



**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
SCHOOL OF COMMERCE**

**CHALLENGES OF HUMANITERIAN SUPPLY CHAIN
MANAGEMENT**

**In the Case of National Disaster Risk Management Commission
of Ethiopia**

BY: TIGIST YIGEZU JAFERO

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**THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE AWARD OF MASTER OF ART (M.A) DEGREE
IN LOGISTIC AND SUPPLY CHAIN MANAGEMENT**

**June, 2016
Addis Ababa**



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THESIS APPROVAL SHEET

As a member of the board of Examiners of Master of Art (M.A) thesis open defense examination, we have read and evaluated this thesis prepared by Mrs Tigest Yigezu Jafero entitled **“CHALLENGES OF HUMANITARIAN SUPPLY CHAIN MANAGEMENT: In the Case of National Disaster Risk Management Commission of Ethiopia”** We hereby certify that, the thesis is accepted for fulfilling the requirements for the award of the degree of Master of Art (M.A) in “Logistic and Supply Chain Management”

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DECLARATION

This is to certify that this thesis entitled “**CHALLENGES OF HUMANITARIAN SUPPLY CHAIN MANAGEMENT: In the Case of National Disaster Risk Management Commission of Ethiopia**” submitted in partial fulfillment of the requirements for the award of the degree of Master of Art in “**Logistic and Supply Chain Management**” to the Graduate Program of College of Commerce, Addis Ababa University by Mrs **Tigist Yigezu Jafero** (ID. No. GSR/2764/07) is an authentic carried by her under our guidance. The matter embodied in this project work has not been submitted earlier for award of any degree or diploma to the best of our knowledge and belief.

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ABSTRACT

Every year, about 500 disasters do occur causing a death of about 75,000 people and affecting

some 200 million people. The relevance of humanitarian organizations thus is unquestionable. By their very nature and as part of their mission, they play a significant role in rescuing people in such situations. In recent years, humanitarians have come under immense pressure from the donors, pledging millions in aid and goods, to prove that they are meeting their objectives in an efficient and effective way. Eighty percent of humanitarian organization's operations are spent on supply chain management that targeting an improvement in the practice would be a potential and justified approach to overcome the pressure. Supply chain challenges faced therefore worsen humanitarian operations creating a lot of uncertainty among humanitarian organizations. This study, therefore, conducted to assess the challenges of humanitarian supply chain management in Ethiopia. Specifically, the study had aimed at assessing the supply chain management practices of humanitarian organizations, identifying supply chain challenges facing humanitarian organization in emergencies and identifying supply chain practices that can be adopted to overcome the challenges and evaluate the effectiveness of national disaster risk management commission response rate in terms of timeliness, suitability and adequacy of relief quantities. The data was collected from experts who involved in early warning, supply chain logistic and warehouse professionals, Oromiya region, East shewa zonal and Adama district experts, and Adama woreda relief beneficiaries. This thesis examine the management of disasters by disaster risk management commission in the area of humanitarian supply chain in responds to the 2015/16 disaster and how satisfied drought victims were clustered at community based that EJeers Mersa, Bekoje Dewaro, and Chekawa dufa in Adama district is purposely selected. And the households were randomly selected the respondent in each communities from relief beneficiaries. The analysis was done by using Statistic Package for Social Science (SPSS) and presented using descriptive statistic, Likert scale, mean scores, standard deviation and ANOVA and presented in the form of tables' frequency and percentages. From the findings, challenges facing humanitarian organization grouped into management related challenges, financial related challenges and operating environment related challenges. It was interesting noted that beneficiaries were satisfied with the emergency responses for 2015/16 response rate in terms of timeliness, adequacy, and suitability of the delivery of relief items. The result of the study puts forth a simple framework of supply chain management techniques for management of disaster during relief operations and examines why governments and other humanitarian organization should considered their use.

Key Word: Disaster Response Humanitarian Aids, Humanitarian Supply Chain Management, Logistics, Ethiopia.

ABBREVIATIONS

CLM	Council of Logistics Management
CSCM	Commercial Supply Chain Management
DOD	Department of Defense
DPPC	Disaster Prevention and Preparedness Coordination
ERCS	Ethiopia Red Cross Society

EW	Early Warning
HRD	Humanitarian Requirement Document
HROs	Humanitarian Relief Organizations
HSCM	Humanitarian Supply Chain Management
IFRC	International Federation of the Red Cross and Red Crescent Society
LDCs	Local Distribution Centers
LIS	Logistic Information System
NDRMC	National Disaster Risk Management Commission
NGO	Non-Governmental Organization
PAHO	Pan American Health Organizations
PVOs	Private Voluntary Organizations
SCM	Supply Chain Management
SPSS	Statistic Package for Social Science
UNHCR	United Nation High Commissioner for Refugees
UNHRD	United Nation Humanitarian Resources Depot
UNICEF	United Nations Children Fund
UN/DMTP	United Nations Disaster Management Training Programme
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nation organization for coordination for Humanitarian Affair
USAID	United State of America Aid for Development
WAO	Woreda Agriculture Office
WEF	World Economic Forum
WFP	World Food Program
WHO	World Health Organization

Table of Contents

ACKNOWLEDGEMENT	iii
ABSTRACT	iv
ABBREVIATIONS	v
List of Tables and Figures	ix

CHAPTER ONE 1

INTRODUCTION 1

- 1.1. Background of Study 1
- 1.2. Statement of the Problem 2
- 1.3. Research Questions 5
- 1.4. Objectives of the Study 5
 - 1.4.1. General Objective 5
 - 1.4.2. Specific Objectives 5
- 1.5. Significance of the Study 5
- 1.6. Scope of the Study 7
- 1.7. Limitations of the Study 7
- 1.8. Key Concepts and Definitions of Terms 8
- 1.9. Organization of the Thesis 9

CHAPTER TWO 10

REVIEW OF LITERATURE 10

- 2.1. Supply Chain Management 10
- 2.2. Humanitarian Supply Chain and logistics 11
- 2.3. Humanitarian Actors and parties concerned 15
- 2.4. Barriers to Effective Delivery of Aid 17
 - 2.4.1. Uncertainty 17
 - 2.4.2. Degraded Infrastructure 19
 - 2.4.3. Communications 19
 - 2.4.4. Human Resources 20
 - 2.4.5. Earmarking of Funds 21
- 2.5. Potential Methods for Overcoming Barriers of HSC 22
 - 2.5.1. Dealing with Uncertainty 24

2.5.2.	Acting on a Local or Regional Scale	25
2.5.3.	Decisive Command and Control	25
2.5.4.	Pre and Post-Disaster Assessments	26
2.5.5.	Collaboration	27
2.5.6.	Logistics Information Systems (LIS)	27
2.5.7.	Military Partners	29
2.5.8.	Resource Management	31
2.5.9.	Transportation Management	33
2.5.10.	Training and Education	36
2.6.	Conceptual Framework	36
CHAPTER THREE		38
RESEARCH METHODOLOGY		38
3.1.	Study Design	38
3.2.	Population of the study	38
3.3.	Sampling Design	39
3.4.	Sample Size Determination	39
3.4.1.	Sampling Procedures	40
3.5.	Method of Data Collection	41
3.6.	Data Collection Instrument	41
3.7.	Method of Data Analysis	42
3.8.	Validity and Reliability of Instruments	43
3.9.	Ethical Considerations	43
CHAPTER FOUR		45
DATA ANALYSIS AND DISCUSSION		45
4.1.	Demographic Profile of the Respondents	45
4.2.	Humanitarian Supply Chain Management practice of NDRMC	47

4.3. Perception of beneficiaries satisfaction on NDRMC's Response in the 2015/16 Disaster in the district	56
4.3.1. Impact of NDRMC's Timely Delivery of Relief items on Beneficiaries' Satisfaction	56
4.3.2. Impact of NDRMC delivery of Adequate Relief Items on Beneficiaries' Satisfaction	58
4.3.4. Age Distribution of beneficiaries' Satisfaction	60
4.3.3. Age Distribution of beneficiaries satisfaction in terms of adequacy	61
4.4. Challenges Facing Humanitarian Supply Chain Management	62
4.5. Opportunities of humanitarian actors on the priority sectors	64
4.6. Strategies Adopted by Humanitarian Organizations in Overcoming Supply Chain Challenges	66
CHAPTER FIVE	66
SUMMARY, CONCLUSION AND RECOMMENDATIONS	66
5.1. Summary	66
5.2. Conclusion	69
5.3. Recommendations	70
5.4. Further Research Direction	73
REFERENCES	74
APPENDIX A	84
APPENDIX B	94

List of Tables and Figures

Table 1: The Sampling distribution of the respondent from NDRMC to district level.....	40
Table 2: The Sampling distribution of the household heads in the three rural kebeles.....	41
Table 3: Demographic profile of the respondent.....	45
Table 4: Age * Sex of household * highest education attained Cross tabulation.....	46
Table 5: Respondents Characteristics of NDRMC staff.....	47
Table 6: An existing plan of action for disaster management?.....	47

Table 7: How soon after slow on set disaster occurrence do the initial assessment teams reach in the disaster affected area 2015/16?	48
Table 8: How soon after fast on set disaster occurrence do the initial assessment teams reach the disaster affected area? Time after disaster occurred in 2015/ 16	48
Table 9: NDRMC conduct initial assessment of what logistics information were needed for emergency operation	50
Table 10: Procurement practice of Relief commodities	50
Table 11: NDRMC relief stock location organized and managed? Within Center	53
Table 12: The warehouse quality of following inventory/stock management practices	53
Table 13: Tracing and tracking of commodities	55
Table 14: The food distributed by NDRMC to my household arrived at the time it was	56
Table 15: Building materials NDRMC distributed to my household arrived at the exact time	57
Table 16: The Clothing and bedding materials distributed by NDRMC to my household arrived	57
Table 17: The farm inputs NDRMC distributed to my household arrived at the exact time	58
Table 18: FOOD distributed by NDRMC to my household was the right quantities needed (quantity)	58
Table 19: Clothing and bedding materials distributed by NDRMC to my household was the exact quantity I/We needed (quantity)	59
Table 20: Building materials distributed by NDRMC to my household was the exact quantity I/We needed (quantity)	59
Table 21: Farm inputs distributed by NDRMC to my household was the exact quantity I/we needed (quantity)	60
Table 22: Age Distribution of Beneficiaries satisfaction in terms of timeliness, Relief items arrived at the right time	60
Table 23: Age distribution of Beneficiaries satisfaction in terms of adequacy	61
Table 24: Management Functions	62
Table 25: Challenges Facing Supply Chain Management	62
Table 26: Financial Related Challenges	63
Table 27: Operating Environment Challenges	64
Table 28: Humanitarian actors Opportunities in priority sectors	65
Table 29: Strategies Adopted to Overcome Supply Chain Challenges	66

List of Figure

Figure 1 Supply chain for humanitarian relief	14
Figure 2 Last mile distribution	15
Figure 3: Humanitarian aid supply network	16
Figure 4: Conceptual Framework for HSCM	37

CHAPTER ONE

INTRODUCTION

1.1. Background of Study

Every year disasters both natural and man-made impact the livelihood of people worldwide, more often than not resulting in the deaths of thousands of people. These disasters, combined together with a number of other developing threats and trends, have left more and more people vulnerable and inflicted considerable damage, loss, and disruption on humanity worldwide. (IFRC 2010:1).

Disaster is the disruption of a system that affects its operations as a whole and threatens its priority and goals. A disaster can be natural or man-made with a natural disaster being caused by an act of God, such as earthquake, famine and drought while man-made disaster are caused by human behavior, for example terrorism, coups and rebellions. Every year, there are about 500 disasters killing about 75,000 people and affecting some 200 million people (Wassenhove, 2006). For example, in Sudan alone, there are about 2.5 million people in Darfur displaced by the war who are in need of assistance not to mention the millions of returnees in South Sudan. In Syria, about 4 million people have been displaced by the war while 800,000 people have lost their lives. In Ethiopia 10.2 million people need food assistance due to drought induced disaster in 2015/2016 (HRD, 2016). Humanitarian organizations therefore play a big role in meeting the basic needs of millions of people in need of humanitarian aid.

A humanitarian organization is not-for-profit institution/body dedicated to providing aid or assistance to the vulnerable members of society. These institutions operate in areas of emergency and areas where people are afflicted by conflict, disease and poverty. Humanitarian organizations depend fully on donor funds from development partners, governments and volunteers. Humanitarian organizations are also referred to as Non-Governmental Organizations (NGOs) or relief organizations. In this study, these terms will be used interchangeably to mean the same thing.

The main objective of humanitarian organizations include value for money, achieving efficiency and effectiveness, ensuring fair competition among suppliers, ensuring accountability, transparency and ethics. This is different from private sector companies who are profit oriented.

In recent years, humanitarians have come under immense pressure from the donors, pledging millions in aid and goods, to prove that they are meeting their objectives in the most efficient and effective way. Since donors are becoming more involved when it comes to expenses, humanitarian organizations are under greater scrutiny to monitor the impact of aid, not just the input and output but the whole operation (Wassenhove, 2006). As a result, humanitarian organizations are forced to be more result oriented, accountable and transparent in their operations.

In disaster relief, 80 percent of the operations are spent on logistics. Therefore, efficiency and effectiveness in logistics and in particular SCM is of dire importance in the operation of humanitarian organizations. Therefore, just as the science of logistics and SCM has become important for private sector logisticians, so too is it becoming more important for humanitarians (Wassenhove, 2006).

1.2. Statement of the Problem

Ethiopia has experienced at least five major national droughts since 1980, along with a large number of localized droughts (World Bank, 2008). These cycles of drought create poverty traps for many households, constantly consuming their efforts to build up assets and increase income. About half of all rural households in the country experienced at least one major drought from 1999 to 2004 (Agrawala, Fankhauser, 2008).

The recurrent drought and other disaster need immediate humanitarian responses based on the type of onset disasters. There are a number of challenges of humanitarian supply chain management process on preparedness, assessment and appeal, resource mobilization, procurement, transport execution, tracking and tracing, warehousing, and delivery of aid. These can be grouped in to

barrier to collaborative working, supply chain complexity, suppression of market forces, network structures and power. The overall effect may effect on timely, adequately and suitable disaster responses for the affected population.

Prior to taking up a role within this research, I served for almost 10 years in the NDRM, during which time I was involved in numerous overseas disaster relief operations. In particular, time spent on a variety of overseas operations gave first hand exposure to the challenges and frustrations of working alongside organizations engaged in the practical provision of humanitarian relief and support to affected populations in need of life saving aid. The researcher recalls being struck at the time by the common drive amongst all participants within the humanitarian supply chain to improve the provision of aid and to alleviate suffering, but also by the reticence of some organizations' and individuals to avoid and, in some cases to actively reject the attempts made by personnel and their chains' of command to step away from a solely based role and to involve themselves in the practical provision of the relief effort itself.

No standard model exists for using supply chain management (SCM) techniques to provide relief to populations affected by disasters. For managers within the humanitarian sector, coordinating logistics during a relief effort is often a daunting task that can result in the loss of life and resources if not done quickly and effectively. As Anisya Thomas, Executive Director for the Fritz Institute, states, "humanitarian logistics has much in common with corporate logistics, yet the best practices from the corporate world, or from other humanitarian organizations in many cases, have not crossed over" (Thomas, 2003:2). And yet, humanitarian logistics offers challenges rarely faced in commercial operations.

The humanitarian environment is becoming increasingly complex, given the number and diversity of the different stakeholders involved and the environment in which they operate. There is the public sector with the government agencies, emergency relief mechanism and local authorities. There is the private sector with the corporations, service providers, goods suppliers and individuals. In between, there is the international community and the large and small aid agencies. Lastly, there are the societies at large, which, regardless of their condition after the disaster, are

exposed to unexpected changes (Tomasini & Wassenhove, 2009). All these stakeholders have different expectations that need to be coordinated for an effective outcome. Failure to do so would be at the expense of optimal performance of the humanitarian organization and ultimately the well-being of those in critical need of assistance. To coordinate all these stakeholders' needs, some level of accountability need to be present at every stage of the organization's operations including supply chain.

Little has been done to address the challenges facing logisticians during relief efforts. In addition, the donor organizations do not understand the challenges faced and often penalize the relief organizations for not adhering to set guidelines. Nyamu (2012) carried out a research to ascertain the impact of SCM challenges facing humanitarian organizations in Kenya. The study identified the challenges but did not seek to establish solutions. Mohamed (2012) conducted a study to establish the SCM practices being implemented by humanitarian organizations in Kenya and their impact on performance. The study did not evaluate the effect of the challenges or identify possible solutions to the challenges faced.

Kovacs & Spens (2009) identified the challenges of humanitarian logisticians with respect to different types of disasters, phases of disaster relief and the type of humanitarian organization. The study was, however based on a country as a case study. Country environment and dynamics differ from country to country. According to Mbohwa (2006), to ensure the procurement process in NGOs is economical and efficient, there is need for stakeholders, including donor agencies, government procurement entities, suppliers and the beneficiaries, to understand the humanitarian supply chain process. This includes understanding the SCM challenges and the impact of the challenges.

This research study seeks to shed light on the challenges facing humanitarian organizations during disasters/emergencies in Ethiopia. Specifically, the study identifies challenges faced in emergency relief SCM. Within this context, the overall objective of this research was to fill the identified gap how some of these challenges can be reduced or eliminated and possible solution surrounding the effective planning and coordination of the provision of humanitarian logistics during the

immediate response phase.

1.3. Research Questions

- 1) What Supply Chain Management practices in NDRMC on Humanitarian Relief operations?
- 2) What are the Supply Chain Management challenges of NDRMC in Ethiopia?
- 3) What are the Strategies for humanitarian supply chains to overcome the challenges in NDRMC?
- 4) How is the perception of beneficiaries' satisfaction in NDRMC humanitarian responses?

1.4. Objectives of the Study

1.4.1. General Objective

The general objective of the study is to assess the Challenges of Humanitarian Supply Chain Management of NDRMC of Ethiopia.

1.4.2. Specific Objectives

The specific objectives are:

- 1) To characterize the humanitarian supply chain management practices of NDRMC of Ethiopia.
- 2) To identify supply chain challenges NDRMC of Ethiopia facing during emergency relief operations.
- 3) To identify Supply Chain Management strategies that can be adopted to overcome the challenges.
- 4) To assess the perception of relief beneficiaries satisfaction toward the NDRMC response rate in terms of timeliness, suitability and adequacy of relief quantities.

1.5. Significance of the Study

Humanitarian organizations are 15 years behind their private sector counterparts who realized

way back the importance of using efficient supply chain, particularly given the increasing opportunity to go global. It is only recently that humanitarian organizations such as International Federation of the Red Cross and Red Crescent Society (IFRC) and the World Food Programme (WFP) have identified logistic and SCM as a key to relief operations (Wassenhove, 2006).

Supply chain challenges worsen humanitarian situations and Nyamwange & Nyaguthie (2004) in their research on humanitarian logistic challenges, concluded that logistics for humanitarian aid are faced by many challenges and stressed the need for further knowledge and standards to help in effective and efficient humanitarian supply chain. This study will help to build on research of humanitarian supply chain by identifying the challenges facing disaster SCM in humanitarian organizations in Ethiopia, the impact of the challenges and possible solutions.

The study will benefit humanitarian organization in Ethiopia who knows beforehand possible challenges they might face during relief operations and put mitigating factors to reduce the impact of the challenges. Donors understood supply chain management challenges facing humanitarian relief organizations and together with the humanitarian organizations work at adopting measures to mitigate the challenges. Governments, like donors, work hand in hand with relief humanitarian organizations during disasters. The study enables them to gain a better understanding of the relief operations and the challenges faced.

Although, the study was carried out for academic purpose and it is confined to a single humanitarian organization in Ethiopia and woreda, the findings shall contribute to deepen the knowledge of humanitarian supply chain in general and the study area in particular. Therefore, the outcomes of the study used for policy maker in formulating future policies and strategies on humanitarian supply chain management, donors gain a better understanding of the environment within which relief humanitarian organizations operate and achieving efficiency and effectiveness, ensuring fair competition among suppliers, ensuring accountability, transparency and ethics. Local government and beneficiaries actively involved in humanitarian supply chain especially in preparedness and assessment. Above all the study is the first of its kind in the areas that, it may be

used to stimulate for further research, researchers and scholars advance the body of knowledge on humanitarian SCM so that they can build upon the concept and work done.

1.6. Scope of the Study

In this study, the researcher tries to assess the challenge of humanitarian supply chain management. Despite the availability of a number of issues related to supply chain management, this research limits itself only on government humanitarian responses to find out the challenges of humanitarian supply chain management in the case of National Disaster Risk Management Commission with particular reference of Oromiya region, East Shewa Zone and Adama district of relief beneficiaries.

The scope of the study is limited on government humanitarian organization i.e NDRMC and single district in particular reference on 2015/16 disaster responses because of the fact the primary responsibility for any disaster response is the government role. This is due to limited resources (financial and time). Researcher strongly wishes to encourage the various humanitarian organizations to conduct.

1.7. Limitations of the Study

In common with all research this study suffered from a number of limitations. Whilst these limitations did not detract from the overall significance of the findings, it was right to comment on them at some stage in the final reporting process. Moreover, whilst the final research strategy proved on the whole to be successful, it was not without its difficulties and challenges; hence, comment is also made by way of lessons learned and some implications for methodology are identified namely: some implications for methodology are identified in 3 key areas, namely: Research Boundaries, Interviews, questionnaire and Observation, and Multiple 'Domains'.

Research Boundaries: The study was conducted in one organization and district and it is difficult to generalize based on the results? Humanitarian supply chain practices of single organization, it is difficult to single out its contribution to existing problems. An emergency response has been

blamed for many problems, and further detailed analysis is required to determine its contribution. Getting basic information about farming livelihoods and how farmers respond to emergency response was sensitive, and there is a danger of not getting the right responses. In this case, some farmers were reluctant to give the correct information on their economic situation, and based on their experiences of the projects they have been affiliated to previously their responses may have been formed according to an expectation of the provision of support.

Self-administer & Interview questionnaire: The study was based on primary data which has been collected through self-administered and interview questioner by employee of NDRMC and households. Due to the complex range of actors (all external participants involved in humanitarian supply chain) involved in disaster relief pertains it is not possible with in this study to illustrate the complete scope of practices and circumstance that prevail in the real life.

However, efforts were made to get the required information by crosschecking responses using different data collection methods.

1.8. Key Concepts and Definitions of Terms

Supply Chain Management: Supply chain management is a system where organizations, people, technology, activities, information and resources are involved in moving a product or service from suppliers to customer. Supply chain activities transform natural resources, raw materials and components to finished products. Quinn (1997) defines the supply chain as “all of those activities associated with moving goods, from the raw materials stage through to the end user. This includes sourcing and procurement, production scheduling, order processing, inventory management, transportation, warehousing and customer service.

Procurement: Procurement is part of the supply chain process and is the act of buying goods and services. The process includes preparation and processing of a demand as well as the end receipt and approval of payment. It is the acquisition of goods, services or works from an external source. Procurement involves buying goods or services at the best possible cost to meet the needs of the purchaser in terms of quality and quantity, time and location. Quinn (1997)

defines procurement as ‘all of those activities associated with acquisition of goods, from raw materials stage through to the end products. This includes sourcing and purchasing, order processing, inventory management, transportation, warehousing and customer service’.

Logistics : Logistics mean different things to different people; to the military, it is the science of planning and carrying out the movement and maintenance of forces of military operations that deal with the design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposition of material (Department of Defense (DOD), 2002). To businesses, it is defined as a planning framework for the management of material, service, information and capital flows and includes the increasingly complex information, material, communication and control systems required in today's business environment.

Humanitarian supply chain Management : is the process used by not-for-profit or donor funded organizations to plan, implement, control the efficiency, cost effective flow and storage of goods and materials as well as related material, from the point of origin to the point of consumption for the purpose of alleviating the suffering of the most vulnerable and most at risk people. The function encompasses a range of activities, including preparedness, planning, procurement, transporting, warehousing, tracking and tracing and custom clearance (Oloruntoba & Gray, 2006).

1.9. Organization of the Thesis

This study organized into five chapters. Chapter one deals with background of the study, statement of the problem, objectives, and research questions, scope of the study, significance of the study, delimitations and limitation of the study and Definition of key terms. Chapter two is mainly concerned with review of literatures. It comprises theoretical and empirical literatures, analytical framework and conceptual underpinning. Chapter three focuses on research methodology which comprises rationale for the selection of research area, study design and sampling techniques, data collection methods and analysis. Chapter four presents results and discussion of data. Finally chapter five presents summary of the research finding, concluding remarks and recommendations for future action.

CHAPTER TWO

REVIEW OF LITERATURE

2.1. Supply Chain Management

Supply chain management allows companies and organizations to optimize their logistical performance at inter-organizational levels. (Tomasini & van Wassenhove 2009:2) Supply chain management can be extensive and intricate or simplistic and straightforward; nevertheless the process is made up of certain key elements which are crucial in moving products to their final destinations. Although the concept of supply chain management has been around since the early 1900s and is evident in the development of the assembly lines, the term was first introduced in the Financial Times in 1982 (Choudhary, Ansari, Ahmed & Hammayun 2014: 75). Despite more than 30 years having passed since that interview in which Keith Oliver coined the term “supply chain management” there is yet to be a widely agreed upon definition for the term (Stock & Boyer, 2009). Although there are very many definitions for SCM, the Council of Supply Chain Management of Professionals define it as:

“Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies” (Kovacs & Spens 2012).

Supply chain management encompasses all of the combined activities that take products from their origin to the market for customers for consumption. Furthermore SCM represents the managing and controlling of the various activities such as planning, coordinating, cooperation and regulating movements of materials, components and ultimately the final products from the suppliers to the customers. Supply chain management is based on the notion that a single outlined plan for the flow of products, services, information and finances is imperative to the success of a business operation. The supply chain essentially develops into a business model which presents all the steps from the point of origin to the point of consumption of a product and their relationship along the way. The end goal is to have merchandise produce in the right

quantities and distributed at the right time and to the right locations to minimize system wide costs while satisfying end customers. (Simchi- Levi, Kaminsky & Simchi-Levi 2007:1). The developing of a business model is not only a matter of visualization as it functions to track and manage all internal and external activities linked to a company.

All activities of the supply chain are closely monitored by all organizations from parts to product to minimize delay and obstruction, subsequently gaining a competitive advantage (Choudhary 2014: 75). When a business connects all operations required to produce an output through establishing a network of suppliers, manufacturing plants, factories, warehouses, distribution centers and retailers it can result in immense benefits for all parties involved.

2.2. Humanitarian Supply Chain and logistics

Humanitarian SCM and logistics have emerged as a worldwide-noticeable theme as disasters, either man-made or natural, may occur at any time around the world with enormous consequences (Carroll and Neu, 2009; Tomasini and van Wassenhove, 2009; Kovács and Spens, 2007; Yamada et al, 2006). Consequently, the provision of timely and appropriate humanitarian aid has developed into a global and multinational industry (Carroll and Neu, 2009) and more and more focus is being placed on the optimization of the logistics and supply chains that are charged with transforming public and private donations into tangible aid. There now exists a fierce need to coordinate the logistics resources of the public and private sectors to avoid arbitrary resource allocation during disasters; however, ineffective coordination of efforts between relief suppliers, logistics servers and demanders is still a major concern (Carroll and Neu, 2009; Tomasini and van Wassenhove, 2009). It has been recognized that the humanitarian relief effort concerns itself with:

“A process of planning, managing and controlling the efficient flows of relief, information, and services from the points of origin to the points of destination to meet the urgent needs of the affected people” (Ernst, 2003), and that in humanitarian relief operations: “Logistics planning and coordination need to be seen as essential rather than merely desirable” (Rickard, 2003).

Whilst business logistics has already been clearly defined by numerous authors (see for example Mangan et al, 2012; Christopher, 2011; Harrison and van Hoek, 2011; Slack et al, 2010; Chopra and Meindl, 2010; Monczka et al, 2010), definitions of humanitarian logistics are less prevalent.

The principles of the Chartered Institute of Logistics and Transport's Humanitarian and Emergency Logistics (HELP) forum offer one definition: "Right people, equipment and material, in the right place, in the right sequence as soon as possible, to deliver maximum relief at the least cost saved lives, reduced suffering and the best use of donated funds" (CILT, 2011). However, the statement offered by Thomas and Kopczak (2005) seems to be the one that is currently adopted by the majority of authors within the field:

"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. The function encompasses a range of activities, including preparedness, planning, procurement, transport, warehousing, tracking and tracing, and customs clearance" (Thomas and Kpezak 2005:2)

The similarity between this definition and that offered by the CSCMP (2014) and discussed earlier, in respect of the business sector is striking. Hence, for the purposes of this research Thomas and Kopczak's (2005) definition for the humanitarian SC is adopted. Moreover, thinking back to the perspectives offered by Larson and Halldórsson (2004), some argue that within the humanitarian logistics community a re-labeling is taking place in that what was once logistics is now SCM (Heaslip, 2012b:38). However, given the focus on collaboration within this thesis a unionist stance will be adopted whereby logistics is regarded as a fundamental part of SCM. In keeping with the thoughts of Mangan et al (2012:13): "The SC is a much wider, intercompany, boundary-spanning concept, than is the case with logistics."

Even though the structure of humanitarian chains is similar to most business supply chains, the humanitarian supply chain is often unstable (Oloruntoba and Gray, 2006). As a result, coordination and management of disaster supply chains are increasingly needed and must be put in place in the humanitarian supply chains. Goals, revenue sources, and performance metrics of humanitarian and regular supply chains differ notably. Unlike the humanitarian supply chains, which do not have any profit targets and rely heavily on volunteers and donors, in regular supply chains, stakeholders are the "owners" of the chain. The source of revenue for humanitarian supply chain is government funding, charitable donations from individuals and corporation, and in-kind donations. The goal of humanitarian supply chain is to be able to respond to multiple interventions, as quickly as possible and within a short time frame (Wassenhove, 2006). In

addition, performance measurement in the nonprofit sector include the intangibility of the services offered, immeasurability of the missions, unknowable outcomes, and the variety, interests and standards of stakeholders (Beamon and Balcik, 2008).

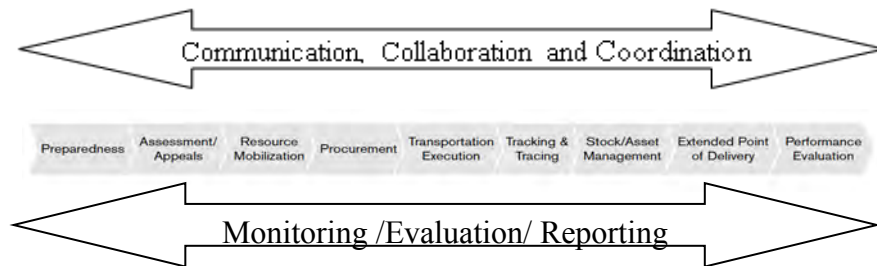
Thomas and Kopczak (2005: 2) offer four supporting reasons why humanitarian logistics is central to disaster relief and crucial to the performance of both current and future operations:

- 1) Logistics is crucial to the effectiveness and speed of response for major humanitarian programs.
- 2) With procurement and transportation included in the function logistics can be one of the most expensive parts of a relief effort.
- 3) The logistics department is often the repository of data that can be analyzed to provide post-event learning, as it will handle the tracking of goods through the supply chain.
- 4) Logistics data reflects all aspects of execution from the effectiveness of suppliers and transportation providers, to the cost and timeliness of response, to the appropriateness of donated goods and the management of information.

Having defined the humanitarian supply chain within the context of this research and acknowledged the significance of the chain itself and of the associated logistics processes, thoughts must now turn to defining the actors involved in the overall relief effort.

More specifically humanitarian logistics has been characterized 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” (Thomas & Kopczak 2005, 2). In humanitarian relief, logistics is the biggest factor that determines whether an operation is a success or a failure (van Wassenhove 2006: 475-476). “Since disaster relief is about 80 % logistics it would follow then that the only way to achieve this is through slick, efficient and effective logistics operations and more precisely, supply chain management” (van Wassenhove 2006). Humanitarian organizations are just beginning to understand the vital strategic role of logistics in relief chain management. Before this realization the humanitarian field has long considered logistics as just another basic expense (Beamon & Kotleba 2006; van Wassenhove 2006).

Figure 1 Supply chain for humanitarian relief



Source: (Thomas 2003, 3)

Most researchers agree on that disaster relief consist of three main phases that has to be managed but some of them have defined to a deeper extent. (Tufinkgi, 2006) developed a more detailed three-phase model from a disaster management perspective based on process descriptions drawn up by the Disaster Management Centre of the University of Wisconsin (Tufinkgi, 2006). He differentiates between three phases of pre-disaster (comprising prevention, mitigation, and preparedness); response (consisting of warning, impact and emergency response); and post-disaster recovery (transition/rehabilitation and reconstruction and development).

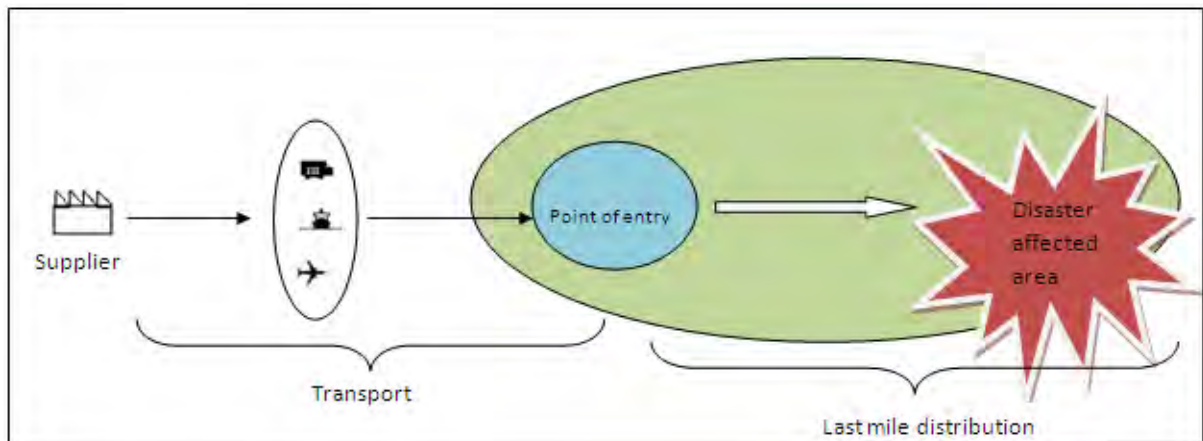
Schultz presents the emergency response cycle of humanitarian organizations based on IFRC Disaster Response Cycle. This takes the emergency response phase (immediate response) and explains it furthermore by illustrating different steps from identification of beneficiaries to resource distribution and evaluation of impact.

“Once a disaster occurs demand for large amounts of a large variety of supplies occurs suddenly in massive amounts.” (Balcik and Beamon, 2008) Their work introduces the Relief mission cycle model identified by (Thomas, 2003) and (Beamon, 2004) and modified it to describe the general flow of resources to the affected areas. The model consists of four phases. First phase (assessment) is assessment of resource after a disaster has occurred. In the second phase (deployment) supplies are deployed to disaster areas to reach relief victims. In the third phase (sustainment) operations are sustained for a period of time and in the fourth phase (reconfiguration) operations are reduced and in the end terminated.

According to Balcik, Beamon, and Smilovitz, (2008) describe the last part in the emergency response phase (immediate response) as “the last mile distribution problem”. This is the final stage of the relief chain and refers to delivery of relief supplies from local distribution centers

(LDCs) to people in the affected areas. They describes the logistical problem related to this as limitations related to transportations resources and emergency suppliers, difficulties due to damaged transportation infrastructure and lack of coordination among relief actors.

Figure 2 Last mile distribution



Source:
(Balcik
and

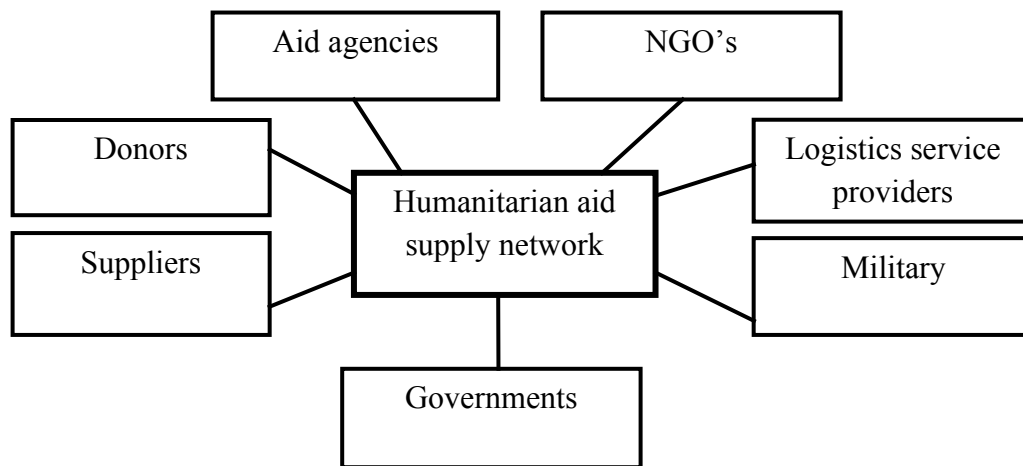
Beamon 2008).

2.3. Humanitarian Actors and parties concerned

The humanitarian relief community has expanded extensively since World War Two. The United Nations now has branches such as the High Commission for Refugees and the World Food Programme collaborating with a wide variety of other NGOs both at the national and international levels (Therien & Lloyd, 2000; Oloruntoba & Gray 2006, 115). “In a humanitarian disaster, there is always a need for coordination in order to maximize the efficiency and effectiveness of the humanitarian effort to meet the needs of affected communities” (Humanitarian Coalition 2015). Humanitarian logistics is a rather new and developing field however it has become an important topic in governments, in the private sector and non-profit organizations as exposure to disasters increases heavily due to “climate change, rapid and unplanned urbanization, demographic pressure, construction and more intensive land-use in hazard prone areas, biodiversity loss and eco-system degradation.” (Kovacs & Spens, 2009:506; European Commission: 2014). As humanitarian operations become more widely discussed it has attracted a diverse number of actors such as parties from the private sector which are interested in

collaborating and contributing to disaster management. (Maspero & Ittmann: 2008). Humanitarian organizations are also working together to improve their overall results “Logistics coordination between NGOs has improved in recent humanitarian operations (van Wassenhove and Samii 2003) with shared equipment, assets or resources such as aircraft, trucks, food stocks, forklifts etc., and with some agencies or even individuals designated as having the best local knowledge and contacts” (Oloruntoba, 2007).

Figure 3: Humanitarian aid supply network



Source: Kovacs & Spens, (2008: 223)

There are plenty of humanitarian actors, governmental, non-governmental, local, international, faith based agencies and now, more than ever, even actors from the business sector. Although the overall objective of these actors is to make a difference in alleviating the suffering of the impacted population, they all have different methods, principles and capabilities. The large number of actors with different operation capacities can alleviate the suffering of those impacted by natural disaster more effectively and efficiently (IFRC, 2007). Partnerships and collaborative efforts are intended to maximize the overall effectiveness and have less to do with moving aid from one location to another. Reducing costs, improving performance, knowledge sharing and cancelling redundancies are some of the few benefits of the collaborative approach (Thomas, 2004).

With disasters on the rise impacting more people than ever, more collaborative efforts are required to decrease complexities. Collaborations with governments and militaries are crucial;

however partnerships with the private sector have become just as important. The desire to implement corporate social responsibility strategies has cultivated a path way for collaborative efforts within the humanitarian field. (van Wassenhove 2006: 487) Although there is still very much distrust between the humanitarian and business companies, the private sector can participate in the role of donors, collectors and providers for humanitarian organizations. (van Wassenhove, 2006:486; Cozzolino, 2012: 14) Partnerships in the humanitarian field are crucial as no one group can effectively respond to and overcome a disaster singlehandedly. Using all the available collaborations, consultations as well as local capacities and knowledge bolsters the ability to respond to disasters of all types and enhances preparedness (Logistics Cluster, 2013).

When a natural disaster occurs, the size and impact of the disaster defines who should handle the relief operations. If the disaster is of minor art, specialized national or local agencies, sometimes in cooperation with international organizations, handle the disaster. The Pan American Health Organizations (PAHO) and World Health Organization (WHO) claims that if there is a major disaster, it is usual to call for the international community for help.

2.4. Barriers to Effective Delivery of Aid

Each of the following subsections presents issues that negatively impact logistics operations during humanitarian relief missions. The manager tasked with controlling the influence of these factors is challenged to direct not only those operations within his or her span of control, but must also consider the effect of the following barriers on his or her agency, partners, and relief beneficiaries.

2.4.1. Uncertainty

The most challenging obstacle in humanitarian logistics is uncertainty. Usually, there will be no indication as to when a disaster will strike, how many people will be affected, what infrastructure will be left intact, which suppliers will donate, or what other obstacles may arise. Uncertainty can stem from many elements relating to the mission, the organization itself, or nature of the 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 (Van der

Vorst and Beulens, 2002:424). Van der Vorst and Beulens also recognize how supply chain configuration and control structures, long forecast horizons, decision complexity, poor information reliability, and agency culture may create uncertainty (2002:424-426). As supply chains become larger and more geographically diverse, natural and man-made disasters can also disrupt the supply chain (Simchi-Levi and others, 2003:5). Regarding uncertainty, Sowinski quotes Lynn Fritz, founder of the Fritz Institute:

“...disasters are the embodiment of randomness. You don’t know when they’re going to happen, where it’s going to happen, and who’s going to be affected. This is the ultimate execution of a sophisticated supply chain, particularly from an algorithmic planning basis. Every other supply chain is based on predictability” (Sowinski, 2003:19).

Like their commercial counterparts, managers of logistics in humanitarian missions would prefer the ideal environment of predictable demand, easy access, and cooperative partners. Instead, what commonly occurs is a chaotic, possibly hostile, environment where every passing minute could mean another life saved. Gooley writes, “The nature of the situation ensures that the business of transporting humanitarian aid is highly unpredictable. Logisticians often have little or no notice of what and how much material they must move, not to mention when and where it is to go” (1999:83). This problem is amplified by distance. Long and Wood note that often the office coordinating the aid mission is far away from the actual disaster site and must make assumptions about the types and quantities of aid that should be supplied. Once response teams are in place at the disaster site, the supply pipeline can transition from a “push” system to a “pull” system based on more accurate needs assessments and communications back to headquarters and donors (Long and Wood, 1995:218). These assessments should also include anticipated needs (PAHO, 2000:21). If supplies are “pushed” through a system, quantities are dictated by an upstream authority with little or no input from the customer. In a “pull” system, quantities are determined at the point of consumption.

Another element of uncertainty creeps in as well-intentioned donors generate supplies and manpower support for the relief effort that are of the wrong type or condition. Variability in quantity, quality, and suitability burdens the process of sorting, storing, and distribution. “When individuals and local organizations respond in times of crisis, they add an element of unpredictability that may unintentionally create logistical headaches for the very organization they are trying to help.” (Gooley, 1999:83) The United Nations Disaster Management Training

Programme (DMTP) states that “consistently, many of the internationally supplied relief goods flown into countries...prove to be inappropriate and unnecessary...[and] may even be a barrier to more important deliveries” (DMTP, 1993:10). In anticipation of excess, inappropriate, or unneeded goods, “the logistics pipeline...needs to have at the origin, some mechanism to discriminate among donations.” (Long and Wood, 1995:220)

2.4.2. Degraded Infrastructure

Inadequate transportation and communications infrastructure is another barrier to effective delivery of aid. In the DMTP logistics handbook, it states “the overall effectiveness of relief logistics often depends on the level of prior investment in both the transport and communications infrastructure and how far relief requirements have been considered in the planning” (DMTP, 1993:12). Rapid onset of a disaster may degrade the country’s existing infrastructure to the point where delivery of aid is severely hampered. “Often...transportation infrastructure is in poor condition and cannot handle the huge numbers of refugees, military vehicles, and relief shipments that pour into these areas in times of disaster. (Gooley,1999: 82). “Accurate assessment of the road infrastructure is critical...a road may be a five-foot wide strip of mud only inches above the water line that can accommodate only scooters and livestock, or it can be an eight-lane highway pocketed with bomb craters” (Long and Wood, 1995:225). System-wide, the logistics manager could encounter delivery options ranging through ships, aircraft, rail, and trucks. At the same time, those routes may closed or clogged (Moody, 2001) limiting distribution to pack animals. These are obstacles that must be dealt with on a case-by-case basis due to the unpredictable effects of disasters and the vulnerability of the infrastructure.

2.4.3. Communications

Poor communication is a major barrier to delivery of aid. Not only are there obvious difficulties associated with speaking to someone using a different language, but the communications infrastructure may be crippled by a disaster (if it ever existed in the first place). Teams at a disaster site may not be able to communicate upstream with headquarters or donors. The relief agency may not be able to effectively communicate needs to donors. Long and Wood explain that organizational language and terminology may hamper the aid process. For example, some

organizations estimate need on a family basis and others use a per person basis (Long and Wood, 1995:218). Organizations may use different names and definitions for transportation modes, supplies, the composition of worker teams, etc. “Ironically, inter-organizational relations are usually a challenge to the relief effort instead of a source of support. Each organization has its own operating methods and goals, and it is only with great effort that they coordinate their plans and share resources” (Long and Wood, 1995:216). This is an indication that organizational and cultural language may lead to procedural difficulties (Long, 1997:28). This inability to coordinate effectively is common during emergency response and is only made worse by disputes between organizations, and reluctance to share information which will ultimately lead to duplicated efforts and wasted resources (PAHO, 2000:5).

Communications problems exist long after the effects of a disaster are mitigated. Sowinski states that a lack of funds at the end of a humanitarian action often limits recording of best practices and tracking of information on complex supply chain conditions. It thereby hampers learning opportunities and institutional memory regarding successes and failures (Sowinski, 2003:20). As the money runs low and the relief mission and its workers fade into the background, it is understandable that events could slip by unrecorded. Another shortcoming of many operations with “wide variation in the quality of field programs and the technical competence of staff” is that beneficiaries and donors often have no way to gauge the effectiveness and accountability of humanitarian agencies at the field level (Natsios, 1995b:409). 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.

2.4.4. Human Resources

Poor or nonexistent training ultimately affects the quality of any logistics operation. Field managers are faced with an onslaught of requirements during the relief effort, including demands from the affected population and local government, pressure from international media, monitoring agency attention, and restrictions imposed by donors on how aid is administered. In the midst of this confusion, field operations managers are also faced with recording progress and passing information back to their headquarters and media partners as well as providing a record

of events for future managers.

Thomas points out that there may be problems with employee reliability (2003:7) stemming from lack of training. There is a notable lack of employees who are knowledgeable in supply chain or logistics management. Thomas points out that “an actor, an osteopath, an extreme sports enthusiast, a nurse and a country manager” were acting as head logisticians in the organizations she studied. “Neither their backgrounds nor their values are geared toward process improvement” (2003:7). Likewise, Long notes that “most people from development agencies...have backgrounds in public policy or third world development, and professional logisticians are rare” (1997:27).

2.4.5. Earmarking of Funds

Another major problem faced by logistics managers in humanitarian organizations is that the donor has significant influence over where and how aid is distributed while the victim is a third party with little voice in the matter (Long and Wood, 1995:225).

Funding for organizational support and infrastructure is often neglected under donor demands that as much aid as possible is pushed to victims. Thus, distribution channels may suffer as warehouses, equipment, communications infrastructure, and training remain unimproved or deteriorating. Thomas writes:

“Donor scrutiny over the usage of funds, concern that contributions flow directly through to beneficiaries combined with earmarking of donations for particular relief operations, drives HROs (humanitarian relief organizations) to focus on direct relief rather than investing in systems and processes that will reduce expenses or make relief more effective over the long-term. Thus, operational disaster response approaches are encouraged by the funding mechanism and strategic disaster preparedness opportunities are discouraged. This results in an underinvestment in infrastructure such as information systems and warehousing facilities, and a reluctance to preposition inventory to improve responsiveness.” (Thomas, 2003:7).

As a result, there may be aid available, but the organization may be incapable of effective delivery in a timely manner due to limiting factors in the distribution process. Organizations may, for example, be “reluctant to spend money on a sophisticated information system that would actually improve their efficiency in the long run” (Long, 1997:29). Earmarking funds specifically for the affected population can also lead to a lack of parts and service support for the

truck and planes required to move material aid (Long and Wood, 1995:226) and lack of funding for unallowable costs such as headquarters expenses (Randel and German, 2002:22).

In effect, the earmarking of funds violates the humanitarian ethos of impartiality by placing stipulations on how relief is administered. Macrae and others point out that “the idea of humanitarian aid as a distinctive form of assistance governed by principles of impartiality and neutrality is being gradually eroded. In particular, its independence from the foreign policy objectives of donor states is under threat, both in principle and in practice” (2002:7). This is a political and administrative problem that has underlying implications for logistics managers since earmarking aid focuses the relief agency on delivering the most aid to the most affected populations in the most visible crises, not on promoting efficiency in logistics operations. In effect, “in spite of their nonprofit nature, PVOs [Private Voluntary Organizations] need to compete;...the quality of their field programs affects their capacity to gather government grant funding and their public visibility affects their private contributions” (Natsios, 1995a:72). Donor earmarking of funds and stipulation of how materiel aid is distributed also inhibits rapid progress during relief operations and is noted by Macrae and others as a method to “influence the global policy of humanitarian organizations” (2002:5) because of the fear that funding will be “turned off” if donor stipulations are not met.

2.5. Potential Methods for Overcoming Barriers of HSC

Supply chain management is used to efficiently integrate suppliers, manufacturers, warehouses, and outlets; so that services or products are produced and distributed at the right quantities, to the right locations, at the right time, in order to minimize system wide costs while satisfying service level requirements (Simchi-Levi and others, 2003:1). For HROs, this means satisfying as much demand for relief services and materials as possible, while reducing the mission cost in terms of funding, manpower, delivery time, supplies, etc. “In a well-functioning supply chain, at every link, each unit should treat the next unit as a customer, always focusing on service to the ultimate customer, the end user” (John Snow, Inc., 2000b:25).

Supply chain management is also an exercise in systems theory; i.e., the manager seeks to

improve the performance of the entire supply and distribution system by analyzing and improving its components. The supply chain itself is the “system of connected logistics networks between the original vendors and the ultimate final consumer” (Coyle and others, 2003:15). As such, the humanitarian logistics manager is faced with making tradeoffs to serve the affected population. Elements of the supply chain that must be managed include inventory levels, landed costs at the end of the pipeline, information, customer service level, and roles and relationships of partners (Coyle and others, 2003:22-24). The manager must also be mindful of agency goals, donor policies, host government requirements, security and accountability issues, and a multitude of criteria that may not be so easily defined. An ideal solution to providing emergency humanitarian aid could be described as:

“...a contingency approach. The supply line should be able to turn on or off at very short notice. The origin and destination of supplies can change quickly. Management controls are designed to anticipate as many such contingencies as possible, and react to the unanticipated events quickly. Whereas many distribution models are suited for repetitious actions, a model for famine relief would emphasize quick reaction capabilities, and efficiencies are gained from flexibility and effective real time communications. Decision criteria would include many variables that defy quantification such as humanitarian need.” (Long and Wood, 1995:214)

A general strategy for reducing the effect of disasters on the supply chain is to utilize the five steps set forth by the Council of Logistics Management (CLM) for the continuity of supply networks in the commercial sector. Helferich explains the CLM strategy as a simple, flexible, clearly defined sequence of planning, mitigation, detection, response, and recovery (Helferich, 2002:1). He places emphasis on mitigation of harmful effects of disaster on critical components of the firm’s supply chain, such as infrastructure, production facilities, supplier networks, transportation networks, information and communications, electricity, water, and other critical services (Helferich, 2002:3). The critical areas are identified through prior planning, mitigation is used to reduce vulnerability to disasters, and “what if” exercises limit confusion in the aftermath. In a broad sense, we can view countries or regions which are susceptible to disasters as Helferich’s firm and the HRO and its partners as the supply chain. The same five steps can be transferred from commercial practice to benefit emergency humanitarian response procedures. Components of these generic approaches will be explored further in the following sections.

Based on the barriers uncovered in the first part of this literature review, a targeted review of SCM literature was undertaken to find solutions. Management methods for dealing with

uncertainty, acting on a local or regional scale, improving command and control, conducting assessments, improving collaboration and using logistics information systems will be examined. In addition the use of military partners, resource management, and transportation management methods are considered. Whether implemented in part or in whole, the methods serve to improve response to disasters when applied to the humanitarian logistics network.

2.5.1. Dealing with Uncertainty

There are many different sources of uncertainty. Although uncertainty cannot be eliminated entirely, there are SCM methods which can minimize the effect (Simchi-Levi and others, 2003:5). Many of these techniques focus on reducing performance variability of separate functions in an effort to reduce negative effects on the system. Another method involves using information to forecast supply and demand (Stock and Lambert, 2001:281-282). As explained later, careful collaboration and planning with partners helps cut down uncertainty.

Uncertainty stemming from inconsistent supply can complicate relief planning. To manage donated goods of the wrong type or quantity, Stewart writes that the World Food Programme (WFP) uses port captains at debarkation points to screen donations for usefulness. Wet or infested food and damaged goods are eliminated at the port before it moves inland, eliminating the wasteful transportation of useless goods (Stewart, 2003:19). Sorting out the proper food/supplies early in the pipeline can reduce the amount of improper material being transported, thus freeing transportation and personnel resources to move the items that are truly needed. Even better, the affected country should make a detailed assessment of needs before generating a request for assistance, thus ensuring the importation of “only those materials and help that would be useful because they have been requested based on a real appraisal of needs” (PAHO, 2000:10). Van der Vorst and Beulens (2002) compiled multiple methods for coping with uncertainty based on comprehensive literature review. Some of these strategies also serve as solutions for other barriers to effective humanitarian logistics thereby providing further reason to consider their implementation.

2.5.2. Acting on a Local or Regional Scale

Many authors point out that local authority, if capable, should be the first source of relief for the affected population (DMTP, 1993:9, Gooley, 1999:85, Long and Wood, 1995:219-221, PAHO, 2000:5, Stewart, 2003:25). This permits a response tailored to the cultures and lifestyles of the victims, stimulates the local economy through increased commerce and use of local labor, keeps the local government involved in the process while preventing issues of infringed sovereignty, and eliminates much of the logistical burden in transporting and storing supplies from outside the region. Sourcing locally also increases pride and confidence that relief efforts are being conducted effectively. Even “logistical planning should give first priority to information coming from local personnel” (Long and Wood, 1995:221) as this point of demand information is the most accurate and reliable. Logistics planning should be conducted on the regional level rather than from global headquarters to more sufficiently address local needs.

One benefit accorded to large developmental organizations is that they may have personnel already working in a region when a disaster strikes; therefore they are good sources of initial knowledge on local terrain, culture and the immediate requirements of the affected population (Natsios, 1995b:407). For these reasons, indigenous NGOs are also extremely beneficial partners at the outset of relief activities, possessing “an intuitive understanding of local conditions that international NGOs could not hope to equal” (Natsios, 1995b:410). The use of local and national response mechanisms as the first course-of-action is strongly encouraged.

2.5.3. Decisive Command and Control

Probably the single most beneficial step to managing the supply chain is to improve communication, command, and control. This reduces the variances encountered in the supply pipeline by coordinating all entities involved in the chain. Gooley recommends giving a single person ultimate authority and maintaining a strict hierarchy governing communications, operations, and decision-making authority (Gooley, 1999:83-85), a sentiment echoed by PAHO in their recommendation for a coordinator to “act as a link between the segments” (2000:15). The IASC utilizes a humanitarian coordinator (HC) to facilitate inter-agency collaboration. The HC concept supports “the deployment of a senior and seasoned official to start up coordination... [and] can be used to great advantage, especially for responding to fast-breaking crises” (Jones

and Stoddard, 2003:9). The advisor needs the ability to “facilitate coordination among program units and among programs, donors, and other agencies” (John Snow, Inc., 2000a:172).

In a contingency environment, having a coordinator gives all partners one ultimate source to consult in the orchestration of the relief mission. The chain of command also provides structure by which responsibilities and procedures are delineated. Although this ignores the obvious potential for political or religious conflict between partners, the single command and control chain should keep relief operations focused on the victims (Jones and Stoddard, 2003:9).

2.5.4. Pre and Post-Disaster Assessments

Another command and control tool that feeds into information sharing and forecast preparation is the vulnerability assessment. To conduct a vulnerability assessment, a team of experts is sent to a region with known vulnerabilities to record the state of the infrastructure, local response capability, and current status of the population. Detailing ongoing WFP actions in Southern Africa, Stewart writes that “rolling assessments are highly sophisticated and involve analysis of a variety of issues, using both food-related and non-food-related criteria....It takes an assessment to understand the scope and depth of this crisis, which to a casual observer, might not be so apparent” (2003:23). If no organizational personnel are in place, other assessment teams are deployed after a disaster strikes. “Initially supplies are ‘pushed’” and when relief personnel arrive, “they reassess the situation, and try to correct the mistakes. Once better assessments have been made and communicated to the origin of supplies, a “pull” system is put into effect and the process becomes much more effective” (Long and Wood, 1995:218). To further improve the effectiveness of assessments, PAHO recommends that joint examinations of the situation be conducted to gain an “interdisciplinary view” (2001:24). This also lays the groundwork for detailed response plans (DMTP, 1993:25-27) and continued collaboration in the relief effort.

2.5.5. Collaboration

Collaborative planning between supply chain partners is another command and control strategy.

Collaboration is way to use strategic partnerships with other organizations to achieve a common goal while sharing both rewards and risks (Simchi- Levi and others, 2003:147). Partners may be other HROs, suppliers, donors, government agencies, etc. An HRO considering collaboration should perform a strategic assessment of its needs, goals and objectives before deciding whether a partner would be useful under the circumstances. This sets the stage for evaluating alternatives, selecting partners with the right capabilities, then structuring and implementing the relationship (Coyle and others, 2003:421-424). Some of the traits of the “right partner” are having a stable line of desired products, compatible technology, aligned corporate cultures, sound financial position, and a high degree of trust between top management levels (Karonis, 1999:175). Logistics managers will find that collaborating with fellow organizations for the purchase and transportation of relief supplies allows increased leverage and better bargaining position with suppliers due to the larger amount of services or goods purchased per transaction.

2.5.6. Logistics Information Systems (LIS)

Implementation of logistics information systems for the humanitarian relief community would greatly enhance coordination between partners, sharing of training and lessons learned, and storage of data that would aid in inventory visibility and demand forecasting. Long characterizes information systems as “arguably the single most important factor in determining the success of an emergency logistical operation” (1997:27-28). Already there are Internet-based clearinghouses such as the Disaster Resource Network operated by the World Economic Forum (WEF), the Relief Web and the World Food Program websites operated by the UN. Natsios writes that larger NGOs “have developed many of the management information, evaluation and control systems of private sector corporations to monitor quality in their projects (1995:409). The basic functions of an electronic data interchange are reduction in paperwork, improved accuracy due to less manual processing, increased speed of information transfer, reduced administrative manpower, reduced ordering costs, increased employee productivity, and better inventory accuracy and order response leading to reduced inventory (Stock and Lambert, 2001:161).

Although these systems along with other initiatives are a step in the right direction, their lack of integration limits their usefulness as an interagency communications tool. Long and Wood

write:

“Relief workers, both in the disaster site and at their respective headquarters, need to know what supplies are available, where the supplies are located, and how best to transport them. The ideal information system must therefore accommodate multiple organizational users and their different operating methods, plus world class communications capabilities. The parts of such an information system have already been developed, but institutional inertia has prevented their integration” (Long and Wood, 1995:227).

As an example, Stewart notes that frequent meetings with partners, “a constantly updated website,” and other forms of communications greatly benefit the World Food Program distribution network in Southern Africa (Stewart, 2003:19). The manager should keep in mind that while information systems would enhance performance measurement and sharing of data/lessons learned, any information system will be ineffective if communications infrastructure is degraded, reporting is not timely, or employees are poorly trained in the use of the tools (Thomas, 2003:6). Information is a stepping stone for a better educated and more prepared staff as long as the system is implemented based on a familiar and well-established organizational structure.

At the most basic level, “to make logistics decisions, a logistics manager needs three essential data items: stock on hand, rate of consumption, and losses and adjustments” (Family Planning Logistics Management/John Snow, Inc., 2000a:26). These items, in addition to any other specifically requested data, can be used to make informed decisions for supply chain management. Some of the general benefits of inventory visibility, all facilitated by the LIS, are: order statuses, minimization of order error and backorders, accurate and timely requirement relay, and enhanced response to delays and stock outs (Coyle and others, 2003:211). Simchi-Levi and others recommend aggregating very detailed data into representative groups that can simplify distribution planning based on geography, customer type, or product type (Simchi-Levi and others, 2003:27). This enables more accurate forecasts due to the likelihood that high demand in one subset of the group will be offset by low demand in another (Simchi-Levi and others, 2003:66).

A robust logistics information system enables forecasting techniques based on frequency and intensity of past disasters and help limit the unpredictability experienced in humanitarian missions. Long and Wood write “the management of information during a crisis is the single

greatest determinant of success. Forecasts allow regions at risk to prepare them and for relief agencies to prepare their efforts.” (1995:218).

Historical data and a contingency plan prepared in advance can drastically cut down response time. “By reviewing information from past operations and implementing regional strategy based on flexible, readily deployable mechanisms, logistics can be transformed from an activity that is almost exclusively reactive to one based on preparedness and experience-based action” (Thomas, 2003:12).

Logistics information systems also set the stage for identifying strengths and weaknesses of the supply chain. Quantifiable performance measures can be reviewed and used as a gauge for adjusting policies and practices. For example “some indicators of logistics system functioning are: actual lead time compared with expected lead time, frequency of stock outs, and frequency of emergency orders” among others (John Snow, Inc., 2000a:152). Improved performance metrics is one of the benefits of timely accurate information (Coyle and others, 2003:211). It should be understood that quantifiable measures will not always be available. “Logistics gives an intangible service, and its quality relies to a large extent on subjective evaluation” and “logistics is so closely integrated with other operations and outside influences that it cannot be evaluated in isolation” (Waters, 1999:141). This is to say that due to hard to define goals such as customer satisfaction and due to the complex interactions of the supply chain, performance may not easily be gauged. Managers must also recognize that their customers, the donors and recipients, may have implicit and explicit measures which are expected to be met as a part of operational success (Van Brabant, 2003:44).

2.5.7. Military Partners

The use of military forces to provide elements of the relief effort is often a necessary part of rapid response. For humanitarian organizations, this is a special form of collaboration because of the political and ethical implications of using a non-neutral party in the relief effort. Military forces can supply specialized capabilities such as force protection, information sharing, airlift, overland trucking, bridge and road repair, and water sanitation among other requirements.

According to Natsios, “the two most important capabilities the military brings to any emergency response remain logistics and security: they are the tasks that relief organizations can never match but increasingly need in complex emergencies” (1995a:80). In addition, military logisticians are trained with a “mission oriented” mentality (Long, 1997:27) and are experienced in moving massive amounts of materiel.

These contributions do not come without a price, both in the sense of donor country expenditures and moral and ethical implications of employing foreign military forces in a region. “It is essential that these two role are impartial humanitarian assistance as a response to an urgent and in alienable right, and peace operations with their inevitably partial and political mandates are kept separate” (Barry and Jeffrys, 2002:2). There is a blurred line between using military forces in an impartial manner and using them to advance political or social objectives. As Barry and Jeffrys point out, shared “information is not a neutral commodity, but may have important tactical or political value” (2002:5) and linked military and humanitarian missions are “increasingly used as an instrument of political intervention” (2002:8). This sentiment is also noted by other authors (Macrae, 2002:16, Reindorp, 2002:29, Graham, 2003:40, and Aall, 2000:127). Barry and Jeffrys go on to define impartiality as relief given solely on the basis of need, not used to further political, military or any other objectives (2002:11).

Humanitarian organizations and military organizations should settle on a common language regarding relief missions and agree that military resources should only be used as a last resort (Barry and Jeffrys, 2002:16-17). The relationship between humanitarian and military agencies has grown in the past decade as “exposure to each other’s strengths and capabilities has served to increase the military’s respect for the innovation and dedication of NGOs, and to foster and appreciation among NGOs for the unsurpassed logistical capacity of the military” (Aall, 2000:133). It is important to clearly define the responsibilities of military partners as “the military sometimes misses the mark on humanitarian mission statements where objectives can be implicit and intangible” (Natsios, 1995a:70). This is to say that military partners can contribute significantly to the effort given clearly defined roles within the collaboration.

2.5.8. Resource Management

The fundamental purpose of a logistics network is to procure resources such as manpower, supplies, and equipment and move them to a point of need. Inventory exists to: secure efficiencies in transportation through batch discounts or to make use of existing transportation schedules, provide safety stock to guard against unpredictable demand, hold stock to conserve storage space at later supply points, and build up stock in anticipation of a predicted future need (Owens and Warner, 1996:1, and Simchi-Levi and others, 2003:45). “The key to dealing with inventory is to recognize that it has to be managed from a systems perspective, in which tradeoffs are measured comprehensively and accurately” (Coyle and others, 2003:260).

Procurement of items or services is the foundation for satisfying demand. “Procurement consists of all those activities necessary to acquire goods and services consistent with user requirements (Coyle and others, 2003:119). This process includes: identifying needs, defining user requirements, deciding to make or buy the item or service, deciding how the item will be obtained, searching the market and selecting a supplier, taking delivery and evaluating the purchase (Coyle and others, 2003:119-122). Selecting a supplier is an important part of constructing a reliable and responsive supply channel. When procuring inventory, the logistics manager should consider quality of the product, reliability, capability, and financial stability of the vendor, and other desirable qualities such as proximity and hidden costs (Coyle and others, 2003:127-129).

The traditional solution for dealing with uncertain demand is to maintain a safety stock of inventory “just in case” a surge in demand occurs. “Forecasting demand is a common approach to help resolve uncertainty, but it is never completely accurate...the net result of uncertainty is usually the same: companies accumulate safety stock to buffer themselves against uncertainty” (Coyle and others, 2003:194). Safety stock protects against uncertainty and fluctuation in production, lead times, and demand surges by providing a minimum reserve level of stock to prevent stock outs under unusual supply chain disruptions. Keeping “anticipatory stock” is another way for an organization to prepare for an unusual event (Coyle and others, 2003:196). For the humanitarian organization these methods help prepare for both unpredictable and undesirable events.

The safety and anticipatory stock concepts can be extended to logistics practices of HROs via consolidation and prepositioning of stockpiles and staff. Sharing warehouse space at a forward location cuts personnel requirements for multiple organizations while simultaneously providing employees who are familiar with local ways and who are able to relay situation reports in the event of a regional disaster. During the Second Gulf War, USAID prepositioned staff in neighboring countries around Iraq (Kunder, 2003). While this may not be practical for those disasters which are not foreseen, the concept may be employed by placing small cells of staff over a wide area. The members of these cells could rapidly converge on a region of need to form one large contingent of trained support personnel once the disaster happens. This method would bolster the local contingent with personnel already somewhat familiar with regional customs, requirements, and practices. Kunder went on to state that certain specialties such as public administration specialists will be in immediate demand and should be kept on-call for emergency response (Kunder, 2003).

Prepositioning stocks may have other unintended consequences, however. The United Kingdom-based Iraqi Refugee Aid Council cautioned that prepositioning relief materiel could signal impending disaster or become a draw to refugees, exposing them to more vulnerability (Graham, 2003:38). Consider the concern that might be generated if humanitarian operations centers and warehouses full of aid materials started popping up outside your hometown. In addition, Graham notes that “effective response demands availability of standby resources and there are very real worries that agencies will have to divert funds from emergencies in order to achieve a minimal level of preparedness” (2003:40). This assumes that stockpiles of aid materiel will tie up massive amounts of capital that would otherwise be spent elsewhere by the humanitarian organization. There is also a risk that aid will be positioned in the wrong location, thereby tying up additional transportation resources to move the supplies when they are needed elsewhere.

Risk pooling is an inventory management method which is used to aggregate stock from many locations into one centralized warehouse. This method assumes that high demand at one outlet will be offset by low demand at another (Simchi-Levi and others, 2003:66). The main advantage of risk pooling is lower total inventory level due to retail outlets not having to keep separate

safety stocks. This assumes that transportation capacity and lead time will be sufficient to reach the consumer when goods are needed. In general, shipping times will be longer to the consumer, but less money will be tied up in inventory, and warehousing costs will be lower due to operating a few centralized facilities rather than many satellites (Simchi-Levi and others, 2003:137).

Another inventory management method would be to contract for more numerous, yet smaller batch sizes of supplies from multiple sources. “In terms of reactivity and predictability, big order lot sizes with long lead times are the most problematic, since adjusting an order to a new level should be done far more in advance than in the case of small batches” (Helo, 2000:4528). Bearing in mind that smaller batch sizes are easier to produce and deliver to the point of debarkation quickly, higher transportation costs are likely to be incurred due to the demand for faster and more frequent delivery performance (Helo, 2000:4530). The small batch concept can be employed using local vendors of bulk commodities whereby a large quantity is purchased in advance, and the vendor distributes increments upon request (PAHO, 2000:25). This relieves some storage burden from relief agencies.

The minute details of warehouse management are beyond the intent of this paper; however the humanitarian logistics manager should consider the fundamental value-added functions of maintaining a warehouse. These are: the ability to consolidate small loads to save on transportation costs, the ability to mix product types to fulfill orders at the destination, improved service levels due to reduced lead times and stock outs, and contingency protection against unexpected delays and interruptions (Coyle and others, 2003:286). Information on warehousing is widely available.

2.5.9. Transportation Management

Management of the distribution function should be an integral part of system management. “The activities of each function must be closely tied with the function downstream to avoid delays at handoff points in the logistics network” (Thomas, 2003:6). The operations must be physically and conceptually compatible. For example, one method for making the distribution process more robust would be to establish multiple distribution channels comprised of redundant routes and

delivery methods for supplies (Coyle and others, 2003:107-109). Likewise, the distribution system should have built-in mechanisms to allow for tradeoffs between transportation costs and service level. More costly, faster transportation allows lower inventory levels to be kept due to a more responsive system (Coyle and others, 2003:340). If the system is unified in its distribution plan, disruption and delay will be minimized.

Transshipment is the movement of goods between facilities at the same level in the supply chain, most often at the retail level (Simchi-Levi and others, 2003:136). This method shares inventory between all partners, but places a burden upon the transportation system due to the need to move goods more than once. Transshipment is facilitated by a good information system and makes use of the “risk pooling concept, even if no central warehouse exists, because one can view inventory in different retail outlets as part of a large, single pool” (Simchi-Levi and others, 2003:136).

Direct shipment is another method by which aid may be delivered. In the commercial sector, “the need for an emergency transshipment [direct shipment] may arise due to rush orders from the customer that may not normally be met by the ‘gateway’ stock or due to a short-term measure to ensure customer service level in the light of capacity constraints” (Hong-Minh and others, 2000:789). The basic form of direct shipment is for the manufacturer or supplier to bypass warehouses and distribution centers to deliver goods directly to the retail level (Simchi-Levi and others, 2003:134), thereby allowing a rapid reaction to increased demand for inventory (Hong-Minh and others, 2000:794-795). Direct shipment is often used when lead times are critical because of perish ability issues and when stock outs are unacceptable. While direct shipment may be infeasible in many humanitarian disaster situations due to degraded or non-existent infrastructure, it should be considered if infrastructure and capacity are adequate (such as in industrialized nations where ports and airfields are left intact after a disaster).

Another strategy which focuses on the physical infrastructure of the affected region is to provide for special operations, outside of the normal realm of HRO expertise, which will facilitate the distribution of aid. In the context of humanitarian relief (not military operations), a special operation (SO) is “an activity to rehabilitate and enhance transport infrastructure, if necessary in extraordinary circumstances, to permit speedy and efficient delivery of food assistance to meet

emergency and protracted relief needs” (Stewart, 2003:21). Examples given by Stewart are repairs to roads, bridges, airports, ports, and railways as well as possibly establishing a joint logistics center or communications capability (Stewart, 2003:21).

Another method to cut documentation and eliminate frustration of managing international movements is to contract freight forwarders and third party logistics (3PL) providers specializing in relief and international freight movements (Long and Wood 1995:225). Knowledgeable freight companies will help smooth out customs procedures, road tolls, and country-specific import restrictions (Stewart, 2003:19). Contracting 3PL services, facilities, and equipment allows the HRO to focus on its core competencies while the 3PL leverages its expertise and buying power to decrease distribution costs (Simchi-Levi and others, 2003:152). Outsourcing functions which are beyond the capabilities of the HRO has the potential to reduce overall costs while improving service, avoiding investment in facilities and equipment, while improving access to logistics expertise (McKinnon, 1999:215).

Some miscellaneous measures to overcome barriers to aid are: construct distribution centers outside the area of operations to prevent damage from the very disaster you are trying to relieve and build a storage facility anywhere there is a change in transportation mode to prevent damage and loss while waiting on onward transportation (Long and Wood, 1995:222). By centralizing stockpiles, the concept of risk pooling is employed. Another consideration would be to collaborate with the manufacturer to design more compact and securely packaged products to help reduce the transportation burden and guard against adverse environmental conditions (Simchi-Levi and others, 2003:215).

See the Pan American Health Organization logistics and supply management handbooks (PAHO, 2000 and PAHO, 2001) for a thorough summary of field-level acquisition, warehouse management, fleet management, and distribution methods. Two other very detailed sources on distribution, storage, and forecasting are references from (John Snow, Incorporated (2000a and 2000b)).

2.5.10. Training and Education

Each of the previous recommendations may present a radical change to the policies and procedures of the HRO. “Even small changes in policy or procedure may suggest the need for formal training” (John Snow, Inc., 2000a:170). Changes in organizational process may require ensuring employees have the following enablers (John Snow, Inc., 2000b:35):

- Specific skills, knowledge, and attitudes.
- Natural strength, mental, and emotional capacity.
- Motivation to succeed.
- Information, including equipment and instructions needed to perform a job.
- Tools and settings, including equipment, physical space and an appropriate social environment to do the job.
- Incentives, including compensation, recognition, praise, and rewards.

The importance of training in establishing these personnel traits cannot be ignored. However, equipping individuals with these traits will not necessarily result in improved performance. Granville notes that organizational factors must also be incorporated such as information on strategies, goals, and performance criteria, reinforcement and reward programs, and integrated personnel involvement to help close organizational gaps (McKinnon, 1999:260).

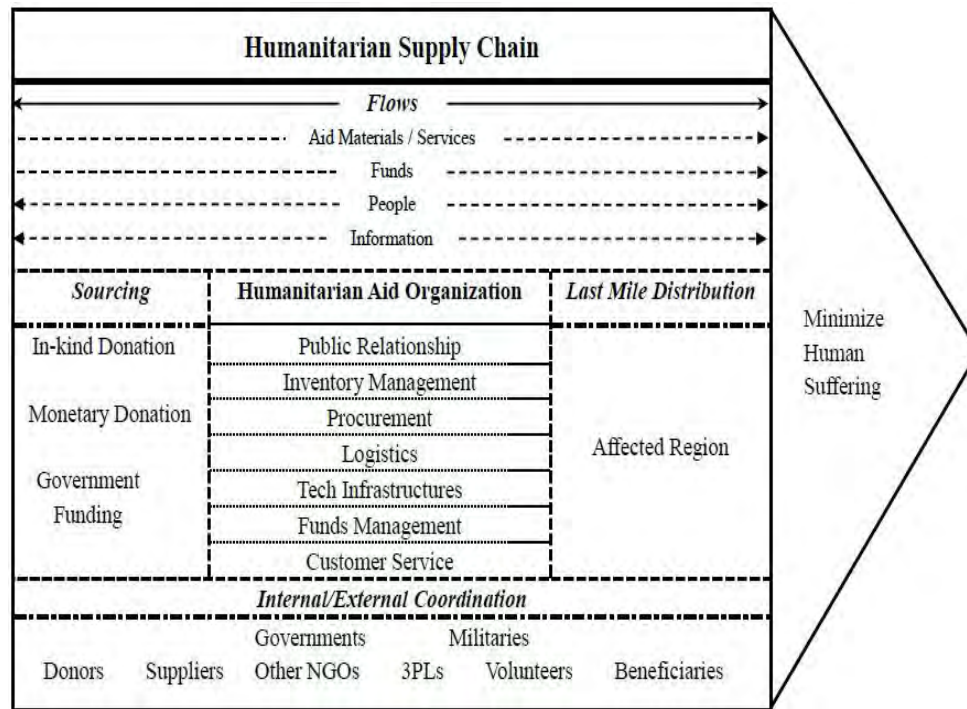
2.6. Conceptual Framework

Supply chain management is a concept, “whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers” (Monczka et al., 1998). Using the paradigms of existing frameworks for CSCM and borrowing from the framework proposed by Mentzer et al. (2001), develop a framework for HSCM with an intention to capture characteristics of both disaster relief management and humanitarian development aid management.

Humanitarian Aid Organization: At its epicenter, framework (Figure 4) positions the individual humanitarian aid organization which aims to reduce the human suffering in the affected areas. The other components of framework further extend to upstream and downstream of the focal

individual humanitarian aid organization and altogether weave the humanitarian supply chain structure.

Figure 4: Conceptual Framework for HSCM



Source: Mentzer et al. (2001).

Although “humanitarian aid organization” is a more general term, typically NGOs act as main players in humanitarian aid management when a disaster occurs. It is worth mentioning that humanitarian aid organizations involving in humanitarian aid activities include humanitarian agencies (HAs), NGOs, disaster relief organizations, and humanitarian organizations (HOs), etc., and there are some differences among the definitions of these organizations (Therien and Lloyd, 2000). For the purpose of this study, treat “NGO” and “humanitarian aid organization” as interchangeable in this framework. Other framework components include sourcing, internal and external coordination, flows and last mile distribution.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Study Design

Descriptive study designed humanitarian supply chain management at national level and within Oromia region was adopted for the study in order to carry out an in-depth assessment on challenges of humanitarian supply chain management adopted by NDRMC in disaster management. Not with standing its weakness of limited extrapolation, this design was adopted because it is one of the best for obtaining reliable and relevant research results for application to similar organizations (Saunders et al, 2007).

3.2. Population of the study

This study focuses on challenges of humanitarian supply chain management in NDRMC of Ethiopia operating in disaster situations. This organization is responsible for emergency preparedness and response for disaster management through provision of emergency suppliers. They are in most cases the first to respond during disasters in the country.

The total population of the study was 1,280 HHs consisting of the three communities Ejersa Mersa, Bekoje Dewaro and Chakawa dufa in Adama district with the population of 390, 469 and 421 respectively.

A total of 35 experts form EW, logistic and supply chain, procurement, finance and warehouse departments were the population of the study. Those are directly involved in (a) Preparedness; (b) Supply Chain Planning; (c) Procurement (d) Transportation (e) Warehousing (f) Tracking and Tracing and Custom Clearance Practices.

3.3.Sampling Design

The study follows a multi-stage stratified purposive sampling procedure. At the first stage, respondents were selected from NDRMC various departments who are directly involved in humanitarian SCM process to know the supply chain practice and challenge, and then to Oromiya Region, East Shewa Zone and then to Adama district relief beneficiaries. Out of 9 regions in the country the most populating region is Oromiya and the second highest next to Somalia relief beneficiaries (CSA, 2011; HRD, 2016). In the second stage, Adama district was purposively selected due to the facts that the district was frequently susceptible to recurrent drought (WAO, 2016).

3.4.Sample Size Determination

Simplified formula provided by Cochran, (1997) is used to determine the required sample size at 95% confidence level, 5% degree of variability and 8% level of precision. Accordingly, 1,287 samples from relief beneficiary households a total of 152 HHs sample were selected for the study from three kebele and inclusion in the analysis.

Prior to determining sample size of the study, all logistics and SCM experts used stratified based on their location and involvement; NDRMC has 7 Early warning Professional, 2 logistic and SC Managers, 2 procurement committee, 1 finance, 9 warehouse coordinator were selected. From Oromiya region DPPC 2, East shewa zone DPPC 2 and from Adama woreda 2 EW experts used as sample.

Record of total relief beneficiaries' households living in the Adama woreda obtained from Woreda and the three Kebele administrations. There are about 1,280 HHs relief beneficiaries. Eventually, the total sample size was determined using the following formula (Cochran, 1997).

$$n_o = \frac{z^2 pq}{d^2} \longrightarrow n = \frac{n_o}{1 + \frac{n_o - 1}{N}}$$

is the desired sample size when the population is greater than 10,000

- n is number of sample size when population is less than 10,000
- Z is 95% confidence limit i.e. 1.96
- p is 0.1 (proportion of the population to be included in the sample i.e.10%)
- q is 1-0.1 i.e. (0.9)
- N is total number of population
- d is margin of error or degree of accuracy desired (0.05)

Using simple random sampling technique, proportional to the population of villages identified, study sample were selected from the list of relief beneficiaries households proportionate of the sample size. Accordingly, Ejersa Mersa has 390 HHs, Bekoje Dewaro 469 HHs, and Chakawa dufa 421 relief beneficiaries HHs. The samples were selected 46, 56 and 50 HHs respectively. A total of 152 household heads were selected and interviewed for this study.

3.4.1. Sampling Procedures

Table 1: The Sampling distribution of the respondent from NDRMC to district level

Due to inaccessibility of experts due to other urgent assignment 27 out of 35 experts participated in this study only 8(22.8%) of respondents were missed.

S.N		Population	Selected sample	%
1	NDRMC EW Department	7	7	100
2	NDRMC Logistic and SC Manager	2	2	100
3	NDRMC procurement Committee	5	2	40
4	NDRMC Finance	2	1	50
5	NDRMC central Warehouse Managers	13	9	69.23
6	Oromiya Regional DRM EW Expert	2	2	100

7	East Showa Zonal DPP EW experts	2	2	100
8	Adama Woreda EW and distribution center	2	2	100
	Total	35	27	77.14

Source:-NDRMC (2016)

Table 2: The Sampling distribution of the household heads in the three rural kebeles

Agro-Climatic zones	Name of Kebeles	Total Households sample		Sample House holds
		Total HH	Percentage	Sample HH
Wognadega	Ejersa Mersa	390	30.46	46.00
Kolla	Bekoje Dewaro	469	36.65	56.00
	Chakawa dufa	421	32.89	50.00
Total		1,280	100	152

Source: (WAO: 2016)

3.5. Method of Data Collection

The data for the present study were collected in April, 2016. A combination of methods was used to collect relevant data in this study, primary and secondary sources. These methods generated relevant information for the study.

The primary sources were collected from experts from NDRM to the district level by using self-administered questionnaire and from the households by using structured interview questionnaire and while secondary data were collected by reviewing both published and unpublished materials and documents also used to gather from different journals, articles, books, GO/NGO reports working in the area.

3.6. Data Collection Instrument

Data was collected using structured self-administered questionnaire and household interview. Structured self-administered questionnaire for NDRMC staff and management, twenty seven persons from NDRMC to district level were selected for structured questionnaire (see Appendix

A) using both close-ended and open ended questionnaire. For relief beneficiaries HHs interview question is designed (see Appendix B) from the views of relief actors as NDRMC collaborators perception statements using Likert scale were adopted from Russel (2005) and other literature related to humanitarian logistics and SCM. These were adapted to suit the Ethiopian Socio-cultural situation. The items on the beneficiary interview questionnaire had options that best suited the extent to which they agreed with the statements (1=strongly disagree, 2= disagree, 3= agree, 3=strongly agree 5= didn't receive any)

3.7.Method of Data Analysis

The data collected were analyzed with the aid of SPSS package. The techniques included descriptive statistics with significance tests. Descriptive statistics includes frequency and percentage and measures of location (mean and standard deviation). Inferential statistic was used grouped mean because data was categorical and ordinal or nominal (Saunders et.al, 2007). These measures used to summarize, organize, evaluate and interpret the numeric information.

The overall beneficiaries of NDRMC responses to the disaster occurred in 2015/2016 were analyzed as a dependent outcome against three critical factors; timeliness, suitability and adequacy. In order to achieve objective which to identify supply chain practices adopted by NDRMC, description of the general SCM system in the organization was carried out. This review focuses on the processes and procedures used in Humanitarian SCM. The description helped in gaining an insight into the current supply chain system. The information collected through literature search, which involved reviewing available materials such as organization information, journals, manuals and other published materials. To achieve objective two, which was to identify supply chain challenges facing humanitarian organizations in emergencies, an interview questionnaire used to collected primary data on the challenges facing humanitarian SCM in NDRMC the questionnaire focused on collecting data on the humanitarian supply chain challenges and impact of the challenges facing the selected organization. This questionnaire target managers in supply chain department, EW expert, Procurement committee, Warehouse coordinator. A questionnaire distributed to the head of supply and logistic department or equivalent department for them to provide possible solutions to challenges faced during SCM. Literature search from

journals, on line databases and other publications used in order to obtain possible solutions to humanitarian supply chain challenges.

3.8. Validity and Reliability of Instruments

Validity and reliability are two basic concepts that are essential to define and measure bias and distortion of any study. I used a blend of qualitative and quantitative methods (Questionnaire, household interviews, and observation) that helps me to avoid any kind of biases and ensure their validity. On the other hand, information of the respondents was cross-checked and triangulated to ensure validity. I used to employ the whole processes of the research work based on the research questions, objectives, and theories that helps me to confirm the validity of the study.

I used a multiple sources of information to ensure the reliability of the data. I used both male and female household head, government official, experts and various ways of data collection techniques such as, Questionnaire, interviews, and observation to make this study more reliable and realistic. In order to secure the validity and reliability of the research, I personally observe what was exactly happening and interviewed the informants being in the field and discuss the issues with experts and other informants. I crosscheck the validity and reliability of the information by asking probing questions and triangulated information by crosschecking others. I also crosschecked their age when they report events in terms of calendars. It is also attempted to rule out the possibility of distortion and inconstancies by checking informants' information by asking children in different occasions during the field work. Thus I used to argue that it could make the research results dependable and credible.

3.9. Ethical Considerations

A letter from Addis Ababa University Graduate school of Commerce department of Logistic and supply chain Management used, to have permission of the selected staff who are involved in humanitarian Supply Chain from federal NDRMC, regional , zonal and woreda expert to collected data from experts. Prior to filling the questionnaire each of the respondent's given detail

explanation about the objective and significance of the study. Then experts asked for their informed consent to participate by explaining the fact that they had the right to decline to respond/fill the questionnaire. In addition, the sensitive nature of the study also explained to the respondent when obtaining their consent. They assured about the confidentiality of the information by explaining the fact that interviews held in private with them and no names recorded on the individual interviews; instead questionnaires identify exclusively using codes on the cover pages. Moreover, confidentiality on the information kept after the completion of the interview and was not transferred to any other third party or used for any other purpose.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1. Demographic Profile of the Respondents

This section discusses the age, sex, occupation and educational status of respondent's; it goes further to compare the sex with age and occupational distribution of the respondents.

Table 3: Demographic profile of the respondent

Demographic Characteristics		Kebele			Total Freq.	%
		Ejersa mersa	Bekoje deworo	Chekaw Dufa		
Sex of household	Female	17	17	11	45	29.61
	Male	29	39	39	107	70.39
	Total	46	56	50	152	100.00
Age	under 18 age	1	0	3	4	2.63
	18-30 years	5	17	24	46	30.26
	31-45 years	23	27	18	68	44.74
	46-60 years	17	11	3	31	20.39
	61-75 years	0	1	2	3	1.97
	Total	46	56	50	152	100.00
Occupation	unemployed	0	0	2	2	1.32
	Farmer	46	56	47	149	98.03
	Trader	0	0	1	1	0.66
	Total	46	56	50	152	100.00
Highest education attained	Grade 1-8	16	16	21	53	34.87
	Grade 9-12	0	0	7	7	4.61
	Illiterate	29	40	21	90	59.21
	Diploma	1	0	0	1	0.66
	Total	46	56	50	152	100.00

Table 3 shows the sex distribution of respondents. Data collected from the field shows that 107(70.4%) are male and 45(29.6%) are female.

Data collected from the field shows that 46(30.3%) of the respondents representing fall within the ages of 18 to 30 Years. 68 (44. 3 %) fall within the age 31 to 45 years and 31(20.4%) falls within the ages of 46 to 60 years.

The occupational distribution of respondents out of the 152 respondents, 149 (98%) are farmers and the rest are traders and unemployed.

Table 4: Age * Sex of household * highest education attained Cross tabulation

highest education attained			Sex of household		Total
			Female	Male	
Grade 1-8	Age	under 18 age	2	1	3
		18-30 years	7	14	21
		31-45 years	4	15	19
		46-60 years	0	10	10
	Total		13	40	53
Grade 9-12	Age	18-30 years	1	5	6
		31-45 years	0	1	1
	Total		1	6	7
Read and write	Age	18-30 years		1	1
	Total			1	1
Illiterate	Age	under 18 age	0	1	1
		18-30 years	11	7	18
		31-45 years	13	35	48
		46-60 years	6	14	20
		61-75 years	1	2	3
	Total		31	59	90
Diploma	Age	46-60 years		1	1
	Total			1	1
Total	Age	under 18 age	2	2	4

		18-30 years	19	27	46
		31-45 years	17	51	68
		46-60 years	6	25	31
		61-75 years	1	2	3
	Total		45	107	152

The above table indicates that female respondents between ages 18 to 30 are 7(4.6%), 4(2.6%) between the ages of 31 to 45 years and those between the ages of 46 to 60 years are none existence. The number of male respondents falling between ages 18 to 30 years are 14(9.2%), 31 to 45 are 15(9.8%), and 46 to 60 years are 10(6.5%) are attending elementary schools.

Table shows compares the sex and education distribution of respondents 5 male whose age 18-30 are attending in high schools. The number of female with elementary or basic education is 13 while male are 40. No female had in higher education or diploma but 1 male had in HE/Diploma. The numbers of male attending high schools are 6 while female is 1. 31(20.4%) female respondents and 59(38.8%) had male respondents said they had no formal education. Further observation reveals that the ration of sex to education that is male to female is 107:45.

Table 5: Respondents Characteristics of NDRMC staff

Respondents of NDRMC staff		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Director	2	7.4	7.4	7.4
	Coordinator	3	11.1	11.1	18.5
	Expert	9	33.3	33.3	51.9
	Warehouse	7	25.9	25.9	77.8
	Planner	4	14.8	14.8	92.6
	Internship	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

The table shows that data collected from the field shows that 9(33.8%) of the respondents representing are experts and 7(25.9%) are warehouse coordinator and 4(14.8%) are planner.

4.1. Humanitarian Supply Chain Management practice of NDRMC

a) Preparedness

Table 6: An existing plan of action for disaster management?

Plan of action		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	26	96.3	96.3	96.3
	No	1	3.7	3.7	100.0
	Total	27	100.0	100.0	

The table indicate that data collected from the field shows that there is plan of action for preparedness before any disaster occurrence 26 (96.3 %) of the respondents responding that there is a plan of action before any disaster happening.

Table 7: How soon after slow on set disaster occurrence do the initial assessment teams reach in the disaster affected area 2015/16?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Within 24hrs	2	7.4	7.4	7.4
	1-3 days	24	88.9	88.9	96.3
	Over 4wks	1	3.7	3.7	100.0
	Total	27	100.0	100.0	

The above table show that the assessment team reach disaster affected area for slow on set disaster 24(88.9%) from 1-3 days, 2(7.4%) within 24 hours the rest 1 (3.7%) over 4 week time. These indicate that the assessment team organized from different sectors reach in the disaster affected area to the standard for the preparedness of emergency responses.

Table 8: How soon after fast on set disaster occurrence do the initial assessment teams reach the disaster affected area? Time after disaster occurred in 2015/ 16.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Within 24hrs	16	59.3	59.3	59.3
	With 72 hour	5	18.5	18.5	77.8

	1-2wks	5	18.5	18.5	96.3
	Don't know	1	3.7	3.7	100.0
	Total	27	100.0	100.0	

The above table shows that the assessment team reach in disaster affected area after fast on set disaster occurred 16(59.3%) responded within 24 hours the rest 5(18.5%) with in the 72 hours and 5(18.5%) reported 1-2 week time. This indicates that the majority of the respondent reported the assessment team reach on fast on set disaster occurred area with in the standards time.

a) Planning practices:

NDRMC had a well-planned disaster management plan according to the various disaster management phases. Below shows the activities to the Organization the activities of the organization under the various phases of disaster were as follows;

A. Pre Disaster phase (These are the activities we undertake to prevent man-made disasters and minimize the effect of natural one).

These activities included;

- Identification of hazards or emergency situations that may degenerate in to disasters.
- Education and Training for awareness creation and skill acquisition for disaster prevention and management.
- Acquisition of relevant data and basic reference materials designing and equipping of emergency operations and casualty centers and earmarking of spaces for relocation of victims.
- Identification, acquisition and storage of resources needed in relief programmes.
- Purchase and storage of relief items.
- Identification and preparation of data base on collaborating institutions or agencies.
- Formation and training of volunteer. Corps.

- Recommendations on storage of supplies and emergency care training needs of health personnel and volunteers.

Pre-Disaster Phase Preparation

The first phase of the SCM is the preparation stage which involves forecasting demand for, and pre-positioning of relief items. NDRMC undertook disaster impact assessment in the areas affected. This enabled it to know the immediate, medium and long term needs of the victims.

This information was used by the Government to assist the victims to regain their livelihoods, and thereby strengthening their resilience to the impacts of disasters. In a bid to identify the urgent need of the affected population a joint UN/NGO/Government assessment was conducted Assessment from 17 to 20 August 2015 and coordination meeting were held in Addis with the participation of UN/NGO/Government team. The relief operation assists 10.2 million vulnerable individual, who have been directly affected by a recent wave of drought in vulnerable regions of the Federal Government of Ethiopia.

The Humanitarian Requirements Document (HRD) 10.2 million people need, food, WaSH and non-food items funding of \$1.4 billion for approximately 561,000 <5 and pregnant women and lactating mother are affected in Oromiya region.

Table 9: NDRMC conduct initial assessment of what logistics information were needed for emergency operation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Independent assessment	6	22.2	22.2	22.2
	Joint assessment	21	77.8	77.8	100.0
	Total	27	100.0	100.0	

The above table shows that the organization conducts initial and comprehensive assessment for logistic needed for emergency response operations 21(77.8%) conducted joint assessment the rest 6(22.8%) responds there is independent assessment this respondent may be miss informed

from the questioners initial assessment also conducted before joint assessment at district level. The organization conducted assessment with joint line minister and sector offices, UN/affiliated organization (WFP, UNICEF, UNOCHA,WHO), other International organization such as safe the children, CARE Ethiopia, World Vision Ethiopia, Plan International, ChildFund, Goal Ethiopia etc. These help to contribute efforts and resource in well-organized manner.

b) Procurement Practices

Table 10: Procurement practice of Relief commodities

1. Food item		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't Know	4	14.8	14.8	14.8
	actual very much more	5	18.5	18.5	33.3
	actual slightly less	3	11.1	11.1	44.4
	actual slightly more	4	14.8	14.8	59.3
	actual same as estimate	11	40.7	40.7	100.0
	Total	27	100.0	100.0	
2. Shelter& Non-food items		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't Know	5	18.5	18.5	18.5
	actual very much more	5	18.5	18.5	37.0
	actual slightly less	8	29.6	29.6	66.7
	slightly more	5	18.5	18.5	85.2
	actual same as estimate	4	14.8	14.8	100.0
	Total	27	100.0	100.0	
3. Vehicles		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't Know	13	48.1	48.1	48.1
	actual very much less	5	18.5	18.5	66.7
	actual very much more	1	3.7	3.7	70.4
	actual slightly less	6	22.2	22.2	92.6
	actual slightly more	2	7.4	7.4	100.0
	Total	27	100.0	100.0	
4. Farm inputs		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't Know	15	55.6	55.6	55.6
	actual very much less	6	22.2	22.2	77.8
	actual very much more	1	3.7	3.7	81.5

	actual slightly less	3	11.1	11.1	92.6
	actual slightly more	1	3.7	3.7	96.3
	actual same as estimate	1	3.7	3.7	100.0
	Total	27	100.0	100.0	

Source: (Survey, 2016)

The above table shows that NDRMC procured food relief commodities during disaster response 11(40.7%) actually same as estimated, 5(18.5%) it is actual very much more and 4(18.8%) actually slightly more.

Non Food & shelter items procurement respondents reported that 8(29.6%) actually slightly less the required, 5(18.5%) actually very much more and 5(18.5%) slightly more the required amounts.

Vehicle/Transport services 6(22.5%) actually slightly less, 13(48.1%) don't know the procurement process.

Farm inputs the respondents response 6(22.2%) responded very much less and 3(11.1 %) actually slightly less.

Procurement/ Supplier Relationship Management: there were established procedures for procurement and these were used during the operation in question. There were however no long-term framework contracts or formalized agreements with supplier even though arms' Length relationship exist. Relief items, which did not include gifts-in-kind nor unsolicited donations, were all procured with in Ethiopia so far the Government has spent the equivalent of US 6.2 m in trying to provide food and non-food items to the affected regions. The supply from government which started a little over a month lasted for a period of two months. The frequency of the re-supply is dependent on when the affected people have their first post drought sizeable harvest. To that effect, government is committed in providing resources for re-cropping. In close collaboration with the Ministry of agriculture (MoA) and other UN and NGOs partners in the Food security cluster NDRMC project of \$ 252.413 immediately cover the purchase of 180 metric tons of fertilizers to be distributed to 7,100 floods affected regions of Ethiopia.

c) Transportation Management practices

The relief commodities transported from donor in kind transported using sea transport and then use road transport from abroad to the central warehouse. From warehouse to the distribution center are using road transported. Due to poor infrastructure in areas of operations, geographic characteristics of the affected region, inadequate transportation modes are the major challenges that may affect the SCM process. In addition, the study identified effects of the challenges faced as delayed delivery of goods and services at the required time and place, poor quality of supplies, supplies not in the required quantity, poor storage facilities affect the condition of the products and poor operational management may derail delivery of products at the right time.

d) Warehouse Management practices

Table 11: NDRMC relief stock location organized and managed? Within Center

Is stock organized and managed manner?		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	1	3.7	3.7	3.7
	Central warehouse	21	77.8	77.8	81.5
	Decentralized stores	4	14.8	14.8	96.3
	Other	1	3.7	3.7	100.0
	Total	27	100.0	100.0	
Is the store use for current disaster?		Frequency	Percent	Valid Percent	Commulative Percent
Valid	N/A	1	3.7	3.7	3.7
	Yes and used in this operation	21	77.8	77.8	81.5
	Yes, but didn't use it in this operation	2	7.4	7.4	88.9
	Don't Know	3	11.1	11.1	100.0
	Total	27	100.0	100.0	

Source: (Survey, 2016)

Stock Asset Management: As shown the above table NDRMC use centralized stock location 21(77.8%) respondents reported at Dire Dewa, Nazeret and Kombicha warehouse for relief commodity. While 4(14.8%) responded decentralized warehouse. The majority of the respondents' 21(77.8%) reported this centralized warehouse used for the current disaster situation of the country. NDRMC had systems and procedures in place which were perceived to have met the need of the operation.

Table 12: The warehouse quality of following inventory/stock management practices

Receiving		Frequency	Percent	Valid Percent	Commutative Percent
Valid	D/N	1	3.7	3.7	3.7
	Need improvement	1	3.7	3.7	7.4
	Average	4	14.8	14.8	22.2
	Good	6	22.2	22.2	44.4
	Excellent	15	55.6	55.6	100.0
	Total	27	100.0	100.0	
Storing		Frequency	Percent	Valid Percent	Commutative Percent
Valid	D/N	1	3.7	3.7	3.7
	Very poor	1	3.7	3.7	7.4
	Need improvement	1	3.7	3.7	11.1
	Average	5	18.5	18.5	29.6
	Good	9	33.3	33.3	63.0
	Excellent	10	37.0	37.0	100.0
	Total	27	100.0	100.0	
Dispatching		Frequency	Percent	Valid Percent	Commutative Percent
Valid	DK	1	3.7	3.7	3.7
	Needs improvement	1	3.7	3.7	7.4
	Average	6	22.2	22.2	29.6
	Good	7	25.9	25.9	55.6
	Excellent	12	44.4	44.4	100.0
	Total	27	100.0	100.0	
Reporting		Frequency	Percent	Valid Percent	Commutative Percent
Valid	D/N	1	3.7	3.7	3.7
	Needs improvement	2	7.4	7.4	11.1
	Average	11	40.7	40.7	51.9
	Good	5	18.5	18.5	70.4
	Excellent	8	29.6	29.6	100.0
	Total	27	100.0	100.0	

Source: (Survey, 2016)

The above table shows that the warehouse quality status of stock management practices in terms of receiving commodities 15(55.6%) of the respondents reported is excellent, 6 (22.2%) the warehouse is at good status and 4(14.8%) reported on average status. Storing of the materials 10(37.0%) of the respondents reported excellent, 9(33.3%) in good condition and 5(15.8%) on average status. Dispatching 12(44.4%) is excellent, 7(25.9%) is good and 6(22.2%) is on average status. With regards of reporting the majority of the respondents reported 11(40.7) on average status, 8(29.6%) is reported excellent and 5(18.5%) at good status.

e) Tracking and tracing

Table 13: Tracing and tracking of commodities

1. Manually(pen and paper)		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	1	3.7	3.7	3.7
	Within Center	6	22.2	22.2	25.9
	Within affected area	20	74.1	74.1	100.0
	Total	27	100.0	100.0	
2. Excel spreadsheet		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	2	7.4	7.4	7.4
	Within center	24	88.9	88.9	96.3
	Within affected area	1	3.7	3.7	100.0
	Total	27	100.0	100.0	
3. Computer software		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	1	3.7	3.7	3.7
	Within Center	24	88.9	88.9	92.6
	Within affected area	2	7.4	7.4	100.0
	Total	27	100.0	100.0	

Source: (Survey, 2016)

Track and trace: The above table shows that the updates and tracking and tracing of commodities. Majority of the respondents were reported completely manual using pen and paper with in affected area 20(74.1%) 6(22.2%). There were using 24(88.9%) computer software with the center while 2(7.4%) were using computer software within affected area. The centers were communicated to the field on ad hoc basis, while tracing was done with the aid of fixed-line/cellular telephony. Even so NDRMC office and field staff thought they received accurate and timely information on what was in the pipeline most of the times.

f) Monitoring, Evaluation and Reporting

Monitoring, Evaluation and Reporting: To some extent NDRMC has risk information management systems. At the governmental level, a system is underway in building an information management system for disaster risk reduction (HRD, 2015), UN affiliated organization international NGO's, like the World vision International have information management system in place for disaster risk reduction (UNOCHA, 2015). The information is collected by their staff and disseminated through Brochures, Posters Symposia, Workshops, and Seminars; Main users include the general public, NDRMC and affected communities. Academic and research communities in the country are linked to institution dealing with disaster reduction. Come experts from the academic and research institutions are members of the Technical Committees of NDRMC.

4.2. Perception of beneficiaries satisfaction on NDRMC's Response in the 2015/16 Disaster in the district

This section describes the factors that affect beneficiaries' satisfaction in NDRMC's response rate in the 2015/16 drought response, it goes further to explain the critical success factors that affects the effectiveness of NDRMC's responses.

4.2.1. Impact of NDRMC's Timely Delivery of Relief items on Beneficiaries' Satisfaction

Table 14: The food distributed by NDRMC to my household arrived at the time it was needed (timeliness)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.7	.7	.7
	Disagree	3	2.0	2.0	2.6
	Agree	68	44.7	44.7	47.4
	Strongly agree	80	52.6	52.6	100.0
	Total	152	100.0	100.0	

Source: (Survey, 2016)

Table 14 describes how timelines of NDRMC's response in the delivery of relief items affects beneficiaries' satisfaction. The respondent responded on timely delivery of food items. The majority of the respondents strongly agree 80 (52.6%) and 68(44.7%) agree on the timely delivery of food items were satisfied on the timely delivery of food items.

Table 15: Building materials NDRMC distributed to my household arrived at the exact time I/we needed it (timeliness).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	71	46.7	46.7	46.7
	Disagree	3	2.0	2.0	48.7
	Agree	37	24.3	24.3	73.0
	Didn't receive any	41	27.0	27.0	100.0
	Total	152	100.0	100.0	

Source: (Survey, 2016)

Table 15 describes how timelines of NDRMC's response in the delivery of building materials for disaster affected beneficiaries'. The majority of the respondents strongly disagree 71 (46.7%),

41(27%) didn't receive any and the rest 37(24.3%) agreed on building material support as emergency responses.

Table 16: The Clothing and bedding materials distributed by NDRMC to my household arrived at the exact (timelines)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	70	46.1	46.1	46.1
	Disagree	3	2.0	2.0	48.0
	Agree	38	25.0	25.0	73.0
	Didn't receive	41	27.0	27.0	100.0
	Total	152	100.0	100.0	

Source: (Survey, 2016)

Table 16 describes how timelines of NDRMC's response in the delivery of Clothing's and bedding materials. Beneficiaries responded timely delivery of Clothing's and bedding materials. The majority of the respondents were strongly disagree 70 (46.1%), 41(27%) didn't receive any support the rest 38(25%) agreed on the timely getting of building material support as emergency responses.

Table 17: The farm inputs NDRMC distributed to my household arrived at the exact time I/we needed it (timeliness)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.7	.7	.7
	Disagree	11	7.2	7.2	7.9
	Agree	102	67.1	67.1	75.0
	Strongly agree	38	25.0	25.0	100.0
	Total	152	100.0	100.0	

Source: (Survey, 2016)

Table 17 describes how timelines of NDRMC's response in the delivery of farm inputs. The respondent responded on timely delivery of farm inputs. The majority of the respondents strongly disagree 70 (46.1%), 41(27%) didn't receive any support and the rest 38(25%) agreed on the timely getting of building material support as emergency responses.

4.2.2. Impact of NDRMC delivery of Adequate Relief Items on Beneficiaries' Satisfaction

Table 18: FOOD distributed by NDRMC to my household was the right quantities needed (quantity)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.7	.7	.7
	Disagree	43	28.3	28.3	28.9
	Agree	104	68.4	68.4	97.4
	Strongly agree	4	2.6	2.6	100.0
	Total	152	100.0	100.0	

Source: (Survey, 2016)

As indicated in table 18 describes how adequacy of NDRMC's response in the delivery of food items. The majority of the respondents agree 104 (68.4%), and other 43(28.3%) disagree on the adequacy quantity getting of food items. This may be happened all family members was not addressed and during emergency response not considering of all house hold consumption goods.

Table 19: Clothing and bedding materials distributed by NDRMC to my household was the exact quantity I/We needed (quantity).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	70	46.1	46.1	46.1
	Disagree	3	2.0	2.0	48.0
	Agree	38	25.0	25.0	73.0
	Didn't receive	41	27.0	27.0	100.0
	Total	152	100.0	100.0	

Source: (Survey, 2016)

Table 19 describes NDRMC's response is the adequacy of clothing and bedding materials. The majority of the respondents are strongly disagree 70 (46.1%), 41(27%) didn't receive any and 38(25%) agree on the adequacy.

Table 20: Building materials distributed by NDRMC to my household was the exact quantity I/We needed (quantity).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	71	46.7	46.7	46.7
	Disagree	3	2.0	2.0	48.7
	Agree	37	24.3	24.3	73.0
	Didn't receive	41	27.0	27.0	100.0
	Total	152	100.0	100.0	

Source: (Survey, 2016)

Table 20 describes NDRMC's response is the adequacy of building materials. The majority of the respondents are strongly disagree 71 (46.7%), 41(27%) didn't receive any and 37(24.5%) agree on the adequacy.

Table 21: Farm inputs distributed by NDRMC to my household was the exact quantity I/we needed (quantity)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	.7	.7	.7
	Disagree	146	96.1	96.1	96.7
	Agree	5	3.3	3.3	100.0
	Total	152	100.0	100.0	

Source: (Survey, 2016)

Table 21 describes NDRMC's response is the adequacy of Farm inputs. The majority of the respondents are disagree 146 (46.7%), and only 5(3.3%) agree on the adequacy of farm inputs.

4.3.4. Age Distribution of beneficiaries' Satisfaction

Table 22: Age Distribution of Beneficiaries satisfaction in terms of timeliness, Relief items arrived at the right time.

Food, clothing, building materials and farm input cross tabulation Relief items arrived at the tight time (food, clothing, building materials and farm input

	Strongly agree	Agree	Disagree	Strongly disagree	Didn't receive any	Total
Age 18-30	10	19	7	1	2	39
31-45	10	22	15	2	10	59
46-60	5	21	10	4	14	54
Total	25	62	32	7	26	152

Source: (Survey 2016)

The above table describes how age of beneficiaries affected their satisfaction of NDRMC response in the delivery of relief items in terms of timeliness. 56% of respondents were satisfied at the timely delivery of relief items and 44% were unsatisfied with the arrival of the items. It can be observed that there is not much significant difference in the ages of respondents who agree to the fact that relief items arrived on time. Out of the 25 who responded to the 'strongly agree and agree' it is fairly distributed among the ages of 18 to 30, 31-45 and 46 to 60 years. What is worth noting is the significant differences in the ages of those who said they 'didn't receive any' this is skewed to those in the ages of 46 to 60 years. This could be explained by the fact that those in the ages of 18 to 30 years are more mobile and were the once sent mostly to go to NDRMC distribution point to collect these relief items.

4.2.3. Age Distribution of beneficiaries satisfaction in terms of adequacy

Table 23: Age distribution of Beneficiaries satisfaction in terms of adequacy

	Strongly agree	Agree	Disagree	Strongly disagree	Didn't receive any	Total

Age 18-30	0	10	16	4	9	39
31-45	4	15	14	1	24	58
46-60	1	20	10	2	21	54
Total	5	45	40	7	54	152

Source: (survey, 2016)

The table 23 shows the age distribution of beneficiaries' satisfaction on adequacy of relief items. About 50 of the respondent were satisfied with the adequacy of the relief items, 47 were not satisfied and 54 did not receive anything, thus were not satisfied. It is observed that those who were not satisfied fell within the ages of 31 to 60 years. This age group had families so were more concerned about adequacy of items as such given the same quantity of items they were more likely to be dissatisfied.

The table shows above the age distribution of beneficiaries' satisfaction on adequacy of relief items. About 50 of the respondent were satisfied with the suitability of the relief items, 47 were not satisfied and 54 did not receive anything, thus were not satisfied. It is observed that those who were not satisfied feel within the age of 31 to 60 years. This age group had families so were more concerned about adequacy of items as such given the same quantity of items they were more likely to be dissatisfied.

4.3. Challenges Facing Humanitarian Supply Chain Management

Table 24: Management Functions

Function	Frequency	Percent
Planning	2	7.41
Staffing	1	3.70
Organizing	9	33.33

Directing	1	3.70
Coordinating	3	11.11
Controlling	9	33.33

Source (Survey, 2016)

The Above table revealed that majority (33.3 percent) of the respondents viewed organizing as the major function of the humanitarian organization, (33.33% percent) of the respondents reported controlling function, (11.11 percent) cited coordinating, and 40 percent reported planning and 7.41 percent reported staffing and directing functions as shown in Table 24 above.

Table 25: Challenges Facing Supply Chain Management

S.No	Challenges Facing Supply Chain Management	Mean	Standard Deviation
1	The role of the supply chain management in humanitarian operations is not recognized	4.52	0.012
2	Supply chain management is not given emphasis or integrated into the organization systems support	4.01	1.40
3	Lack of proper planning in supply chain management	3.43	2.040
4	It is hard to coordinate and manage multiple players along with	4.00	0.054
5	It is hard to keep complete track, control and accountability of the humanitarian programs and their outcomes	3.90	0.100
6	It is difficult to establish goals and performance metrics of humanitarian supply chains	2.54	0.053
7	Inability to anticipate disasters	4.87	0.085
8	Lack of transparency of information and knowledge across the supply chain	3.10	0.150
9	Lack of training programs on relief supply chain operations	3.84	1.02
10	Ambiguity of supply chain activities result in resource limitation and high uncertainty thereby making it difficult to assess the uncoordinated commitments of stakeholders	3.51	0.54
11	Lack of coordination among players inhibit efficiency in disaster supply chain management	3.48	0.11

The above table shows majority of the respondents agreed that the major challenges faced by

humanitarian organization is their inability to anticipate disasters (4.87 mean score) that the role of the SCM in humanitarian operations was not recognized (4.52 mean score), Supply chain management was not given emphasis or integrated into the organization systems support (4.01 mean score). They agreed that it is hard to coordinate and manage multiple players along with all the items that need to be delivered (4.00 mean score) as well as keeping complete track, control and accountability of the humanitarian programs and their outcomes. However, the respondents were not sure whether lack of proper planning affects SCM (3.43 mean score). They also disagreed with the statement that it is difficult to establish goals and performance metrics of humanitarian supply chains (2.54 mean score).

Table 26: Financial Related Challenges

S.No	Challenges	Mean	Standard Deviation
1	There is lack of capital investment in supply chain activities	4.62	1.00
2	High cost of supplies during disaster period inhibit ability to access affected areas	4.33	1.55
3	There is very high level of uncertainty in demand	3.91	0.56
4	Relief demand is affected by dynamic and hard to measure factors such as local economy, disaster condition, social and political conditions and security conditions	3.82	0.55
5	Stringent donor rules and guidelines inhibit efficient and effective supply chain management	4.05	0.80

As Table 26 indicates, majority of the respondents agreed that there is lack of capital investment in supply chain activities (4.62 mean score) and that stringent donor rules and guidelines on financial policies inhibit efficient and effective supply chain management (4.05 mean score). High cost of supplies during disaster period inhibit ability to access affected areas (4.33 mean score) and relief demand is affected by dynamic and hard to measure factors such as local economy, disaster condition, social and political conditions and security conditions (3.82 mean score).

Table 27: Operating Environment Challenges

S. No	Challenges	Mean	Standard Deviation
1	Poor infrastructure in the areas of operation	4.40	0.015
2	External complications due to foreign relations limit performance	3.71	1.31
3	Geographic characteristics of the affected region present challenges in assessing affected population	4.23	0.94
4	Inadequate transportation modes present challenges in accessing affected areas	4.11	1.54
5	Domestic barriers such as country specific policies cause delays in responding to emergency	3.78	2.00

Source: (Survey, 2016)

The above table 27 shows majority of the respondent agreed that poor infrastructure is one of the operating environments that affect humanitarian supply chain management operations (4.4 mean score) while geographic characteristics of the affected region present challenges in assessing affected population (4.23 mean score). Inadequate transportation modes also present challenges in accessing affected areas (4.11 mean score) and that domestic barriers such as country specific policies cause delays in responding to emergency (3.78 mean score).

4.4. Opportunities of humanitarian actors on the priority sectors

While some aspects of commercial logistics and supply chain management (during normal time) are similar to disaster response supply chain, many components are not directly transferrable. However managers of both operations could learn from each other and supplement for best practices.

One obvious reason for opportunities of studying disaster response supply chain is to provide during relief increased number and intensity of disasters and save millions of valuable lives. The second area of opportunity of study is to develop strategy for improving the performance of disaster response supply chain. One way is to integrate across various functional areas within the relief organization and networking with different stakeholders. Finally, in case of a disruption in the disaster supply chain, the discussions are on specific stages like pre-disaster response or post disaster phases. But since three phases are interrelated (each one has effect on other) and so a

comprehensive model integrating multiple disaster stages is needed. Strategic planning by actors leading to a common Humanitarian Action Plan (Stoddard, Abby, 2003). The drought appeal was launched to raise funds to improve and sustain humanitarian ongoing efforts to address the emergency needs most affected people in the 9 main areas sectors listed below.

Table 28: Humanitarian actors Opportunities in priority sectors

Sector	Sector lead and actors
Education	UNICEF, World Vision, Plan Ethiopia, Save the children
Food Security	WFP, FAO, Concern World Wide, CARE, Oxfam, CRS, Plan International
WASH	UNICEF, Concern worldwide , World Vision, Plan International
Logistics	UNDP
Nutrition	UNICEF, WFP, Goal Ethiopia, Concern Worldwide
Health	WHO, FAO, Concern Worldwide , Oxfam, Plan International
Shelter/ Non-food items	Ethiopia Red cross Association, UNHCR, IOM, World Vision, CRS,
Coordination	UNOCHA
Sustainable livelihood	UNDP, FAO, Concern World Wide, Care International, World Vision, Oxfam, Plan International
Other bilateral	USAID, World BANK,

Source: (HRD, 2016)

4.5. Strategies Adopted by Humanitarian Organizations in Overcoming Supply Chain Challenges

In this section, the study sought to find out from the respondents possible solutions to the challenges made. The study findings indicated that majority (70.37 percent) of the respondents reported proper tendering process as the major solution to supply chain challenges, 11.1 percent reported the adoption of technology in procurement process as the solution, 11.1 percent reported proper demand analysis mechanism as a possible solution to the challenges while 7.4 percent reported use of qualified personnel as the major solution to the challenges faced. These findings are shown in Table 29 below.

Table 29: Strategies Adopted to Overcome Supply Chain Challenges

Strategies	Frequency	Percent
Proper tendering process	19	70.37
Technology adoption	3	11.11
Demand analysis	3	11.11
Use of qualified personnel	2	7.41
Total	27	100

Source: (Survey, 2016)

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1. Summary

The study revealed that are the major function of supply chain function of humanitarian Organizations were procurement services, contract awarding, inventory maintenance and logistics support. The information gathered from logistic and supply chain department responsible for the procurement and distribution of goods and services.

Relief supply Chain Processes: With the deployment of its supply chain management facilities and resources NDRMC was poised to deliver relief aid to its victims of the disaster, the various supply chain processes thus deployed are summarized as follows:

Disaster preparedness process: The data collected from the field shows that there is plan of action for preparedness before any disaster occurrence 26 (96.3 %) of the respondents that there is a plan of action before any disaster happening the organization conducts initial and comprehensive assessment for logistic information needed for emergency response operations 21(77.8%) conducted joint assessment the rest 6(22.8%) responds there is independent assessment. The organization conducted assessment with joint line minister and sector offices, UN/affiliated organization (WFP, UNICEF, UNOCHA, WHO), other International organization. NDRMC had a process to create a plan for the relief effort but was unable to tell at this stage whether their plan met operational needs. Neither could relief staff confirm that relief plan action was distributed according to established guidelines, a situation that aggravated the no-prepositioning situation and the effectiveness of resource mobilization.

Needs Assessment: Demand Management based on the findings of the joint UN/NGO/Government Assessment and strategic planning by actors leading to a common Humanitarian Action Plan, the drought appeal was launched to raise funds to improve and sustain humanitarian ongoing efforts to address the emergency needs of 10.2 million most affected people in the 9 main areas for a period of 6 months, Currently the drought appeal is about 93% funded.

Perception of Beneficiary Satisfaction: Analyses on responses gathered from questionnaires administered to beneficiaries to measure. Their satisfaction with NDRMC's Intervention –in terms of timeliness, quantity and suitability was used to gauge the level of effectiveness and success of the NDRMC's relief supply chain management. Generally, beneficiaries were far more satisfied with the timeliness (28%) of relief supplies distributed than with adequacy (15.3%) which was in turn better appreciated than suitability (6.2%). In most cases, demographic features like age, occupation and educational background of respondent

significantly affected the degree of satisfaction of beneficiaries with timeliness, quantity and suitability of relief, satisfaction ratings were by the highest for timeliness (28%) followed by adequacy (15.3%) and suitability (6.2%) for of relief items; but adequacy was rated higher (15.3%) than adequacy/quantity (6.2%) while timeliness remained highest (28%) in the reconstruction phase. In most cases, demographic features like age occupation and educational background of respondent significantly affected the degree of satisfaction of beneficiaries with timeliness, quantity and suitability of relief items.

Supply chain management challenges can be classified in terms of management related challenges, financial related challenges and operating environment challenges. The major management related challenges were inability to anticipate disaster, the fact that the role of SCM in humanitarian operation is not recognized, and SCM is not given emphasis or integrated into the organization system support. The respondents also agreed that it was hard to coordinate and manage multiple players along with all the items that need to be delivered as well as keeping complete track, control and accountability of humanitarian programs and outcomes.

Financial challenges were identified as lack of capital investment in supply chain activities, stringent donor rules and guidelines on financial policies, high cost of supplies during disaster periods and high level of uncertainty in demand, whereas the operating environment challenges included poor infrastructure in areas of operation, geographic characteristics of the affected region, inadequate transportation modes and domestic barriers such as country specific policies. In addition, the study identified effects of the challenges faced as delayed delivery of goods and services at the required time and place, poor quality of supplies, supplies not in the required quantity, poor storage facilities affect the condition of the products and poor operational management may derail delivery of products at the right time. The study also revealed that the organization employed various methods to improve efficiency in their supply chain process. These included demand analysis for relief supply, adoption of technology in the supply chain, improving tendering process by prequalifying the suppliers as well as training the purchase and supply employees.

A long-term, strategic coordination and management of disaster response supply chain has challenging problems. The supply network is remote and complicated with numerous players (donors, NGOs, government, military, and suppliers), and it is difficult to coordinate all of them along with all the items that need to be delivered. However collaboration, coordination, professionalism and accountability are important factors on which the performance of the supply chain relies on.

5.2. Conclusion

The study concludes that SCM in humanitarian organization is faced by numerous challenges such as uncertainty in demand during emergencies, high cost of supplies during emergency and diminishing donor funding opportunities. The challenges are threatening the future of humanitarian supply chain process during emergencies. The organization is therefore opting to engage in development humanitarian operations as opposed to emergency operations. Long term development projects are more structured and predictable hence reducing some of the supply chain challenges faced during disasters or emergencies.

It is hardly observed that the humanitarian agencies rely on improved technology in managing the supply chain operation. Very limited numbers of software were also in place to use during the disaster response initiatives. It is very important to develop a standardize methodology and maintain coordination to manage relief supplies and equipment efficiency. This can trigger urgent needs, prevent unsolicited interferences, strengthen centralized data base, and help in visibility and transparency. Owing to the complexity of the sourcing processes and uncertainty of demand, technological improvement helps to smoother movement of supply chain to a great extent.

Successful implementation of disaster response supply chain is dependent on the satisfaction of the affected community. It is needless to mention that the people facing the crisis are the end users/ customers at the extreme point of the supply chain. The responsibility of the supply chain in this case is to prepare, support and rebuild the society in the face of natural or man-made disasters. In case of unprecedented natural disasters like drought and/or flood the time span of

interaction between the aid agencies and the affected communities is very negligible. The supply chain set up and materials supplied have hardly met the critical needs of the end users. A case in point is about the supplies sent for the drought affected communities of Adama Zura. Aid agencies started supplying food and clothes. This explains the necessity of involvement of local communities in the supply chain to take decision about the procurement. Sometimes aid agencies also take decisions of supplies based on the donor priorities and area of their interest. They restrict where and how their resources can be used. There are also instances where the donors have sent a truck load of materials simply because it is in their store, which never satisfies the need of the recipient.

Emergency relief operation is dynamic and time sensitive every hour of delay in supply of materials is a question between life and death of the affected population. The speed and efficacy of disaster response depends on severity of the event, location, nature of disaster and availability of alternative channels. In an emergency situation, the existing logistic network is disrupted to a great extent and there is a need to establish an alternative mechanism to deliver the supplies

5.3. Recommendations

Based on the findings discussed, there is need for uniformity in supply systems and procedures. This study therefore recommend for management to ensure consistencies in supply chain procedures. In addition, management should use effective communication in making employees understand the need for SCM.

Humanitarian organizations should adopt pre-positioning of relief items stocks in strategic location, especially near disaster-prone areas to enhance supply chain agility and efficiency. In

the meantime, the government can make greater investments in information technology to enhance tracking and tracing of relief items as they enter and move through the supply chain.

They should also give more visibility to logistics and supply chain professionals in their humanitarian efforts as at every stage of the process, since logistics typically takes up over 80% of the expenditure on relief operations, this could be done through recruitment of logistics and supply chain professional, as well as training to enhance relief work.

On the basis of the concept of differential vulnerability to disasters, it is strongly recommended that a strategy of ‘mass customization’ be adopted in determining quantities of relief items distributed to each household. This is expected to avoid the ‘all-sizes-fit-all’ situations as experienced in the operation under review. This way, beneficiary utility and satisfaction maximized in future operations.

Considering that a key characteristic desirable of SCM is the integration of processes and structural components in to a seamless machinery of delivering to beneficiaries’ satisfaction, NDRMC would need to consider enhancing collaboration between, not only supply chain function and also the rest of the functions.

Therefore, some recommendations will be offered for continued improvement as below:

- 1) ***Cooperation with Local Governments:*** Local governments played a key role in decision making and implementation of the humanitarian aids logistics and relief supply chain operations and closer cooperation with the local governments are set against the backdrop of the humanitarian aids processes and relief supply chain suffering. The information sharing of the disaster affected population and type of intervention started at grass root level (at KA and district level). So reliable information being shared through strengthening of EW system.
- 2) ***Cooperation within Relief Organizations:*** Better linkages and cooperation within the

relief supply chain organizations have been crucial issues for well maintaining and close cooperation between the new, large, short-term and the long-term relief processes to speed up the efficient and effective management of the survive operations.

- 3) ***Decentralization of Decision-making:*** In case on national disasters, balance between speed and quality of the relief operations is vital. Which is hard to balance against the backdrop of emergency relief needs is the radical shift in priorities of the people involved the relief supply chain operation in the aftermath of a disaster. One strategy in which relief operation teams may have been able to move more swiftly, but without compromising the speed and quality achieved through the survival processes, would have been through the decentralization of some decision-making and bringing them to the field offices.
- 4) ***Coordinate with Other Actors:*** During the relief supply chain processes and victims survival operations, establishing a coordination system with other players of the scene and enabling the system for sharing of imposed issues and problems, and coping strategies in the context of humanitarian aids logistics is considered.

Moreover, based on the investigation among the logisticians national and regional relief supply chain organizations about their resiliency management aspirations, the most significant priorities were; well defined management structure, knowledge-based field with a clear career track, collaboration with peers across organizations and the ability to demonstrate the value of humanitarian logistics with unambiguous measures and metrics that tie with inter organizational strategies.

The detailed recommended strategies for humanitarian supply chain management improvement are as follows:

- 1) ***Creating a professional resilient logistics community;*** to enable humanitarian aid logisticians to share their knowledge, capabilities and experience on common issues, and to create a consistent powerful voice with all the stakeholders in the scene.
- 2) ***Investing in standardized training and professional certification;*** to build a pool of humanitarian logistics and relief supply chain professionals that share common

processes and vocabulary, promoting professionalism, and collaboration to above disaster.

- 3) ***Focusing on metrics operation and performance measurement***; to empower the logisticians to demonstrate and improve the efficiency and effectiveness of the humanitarian aids and relief supply chains.
- 4) ***Communicating the strategic importance of humanitarian logistics management***; to enable logisticians to create awareness of the contribution that humanitarian logistics makes, and to obtain needed funding and resources.
- 5) ***Developing flexible resiliency strategies in conduct with technological solutions***; to improve responsiveness by creating visibility of the information and materials pipeline and increasing the effectiveness of people and processes through better management of the scene.

Finally, the study above emphasize that humanitarian logistics and relief supply chain has the opportunity to increase the contribution during disaster relief supply chain operation, and improve this contribution by implementing initiatives in the areas of knowledge management, technology, measurement, community, and positioning.

Only a supply chain resilient management strategy will be able to improve the performance and effectiveness of humanitarian logistics and relief supply chains operation, while a lack of it imposed huge dramatic consequences for stricken populations.

And, a resilient humanitarian logistics and relief supply chain management will be achieved through an empirical mechanism with providing time banded and analyzed information and establishing of shared and invested communities of expert humanitarian aids logisticians.

5.4. Further Research Direction

Since the study adopted a case study design, it might be possible that the findings may not reflect the challenges of supply chain of other similar Humanitarian organizations on their service delivery to their clients. It is, therefore important that further study be carried out on other organizations in the

humanitarian industry to establish whether similar scenarios exist. A study should also be carried out to establish whether poor performance of NGOs in relation to financial allocation causes the declining donor fund in the developing countries despite arising needy.

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