation that enforces risk assessment in Kuwait to identify the possible hazards that could pose harm on Kuwait. Additionally, there is lack of guidance in terms of an effective risk assessment procedure. The participants also agreed that the hazards identified by the Civil Defence Committee, as illustrated in (Table 2, Chapter 1), were identified randomly and without a scientific risk assessment procedure. Moreover, the author discussed with the experts in the focus group the international standards used for management of disasters, such as the disaster management life cycle, which was also improved by the author during this research (Figure 2 in Chapter 1). Therefore, all participants agreed that the current risk assessment procedure must be improved and enforced by an Act. In terms of the current Disaster Management Framework, the second topic discussed in the focus group, the experts were shocked by the current Disaster Management Framework used in Kuwait and they agreed that the current framework is in conflict with the recent disaster management philosophy. This is due to the

framework involving three different committees whose processes are not clear and ineffective due to their work primarily focusing on the aftermath of the disasters.

At the same time, the author illustrated for the participants in the focus group, the samples of the Disaster Management Frameworks, which were discussed in Chapter 2, to provide different ideas of Disaster Management Frameworks. The participants confirmed that the current Disaster Management Framework is as good as non-existent, due to different factors, especially the lack of clarity on which organisations or agents are responsible for adopting the current Disaster Management Framework. On the other hand, the current Disaster Management Framework is enforced by a Ministry of Interior Act, which has led to its adoption only by the Ministry of Interior, without any engagement from the different critical organizations, such as the Fire Service and the Medical Services. Therefore, the participants in the focus group agreed that the current framework does not really exist and would require significant improvement.

The third factor discussed during the focus group meeting is the current early warning procedure and system in Kuwait. The researcher highlighted the current Early Warning System to the participants, namely the sirens used by the Ministry of Interior. However, all the participants stated they have no idea which disasters the Ministry of Interior will activate the sirens for and they confirmed that most of the population in Kuwait is not aware of the current early warning procedure. The conclusion is that the early warning procedure is ineffective and inadequate.

The fourth topic discussed in the focus group is the emergency shelters in Kuwait. During the focus group the participants were asked to locate the nearest emergency shelters as well as discuss the strengths and weaknesses of these shelters, in terms of how long the evacuated people can stay in the shelters and if the current shelters are designed to cater for the different genders, ethnicity, age etc. All the participants confirmed that there is inadequate management of the current emergency shelters, no awareness programmes for the public in Kuwait to be able to find the nearest emergency shelter and when the population should evacuate to these emergency shelters. Therefore, the participants confirmed that the entire disaster management process should be improved in Kuwait.

The current communication system used by the emergency services during disasters was the fifth topic discussed in the focus group meeting. The author pointed out to the participants that the current communication system used by the four emergency services in Kuwait, is the Tetra Radio

System. This system is used by the Police, Fire Department, Ambulance Service and the National Guard in Kuwait during emergencies and disasters. However, the author pointed out the lack of any backup system in the event of the main system being interrupted. Additionally, the different organisations (Table 1, Chapter 1) who participate in disaster management do not use the same communication system, which makes the communication process ineffective and lacking in integration.

The current Disaster Management Acts were the sixth topic discussed in the focus group meeting; the researcher highlighted the current Acts in Kuwait, which are illustrated in Chapter 3, such as the Civil Defence Act and the Fire Service Act. This topic represented the most important part of the focus group meeting. The participants criticised the current Disaster Management Acts to be as good as nearly non-existent, due to different factors; such as:

1. The Acts are old.
2. Designed for the Ministry of Interior only.
3. Lack of risk assessment enforcement.
4. Lack of accountability.
5. Do not consider different agencies currently responsible for disaster management.
6. The obvious overlap in terms of disaster management functions of the various agencies, such as the Fire Service and the Civil Defence.

Therefore, all the participants in the focus group agreed that the current Disaster Management Acts must be improved and updated.

The seventh topic discussed in the focus group meeting was the strengths and weaknesses of the disaster awareness level in the country. The author asked the participants to highlight the awareness programmes provided in Kuwait, which are aimed at raising the general publics awareness of disaster hazards, risks and safety practices designed to reduce the level of risks during a disaster. However, the participants confirmed that the current Disaster Management Act does not require any organisation to provide disaster awareness programmes, which has resulted in a lack of awareness by the general public in terms of disasters in Kuwait.

The External disaster response was the eighth topic discussed in the focus group. The participants confirmed that there is a need to reconsider the disaster management practices, especially, the risk assessment procedure and the current Disaster Management Framework.

Finally, the author of this research asked the participants to review and highlight the background of the current strategic Civil Defence Committee in Kuwait, which is responsible for managing all disasters in Kuwait. This task surprised the participants, as it did not make sense at that time they described it. The discussion of this topic was varied; however, all the participants agreed that there is a lack of local institutes providing academic education on disaster and emergency management, which has resulted in most of the strategic participants of the high Civil Defence Committee not having any specialized disaster management expertise in the country.

Based on the results gained and discussed with the expert during the focus group, the author of the research at this stage had a solid base to build an improved Disaster Management Framework for Kuwait. The final framework will be validated in the Chapter 7.

6.10 Chapter 6 Summary

This chapter included and illustrated the analyses of all data collected for this research, from the pilot study, secondary data, interviews conducted with 26 members of the Civil Defence Committee in Kuwait and the focus group. The analyses show that the designed interview form for this research, along with the in-depth literature review on the current Disaster Management Act, policies and procedures in Kuwait, all provided sufficient information for the researcher to develop an improved version of the current Disaster Management Framework for Kuwait. The main issues that the author found in Kuwait's current Disaster Management Framework is a lack of guidance, explanation of terms and definitions, scientific support, international disaster risk reduction strategies, disaster education and awareness, disaster and emergency institutes, disaster management standards, proper Disaster Management Acts and policies and, most importantly, lack of unified disaster management efforts and practices.

The first step required to improve the current Disaster Management Framework in Kuwait is the creation of a new Act. This is because the current disaster management legislation in Kuwait creating overlaps between different agencies and ministries in Kuwait. This leads to individual agencies preparing separately for disasters, which can potentially cause confusion in the preparation of disaster management plans. In turn, this can result in serious consequences when dealing with disasters or providing information on disaster risks. Therefore, a National Disaster Management Committee should be established by the head of the Council of Ministers in Kuwait.

In Kuwait, there are different institutes which, if they worked together, could improve the disaster management process in Kuwait. As such, there is a vital need for a National Disaster Management Centre in Kuwait. This centre should be chaired by the head of the Council of Ministers in Kuwait. This centre will help with the unification for all the efforts and services that are provided by the different agencies and ministries in Kuwait. When these agencies work together and adopt the disaster classifications, which were discussed in Chapter 2, they will have great success in terms of disaster risk management as each agency will have reasonable logistics needed in different parts of the disaster management process. For instance, the meteorological department can use weather forecasting to warn others of possible disasters, while institutes for scientific research can provide research and maps on different hazards to educate the public and emergency service workers. It is the author's recommendation that the efforts of different agencies must be unified under one umbrella (which should be the National Disaster Management Centre). The recommended Disaster Management Centre will be discussed in more detail in the next chapter, Chapter 7.

The literature and analyses in this research also shows that a suitable disaster management standard has not been adopted to be used to prepare for all phases of a disaster. Therefore, the use of the disaster management life cycle will improve disaster management processes and practices in Kuwait.

The outcomes of emergency institutes and emergency education were discussed Chapter 2 (Sections 2.10 and 2.11). Kuwait lacks emergency institutes which could help emergency planners in different areas, such as in the formulation of a new policy or identifying local, regional and international hazards. The National Disaster Management Centre would encourage the establishment of such institutes in Kuwait, as well as coordinate and sign a cooperation protocol with regional and international disaster management institutes in order to strengthen the country's Disaster Management Framework. The need for disaster education represents a high priority for providing and developing disaster management professionals and planners. Offering disaster management education will increase the number of qualified personnel in the disaster management field and will increase the level disaster awareness and capacity within the country. Therefore, there is a vital need for Kuwait to establish disaster and emergency management courses at universities and colleges.

Kuwait does not follow any important international disaster risk reduction strategy, such as the Yokohama Strategy, the Plan of Action for a Safer World (see Chapter 2, Section 2.9.1), the *Hyogo Framework for Action Plan 2005-2015* (see Chapter 2, Section 2.9.2) or the recent Sendai Framework for disaster risk reduction. Such strategies provide important information from international experts and are thus very beneficial. Therefore, the author of this research will ensure that Kuwait keeps abreast with such strategies, following a recommendation to the Ministry of Foreign Affairs in January 2017. The author will also coordinate with The United Nations Office for Disaster Risk Reduction (UNISDR) to ensure the adaptation of disaster risk reduction strategies in Kuwait, which is critically important for disaster risk management in the country. The next chapter will validate the final framework for this research.

Chapter 7: The Final Framework

7.1 General

Chapter 6 highlighted the analysis process of the gained data for this research. This chapter highlights and presents the final framework for this research and illustrates how the components of the conceptual framework in Chapter 4, along with the results of the analyses in this research, fill the current gaps in the disaster management process in Kuwait. The aim is to provide comprehensive assistance to leaders and planners in Kuwait in managing disasters at a strategic level. At this stage of the research, the author has gained a variety of information that helps fill the gaps in the current disaster management process in Kuwait. This includes providing answers to the studies research questions.

The current Disaster Management Framework in Kuwait was discussed throughout this research. The conceptual framework in Chapter 4 highlighted the author's desire to achieve the outcomes of this research (which mainly revolved around improving the current Disaster Management Framework in Kuwait). Improving any Disaster Management Framework requires support, for instance, an appropriate legislative Act. Therefore, this chapter highlights the required Act which could facilitate the improvements suggested to create the Disaster Management Framework in Kuwait.

This chapter also highlights and discusses the integration of all the elements which have been identified by the author throughout this research, such as the Disaster Management Centre, risk assessment, emergency procedures and education. When all the elements come together into a single system, they will provide a significantly improved version to the current Disaster Management Framework for Kuwait.

7.2 Final Framework - Background

As discussed earlier in (chapter 2, section 2.8), a framework in disaster management is used to support emergency agencies and organisations to integrate disaster management into a manageable system. The current Disaster Management Framework in Kuwait was presented and discussed in Chapter 3, and showed several limitations in terms of providing assistance and guidance for the strategic level of the disaster management in Kuwait. This section of the research demonstrates how the empirical findings influenced the author to prepare the final framework.

Different factors influenced the author of this research to improve the current disaster management framework in Kuwait, for instance the risk assessment procedure used by the Civil Defence Committee to validate the disaster hazards scenarios (see Chapter 1, Table 2). This shows that the Committee did not used a specific risk assessment standard or a scale, which led to the people in Kuwait facing unpredicted natural and manmade hazards. Hence, the author of this research was encouraged to discuss an important model to be used for disaster management, which is known as the disaster management life cycle. This was developed by the Federal Emergency Management Agency (see Chapter 1, Section 1.1). with the aim to improve the model through integrating the term identified (see Figure 2, Chapter 1). Basically, this means that the first step that should be taken by the emergency planners, is to identify the hazards.

Moreover, the author of this research demonstrated the recommended risk assessment process (See Chapter 2, Section 2.6 & 2.61), which can be used by the Civil Defence Committee to identify all hazards and classify them. Therefore, it is believed that this step will enable the Civil Defence Committee to have a better scientific procedure to approach or identify all hazards that could cause harm to the country. This should take into account the importance of joining stakeholders from the government and non-government sectors to participate in the risk assessment process. The recommended participant will be discussed later in the final framework section (Table 29).

Moreover, the findings from the literature shows that the current disaster management framework in Kuwait (see Chapter 3, section 2.6) was found to be out-of-date and cannot provide any assistance or guidance to the Civil Defence Committee with planning the disaster management process and needs. Hence, the author of this research reviewed different disaster management frameworks used in different countries (see chapter 2, sections 2.8.1 to 2.8.4) highlighting their strengths, weaknesses and how can these frameworks exist in different areas.

The finding also show that all of the frameworks should highlight the accountability for all agencies and stakeholders towards any specific tasks. Another important factor was found that all the frameworks which were reviewed in the literature (See chapter 2, Section 2.8.1 to 2.8.4) were supported with an up-to-date Act. This provided legal power and accountability for all agencies who are participating in the disaster management processes. Therefore, the author of this research took the advantage to add the term and disaster act into the conceptual framework (Figure 23, chapter 4), with different terms that the author finds critical with assisting to improve the current

disaster management framework in Kuwait. Moreover, the author of this research validated a recommended disaster management act which can support the adaptation of the recommended disaster management framework in this research. The recommended disaster management act will be discussed later in the chapter.

Understanding the terms and definitions used in the disaster management field are considered important. The finding shows that there is a lack of definitions for the terms used by the Civil Defense act (21/1979). Also, the data collected from the participants in this research, shows there is a lack in terms of educating people in the disaster management field. This situation applies to all civil defense committee members, which led to disaster management practices being adopted, without any obvious standard. Therefore, the author of this research focused on the term "emergency education" to highlight the importance of validating and educating the manpower who can adopt and carry out the disaster management life cycle. This should take into account the importance of local universities providing degrees in the disaster and emergency management studies in Kuwait, due to there being none available. Hence, when there is educated people within the disaster and emergency management field, they can adopt comprehensive and suitable emergency procedures in the country, such as preparing emergency response plans, preparedness and recovery plans.

A more recent challenge in most countries is to follow an international disaster risk reduction framework, such as the Sendai framework (see Chapter 2, section 2.9.3). Such a framework provides up-to-date guidance for all courtiers towards specific important tasks, These include, the importance of validating the risk reduction strategies, enhancing the early warning systems, minimizing the loss of lives and cost of disasters, along with enhancing the critical infrastructure. Therefore, the representative of each country within the United Nations Office for Disaster Risk Reduction (UNISDR) is a critical aspect which can assist the local authority and emergency planners with up-to-date disaster risk reduction trends and strategies. In addition, the findings show that Kuwait was nominated the first focal point to follow up and adopt the requirements of the Sendai framework in January 2017. However, the findings also show that the Civil Defense Committee and the current national focal point of Kuwait are working separately. Hence, the author of this research took the advantage to integrate the national focal point into the conceptual framework (Figure 23, chapter 4). The author also seen the importance of clarifying the work of the national focal point with the recommended disaster management framework of this research.

Finally, the findings of the literature also show Kuwait's lack of scientific research in the disaster management field. On the other hand, a recent trend in disaster risk reduction encourages and urges policies to be established which are based on the findings of scientific research. Therefore, the author of this research integrated the Emergency Institutes into the conceptual framework, clarifying the need of establishing emergency institutes in Kuwait.

7.3 The Current Disaster Management Process Review

The current Disaster Management Framework, risk assessment procedure and Disaster Management Act in Kuwait were discussed in Chapters 2 and 3. The current Disaster Management Framework in Kuwait consists of three different committees:

1. The Civil Defence Committee (see Chapter 3, Section 3.3.1) (the strategy)
2. The Technical Committee for Dangerous Aspects (see Chapter 3, Section 3.3.2)
3. The Supervision Committee on implementing the radiation and nuclear emergency plan (see Chapter 3, Section 3.3.3)

The Civil Defence Committee in Kuwait defined 13 different disaster scenarios that could harm Kuwait (see Chapter 1, Table 2). However, the overall process which follows identification of hazards, which should be taken when using a scenario method (e.g., highlighting the vulnerability, risk, mitigation), is not available in Kuwait nor is it considered by the Civil Defence Committee. At the same time, the Technical Committee for Dangerous Aspects and the supervision committee responsible for implementing the radiation and nuclear emergency plans do not provide the missing information. This shows that there is a need to improve the current Disaster Management Framework. This is especially true considering that the Civil Defence Committee was established in 1997 and that the two other committees were established in 2007 and could be made progress through achieving a way forward to improve the situation.

Therefore, the designed conceptual framework in this research provides guidance and a comprehensive approach for each type of hazard. The framework can be adopted through a risk assessment process to validate all the data for each disaster scenario that has been identified by the Civil Defence Committee. This standard and systematic process of hazard identification will provide a scientific approach for each type of hazard using the disaster management life cycle. In addition, it can provide holistic information against each type of hazard. The risk assessment

procedure was highlighted and explained in Chapter 2 (Section 2.6 & 2.6.1). Moreover, using the disaster classification process (see Chapter 2, Section 2.3) will assist in identifying and managing all hazards as it classifies the hazards into different categories (e.g., biological hazards, geophysical hazards) which were explained in detail in Chapter 2 (Section 2.3). This hazard classification process provides an opportunity for the domain specialist to predict relevant hazards, rather than adopting the current random hazard identification procedure in Kuwait. Therefore, the process of risk assessment in the recommended Disaster Management Framework will require to be on-going.

The proposed conceptual framework in Chapter 4 (Section 4.11.3) is referred to as a legal team. This legal team has the power to create Acts which legislate how to protect the public against each type of hazard. This is achieved by establishing the right policies for the right groups of people enabling them to coordinate and enforce the management for different hazards. The evaluation of the current disaster management policies and legislation in Kuwait found that they are ineffective and may even produce negative outcomes. This is due to them being too general and failing to specify which specific group of people are responsible for managing the identified hazards. This section has addressed the findings to research question one. The next section highlights the recommended Disaster Management Framework for Kuwait.

7.4 The Recommended Disaster Management Act

As mentioned earlier in this chapter, improving the Disaster Management Framework requires an Act. This section illustrates the required Disaster Management Act for Kuwait.

The discussed frameworks in this research (see chapter 2 section 2.8.1 to 2.8.4) show that a successful disaster management framework requires a government Act. In addition, the results of the data analysis process in this research conclude that the first step required to improve the current Disaster Management Framework in Kuwait is to create a completely new disaster management Act. This is due to the overlaps between different ministries and agencies in the current disaster management legislation in Kuwait. This can lead to individual agencies putting together different plans for disaster management plans and potentially causing confusion in the preparation of disaster management arrangements. Figure 40 illustrates the roadmap for improving the current disaster management in Kuwait.

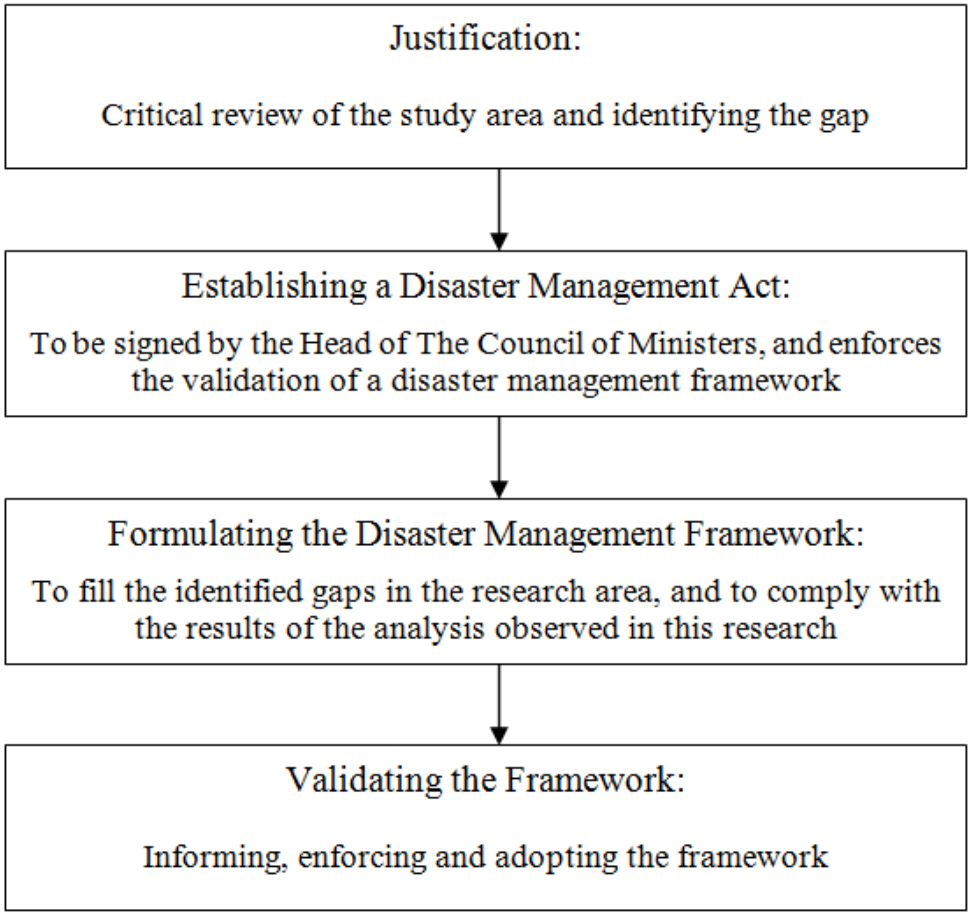


Figure 40: Roadmap for Improving the Current Disaster Management Framework

The previous figure started with the term 'justification', which represents the author's process to highlight and justify the importance of improving the current Disaster Management Framework in Kuwait. Such justification has been provided in detail throughout the previous chapters of this research. The next step is to formulate a reasonable and comprehensive Disaster Management Act.

A successful Disaster Management Framework requires the integration of all institutions: government, private and nonprofit organizations, in order to cultivate a unified disaster management effort. However, this could be difficult and slow in a bureaucratic country like Kuwait, unless key policy-makers intervene and establish policies to unify all efforts of all institutions to support the disaster management process, failing which a Disaster Management Framework, that is even satisfactory, will not be established in Kuwait. Therefore, the author outlines a recommended Disaster Management Act below.

The Disaster Management Act (2020)

Due to the increase of local, regional and international concerns in terms of disaster risk management, the continuous increase with the frequency of disasters, their impact worldwide and according to scientific research, the following Kuwaiti Disaster Management Act is proposed will help improve and strengthen the current Disaster Management Framework in Kuwait. The Head of the Council of Ministers presents the following articles to be adopted in Kuwait for managing disasters:

Part I - General

1. A National Disaster Risk Reduction Committee shall be established under the command of the head of the Council of Ministers, in order to improve the current Disaster Management Framework in Kuwait.
2. The fire service general manager shall indicate to the head of the Council of Ministers, members and agencies that they must participate in the National Disaster Risk Reduction Committee within one month of the establishment of this Act.
3. This Act revises all previous disaster management processes used for identifying hazards, mitigation, preparedness and recovery from disasters in Kuwait which have been enforced by the Civil Defence Act 1970, the Fire Service Act 1982 and the Environment Act 2014.
4. The National Disaster Risk Reduction Committee shall review the improved Disaster Management Framework, which will be submitted to the head of the Council of Ministers, in providing feedback and guidelines on the adaptation of the framework.
5. The members of the National Disaster Risk Reduction Committee represent the strategic level of disaster management in the state of Kuwait.

Part II - Important Definitions

1. Disaster: As defined by the Author in Chapter 2, (Section 2.2)
2. Disaster Management: As defined by the Author in Chapter 2 (Section 2.2)
3. Natural Hazard: As defined by the Author in Chapter 2 (Section 2.2)
4. Risk: As defined by the Author in Chapter 2 (Section 2.2)
5. Vulnerability: As defined by the Author in Chapter 2 (Section 2.2)
6. Impact: As defined by the Author in Chapter 2 (Section 2.2)

7. Disaster Classification: As defined in Chapter 2 (Section 2.3)
8. Technological Hazard: As defined by the Author in Chapter 2 (Section 2.3.1)
9. Terrorism Hazards: As defined by the Author in Chapter 2 (Section 2.3.2).
10. Identifying Phase: As defined in Chapter 1 (Section 1.1)
11. Mitigation Phase: As defined in Chapter 2 (Section 2.4)
12. Preparedness Phase: As defined in Chapter 2 (Section 2.4)
13. Response Phase: As defined in Chapter 2 (Section 2.4)
14. Recovery Phase: As defined in Chapter 2 (Section 2.4)
15. Disaster Risk Assessment: As illustrated in Chapter 2 (Section 2.6)
16. National Disaster Management Committee: A competent disaster risk management group, which represents disaster management in Kuwait at the strategic level and is located in a particular or a specific geographical area to improve the disaster risk management process.

Part III the Management Process

1. The disaster management process shall include and cover the five phases of disaster management (identifying, mitigation, preparedness, response and recovery), as illustrated in Chapter 1 (Section 1.1) and Chapter 2 (Sections 2.2 and 2.3).
2. The National Disaster Risk Reduction Committee shall classify disasters into different groups, as illustrated in Chapter 2 (Section 2.3).
3. The relevant ministries, authorities, private sector organizations, institutes and NGOs shall take into account the identification of hazards that refer to their experience, jurisdiction and science in order to highlight and discuss these with the National Disaster Risk Reduction Committee. This will allow them to prepare for hazards by using the five phases of the disaster management life cycle.
4. The National Disaster Risk Reduction Committee shall explore the establishment of disaster management education and training programs with all local universities and training institutes.
5. The National Disaster Risk Reduction Committee shall prepare and validate the recommended early warning procedures. to warn the public in the event of a disaster.
6. The National Disaster Risk Reduction Committee shall study the requirements for establishing a National Disaster Management Centre in Kuwait.

7. The National Disaster Risk Reduction Committee shall adopt and enforce the new Disaster Management Framework.
8. The National Disaster Risk Reduction Committee shall develop a timeline for their work and highlight the required period in order to present the required tasks to the head of the Council of Ministers.
9. The National Disaster Risk Reduction Committee shall engage with any local, regional, or international partners, institutes, or agencies to carry out the specific task of improving the disaster management process in Kuwait.

The Act is to be signed by: His Excellency, The Amir of the state of Kuwait or the head of the Council of Ministers.

7.5 The Final Disaster Management Framework

Each country in the world has the right to plan, prepare for and manage its own disasters with its own framework and have an efficient coordination of all activities of the stakeholders within the disaster management structure. Therefore, the recommended Disaster Management Framework for Kuwait will be as presented in the following section.

The findings from the analyses process of all the data collected for this research shows a lack of clear guidance, disaster risk assessment, disaster education and awareness, disaster management standards, proper disaster management policies and, most importantly, lack of unified disaster management efforts and practices.

Therefore, the author believes there is a vital need for the government of Kuwait to establish a national disaster management committee in order to facilitate the disaster management agenda in the country and to supervise the adaptation of the improved disaster management framework.

The results of the analysis process also show a lack of enough strategic stakeholders who are participating in the current civil defence committee (see Table 1, in chapter 1). This leads the committee to miss identifying several hazards that could harm the country, due to a lack of stakeholder participation from important ministries and agencies.

Therefore, the author of this research recommends additional stakeholders from all ministries and agencies in Kuwait to get involved in formulating the disaster management process (Table 29).

The author of this research also suggests that before the adaptation of the improved disaster management framework in this research, a national disaster risk reduction committee shall be established, with all representatives of each ministry and agency participating in the national disaster risk reduction committee. As soon as the committee finalises all the required tasks shown in (Table 30) below, the next stage is to establish the disaster management centre, which is covered later in this chapter. This process will assist the Kuwaiti government with supervising the disaster management system.

Hence, according to the new Kuwaiti Disaster Management Act (2020), the head of the Council of Ministers in Kuwait announces and presents, in this paper, the following policy to provide more power and perform accountability of the stakeholders from different ministries and agencies towards disaster risk management requirements.

The Disaster Management Framework - Policy Number (1/2020)

Under the power and to comply with the current Disaster Management Act (2020), this paper presents the Kuwaiti Disaster Management Framework; the head of The Council of Ministers in Kuwait highlights the formulation of the National Disaster Management Committee (Table 29).

Table 29: Participants of the National Disaster Risk Reduction Committee

No	The Agencies	No	The Agencies
1	Ministry of Interior	22	Ministry of Public Works
2	Ministry of Commerce and Industry	23	Kuwait National Guards
3	Ministry of Defence	24	Environment Public Authority
4	Ministry of Water and Electricity	25	Ministry of Municipal
5	Ministry of Health	26	Kuwait Fire Service Directorate
6	Ministry of Transport	27	Kuwait Red Crescent
7	Ministry of Media	28	The General Institute for Industry
8	Ministry of Oil	29	Kuwait Institute for Scientific Research
9	Kuwait University	30	Kuwait Oil Company KOC
10	Ministry of Education	31	Kuwait National Petroleum Company KNPC
11	Kuwait Petroleum Corporation KPC	32	Petrochemical Industries Company PIC
12	The Civil Service Council	33	Ministry of Foreign Affair
13	Ministry of Planning	34	The Accounting Department
14	Ministry of Finance	35	Ministry of Islamic Affair
15	The Civil Service Institute	36	The Custom Department
16	The Community Council	37	The General Institute for Agriculture & Fish Wealth
17	The Ministry of Youth	38	Kuwait Central Bank
18	Kuwait Found for Development	39	Kuwait News Agency

19	Kuwait Ports Institutes	40	The GCC Centre for Emergency Management
20	Oil Transport Company	41	The Civil Aviation
21	Kuwait Central Bank	42	Co-op Society Union

Moreover, the analysis of the interviews conducted with all the strategic civil defence committees (See chapter 6, sections 6.7.2) show a lack of an obvious agenda and guidance that enables the stakeholders to work within a manageable system. There is also a lack of specific tasks to guide the strategic stakeholders to perform the disaster management needs. All these affect the disaster management process in Kuwait and allows the current stakeholders (Table 1, chapter 1) to focus only on the response phase of a disaster, without any concerns about any other phases of the disaster management life cycle. Therefore, the author of this research provided a recommended timeline, supported with different tasks (Table 30), to guide the participants of the national risk reduction committee in performing their work.

Table 30: Direction and Timeline of the National Disaster Risk Reduction Committee

Task	2021			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Welcoming and informing members of required tasks; classifying hazards				
Identifying phase of the hazards; discuss with the committee participants				
Mitigation phase planning				
Preparedness phase planning				
Response phase planning				
Recovery phase planning				
Reviewing and validating national disaster management plans				

1. Disaster management process should be planned across the five phases: identifying mitigation, preparedness, response and recovery.
2. All hazards, both natural and man-made, must be covered in the disaster management planning and process.
3. The Council of Ministers shall be responsible for supervising and enforcing the disaster management process and planning in Kuwait.
4. The disaster management process must identify an Early Warning System or procedure for each type of hazard.
5. The committee shall adopt the disaster classification and highlight the relevant agencies who will be responsible for identifying each type of hazard and its possible impact on Kuwait (see Appendix D).

The result of the analysis process in chapter 6, and as discussed in the introduction to this research (See chapter 1, section 1.1), shows a lack in terms of an obvious risk assessment process/standard that is currently used by the civil defence committee in Kuwait with identifying hazards. This includes a lack of accountability to enforce a specific ministry or agency in the country to conduct the risk assessment. Therefore, the author of this research provides an example of guidance (see Tables 31, 32, and 33), which can assist the stakeholders of the national disaster risk reduction committee with identifying all hazards, taking into account the tasks of the agencies for each type of hazard.

Table 31: Agencies Responsible for Managing Natural Hazards and Building Capacity

Hazard Class	Hazard Type	Agency Responsible for Identifying Hazard, Vulnerability, Risk, Impact and Capacity Assessment
Natural	Earthquake	**For identifying the hazard, risk, vulnerability and possible impact:** 1. Kuwait Institute for Scientific Research 2. Ministry of Oil 3. Kuwait University 4. Ministry of Public Works 5. All oil companies **For Capacity Building:** 1. Kuwait Fire Service Directorate 2. Civil Defence

		3. National Guards 4. Ministry of Health 5. Emergency Medical Service 6. Kuwait Red Crescent
	Flood	**For identifying the hazard, risk, vulnerability and possible impact:** 1. Kuwait Institute for Scientific Research 2. Kuwait University 3. Metrological Department 4. Ministry of Public Works **For Capacity Building:** 1. Kuwait Fire Service Directorate 2. Civil Defence 3. Ministry of Public Works 4. Ministry of Health 5. Emergency Medical Service 6. Kuwait Red Crescent
	Dust and Thunder Storms	**For identifying the hazard, risk, vulnerability and possible impact:** 1. Meteorological Department 2. Kuwait Institute for Scientific Research 3. Kuwait University **For Capacity Building:** 1. Kuwait Fire Service Directorate 2. Ministry of Health 3. Ministry of Interior 4. Emergency Medical Service 5. Kuwait Red Crescent

Table 32: Agencies Responsible for Managing Technological Hazards and Building Capacity

Hazard Class	Hazard Type	Agencies Responsible for Identifying Hazard, Vulnerability, Risk, Impact and Capacity Assessment
Man-made: Technological Hazards	Radiation from Nuclear Power Plant	**For identifying the hazard, risk, vulnerability and possible impact:** 1. Kuwait Institute for Scientific Research 2. The Environment Agency 3. Kuwait University 4. Ministry of Health 5. National Guards 6. Ministry of Interior **For Capacity Building:** 1. Kuwait Fire Service Directorate 2. Civil Defence 3. National Guards 4. Ministry of Health 5. Emergency Medical Service 6. Kuwait Red Crescent
	Leakage of H_2S Gas, Toxic Gases	**For identifying the hazard, risk, vulnerability and possible impact:** 1. Kuwait Institute for Scientific Research 2. All oil companies (see Table 29) 3. The General Authority for Industry 4. Metrological Department 5. Civil Defence 6. Kuwait Fire Service Directorate **For Capacity Building:**

		1. Kuwait Fire Service Directorate 2. Civil Defence 3. All oil companies 4. Ministry of Health 5. Emergency Medical Service
	Hazardous Material Major Incident	**For identifying the hazard, risk, vulnerability and possible impact:** 1. All oil companies 2. Kuwait Fire Service Directorate 3. The General Institutes for Ports 4. The General Department for Custom 5. Ministry of Education 6. Ministry of Health 7. The General Authority for Environment 8. Ministry of Interior **For Capacity Building:** 1. Kuwait Fire Service Directorate 2. Ministry of Health 3. Ministry of Interior 4. Emergency Medical Service

Table 33: Agencies Responsible for Managing Terrorism Hazards and Building Capacity

Hazard Class	Hazard type	Responsible Agencies for Identifying hazard, Vulnerability, risk, impact and capacity assessment
Man-made: Terrorism	Chemical, Biological, Radiological, Nuclear, Explosions, CBRNE	**For identifying the hazard, risk, vulnerability and possible impact:** 1. Kuwait Institute for Scientific Research 2. The Environment Agency 3. Kuwait University 4. Ministry of Health 5. Kuwait National Guards 6. Ministry of Interior 7. Ministry of Defence 8. Kuwait Fire Service Directorate **For Capacity Building:** 1. Kuwait Fire Service Directorate 2. Civil Defence 3. National Guards 4. Ministry of Health 5. Emergency Medical Service 6. Kuwait Red Crescent 7. Ministry of Defence

6. The committee shall determine the following:
   - The hazards that could pose a threat to Kuwait
   - Classifying the hazards
   - Vulnerability
   - Risks
   - Possible impact

- Disaster statistics in Kuwait from 1990 to 2019

7. Each plan formulated by the committee should be adopted and signed as a national plan, be approved and signed by the head of the Council of Ministers.
8 The Committee shall highlight the incident command procedure for each type of hazard, clarifying the rules and responsibilities of each agency that should participate in a specific disaster.
9. All the disaster management plans shall be saved and used in the national GIS database of the Kuwait Fire Service, assistance of relevant agencies.
10. The Kuwait Fire Service shall establish a disaster resilience website and validate guidelines for all disaster hazards in Kuwait, in both Arabic and English.
11. The committee shall follow up with Kuwait's UNISDR focal point to comply with the international disaster risk reduction strategies.
12. The Ministry of Education shall develop disaster awareness programs for all school levels and shall plan the introduction of disaster management courses for all universities in Kuwait.
13. The Kuwait Institute for Scientific research shall develop and implement a cooperation protocol with different disaster management institutes at local, regional and international levels.

To be signed by the Head of the Council of Ministers

The relevant agencies shall be responsible for identifying all future hazards that affect Kuwait or its region, taking into account the vulnerability, risk, impact and capacity associated with each hazard. The analysis of all data collected in this research suggested that the design of the disaster management framework should be applied. This can demonstrate the work process or the structure which highlights the different factors needed for disaster management to support of emergency planners in the adaptation of the framework elements. Therefore, the author of this research validated the final framework (Figure 41), based on the findings of the data collected and analysed within this research.

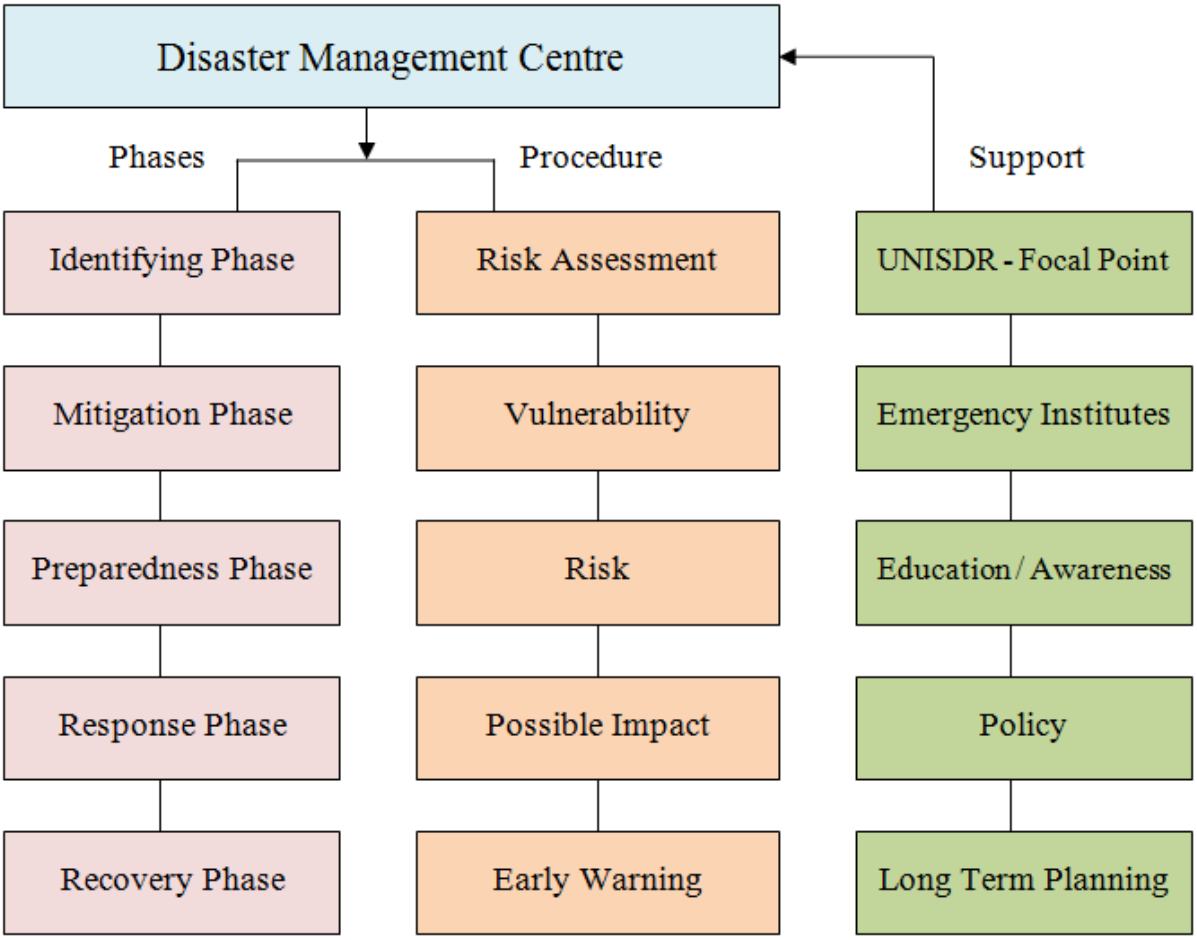


Figure 41: The Final Disaster Management Framework

7.6 The Recommended Disaster Management Centre

The implementation of the disaster management process requires input, commitment and support from each branch of the government. Therefore, the recommended national disaster risk reduction committee will recommend the establishment of the national disaster management centre, which is to be the primary centre for disaster management in Kuwait. The recommended design and structure of the National Disaster Management Centre for Kuwait is discussed in the sections below.

The findings of the data analysed in this research show a lack in terms of an obvious chain of command to coordinate any disaster management processes in Kuwait. This is due to random management and different Acts that have been published by different agencies in the country (see Chapter 3, sections 3.3, 3.7.1, 3.8, and 3.9). Therefore, the author of this research recommends that Kuwait should establish a disaster management centre in order to unify and facilitate the disaster management process. Consequently, the author of this research also recommends that the Kuwaiti

government establishes a disaster management centre (Figure 24) to assist the government in managing the disaster management process. Figure (42) illustrates the nature of work or the structure of the recommended Disaster Management Centre for Kuwait.

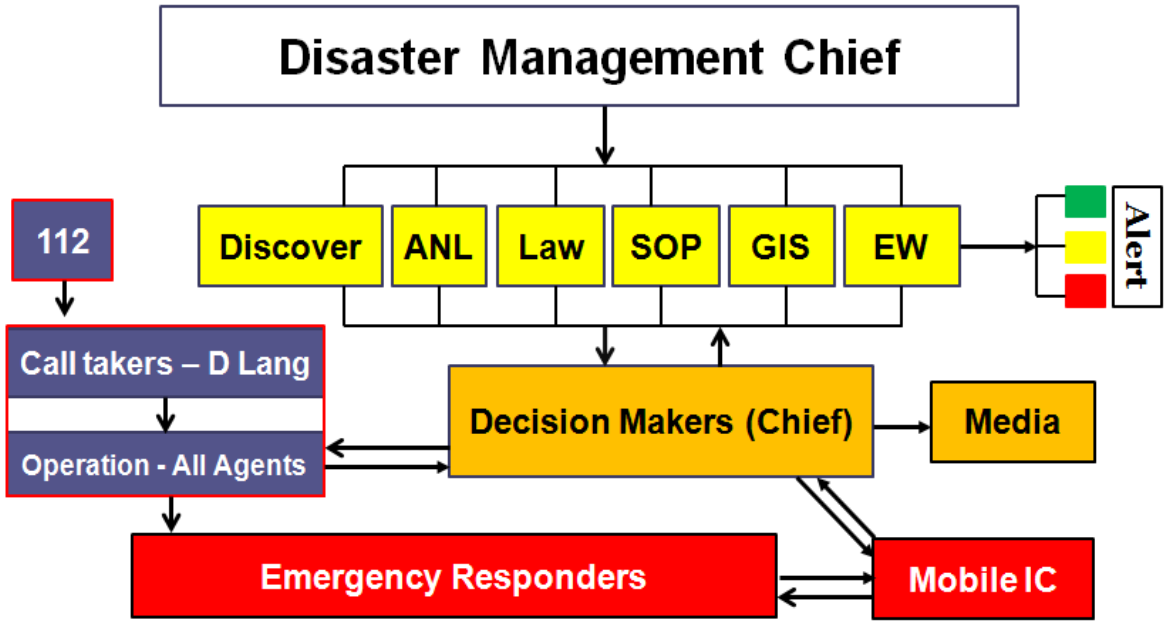


Figure 42: Structure of the Recommended Disaster Management Centre of Kuwait

The Disaster Management Chief was defined in (Chapter 4, Section 4.11.1). The main roles of the Disaster Management Centre Chief are:

1. To review the hazards classification process.
2. To review the vulnerability, risk, impact and capacity associated with the identified hazards.
3. To encourage the disaster management team.
4. To set priorities in terms of hazards that could have a huge impact and make decisions for reducing the impact.
5. To recommend a time for reviewing the disaster management process.
6. To make decisions before, during and after a disaster.

Under the Disaster Management Centre Chief, there are six different groups which represent the disaster management team, as illustrated in Chapter 4 (Figure 24 and Section 4.10.2); all groups are highlighted in yellow in Figure 38 above. These groups are the discover group, the analysis (ANL) group, the law group, the standard operating procedure (SOP) group, the geographic

information system (GIS) group and the early warning (EW) group. The following section explains the roles of each of the six groups.

1. The Discover Group: This group consists of staff nominated from each ministry, industry, non-governmental agencies and companies, as mentioned in (Figure 42) above. These members should be familiar with disaster management science. Each employee in the Disaster Management Centre would be paid by their respective employer or ministry and work as representatives of the agency to which they belong. Each participant in the discover group, based on the disaster class (see Tables 36 to 38), takes responsibility for identifying the hazards that he or she predicts are going to affect Kuwait. They are also responsible for sharing these hazards with the relevant staff in their ministry or organisation, as well as with the other participants in the discover group. When the hazard is agreed upon by the discover group, the next step is to write a report for each hazard which is then sent to the analysis group.

2. The Analysis Group: This group also consists of nominated staff who are qualified in disaster management science. The main tasks of this group are to study identified hazards and use the disaster management life cycle, in cooperation with other participants, for a specific hazard. When plans are ready and clearly written, the next step is to send the plans to the law group.

3. The Law Group: This group consists of nominated staff who are qualified and experienced in the field of law. The main duties of this group are to formulate policies that support the designated plan for each type of hazard and legally empower the agencies responsible for managing these hazards. When the policy is established and has been signed by the Disaster Management Chief, the next step is to send the policy and the disaster management plan to the standard operating procedure (SOP) group.

4. Standard Operating Procedure (SOP) Group: This group mostly consists of senior emergency responders who are able to plan for the response phase for each disaster or hazard. The main task of this group is to provide a written response procedures (or standard operating procedure) to be carried out by emergency responders in the event of emergencies. Response Procedures should highlight the logistics required for each type of disaster and outlines the recovery plan for each disaster. When the standard operating procedure is ready and has been signed off by the Disaster Management Chief, the written plan, policy and standard operating procedures are sent to the Geographic Information System (GIS) group.

5. The Geographic Information System (GIS) Group: This group consists of GIS experts from each ministry and other organisations shown in (Figure 42). The main task of this group is to develop a disaster management database for all disaster management plans, policies and the standard operating procedures for identified hazards. Another important task of the GIS group is to validate hazards, vulnerabilities, risks and possible impacts for each disaster. When this database is established, the next step is for the early warning group to use the database to establish an Early Warning System for each disaster.

6. The Early Warning Group: This group consists of senior emergency specialists and information technology specialists. This group will work 24 hours a day, 7 days a week to observe any hazard that could potentially cause harm to the people living in Kuwait and to use different Early Warning Systems and information from the developed disaster database. According to the Common Alerting Protocol (see Chapter 4, Section 4.10.9), the alerts criteria for Kuwait can be created and designed based on the current hazards prediction systems within Kuwait (e.g., the radiation detection systems). Other hazard detection systems can be produced based on the results of the hazard risk assessment – as explained in Chapter 2 (Section 2.6) – which should be done after classifying the hazards as illustrated previously in Section 7.5.4 of this chapter. The early warning group should also establish cooperation with regional and international disaster management centres and common alerting protocol centres to share and gain information before a disaster occurs, and/or during the early stages of a disaster. The orange boxes in Figure 38 above indicate the decision-makers and the media, whose roles are discussed next:

1. The decision-makers: This group represents the strategic-level (or top management) representatives from the ministries in Kuwait (e.g., police chief, fire chief) as planned during the disaster risk assessment phase (see Tables 36 to 38). This group should respond promptly when they receive an alert or call from the early warning group, before the disaster or during the quick onset of a disaster. The leader of the decision-makers group will depend on the nature of the observed hazard; for instance, the police chief will lead the decision-makers in the event of terrorism disasters, while the fire chief will be lead the group for large-scale fires. The idea of this group is to produce one unified command strategy. The main tasks of the decision-makers are:

- Setting the disaster management tasks.
- Reviewing the disaster management plan for the relevant hazard.

- Reviewing the available resources.
- Reviewing the vulnerability, risks and possible impact.
- Providing safety information for the media group.
- Providing the silver or mobile incident command with the disaster management tasks.
- Providing the disaster centre chief with updates on hazards and risks.

2. The Media Group: This group consists of staff who are experienced in the field of public relations. They must respond promptly when they receive an alert or call from the early warning group, before a disaster occurs or during the quick onset of a disaster. Their main task is to coordinate with the decision-makers and disseminate the public awareness regarding an observed hazard, following the approval of the decision-makers chief. The media group are also responsible for preparing media conferences in coordination with the decision-makers chief.

The red boxes in Figure 38 indicate the Mobile Incident Command (MIC) group and the emergency responders group. The Mobile Incident Command (MIC) represents the silver (or the middle-management) level of agencies which normally respond to disasters in Kuwait. Their main duties are to review the disaster management task that has been developed by the decision-makers chief, to set up a response plan for emergency responders and to highlight the logistics and resources required to implement the plan.

The Emergency Responders: This group consists of employees at the bronze (or operational) level of fire stations, police stations, etc. They are responsible for responding to and dealing with disasters when they occur. Currently, there are different dispatch centres in Kuwait. The main dispatch centre in Kuwait is the Ministry of Interior and people in Kuwait are familiar with the Emergency Number (112) managed by the Ministry of Interior. Therefore, the blue boxes in Figure 38 consist of the emergency phone number in Kuwait (112), which is handled through the call takers group, who speak multiple languages, to answer emergency calls and coordinate with the emergency dispatch room. This group should in turn consist of representatives from different agencies (fire, police, ambulance, etc.) who provide daily emergency services and work 24 hours a day, 7 days a week. This will prevent delays that currently exist with the requirement to transfer emergency calls to different locations. It will also lead to sharing of information, plans, resources and logistics between dispatchers. In addition, it will provide information to the decision-makers during disasters.

7.7 Chapter 7 Summary

Chapter 7 highlighted the final framework of this research and showed how the developed Disaster Management Framework, proposed in this research, can improve the current Disaster Management Framework in Kuwait. The proposed framework aims to ensure there is sufficient management during all phases of a disaster through an all-hazards approach. This chapter also highlighted methods for bringing together all disaster management stakeholders to participate as one team under the same command of the head of the Council of Ministers, using an obvious unified command structure and the currently available resources in Kuwait. This can extend the vision of the disaster management decision-makers in Kuwait with planning new disaster risk management strategies at a lower cost. Chapter 7 highlighted the results and aims of this research, such as the improved Disaster Management Framework, which the author believes will improve the disaster management process in Kuwait. The validation of the final framework in this research was based on various factors studied during the research, such as evaluating the outcomes and results gained throughout the focus group meetings and results of the gap analysis.

Chapter 8: Validation of the Proposed Framework

8.1 General

The data collection and data analyses for this research were presented in detail in Chapters 5 and 6. A discussion of how the Disaster Management Framework would be formulated and implemented was conducted in Chapter 7. This current chapter outlines the validation of the developed framework in this research.

The improved Disaster Management Framework proposed in this research was tested at all levels of implementation. It was felt that the framework could not be validated if it was not supported by an appropriate legislative Act. Therefore, the author developed a new proposed Disaster Management Act to support the proposed improved framework, which was illustrated in Chapter 7. This recommended Disaster Management Act is to be issued by the head of the Council of Ministers in Kuwait in order to stop the current overlapping responsibilities of different disaster management groups in Kuwait. The governments initiative in terms of preparing for disaster management will add value with supporting the country's effort to have a comprehensive disaster management process.

The Fire Service Act specifies that the fire service should prepare and respond to disaster and emergencies independently. Clearly, there is a vital need to improve the current Disaster Management Framework in Kuwait and to ensure it is supported by an effective and unified Disaster Management Act. This ambition can be achieved in Kuwait if the government takes the appropriate steps with using the outcomes of this research as guidance.

Currently, various emergency response services are responsible for dealing with disasters and minimizing the losses when specific disasters occur, while the Civil Defence Committee is responsible (according to their Act) for supervising and managing all disasters in Kuwait, with the cooperation from the different emergency services. However, The Civil Defence Department has poor capability, capacity and logistics to deal with even small incidents, such as house fires. Therefore, any major problems with capacity affect the emergency services who respond to disasters, as well as the work of the Civil Defence Committee. Moreover, The Civil Defence Committee, under the Act (21/1979) (see Chapter 3), is responsible for warning the public against looming disasters, with a view to reducing the impact of each disaster. However, there is no

effective Early Warning System provided by the Civil Defence Department, which leaves the people of Kuwait vulnerable to potential disasters.

The current agency which deals with most types of disasters in Kuwait are the Kuwait Fire Service Directorate. It has an acceptable response time (four to seven minutes) with more than 40 Fire stations throughout the country, covering all the regions of Kuwait. However, there are different factors which presently render the fire service unable to prepare for or to take full responsibility for managing disasters. The main factor is the weak Fire Service Act (36/1982) (see Chapter 3). This Act mentions the term "disaster" in only one article and this is only stated in general terms. Another concern with this article, is the use of the term "natural disaster", which implies that the Kuwait Fire Service is not responsible for dealing with manmade disasters.

As previously observed, the Civil Defence Committee has a lot of power derived from their Act but they do not have the capability to prepare for or deal with disasters effectively. In contrast, the Kuwait Fire Service has adequate capabilities for preparing for and dealing with disasters but they have little power derived from their Act. In terms of the hazards identified by the Civil Defence Committee (see Chapter 1, Table 2), there is a lack of information provided by this committee regarding risks, vulnerability and possible impacts associated with identified hazards. This shows that the current Disaster Management Framework is not effective as it does not support the country's disaster management goals. Therefore, the recommended framework that was outlined in Chapter 7 will strengthen and support Kuwait by bringing together all the relevant agencies in the preparation, identification and management of all types of disasters.

However, the previous discussion only related to the technical issues of disaster management and response; however, it is also vital to improve the entire management side of the process for disaster management in Kuwait, which will be discussed in this chapter, validating the outcomes of this research.

8.2 The United Nations Office for Disaster Risk Reduction

The United Nations Office for Disaster Risk Reduction (UNISDR) coordinates the international efforts of all the United Nations member countries, by following a systematic disaster risk reduction framework that assists each country in mitigating the impact of disasters through the development of an international ten-year disaster risk reduction strategy. This requires to be followed by each country. The latest disaster risk reduction framework (the *Sendai Framework*)

was established after the international conference of disaster risk reduction in March 2015 in Sendai, Japan. The researcher, along with delegates from Kuwait, attended this conference to explore the possible implementation of this Disaster Management Framework in Kuwait.

UNISDR requires all United Nations members to nominate a focal point; a person who ensures the coordination of the outcomes of the *Sendai Framework* in their home country. In January 2017, the author of this work was nominated by the Ministry of Foreign Affairs to be the focal point for Kuwait with ensuring and coordinating the adoption of the *Sendai Framework* for the years 2015 to 2030. Currently, the researcher is working closely with UNISDR towards improving the current Disaster Management Framework in Kuwait, using the content and outcomes of this research.

UNISDR invited the researcher to submit a proposal for the recommended Disaster Management Framework in Kuwait, which is basically the framework developed in this research. The support of UNISDR was given to the researcher as there is currently no adequate disaster risk reduction strategy or suitable Act in Kuwait. Therefore, this research was the first step in verifying the developed framework by sharing the experiences of international disaster management experts and practitioners with emergency planners in Kuwait. In addition, the UNISDR assisted the researcher with validating the framework which was developed in this research, using a coordination system between the UN member countries.

8.3 Validation of the proposed Framework

This section outlines the testing procedure for the final framework developed in this research. The process shows the procedure taken by the author of this research and the focus group to achieve the objectives of this research, and is illustrated in Figure 43. The figure contains three columns, each addressing a different dimension. The left column represents the best international disaster management practices (as clarified and discussed in Chapters 2 and 3); the middle column highlights current disaster management practices in Kuwait; the right side column presents ideas and information gained from the 26 interviews conducted during the research, which compared with the international best practices in terms of disaster management needs.

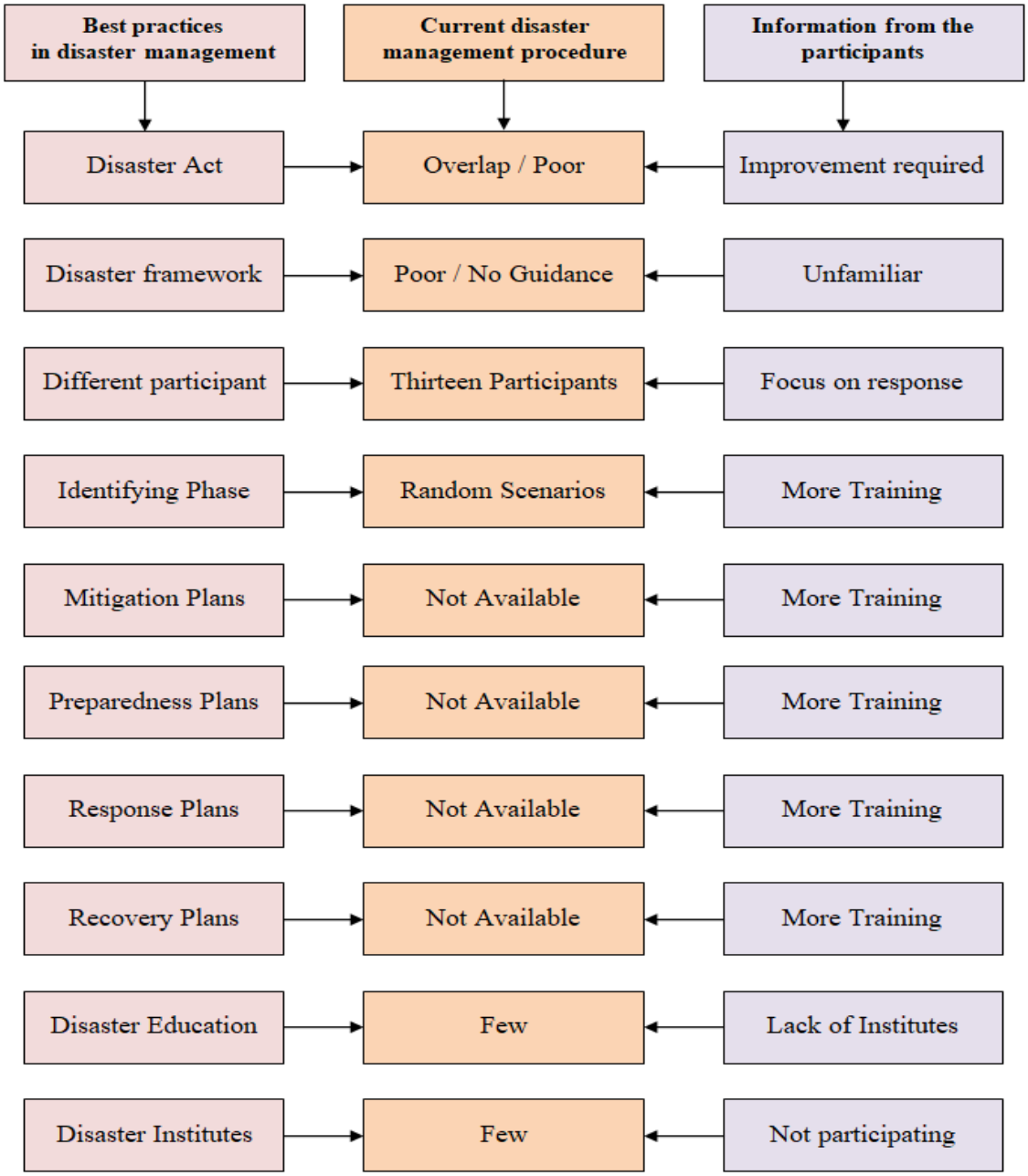


Figure 43. Validation of the Final Framework

The focus group participants are specialized in disaster management and they work for the Fire Service in Kuwait, mainly to improve the disaster management process and prepare a standard operating procedure for all the incidents. The focus group staff had different qualifications, for instance, disaster and emergency management, geographic information system, analysis and legislation.

To date, the focus group together with the author of this research have issued three publications titled: Incident Command System, Urban Incidents Command and Control and The Emergency Response Plans for the Fire Service in Kuwait. Therefore, the author of this research has worked very closely and has a good relationship with the focus group participants. The main task of these staff and the author of this research are to improve the disaster management process in the Fire Service and Kuwait.

Hence, the author of this research discussed the outcomes of the final framework proposed in this research with the participants of a focus group, who agreed that the improved Disaster Management Framework will add value to the disaster management process in Kuwait. The focus group provides sufficient support to the author of this research to achieve the research objectives, for instance, one of the major gaps in the disaster management process in Kuwait is that the Civil Defence Committee did not identified all the hazards that could affect Kuwait in the future. This is considered as one of the main disaster management principle.

Therefore, the focus group participant agreed that there is a lack of comprehensive risk assessment process that should be conducted by the Civil Defence Committee. This motivated the author of this research with improving the current disaster management life cycle to be start with the Identifying process (Figure 2, in Chapter 1). This will assist the Civil Defence Committee with understanding the different phases of the disaster management, as well as the starting point for achieving comprehensive disaster management practices. This improvement enabled the author of this research in achieving the objectives (1, 2, 3 and 4) of this research.

To validate the proposed framework which was developed in this research, the focus group together with the author of this research recommended, along with a request from the Fire Service chief, the importance of establishing a national teamwork. This consisted of 30 different Ministries and Agencies in Kuwait with the aim of achieving the Sendai Framework for Disaster Risk Reduction 2015/2030, which was clarified in (Chapter 2), and to review the current disaster management process in Kuwait, as well as discussing the proposed framework in this research. The following (Table 34) illustrates the agencies that participated with testing the proposed framework in this research.

Table 34. Agencies that participated in testing the proposed framework

Number	Agency/ Ministry
1	Ministry of Defence
2	Ministry of Interior
3	The National Guard
4	Kuwait Fire Service
5	Ministry of Foreign Affairs
6	Ministry of Health
7	Ministry of Media
8	The National Security Peru
9	Ministry of Utilities
10	Ministry of Oil
11	Ministry of Public Work
12	Ministry of Municipality
13	Ministry of Electricity & Water
14	Ministry of Education
15	Ministry of Finance
16	Kuwait University
17	The General Institute for Industry

18	The General Institute for Environment
19	The General Institute for Civil Information
20	The General Institute for Agriculture & Fisheries
21	The Communication Institute
22	Kuwait Institute for Scientific Research
23	Kuwait Petroleum Company
24	The Co-Op Society
25	Kuwait Red Crescent
26	The Civil Aviation
27	The General Department for Custom
28	The General Institute for Housing
29	Kuwait Ports Institute
30	Kuwait Transportation Company

At the first meeting, which was conducted in May 2018, the author of this research demonstrated the proposed framework for all the national teamwork and highlighted the importance of conducting a comprehensive risk assessment to identify all hazards that could affect Kuwait. This took into account the disaster classification and the risk assessment procedure discussed earlier in Chapter 2.

Figure 44. The author of this research explaining the proposed framework for the national team

Figure 45. Part of the national teamwork meeting at Kuwait Fire Service, May 2018

The results of the risk assessment were collected from all the participants during June, July, August and September 2018, using different mechanism for instance; email, fax and an official mails. The following (Table 35) highlights the results of the risk assessment, which were considered as the agreed hazards data base for Kuwait:

Table 35. Hazards data base for Kuwait

Number	Type	Hazard
1	Natural	Earthquake
2	Natural	Drought
3	Natural	Desertification
4	Natural	Land slide
5	Natural	Sand dunes creep
6	Natural	Sea level rising
7	Natural	Death of fish
8	Natural	Sand storms
9	Natural	Heavy rains
10	Natural	Floods
11	Natural	Flash flood
12	Natural	Strong wind
13	Natural	Human epidemics
14	Natural	Animals epidemics
15	Manmade	Radiation accidents
16	Manmade	Radiation pollution in the environment
17	Manmade	Radiation pollution from oil industry
18	Manmade	Radiation pollution from mid. equipment

19	Manmade	Hazmat industries
20	Manmade	Oil spill
21	Manmade	Soil pollution from crude oil
22	Manmade	Oil spills in water sources
23	Manmade	Hazmat. in transport
24	Manmade	Riot
25	Manmade	Economic crisis
26	Manmade	Terrorist activities
27	Manmade	Mines
28	Manmade	Aeroplane crash
29	Manmade	Major transport inc.
30	Manmade	Building collapse
31	Manmade	Oil fires
32	Manmade	Drying of water sources
33	Manmade	Boil water
34	Manmade	Biological incidents
35	Manmade	Induced human epidemic disasters
36	Manmade	Induced animal epidemic disasters
37	Manmade	Food shortage

38	Manmade	High rise building fires
39	Manmade	Fire in large industries
40	Manmade	Random waste and landfill fires
41	Manmade	Large oil ships fires
42	Manmade	Airport terminals fires
43	Manmade	Gas stations fire
44	Manmade	Football stadium fires
45	Manmade	Fire in national celebration locations
46	Manmade	Large shopping malls fire
47	Manmade	Hospital fires
48	Manmade	Fire in arms depots
49	Manmade	Fires in electricity generating building
50	Manmade	Shutdown in water desalination plants
51	Manmade	Blackout
52	Manmade	Fires in political build.
53	Manmade	Fires in large min. build.
54	Manmade	Fires in large mosque
55	Manmade	Fires in ports
56	Manmade	Fires in large dwellings

57	Manmade	Fires in large stores
58	Manmade	Strike

These results confirm that the (13) hazard scenarios which were identified by the Civil Defence Committee in 1997 (Table 1, in chapter 1) are insufficient and the process used to identify these hazards was not suitable. This was due to the agents who participated in the risk assessment or hazards identification process as being inapplicable because of lack in the participating Agencie being involved in the risk assessment process. At the same time, disaster management as a practice is rapidly improving and expanding, Damon (2015).

Therefore, the author of this research is attempting to improve the current disaster management process, by improving the current Disaster Management Framework in Kuwait, as well as highlighting the importance of considering the different phases of the disaster management life cycle. Hence, the challenge now is for the national teamwork, who are responsible for the implementation of Sendai Framework in Kuwait, to apply each disaster management phase; such as mitigation, preparedness, response and recovery, to each hazard scenario identified in the previous (Table 35). This will produce comprehensive national disaster management plans for the country.

8.3.1 Disaster Management Act

The current Disaster Management Acts in Kuwait were previously discussed and are shown to lack guidance and important definitions; in addition, the Acts resulted with overlaps between different departments, agencies and ministries in Kuwait in terms of their responsibilities before, during and after a disaster. The author also analysed the research participants' perspectives on the current Disaster Management Acts in Kuwait (see Chapter 6, Section 6.3.6), which resulted with all participants agreeing that the current Disaster Management Acts must be improved.

Therefore, the author of this research has provided a recommendation for a new Disaster Management Act (see Chapter 7), which is designed to be a single Act for all agencies in the country, to follow. Upon the implementation of this Act, the proposed National Disaster Management Committee can establish different disaster management policies in order to ensure proper and sufficient risk management strategies are adopted for each type of hazard.

8.3.2 Verifying the Disaster Management Framework

The current Disaster Management Framework in Kuwait was discussed and illustrated in Chapter 3. It was shown that the current framework cannot assist the disaster management planners in Kuwait to achieve suitable and sufficient disaster risk management outcomes. Therefore, the author of this research has proposed an improved Disaster Management Framework, as detailed in the previous chapter, to provide greater resilience. This framework was designed based on an extensive study and evaluation of the current disaster management process in Kuwait which showed that several important factors (e.g., vulnerability, risk and possible impact) were ignored in the disaster scenarios listed in Chapter 1 (Table 2). The author also found that the use of proper disaster management standards were lacking in the country due to the Civil Defence Committee in Kuwait identifying hazards randomly, i.e. without any scientific risk assessment procedures.

In addition, the participants in this research seemed to be unfamiliar with how to adopt and follow the current Disaster Management Framework in Kuwait. Therefore, they all agreed that the current Disaster Management Framework must be improved, a finding which was also reiterated by the participants in the focus group. The current disaster management suffers from a lack of guidance and instruction, preventing disaster management participants from achieving desirable disaster management outcomes. Therefore, the author of this research discussed different effective Disaster Management Frameworks used in other countries, namely, India, USA, Pakistan and Australia, in (Chapter 2) to gain different perspectives and approaches to effective disaster management policies, as well to evaluate participants' perspectives in terms of what factors are missing from Kuwait's current Disaster Management Framework.

8.3.3 Participants in Disaster Management

The participants in disaster management in Kuwait were discussed in Chapter 1 (Section 1.2). It was shown that there are currently only 13 participants represented at the strategic level of disaster management in Kuwait.

The country's desired disaster management outcomes cannot be achieved if the processes are carried out without engaging all relevant agencies. Therefore, the current pool of participants in the disaster management process in Kuwait lacks variety in terms of stakeholders who can help to identify and classify hazards, amongst other things. Therefore, the author of this research provided an example of an effective hazard classification process in Chapter 2, which would inform

emergency planners on which agencies are responsible for identifying a specific hazard and – upon knowing the results of the hazard classifications – the participants responsible for managing the disaster.

8.4 Chapter 8 Summary

It has been concluded that improvement to the disaster management process requires major improvements within the Disaster Management Framework. This chapter highlighted the importance of improving the current Disaster Management Framework in Kuwait. This research presented all the factors that, when used together, could improve the current disaster management process in Kuwait.

The 26 participants who were interviewed by the author of this research, were members of the strategic Civil Defence Committee in Kuwait and the decision makers for all issues related to disaster management. The author developed Figure 43 to highlight and illustrate different perspectives of the elements and factors that could improve the disaster management process; such as the international best practices in modern disaster management. The author also used his experience, as a planner and responder in the disaster management field, to examine the current status of disaster management practices in Kuwait, together with feedback from the participants of this research. The outcomes of this research were also discussed with the focus group, all of whom confirmed that the proposed Disaster Management Framework will improve the disaster management process in Kuwait.

The author of this research took an opportunity in May 2018, to improve the disaster management process in the Kuwait State, as a focal point for the state with the UNISDR, and to follow up through implementing the Sendai Framework for Disaster Risk Reduction 2015/2030. To be successful in this project, an action plan was designed by the author of this research to enable the country to achieve the requirements of Sendai Framework. This action plan was supported with different objectives. The most important stage was to establish a national teamwork responsible for the implementation of Sendai Framework in Kuwait. this teamwork consisted of different stakeholders (Table 34) from most Ministries and Agencies in Kuwait, to cooperate and coordinate with the author, to increase the awareness level of these participants in terms of the need to improve the current disaster management process in the country and to clarify the gap in this field and finally, to implement the Sendai Framework.

When this teamwork was formulated, the author designed a form to collect information regarding the participants perspectives in terms of the hazards that could produce harm on the civilians and environment in Kuwait and to enable the participants to conduct a risk assessment as a specialist in a specific field; such as the environment authority, the electricity and water, the municipal, health etc. The results of the risk assessment were that the results showed the number of hazards identified by the teamwork were 58 different hazards: 14 natural and 44 manmade hazards. These results will be consulted with the Civil Defence Committee in the near future, together with the results of this research. The next chapter will present the conclusion of this research.

Chapter 9: The Conclusion

9.1 General

Today, disaster management is considered as a major function in most countries of the world. This is the means through which countries can effectively reduce and mitigate the impact of disasters by following good practice and scientific processes. The scientific developments in disaster management practice enable disaster management practitioners, such as responders, planners and leaders to use systematic processes when preparing for or dealing with disasters.

Chapter 1 of this research presented the introduction to the research, which was followed by the aims, objectives, questions and identification of the gap in disaster management, within the context of Kuwait. The obvious disaster risk that the country may face in the future was also presented in this chapter.

In Chapter 2, the author discussed the literature review on disaster management focusing on the whole disaster management life cycle. The author illustrated the terms used in the disaster management life cycle, namely mitigation, preparedness, response and recovery. Chapter 2 also covered how to classify hazards along with the importance of conducting hazard risk assessments. Disaster Management Frameworks used in India, Australia, Pakistan and the US were discussed in Chapter 2, with a focus on the importance of disaster education. The use of Early Warning Systems and how they help to reduce the impact of disasters was also covered.

In Chapter 3, the author explored literature on the current disaster management procedures used in Kuwait. The country's Disaster Management Acts, Disaster Management Framework and hazard identification process were all examined. Chapter 3 also highlighted the overlap in the Disaster Management Acts between different agencies in Kuwait. This was followed by an examination of the current disaster response procedures, as well as the role of the Civil Defence Committee, representing the highest strategic disaster management body in Kuwait.

In Chapter 4, the author highlighted the designed conceptual framework for this research, which included the process used by the researcher to answer the research questions and achieve the outcomes of this research. These all pertained to the improvement of the current Disaster Management Framework in Kuwait. The conceptual framework, which was designed by the author, assisted with facilitating and illustrating the road map of the research trend: .the first part of the concept highlighted the key areas that the author investigated during the research; part two

highlighted the elements which the researcher believed would improve the current Disaster Management Framework and process in Kuwait; and part three of the conceptual framework represented the outcomes of this research, which it is to improve the current Disaster Management Framework in Kuwait.

Chapter 5 highlighted the research methods and the data collection methods for this research along with the pilot study, which was conducted by the researcher to test the interview process. The initial data collected for this research was the form of secondary data literature (e.g., published papers, scientific research, journals, newspapers, etc.). The researcher then conducted 26 interviews with all of the Civil Defence Committee members,.tThis allowed insights to be gained relating to the current Disaster Management Framework in Kuwait from a strategic level, in order to find any missing or unpublished aspects that would help the researcher to answer the research questions.

In Chapter 6, the author illustrated the analysis process for the data gained through the pilot study and main interviews with the 26 participants of the strategic disaster management Committee in Kuwait. Chapter 7 highlighted the final framework of this research, which was developed by the Author to propose improvements to the current Disaster Management Framework in Kuwait. Chapter 8 included the validation of the framework developed in this research. Finally, Chapter 9 provides conclusions to this research.

9.2 Summary of the Work Undertaken

The current disaster management procedure, framework and Acts in Kuwait were discussed and illustrated throughout this research. The author found that the current disaster management procedures in Kuwait were inadequate and could not enable disaster management planners at the strategic level to identify all disaster hazards or to reduce their impact when disasters occur, especially due to the obvious overlap in the Disaster Management Acts governing the activities of the different agencies. In this research, the author highlighted different Disaster Management Frameworks used in different countries, such as India, Pakistan, Australia and America. The researcher found that these frameworks could be adapted to the Kuwait context.

However, the author found that the Disaster Management Framework being used in Kuwait is poor. and has resulted with a haphazard application of disaster management procedures in Kuwait. The disaster management in Kuwait was found to involve three committees, which only meet when

the need arises, suggesting that the focus of disaster management is currently only during the response phase of a disaster. At the same time, there has been no obvious work conducted by the committees in capacity-building, which has led to a lack of clarity in terms of the capabilities of emergency services. In addition, the Disaster Management Framework was found to lack any kind of enforcement for stakeholders who participate in the Civil Defence Committee to carry out any specific tasks, for instance "risk assessment". Therefore, the participants in this strategic committee are considered as volunteers.

The author of this research designed a conceptual framework to meet the needs and requirements of the disaster management process in Kuwait. This also highlights the procedures that the researcher used to answer the research questions and to achieve the outcomes of this research. To gain important data for this research, the researcher conducted interviews with all the participants of the Civil Defence Committee. The author concluded from these interviewees that the disaster management process in Kuwait must be improved in order to achieve a modern level of disaster management practice that is comparable to most developed countries.Throughout the interviews with the 26 Civil Defence Committee members and the participants in the focus group, as well as the national team work which was established to follow-up the requirements of Sendai framework and recommendations of the focus group, the researcher tested the framework developed in this research, and was provided with guidance on the processes involved in adopting the developed framework in this research.

Hence, the author of this research explored the disaster management concepts and principles to establish an Improved Disaster Management Life Cycle (Figure 2, chapter 1), which represent the first objective of this research. The author also designed a conceptual framework to evaluated the current Disaster Management Framework, risk assessment procedure and acts, to highlight the gap/s in terms of having a comprehensive disaster management procedure and Act in Kuwait, which represents the second objective of this research. The third objective of this research was achieved throughout the analysis process of the different factors studied in the conceptual framework (Figure 23), as well as the aoyhor' experience in the disaster management field. The forth objective achaived throughout the results identified by the national team work (Table 34, Chapter 8) which was collected through a comprehensive risk assessment conducted by all the ministries/agencies in Kuwait (Table 34, Chapter 8).

The proposed Disaster Management Framework was developed based on the different data collection on the research area and the analysis techniques conducted, as well as the results gained from international best practices along with the author's experience in the disaster management field. The improved Disaster Management Framework was tested and validated throughout the discussions between the author and participants of the Civil Defence Committee, as well as the national teamwork (Table 33, Chapter 8). All these agreed that the proposed framework will improve the current disaster management in Kuwait, which represents the final objective of this research.

9.3 The Conclusion

In Chapter 2, the author described the disaster management life cycle to illustrate the importance of the different phases of a disaster. Based on the hazard classification process and feedback given by the participants of this research, it is clear that the disaster management process in Kuwait focuses only on the response phase of disasters, ignoring all other phases such as; identifying the hazards, mitigation, preparedness and recovery, which were considered as a gap in disaster management. This confirms what was noted in the (US-Aid, 2011) report that emergency leaders and communities were dealing with disasters during and after their occurrence.

As discussed in (chapter 1, section 1.1), different scientists and organizations in the disaster management field, for instance (Carr, 1932; Powell, 1954; Stoddard, 1968; and FEMA, 2014), are trying to improve the disaster management life cycle (the phases), to help the emergency planners/practitioners with understanding the different phases required. Therefore, the author of this research also proposed to improve the disaster management life cycle by incorporating an identifying phase (see Chapter 1, Figure 2). The reason this phase should be included, is that the author has found, in the literature report for instance (US-Aid, 2011), and from feedback given by participants in this research, that the focus is only on the response phase. It was also noted that the hazard identification process in Kuwait was conducted haphazardly, especially that Kuwait was affected disasters, such as terrorist activity, which were not identified as a hazard by the Civil Defence Committee in Kuwait. Hence, the identifying phase or theory will support and add value to all the emergency planners and practitioners.

In terms of disaster management stakeholders, the author found that the agencies involved in the Civil Defence Committee (Table 1, Chapter 1) are insufficient to facilitate the disaster

management needs and this is confirmed when the national team-work representatives (Table 34, Chapter 8) identified 58 hazards, compared to the hazards database identified by the Civil Defence Committee (Table 2, Chapter 1). Hence, the identifying phase enabled the national team-work with classifying the hazards into different classes, as discussed in (chapter 2, section 2.3), and assists the relevant agencies with identifying hazard/s relevant to their field of speciality.

The feedback from the participants in this research strongly indicates that there is a lack of knowledge in terms of hazard identification and classification processes, and that more training is required to ensure the use of suitable hazard identification procedures. Therefore, the recommended framework outlined in Chapter 7 enables the participants in the disaster management process to take an appropriate approach to identifying all hazards that could harm Kuwait. The final framework of this research provides a systematic hazard identification process, in which specific agencies would have to identify all hazards relevant to their agency.

The five phases of the disaster management life cycle were discussed and illustrated in detail in Chapter 1 (Section 1.1) and Chapter 2 (Sections 2.4 and 2.5). The Civil Defence Committee in Kuwait has identified 13 disaster or hazard scenarios (see Chapter 1, Table 2). However, this represents only one phase of the disaster management life cycle and ignores mitigation, preparedness, response and recovery. This incomplete assessment leads to various problems, such as increases in vulnerability, risk and possible impacts of disaster, if any of the 13 identified hazards does occur. It also leads to uncertainty in terms of the capacity of emergency response services. When the author of this research discussed the disaster management life cycle phases with the participants of this research, the findings showed that there is a lack of knowledge on how to adopt a disaster management standard, such as the disaster management life cycle. In addition, the participants were in agreement that more training is needed to operationalise the five phases of the disaster management life cycle.

Additionally, the author highlighted and discussed different perspectives on the various phases of the disaster management life cycle. For instance, the author cited FEMA in the United States, which developed a framework for each phase of the disaster management life cycle. Therefore, the author emphasised, in the final framework in Chapter 7 (Section 7.5), the importance of adopting and considering the five phases of the disaster management life cycle.

As stated in Chapter 2, education is key to the development of an effective Disaster Management Framework in Kuwait. This research has provided extra focus in the conceptual framework along with the importance of having qualified disaster managers or planners. Due to the scientific nature of disaster management, it is important for practitioners in the field to understand how disasters can be managed; at the same time, the disaster management process requires different approaches from different specialisms (meteorological, geophysical, biological, etc.). A competent disaster planner should be able to integrate all the specialisms and facilitate the disaster management process with the aim of achieving very favourable disaster management outcomes.

The literature reviewed in Chapter 3, showed that the Civil Defence Committee lacks members who are qualified to make decisions regarding disaster management in Kuwait. The feedback gained from the participants in this research supported this idea. Due to the lack of disaster management knowledge, the disaster management process used in Kuwait is currently inadequate. This confirms the importance of having disaster management education opportunities. As such, the author of this research provided different solutions in the final framework for improving the number of qualified disaster management personnel in Kuwait, by encouraging the universities and training institutes in Kuwait to establish and operate disaster management courses.

The benefits of establishing a disaster management institute were highlighted in the literature review in Chapter 2. A disaster institute would assist the government with enhancing scientific research on disaster management and providing training programs for disaster management professionals. It would also be useful with predicting future disaster hazards by preparing research on the disaster management field. Disaster or emergency institutes can also enable the government to establish effective disaster policies and legislation. As observed from the literature reviewed in Chapter 2, some countries, such as Australia, used research to formulate and prepare their Disaster Management Acts and legislation. The government's cooperation with the disaster institutes will add value to the Disaster Management Framework in Kuwait, especially through identifying future potential hazards, formulating disaster management policies and improving the Disaster Management Act. As discussed in Chapter 4, the Kuwaiti government can also sign different cooperation protocols with various disaster management institutes, at both regional and international level enhancing disaster management capability.

The findings from this research shows a lack of disaster management institutes in Kuwait and a lack of cooperation between different agencies to allow the disaster management process to be improved within Kuwait. Therefore, the author of this research has, in the final Disaster Management Framework in Chapter 7 (Section 7.5), provided guidance for government to establish disaster management institutes and sign a cooperation protocol with different disaster management institutes, both at regional and international level. All results were discussed by the author with the participants of the focus group, all of whom agreed that the results and outcomes of this research will improve disaster management practice in Kuwait. Moreover, the author was nominated to represent the Fire Service in a committee designed by the Council of Ministers in Kuwait, aimed at addressing the strategic factors required to improve the current disaster management process in Kuwait.

9.4 Contribution to Knowledge

The disaster management life cycle is to used to describe, examine and understand disasters and help organise the practice of disaster management. The author of this research highlighted and explained the disaster management life cycle in the introduction of this research (chapter 1, section 1.1), and in this chapter (section 9.3). The author also highlighted that the scientists and organizations in the disaster management field have been trying since the 1930s to improve the disaster management life cycle (the phases), as well as different researchers for instance; (Quarantelli's, 1995; and Neal, 1997). They are encouraging the researchers to improve the disaster management life cycle as they argued that the disaster management planners/practitioners were focusing only on specific phases, for instance the response phase of a disaster (US-Aid, 2011).

Therefore, the author of this research attempted to provide proposals to improve the current disaster management life cycle which was developed by (FEMA, 2014), (see chapter 1, Figure 1), by integrating the term ‘identifying’ to the model (see Chapter 1, Figure 2). This should challenge disaster management planners and leaders with taking extra care when identifying hazards through using the disaster classification methodology illustrated previously in (Chapter 2, Section 2.3). This will enable the planners and leaders to start the disaster management, prior to developing the overall requirements of the disaster management life cycle. The aim of improving the current disaster management life cycle is to close the obvious gap in the disaster management process

worldwide, especially in Kuwait, which has led the Civil Defence Committee to fail with identifying all hazards that could harm the country, as along with improving the risk assessment procedures. In addition, the author found that the current hazard identification procedures in Kuwait are conducted haphazardly, without using a scientific theory or systematic procedure.

The author also developed a conceptual framework to improve the current disaster management practices in Kuwait (see Chapter 4). The designed conceptual framework in this research consists of three different parts. The first part represents the author's process for highlighting the current disaster management procedure in Kuwait;. this illustrates the current Disaster Management Acts, the Disaster Management Framework, preparedness, disaster response procedures and hazard identification processes. The second part of the conceptual framework represents the author's knowledge-generation process for the improvement of the current Disaster Management Framework in Kuwait; this consisted of different terms, such as disaster management centre, risk assessment, disaster Act, emergency procedure, emergency education, emergency institutes and an international framework focal point. Part three of the conceptual framework represents the desired outcome of this research: to improve the current Disaster Management Framework in Kuwait.

The author also validated the recommended Disaster Management Framework for Kuwait and provided guidance on the recommended Disaster Management Centre, describing its structure, main tasks, functions and procedure. The outcomes of the focus group also enabled the author to validate the improved Disaster Management Framework. The focus groups recommendation in terms of establishing a national teamwork to test the proposed framework and the Improved Disaster Management Life Cycle (Figure 2, Chapter 1), enabled the author to come up with a new hazards data base (See Table 35, Chapter 8) for Kuwait. Currently, the national team (See Table 33, in Chapter 8) are working on formulating the national disaster management plans for each type of hazard. The terms used by the author in the conceptual framework (generation process) were tested throughought the interviews with all of the civil defense committee members (the 26 participants) in this research. Most of the participants agreed that the current Disaster Management Framework and procedure must be improved with the results of the focus group supporting and validating the improved framework in this research. It was concluded that the Kuwaiti government must initiate improvements to the entire disaster management process in Kuwait by establishing a National Disaster Risk Reduction Committee. The author also recommended a new Disaster

Management Act to support the proposed framework in this research. The author gained support from local and international members with establishing the recommended Disaster Management Act to support the recommended Disaster Management Framework for Kuwait.

Therefore, this research provides different approaches and methodologies to adequately prepare for disaster management at a strategic level. For instant, this research proposed an improvement to the disaster management life cycle, which is a standard used by different countries worldwide to highlight the identfication of hazards as a critical part of the initial phase of disaster management. At the same time, the author contributed to fill the gap in the disaster management process in Kuwait by providing a solid improved Disaster Management Framework. This was validated by experts in the disaster management field in Kuwait.

9.5 Limitations

One obvious limitation associated with this research is due to a lack of official disaster statistics in Kuwait as not all disasters which have occurred in Kuwait were documented. The only official statistics available were listed on the Kuwait Fire Service's website and these were limited to fires and transport accidents. Therefore, the researcher was unable to provide any examples or case studies to support the idea that the disaster management processes and procedures in Kuwait are ineffective. Another important issue, if it was addressed, would improve the results of this research if the author had the use of a recording device for all the interviews. This would have allowed the author to collect data more accurately. There were few experts in the disaster management field in Kuwait which could be approached regarding the topic and no academic experts in the field.

9.6 Recommendations for Future Work

As discussed previously, due to the geographic location of Kuwait, it is free from some natural disasters (e.g., hurricanes, strong earthquakes, landslides). However, due to climate change causing the sea level to rise, terrorism activities and technological hazards which are all relatively new developments that could result with disasters occurring in Kuwait.

The author recommends that the Kuwaiti Government reconsiders the disaster management processes and procedures in Kuwait. The author found that there is a lack of qualified disaster planners in Kuwait and none of the members of the Civil Defence Committee are qualified in the field of disaster management. Therefore, the author encourages the Kuwaiti government to prepare

a plan for ensuring that disaster planners and practitioners, in the future, would receive disaster management training and degree level qualifications within Kuwaiti universities and institutes. When there are sufficient qualified disaster planners and managers, the next step is to enable these planners to take over the disaster management process in Kuwait as they would be able to understand the work required to reduce the impact of disasters through following a standardized and systematic disaster management process, such as the disaster management life cycle. Currently, the national teamwork (Table 33, Chapter 8) has all the power to adopt the proposed framework in this research. This is due to the teamwork which has a representative from all the agencies in Kuwait, hence, results can be achieved by this national teamwork and discussed with the civil defence committee.

Therefore, the author of this research recommends further research to validate comprehensive information on the previous disasters that affected Kuwait in the past to show statistics of the losses/impact which has resulted from these disasters. This will clarify the vision for the emergency planners in understanding, for instance the capacity building and preparedness for future hazards.

References

Act 897. (1997). *The Civil Defiance Regulation*. State of Kuwait Regulation. In Arabic.

Act 36. (1982). *Establishing Kuwait Fire Service Directorate*. State of Kuwait Regulation. In Arabic.

Act 21. (1979). The State of Kuwait Disaster Management Act. In Arabic.

Adams, J., (2014). Managing Risk: framing your problems, BoeringerIngelheim Alumni Seminar, SchlossGracht, Cologne 9-11

ADPC (2014). The Asian Disaster Preparedness Centre. Available at: http://www.adpc.net/igo/?

Advance in Knowledge Discovery and Data Mining (2013). 17th. Pacific-Asia Conference, PAKDD 2013. Gold Cost, Australia. April 2013. Proceedings, Part II. LNAI 7819

Alexander D. (2015). *Disaster and Emergency Planning for Preparedness, Response, and Recovery*. Subject: Recovery, Risk Management, Response, Preparedness Online Publication Date: Sep 2015 DOI: 10.1093/acrefore/9780199389407.013.12

Alexander, D. (2016). *How to Write an Emergency Plan*. Paperback – 9 Jun 2016

Al-Fahad J. (2012). Reform of Building Codes, Regulations, Administration and Enforcement in Kuwait: within the legal, administrative, technical, & social framework. A Doctoral Thesis. Loughborough University. April, 2012.

Altimimy A., (2016). *The Emergency Management Centre GCC Director*. Kuwait 2016.

Alqabas Newspaper (2010). Visited on 27/12/2016, Available at: http://www.alqabas.com.kw/Article.aspx?id=574351&date=05022010

Alshahed Newspaper. (2011). Local Newspaper, Kuwait. Visited on 1/7/2016. Available at: http://www.alshahedkw.com/index.php?option=com_content&view=article&id=56385&catid=71:08&Itemid=385

Arab Times (2018). *Kuwait is not immune to quakes*. Available at: http://www.arabtimesonline.com/news/kuwait-is-not-immune-to-quakes/

Audi, R. (2000). *Epistemology: A Contemporary Introduction to the Theory of Knowledge*, Rutledge, London.

Bartholdson S. and Schreeb J. (2018). *Natural Disasters and Injuries: What Does a Surgeon Need to Know*? Curr Trauma Rep. 2018; 4(2): 103–108. Published online 2018 Mar 23. doi: 10.1007/s40719-018-0125-3.

The Ayatollah's Nuclear Gamble. (2012). *The Human Cost of Military Strikes against Iran's Nuclear Facilities*. Visited on: 1/7/2015. Available at: http://nucleargamble.org/

Baird, A. O'Keefe, P., Westgate, K. N. & Wisner, B. (1975). *Towards an Explanation and Reduction of Disaster Proneness*. University of Bradford: Disaster Research Unit. Occasional paper no.11. pp. 50. Aug.

Behbehani K. (2013). *Kuwait National Programme for Healthy Living: First 5-Year Plan*. (2013-2017). Med Princ Pract. 2014 Apr; 23(Suppl 1): 32–42. Published online 2014 Mar 19. doi: 10.1159/000358884. PMCID: PMC5586954. PMID: 24662472

Bekhet A. & Zauszniewski J. (2012). Methodological Triangulation: An Approach to Understanding Data. *Nurse Researcher*, Vol. 20, No. 2 (November 2012): 40-43. DOI. © RCN

Berg, B. L. (2001). *Qualitative Research Methods for the Social Sciences*. California State University, Long Beach

Bergstrand K, Mayer B, Brumback B, and Zhang Y (2015). *Assessing the Relationship Between Social Vulnerability and Community Resilience to Hazards*. PMCID: PMC5739329. NIHMSID: NIHMS896778. PMID: 29276330. Soc Indic Res. 2015 Jun; 122(2): 391–409.

Bou-Rabee, F. & Nur, A. (2002). The 1993 M4.7 Kuwait earthquake: Induced by the burning of the oil fields. *Kuwait Journal of Science and Engineering, 29*(2), 155-163.

Bou-Rabee, F. (2004). The needs for seismic risk and vulnerability assessment in Kuwait and other Arabian Gulf countries. *Arab Gulf Journal of Scientific Research, 22*(3), 117-129.

Bradford, T. (2009). *Disaster & Catastrophe Lecture Note*. University of Central Lancashire. UCLAN England.

British Geological Survey (2016). Natural Hazards Partnership [online]. Available at: www.bgs.ac.uk/research/earthHazards/naturalHazardsPartnership.html

Bronfman NC, Cisternas PC, Repetto PB, Castañeda JV (2019). Natural Disaster Preparedness in a Multi-Hazard Environment: Characterizing the sociodemographic profile of those better (worse) prepared. PLoS ONE 14(4): e0214249. https://doi.org/10.1371/journal.pone.0214249

Bryman, A. (2004). *Social Research Methods*. New York, Oxford University Press.

Canadian Centre for Occupational Health and Safety CCOHS (2019). *Risk Assessment*. OSH Answers Fact Sheets. Available at:

https://www.ccohs.ca/oshanswers/hsprograms/risk_assessment.html

Carr, L. J. (1932). Disaster and the sequence-pattern concept of social change. *The American Journal of Sociology*, *38*(3), 207-218.

Carter, W. N. (1991). *Disaster Management: A Disaster Manager's Handbook*. Asian Development Bank, pp. 417.

Cebulla, M. (2004). *Modeling Concepts for Safety Related Requirements in Sociotechnical Systems*. In Heisel, M., et al. (eds.) SAFECOMP 2004, Berlin & Heidelberg: Springer-Verlag.

Chapman, D. W. 1962. *A brief Introduction to Contemporary Disaster Research in Man and Society in Disaster*. (by Baker, G.W. & Chapman, D.W.). Basic Books, Inc. New York. pp. 431.

Chen W. Zhai G. Ren C. Shi Y. and Zhang J. (2018). *Urban Resources Selection and Allocation for Emergency Shelters*: In a Multi-Hazard Environment. Int J Environ Res Public Health. 2018 Jun; 15(6): 1261. Published online 2018 Jun 14. doi: 10.3390/ijerph15061261. PMCID: PMC6025408. PMID: 29903997

Coetzee, C. (2009). *The Development, Implementation and Transformation of the Disaster Management Cycle*. North-West University, Potchefstroom Campus. Visited on: 5/5/2015. Available at: http://acds.co.za/uploads/thesis/christocoetzee_m.pdf

Coetzee, C. (2009). *The Development, Implementation and Transformation of the Disaster Management Cycle*. North-West University, Potchefstroom Campus. Visited on: 5/5/2015. Available at: http://acds.co.za/uploads/thesis/christocoetzee_m.pdf

Coetzee C., Van Niekerk D. (2012), 'Tracking the evolution of the disaster management cycle: A general system theory approach', *Jàmbá: Journal of Disaster Risk Studies* 4(1), Art. #54, 9 pages.

Colin E. (2004). *Decision Aiding Analyzing cognitive maps to help structure issues or problems*. University of Strathclyde Graduate School of Business, 199 Cathedral Street, Glasgow G4 1QU, Scotland, UK. European Journal of Operational Research 159 (2004) 673–686

Collis J. and Hussey R. (2013). Business research: A practical guide for undergraduate and postgraduate students. Macmillan International Higher Education

Country Meters (2015). The Demographic Profile of Kuwait. Visited on: 5/7/2015. Available at: http://www.escwa.un.org/popin/members/kuwait.pdf

Cox L. (2012). *International Series in Operations Research & Management Science. Improving Risk Analyse*. ISBN 978-1-4614-6058-9 (eBook). Colorado, USA

CRS Report for Congress. (2007). *The Department of Homeland Security's Risk Assessment Methodology: Evolution, Issues and Options for Congress*. February 2, 2007.

CSB (2012). Central Statistic Beareau - Kuwait. Available at: https://www.csb.gov.kw/Default_EN

Cutter, S. L. (1996). Vulnerability to Environmental Hazards. *Progress in Human Geography, 20* (4), 529–539.

Damon P. (2015). Introduction to International Disaster Management. 3ed Edition.

Des-Inventar, (2016). Inventory System of the Effects of Disasters. Available at: https://www.desinventar.org/

Denscombe M. (2014). The Good Research Guide for Small-Scale Research Project. 5th. Edition. Open University Press, England

Disaster Management Act. (2015). *Queensland State Disaster Management Plan.* Reviewed May 2015. © The State of Queensland (Queensland Police Service) 2015.

Disaster Management Framework for Afghanistan. (2003). Visited on: 1/7/2015. Available at: http://saarc-sdmc.nic.in/pdf/afghanistan/file1.pdf

Disaster Mitigation Act Of 2000. Public Law 106–390—Oct. 30, 2000.

Disaster Management Amendment Act, (2015). Republic of South Africa. Vol. 606. Cape Town

Dombrowsky, W. R. (1981). *Another Step Toward a Social Theory of Disaster*. University of Delaware: Disaster Research Center. Preliminary Paper 70. pp 10.

Disaster Management Strategic Policy Framework (2005). The State of Queensland (Department of Emergency Services) 2005. Department of Emergency Services

Du Y., Ding Y., Li Z., and Cao G. (2015) The role of hazard vulnerability assessments in disaster preparedness and prevention in China. Mil Med Res. 2015; 2: 27. Published online 2015 Nov 24. doi: 10.1186/s40779-015-0059-9. PMCID: PMC4657270. PMID: 26605045

Dynes, R. R. and Quarantelli, E. L. (1992). *The Place of the 1917 Explosion in Halifax Harbour in the History of Disaster Research*: The work of Samuel H. Prince (Paper presented at Conference on 'The 1917 explosion: Collision in Halifax harbour and its consequences.' Organised by The Gorsebrook Research Institute for Atlantic Studies, held at St. Mary's University, Halifax, Nova Scotia from 3-6 December 1992. Halifax. pp.1-22).

Easterby-Smith, M., Thorpe, E., & Lower, A. (2002). *Management Research: An Introduction*. London, SAGE.

ESRI. (2012). *What is GIS*? Available at: http://www.esri.com/library/bestpractices/what-is-gis.pdf

FEMA. (2014). *The Federal Emergency Management Agency.* Visited on: 1/6/2015. Available at: http://usasearch.fema.gov/search?query=emergency+management+life+cycle&op=Search&affiliate=fema

FEMA (2018). The Federal Emergency Management Agency. The Department of Homeland Security. Available at: https://www.fema.gov/what-mitigation

FEMA Mitigation Core Capabilities (2018). FEMA Core Capabilities. Available at: https://www.fema.gov/core-capabilities

Fiedrich F. (2013) Integrated Emergency Management System. In: Bobrowsky P.T. (eds) Encyclopedia of Natural Hazards. Encyclopedia of Earth Sciences Series. Springer, Dordrecht

Folkestad, B. (2008). Analysing Interview Data Possibilities and Challenges. Working Paper No.13. December 2008. EUROSPHERE Copyright .

Galvani A. Bauch C. Anand M. Burton H. Singer B. and Levin S. (2016). *Human–environment interactions in population and ecosystem health.* Proc Natl Acad Sci USA. Dec 20; 2016. 113 (51): 14502–14506. Published online 2016 Dec 8. doi: 10.1073/pnas.1618138113. PMCID: PMC5187669. PMID: 27956616.

Garbarino S. and Holland J. (2009). Quantitative and Qualitative Methods in Impact Evaluation and Measuring Results. March 2009. GSDRC Governance and Social Development Resources Centre.

Gencer E., (2013). *The Impact of Globalization on Disaster Risk Trend: A Macro and Urban Scale Analysis*. Geneva – Switzerland

GCC (2013). The Gulf Cooperative Countries Center for Emergency Management Leaflet.

Global Terrorism Index (2016). The Institute for Economics and Peace. *Measuring and Understanding the Impact of Terrorism*. Available at: http://visionofhumanity.org/app/uploads/2017/02/Global-Terrorism-Index-2016.pdf

Goertz G. & Mahoney J. (2012). Concepts and measurement: Ontology and epistemology. Volume: 51 issue: 2, page(s): 205-216. Published online: May 24, 2012; Issue published: June 1, 2012

Gov. UK. (2013) Risk Assessment: how the risk of emergencies in the UK is assessed [online]. Available at: https://www.gov.uk/guidance/risk-assessment-how-the-risk-of-emergencies-in-the-uk-is-assessed

GOV.UK. (2017). *National Risk Register of Civil Emergency*. Cabinet Office, UK, Crown Copyright.

GRIP. (2009). *Regional Strategy for Disaster Risk Assessments in the SEE Region*. Global Risk Identification Programme. UNDP.

Greenberg M., Dunning L., and Dunning G. (2012). Worrying About Terrorism and Other Acute Environmental Health Hazard Events. Am J Public Health. April 2012; 102(4): 651–656.

Published online 2012 April. doi: 10.2105/AJPH.2011.300434. PMCID: PMC3489373. PMID: 22397346.

Gross M. Canetti D. and Vashdi D. (2017). The psychological effects of cyber terrorism. PMCID: PMC5370589. NIHMSID: NIHMS817956. PMID: 28366962. Bull At Sci. 2016; 72(5): 284–291. Published online 2016 Aug 4. doi: 10.1080/00963402.2016.1216502.

Guide to Risk Assessment in Major Emergency Management. (2010). *A Framework for Major Emergency Management*. Document 1. January 2010.

Guidelines for Evaluation and Research in the *"Utstein Style"*, (2016) Chapter 4: Conceptual model: Hazard, risk, vulnerability and damage. *Prehosp Disast Med* 2016;17 (Suppl 3):56–68.

Gupta, A. K. & Nair, S. S. (2012). *Environmental Legislation for Disaster Risk Management*. National Institute of Disaster Management. Ministry of Home Affairs, IIPA Campus, New Delhi & Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Germany. ISBN 978-81-924336-7-7. ©NIDM & GIZ, 2012.

Haerifard S., Jarahi H., Pourkermani M. and Almasian M. (2018). *Seismic Hazard Assessment at Esfaraen–Bojnurd Railway, North–East of Iran*. January 2018, Volume 52, Issue 1, pp 151–156.

Haddow, G., Bullock, J., & Coppola, D. (2011). *Introduction to Emergency Management*. Fifth Edition. Copyright Elsevier Inc.

Hamza A. A. (2013). Emergency Management Centre. A role model for the Middle East and beyond. Available at: https://www.preventionweb.net/files/30605_1gccdisastermanagementcenter.pdf

Hans De Smet H. Schreurs B. Leysen J. (2015). The Response Phase of the Disaster Management Life Cycle Revisited Within the Context of "Disasters Out of the Box. Article *in* Journal of Homeland Security and Emergency Management 12(2):- · June 2015 *with* 182 Reads. DOI: 10.1515/jhsem-2015-0005.

Heinz, P. B. (2010). *Risk Management: Procedures, Methods and Experiences, Vol.1*. 2010, June. RT&A # 2 (17).

HFA, (2005-2015). *Hyogo Framework for Action 2005-2015.* Building the Resilience of Nations and Communities to Disasters. The United Nation International Strategy for Disaster Reduction.

Homeland Security (2014) Overview of the National Planning Frameworks.

Homeland Security Affairs (2018). *Assessing Homeland Security Risks: A Comparative Risk Assessment of 10 Hazards*. Available at: https://www.hsaj.org/articles/7707.

Horowitz M. (2015). *The Rise and Spread of Suicide Bombing*. Annual Review of Political Science. Vol. 18:69-84 (Volume publication date May 2015) First published online as a Review in Advance on February 11, 2015.

HM Government (2009). Emergency Response and Recovery, Third Edition, UK Government.

IAEA (2015). International Atomy Energy Agency. Visited on: 30/6/2015. Available at: https://www.iaea.org/technicalcooperation/Home/Highlights-Archive/Archive-2014/04102014-Gulf.html

IFRC, 2015. The International Federation of Red Cross and Red Crescent National Societies. Available at: http://www.ifrc.org/en/what-we-do/disaster-management/about-disaster-management/

Irfandhi K. (2016). Risk Management in Information Technology Project: an empirical study. ComTech Vol. 7 No. 3 September 2016: 191-199

Ismail N., Kinchin G., Edwards J., (2018). Pilot Study, Does It Really Matter? Learning Lessons from Conducting a Pilot Study for a Qualitative PhD Thesis. International Journal of Social Science Research ISSN 2327-5510. 2018, Vol. 6, No. 1

ISO (2002). Risk Management Vocabulary. ISO/IEC Guide 73.

Jabareen, Y. (2009). Building a Conceptual Framework: Philosophy, Definitions, and Procedure. *International Journal of Qualitative Methods*, 49–62. https://doi.org/10.1177/160940690900800406

Joint Research Centre (2016). Guidelines for Harmonized Vulnerability and Risk Assessment for Non-Nuclear Critical Infrastructure. ISBN 978-92-79-64606-5 - ISSN 1831-9424 - doi:10.2788/10912. European Union, 2016.

Johnson R. (2000). GIS Technology for Disasters and Emergency Management. An ESRI White Paper. May 2000.

Kellman, I. (2007). Disaster Management Cycle vs. Disaster Management Rut. *Radix Digest, 69* (2).

KFSD (2015). The Official Website of Kuwait Fire Service Directorate. Visited on: 2/5/2015. Available at: http://www.kfsd.gov.kw/

Khan, H., Giurca, L. & Khan, A. (2008). Disaster Management Cycle – A Theoretical Approach. Visited on: 5/6/2015. Available at: http://www.mnmk.ro/documents/2008/2008-6.pdf

Kuwait Government (2016). Governorates of Kuwait Online. The State of Kuwait. Available at: https://www.e.gov.kw/sites/kgoenglish/Pages/Visitors/AboutKuwait/KuwaitGovernorates.aspx

Kuwait Country Report (2018). Transformation Index. Available at: https://www.bti-project.org/en/reports/country-reports/detail/itc/kwt/ity/2018/itr/mena/

Kuwait Times (2018). Kuwait Times - Local News Paper. Visited on 5/6/2018. Available at: http://news.kuwaittimes.net/website/shuaiba-oil-refinery-fire-not-terror-act-knpc-shuts-down-shuaiba-refinery-after-fire/

KNSN, (2009). Kuwait National Seismic Network. FDSN Network Information. Available at: https://www.fdsn.org/networks/detail/KW/

KUNA, 2018. Kuwait News Agency. Available at: https://www.kuna.net.kw/ArticleDetails.aspx?id=2757567&language=en#

Law on Safety and Health at Work (2005). Službeni glasnik Republike Srbije101/05, Beograd

Liamputtong P. (2011). *Focus Group Methodology: Introduction and History.* In Focus Group Methodology: Principles and Practice. Counseling and Psychotherapy, Health, Sociology. Online ISBN: 9781473957657.

Lima H, Alvino-Borba, Pinheiro A, Lima A, Almeida J. (2013). *Impacts of natural disasters on environmental and socio-economic systems: what makes the difference*? Ambient. soc. vol.16 no.3 São Paulo July/Sept. 2013. *On-line version* ISSN 1809-4422.

MacDonald, S. & Headlam, N. (2015). *Research Methods Handbook*: *Introductory guide to research methods for social research.* Visited on: 10/7/2015. Available at: http://www.cles.org.uk/wp-content/uploads/2011/01/Research-Methods-Handbook.pdf

Maqbool M. Hussain S. Khan M. (2017). *Institutional Framework for Disaster Risk Management in Pakistan*: Issues, Challenges and Policy Recommendations. Abasyn Journal of Social Sciences. Volume 10, Special Issue November 2017: Disaster Risk Management and Climate Change for Business Continuity and Sustainable Development

McEntire D. (2014). Development, disasters and vulnerability. Disaster Prevention and Management, Volume 13· Number 3 · 2004 · 193-198

Metrological Department (2017). The State of Kuwait Directorate General of Civil Aviation. Available at: https://www.met.gov.kw/Forecasts/kuwait.php

Mertens, D. M., & Hesse-Biber, S. (2012). Triangulation and Mixed Methods Research: Provocative Positions. *Journal of Mixed Methods Research*, *6*(2), 75–79. https://doi.org/10.1177/1558689812437100

Miles, M. B., & Huberman, A. M. (1994). Qualitative data analysis: An expanded source book (2nd ed.). Newbury Park, CA: Sage.

Mokhtari, M. (2011). *Tsunami in Makran Region and Its Effect on the Persian Gulf*. International Institute of Earthquake Engineering and Seismology, Iran. Available at: http://cdn.intechopen.com/pdfs/24941/InTechTsunami_in_makran_region_and_its_effect_on_the_persian_gulf.pdf

National Disaster Management Authority (2007). National Disaster Management Framework. Government of Pakistan.

National Disaster Recovery Framework, (2018). FEMA. Official website of the Department of Homeland Security. Available at: https://www.fema.gov/national-disaster-recovery-framework

National Disaster Management Guidelines (2017). *Cultural Heritage Sites and Precincts*. National Disaster Management Authority. Government of India

National Policy on Disaster Management (2005). India. Visited on: 28/7/2016. Available at: http://ndmindia.nic.in/NPDM-101209.pdf

NationMaster.com. (2003-2012). Maps of Kuwait. Visited on: 30/5/2015. Available at: http://maps.nationmaster.com/country/ku/1

Neal, D. M. (1997). Reconsidering the phases of disaster. *International Journal of Mass Emergencies and Disasters, 15* (2), 239-264.

Nissen E., Tatar M., Jackson J., Allen M. (2011). New views on earthquake faulting in the Zagros fold-and-thrust belt of Iran. Geophysical Journal International, Volume 186, Issue 3, September 2011, Pages 928–944, Published: 01 September 2011.

Nojavan M, Salehi E, and Omidvar B. (2018). *Conceptual change of disaster management models: A thematic analysis*. Jamba. 2018; 10(1): 451. Published online 2018 Apr 19. doi: 10.4102/jamba.v10i1.451.

Nowroozi, A. (1987). Tectonics and earthquake risk of Iran. *Developments in Geotechnical Engineering, 44,* 59-75.

Nyumba T., Wilson K., Derrick C. Mukherjee N. (2017) the use of focus group discussion methodology: Insights from two decades of application in conservation. vol. 2018;9:20–32. Received: 5 March 2017. DOI: 10.1111/2041-210X.12860

The Nuclear Threat Initiative (NTI, 2013). Building Safer World. Visited on: 4/7/2015. Available at : http://www.nti.org/about/

Order No. 897/1997. Ministry of Interior Act. Kuwait (in Arabic).

PACI. (2015). The public authority for civil information. Visited on: 1/11/2011. Available at: http://stat.paci.gov.kw/arabicgs/

Peterson, K. (2012). *Another Chernobyl-Scale Disaster in the Making* . The Bushehr Nuclear Power Plant in Iran. Visited on: 1/7/2015. Available at: http://nucleargamble.org/ wordpress/wp-content/uploads/2012/12/Omid-Press-Release-12-04-12.pdf

Piazza F, 2007, *Kuwait In Pictures, Visual Geographic Serious,* 2nd Edition

Powell, J. W. (1954). An Introduction to the natural history of disaster. University of Maryland Disaster Research project. Richardson, 2005.

Prince, S. H. (1920). *Catastrophe and Social Change*. Columbia University. pp. 151. Carr, 1932

Queensland Disaster Management Act (2003). Australia Government.

Punch K. (2005). Introduction to Social Research–Quantitative & Qualitative Approaches. London: Sage, 320 pages, ISBN 07619 4416 8

Raj, L., Tony, M. (2004). *Tolley's Handbook of Disaster and Emergency Management*: *Principles and Practice.*

Raikes J. and McBean G. (2016). *Responsibility and liability in emergency management to natural disasters: A Canadian example*. International Journal of Disaster Risk Reduction. Volume 16, June 2016, Pages 12-18.

Rajasekar, S., Philominathan, P., & Chinnathambi, V. (2013). *Research Methodology*. School of Physics, Bharathidasan University, Tiruchirapalli – 620 024, Tamilnadu, India.

Richardson, K. B. (2005.) The phases of disaster as a relationship between structure and meaning: a narrative analysis of the 1947 Texas city explosion. *International Journal of Mass Emergencies and Disasters*, *23*(3), 27-54.

Richards A. (2015). Conceptualizing Terrorism. Published to Oxford Scholarship Online: October 2015. Print ISBN-13: 9780198746966. Published to Oxford Scholarship Online: October 2015.

Ronald W. (2016). DEFINING DISASTER: AN EVOLVING CONCEPT. 6 April 2017. DOI: 10.1007/978-3-319-63254-4_1. In book: Handbook of Disaster Research, pp.3-22

Rout B**.** and Sikdar B. (2017). Hazard Identification, Risk Assessment, and Control Measures as an Effective Tool of Occupational Health Assessment of Hazardous Process in an Iron Ore Pelletizing Industry. Indian J Occup Environ Med. 2017 May-Aug; 21(2): 56–76

Roberta H. & Dorothy F. (2013). Understanding Triangulation in Research. Evidence-based nursing. 16. 10.1136/eb-2013-101494.

Rubin C. (2009). *Long Term Recovery from Disaster. The Neglected Component of Emergency Management*. Journal of Homeland Security and Emergency Management. Volume 6, Issue 1. Rticle 46.

RSOE EDIS. (2016). Emergency and Disaster Information Service. Visited on: 2/8/2016. Available at: http://hisz.rsoe.hu/

Roy, Francis & Ferland, Yaïves. (2015). Land-use Planning for Disaster Risk Management. Land Tenure Journal. 2014. 70-103. Available at: https://www.researchgate.net/publication/281407216_Land-use_planning_for_disaster_risk_management [accessed Sep 17 2018].

Operation and Control (2015). *Kuwait Fire Service Directorate Magazine*. Monthly Magazine. Issue No 566/2015.

Sadek, A. W. (2004). Seismic map for the state of Kuwait. *Emirates Journal for Engineering Research, 9*(2), 53-58.

Sadigh, K., Chang, CY., Egan, JA., Makdisi, F. & Youngs, RR. (1997), 'Attenuation relationships for shallow crustal earthquakes based on California strong motion data', *Seismological Research Letters,* vol. 68, no. 1.

Satish C. (2013). Society of Earth Scientists Series. Springer Verlag Berlin Heidelberg Copyright

Saunders M. & Lewis P. & Thornhill, A. (2009). Research Methods for Business Students. Pearson, New York.

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research Methods for Business Students*. London: Pitman.

Saunders M. Lewis P., & Thornhill A. (2016). Research Methods for Business Students. Pearson 2016

Schmidt-Thomé P. (2003). *The spatial effects and management of natural and technological hazards in general and in relation to climate change*. ESPON Programme, March 2003.

Shaw S. Izumi T. and Shi P. (2016). *Perspectives of Science and Technology in Disaster Risk Reduction of Asia*. International Journal of Disaster Risk Science. 21 December 2016. Volume 7, Issue 4, pp 329–342.

Shimura T. Yamaguchi I. Terada H. Svendsen E. and Kunugita N. (2015). Public health activities for mitigation of radiation exposures and risk communication challenges after the Fukushima nuclear accident. J Radiat Res. 2015 May; 56(3): 422–429. Published online 2015 Apr 9. doi: 10.1093/jrr/rrv013. PMCID: PMC4426935. PMID: 25862700

State Disaster Management Group (2010). *Disaster Management Strategic Policy Framework*. Queensland Government. The State of Queensland Copyright.

Stoddard, E.R., 1968, *Conceptual models of human behaviour in disasters,* Texas Western Press, El Paso

Strategic Plan (2013/2018). Disaster Risk Reduction and Response. A more resilient health sector in the Americas, targeting efficient and innovative approaches

Teijlingen V, Edwin & Hundley, Vanora. (2002). The Importance of Pilot Studies. Nursing standard (Royal College of Nursing (Great Britain) : 1987). 16. 33-6. 10.7748/ns2002.06.16.40.33.c3214.

The Ayatollah's nuclear gamble. (2012). *The Human Cost of Military Strikes against Iran's Nuclear Facilities*. Visited on: 1/7/2015. Available at: http://nucleargamble.org/

The Emergency Events Database (EM-DAT, 2009). The International Disaster Database. Centre for Research on Epidemiology of Disasters. Available at: https://emdat.be/classification

The International Institute for Applied Knowledge Management (2015). What is Risk? Available at: http://www.iiakm.org/

The United Kingdom-Civil Contingency Act. (2004). *Civil Contingencies Act 2004*. Chapter 36. Local Arrangements for Civil Protection. *The Field Turns Fifty: Social Change and the Practice of Disaster Field Work.*

The United States geological survey natural hazards [online]. Visited on: 9/9/2015. Available from: https://www2.usg.gov/natural_hazards/

Toh S. M., Morgeson F.P., & Campion M. A. (2008). Journal of Applied Psychology Copyright 2008 by the American Psychological Association. Vol. 93, No. 4, 864–882 0021-9010/08/$12.00 DOI: 10.1037/0021-9010.93.4.864.

Turner, D. (2010). Qualitative interview design: A practical Guide for Novice Investigators. *The Qualitative Report, 15*(3), 754-760.

UK Aid (2012). *Multi-Hazard Disaster Risk Assessment, Vol. 2*. Department of International Development. © Crown copyright 2012.

UNDP (2010). *Disaster Risk Assessment*. Bureau for Crisis Prevention and Recovery. United Nations Development Programme.

United Nation Development Programme UNDP (2019). About Kuwait. Available at: http://www.kw.undp.org/content/kuwait/en/home/countryinfo.html

UNISDR (2016). *The United Nation Office for Disaster Risk Reduction*. Visited on 30/6/2015. Available at: http://www.unisdr.org/archive/30600

UNISDR (2017). Building Back Better – in Recovery, Rehabilitation and reconstruction. Available at: https://www.unisdr.org/files/53213_bbb.pdf

UNISDR (2017) United Nations Office for Disaster Risk Reduction terminology [online]. Available at: www.unisdr.org/we/inform/terminology

US-AID (2011). *Introduction to Disaster Risk Reduction*. African Centre for Disaster Studies NWU.

US-AID (2014). *Country Development Cooperation Strategy 2014-2017.* Angola. Public Version: January 31, 2014.

USC Library (2016). Research Guide, Organizing Your Social Sciences Research Paper: Theoretical Framework. University of Southern California.

Vaughan, R. (2008). *Conceptual Framework*. Bournemouth University. Visited on: 9/7/2015. Available at: http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=13&sqi=2&ved=0CGcQFjAMahUKEwja5pbuhNvGAhUpK9sKHViABT8&url=http%3A%2F%2Fwww.bournemouth.ac.uk%2Fservice_industries%2Fnews_events_conference

Ventresca, M. J. & and Mohr, J. W. (2001). *Archival Research Methods*. Blackwell Publishers. Available at: http://www.soc.ucsb.edu/faculty/mohr/classes/soc4/summer_08/pages/Resources/Readings/Ventresca%20&%20Mohr.pdf

Wedawatta, G., & Ingirige, B. (2011). *Case study as a research strategy: Investigating extreme weather resilience of construction SMEs in the UK.* Paper presented at the ARCOM Doctoral Workshop, International Conference on Disaster Resilience - 7th Annual International Conference of International Institute for Infrastructure, Renewal and Reconstruction. Kandalama, Sri Lanka.

Williams M. and Sizemore D. (2019). *Biologic, Chemical, and Radiation Terrorism Review*. Treasure Island (FL): StatPearls Publishing; 2019 Jan. Available at: https://www.ncbi.nlm.nih.gov/books/NBK493217/

Willis H., Tighe M., Lauland A., Ecola L., Shelton S., Smith M., Rivers J., Leuschner K., Marsh T., Gerstein D. (2018). *Risk Assessment Methodology. Homeland Security National Risk Characterization*. Paperback ISBN/EAN: 9780833099686. Document Number: RR-2140-DHS**.** Copyright: RAND Corporation.

World Bank (2011). *Disaster Risk Management Programs for priority Countries: Global Facility for Disaster Reduction and Recovery*. 2nd Edition.

World Bank (2013). Middle East & North Africa. Visited on: 30/6/2015. Available at: http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/MENAEXT/0,,contentMDK:22716680~pagePK:146736~piPK:226340~theSitePK:256299,00.html

World Bank (2014). *Natural Disasters in the Middle East and North Africa*: *A Regional Overview*. © 2014 The International Bank for Reconstruction and Development.

World Disaster Report (2014). Focus on Culture and Risk. The International Federation of Red Cross and Red Crescent Societies Copyright 2014.

Zainal Z. (2007). Case study as a Research Method. Faculty of Management and Human Resource Development Universiti Teknologi Malaysia. *Jurnal Kemanusiaan bil.9, Jun 2007*

Zanon A. (2014). *Natural Disasters in the Middle East and North Africa*: *A Regional Overview*. Urban, Social Development and Disaster Risk Management Unit Sustainable Development Department Middle East and North Africa.

Zhang Y, Hwang S., Lindell M. (2017). *Hazard Proximity or Risk Perception? Evaluating Effects of Natural and Technological Hazards on Housing Values*. Available at: https://journals.sagepub.com/doi/abs/10.1177/0013916509334564

Zodrow, I. & Llosa, S. (2011). Disaster risk reduction legislation as a basis for effective adaptation. Global Assessment Report on Disaster Risk reduction.

Appendix A: Direction and Planned Research Programme

Table 36: Direction and Planned Research Programme

Research Activities	2014	2015				2016				2017				2018
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Literature Review														
Research Design														
Interim Assessment														
Data Collection														
Data Analysis														
Internal Evaluation														
Writing, Submission														

Appendix B: Supervisor Meetings & Training Attended

Table 37: Supervisors Meeting & Training Attended

No	Topic	Facilitator	Date
1	Incident Command System 300 Courses	GCCENC	20/10/2016
2	Discussed the Internal Evaluation Report	Dr Chika	14/9//2016
3	Discussed the conceptual framework	Dr Chika	12/12/2016
4	Discussed the validation of the framework	Dr Chika	19/09/2016
5	Discussed the research methods	Dr Chika	20/01/2017
6	Discussed how to test of the framework	Dr Chika	11/04/2017
7	The preparatory Arab Conference for DRR – Qatar, from 30/04/2017 to 01/05/2017	UNISDR	30/04/2017
8	Discussed the validation & verification	Dr Chika	12/05/2017
9	The International Conference on Disaster Risk Reduction, Mexico, from 22 to 26/05/2017	UNISDR	22/05/2017
10	Discussed the structure of the chapters	Dr Chika	07/07/2017
11	Discussed Chapter 7	Dr Chika	12/07/2017
12	Discussed the final framework	Dr Chika	14/07/2017
13	Research Methods Training - "Mixed Methods Research" to be presented by Dr Nick Davies	Salford, Maxwell 823	12/07/2017
14	Quantitative Research Design and Analysis: Individual Advice Sessions. By Dr Furat Al-Faraj	Salford, Maxwell 432a	26/07/2017
15	Discussed Chapter 8	Dr Chika	31/07/2018
16	Discussed the VIVA	Dr Chika	02/08/2018
17	Discussed the VIVA and conducted Co-VIVA	Dr Chika	22/03/2019
18	Discussed all the guidance provided by the examiners	Dr Chika	27/09/2019

- Dr Chika Udeaja: main supervisor
- UNISDR: The United Nations Office for Disaster Risk Reduction
- GCCENC: Gulf Cooperative Countries Emergency Management Centre

Appendix C: The Semi-Structured Interview Guideline

Interview reference number:

Introduction

The main aim of this interview is to understand the interviewee's perspective about issues related to management disaster in Kuwait; policies, risk assessments and framework. The data collected from the interviews will help the researcher understand the current issues and concepts of disaster management as they currently exist in the context.

Accordingly, there are no right or wrong answers for the questions rather it is a matter of reflecting the interviewee's experience with the phenomena as they were conceived by him/her .

Your Rights

You may decide to stop being a part of the research study at any time without explanation. You have the right to ask that any data you have supplied to that point be withdrawn or destroyed. You have the right to omit or refuse to answer or respond to any question that is asked of you.

You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study's outcome). If you have any questions as a result of reading this information sheet, you may query the researcher at any time.

Section One: General

- As I understand, you have been working in this directorate since _____. Correct me if I am mistaken.
- Which department do you belong to?
- How would you describe the current disaster management policies, the identified hazards and the Disaster Management Framework in Kuwait?
- What are the disasters that you guess will occur in Kuwait?

Section Two: Risk Assessment

- How does your organisation identify disaster hazards?
- How does your organisation evaluate or manage the identified hazards?
- Does your organisation seek help from other agencies to identify hazards?

- Do you think more policies are needed for disaster management in Kuwait?
- Who are the stakeholders involved?
- Strengths?
- Weaknesses?
- How can we further improve the current disaster management process?

Section Three: Disaster Management Framework

- How do you evaluate the current Disaster Management Framework?
- Do you think more work is needed to develop a Disaster Management Framework?
- Who are the stakeholders involved?
- Strengths?
- Weaknesses?
- How can we further improve this stage?

Section Four: Early Warning Procedure

- How do you evaluate the current disaster early warning procedure?
- What is the current early warning procedure? And for which disaster?
- Do you think more Early Warning Systems are needed?
- Who are the stakeholders involved?
- Strengths?
- Weaknesses?
- How can we further improve this procedure?

Section Five: Shelters

- How do you evaluate the current shelters?
- How many people can the shelters in Kuwait withstand/accommodate?
- Strengths?
- Weaknesses?

- How can we further improve this stage?

Section Six: Disaster Communication

- How do you evaluate the current emergency communication methods with other emergency services (fire, ambulance, police, etc.)?
- Strengths?
- Weaknesses?
- How can we further improve this stage?

Section Seven: Disaster Management Policies

- How do the current policies/legislations support your organisation during disaster management?
- Are there any protocols or policies that address the external emergency response (support) during major disasters?
- Are the current policies/legislations sufficient? And why?
- Strengths?
- Weaknesses?
- How can we further improve this stage?

Section Eight: Disaster Awareness

- How do you evaluate the current disaster awareness programmes?
- Do you think that the people in Kuwait are aware of all the disaster hazards?
- Strengths?
- Weaknesses?
- How can we further improve this stage?

Section Nine: External Disaster Response

- Does your organisation have national/regional disaster management plans?
- Does your organisation adopt any regional/international disaster exercises?
- Is your organisation aware of the external disaster hazards?
- Strengths?
- Weaknesses?
- How can we further improve this stage?

Section Ten: Disaster Management Competent

- Does your organisation employ a qualified disaster management employee?
- What are their qualifications?
- How many qualified disaster management employees are in your organization?
- Strengths?
- Weaknesses?
- How can we further improve this stage?

Appendix D: Disaster Group Classifications

Table 38: Grouping of Geophysical Disasters

Disaster Generic Group	Disaster Group	Disaster Main-Type	Disaster Sub-Type	Disaster Sub-sub Type
Natural Disaster	**Geophysical**	Earthquake	Ground shaking	
			Tsunami	
		Volcano	Volcanic eruption	
		Mass movement	Rock fall	
			Avalanche	Snow avalanche
				Debris avalanche
			Landslide	Mudslide Lahar Debris flow
			Subsidence	Sudden subsidence
				Long-lasting subsidence

Table 39: Grouping of Meteorological Disasters.

Disaster Generic Group	Disaster Group	Disaster Main-Type	Disaster Sub-Type	Disaster Sub-sub Type
Natural disaster	**Meteorological**	Storm	Tropical storm	
			Extra-tropical cyclone (winter storm)	
			Local/convective storm	Thunderstorm/ lightning
				Snowstorm/blizzard
				Sand or dust storm
				Generic (severe) storm
				Tornado
				Orographic storm (strong winds)

Table 40: Grouping of Hydrological Disasters.

Disaster Generic Group	Disaster Group	Disaster Main-Type	Disaster Sub-Type	Disaster Sub-sub Type
Natural disaster	**Hydrological**	Flood	General (river) flood	
			Flash flood	
			Storm surge/coastal flood	
		Mass movement (wet)	Rock fall	
			Landslide	Debris flow
			Avalanche	Snow avalanche
				Debris avalanche
			Subsidence	Sudden subsidence
				Long-lasting subsidence

Table 41: Grouping of Climatological Disasters.

Disaster Generic Group	Disaster Group	Disaster Main-Type	Disaster Sub-Type	Disaster Sub-sub Type
Natural disaster	**Climatological**	Extreme temperature	Heat wave	
			Cold wave	Frost
			Extreme winter conditions	Snow pressure
				Icing
				Freezing rain
				Debris avalanche
		Drought	Drought	
		Wildfire	Forest fire	
			Land fires (grass, scrub, bush, etc.)	

Table 42: Grouping of Biological Disasters.

Disaster Generic Group	Disaster Group	Disaster Main-Type	Disaster Sub-Type	Disaster Sub-sub Type
Natural disaster	**Biological**	Epidemic	Viral infectious diseases	
			Bacterial infectious diseases	
			Parasitic infectious diseases	
			Fungal infectious diseases	
			Prion infectious diseases	
			Grasshopper/locust/worms	
		Insect infestation		
		Animal stampede		

Table 43: Grouping of Extra-Terrestrial Disasters.

Disaster Generic Group	Disaster Group	Disaster Main-Type	Disaster Sub-Type	Disaster Sub-sub Type
Natural Disaster	**Extra-terrestrial**	Meteorite/Asteroid		