AN EVALUATION OF THE EFFECTIVENESS OF THE SUPPLY CHAIN IN HANDLING DROUGHT RELIEF DISTRIBUTION: A CASE STUDY OF OKATANA CONSTITUENCY, NAMIBIA

By

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Declaration

I, Frans N Atshipara hereby declare that this research project is the result of my own investigation and research and that it has not been submitted in part or full for any other degree or to any other institution and the work of other researchers and authors have been herein acknowledged accordingly.

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Student signature **Date**

Dedication

This project is dedicated to my daughter Hilma Niita Atshipara and my late father Mr Engelbert Atshipara; it is because of his coaching, upbringing and mentorship that I have achieved so much today.

Acknowledgement

I do hereby take this opportunity to acknowledge all forms of literature, sources of information, and illustrations that might have been used in this document. All the above-mentioned is referred to in the references section. I also acknowledge those who assisted me in this project especially my working colleagues, family and friends who contributed towards the completion of this project.

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Abstract

The purpose of this study was to evaluate the challenges faced by the supply chain during the handling of disaster relief operations and also propose strategies to overcome these challenges. After explaining different phases of disaster relief operations, the literature review discussed the critical role of the supply chain in effective relief distribution within a disaster management cycle focusing especially on the preparation and response aspects of the chain. The theoretical framework examined some relevant theories such as unitisation that were considered suitable for the effective supply chain handling of relief material distribution in Namibia. The study was based on the performance of the supply chain using one governmental organisation and residents of one of the most affected constituencies in Namibia as case studies, namely the Office of the Prime Minister (OPM), the Oshana Regional and constituency offices and the residents of Okatana constituency.

A mixed research method involving both qualitative and quantitative research designs were used during the survey. Data were collected using the questionnaires as the main research instrument and 140 questionnaires were distributed to all participants but only 94 of the questionnaires were returned after persistent efforts and were analysed with Microsoft excel. All data are presented in tables and figures. The findings of this study show that inadequate financial resources, restrictions on transport and difficulties associated with planning for the initial relief requirements of a distressed community are the main challenges affecting the effective handling of the supply chain when distributing the relief materials in Okatana community as well as other communities similarly affected by drought in Namibia.

The study therefore recommended that all agencies involved in the handling of relief materials distribution should be involved in an on-going development activities as well as putting systems in place that could be aligned to standard operating procedures for disaster response. The study therefore made some recommendations that could be useful in establishing an improved supply chain for the effective handling of drought relief distribution both in Okatana constituency as well as in other parts of Namibia.

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Definitions of terms

Logistics is the process of strategically managing the acquisition, movement and storage of materials, parts and finished inventory and related information flows through an organization and its marketing channels to fulfill orders most cost – effectively – does add value and can play a vital part in organizational profitability (Mangan, Lalwani, & Butcher, 2008).

Supply chain is the network of organizations that are involved, through upstream and downstream linkages in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer (Mangan, Lalwani, & Butcher, 2008).

Drought has been defined as an extended and continuous duration of very dry weather (Jones et al, 1990)

Disaster is a natural or artificial event occurring with or without warning, causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope with its effects using their own resources.

Humanitarian logistics is the aspect of the supply chain relating to the planning, implementing and controlling of the flow of humanitarian materials, goods and other resources from the source or point of origin to their final destination to meet the requirements of disaster victims who are the end-users (Balcik et al., 2010).

List of abbreviations

CRO	-	Chief regional officer
ERP	-	Enterprise resource planning
HFA	-	Hyogo framework for action
NDP	-	National disaster plan
NGOs	-	Non-governmental organisation
NPC	-	National planning commission
NRCS	-	Namibia Red Cross Society
OPM	-	Office of the Prime Minister
PAHO	-	Pan American Health Organisation
SCM	-	Supply chain management
SCRM	-	Supply chain risk management
SCSO	-	Supply chain security orientation
SFDRR	-	Sendai framework for disaster risk reduction
TMS	-	Transport management system
WMS	-	Warehouse management system
UNISDR	-	United Nations Office for Disaster Risk Reduction

Chapter One

Introduction and Background to the study

1.1 Introduction

Namibia is affected regularly by natural disasters, one of the most common being drought. Drought has been particularly harmful to the economy of the affected communities particularly in the country's seven northern regions namely: Oshana, Omusati, Oshana, Caprivi, Kavango, Oshikoto and Hardap Region (Wilhelm, 2012). Drought has brought the destruction of agriculture as well as the destruction of businesses. In addition to that, floods and drought have caused structural damage and loss of life and livelihoods with long-term effects on Namibia's development (Ministry of Education, 2015). Therefore, it has become essential for the Government, through the Office of the Prime Minister (OPM) and international humanitarian agencies such as the Namibia Red Cross Society (NRCS), to supplement the efforts of Regional and local governments in alleviating the huge demand during disasters (Sebbah, Boukhtouta & Ghanmi, 2012). Disaster management in the country involves the government, the military, humanitarian organisations and the community members in order to effectively handle the distribution of relief materials to the victims (Sweet, 1998). During disaster situations, the actors have little encouragement of working together for an extensive period of time as the aid agencies are unexpectedly faced with pressure to use their resources to capacity in assisting and mitigating the disruptions and the widespread losses affecting the victims (Wilhelm, 2012). This study focused on evaluating the effectiveness of the supply chain during the handling of drought relief distribution in Okatana constituency, Oshana region Namibia. It also sought to find solutions to the regular hindrances of the effectiveness of the supply chain systems when handling the distribution of relief materials.

1.2 Background of the study

Namibian regions receive less than 300 mm annual rainfall and drought has been a recurrence phenomenon every after second year in the country (Namibian Metrological Services, 2016). Major droughts affecting large portions of the country are believed to have occurred as far back as the 1930s and for an extended period in the 1960s and ended in the 1971 season which was declared the most devastating drought experienced to date in the country (Namibian Disaster Management Plan, 2015). Drought disasters occurred between 1982 and 1984 as a result of poor rainfall during those three consecutive years and again followed by another drought between 1992 and 1993 still due to rain deficiency (Sweet, 1998). Disasters in general have over the years resulted in 24 000 deaths, displaced more than 608 million people and caused damages amounting to $27 billion worldwide annually (Hoyois et al, 2007). The given numbers are alarming and show the effects of natural disasters such as floods, droughts, as well as man-made disasters such as major accidents. The Namibian Disaster Management Act 10 of 2012 defined a disaster as any event which causes widespread human suffering and that is characterized as an event that causes breakdown in the community's normal functioning and that overpowers local response capability. All disasters both natural and manmade have extensive measure of human suffering and any delay in distribution of reliefs at any given disaster can have negative consequences.

Disaster relief encompasses many of the same logistic processes such as ordering, receiving, sorting, storage and dispatching which are encountered in the non-humanitarian sectors. Logistics processes have recently been adopted during disaster aid distribution and recovery (Sweet, 1998). Humanitarian logistics is gradually developing as an independent component within the supply chain and logistics management. Humanitarian logistics is defined as the process and systems involved in activating people, resources, skills, and knowledge to help

vulnerable people affected by disasters and complex emergencies (Thomas, 2003). Thomas (2003) further stated that the discipline consists of activities similar to non-humanitarian sector logistics such as transport, tracing, tracking, customs clearance, local transportation, warehousing, delivery, and procurement.

The Pan American Health Organisation (PAHO) (2003) noted that it is vital to acknowledge that the logistics components are co-related and they are like links in a chain that depend on each other, thus a poor functioning of anyone of them will adversely affect the performance of others. During emergency humanitarian logistics, disaster managers should acknowledge the value of time rather than transportation value. This implies that it is critical to transport relief products quickly with whatever quicker available mode of transport at that time than using slower transport in order to curb costs. Logistics is critical as it allows for a quicker assessment of need and thus rapid mobilisation of personnel, equipment, and material in response. Inventory management during drought relief distribution is unique in that the time value of the products is much greater than the inventory carrying costs. Expediting deliveries is the foundation of humanitarian logistics and thus having the food available and moving it as rapidly as possible is much more important than holding minimal stock levels (Lee & Zbinden, 2003).

Various governments and non-governmental organisations (NGOSs) alongside other private organisations avail financial, human and other tangible resources to assist victims of disasters in the form of donations. The number of different role players involved in providing humanitarian assistance complicates efforts to improve coordination (Balcik & Beamon, 2008). Various organisations that deal with different aspects and specialties provide various levels of assistance, sometimes creating inefficiencies by duplicating efforts. This is why this research also addresses effectiveness in their logistics processes. Okatana Constituency the main area for the study has been receiving drought relief since the last outbreak. There have

also been various reports in Namibian dailies of issues with drought relief (Staff Reporter, 2016; Kahiurika, 2016). These also became the focus of discussions at various conferences, seminars and other events on drought relief distribution (Haufiku, 2013).

1.3 Description of the study area

The study area is Okatana constituency in Oshana region, Namibia, with a total estimated population of 15 562 (NPC, 2012). The Okatana village is four kilometres away from Oshakati, which is a hub for all the shopping centres and financial institutions in the region. Okatana which is located on the Okatana River and a former Catholic mission station is the centre of Okatana Constituency. The climate in the area is classified as humid subtropical.

Residents of this constituency make their living mostly on their agricultural and animal outcomes. Lack of sufficient rainfalls results in poor harvesting and animal deaths, which have a negative impact on their livelihood. Like other parts of Namibia, the area is faced with high unemployment and increased poverty amongst others.

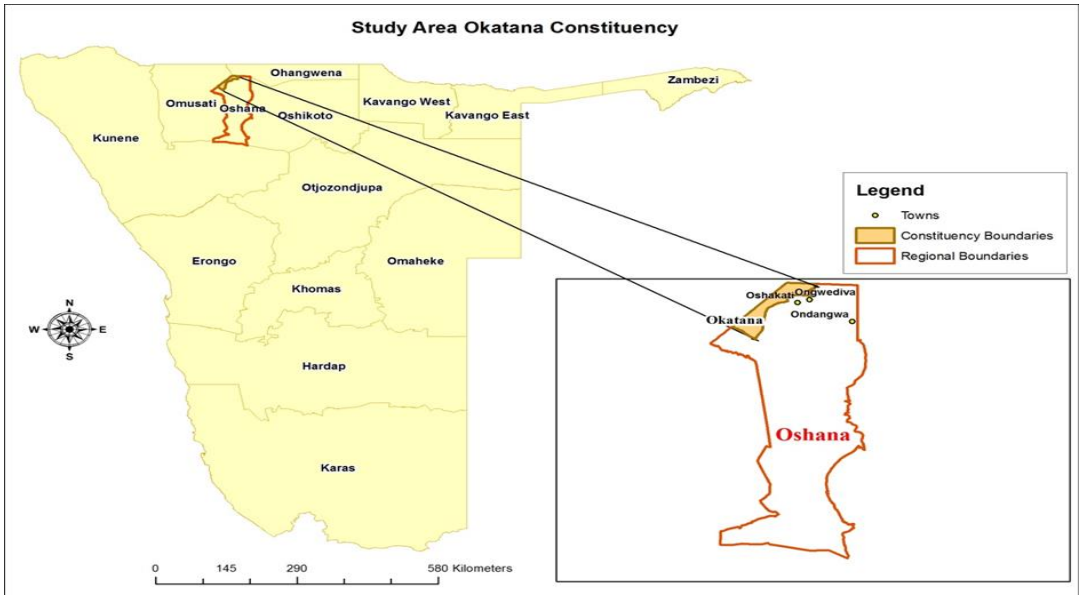

Figure 1: Location of Okatana Constituency in Namibia

1.4 Problem Statement

There is no existing model for employing supply chain management (SCM) techniques to provide relief to those communities affected by disasters in Namibia. Namibia has over the years been affected by devastating drought due to rain deficiency (See Table 1). In its attempts to lessen the drought situation, the government of the Republic of Namibia always responds to its citizens' outcry by availing funds through the office of the prime minister to mitigate the drought effect.

Table 1: Occurrence and Effect of Droughts in Namibia (1982–2015)

Year	Occurrence	Affected	Total affected	Total damage
1982	1			
1991	1	250000	250000	50000
1995	1	163200	163200	
1998	1	25000	25000	1000
2001	1			
2002	1	345000	345000	
2013	1	331000	331000	64000
2015	1	580000	580000	

Source: EM-DAT database

A rapid assessment done by the Office of The Prime Minister in 2015, noted that the speed by which the drought relief commodities reach the intended targets moves at a slower pace due to ineffectiveness within the supply chain. Moreover, relief commodities aimed at addressing the drought disaster get rotten in warehouses due to misadministration within the supply chain thus tax payers money gets wasted in the process (The Namibian, 2005). For managers within the humanitarian sectors, coordinating logistics during a relief effort is often a critical task if loss of lives is to be prevented hence effectiveness within the supply chain should be advocated. This study is critical because its findings could identify the causes of

ineffectiveness within the drought supply chain and lives of people that could have been at stake due to poor management of drought aid will be saved.

1.5 Study aim and objectives

The aim of the study was to evaluate the effectiveness of the supply chain during the handling of drought relief aids in the Okatana constituency. Hofstee (2006) stated that, it is of paramount importance for the author to clarify at the outset of what s/he wants to achieve with the study and that naming the objectives is critical if the aim of the study is to be realized.

The specific objectives of this study were:

- To investigate the causes of delays in handling the distribution of materials within the drought relief supply chain.
- To identify ways of improving effectiveness of the supply chain system in handling the distribution of relief materials.
- To make recommendations to governmental and humanitarian agencies that can lead to improvements within the supply chain.

1.6 Research questions

When there is no sufficient knowledge about the problem statement, research questions are used sometimes to allow the thesis to be formulated or convincingly argued (Hofstee 2006). Thus, asking specific question to gain more insight about the problem is critical in realizing the aim and objectives of the study.

The study attempted to answer the following research questions:

- What are the main causes of delays within the drought humanitarian supply chain in Namibia?

- How can the effectiveness of the supply chain system in handling the distribution of relief materials be improved?
- What recommendations can be suggested to the governmental and humanitarian agencies in order to improve effectiveness within this supply chain?

1.7 Delimitation of the research

Namibia is a large country with 14 Regions. The drought which is the disaster in question has also affected a very large area covering all 14 regions in the country. Due to the size of the country, time and financial constraints, the researcher purposively concentrated the studies on Okatana constituency in Oshana region, Namibia. The strategy of delimiting the study to a narrow area makes the study more specific as opposed to a generalized one.

1.8 The significance of the research

The study of evaluating the effectiveness within the drought relief distribution supply chain in Okatana constituency is of significance not only to those that benefit from such initiative but also to those that work within this supply chain and disaster management at large. This study is unique in itself, since it was never conducted in this constituency and country at large. The study explored the weaknesses of government and other agencies working in this field, so that best practices could be identified and implemented to avoid delays in reliefs' distribution and enhance effectiveness of drought relief supply chain to avoid loss of lives. Research of this nature contributes to the field of disaster management at all levels of both government and private entities by providing an analysis of current drought disaster relief material distribution preparedness capabilities within the constituency and country at large. By embarking on this study, deep understanding of preparedness of the humanitarian agencies and supply chain effectiveness has been established.

The study can lead to improved logistics management within the drought relief supply chain network around the country as it provides strategies that can strengthen the effectiveness within the humanitarians supply chain. Furthermore, it enables them to deliver relief products to the affected communities in a timelier manner hence saving lives. The Namibian government has long recognized and acknowledged the importance of supply chain management and it has therefore introduced a logistic programme at the then Polytechnic of Namibia (Namibia University of Science and Technology) aimed at addressing the skills shortage in the industry. The findings of this study will enable the government of the Republic of Namibia to identify the causes of delay of relief materials distributions in the country and how best the problem can be addressed. The study further strengthens the capabilities of humanitarian agencies in the country in the effective handling of supply chain system by recruiting competent officials that can be more effective in relief material distributions.

1.9 Conclusion

This chapter focused on the introduction and background to the research. It covered the research problem as well as the research objectives, its significance and limitations. The next chapter examines the theoretical and legislative framework relevant to the effective distribution of relief materials during disasters and underpinned this research.

Chapter Two

Theoretical and Legislative Framework

2.1 Introduction

This chapter is divided into two sections. The first section contains the theoretical framework that underpins this study on the effectiveness of the supply chain in handling drought relief distribution in Namibia with a special focus on Okatana constituency. The second section examines the legal framework guiding disaster management in Namibia. The chapter describes disaster management cycle as a theory within the context of humanitarian logistics stream and defines the concepts of humanitarian supply chain management (SCM) as a theory that is guiding this study. Further it explains the supply chain risk management (SCRM), integrated supply chain management, and the supply chain systems theory among others and linked them to the situation in Namibia.

2.2 Disaster management cycle

The United Nations International Strategy for Disaster Risk Reduction (UNISDR) (2004) defines disaster management as the systematic process of using administrative decisions, organisation, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. The disaster management theory known as the continuum comprises all forms of activities, including structural and non-structural measures to prevent or to limit the adverse effects of hazards. According to Bullock and Haddow (2004), disaster management is the discipline of dealing with and avoiding risks. They view it as a discipline that involves preparing for disaster either before or after its occurrence that is through emergency or rapid response to disasters as well as supporting and rebuilding the affected community. In general, any emergency management is a continuous process by

which all individuals, groups, and communities manage hazards in an effort to avoid or ameliorate the impact of disasters resulting from the hazards. According to Van Wassenhove (2006), disaster relief is about 80 % logistic that only requires efficient and effective logistics operations and more precisely, supply chain management to succeed. He further argued that successful response to a disaster cannot be improvised because the better the preparation the more effective the response. Preparation is very important because disaster always come in a cycle just as disaster management also comes in a cycle of phases that had generally been identified by many scholars (Lin Moe & Pathranarakul, 2006; Vasilescu, Khan & Khan, 2008) namely:

i) Mitigation;

ii) Preparation;

iii) Response;

iv) Reconstruction

Figure 2: Disaster management continuum

The preparation phase generally refers to all operations that might occur before a disaster strikes. This phase includes the strategies put into place for the successful implementation of operational response. It is a very important phase because preparation can mean the difference between a successful or failed operation. One of the critical aspects of preparation phase is inventory since the timely response to a disaster depends on the relief distributors not running out of relief materials and being able to delivered as quickly as necessary.

The response phase is another critical phase and is usually the greatest cost in distribution. It corporates all operations implemented immediately following a disaster thus both preparation and response are keys stages in this study. According to Cozzolino, Rossi and Conforti (2012), the objectives of the response phase are two-fold:

i) The immediate response phase – silent or temporary network is activated.

ii) The restoration phase – basic services and goods are delivered to the highest possible number of beneficiaries in the shortest possible time. This involves mitigating the damages to the beneficiaries and accelerates recovery and reconstruction.

2.3 Theoretical framework for an effective supply chain in the distribution of relief materials

There are separate elements within the supply chain function: cargo, vessels, ports, people, information and financing (Rushton, Croucher & Baker, 2014). Most analysts have either focused on the complete supply chain as an abstract entity or on an individual element of the chain and most of them do not discuss the effectiveness of integrating the supply chain in handling drought relief distribution at all. Instead, their concern has mostly been with the impact of the supply chain on trade, vessel network resilience, and congestion in ports. A few researches, however, focused on the linkage between effective supply chain networks and distribution of materials (Autry & Bobbitt, 2008). An overview of the literature associated

with various theoretical approaches that are linked to the effectiveness of the supply chain in handling distribution of materials is presented below:

2.3.1 Supply chain integration approach

Many humanitarian organisations are not performing effectively today due to their fragmented functional structure. With a fragmented approach to aids distribution, they have to manage functions rather than processes. It is also difficult for organisations like these to reflect external integration when they lack internal integration. Organisations that have got over this problem only have to design close linkages with their supply chain partners so as to make logistics managers view their specific functions as part of a process and not just stand-alone activities. One of the most important keys to successful supply chain integration is the transparent flow of information from one end of the chain to the other (Lin Moe & Pathranarakul, 2006). With this, supply chain partners are able to respond more rapidly to emergency demands with lesser inventory and hence lower cost by sharing information. An effective supply chain has to be highly integrated internally across functions and externally with suppliers and aids beneficiaries.

2.3.2 Hierarchy of supply chain integration:

i. **Competencies:** For long-term survival, a wide variety of competencies are required. An aids organisation will perform effectively if it possesses some of the core competencies.
ii. **Performance cycle:** A structure integrating all aspects of supply chain operations linking procurement, manufacturing, support and physical distribution.
iii. **Functions:** These are traditional areas of logistics specialization, which are essential for operational excellence. They need to be viewed as integral parts of the overall logistical competency and not as unique areas of performance (Stadtler, 2015).
iv. **Sub functions:** These are specific jobs within functions which need to be performed within functions for satisfying logistical requirements.

The humanitarian organisation is at the centre of an inter-dependent network that competes as an integrated supply chain against the other supply chains. Managing such an integrated structure requires various skills and priorities. A focus on the network management as well as upon internal processes is necessary to achieve effectiveness of the supply chain (Rushton et al, 2014). The following are the most significant issues in such an environment:

- **Collective strategy development:** In the traditional view, members of a supply chain thought of themselves as separate entities that did not see themselves as part of a network and consequently never shared their strategic thinking with each other. A higher level of joint strategy development is required for a network to be truly effective. Network members must collectively agree to strategic goals for the network and the means of attaining them.
- **Open communication:** The advent of information technology is making the exchange of information between supply chain partners very easy and this has been one of the most powerful drivers of change in the networks.
- **Benefits for partners:** There is a growing realization between network partners for cooperation that usually leads to improved performance. Another issue is how the results of that improved performance can be shared amongst the various players. All partners must benefit and be better off due to co-operation.

Most aids organisations have now realized that there are enormous opportunities to be gained from integrating the physical distribution of relief materials into a virile network. The gains are mostly in terms of supply chain effectiveness, operating efficiency, time reduction and place utilities. Thus, an effective supply chain can lead to the maximization of benefits for the relief distribution agency as well as aid beneficiaries. The term humanitarian logistics encompasses all the activities that are involved in getting the right goods to the right place, at

the right time, in the right quantity, and with the right sort of support (Rushton, Croucher & Baker, 2014). The supply chain is however much more than just distributing the materials from one place to another as it includes the following pertinent areas:

- **Transportation**: choice of transport method (road, sea, air, rail, and so on), vehicle utilisation (own, hired or leased), vehicle selection, scheduling and routing, load planning
- **Materials handling**: palletisation, packaging, unitisation, handling systems
- **Warehousing and delivery**: space, layout, facilities, utilisation delivery policy and returns
- **Inventory**: stockholding policy, inventory levels, security, insurance, stock checks
- **Location**: choice of warehouses and depot locations
- **Processing**: administrative systems
- **Cost control**: audit procedures, cost allocation
- **Policy formulation**: strategic issues, motivation, planning, communication, just-in-time (JIT).

Humanitarian logistics consider the cost of all the activities in order to keep the operating costs to a minimum. So much of the costs go into the packaging and movement of the product from the humanitarian organisation to the relief material beneficiaries that it is necessary to evaluate every activity and trade off one cost against another. There is little point in reducing the cost of packaging or the speed of handling if it increases the cost of handling and breakages (Cozzolino et al, 2012). In assessing the physical aspects of the supply chain operation, the following criteria need to be considered:

- **Transit time:** very important for perishable goods such as food, though this is less important for some other relief materials; the destination of some perishable foods may have to be changed if there is a delay in the transport system, or even if the weather changes dramatically
- **Reliability:** also very important for relief materials to be made available at the right time and place
- **Accessibility:** the warehouse and carriers must be easily available to move the goods over the best network of roads, railways or waterways
- **Capability:** the warehouse and carrier's transport must be able to provide cold storage for some products, or safety for such products as gases and fuels
- **Co-ordination:** the warehouse company must be willing to co-ordinate activities with other relief organisations
- **Traceability:** it is often necessary to find out just where a consignment is, to give an idea of when it will arrive at the destination
- **Cost:** there are times when the minimum cost is best, but other times when a higher cost is more acceptable, if the trade-off includes faster delivery.

2.3.3 Systems theory for humanitarian supply chain management

This is a cost-service integration theory, backed by an integrated supply chain network, which aims at minimizing the total cost of distribution at a given level of service that can save the government's and other involved players funds involved in the distribution of relief items. The main components are as follows:

i. **Total cost perspective:** The cost of logistics includes various logistics activities such as cost of planning and managing range of logistics and supply chain activities such as transportation, distribution of materials, receipt, inspection and storage of goods and

so on. All functions necessary for converting inventories and satisfying aids beneficiaries have a cost. Individual cost control perspective should be avoided so as to take the overall cost of all logistics elements into consideration simultaneously. That is, tackling the cost of logistics as a whole, while trying to tackle the primary function of logistics system holistically in order to perform the function assigned to the system in a most cost effective manner. In fact, the total cost perspective is an important component of logistics and the supply chain (Peck, 2005).

ii. **Total supply chain system perspective:** This perspective is an extension of the total cost concept and is a key for managing logistics and the supply chain function. Although this total system perspective of logistics can be time consuming, it had resulted in the reduction of inefficiency in the logistics systems as a whole. The total system of logistics also has a number of sub-systems such as transportation, warehousing, inventory management and so on (Wisner, Tan & Leong, 2014). A number of techniques and objectives that are stated beforehand have been designed so that each of these activities is conducted in an optimal manner. A proper balance between these activity centres is necessary to reduce the total cost of logistics.

iii. **Trade-offs:** This refers to the evaluation of the cost of each system component with the objective of determining a combination of components providing a minimum total cost for a specified level of service. Trade-off takes place when management incurs cost in a particular activity centre as part of the strategy to achieve benefits from another activity centre (Wisner, Tan & Leong, 2014).

iv. **Intra – activity trade-off** occurs when trade-offs occur within an individual activity of the logistics or supply chain system (Wisner et al, 2014). An example can be a decision to use one's own transportation instead of a public transportation.

v. **Inter-activity trade-off** occurs between various activities of logistics system. Management prepares itself to bear the increased cost of one activity centre so as to get the profits from another (Wisner et al, 2014). For example, using airfreight can increase transportation cost but would result in a reduced inventory and warehousing cost.

vi. **Inter-functional trade-off** occurs between the logistics system and other functional areas of the firm. A trade-off is made between various functions (Wisner et al, 2014). For example, the packaging structure for a company was changed from conventional vacuum packs to a different shape to suit the structure of the product.

vii. **Inter-organisational trade-off** is a category between manufacturer and other organisations involved in creating utilities for the manufacturer (Wisner et al, 2014). The manufacturer has to be concerned with the members of the distribution channel and should try maintaining relations with these members.

Namibia, as a developing nation with limited resources, still needs to device cost saving methods capable of integrating its humanitarian supply chain network so as to minimize the total cost of distributing relief materials to places such as Okatana community during drought when they always lose their valuables such as animals and farm crops thus part of this study will be guided by this theory.

2.3.4 Unitisation theory of the supply chain

The theory of unitisation is another important theory in which packaging plays a very significant role. The theory states that the supply chain is more effective in handling distribution when cargoes are packed in such a manner that it is moved and handled entirely by mechanical equipment, like lifts and cranes, all through the distribution network. It argues that this will enable faster loading and unloading by transportation equipment, results in more

efficient distribution centre operations and also a reduced level of pilferage. Furthermore, unitisation allows organisations to determine the degree of protection required to cope with anticipated physical and element problems in the environments in which they have to operate (Rushton, Croucher & Baker, 2014). According to this theory, the effectiveness of the supply chain in handling drought relief distribution relief therefore depends on whether its packaging is unitized or not. Essentially, unitisation refers to the process of grouping the master cartons physically into one restrained load for easier material handling, transportation and identification. The theory of unitisation is used to explain where individual products are packed into cartons, bags, bins, or barrels for handling efficiency. As such, it allows master cartons to be grouped into larger units for efficient handling. This combination is usually referred to as unitisation or containerisation and can be designed to meet the logistical distribution objectives of humanitarian organisation since particular aids materials can grouped together in cartons, bags and barrels for effectiveness of the supply chain in handling their relief distributions. The containers used to group individual products are called master cartons. When the master cartons are grouped together, it is called unitisation. Unitisation is a situation where various packages are handled together as one unit. The costs of these are referred to as transport costs, which are governed either by the weight of the finished pack or the volume or may also depend upon the distance and value of the item being handled (Rushton et al, 2014).

In Namibia, packaging has been contributing immensely to the effectiveness of the supply chain when handling drought relief distribution and had been impacting positively on the cost of the logistics or supply chain system. In fact, any logistic model designed to control the total distribution costs has to incorporate all the relevant costs relating to packaging because the cost of every logistical activity is always affected by packaging. Inventory control is

dependent on the accuracy of the identification systems that are keyed by its packaging (Caris et al, 2014). The material selection speed, accuracy, and efficiency are affected by the identification of the materials, their configuration and ease of handling. The capabilities of unitisation and techniques influence the handling cost. Package size and density influences the transportation and storage costs too. Besides, factors like quality control during distribution, providing consumer education, compliance with environmental regulations also explain the importance of packaging (Caris et al, 2014).

2.4 Legislative framework

According to Yang and Wei (2013), the supply chain includes all activities associated with the flow and movement of goods, services, and related information from the point of origin to the point of consumption. Humanitarian supply chain includes suppliers; logistics service providers, freight forwarders, ocean carriers, customs, and buyers. According to Closs and McGarrell (2004), supply chain management (SCM) is the inter- and intra-organisational coordination of the sourcing, production, inventory management, transportation, and storage functions with the objective of meeting the service requirements or consumers at the minimum cost. Essentially, SCM integrates supply and demand management across organisations as efficiently as possible. In order to ensure the effectiveness of the supply chain in the distribution of relief materials in the country, the Namibian Government has over the years passed some laws regarding the management of disasters including drought. Some of these Namibian laws are discussed below with other world laws:

2.4.1 Namibian Disaster Risk Management Act of 2012

The Disaster Risk Management Act No. 10 of 2012 was passed into law by the Parliament of the Republic of Namibia to cater for all disaster related activities including drought management. The Acts is responsible for the following:

i. Providing for the establishment of institutions for disaster risk management in Namibia.
ii. Providing for an integrated and coordinated disaster management approach that focuses on preventing or reducing the risk of disasters
iii. Emergency preparedness
iv. Rapid and effective response to disasters and post-disaster recovery
v. To provide for the establishment of the national disaster management risk fund
vi. To provide for incidental matters.

The Namibian Disaster Risk Management Act 2012 Section 30 and the following subsections make the following provisions:

i. If at any time it appears that any disaster is of such nature and extent that extraordinary measures are necessary to assist and protect the persons affected or likely to be affected by the disaster in any area within Namibia, or that circumstances are likely to arise making such measures necessary, the chairperson or the committee may recommend to the cabinet that a state of national disaster be declared for the whole or part of Namibia.
ii. On recommendation made under subsection (1) the Cabinet must consider it and advise the President on whether he or she should take action in terms of article 26 (1) of the Namibian constitution.
iii. If it happens that the President is satisfied that the requirements mentioned in subsection (1) exists, or are likely to arise and that the criteria set out in subsection (4) have been met, the President may, pursuant to article 26(1) of the Namibian Constitution, by proclamation in the Gazette declare that, with effect from a date specified by him or her in the declaration, a state of national disaster exists within an area defined by him or her in the declaration.
iv. The President may declare that a state of national disaster exists only if:

a. The is a situation that requires immediate action to prevent, mitigate or reduce a danger of major proportions that could results in death or serious harm to persons or substantial damage to property or to the environment; and
b. One or more of the following situations exists:
    i. The disaster event affects more than one constituency or region
    ii. The available resources to the region, constituency or governmental institutions situated in the constituency or region cannot be relied upon without the risk of serious delay;
    iii. The resources referred to in subparagraph (ii) may be insufficiently effective to address the disaster; or
    iv. It is not possible to ascertain whether the resources referred in subparagraph (ii) can be relied upon without the risk of serious delay
    v. After a declaration has been made under subsection (3), the President on the advice of the Cabinet, may at any time if circumstances warrant reclassify the declaration as a regional or local disaster and he or she may in like manner reclassify a regional or local disaster declared in terms of section 35 or 38 as a national disaster.
    vi. A declaration of a state of national disaster remains in force until such time that it is revoked by the President by proclamation in the Gazette or it ceases to have effect in terms of the provisions of Article 26 of the Namibian Constitution.

Section 31 of the Namibian Disaster Risk Management Act of 2012 highlights the responsibilities of the national disaster management committee and among them, is a critical responsibility of making arrangements for the release of any available resources of the

national government, including stores, equipment, vehicles, water transport, air transport and any other related facilities during disasters. Section 45 of the Namibian Disaster Risk Management Act 2012 allows for the establishment of the fund known as the National Disaster Fund which is a fund designated for a special purpose as contemplated in Article 125(3) of the Namibian Constitution to cater for all disaster declared by the President as articulated in Article 26 of the Namibian constitution. This legislation is closely linked to the handling of drought relief distribution in Namibia as it provides for the management and funding of disasters in the country.

2.5 The Sphere book project and its role in the relief materials supply chain

The Sphere book and its projects are well-known for introducing considerations of quality and accountability to humanitarian response. Introduced in 1997 by a group of humanitarian non-governmental organisations and the International Red Cross movement, their aim was to improve the quality of their actions during disaster response and to claim accountability thereof. The Sphere philosophy is based on two fundamental beliefs. First, those that are affected by any type of disaster or conflict have a right to life with dignity and, therefore, a right to assistance. Second, all possible steps contained in the book should be taken to alleviate human suffering arising out of disaster.

The common principle and the right relevant to this study is the right to receive humanitarian assistance with the interaction of various supply chains. This right is a critical element of the right to life with dignity and thus it should be adhered to. This comprises the right to an adequate standard of living that includes adequate food and water which are expressly guaranteed in international law. The Sphere core standards and minimum standards reject these rights and give practical expression to them, specifically in relation to the provision of assistance to those negatively impacted by disasters. Where a government or non-

governmental organisations cannot provide such assistance, the Sphere book believe that they must allow others to assist as necessary.

The Sphere book further indicates the minimum standards for food security and nutrition as a practical expression and commitments of humanitarian agencies and the common principle rights and duties governing humanitarian action set out in the humanitarian charter. It is founded on the principle of humanity and reflected in international law. The supply chain management in any drought relief activities is critical in ensuring that goods are supplied to the needy within the shortest time possible and at the right time. The minimum standard of water supply, food security and nutrition is advocated by the Sphere book and it is critical that the supply chain handling drought relief is effective in order to deliver such items in the shortest time possible. Failure to stablish an effective supply chain, loss of lives might be experienced and that contradicts some of the Sphere's book elements such as the right to life with dignity and the right to adequate standard of living.

2.6 Sendai Framework for Disaster Risk Reduction 2015-2030

Priority 4 of the Sendai Framework for Disaster Risk Reduction calls for enhancing disaster preparedness for effective response to build back better in recovery, rehabilitation and reconstruction. The implementation of the priority within the framework was necessitated by the steady growth of disaster risk that includes assets and people exposure combined with lessons learned in previous disasters. This raised the need to further strengthen disaster preparedness for response, take action in anticipation of events for example preparing the inventory at hand to deal with the demand, and to ensure that capacities are in place for effective response and recovery. The framework further empowers woman and persons living with disabilities to lead and promote gender equitable and universally accessible response, recovery rehabilitation and reconstruction approaches. It thus gives equal chances to all the

citizens to ensure that goods and services flow uninterruptedly within the supply chain. The effective response as advocated by the framework will only be achieved with the effective supply chain during handling of drought reliefs in Okatana Constituency.

2.7 Hyogo Framework for Action 2005-2015

The Hyogo framework for action calls for States, within the bounds of their financial capabilities, regional and international organisations, through bilateral and regional coordination mechanisms, to undertake the following tasks to mobilize the necessary resources to support the implementation of the framework:

i. Mobilize the appropriate resources and capabilities to relevant national, regional and local entities to deal with all required logistical needs
ii. Provide support through bilateral and multilateral channels for easy flow of good and service to the needy groups.
iii. Mainstream disaster risk reduction measures appropriately into multilateral and bilateral development assistance programmes including those related to poverty eradication and supply chain trainings.

A well maintained and effective supply chain is needed in order to mobilize resources so that goods are delivered where they are needed, without delay; and this is supported by this framework and thus highly linked to this study. The framework further calls for an easy flow of goods and services in order to maintain an effective supply chain when handling disaster reliefs.

2.8 Conclusion

This chapter reviewed the theoretical and legal frameworks underpinning the research into the effectiveness of the supply chain within the disaster management cycle as well as the

disaster risk management process and strategies in Namibia. It also examined relevant humanitarian supply chain theories such as the systems theory and supply chain integration approach. In addition, it discussed how containerized relief materials could lead to more effective distributions within Namibia's legal framework for the distribution of disaster relief materials.

Chapter Three

Literature Review

3.1 Introduction

According to Creswell (2011), the purpose of a literature review is to provide a meaningful context for carrying out a research and that this is only possible by looking at the work that had already been done in the particular subject area. Carole and Almut (2011) also state that literature refers to all sources of published data and that literature review is a written summary from literature research. Furthermore, Marshall and Rossman (2014) stated that literature review describes diverse perspectives and previous research findings regarding the problem at hand. In this case, the existing literature on the effectiveness of the supply chain in handling drought distribution had been reviewed because the purpose of this study was to evaluate the underlying dimensions of the effectiveness of the supply chain in handling drought reliefs in Okatana constituency, Namibia.

3.2 The concept of disaster

Rogstadius et al. (2013) defines disaster as an unexpected event such as a very bad accident, a flood or fire that kills a lot of people or causes a lot of damages. According to the South African Disasters Management Act No. 57 of 2002, disaster is a natural or artificial event occurring with or without warning, causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope with its effects using only their own resources. It further adds that disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of the disaster risk. Disaster could be either natural or man-made. Natural causes of disasters include droughts, earthquakes, floods, hurricanes, volcanic eruptions and wildfires. Man-made

disasters comprise both technological and sociological disasters. Some of its examples are airplanes, ships, or railways, and vehicular mishaps. Other man-made disasters can be traced to the collapse of buildings and bridges, bombs explosions and fires, terrorism, conflicts and wars. Hence, in this study, the term disaster is operationally defined as a sudden, accidental event that causes injuries, destruction of property, catastrophe, crisis, tragedy, calamity, predicament, poverty and death.

In contemporary academia, disasters are seen as the consequence of inappropriately managed risk. These risks are the products of hazards and vulnerability. Hazards that strike in areas with low vulnerability are not considered a disaster, as is the case in uninhabited regions (Quarantelli, 1998). Disasters are usually measured in terms of their effects on human beings as well as the immediate environment. Researchers in disaster management assert that whenever disaster strikes, it deprives victims of their sources of livelihood and basic needs such as food, healthcare and housing which can lead to abject poverty (O'Brien et al, 2006). Observation also shows that the poorest nations (countries with Gross Domestic Product less than $900 and per capita income less than $1) are those worst affected by either natural or artificial disasters. Afghanistan, Burundi, Niger, Somalia, Albania, Yemen and East Timor top the list due to war and drought catastrophes (Central Intelligence Agency, 2013). Developing countries suffer the greatest costs when a disaster hits. According to Altay and Green (2006), more than 95 percent of all deaths and sufferings caused by disasters occur in developing countries.

Researchers have been studying the classification of disasters for more than a century (O'Brien et al, 2006). For more than forty years, disaster research has been institutionalized through the Disaster Research Centre. The researchers agree that all disasters can be seen as

artificial as they argue that human actions before the strike of the hazard can prevent it developing into a disaster. They concluded that all disasters can therefore be attributed to the failure of human beings to introduce appropriate disasters management measures (O'Brien et al, 2006).

3.3 Types of disaster

Disaster situations generally fall under two broad categories: natural and artificial disasters.

3.3.1 Natural disasters

Natural disasters are often an aftermath of human actions and inactions on the earth leading to climate change. For example, the effect of climate change or global warming is the dramatic increase in the average temperature of the earth's atmosphere, oceans, and landmasses (O'Brien et al, 2006). Scientists believe that the earth is currently facing a period of rapid warming resulting from the rising levels of heat-trapping gases, known as greenhouse gases, in the atmosphere (O'Brien et al, 2006). Popular natural disasters consist of mostly drought, earthquake, flood, famine, forest fire, tsunami, hurricane and tornadoes. There is no continent in the world that has not been a victim of at least two or more natural disasters and Asia has been worst affected. In the last few years, several earthquakes occurrences in China, Japan, Bangladesh, India, Indonesia and Pakistan buttress this point. Hurricane Katrina of August 23 to August 31, 2005; in North America, the current forest fire incidents; in Australia, several snow; and the wildfires in Europe and numerous cyclones, floods and landslides in South America illustrates the severity and geographical spread of natural disasters globally (Drabek, 2012). Available statistics show that of the ten top deadliest natural disasters that has ever occurred in the world, eight are in Asia with a total death toll of over 100 million between 1900 and 2004 (Drabek, 2012). These disasters have not only caused substantial loss of human lives and property, but also reduce the pace of

sustained economic development often leading to heavy drain of the resources meant for developmental programmes and even threaten collapse or overthrow of government. In the United States of America, President George Bush's government was criticized for late response to hurricane Katrina in Michigan which later affected support for his government policies (O'Brien et al, 2006). More worrisome as observed by scholars is the national and international tensions and threats generated in the course of natural disasters management in the contemporary world. In 2004, the United States of America and India had security tussle over relief administration during the tsunami disaster and similar problem occurred in 2008 during earthquake in China, Pakistan, and Myanmar (Coleman, 2006). Africa is not an exception from natural disasters phenomena, although, it is not ranked among the worst affected continent in the world. Nevertheless, natural disasters have also increased in the continent lately (Drabek, 2012). However, though minor, the level of internally displaced persons (IDPs) and other associated after-effects disaster problems seem to be enormous due to lack of well institutionalized and coordinated disaster management strategies and programmes.

The most common natural disasters are recurrent as they tend to strike the same nations repeatedly. When the devastation caused by droughts and other natural disasters in industrial and developing countries is compared, the negative effects can be up to 100 times higher in the poorer developing countries because there are disaster prevention measures in industrial countries that can reduce the risk of disaster damage(O'Brien et al, 2006). Conversely, in the highly vulnerable areas of the developing world, the certainty of disaster precludes the laying-off of financial risk outside the vulnerable area. It is the typically recurrent nature of natural disasters that has necessitated the implementation of more timely response to disasters in many countries.

3.3.2 Man-made disasters

Man-made disasters are those caused by human action, negligence, error, or involving the failure of a system. Man-made disasters are in turn categorized as technological or sociological (Drabek, 2012). Technological disasters are the results of failure of technology, negligence, carelessness or inability of managing mechanical eventualities such as engineering failures, transport disasters, or environmental disasters (Coleman, 2006). Some of the major globally recognized technological disasters are the Chernobyl chemical discharge in Ukraine in 1986, various oil spills, aircrafts mishaps, maritime, military equipment explosions, terrorist attacks, and various occupational industrial accidents. Sociological disasters have a strong human motive, such as conflicts and wars (Drabek, 2012). In modern history, World Wars I and II and other international and national wars fall within the viewpoint of sociological aspect. The current wars and conflicts in Iraq, Afghanistan, Somalia, South Sudan and the Democratic Republic of Congo (DRC) have resulted in high rates of human casualties and material destructions. Most of these conflicts have been more deadly than ever in terms of lives and property consumed than the natural disasters (Drabek, 2012).

In the context of man-made disasters, Africa maintains the lead owing not only to conflicts arising from power struggle over natural, human and material resources but also carelessness and negligence. In fact, most African countries had at one time or another witnessed one form of sociological disasters or another. However, Angola, Burundi, Democratic Republic of Congo, Somalia, Rwanda, Sierra Leone, Liberia and South Sudan top the list with several years of conflicts and war experiences (Hewitt, 2014). According to Oloruntoba & Gray, (2006) reports globally show that between 1945 and 2005, more than 50% of the 253 sociological disasters (wars and conflicts) took place in Africa . The severity of human

suffering and destruction arising from these disasters has been worsening owing to lack of effective and efficient disasters management agencies and strategies (Oloruntoba & Gray, 2006).

3.4 Impacts of disasters on the society

Disasters such as drought directly affect their individual victims. But beyond that, disasters also affect the social life. Sometimes this is direct and total, as when, as a result of disaster, people are forced to leave their land and migrate elsewhere (Altay & Green, 2006). In other cases, the rapid influx of helpers, the presence of government officials, press, and other outsiders (including mere curiosity seekers), the flood of poor people from outside the disaster area into a disaster area seeking their own share of the food and other supplies relief agencies are providing to disaster victims, combine to further disrupt the community. Even when the formal structure of a community is maintained, the disaster can disrupt the bonds holding people together - in families, communities, work groups, and whole societies. These collective effects of disaster may ultimately be as devastating as the individual effects (Drabek, 2012).

Finally, disaster often leads to permanent changes in the community's productive patterns such as shifting from subsistence agriculture to wage labour and rural-urban migration.

3.5 The concept of drought

3.5.1 Definition of drought

Drought has been defined as an extended and continuous duration of very dry weather (Jones et al, 1990). Although there is no generally accepted definition of drought, it is widely accepted that the menace is characterized by moisture deficiency, when the demand for water exceeds the supply available from various sources (Wilhite et al., 2014).

3.5.2 Types of drought

There are variations in the definition of drought from country to country because there are differences in their weathers. In the United Kingdom, for instance there are three noticeable types of drought (Wilhite et al. 2014):

(a) Total drought is a period of 15 or more consecutive days with a rainfall below 0.2mm;

(b) Partial drought has a duration of 29 successive days with a mean rainfall of 0.2 mm or less per day;

(c) A dry spell has duration of 15 or more successive days, during which the rainfall does not exceed 1 mm per day.

In the United States, on the other hand a drought is a period:

(a) Of 14 days without measurable rainfall;

(b) With an experience of insufficient water supply to meet usual domestic, agricultural and industrial demands (Wilhite et al. 2014).

Drought takes place under many climatic regimes and may vary in severity from the minor and short-lived summer restrictions on washing cars and watering gardens in southern and eastern England to catastrophic events such as the development of the Dustbowl in the American Midwest during the 1930s and the large-scale crop failures during the Ethiopian famine of 1985. Droughts are now regarded as a recurrent phenomenon in Namibia including Okatana constituency as it is now almost an annual event. Wilhite et al., (2014) identified four basic types of drought, namely:

i) Meteorological drought; which occurs when dry weather patterns dominate an area.

ii) Agricultural drought; this is when crops are affected due to meteorological drought.

iii) Hydrological drought; which occurs when low water supply in streams, reservoirs, and groundwater levels becomes manifest, especially after many months of meteorological drought, and

iv) Economic drought; this relates to the supply and demand of various economic goods to drought.

In Namibia, the four types of drought are experienced because of insufficient moisture and non-availability of precipitation at the appropriate time to meet the evaporative needs of crops, vegetation, pastures and other agricultural systems that had resulted in declining farm yield and productivity. Overall, drought is often described as a percentage of the long-term average rainfall in a given location and usually takes place when there is a prolonged absence or deficiency or inadequate distribution of precipitation. Crops require varying moisture needs throughout their growth and development periods, and therefore, the timing of rain is essential in agricultural regions in determining whether there will be a good harvest or a poor one (Williams, 2016). Wilhite et al (2014), noted that drought takes place when the water needs of plants cannot be met by available precipitation. Some of the articulated features of drought are as follows:

(a) Low rainfall and high rainfall variability

(b) High evaporation and potential evapotranspiration rates

(c) Generally persistent negative rainfall anomalies

(d) Occasional torrential rains resulting in floods

(e) Rapidly high erosive runoff especially on steep terrains

(f) Sparse vegetation cover

(g) Too little moisture for rain fed cultivation for growth and development

Drought experience is indeed a devastating phenomenon that have occurred in varying degrees of severity and duration in the Okatana constituency of Namibia and had on several occasions led to emergency situations. The miserable distress arising from drought occurrences have sometimes led to mass migration, famine and cessation of economic activities in many parts of Namibia including the Okatana constituency.

3.5.3 The socio – economic impacts of drought on Okatana community

According to the Ministry of Education (2015), drought is the most serious natural hazard posing threat to Namibia. In fact, the country had experienced severe droughts that required disaster response five times within three years in the immediate period prior to the country's independence in 1990. As a result, thousands of people were affected in the northern parts of the country, especially in the Okatana community. Drought has forced people to use water from unhealthy sources and this has placed them at risk of being infected with water borne diseases. Besides, food insecurity has put a further strain on the affected population in particular among vulnerable groups (The Sun, 2016).

Drought is one of the devastating hazards in Namibia's Okatana constituency and poses a great threat to the economy of the country as well as to the well-being of the society. According to Mutorwa (2016), the basic socio-economic impacts of drought on a nation include:

- Unemployment: As farmers face declining agricultural activities and productivity thus forcing the labour force to migrate to urban locations against their will.
- The dynamics of rural-urban migration from rural areas places more pressure on jobs and facilities in the urban centres. The economic and social consequences of these movements are substantial.

- The consequences of drought have sometimes led to conflicts among farmers competing for water and food to feed their animals.
- Decrease in the quality of living as a consequence of the decline in the quality of the rural communities due to inadequate income generation.
- Increased demand on available facilities that might make many of the drought victims to become destitute as women, old men and little kids are left in a pathetic state of inadequacy of such amenities as housing, food, medicine, and so on.
- Increased social vices as the urban centres are littered with loiterers and beggars with high incidence of crime among idle immigrants from affected communities.
- Persistent drought might lead to famine and death.

It is important to note that drought has been identified as one of the major causes of desertification in Namibia. But this is only possible because the periodic drought has always been intensive and prolonged, leading to the loss of several plant species (The Sun, 2016). In the Okatana constituency, drought is a periodic event where periods of rainfall failure are interposed with periods of abundant rainfall. Some of the important factors that have also contributed to the drought situation in Okatana community are as follow:

a) Over-grazing by livestock had contributed to the situation in different ways such as
    - The substitution of annual for perennial grasses which perhaps reduces the plant cover available to protect the soil in the long dry season.
    - Damaging of soil structure in the vicinity of wells as a result of trampling by cattle.
    - Destruction of seedling.

b) Wood cutting to produce fuel wood or construction timber generally impairs natural regeneration of woody species and a great proportion of the soil surface nutrients content are exposure after woodcutting.

c) Cultivation: Yearly cultivation without adequate fertilization impoverishes the soil structurally in quality- wise. It also increases the possibility of remobilisation by wind.

d) Burning: Burning affects farm productivity by

- Destroying grass and herb growth
- Favouring fire resistant species
- Stimulating fresh shoots, particularly of grass

e) Other human activities: urban development, and road construction.

3.6 Different phases of disaster relief operations

Disaster relief has been described as having many phases (Tomasini & Van Wassenhove, 2009). According to Lee and Zbinden (2003), there are three major phases of disaster relief operations, namely: preparedness, during operations and post operations. However, Kovács and Spens (2008) explained that there are different operations or phases within a disaster relief operation which they identified as preparation, immediate response and reconstruction. It is important to note that all researchers agree that **i**n order for a disaster relief operation to be successful, it is necessary that the types of response that are offered should match the following phases of emotional responses of the victims (Lee and Zbinden 2003):

3.6.1 The rescue phase

According to Lee and Zbinden (2003) the rescue phase refers to the period immediately following a disaster when the highest priority is the need for rescue and relief workers, whose continued effective functioning is essential. This may involve crisis management, crisis intervention, conflict resolution, assisting with problem solving, or "defusing". Immediately

after the disaster, the most urgent needs of victims are for direct, concrete relief such as rescuing lives, ensuring physical safety, providing medical care, providing victims with food, water, shelter, reuniting families. Psychosocial interventions aimed at victims during this phase are primarily directed at serving these ends.

3.6.2 The inventory phase

Lee and Zbinden (2003) refer to the inventory phase as a period when many people will not be receptive to psychosocial interventions or will feel they do not need them. Others, however, may welcome the chance to talk through their reactions within a few days of the disaster or to find someone who can help them plan how to overcome the obstacles they are facing. The bulk of psychosocial interventions directed at victims themselves occur in this period. Discouragement and disillusionment with relief and reconstruction efforts may set in. Anxiety, sadness, irritability, frustration, and discouragement now combine with disaster-produced losses and post-traumatic stress effects to produce a relatively high level of need.

3.6.3 The reconstruction phase

The reconstruction phase according to Lee and Zbinden (2003) covers the emotional consequences of the disaster and may continue to appear for up to two years or more after the incident. This generally represents delayed reactions and in some cases might represent the irreversible consequences of the disaster. Reconstruction is necessary at this stage to assist the victims overcome their traumatic experiences and be able to move on.

3.7 Overview of humanitarian logistics management and humanitarian supply chain

The main goal of humanitarian logistics is to increase overall efficiency, to cut costs, to deliver with fewer errors, and to make the delivery at the right time so as to save more lives (Kovács & Spens 2007). At its most basic level, supply chain involves the movement of

goods or products from one point to another. For example there is a supply chain if a company makes its product from parts purchased from various suppliers, and those products are sold to its customers. Humanitarian logistics management is the aspect of the supply chain relating to the planning, implementing and controlling of the flow of humanitarian materials, goods and other resources from the source or point of origin to their final destination to meet the requirements of disaster victims who are the end-users. Those involved in humanitarian relief operation management are usually people with different culture, purposes, interests, mandates, capacity, and logistics expertise (Balcik et al., 2010). In general, the key players in humanitarian operations in most cases would include: governments, the military, aid agencies, donors, non-governmental organisations (NGOs), and private organisations such as logistics service providers (Kovács & Spens 2007). Thus, the implementation of an effective and efficient system that can ensure a timely delivery and distribution of relief materials is very important since there are many phases and actors involved in the chain.

Humanitarian supply chains vary in intensity, because some of them are very simple while others are rather complicated. The complexity of distributing relief materials through the humanitarian supply chain varies with each disaster situation which in turn depends on the environment, the intricacies and numbers of items being moved to the desired location (Tomasini & Van Wassenhove, 2009). Most disaster prone countries have adopted humanitarian supply chain management processes and its associated technology in order to ensure that they are able to meet the demands of the victims timeously in order to satisfy their needs (Tomasini & Van Wassenhove, 2009). A simple humanitarian supply chain is generally made up of several elements that are linked by the movement of materials along it:

i) **Planning** involves creating a plan ahead for implementation at the appropriate time in order to meet the needs of disaster victims.

ii) **Inventory** involves checking the accuracy of the materials in stock and that their quality is of the required standard before they are moved into the warehouse for storage. It also involves receiving materials prior to delivery to the community in need.

iii) **Transportation** involves moving the materials to the right place in the most efficient method. The management of transportation is not easy since costs must be controlled and the type of transport chosen and always kept under review. Road transport is considered to be the most popular method of transportation with its advantages of speed and door-to-door delivery although rail transport is also used when lead-time is not very important or in a bid to reduce costs. Air transport is also used in circumstances where long distance routes can justify the cost or when transporting highly perishable relief materials such as fresh tomatoes.

Overall, humanitarian supply chain management activities have three levels that are generally applicable in different parts of an organisation:

i) **Operational**: involves decisions that are made on day to day basis in organisations relating to how materials are moved along the supply chain.

ii) **Tactical**: involves middle range decisions affecting the movement of materials into the storage facilities and moving these materials to the affected communities. This generally involves creating strategies aimed at the reduction of storage costs and timely delivery of items to the affected community.

iii) **Strategic** involves high level long term decisions pertaining to the involvement of the organisation in its relationship to other stakeholders such as the government and its agencies.

In order to successfully implement the humanitarian supply chain management process, many countries now use the enterprise resource planning (ERP) which is integrated with a transportation management system (TMS) which in turn drives the warehouse operation run by a warehouse management system (WMS). In order to optimize the benefits of the ERP, it has to be tied to the organisation's financial system. Furthermore, the advent of the world-wide web has made instant communication between companies and their customers possible and this has also made the timely updating of information possible.

3.8 Elements of humanitarian logistics and supply chain management

A recent study by Roussat and Vega (2015) observed that humanitarian logistics and supply chain management emphasize response to disaster crisis and aid agencies that provide the right assistance at the right place, right time and reasonable cost. For an affected population, it is important that a humanitarian agency should always ensure the rapid delivery of relief items to the identified population in planned emergency response and that the agency is capacitated for distribution activities (Chandes & Paché, 2010).

3.9 The role of logistics and the supply chain in the handling of disaster relief materials distribution

In relation to the occurrence of a disaster, disaster relief delivery and distribution has been defined as a planned response that aims at saving lives, relieving suffering, limiting damages and restoring essential services to assist local authorities to deal with the results of the catastrophe (Ministry of Education, 2015). However, Kovacs and Spens (2007) have explained that disaster relief delivery and distribution are generally structured into the following three main phases: the preparation phase, the phase of immediate response, and

finally, the reconstruction phase. In humanitarian logistics, these processes are regarded as planning phase, implementing phase and the phase of controlling the efficient flow and storage of goods, materials and information, from point of origin to point of alleviating the suffering of vulnerable people (Thomas & Mizushima, 2005). According to Van Wassenhove (2006), humanitarian logistics include all the processes and systems involved in mobilizing people, resources, skills and knowledge to help vulnerable people affected by disaster. In addition, humanitarian logistics also comprise a variety of other activities such as: preparedness, planning, procurement, transport, warehousing, tracking and tracing, as well as customs clearance (Thomas & Kopczak, 2005). Furthermore, it is widely acknowledged that humanitarian logistics is mostly concerned with the delivery and distribution of relief aids to disaster victims as well as in complex emergencies including war and conflict situation (Jahre, Jensen & Listou, 2009). Thomas (2003) concluded that logistics is central to disaster relief delivery and distribution for the following reasons:

i) It serves as a bridging between several points namely: disaster preparedness and response, procurement and distribution as well as headquarters and the field.

ii) It is vital to the success and speed of response of relief items such as medication, food, water, shelter and sanitation.

iii) Being the department that handles tracking of goods through the supply chain, it is regularly the source of data that is able to provide post-event learning. Thus, logistics can be the greatest expensive parts of a relief effort (Thomas, 2003).

The effectiveness of the supply chain in handling relief distribution has become very important because in most cases the situation under which it operates are considered as clearly erratic, turbulent and requiring flexibility (Oloruntoba & Gray, 2006). Some other scholars also argued that the role of the supply chain are becoming inextricable important in

humanitarian logistics; hence it has become imperative that the humanitarian relief organisations embrace new supply chain strategies, techniques and technology for improving their effectiveness in service operations in humanitarian logistics (Heaslip, 2015). In addition, Kovacs and Spens (2007) explained that within humanitarian logistics the greatest focus has shifted from providing core products and services to the effectiveness of its supply chain. This means that humanitarian organisations have to improve the effectiveness of their supply chains in getting the relief aids to the needy as early as possible. Hence, scholars have agreed that it is only a great logistics service that can enable the quick, safe and reliable supply of goods and services to the needy as and when necessary. In support of this position Bölsche et al (2013) confirmed that, if the right goods (food, non-food items and medical items) are received by the right people (the most affected people) at the right time (as fast as possible) at the right place, in the right quantity and with the right quality (not poor quality goods), then the supply chain can be described as effective as it would have contributed to alleviating the suffering of vulnerable people.

3.10 Supply Chain Risk Management (SCRM)

The Supply Chain Risk Leadership Council (2011) defined supply chain risk (SCR) as the likelihood and consequence of (negative) events at any point in the end-to-end supply chain. It further defines SCRM as the coordination of activities to direct and control an enterprise's end-to-end supply chain with regard to supply chain risks. SCRM seeks to prevent intentional, unauthorized acts designed to cause harm or damage to, or by, the supply chain. The scope of SCRM activities includes mitigating the impact of unintentional events such as droughts, fire outbreaks, earthquakes or floods and intentional events such as sabotage or political unrest. Autry and Bobbitt (2008) developed the concept of supply chain security orientation (SCSO) which states that a firm’s security orientation represents its collective

attention to both supply chain security management and supply chain risk management principles. The logic is that the employees of a firm with a SCSO should be aware of the risks in the organisation such as product contamination, loss or destruction as to be prepared for such disruption for them to mitigate its impact on the firm and its supply chain partners. A good example is having a stand-by fire brigade organisation.

3.10.1 Risk Governance

The research presented here emphasizes risk governance rather than the traditional risk analysis. Risk analysis encompasses risk assessment, risk management, and risk communication. Hermans, Fox and van Asselt (2012) state that risk governance aims to take into account the complex web of actors, rules, conventions, processes and mechanisms concerned with how relevant risk information is collected, analysed, and communicated, and how management decisions are taken. There is a convincing and empirically sound body of evidence that argues that many risks cannot be calculated using quantitative methods alone and that regulatory models that build upon this positivistic risk paradigm are not only inadequate but can further complicate dealing with contemporary risks in a responsible manner. Hermans et al., (2012) conducted an extensive literature review on the topic drawing literature from various subjects such as engineering, psychology, sociology, science and technology studies, political science and law. By extension, there is room for qualitative assessment of risk, as well as tools that assist in that assessment.

3.10.2 Classifications of risks in the supply chain

Trkman and McCormack (2009) identified different classifications of risks in the supply chain each of which possess certain properties or risk. Each classification focuses on a particular source of risk. Those relevant to this study are highlighted here:

i. Financial and non-financial

Financial risks involves the following three elements - the individual or organisation exposed to the loss such as the ship owner or shipping company; the asset whose damage or loss will cause further financial loss to the company such as ship, cargo and crew; and the peril that can cause the loss such as piracy. Non-financial risks include mental trauma, physical trauma, and loss of life.

ii. Pure and speculative

Pure risk arises in situations where there only is a chance of loss or no loss. An example of this is the loss of ownership of property or an asset, such as a ship held ransom on the Somali coast. Speculative risk is the kind of risk that is not insurable and does not involve guarantees of profit nor loss.

iii. Fundamental and particular

A fundamental risk is caused by conditions beyond the control of individuals. Since this is not the fault of any one person, society rather than the individual has the responsibility to deal with the risk. From this perspective piracy is a fundamental risk. It is the task of the nations of the world to keep it under control since it threatens international trade, law and order. A particular risk is experienced by individual and businesses that has to carry the direct burden of incidents such as pirate attack in terms of loss with no compensation from society**.** Thus the supply chain of handling drought reliefs

iv. Core/strategic and non-core/operational

Core risk arises from the nature of the business. A shipping company assumes the risk of losing a ship on the ocean if it is in the business of international shipping cargo. It makes strategic decisions on what cargo to transport, to where, and when.

Non-core risk is associated with risks that arise from the operational activities of the business. Piracy is a non-core risk because a ship carrying cargo has to pass through an area where

there is pirate activity. The risk can be addressed through strategic solutions such as re-routing or increasing its security or subscribing to extra-ordinary insurance adequate to cover losses if the pirates strike. Madejski and Fritze (2014) pointed out that one can distinguish between internal and external risk. Internal risks originate in management decisions affecting the normal operations of the supply chain. Simply put, management can make poor or wrong decisions, or not make decisions when needed.

External risk arises from natural disasters, epidemics, war, piracy, terrorism, fire outbreaks, and so on. This risk cannot be influenced by management decisions. As a result, risk managers need to deal with both uncertainly and risk. Risk events are usually handled in two ways. Risk can be viewed as a rare event whereby the managers only react when something happens. This is called reactive risk policy. The research presented here supports the second approach, proactive risk policy which demands that risks should be identified in advance in order to manage them and reduce their impact. Ben-Ari and Or-Chen (2009) have also distinguished between probabilistic and contextual risk. Within risk literature these are seen as opposing perspectives. From an epistemological perspective, knowledge about a risk is knowledge about what is not known (Madejski & Fritze 2014). When there is a risk, there has to be something that is unknown, or has an unknown outcome. The notion of probability implies a degree of uncertainty. Equating risk with the probability of harm works in fields such as engineering but fails to address the difficulty of managing risk at the societal level. Criticism of the probabilistic concept resides in the argument that it ignores the subjective nature of risk which is an inherent attribute or risk. This is not to state that the approach does not have merit. The objectivity that the approach provides serves to position risk as a real world concern rather than an abstract notion of harm. At the same time, it struggles to

account for real world decision-making where economic, social, cultural and political factors influence the adoption of objective recommendations.

3.10.3 Supply chain risk management strategies

According to Fischer, Halibozek and Green (2008), business has a number of strategies at its disposal in dealing with risk. These include risk avoidance, self-assumption of risk, risk-transfer, risk reduction, and risk spreading. The strategy followed in dealing with supply chain piracy will foremost determine the need for armed security. Risk avoidance involves taking no risk, such as deciding not to sail a specific route. An extreme case of risk assumption is called self-assumption that is, going without any insurance cover. Relying on insurance to mitigate the impact of piracy is called risk transfer. Purchasing insurance and implementing a security program serves both as risk reduction and risk. An effective supply chain in handling drought relief items need to be risk averse to ensure that they do not incur loses.

3.10.4 Supply chain risk management process

According to Madejski and Fritze (2014), every risk management process starts with uncertainty because risk is a product of uncertainty. Based on the level of uncertainty and the nature of the risk, possible events may unfold that could harm the supply chain. That these events may come to pass is not certain, but probable. For each risk there are alternative responses. What is done depends on the risk management strategy of the organisation, including whether it maintains a reactive or proactive risk policy. Consequences arise from what is done or not done. An approach such as risk governance emphasizes the management of risk. Failure to act can have severe consequences for not just the business, but for the entire supply chain. The risk management process, including the decisions taken by management, serves to mitigate or enhance the organisation's vulnerability to risk, and by implication specific risks. The process or managing risk can be broken down into core

activities (Madejski & Fritze, 2014). Preparation is needed to prepare organisational infrastructure and designate responsibilities within the risk management process. A risk strategy has to be defined by the organisation to guide management decisions, including attitude to risk, aims of the strategy, and methods available to manage or curb risk. The risk management process starts with identifying the types of risk. In the case of the research presented here, the risks along the whole supply chain have to be examined. Activities have to be defined and their relationships mapped. Activities and their relationships have to be examined to identify areas of risk. The first core activity delivers a list of potential risk areas.

A second core activity involves analysis of the risks. Here the potential impact of the risks on the supply chain is examined. In the traditional Knight model, there is the probability that the risk will occur and this usually ranges from rare to very likely, and the likely impact, mostly defined in range from very low to very high, or minor, moderate and major. Based on the topology constructed from these two variables, managers can then determine what priority a risk event should have. The second core activity produces a list of risk events with events with the highest impact listed at the top (Madejski & Fritze, 2014). These are the events managers should concentrate their resources on. The third core activity revolves around developing an appropriate response. Once the severity or the risk is known, a way has to be found to deal with it. In general, managers have three choices. They can practice risk prevention, that is to reduce the probability of a risk event occurring. Risk mitigation emphasizes reducing the consequences of a risk event. Risk response is a reactive approach whereby the management waits until the actual risk event occurs and then reacts based on the situation. Once a response is adopted, monitoring and evaluation would take place because risk is a constantly changing phenomenon. Responses have to be constantly adjusted and controlled.

3.11 Planning and preparation for emergency relief distribution

According to Cottrill (2002), the phases of disaster management are planning, mitigation, detection, response and recovery. The three phases constituting disaster management cycle in the view of Van Wassenhove (2006) are preparation, response and collaboration. Kovacs and Spens (2007) also discussed the three phases of disaster management as preparation, immediate response and reconstruction. Humanitarian logistics management provides some thought provoking guidance and discussion on the core issues facing those who are involved in managing the supply chain of disaster relief distribution to vulnerable people in a disaster area (Thomas & Kopczak, 2005). To achieve the desired results, it would require an effective supply chain management for the smooth flow of goods, information and finances from donors to those in need. Thus, Ssengonzi and Oginski (2012) asserted that just as the science of logistics and supply chain management has become critically important for private sector logisticians, it is also becoming very important for humanitarian workers as they have come to realize that it is a critical part of their operations that can mean the difference between a successful or a failed relief operation and that it is the bridge between disaster preparedness and response, procurement and distribution and between headquarters and the field (Thomas & Mizushima, 2005). They concluded that it has become inevitable to consider the supply chain as a core function of disaster management. However, Kovacs and Spens (2007) found out that the supply chain in a relief operation is usually characterized by the uncertainties, irregular demands and unusual constraints in large-scale emergencies. In their opinion, there are many factors in relief operations that can contribute to delays such as suppliers having different motives for participating, transporters not prepared when called upon, and customers not expressing their real needs thus making humanitarian logistics and supply

chain management extremely challenging (Balcik and Beamon, 2008). In terms of logistics, the following are the four main phases of emergency management:

- **Preparedness** includes all activities that can prevent the occurrence of an emergency, reduce the chance of an emergency happening, or reduce the damaging effects of unavoidable emergencies.
- **Response** includes plans or preparations made to save lives and to help response and rescue operations.
- **Recovery** includes actions taken to save lives and prevent further property damage in an emergency situation. Response is putting your preparedness plans into action. Recovery includes getting financial assistance to help pay for the necessary repairs.
- **Prevention/ Mitigation** include all actions taken to return to a normal situation or a safer situation following an emergency.

3.11.1 Preparation

Whenever a disaster hits, it is important that relief organisations have action plans ready for delivering and distributing appropriate aid in response to the needs of those affected. Their supply chains should be fast and responsive even when the nature of the disasters is not the same. The practice of taking action against disasters in rescuing victims is similar in all cases. Assessing the needs required should always be the first process to establish the goods and services necessary in assistance (Tomassini & Van Wassenhove, 2009). Disasters are difficult to prevent and they need to be carefully prepared for by, for example, offering free training to the community members involved as well as the volunteers and developing evacuation plans well in advance (Kovacs & Spens, 2007). Tatham and Houghton (2011) stressed that trained aids staff are mostly allocated with receiving and distributing the goods, while expert teams carry out services like medical check-ups and telecommunications. Even though, Van

Wassenhove (2009) observed that disaster preparations also deals with reforming the whole supply chain set-up which entails resource accumulation and reallocating aid items as well as delays.

Humanitarian agencies must improve their monitoring of needs and how they can be met through rapid response that can be activated every time a disaster takes place. There is a disparity in the type of disaster occurring, the number of people affected, the resources required and personnel required working on site. The supply chain management in humanitarian logistics remains a central function that should be embraced in responding to all types of disasters. Tomasini and Van Wassenhove (2009) also asserted that the focus should be on the supply chain set-ups and its practice whenever making preparations in advance for handling relief materials distribution as this is crucial to its success. The agencies have to concentrate on removing the uncertainties along the supply chain as these can create problems when the humanitarian supply chain is activated. Failure to identify and remove these uncertainties might lead to serious disruptions in the humanitarian aid process.

3.11.2 Response

Disaster response strives to assist the most vulnerable people during emergencies and focusing on prioritized basic needs. The response system refers to various operations implemented after a disaster occurs and has two main objectives (Cozzolino, Rossi & Conforti, 2012). The first objective is to respond immediately by activating short-term networks and the second objective is to restore in the shortest time possible the basic services and delivery of goods to the highest possible number of beneficiaries (Jahre, Jensen & Listou, 2009). In the response stage, coordination and collaboration among all players involved in the humanitarian emergency deserves particular attention (Balcik et al., 2010). Beamon and Balcik (2008) observed that there is a high relevance of uncertainty in the response stage

when disaster is contextualized and various external factors like security and politics influence is affecting the response. Governments however always steps in to stop violence (Apte, 2010).

Humanitarian firms follow three principles in responding to catastrophes and they comprise of humanity, neutrality and impartiality. The grouping of these principles guarantees that aid agency work force do not discriminate against or take sides and they should show compassion and remain fair while attending to human sufferings (Tomasini and Van Wassenhove, 2009). Humanitarian agencies respond to crises to sway their relief efforts and grant assistance regardless of threatening challenges involved mainly conflicts. Thoroughly negotiations and risk taking decisions are made before disaster responses (Thomas & Kopczak, 2005).

Investing in information management is one of the preparedness elements that assist agencies in constructing evident needs and accountability amongst all key players involved. Managing information help reduce the difficulties brought along by uncertainties of demand. There had been numerous initiatives by humanitarian firms to design a common language and promote collaboration among various organisations involved in humanitarian logistics (Van Wassenhove, 2006). Van Wassenhove (2006) further highlighted that the disaster response area should focus on issues of collaboration and coordination that involve multiple players' interactions to respond to emergencies.

3.11.3 Collaboration

A study conducted by Christopher and Tatham (2014) stated that, alliance takes place among both humanitarians and other actors like private sectors and local community members. Kunz and Reiner (2012) further justified that when aid agencies attend to disaster needs they may

not have the resources and competence that private sectors have to meet the assisted populations' needs. However, humanitarian firms also require the community's assistance in ensuring considerable risk factor reductions endangering good recovery systems before an exit from relief operations. Balcik et al. (2010) stated that humanitarian relief community is diverse and engages very different players with a variety of interests, purposes, logistics expertise and mandates. Kaatrud, Samii and Van Wassenhove (2003) categorized the major players in humanitarian relief operations as follow:

3.11.3.1 Private sector organisations

According to Davis and Lambert (2002), the private sector can be involved in the relief system at different levels: manufacturing and supplying equipment, providing consultancy and training service. Most companies view being a good corporate citizen as a heart of humanitarian performance either the deeds of offering cash, goods, human resource and knowledge and expertise even though it comes with consequences (Tomasini & Van Wassenhove, 2009). Gradually, companies opt to design their community commitments through long term programmes and partnering with humanitarian firms. These private logistics companies partake in alliances not only for charity concerns but also opportunities for learning and developing their businesses while humanitarian agencies invest the same resources in hope of improving their performance and increase their competence but only end up benefiting on better disaster preparations and reallocation of assets during crises like food, telecommunication, medicines and donations.

3.11.3.2 Community members

Developing partnerships with community members goes beyond emergencies to focusing more on sustainable reduction of vulnerabilities in communities. Mostly, disaster reliefs only attend to instantaneous needs of prompt response, only when careful attention is given to reducing risk factors that led to the event and all needs become immediate. The community

members' engagement should be increased to be able to deal with emergencies, if supply chain management is active, it can help the communities recover from disasters in many ways.

3.11.3.3 Military Organisations

Military troops assist agencies with a wide range of logistical and material support in humanitarian relief efforts. They play a dynamic role following a disasters impact with the expertise at their exposure. According to Davis and Lambert (2002), military forces also need to prepare and plan for humanitarian relief work, refugee camps for example should be accounted for as a special social need for the victims. Military organisations maintain peace keeping in conflict situations and collaborate with humanitarian agencies to have significant support, equipment and expertise.

3.11.4 Mitigation

Van Wassenhove (2006) describes mitigation as a phase which encloses laws and methods that reduce social vulnerability and relate to the responsibilities of governments not directly involving the direct participation of logisticians. Measures of limiting and minimizing the impacts of a disaster are however undertaken at this element. Tatham and Houghton (2011) found that the mitigation measures undertaken are always of different kinds, ranging from physical measures such as flood defences, safe building designs, training and public awareness. Mitigation can take place before a disaster occurrence, during an emergency and after a disaster or during the reconstruction phase.

3.11.5 Reconstruction

Kovacs and Spens (2007) stated that after immediate responses, regional actors can begin aiding victims in the location. Tomassini and Wassenhove (2009) highlighted that different operations in the aftermath of a disaster takes place in reconstruction, it involves rehabilitation, and aims to address the problem from a long-term perspective. The effects of a

disaster can persist for a long period of time, and can have severe consequences on the affected population. In addition, disasters can also have long-term effects on the management of companies for example, immediately alter a disaster, transportation companies may undergo a modal shift from road to rail that prevails long after the occurrence of the disaster, due to road (infrastructure) destruction (Kovacs & Spens, 2007). The objective of the reconstruction phase is saving as many costs as possible and it can be achieved through leanness whereby efficiency ensures that cost is saved and more lives are rescued (Cozzolino et al, 2012). Reconstruction is important because disasters like drought always come with long-term effects on communities. In addition, disasters can also have long-term effects on the management of companies. Kovacs and Spens (2007) highlighted that, regional actors should also focus on the reconstruction for which continuity planning is needed, their disaster prevention plans need to be revised to include things that have been learned from the current disaster.

3.12 Barriers to effective distribution of relief materials

Logistics is a term used by the military to cover a range of activities that ensure that the supplies are in the right place, at the right time, in the right condition and delivered to the right people (Cottrill, 2002). . Thus, it facilitates getting the right products and services to the right place and people as and when they are needed. In order to be truly effective, all the functions within the logistics function must be fully integrated as the importance of time and place cannot be over-emphasised. Specifically, Thomas and Kopczak (2005) has defined humanitarian logistics as the activities of planning, implementing and controlling the efficient, cost-effective flow of and storage of goods and materials as well as related information, from point of origin to point of consumption for the purpose of alleviating the suffering of vulnerable people. Humanitarian logistics encompasses a range of activities,

including procurement, transport, tracking and tracing, customs clearance, local transportation, warehousing and deliveries in responding to emergencies (Cottrill, 2002). Nisha de Silva (2001) highlighted the importance of professionalism in the field of humanitarian logistics in disaster response as he argued that the humanitarian agencies that are concerned has to reach the affected areas to witness and document the level of damage and assess the number of resources needed to implement immediate solutions.

Humanitarian logistics covers different operations at different times in response to various catastrophes. The common aim of all these operations is that of aiding vulnerable people for survival (Whiting & Ayala-Öström, 2009). However, it is important to note that aiding in the development of a region and running refugee camps is substantially different from the kind of aid needed after a natural disaster. Thus, according to Kovacs and Spens (2011), the two main streams of humanitarian logistics can be distinguished as continuous aid work and disaster relief. Overstreet et al. (2011) also defined humanitarian logistics as the process of planning, implementing, and controlling the efficient, cost-effective flow and storage of goods and materials, as well as related information, from the point of origin to the point of consumption for the purpose of alleviating the suffering of vulnerable people. It had for long used the supply chain in handling all sorts of relief distribution in the aftermath of disasters such as droughts, earthquakes, tsunami, hurricanes, epidemics, famine, floods, terrorist attacks and war situations as well as concurrently occurring disasters (Kovacs & Spens, 2007).

Kovacs and Spens (2007) argued that humanitarian logistics is a term for diverse assortments of operations such as supply chain that involves the effective delivery and distribution of disaster relief materials to the needy as well as continuous support for developing regions (Whiting & Ayala-Öström, 2009). Van Wassenhove (2006) described the processes of

humanitarian logistics as involving the mobilisation of people, resources, skills and knowledge to help vulnerable people affected by disaster. Briefly, he summarised humanitarian logistics as the management of the movement of relief materials from the point of origin to the point of consumption to meet the needs of the relief beneficiaries. The resources managed in humanitarian logistics include physical items, such as food, materials and equipment. The logistics of moving physical relief items through the supply chain usually involves the integration of information flow, material handling, inventory, transportation, warehousing, and security.

For the supply chain to be effective in handling the delivery and distribution of drought relief materials, there should be proper planning, good transportation, fleet management system and route planning. The functions making up the supply chain are often complex and often needs to be managed by professional people. For example, those in charge of the supply chain management are usually tasked with controlling the influence of the operational factors and have to direct not only those operations within their span of control, but would also need to consider the effect of the entire operation on their agency, partners, and relief beneficiaries (Kovacs & Spens, 2007).

3.13 Logistics and supply chain challenges among humanitarian agencies

According to Romano (2011), there are always senses of urgency to deliver relief supplies to the affected areas whenever emergency situations arise. There are different types of commodities that have to be delivered urgently to those affected such as medication, food, telecommunication and equipment (Borda, 2013). In addition to that, the greatest challenges to relief chain design and management include uncertainty and unpredictability of timing, location, type and size (Balcik & Beamon, 2008). There is also the problem of supply chain

unpredictability that might be due to the suddenness of disasters and this can sometimes arouse the high risks associated with the delivery of goods and services on time (Kovacs & Tatham, 2009). Secondly, there might also be difficulties in arranging transports as quickly as necessary to move items from landlocked areas to disaster areas (Balcik & Beamon, 2008). Thirdly, the question of transparency in the distribution of aids might also arise. Fourthly, the security of humanitarian workers is also a huge challenge faced by supply chain managers. Lastly, there is the problem of lack of resources such as inadequate supply of food, technology, transportation capacity, money and volunteers (Balcik & Beamon, 2008). Besides that, Sebbah, Boukhtouta and Ghanmi (2012) claimed that many organisations involved in the distribution of relief materials sometimes also encounter major scientific problems during emergency relief operations. Such problems might relate to automated identification of emergency supply, demand forecasting for basic commodities, transportation routing and monitoring as well as automated assistance to demand response (Sebbah et al., 2012).

The lack of a complete Standardisation of supply chain procedures has been identified as one of the major challenges in the handling of drought relief distribution (Kovacs & Spens, 2009). Nonetheless, the overall importance of humanitarian supply chain is emphasised by the participation of governments and many aid organisations in the system either as suppliers or as third party logistics providers (Kovacs & Spens, 2009). This point is further buttressed by the fact that there is a multitude of humanitarian agencies that are also involved with coordinating the efforts of various participants in every disaster crisis (Balcik & Beamon, 2008). The authors proceeded to identify the crucial supply chain challenges in handling the distribution of relief materials as follows: unpredictability of disaster occurrence, suddenness of demand, high stakes associated with the timeliness of deliveries and lack of enough

supplies, people, technology, transportation capacity, and funds. Kovacs and Spens (2009) categorized humanitarian support function following a disaster as: immediate response, plain relief, development relief and relief that require healing called rehabilitation. These support functions restore peoples' lives each day and improve the systems in place. Causes, effects and disaster scales vary and so do the organisations involved in overcoming the disaster shortfalls (Coleman, 2006). The relief assistance distributed by aid agencies poses particular challenges for the supply chain managers as the reduction of the impacts of these challenges had never been an easy task. Thus, Balcik and Beamon (2008) who reviewed the challenges faced in the supply chain of disaster relief distribution revealed that, these challenges depend on its nature and its area of occurrence. Kovacs and Spens (2009), however, classified the challenges into three types: challenges related to different types of disasters, challenges related to disaster relief phases, and challenges relating to different types of humanitarian firms.

The causes of particular disasters frequently supply an understanding into the disaster logistics challenges. With poor knowledge of climate change effects, lack of standardized planning and preparedness processes, security and safety, different disasters will always prevail. The challenges related to disaster rescue phase are seen in terms of cycles linking recovery to preparedness (Pettit and Beresford, 2009). According to Kovacs and Spens (2009), the challenges differentiating humanitarian organisations take a variety of forms ranging from supranational aid organisations which are UN agencies, Red Cross Agencies and governmental organisations as well as non-governmental organisation (NGOs). The organisations differ in presence, size and mandates to standard operating procedures and moreover, their sizes effectively limit operational potentials. For instance, small humanitarian organisations are known to focus on specified targets prevailing in a certain community or

region (Coleman, 2006). The challenges faced by humanitarian organisations had been identified as follows: absence of collaboration among humanitarian organisations; unavailability of coordination among humanitarians; lack of knowledge among fellow players; humanitarian staffs are deprived of logistical training in carrying out emergencies; lack of supplies and funding among humanitarian agencies; and inadequate infrastructure creating extra logistical costs.

3.13.1 Lack of supplies and inadequate preparation

According to Balcik and Beamon (2008), many humanitarian firms are facing supply chain challenges because of inadequate preparation for emergency situations due to the absence of early warning systems and also because they have no disaster needs assessment and pre-positioning of relief materials in readiness for emergency operations. Furthermore, there is a limited understanding on the possible impacts of damages that can result from a particular disaster and the effectiveness of delivering aid as quickly as possible during the sudden-onset of a disaster (Balcik & Beamon, 2008). Humanitarian organisations struggle with supplies, and donors are only interested in assisting particular regions. Medias capturing of crisis extend great deal of pressures on the government, agencies and donors. Mostly donors respond generously after a disaster has been well published and exposed (Kovacs & Spens, 2009).

3.13.2 Inadequate infrastructural facilities

Özdamar, Ekinci and Küçükyazici (2004) pointed out that humanitarian organisations still continue to struggle with aid item distributions due to lack of technological equipment and inadequate infrastructural facilities. During a crisis, the quality of the infrastructures can be a major issue that often poses a challenge to efficient logistical delivery operations. Inadequate transportation had been identified as one of the major barriers to effective aid delivery.

3.13.3 Security and safety challenges

The security of the supply chain has become a major challenge in recent time as those handling the relief materials had in recent times been attacked, kidnapped or even murdered in some conflict situations (Pettit & Beresford, 2006).

3.13.4 Lack of coordination and collaboration among humanitarian organisations

Kaatrud, Samii and Van Wassenhove (2003) stated that there had been no coordination mechanisms or collaboration among humanitarian organisations and that this had been creating problems in the supply chain and the overall disaster relief efforts. According to these authors, many humanitarian firms now regard each other as competitors instead of collaborating among themselves for increased effectiveness of the supply chain in handling the distribution of relief materials. Collaboration should ultimately mean more efficient, more cost-effective logistics operations to benefit those affected by conflict and disaster (Kovacs & Spens, 2011). Balcik et al (2010) explained that there are no rules and policies regulating the operations of various governments, humanitarian organisations and other aids agencies and this has been identified as one of the leading challenges militating against effective coordination and collaboration of the players in the distribution of relief materials. Moreover, it has been asserted that humanitarian organisations also lack knowledge about each other due to the absence of communication among them and the fact that there are no strategic partnerships amongst them (Thomas & Fritz, 2006).

Kunz and Reiner (2012) revealed that delayed response to a disaster can be devastating to the affected areas. Therefore, it is important for the various aids organisations and governments to cooperate and coordinate their efforts for resource use and information sharing so as to improve the distribution disaster relief materials. Furthermore, Altay and Green (2006) had also pointed out that inter-organisational relations are usually a challenge to the relief effort

instead of been a source of support. According to them, these problems arise because each organisation has its own operating methods and goals, and it is only with great effort that they can coordinate their plans and share resource.

3.13.5 Uncertainty challenges

Although uncertainty has many different faces, its role in humanitarian logistics needs more clarification as urgency and rapid response are necessary. In humanitarian logistics, it is the performance of the supply chain that determines the success or failure of relief operations as it provides a comprehensive performance indicator regarding the handling of the entire operation. Uncertainty has been identified as one of the most challenging obstacles in the supply chain of humanitarian logistics because disasters are in most cases unpredictable and almost impossible to accurately predict the exact time or date when a disaster will strike, what type of disaster will strike, how many people will be affected, what infrastructure will be affected, which suppliers will donate what, and what shortcoming will be encountered. Although the role of uncertainty in humanitarian logistics as well as the supply chain has not been fully explored, it has been found that uncertainty can stem from many elements relating to the mission, the organisation itself, or nature of the logistics demand. For example, uncertainty may arise from inherent characteristics such as what and how much material is demanded, product traits, process fluctuations, and supply problems (Thomas, 2003). He explained further that uncertainty might be created in supply chain performance by any of the following: its configuration and control structures, forecast horizons, decision complexity, information reliability, and agency culture. As supply chains become larger and more geographically diverse, natural and man-made disasters might also disrupt the supply chain (Apte, 2010).

3.13.6 Transportation problems

Transportation is key in facilitating the distribution of relief materials. Without good transportation facilities, it would be very difficult to get relief materials to their destination at the right time (Sandwell, 2011). Many regions are still isolated due to poor infrastructures. It is only the innovation in transportation that can bring about major changes in travel methods and eventually the faster distribution of relief materials all over the world.

3.13.7 Corruption and other challenges

Sandwell (2011) described corruption as another challenge faced by humanitarian firms whereby there is a high degree of dishonesty among individuals appointed in distribution of supplies. There had been accusations of some personnel of humanitarian agencies selling the relief items in their care with no consideration of disaster victims.

3.13.8 Communications barriers in the supply chain

According to Vega and Roussat (2015) there are noticeable complications linked to communication with disaster victims or other aid agencies volunteers during emergencies whereby people communicate in different languages due to inexperience in understanding foreign linguistics, language barriers hinders communication system between the relief volunteers, specialists and the affected people. Relief agencies volunteers also often experience difficulties communicating with their headquarters and their donors during disasters due to a lack of telecommunication devices.

Communication is the act of imparting or transmitting information and is an essential tool of logistics management. Effective communication is essential for the smooth distribution of relief materials because poor communication among the humanitarian officials can negatively affect the timely delivery of aid to the needy (Altay & Green, 2006). Poor communication can be the results of both language barriers as well as the results of communication infrastructural deficiency. Communication between the teams at a disaster site may be poor

and they may not be able to communicate upstream with headquarters as well as with the donors. Besides, the relief agency may also not be able to communicate their needs to the donors. Altay and Green (2006) explain that organisational language, codes and terminology may hamper the supply chain in the aid process. For example, some organisations estimate need on a family basis while others use a per person basis (Altay & Green, 2006).

In some other cases, organisations may use different names and definitions for similar transportation modes, supplies, the composition of worker teams, and so on. They concluded that this is an indication that organisational and cultural language barriers may lead to procedural difficulties (Altay & Green, 2006). Communication problems exist at all stages of the supply chain and even long after the effects of a disaster are mitigated. Lack of funds during humanitarian actions often limits the tracking of information on complex supply chain conditions especially at the field level (Tatham & Houghton, 2011). The inability to coordinate effectively due to poor communication is a common occurrence during emergency response and is only made worse by disputes between organisations, and inability to share information effectively which will ultimately lead to duplicated efforts and wasted resources (Pettit & Beresford, 2009). Perhaps these barriers are among the reasons that humanitarian logistics is only now maturing as a discipline while international response to disasters has been going on for the better part of a century.

3.14 The role of Enterprise Resource Planning (ERP) in the distribution of drought relief materials

Enterprise Resource Planning (ERP) is the generic term used for management software that includes modules such as production, finance, marketing and human resources and permit companies to plan their goods and services (Njihia & Mwirigi, 2014). ERP aims to combine

all management functions through integrated flow of information and management of outside stakeholders while maximizing the use of information technology (IT) (Westrup & Knight, 2000). Thomas (2003) defined ERP as an enterprise-wide information system designed to coordinate all resources, information, and activities needed to complete business processes and measure performance. ERP is thus the foundational layer that provides the organisational information structure, knowledge and business control template. ERP systems are packaged enterprise systems that cover most core business functions including finance, accounting, sales, operations management, purchasing, and human resource management (de Jongh, 2012).

Although the implementation of ERP has its own challenges, it has generally been noted in literature to enhance performance, even though specific performance aspects may differ from sector to sector. In this regard, information technology has contributed immensely to the development of the supply chain function especially in the area of transportation and had helped in drastically reducing the lead time in the distribution of relief materials and thus contributing to its overall success of many aid organisations. Distribution of drought relief materials involves planning the methods of transferring the goods from the point of departure to the point where it is needed and by physically handling the goods, also responsible for achieving its logistic and supply chain objectives of getting the right relief materials to the right place at the right time. Monitoring and control of the supply chain function is very important in order to provide definite measures for operational effectiveness because the ability to make timely delivery is a very important aspect of relief materials distribution. It is critical that the suppliers of drought relief items are equipped with ERP software integrated with the material suppliers. This ensures that goods are ordered and delivered at the required speed to avoid delay since the ERP system assists in managing the connections to outside

stakeholders as well as enhancing their performance management as it uses a centralized database and usually relies on a common computing platform that provides the user with a unified, consistent and uniform environment (De Jongh, 2012). Overall, the use of ERP can reduce operational costs through improving efficiencies, decision making and the coordination of various organisational activities. The benefits of ERP in terms of distribution have been proven by many scholars among them (Rabaa'I, 2009). For instance, the Aberdeen Group made the following findings regarding the system:

i) 22% reduction in operating costs,

ii) 20% reduction in administrative costs,

iii) 17% inventory reductions for manufacturing and distributing,

iv) 19% improvements in complete and on-time delivery,

v) 17% improvements in schedule compliance for manufacturing and distributing.

3.14.1 Critical Success Factors for ERP implementation

The critical success factors for ERP implementation as identified by Rabaa'i (2009) are : top management commitment and support; change management; project management; business process re-engineering and system customization; training; ERP team composition; visioning and planning; consultant selection and relationship; communication plan; ERP system selection; ERP systems integration; and post-implementation evaluation measures. He placed emphasis on the importance of effective project management for the successful ERP implementation. According to this author, effective project management should define clear project objectives, develop a work and resource plan, and carefully track the project's progress.

3.14.2 ERP implementation challenges

3.14.2.1 Inadequate timeframe

In a study by KPMG (2011), 86% of the participants indicated that they failed to meet the timelines demanded for proper ERP implementation. The reasons given included inadequate timeframes, unrealistic timelines, unpreparedness for change and absence of adequately skilled personnel. In any project, there are always possibilities of unforeseen mishaps, changes in scope or direction that need to be considered when setting timeframes. However, prudent delays are better than striving to meet unrealistic timelines as that may be costlier and lead to ineffective implementation.

3.14.3 Financial constraints

Developing countries have limited financial resources and thereby work under tight budgets for projects (Bhatti, 2005). Elragal and Al-Serafi (2011) state that ERP projects are time, personnel and capital intensive and over budgets are mainly noted on actual implementation and not necessarily on software procurement. According to KPMG (2011), 43% of respondents indicated an over budget on the ERP project. Elragal and Al-Serafi (2011) also added that the extra costs may also lead to the failure to accurately capture the costs due to numerous changes and absence of effective and systematic capturing of the costs. Such costs that may be missed are opportunity costs and loss of productivity.

3.14.4 Lack of skills

Inadequate knowledge and lack of skills by the staff is rampant in the developing countries (KPMG, 2011; Elragal & Al-Serafi, 2011). It is therefore necessary to have the right people with the right skills to aid successful implementation of ERP. KPMG (2011) added that the inadequate staff skills may be attributed to inadequate training; as ERP becomes a new project new skills have to be developed. Training is also necessary to enhance skills and ensure effective utilisation of the system which will assist in accurate assessment of benefits

derived from ERP. Hitt and DJ Wu (2002) emphasize the need of effective communication between the staff and the consultant.

3.14.5 Integration problems

An ERP system usually includes a group of business modules that interconnects the multiple functions of an institution into a closely combined single system using a common platform to facilitate the movement of information throughout the organisation (Rabaa'i, 2009). Thomas (2003) argues that many organisations find it challenging to integrate the ERP system with existing separate information systems. Hitt and DJ Wu (2002) stated that the integration challenges faced by organisations could be due to the ERP packages that are not designed according to organisation needs.

3.14.6 System complexity

Njihia and Mwirigi (2014) noted that system complexity has always been a challenge in any e-projects implementation as it increases the risk of failure. Most of the ERP systems are generally designed for private sector and not public sector thereby may fall short of meeting public administration requirements (Ziemba, Obłąk & Informatyczna, 2013). This misalignment contributes to the complexity challenge. The competence of project implementers is therefore very necessary in meeting the requirements for any adopted system (Njihia & Mwirigi, 2014)

3.14.7 Effect of ERP implementation on enterprise performance

Literature generally agrees on enhanced performance due to ERP implementation (Elragal & Al-Sarafi, 2011). Hitt and DJ Wu (2002) however draws attention to the pre and post implementation performance of ERP indicating that some specific aspects may have negative outcomes and not necessary improve performance. Rabaa'i (2009) suggests that this may be sector specific as focus areas might be different. For instance, the services sector normally utilizes the ERP mostly for effectiveness compared to better quality business processes and

information quality. According to Bhatti (2005), project and business outcomes determine ERP project performance and also that it is efficiency, effectiveness and flexibility that define ERP business outcomes. Ağaoğlu, Yurtkoru and Ekmekçi (2015) argued that the three aspects are a result of ERP implementation; business process efficiency, business process effectiveness and business process flexibility. According to Karimi, Somers and Bhattacherjee (2007) ERP results can be measured through the following elements with resultant key performance indicators given:

- **Business process efficiency** - by reducing cost and time cycle, increasing productivity of the production process, and improving quality and customer service
- **Business process effectiveness** - by improving decision making and planning, and resource management and delivery
- **Business process flexibility** - by building flexibility into IT infrastructure to reduce IT cost, by differentiating products and services, and by establishing and maintaining external linkages to customers and supplier

3.15 Strategies for successful implementation of ERP systems

Strategies related to successful ERP implementation might vary from one organisation to another as well as from resource management to people management. Ziemba, et al (2013) indicated prudent financial management as a very important factor as there is need to ensure early budgetary preparations that are well aligned to project requirements. KPMG (2011) also alluded to the need to avail funds in time for the project timelines. As a project, the ERP skills gap must be identified and closed by enhancing the skills of the personnel and engaging skilled consultants or new employees when need arises (Ziemba et al, 2013). Moreover, adoption of the necessary implementation method has to be customized to meet the needs of the entity. Thus, Ziemba et al, (2013) advocates for phased implementation by the aid

agencies due to the size and cross agency involvements. The implementation should also be well assessed for the right package to use as there are different ERP packages (Njihia & Mwirigi, 2014). The project manager should be cognisant of change management skills on ERP implementation (Elragal & Al-Serafi, 2011). This will assist in determining ways to enhance the drivers of change and minimize the negative effect from identified barriers to ERP implementation. This is one of the critical skills that those handling the supply chain of relief distribution should possess for its effectiveness. In addition, Karimi et al, (2007) advocates for training plans with provision of adequate resources to ensure that all those involved in the implementation of ERP have the right skills in order to achieve the desired results.

3.16 Strategies to improve the effectiveness of the supply chain in handling relief distribution

3.16.1 Standardisation of supply chain procedures

Chandes and Paché (2010) recommend maintenance of complete liberty to adapt some elements of the humanitarian supply chain as a function of the geographical context, the quality of the infrastructure, the geopolitical situation, the degree to which the population has been hurt. Pettit and Beresford (2009) adjoined that an optimal decoupling point between Standardisation and adaptation should be defined to postpone the distribution of supplies and other resources as long as possible by taking into account the specific features of humanitarian aid that needs to be deployed at a given time.

3.16.2 Broadening the scope of aids funding during disasters

Kovacs and Spens (2011) recommended that the scope of aids funding needs to be broadened and that donors need to realize that adopting an actively hands-on approach to changing organisational logistics management funds will often not be used as efficiently as they could

be with a wider investment in technology and communications. The NGO's can put to good use the excesses in inventories, product over-runs and over supply, often driven by unforeseen market demands for changing fads. NGOs need to establish a list of criteria that such goods must pass before acceptance/use (Sandwell, 2011).

3.16.3 Invest in humanitarian technology and communication

Pettit and Beresford (2009) recommended that agencies must come to terms with the important role that logistics and supply chain management can play. Senior managers need to recognize that there are great savings to be made by consolidating and standardizing a host of often scattered logistics functions. Middle management must invest time and energy in order to persuade senior leadership. Kunz and Reiner (2012) also recommended that a key area of concern that needs a collaborative contribution by both private sector and NGOs is that of global communications. One idea would be for a consortium of NGOs to work with the private sector, drawing on their resources, expertise and knowledge in radio, satellite, licensing and hardware. One outcome could be a communications unit to serve the wider humanitarian community during a large- scale disaster. Logistics plans, logistics software and logistics staff should be in place. Communications issues should be addressed for the logistics chain to be complete and efficient.

3.16.4 Training for community members and aids agencies personnel

The training of personnel of aid agencies should be seen as a very important factor for the effectiveness of the supply chain in handling relief distribution. This is to enhance knowledge that can greatly assist humanitarian agencies in their duties. Competency-based capacity-building initiatives and mechanisms need to be developed and supported so that humanitarian logisticians' skills and know-how are raised to more professional levels, and supported by appropriate training discipline and accreditation. New employees could be sourced from feeder schools and corporate environments where they might have core professional skills

though needing to learn more about the humanitarian context. In addition, there needs to be a greater emphasis on mentoring and coaching within organisations. Chandes and Paché (2010) observed that training community members in first aid skills can be helpful during disasters. The more prepared a community is, the more flexible it will be in the event of a disaster. However, Overstreet et al. (2011) observed that there is always a need to develop a clear strategy on commencement from emergency phase to recovery and development with the overall aim of ensuring flexibility among households, to the recurring hazard of drought and other common shocks. Van Wasscnhove (2006) reviewed that there is need to invest in building local staff capacity in disaster response to be able to provide rapid, timely response to emergencies leading to reduced delays associated with recruitment of international staff.

3.16.5 Collaboration among aids agencies and between agencies and affected communities

A higher degree of collaboration across agencies is required in the form of workshops and shared specialist pools. It is also important that the sector draw on the brain trust of the commercial sector, particularly in its proven areas of competence, systems and software, technical and engineering expertise. Corporations could provide their own staff with opportunities to work alongside NGOs. The corporate community could also create a pool of logistics experts available to the humanitarian sector for deployment on an on-call/as-needed basis. Humanitarian demand is often seasonal with need often dictated by the specific requirements of an emergency. Corporate experts could work alongside NGOs in the field in both pre emergency and during emergency phases. In the area of partnership there are different ways that can be looked at to consider a communities contribution to emergency response operations. What is required is a much higher degree of collaboration across agencies in the form of workshops and shared specialist pools (Wassenhove, 2006).

3.17 The role of Palletisation in the supply chain and the role of containerisation in supply chain.

3.17.1 The role of Palletisation in the supply chain

Pallets enable unifying dry cargo loads. Basically, it is a flat tray upon which a lot of articles can be placed, and can be handled as one article. For securing the articles to the pallets, metal strapping, plastic films or more elaborate forms of devices are used (Waters & Rinsler, 2014). Benefits of palletisation include:

i. reduction in time required to load or unload the products from the vehicle, and better utilisation of warehouse space,
ii. assembly of individual packages,
iii. easy handling of pallets for road as well as rail vehicles, and
iv. reduction in the rate of damage in transit, and reduced delivery time

The major drawback to palletisation is the lack of uniformity in pallets

3.17.2 The role of containerisation in the effectiveness of supply chain

Container refers to physical equipment which is used for unifying a number of shipments, which then move as individual units; these are used to handle bulk commodities as well as merchandise and are especially adaptable for inter-modal transport (Caris et al, 2014). The benefits of containerisation in a supply chain include:

i. Reduced door to door shipment
ii. Reduced freight costs
iii. Reduced damage and pilferage, thus eliminating intermediate handling of packages
iv. Higher productivity of labour
v. Lesser documentation
vi. Reduced warehousing and inventory costs

vii. Better utilisation of capital equipment through uniformity of cargo

viii. Environmental control

It is therefore necessary for the government and other humanitarian agents to make use of containers for bulk orders in order to minimize damage to relief items thereby increasing effectiveness within their supply chain.

3.17.3 Drawbacks of containerisation in the supply chain

i. All cargo need not necessarily suite containerisation

ii. Heavy capital investment in equipment required

iii. Difficult to thrust liability as there are several carriers and also no intermediate inspection

iv. Proper equipment to handle containers may not be available

v. System not comfortable with air freight

3.17.4 Movement of containers in the supply chain

Any of the following modes of transportation can be used for moving the containers from one point to another:

i. **By road**: This is done by using equipment like direct lifting cranes, forklift trucks, portal frames and other self-loading devices.

ii. **By rail**: For long distances, road may prove uneconomic and thus the rail transport can be used to transfer containers.

iii. **By port terminals**: The container finally arrives at the port to be shipped whether road or rail transport is used to transfer containers.

v. By ships: To secure benefits of rapid loading and unloading and thus to ensure efficient utilisation of space, containers are built or customized. Wide hatches give complete access to holds in these ships.

3.18 Conclusion

This chapter reviewed available literature on different types of disasters especially those afflicting Namibia as well as the supply chain function in the handling of relief material distribution in Namibia. It discussed the humanitarian logistics and supply chains in addition to examining the challenges involved. It also looked into the reasons for the delays in reaching those affected by occurrence of disasters. Finally, the chapter concluded by examining various solutions that can be applied to resolve the challenges encountered by humanitarian supply chains in distributing drought relief materials shortly after the occurrence of such disasters in Okatana constituency in Namibia.

Chapter Four

Research Methodology

4.1 Introduction

Research methodology is the general principle which guides a research (Bryman & Bell, 2015). This chapter outlines and discusses strategies on how the research was carried out and how the necessary data and information to address the research objectives and questions was collected, presented and analysed. It explains the research design, study population, sample size and sampling procedures as well as the research instruments and data collection procedures that were used in the study. Finally, it discussed the research limitations and ethical considerations that were applied while carrying out the research.

4.2 Research philosophy

Research philosophy relates to the development of knowledge, the nature of that knowledge and important assumptions regarding the world views of a researcher (Creswell, 2013). Blaxter (2010) further identifies three major ways of thinking about research philosophy which are: Epistemology, Ontology and Axiology. The authors further identified the following research philosophies: positivism, realism, interpretivism and objectivism. This research adopted interpretivist philosophy which according to Carson et al (2001), allows a researcher to avoid rigid structural frameworks that cannot be avoided in positivist research.

4.3 Research design

Research design is a general term that covers a number of separate but related issues associated with a research study (Blaxter, 2010). Ornstein (2013) defined research design as a

strategic framework for action that serves as a bridge between research questions and the execution or implementation of the research. Saunders & Lewis (2014) outlined different types of research methodology into categories as exploratory, descriptive and explanatory. It may also be defined as a master plan specifying the methods and procedures for collecting and analysing the needed information which the researcher proposed to do (Creswell, 2013). Research design provides the glue that holds the research project together and more importantly evolved to enable the researcher to answer research questions objectively, accurately and economically (Creswell, 2013). Thus, research design is the outline of how a research investigation will take place. By definition, it refers to the overall strategies the researcher chooses to integrate in a coherent and logical way, thereby ensuring the research will effectively address the research problems and constitute the blueprint for the collection, measurement, and analysis of data (Creswell, 2013).

Interpretivism approach allows a more personal and flexible research which are receptive to capturing meanings in human interaction and make sense of what is perceived as reality. In this study, interpretivist allowed the researcher to interpret the elements of the study and also integrated human interest into a study. Accordingly, the researcher assumed that access to reality with regards to the effectiveness of the supply chain in handling drought relief distribution can only be ascertained by using proper research instruments and procedures.

Interpretive studies assume that people create and associate their own subjective and inter-subjective meanings as they interact with the world around them and attempt to understand phenomena through accessing the meanings that research participants assign to them (Saunders & Lewis, 2014). This view point usually takes a qualitative approach to obtain knowledge (Carson et al., 2001). Furthermore, Rossman & Rallis (2011) point out that

qualitative research seeks to understand the procedural affairs of the targeted social phenomenon by focusing on how things happen rather than the fact that they happen. The ability of this philosophy to provide the means to examine situations as well as human beings and their behaviour in an in-depth manner can enable a researcher to overcome the weakness of the positivist approach (Saunders & Lewis, 2014). It was against this background, that this research adopted a broadly interpretivist philosophy and a mixed method approach to ascertain the effectiveness of the supply chain in handling drought relief distribution in Okatana constituency in Namibia. It also made the exploration of expert opinions available for establishing the relationship between the effectiveness of the supply chain and the distribution of drought relief materials.

A case study that focused on evaluating effectiveness of the supply chain in handling drought relief distribution in Okatana constituency was also used. Through the case study, the researcher was able to learn more about causes of ineffectiveness and how these problems can be addressed. This research approach was applied in view of Creswell (2013) argument that it provides an elaborate framework of data collection and analysis procedures that can fully address a research problem. In view of this, the mixed method was used for this study because of its suitability for conducting in-depth scientific investigations. According to Creswell (2013), mixed research method is suitable for the development of concepts which help us to understand social phenomena in natural (rather than experimental) settings, giving due emphasis to the meanings, experiences and views of the participants. It is generally used to gain an understanding of underlying reasons as well as to uncover the factors affecting the effectiveness of humanitarian supply chain in handling the distribution of relief materials as well as to find answers to the research problem. Finally, the study used this design as it

provided a more flexible, open approach to research real world problems, probed into details and gave a deep understanding of the issue at hand.

4.3.1 Mixed approach

The mixed approach is seen as providing both individual and general perspective on the research topic. According to Cope (2005), qualitative and quantitative methods are seen as providing both individual and general perspective on the same issue. He explained that a combination of the two methods uses multi methods that allow a researcher to cross-check results of his findings by approaching a problem from a different angles and using different technique. The research topic required both personal and collective opinions and thus questionnaires and observations were employed in line with the approach that earlier researchers had used and all their research questions were fully answered as the method uses multi-methods to address questions. The phenomenon was examined in different ways so as to produce more accurate findings. The question of whether qualitative and quantitative methods can be used for data collection and analysis in the same piece of research remains an academic debate. Some researchers see the two approaches as different, with qualitative method viewing the world through a wider lens and the quantitative viewing it from a narrow lens (Brannen, 1992). Brannen (1992) argues further that data generated from different methods cannot simply be aggregated, as they can only be understood in relation to the purpose for which they were created. But arguments for studying the same phenomenon by combining quantitative and qualitative methods are much stronger. Cope (2005) expanded the mixed method principle (with different types of interactions by groups over time and space), investigator (with more than one person) and theory (with alternatives theories) used to examine the same phenomenon. Thus in this research, the mixed method approach was used to evaluate the effectiveness of the supply chain in handling drought relief distribution. This combination of methods employed multi-methods therefore offering cross-checking of results

by approaching the research problem from different angles and using various techniques (Creswell, 2013). These combined techniques helped to enrich the research results through internal and external validation, especially given the fact that data in Namibia are hardly consistent (Bryman & Bell, 2015).

4.3.2 Justification of the method

The researcher employed the mixed method approach because it offered the opportunity to cross-check the research results by approaching a problem from a different angles and using both quantitative and qualitative techniques (Welman, Kruger & Mitchell, 2005). This approach is an attempt to legitimatise the use of multiple approaches to answer research questions other than restricting it to one approach. It is a creative expansive form of research and not a limiting one thus pluralistic, inclusive and complementary. The method resulted in better data collection instruments and it promoted greater understanding of findings. Quantitative data can show that change occurred and how much change took place, while qualitative data can help understand the reasons (Welman, Kruger & Mitchell, 2005).

4.4 Research strategy

The choice of strategy for this research was guided by the research questions, research objectives, existing knowledge, the amount of available time and resources and its philosophical underpinnings. The researcher employed the survey strategy because it was flexible and could be used to collect different types of data from the study population.

4.4.1 Survey

Survey method was used in this study in order to be able to correctly evaluate the effectiveness of the supply chain in the distribution of drought relief materials in Namibia. Neuman & Kreuger (2003) highlighted that survey is an extensive method to ensure a more accurate sample to gather targeted results from which to draw conclusions and make

important decisions. This method was preferred because it enabled the researcher to establish the factors that affects the effectiveness of the supply chains in emergency situations in Namibia. It further helped to explore the factors that contributed to the late distribution of relief materials in situation and determine the elements in the supply chain that have a negative impact on the handling of relief materials in Namibia through the use of questionnaires. The strategy also gave the researcher more control over the research process when sampling was used and generated findings that were representative of the whole population at a lower cost than collecting data from the entire population.

4.5 Population

According to Blumberg, Cooper & Schindler (2008), population is the total collection of elements about which we wish to make some inferences. However, Creswell (2013) has also defined a target population as gathering of individuals and items that are the main emphasis of a scientific enquiry. According to Welman, Kruger & Mitchell (2005) a study population may be individual persons, groups and organisations from which the values of the variables of interest could possibly be determined. This study population was a collective of study units for which the values of the variables of interest could possibly be determined (Welmann & Kruger 2001).

The first population group consisted of all drought recipients residing in Okatana constituency who directly benefit from drought relief materials estimated to be around 2675 households. The second group consisted of 5 officials from the office of the Prime Minister who are dealing directly with acquisition, sorting and distribution of the items to various regional and constituency offices for drought relief purpose.

The third and last group consisted of 5 officials from regional and constituency offices who are at the downstream of the supply chain. This officials deals directly with recipients of the

relief items and they are therefore rich in information that the researcher is interested in acquiring; they are also operating under the Office of The Prime Minister but at a different location than those in Windhoek. The first target population was chosen because they are the recipient of the drought relief materials while second and third target populations were chosen because they were involved in the humanitarian supply chain handling the distribution of drought relief materials at Okatana constituency

4.6 Sample and sampling

The principle of random sample method was used for the first study group. "Random sampling method is a method of selecting units from a population in such a way as to enable us to estimate the value of the population and make valid interferences about it (Folarin 1999). The use of the random selection is emphasised so as to guarantee representativeness of the population sampled, known as external validation (Balnaves & Caputi 2001). It is probabilistic sampling and gives every member of the population an equal chance of being selected, hence increasing objectivity and eliminating bias. The technique was used to select households within the constituency who directly benefits from the drought relief materials. The determination of sample size is a thorny problem in research including the even important selection representative samples.

Okatana constituency comprises of a total of 2675 households which is a relatively large number of households, therefore a sample of 130 households were randomly selected for the first study population and only 88 questionnaires were returned. The larger sample will obviously improve accuracy on the findings but time and resources could not allow such a number of households to be examined given the limited time of the study.

The sampling technique that was employed for the second and third study populations respectively was purposeful sampling. According to Raubenheimer (2009) the researcher purposefully chooses respondents (usually experts or opinion formers) believed to be representative of the population. Therefore, 3 key informants from the office of the Prime Minister, warehousing and distribution section were examined. Furthermore, additional 3 key informants from regional and constituency offices of the study were also examined through questionnaires taking the total tally of participants to 94.

4.7 Research instruments

According to Creswell (2013), research instruments are tools that are used for gathering and collecting information that provides relevant data required to come up with results to the problem under investigation. Ornstein (2013) established that research instruments that can be adopted in a research include questionnaires, interviews, observations and documents review. This research study adopted self-administered questionnaires and interviews as the main research instruments. The questions used to construct the questionnaire were based on the objectives of the study. The researcher acquired primary data for the study through the use of questionnaires. The questionnaire consisted of a mixture of open-ended and close-ended questions that were directed to get responses that address the objectives of the study.

4.7.1 Questionnaire

Self-administered questionnaires were used as the main instrument for collecting data. Ornstein (2013) defined a questionnaire as an instrument made up of series of questions that are completed by respondents. Questionnaires were chosen because they were considered less distractive and they allow the respondent time to answer every question carefully with no pressure and they encourage consistency. Generally, the questionnaires were structured into

three sections. The first section comprised of the respondents demographics both drought recipients and key informants. This included the department to which the employees belong, gender, age range and humanitarian level of importance at the place of employment, that is the Office of the Prime Minister and Oshana Regional or constituency office. The second section comprised of closed ended questions relating to the effectiveness of the supply chain in handling drought relief materials in Okatana community while the final section provided the opportunity for respondents to recommend strategies for improvement of humanitarian supply chain service delivery. The questionnaires administered contained both open-ended and closed ended questions in order to provide a more detailed response.

4.8 Reliability and Validity

Reliability of a research instrument concerns the extent to which the instrument yields the same results on repeated trials. The questions in the questionnaire that measure the same variable was grouped together and, the researcher performed a pilot study on the questionnaires before the survey (Creswell, 2013).Validity represents how well a variable measures what it supposed to. The questions asked from the respondents were made relevant as per the content of the literature review so as to gain the most accurate and significant results (Creswell, 2013).

4.9 Ethical considerations

The ability to collect accurate data depends on gaining access to its source. According to Saunders & Lewis (2014), gaining physical access may be difficult because individuals may not be interested or prepared to participate in voluntary activities due to time constraints. Organisations and individuals find it difficult to cooperate if they do not see any value in the

study or if they have doubts about the credibility and competence of the researcher and more so if they are not certain the information they provide will be treated with confidentiality (Saunders & Lewis, 2014).

To manage this, the researcher distributed questionnaires which had an introductory letter that clearly explained the purpose of the study as well as gave assurance of the confidentiality of all responses. The researcher upheld ethical standards in the conduct of the research by seeking permission from all organisations and individuals involved in the research. It was incumbent upon the researcher to ensure that all participants in the study received full disclosure about the nature of the study, the risks, benefits and alternatives and were afforded an extended opportunity to ask questions and seek clarity on any unclear areas. The study was also conducted in a manner which avoided plagiarism and in accordance with required academic standards.

4.10 Data presentation and analysis

Rossman & Rallis (2011) states that qualitative data analysis is the range of processes and procedures whereby we move from the qualitative data that have been collected into some form of explanation, understanding or interpretation of the people and situations we are investigating. He adds that it is based on interpretive philosophy and the idea is to examine the meaningful and symbolic content of qualitative data. There is a vast number of data gathering techniques used in qualitative research, however, content analysis and thematic analysis were used to analyse data in this research. Researchers regard content analysis as a flexible method for analysing text data (Creswell, 2013). According to these authors, content analysis describes a family of analytic approaches ranging from impressionistic, intuitive,

interpretive analyses to systematic, strict textual analysis. On the other hand, Rossman & Rallis (2011) simply describes content analysis as a method of analysing written, verbal or visual communication messages.

According to Ornstein (2013) thematic analysis is used in qualitative research and focuses on examining themes within data. This method emphasises organisation and rich description of the data set. He explains that thematic analysis goes beyond simply counting phrases or words in a text and moves on to identifying implicit and explicit ideas within the data. The quantitative data gathered from the questionnaires and interviews which formed the major part of the primary data were inputted into Microsoft Excel. The data from interviews and questionnaire were generated in tables, bar charts and text in chapter four. The findings were supported by various reference sources including literature, research and journals articles.

4.11 Limitations

One of the limitations was the uneasy accessibility to the target population. Due to the nature of their profession, humanitarian supply chain officials were always busy and not available most of the time. Another limitation has to do with social desirability bias where officials were reluctant to answer some of the questions because of fear of being negatively judged or being considered incompetent by others. Researcher bias also influenced the selection of participants as there was only one of the organisations that were linked to disaster management that was selected for participation in the research.

4.12 Conclusion

This chapter outlined and justified the strategies that were used to carry out the research. These included the research design which comprised the research philosophy, population,

samples, sampling techniques, data collection procedure, data presentation and analysis techniques. Also presented and discussed were the research limitations and ethical considerations. The next chapter presents and discusses the research findings.

Chapter Five

Data analysis and presentation

5.1 Introduction

In this chapter, the analyses, presentation and interpretation the result of the data obtained during the study is presented. The findings were deducted from the questionnaires on an evaluation of the effectiveness of the supply chain in handling drought relief distribution which focused on the area around Okatana constituency in Namibia. There are illustrations making use of graphical and descriptive statistics. The questionnaires were distributed to three (3) key informants at the office of the Prime Minister (OPM), in Windhoek and an additional three (3) informants at Oshana regional offices. Furthermore, one hundred and thirty (88) residents of the Okatana Constituency who benefits from drought relief materials were examined although, 130 questionnaires were distributed. The main focus of data analysis is centred on the research questions. Below each bar chart, a brief description is given, interpreted, discussed and linked to literature review where applicable for full communication of results.

5.2 Location and drought relief humanitarian supply chain

Data collected during the course of the studies shows that the recipients are in remote locations without adequate road network along with lack of transport facilities. This emerged as one of the likely main causes of delays within the drought humanitarian supply chain. Eighty four percent (84%) of the respondents in Okatana Constituency are living in remote areas while sixteen (16%) are living in areas classified as semi remote. The time taken to receive the relief materials once at the distribution centre varies according to the distances of the various communities in the constituency to the centre and the condition of roads. There is

a number of drought distribution centres represented in the study including Uukwangula Okambuga, Eendjati, Okamwandi, Omatando among others. The varied locations of these communities represent a logistic challenge for the humanitarian assistance from governmental and non-governmental organisations. Out of 88 of the examined drought recipients only 20 representing a 15% of recipients, receives their relief items at Uukwangula centre which accommodate the constituency warehouse agreed that items arrives always on time for collection and at the warehouse while 85% of respondents are in disagreement. This is because the items are in no need of transport and high ranked officials are always paying close attention during distribution thus giving close supervision. Sandwell (2011) affirmed that transportation is key in facilitating the distribution of relief materials and thus without good transportation facilities, it would be very difficult to get relief materials to their destination at the right time.

Table 2: Time of arrival of relief materials (Respondents from Constituency)

Response	Number of respondents
1 hour	9
2 -3 hour	56
4 - 6 hour	16
7 hours and more	7

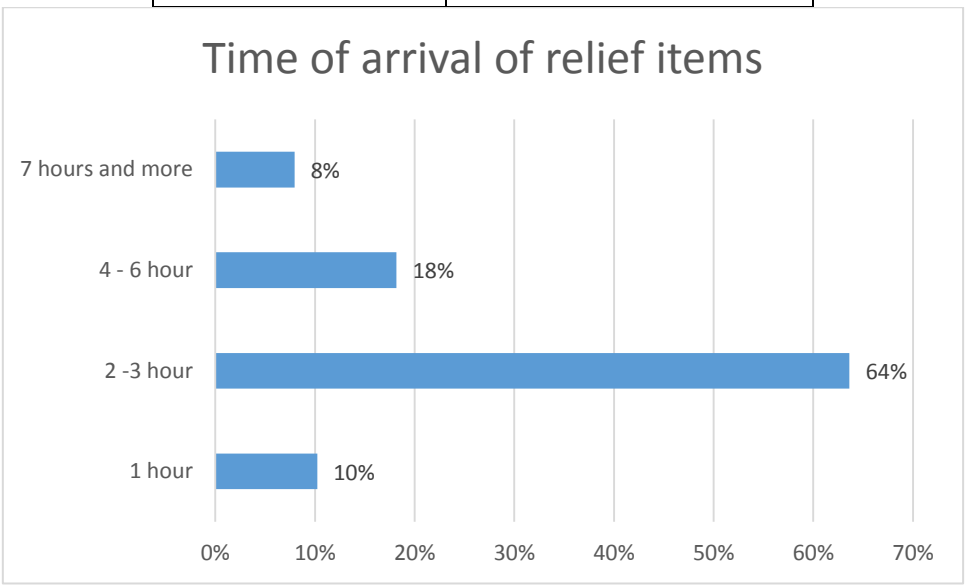

Figure 3: Time of arrival of relief materials

Majority of Okatana constituency respondents also disagreed or strongly disagreed that relief materials were delivered at the designated point and at the warehouse. Deliveries were also regarded as inadequate and not meeting the needs of the communities. In support of this position Bölsche et al., (2013) confirmed that, if the right goods (food, non-food items and medical items) are received by the right people (the most affected people) at the right time (as fast as possible) at the right place, in the right quantity and with the right quality (not poor quality goods), then the supply chain can be described as effective as it would have contributed to alleviating the suffering of vulnerable people. It is noteworthy that respondents were mostly neutral (most did not provide an opinion) on whether officials were helpful and friendly during distribution (66%) and whether they allow free flow of goods (72%). That can be as a result of poor customer care skills because inadequate knowledge and lack of skills by the staff is rampant in the developing countries as identified by (KPMG, 2011; Elragal & Al-Serafi, 2011).

Table 3: Delivery on time and at the designated place

Responses	**Number of Respondents**	**Percentages**
Strongly Agree	2	2%
Agree	12	14%
Neutral	11	13%
Disagree	39	44%
Strongly Disagree	24	27%
	88	100%

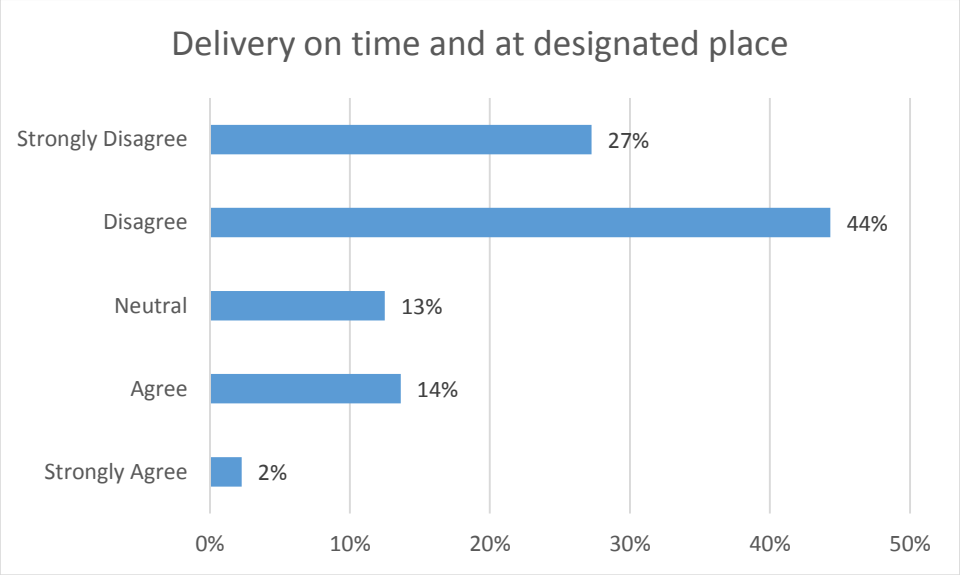

Figure 4: Delivery on time and at the designated place

Given the remoteness of the concerned communities and the lack of good roads, the difficulties in conveying relief materials to their destinations is compounded by the lack of appropriate mode of transportation. Off-road vehicles (4X4s) were not adequately provided for the relief workers according to 80% respondents at the Office of the Prime Minister employees. Delays were also noted by majority of the respondents at the OPM allied to lack of human resources, poor communication and inadequate funding leading to ineffectiveness of the supply chain. The study also revealed that only two (2) employees 40% out of five (5) employees examined at the constituency office are permanently employed.

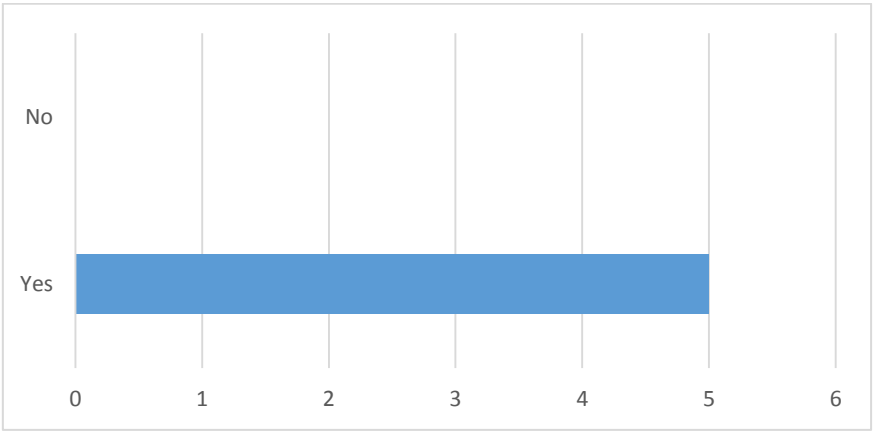

Figure 5: Noticed delays in the distribution of drought relief

5.3 Government resources and drought relief supply chain

On the side of the government officials, during the 2016/17 relief distribution effort, the respondents were of the opinion that there were limitations in the availability of staff while other resources such as poor roads, lack of appropriate software among others were also not readily available.

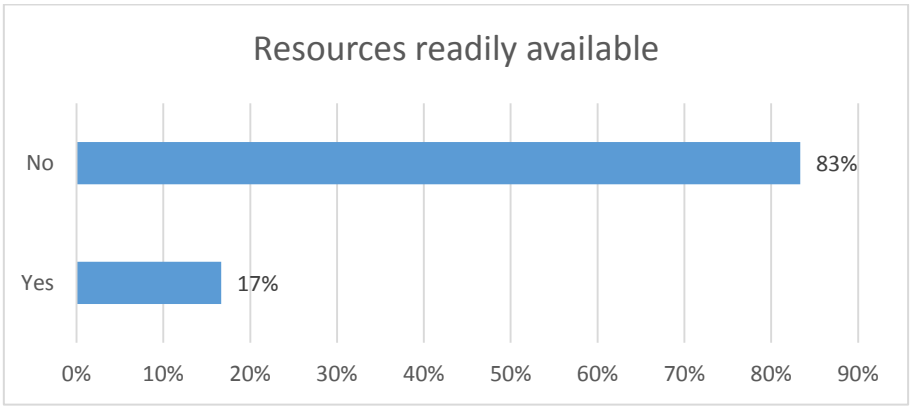

Figure 6: Resources readily availability

The bar chart above revealed that the non-availability of necessary resources in the supply chain can have a dire effect on the drought relief efforts. Balcik and Beamon (2008) in their study discovered that there is a problem of lack of resources such as inadequate supply of food, technology, transportation capacity, money and volunteers in humanitarian logistic sector during emergencies and this study can assert to that. Most of the respondents from the OPM cited budget constraints as the main factor in the provided follow-up question. Also, the respondents disagreed that their organisations received adequate funding with 33% totally disagreeing and 50% with neutral responses and only17% agreed to adequate funding. Furthermore, only 40% of the respondents revealed that there are qualified personnel in the organisation while 60% of the respondents differed.

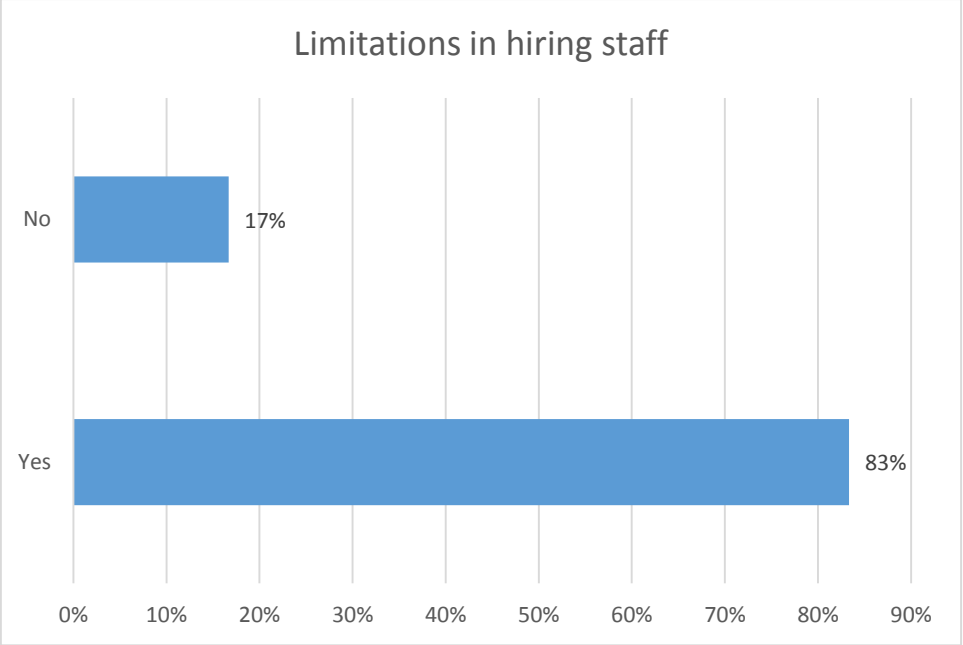

Figure 7: Limitations in hiring staff

Hiring of staff in the Office of the Prime Minister has been a taunting task as per above bar chart. Only 17% indicated that there are no limitations in the hiring of staff within the supply chain contrasted to the 83% respondents who revealed that hiring of staff is a challenging task. After follow up questions it was discovered that lack of adequate funding and the current financial downfall of the country are the major contributing factors to lack of staff hiring.

Table 4: Overall performance in the supply chain (OPM)

Responses	Number of Respondents	Percentages
Excellent	0	
Good	4	67%
Average	2	33%
Poor	0	

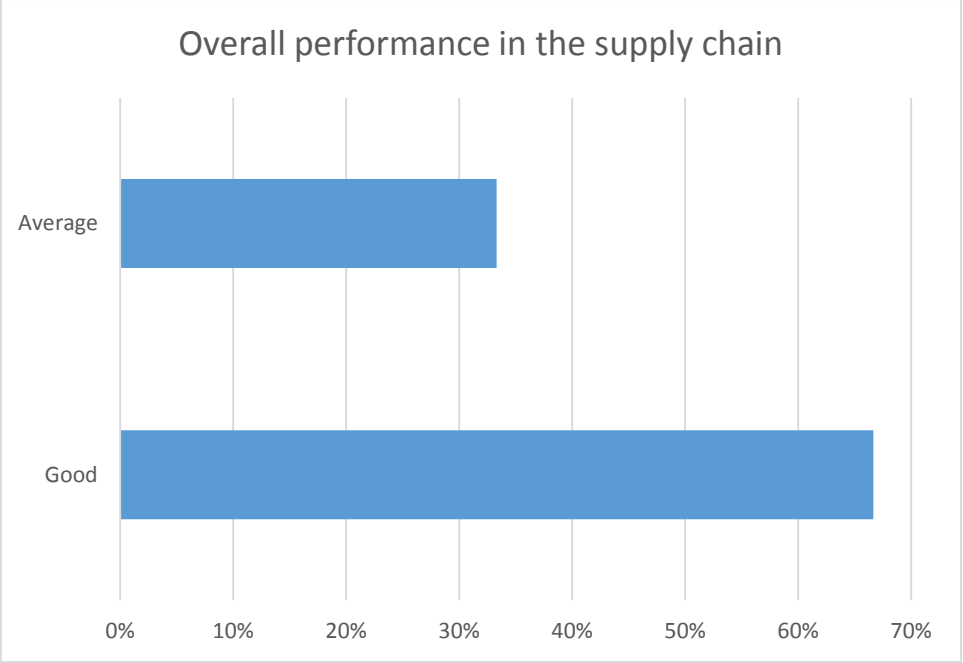

Figure 8: Overall performance in the supply chain

Regardless of the availability of resources, the OPM have established procurement procedures in case of emergency and did put them to use during current relief distribution efforts according to 83% of the respondents. Thus, 67% of the participants responded positively to the question of overall performance of the supply chain while 33% were average on their answers.

5.4 Improving the drought relief supply chain

Improvements were made in the supply chain with the aim of reducing lead-time according to all the respondent OPM staffers. These include training programmes for employees (33%) as well as improvements to the communication platform (17%). Fifty percent (50%) of the respondents from OPM were aware of a plan of action for improving performance within their supply chain while 50% were unaware. Further, 50% key informants had knowledge of the commodity manufacture information system (CMIS) software employed by the OPM, and other 50% were not knowledgeable about it. It was discovered that the 50% key informants

that are aware of the system, are those based in Windhoek. The researcher thus concluded that the CMIS has only been introduced in Windhoek and that a need exist for its introduction in other areas. The drought relief items were not well managed according to 89% of the drought recipient respondents and only 11% of the respondents responded positively to that statement and a further scrutiny on questionnaires discovered that all 11% positive replies are from those recipients receiving their items at Uukwangula centre where the main constituency warehouse is situated. There was a 100% disagreement on whether the OPM are having the enterprise resource planning (ERP) in place. Although the implementation of ERP has its own challenges, it has generally been noted in literature to enhance performance, even though specific performance aspects may differ from sector to sector thus highly recommended by (De Jongh, 2012).

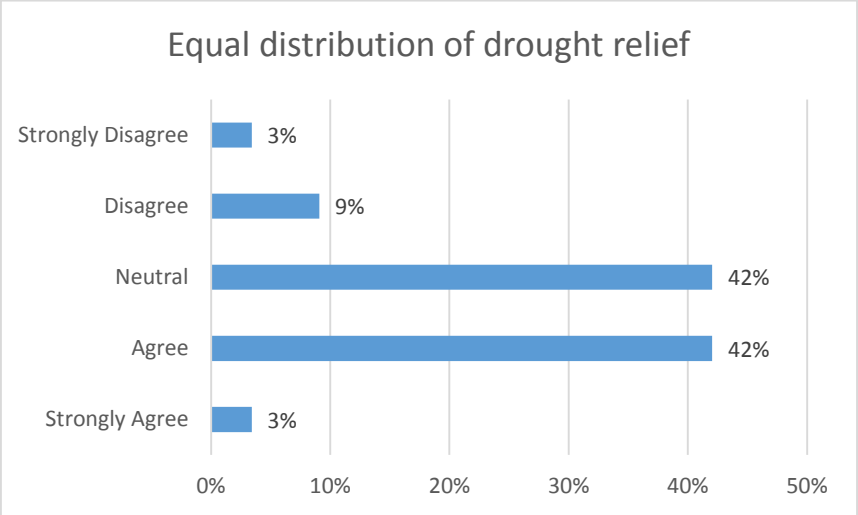

Figure 9: Equal distribution of drought relief

The varied responses to the question of equal distribution could be taken into consideration in terms of future improvements. Although many of the replies from the respondents are negative, there seems to be a positive outcome after it was discovered that 42% of the respondents noticed the equal distribution of relief materials and an additional 42% were

natural to the statement and a further 3% strongly agreed to the statement. Only 12% of the respondents either disagreed or strongly disagreed with the above statement.

5.5 Conclusion

The chapter presented the results from the investigation done to evaluate the effectiveness of the supply chain in handling drought relief distribution which focused on the area around Okatana constituency in Namibia. The findings of the research have been discussed, interpreted and linked with literature where applicable for full communication of results. From the findings presented and analysed in this chapter, it can be summed up that several shortcomings exists within the supply chain of handling drought relief materials and the need to address them is imminent. The following Chapter 6 concludes this research and provides recommendations for further research.

Chapter Six

Conclusion and Recommendations

6.1 Introduction

From the preceding chapter, the study has made conclusions in line with various objectives of the research. The study was guided by three objectives that are; to investigating the causes of delays in handling the distribution of materials within the drought relief supply chain. To identify ways of improving effectiveness of the supply chain system in handling the distribution of relief materials, and to make recommendations to governmental and humanitarian agencies that can lead to improvements within the supply chain.

To arrive at various conclusions, a number of methods were used in data analysis including descriptive statistics. The targeted organisation was the Namibian Office of the Prime Minister (OPM) as well as the residents of Okatana Constituency of Oshana Region. Participants responded to a number of questions related to humanitarian operations in the most recent drought emergency that they were involved. This included handling of the supply chain and individual experiences with various factors.

6.2 Conclusion

Funding, planning, communication and transportation infrastructure emerged as the most important factors influencing the effectiveness of humanitarian supply chain in Namibia. Organisations that experienced lack of funding or cohesive plans and worked in areas without adequate transportation infrastructure were many times more likely to have problems with effective drought relief distribution. Restrictions to the hiring of new staff members is also an important in terms of reaching the remote communities that are in dire need of the relief

supplies. While the officials' views are often different from the residents, they do seem to share similar views on the need for more funding and better transportation facilities.

6.3 Recommendations

The challenges in the drought relief supply chain needs to be addressed through combined effort between various stakeholders to enhance the impact of the process to the beneficiaries of the relief efforts. Of key importance in approaching the matter is the establishment of a new supply chain approval for humanitarian operations in consultations with all stakeholders. There is a need to address the areas of the drought relief distribution where there is delay within the supply chain. In this study, there are specific references to funding, planning, communication and infrastructure especially transportation. Supply chains action plans are also needed with proper attention given to coordination and execution and also a need for humanitarian players to invest in latest software such as ERP to enhance supply chain effectiveness.

Given that many communities that are in great need for the relief materials within the drought relief supply chain are located in remote areas, there is a greater need for advocacy for better infrastructural development. Organisations in the humanitarian relief distribution effort being it government or non-governmental should bring this issue to the front burner. Roads can be built or alternative transportation such as air can be made readily available during emergency periods. Effectiveness can also be improved by providing improved training for participants in the process. Improvements in training, communication and access to modern facilities, and technologies can also lead to improvements in the process. Quality control in terms of checking the goods for distribution and ensuring they are of the required standards can be

dependent on the level of training and access to testing facilities which are also likely to lead to improved effectiveness.

6.4 Recommendations for further research

Given that Namibia as a country is also susceptible to other forms of natural disasters, there is a need to undertake studies in other scenarios where the relief distribution operations are driven by needs emanating from other disasters such as storms and flooding. There is also a need to undertake a study on factors affecting supply chain in humanitarian operations with regard to planning and decision-making. This is also important in learning to minimise costs and get other perspective on effectiveness from other organisations.

References

Ağaoğlu, M., Yurtkoru, E. S., & Ekmekçi, A. K. (2015). The effect of ERP implementation CSFs on business performance: An empirical study on users' perception. *Procedia-Social and Behavioral Sciences*, 210, 35-42.

Altay, N., & Green, W. G. (2006). OR/MS research in disaster operations management. *European Journal of Operational Research, 175*(1), 475--493.

Apte, A. (2010). *Humanitarian logistics: A new field of research and action* (Vol. 7). Now Publishers Inc.

Autry, C. W., & Bobbitt, L. M. (2008). Supply chain security orientation: conceptual development and a proposed framework. *The International Journal of Logistics Management, 19*(1), 42-64.

Balcik, B., & Beamon, B. M. (2008). Facility location in humanitarian relief. *International Journal of Logistics, 11*(2), 101-121.

Balcik, B., Beamon, B. M., Krejci, C. C., Muramatsu, K. M., & Ramirez, M. (2010). Coordination in humanitarian relief chains: Practices, challenges and opportunities. *International Journal of Production Economics, 126*(1), 22-34.

Beamon, B. M., & Balcik, B. (2008). Performance measurement in humanitarian relief chains. *International Journal of Public Sector Management, 21*(1), 4-25.

Ben- Ari, A., & Or- Chen, K. (2009). Integrating competing conceptions of risk: A call for future direction of research. *Journal of Risk Research, 12*(6), 865-877.

Bhatti, T. R. (2005, September). Critical success factors for the implementation of enterprise resource planning (ERP): empirical validation. In *The Second International Conference on Innovation in Information Technology* (p. 110).

Blaxter, L. (2010). *How to research.* McGraw-Hill Education (UK).

Blumberg, B., Cooper, D., & Schindler, P. (2008). *Business research methods* (2nd European edition). Maidenhead: McGraw-Hill Higher Education.

Borda, A. Z. (2013). *International humanitarian law and the international red cross and red crescent movement.* Routledge.

Bölsche, D., Klumpp, M., & Abidi, H. (2013). Specific competencies in humanitarian logistics education. *Journal of Humanitarian Logistics and Supply Chain Management*, 3(2), 99-128.

Brannen, J. (1992). Combining qualitative and quantitative approaches: an overview. *Mixing methods: Qualitative and quantitative research*, 3-37.

Bryman, A., & Bell, E. (2015). *Business research methods.* Oxford University Press, USA.

Bullock, J. A., & Haddow, G. D. (2004). The future of emergency management. *Journal of Emergency Management*, *2*(1), 19-24.

Caris, A., Limbourg, S., Macharis, C., van Lier, T., & Cools, M. (2014). Integration of inland waterway transport in the intermodal supply chain: a taxonomy of research challenges. *Journal of Transport Geography*, *41*, 126-136.

Carole, L & Almut, G. (2011). *Research fundamentals.* Sandown: Heinemann.

Carson, D., Gilmore, A., Perry, C., & Gronhaug, K. (2001). *Qualitative marketing research*. Sage.

Central Intelligence Agency (2013) *The world factbook 2013-14.* Washington, DC: Central Intelligence Agency.

Chandes, J., & Paché, G. (2010). Investigating humanitarian logistics issues: from operations management to strategic action. *Journal of Manufacturing Technology Management*, *21*(3), 320-340.

Christopher, M., & Tatham, P. (Eds.). (2014). *Humanitarian logistics: Meeting the challenge of preparing for and responding to disasters.* Kogan Page Publishers.

Closs, D. J., & McGarrell, E. F. (2004). *Enhancing security throughout the supply chain* (pp. 10-12). Washington, DC: IBM Center for the Business of Government.

Coleman, L. (2006). Frequency of man-made disasters in the 20th century. *Journal of Contingencies and Crisis Management, 14*(1), 3-11.

Cope, M. (2005). Coding qualitative data. *Qualitative research methods in human geography,* 2, 223-233.

Cottrill, K. (2002). Preparing for the worst. *Traffic world, 266*(40), 15.

Cozzolino, A., Rossi, S., & Conforti, A. (2012). Agile and Lean Principles in the humanitarian supply chain. The case of the United Nations World Food Programme. *Journal of Humanitarian Logistics and Supply Chain Management, 2*(1), 16-33.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage publications: Thousand Oaks, CA.

Davis, J., & Lambert, R. (2002). *Engineering in emergencies: a practical guide for relief workers* (2nd ed.). London: ITDG.

de Jongh, H., Martin, W., van de r Merwe, A., Redenlinghuis, J., Kleinbooi, C., Morris, D., Fortuin, A. and Bruwer, J.P., (2012). Utilisation of adequate internal controls in fast food small medium and micro enterprises (SMMEs) operating in Cape Metropole. *African Journal of Business Management*, *6*(31), p.9092.

Drabek, T. E. (2012). *Human system responses to disaster: An inventory of sociological findings.* Springer Science & Business Media.

Elragal, A., & Al-Serafi, A. (2011). The effect of ERP system implementation on business performance: An exploratory case-study. *Communications of the IBIMA,* 2011, 1-19.

Fischer, R. J., Halibozek, E. & Green, G. (2008). *Introduction to Security* (8th ed). Butterworth-Heinemann.

Hassan, N. A., Hayiyusuh, N., & Nouri, R. K. (2011). The implementation of knowledge management system (KMS) for the support of humanitarian assistance/disaster relief (HA/DR) in Malaysia. *International Journal of Humanities and Social Science, 1*(4), 89-112.

Haufiku, M. (2013, August 12). *Drought relief distribution not a snap.* Retrieved from http://reliefweb.int/report/namibia/drought-relief-distribution-not-snap

Heaslip, G. (2015). Guest editorial: humanitarian logistics-an opportunity for service research. *Journal of Humanitarian Logistics and Supply Chain Management, 5*(1), 2-11.

Hermans, M. A., Fox, T., & van Asselt, M. B. (2012). Risk governance. In *Handbook of Risk Theory* (pp. 1093-1117). Springer Netherlands.

Hitt, L. M., & DJ Wu, X. Z. (2002). Investment in enterprise resource planning: Business impact and productivity measures. *Journal of Management Information Systems, 19*(1), 71-98.

Hofstee, E. (2006). *Constructing a good dissertation.* Johannesburg: Interpak Books.

Hoyois, P., Scheuren, J. M., Below, R., & Guha-Sapir, D. (2007). *Annual disaster statistical review: numbers and trends 2006*. Catholic University of Louvain (UCL). Centre for research on the epidemiology of disasters (CRED).

Idris, A., & Soh, S. N. C. (2014). The relative effects of logistics, coordination and human resource on humanitarian aid and disaster relief mission performance. *The South East Asian Journal of Management, 8*(2), 87-103.

Jahre, M., Jensen, L., & Listou, T. (2009). Theory development in humanitarian logistics: A framework and three cases. *Management Research News, 32*(11), 1008-1023.

Jones, G., Robertson, A., Forbes, J., & Hollier, G. (1990). *Collins reference dictionary 'environmental science'.* Glasgow: Collins Sons & Co Ltd.

Kaatrud, D. B., Samii, R., & Van Wassenhove, L. N. (2003). UN joint logistics centre: A coordinated response to common humanitarian logistics concerns. *Forced Migration Review, 18*, 11-14.

Kahiurika, N. (2016, April 27). Drought relief for the unemployed. *The Namibian,* Retrieved from http://www.namibian.com.na

Karimi, J., Somers, T. M., & Bhattacherjee, A. (2007). The role of information systems resources in ERP capability building and business process outcomes. *Journal of Management Information Systems*, *24*(2), 221-260.

Kovács, G., & Spens, K. M. (2007). Humanitarian logistics in disaster relief operations. *International Journal of Physical Distribution & Logistics Management*, *37*(2), 99-114.

Kovács, G., & Spens, K. (2008). Humanitarian logistics revisited. *Northern Lights in Logistics & Supply Chain Management,* 217-232.

Kovács, G., & Tatham, P. (2009). Humanitarian logistics performance in the light of gender. *International Journal of Productivity and Performance Management, 58*(2), 174-187.

KPMG, L. (2011). *ERP and the Public Sector: Useful Implementation Insights from Peers That Have Been There, Done That.* Retrieved from https://www.cgi.com/sites/default/files/articles/kpmg-public-sector-erp-report.pdf

Kunz, N., & Reiner, G. (2012). A meta-analysis of humanitarian logistics research. *Journal of Humanitarian Logistics and Supply Chain Management*, *2*(2), 116-147.

Lee, H. W., & Zbinden, M. (2003). Marrying logistics and technology for effective relief. *Forced Migration Review, 18*(3), 34-35.

Lin Moe, T., & Pathranarakul, P. (2006). An integrated approach to natural disaster management: public project management and its critical success factors. *Disaster Prevention and Management: An International Journal, 15*(3), 396-413.

Madejski, E., & Fritze, C. (2014). Anti piracy disaster risk management for sea cargo logistics in the south east Atlantic and Benguela coastal area. Retrieved from http://ir.nust.na/xmlui/handle/10628/479

Mangan, L. and Lalwani, C., Butcher (2008), Global logistics and supply chain management.

Marshall, C., & Rossman, G. B. (2014). *Designing qualitative research.* Sage publications.

Ministry of Education (2015). *Field Booklet for emergency preparedness and response in Namibia's education sector.* Windhoek: Ministry of Education, Government of the Republic of Namibia

Mouton, J., 2011. How to succeed in your master's and doctoral studies: A South African (p. 280). Van Schaik Publishers.

National Planning Commission [NPC] (2012). *Namibia 2011 population and housing census preliminary results.* Windhoek, Namibia.

Neuman, W. L., & Kreuger, L. (2003). *Social work research methods: Qualitative and quantitative approaches.* Allyn and Bacon.

Nisha de Silva, F. (2001). Providing special decision support for evacuation planning: A challenge in integrating technologies. *Disaster Prevention and Management, 10*(1), 11-20.

Njihia, E., & Mwirigi, F. M. (2014). The effects of enterprise resource planning systems on firm's performance: A Survey of commercial banks in Kenya. *International journal of business and commerce.*

O'Brien, G., O'Keefe, P., Rose, J., & Wisner, B. (2006). Climate change and disaster management. *Disasters*, *30*(1), 64-80.

Oloruntoba, R., & Gray, R. (2006). Humanitarian aid: An agile supply chain? *Supply Chain Management: An International Journal*, *11*(2), 115-120.

Ornstein, M. (2013). *A companion to survey research*. Sage.

Overstreet, R. E., Hall, D., Hanna, J. B., & Kelly Rainer Jr, R. (2011). Research in humanitarian logistics. *Journal of Humanitarian Logistics and Supply Chain Management, 1*(2), 114-131.

Özdamar, L., Ekinci, E., & Küçükyazici, B. (2004). Emergency logistics planning in natural disasters. *Annals of operations research, 129*(1-4), 217-245.

Pan American Health Organisation [PAHO]. (2003). *Guiding principles for complementary feeding of the breastfed child.* Washington, DC/Geneva: World Health Organisation.

Peck, H. (2005). Drivers of supply chain vulnerability: an integrated framework. *International journal of physical distribution & logistics management, 35*(4), 210-232.

Pettit, S. J., & Beresford, A. K. C. (2006). Emergency relief logistics: An evaluation of military, non-military, and composite response models. *International Journal of Logistics: Research and Applications, 8*(4), 313-331

Pettit, S. J., & Beresford, A. K. C. (2009). Critical success factors in the context of humanitarian aid supply chains. *International Journal of Physical Distribution & Logistics Management,* 39(6), 450-468.

Quarantelli, E. L. (1998). *Epilogue: Where we have been and where we might go. What is a Disaster*, 317.

Rabaa'i, A. A. (2009, July). The impact of Organisational culture on ERP systems implementation: Lessons from Jordan. *In Proceedings of the Pacific Asia Conference on Information Systems 2009*.

Republic of Namibia (2012). *Disaster Risk Management Act No. 10 of 2012*.Government Gazette No. 5029:228.

Republic of South Africa (2003). *Disasters Management Act No 57 of 2002.* Government Gazette Vol 451 (24252).

Rogstadius, J., Vukovic, M., Teixeira, C. A., Kostakos, V., Karapanos, E., & Laredo, J. A. (2013). CrisisTracker: Crowdsourced social media curation for disaster awareness. *IBM Journal of Research and Development, 57*(5), 4-1.

Romano, S. J. (2011). Logistics planning and collaboration in complex relief operations. *Joint Force Quarterly*, *62*, 96.

Rossman, G. B., & Rallis, S. F. (2011). *Learning in the field: An introduction to qualitative research*. Sage.

Rushton, A., Croucher, P., & Baker, P. (2014). *The handbook of logistics and distribution management: Understanding the supply chain*. Kogan Page Publishers.

Sandwell, C. (2011). A qualitative study exploring the challenges of humanitarian organisations. *Journal of humanitarian logistics and supply chain management,* 1(2), 132-150.

Saunders, M. N. K., & Lewis, P. (2014). *Doing research in business and management: An essential guide to planning your project.* Pearson Higher Ed.

Sebbah, S., Boukhtouta, A., & Ghanmi, A. (2012). *Humanitarian relief operations: A military logistics perspective.* Retrieved from http://cradpdf.drdc-rddc.gc.ca/PDFS/unc120/p536715_A1b.pdf

Ssengonzi, R., & Oginski, P. (2012). *Effective adaptation to global humanitarian challenges* (Master's thesis, Jonkoping International Business School, Torpa, Sweden) Retrieved from http:/7hj.diva-portal.org/smash/get/diva2:529119/FULLTEXT01

Stadtler, H. (2015). Supply chain management: An overview. In *Supply chain management and advanced planning* (pp. 3-28). Springer Berlin Heidelberg.

Staff Reporter (2016, October 31). Drought relief, what relief? *New Era Newspaper,* Retrieved from http://weekend.newera.com.na

Supply Chain Risk Leadership Council [SCRLC] (2011). *Supply chain risk management: A compilation of best practices.* Retrieved from http://www.scrlc.com/articles/Supply_Chain_Risk_Management_A_Compilation_of_Best_Practices_final[1].pdf.

Sweet, J. (1998). *Livestock–Coping with drought: Namibia–a case study: Human health, water, livestock, conflict resolution, emergency seed supply*. Retrieved from http://www.the-eis.com/data/literature/Sweet%201998%20Livestock%20coping%20with%20drought.pdf

Tatham, P., & Houghton, L. (2011). The wicked problem of humanitarian logistics and disaster relief aid. *Journal of Humanitarian Logistics and Supply Chain Management, 1*(1), 15-31.

The Sphere Project (2011). Sphere handbook: Humanitarian charter and minimum standards in disaster Response. *Retrieved from http://www.refworld.org/docid/4ed8ae592.html*

Thomas, A. (2003). Why logistics. *Forced migration review*, *18*(4), 4.

Thomas, A. & Fritz, L. (2006). Disaster relief, Inc. *Harvard Business Review*, *84*(11), 114-26.

Thomas, A. S., & Kopczak, L. R. (2005). From logistics to supply chain management: the path forward in the humanitarian sector. *Fritz Institute*, *15*, 1-15.

Thomas, A., & Mizushima, M. (2005). Logistics training: necessity or luxury. *Forced Migration Review*, *22*(22), 60-61.

Tomasini, R. & Van Wassenhove, L. N. (2009). *Humanitarian logistics.* London: Palgrave Macmillan.

Trkman, P., & McCormack, K. (2009). Supply chain risk in turbulent environments—A conceptual model for managing supply chain network risk. *International Journal of*

Production Economics, 119(2), 247-258.

United Nations Office for Disaster Risk Reduction [UNISDR] (2015). *Sendai Framework for Disaster Risk Reduction, 2015 – 2030*. UNISDR: Geneva.

United Nations Office for Disaster Risk Reduction [UNISDR] (2004). Basic terms of disaster risk reduction. *United Nations International Strategy for Disaster Reduction,* Geneva.

Van Wassenhove, L. N. (2006). Humanitarian aid logistics: Supply chain management in high gear. *Journal of the Operational Research Society, 57*(5), 475- 489.

Vasilescu, L., Khan, A., & Khan, H. (2008). Disaster management cycle–a theoretical approach. *Management & Marketing-Craiova*, *1*, 43-50.

Vega, D., & Roussat, C. (2015). Humanitarian logistics: the role of logistics service providers. *International Journal of Physical Distribution & Logistics Management*, *45*(4), 352-375.

Waters, D., & Rinsler, S. (2014). *Global logistics: New directions in supply chain management*. Kogan Page Publishers.

Welman, C., Kruger, F., & Mitchell, B. (2005). *Research methodology*. Oxford University Press.

Westrup, C., & Knight, F. (2000). Consultants and enterprise resource planning (ERP) systems. *ECIS 2000 Proceedings*, 178.

Wilhite, D.A., (2011). Essential Elements of National Drought Policy: *Moving Toward Creating Drought Policy Guidelines*.

Wilhite, D.A., Monnik, K. and Botterill, L., (2005). National Drought Policy. *In Drought and Water Crises: Science, Technology, and Management Issues* (pp. 137-172). CRC Press.

Whiting, M. C., & Ayala-Öström, B. E. (2009). Advocacy to promote logistics in humanitarian aid. *Management Research News, 32*(11), 1081-1089.

Wilhelm, M. (2012). *Impact of climate change in Namibia: A case study of Omusati region (Masters dissertation)*. Polytechnic of Namibia.

Wisner, J. D., Tan, K. C., & Leong, G. K. (2014). *Principles of supply chain management: A balanced approach.* Cengage Learning.

Yang, C. C., & Wei, H. H. (2013). The effect of supply chain security management on security performance in container shipping operations. *Supply Chain Management: An International Journal, 18(*1), 74-85.

Yin, R. K. (2011). *Applications of case study research.* Sage.

Ziemba, E., Obłąk, I., & Informatyczna, B. S. (2013). Critical success factors for ERP systems implementation in public administration. *Interdisciplinary Journal of Information, Knowledge, and Management, 8,* 1-19.

Appendices

Appendix I: Research Questionnaire to Constituents

AN EVALUATION OF THE EFFECTIVENESS OF THE SUPPLY CHAIN IN HANDLING DROUGHT RELIEF DISTRIBUTION: A CASE STUDY OF OKATANA CONSTITUENCY, NAMIBIA

My name is FN Atshipara, a student enrolled for a Master in Disaster Risk Management at the University of the Free State with Student No 2014170829. My Thesis is titled: An Evaluation of the Effectiveness of the Supply Chain in Handling Drought Relief Distribution: A case study of Okatana Constituency, Namibia. To enable me complete the research project, I request your participation in this survey. The information from this survey will contribute greatly to this research. The survey will only take 15 minutes to complete. Participants will remain anonymous and the information will be kept confidential. I will very much appreciate your assistance in completing this research and look forward to receiving your responses.

Instructions

- Answer the following questions as briefly as possible
- Feel free to express yourself in words in the space provided
- Fill in the appropriate box by marking with an X.

Section A: Demographic information

This section establishes the profile of the respondents

1. Gender (Please tick the applicable/appropriate box)

Male	
Female	

2. What is your highest formal educational qualification?

None	
Primary	
Secondary	
Tertiary	
Others (specify)	

If other, please specify _____

3. Household ownership

Owner	
Ordinary household member	

4. Where are you residing within the constituency?

Remote Area	
Semi-Remote Area	
Newly proclaimed town	
Others (specify)	

_____

5. Employment

Unemployed	
Self-Employed	
Government/Agencies	
Private Company	

6. Are you a recipient of a social grant

Yes	
No	

Section B: Time, centre and how often drought items are received

7. How often do you receive drought relief items in your community?

Once every month	
Once every two months	
Once every 6^{th} month	
Other (specify)	

8. Which centre do you receive your relief Items from, within the Okatana constituency?

_____

9. How long does it take to receive relief items during distribution from the time of arrival at the centre of reliefs' receipts?

1 hour	
2-3 hours	
4-6 hours	
7 and more	

Section C : The effectiveness measurement within the humanitarian supply chain

Key; SA - Strongly Agree
A - Agree
N - Neutral
D - Disagree
SD - Strongly Disagree

No.	Item	SA	A	N	D	SD
10.	Drought Items are always on time					
11.	Items are always delivered at the right time and at the right place					
12.	Drought items delivered are adequate and meeting the community's needs					
13.	Drought officials are helpful and friendly during distribution					
14.	Officials employed a system that allows free flow of goods during distribution					
15.	There is always equal distribution of drought reliefs among recipients					

16. Are there adequate roads in the constituency to accommodate delivery vehicles?

Yes	
No	

17. Do you think the overall drought relief items are well managed in your constituency?.

Yes	
No	

18.

Elaborate_____

_____

_____

_____

19. List items that are mostly received during drought distribution

_____

_____

_____

Thank you for your cooperation

Appendix II: Research Questionnaire to Supply Chain Management Officials

AN EVALUATION OF THE EFFECTIVENESS OF THE SUPPLY CHAIN IN HANDLING DROUGHT RELIEF DISTRIBUTION: A CASE STUDY OF OKATANA CONSTITUENCY, NAMIBIA

My name is FN Atshipara, a student enrolled for a Master in Disaster Risk Management at the University of the Free State with Student No 2014170829. My Thesis is titled: An Evaluation of the Effectiveness of the Supply Chain in Handling Drought Relief Distribution: A case study of Okatana Constituency, Namibia. To enable me complete the research project, I request your participation in this survey. The information from this survey will contribute greatly to this research. The survey will only take 15 minutes to complete. Participants will remain anonymous and the information will be kept confidential. I will very much appreciate your assistance in completing this research and look forward to receiving your responses.

RESEARCH QUESTIONNAIRE TO SUPPLY CHAIN MANAGEMENT OFFICIALS OF: (OFFICE OF THE PRIME MINISTER & OKATANA CONSTITUENCY OFFICE

Instructions

- Answer the following questions as briefly as possible
- Feel free to express yourself in words in the space provided

Fill in the appropriate box by marking with an X.

Section A Demographic information

This section establishes the profile of the respondent's

1. Name (Optional):
   _____
2. Name of organisation (Optional): _____
3. Position in your humanitarian supply chain organisation
   _____
4. What is your highest formal educational qualification?

Primary level up Grade 7	
Grade 10 Certificate	
Matric/Grade 12	
Certificate/Diploma	
Bachelor `s degree	
Honour`s degree	
Master 'degree	
Doctorate	
Others (specify)	

If other, please specify_____

5. Number of years that you are in a humanitarian supply chain service

Less than 1 year	
1 – 4 years	
5 – 9 years	
10 years and above	

Section B: specific position and function of officials within the supply chain

6. Current supply chain area in which you are active

Supply chain reliefs planning	
Supply chain reliefs receipts	
Supply chain reliefs sorting	
Supply chain reliefs dispatching	
Supply chain reliefs distribution	

7. Which of the following disaster elements have your organisation been engaged?

Preparation	
Response	
Mitigation	
Reconstruction	

8. Is the type of the relief materials that your organisation is distributing to the community meeting their needs?

Yes	
No	

9. Are the relief materials your organisation involved in reaching the target recipient?

Yes	
No	

If no, what could be the problem within the supply chain?

_____

_____

10. Are the relief materials your organisation involved in reaching the target recipient timely?

Yes	
No	

11. Are these relief materials your organisation is dealing with sufficient to address the constituency's drought need?

Yes	
No	

Section C : The effectiveness measurement within the humanitarian supply chain

Key; SA - Strongly Agree
A - Agree
N - Neutral
D - Disagree
SD - Strongly Disagree

No.	Item	SA	A	N	D	SD
12	Your organisation delivers the relief items to the Okatana community timely					
13	Your organisation is given adequate funds to deal with drought reliefs					
14	Your organisation is manned with adequate personnel equipped with appropriate qualifications					
15	Your organisation always strive to reduce lead time					
16	Your Organisation deliver right relief items at the right place(Okatana) at the right time					
17	Your Organisation make use of Enterprise Resource Planning					

18. When was the most devastating drought that was experienced in Okatana constituency?

Current year	
2 years ago	
3-4 years ago	
5 years ago or more	

19. During the most current drought relief distribution in Okatana community, were the necessary resources readily available?

Yes	
No	

20. Were there any limitations in hiring staff from the Oshana Region and/or Okatana local community for the exercise?

Yes	
No	

21. Please rate your organisation's overall performance in the supply chain for the current drought items distribution in Okatana

Excellent	
Good	
Average	
Poor	

22. Does your organisation have any plan of action for improving its performance in the supply chain distribution system?

Yes	
No	

If yes, please explain_____

23. Does your organisation have any established procurement procedures in case of emergency?

Yes	
No	

24. Did you use them for the current drought emergency operation in Okatana community?

Yes	
No	

25. Did you notice any delays in the distribution of drought relief materials in Okatana community during this current drought relief operation by your organisation?

Yes	
No	

26. If yes, in your own words, please explain in detail the reasons for the delay in distributing relief materials to drought victims in Okatana constituency

_____
_____

27. In what ways can these supply chain problems be resolved for improved effectiveness?

_____
_____

Thanks for your cooperation.

Appendix III: Letters for Approval

P.O. Box 51479
Bachbrecht
Windhoek

01 November 2016

Attention: The Permanent Secretary
Office of the Prime Minister
Advocate N Mbako
Windhoek

Dear Madam

RE: LETTER OF APPROVAL TO CONDUCT A RESEARCH STUDY

My name is Frans, N. Atshipara and I am a student enrolled for a Master in Disaster Risk Management at the University of the Free State with Student No 2014170829. My Thesis is titled: *An Evaluation of the Effectiveness of the Supply Chain in Handling Drought Relief Distribution: A case study of Okatana Constituency, Namibia*. This is in partial fulfillment for the requirements of the award of the aforementioned qualification at the University of the Free State.

I am therefore asking permission and approval to carry out a research in the directorate of Disaster Risk Management which entails administering questionnaires to officials who deals directly with the relief item's supply chain at both Windhoek and Uukwangula warehouses. The research is only for academic purposes and has no other implications.

Your assistance towards achievement of the objectives of the research is greatly appreciated and I am looking forward to receiving your written approval at your earliest convenience. Correspondence can be done through my email: fna@windhoekcc.org.na and I can be contacted at 0811274370.

Yours faithfully

Frans, N. Atshipara
(Researcher)

Cc: The Director: Disaster Risk Management
Mr. Jafet Iitenge

P.O. Box 51479
Bachbrecht
Windhoek

11 January 2017

Attention: The Chief Regional Officer
Oshana Regional Council
Mr. Martin Elago
Namibia

Dear Sir

RE: LETTER OF APPROVAL TO CONDUCT A RESEARCH STUDY

My name is Frans, N. Atshipara and I am a student enrolled for a Master in Disaster Risk Management at the University of the Free State with Student No 2014170829. My Thesis is titled: *An Evaluation of the Effectiveness of the Supply Chain in Handling Drought Relief Distribution: A case study of Okatana Constituency,* Namibia This is in partial fulfillment for the requirements of the award of the aforementioned qualification at the University of the Free State.

I am therefore asking permission and approval to carry out a research in your constituency which entails administering questionnaires to drought recipients in the constituency. The research is only for academic purposes and has no other implications.

Your assistance towards achievement of the objectives of the research will be appreciated and looking forward to receiving your written permission soonest. Correspondence can be done through my email: fna@windhoekcc.org.na and I can be contacted at 0811274370.

Yours faithfully

Frans, N. Atshipara
(Researcher)

Cc: Honorable Councilor (Okatana Constituency)
Ms. Rosalia Shilenga