Chapter 63
Relief Supply Chain Planning: Insights from Thailand

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ABSTRACT

The purpose of this chapter is to provide a framework for the development of relief supply chain systems. An illustrative case study is presented in order to help relief supply chain decision makers in their relief supply chain planning process. Developing simulation models to test proposed relief supply chain response plans is much less risky than actually waiting for another disaster to happen and test the proposed relief supply chain model in a real life situation. The simulated outcome can then be used to refine the developed relief supply chain response model.

INTRODUCTION

The purpose of this chapter is to provide a framework for the development of relief supply chain response model. The proposition of a framework is in itself not sufficient and an illustrative case study is presented in order to help relief supply chain decision makers in their relief supply chain planning process. Emergency or relief supply chain plans and response frameworks have been developed by numerous agencies and governments around the world. However, many of these seem to be purely theoretical and relatively ineffective in their initial response or subject to unforeseen constraints. It is therefore important to develop and provide a relief supply chain planning framework that key related stakeholders can adhere to.

The proposed planning framework provides a supply chain perspective on relief operations with a focus on responsiveness. Responsiveness is a key issue for relief supply chain as aid has to arrive as quickly as possible, in the right place, in the right condition to help disaster victims. In order to illustrate the propose relief supply chain planning framework and its application, insights from Thailand was chosen to illustrate the potential outcome of following such a planning process.

DOI: 10.4018/978-1-4666-2625-6.ch063

This chapter is separated into four sections. The first section introduces the manuscript, its objectives and its contextual background. The second section discusses key concepts related to the development of a relief supply chain response model and the role of simulation models. The third section describes a proposed Thai relief supply chain response model and its simulated outcome. The summary further discusses lessons learned from the simulation outcome of the proposed Thai supply chain response model and its impact on relief supply chain planning.

BACKGROUND

According to Beresford and Pettit (2009), the aim of relief supply chain is to establish a tailored supply pipeline that fits a particular crisis or natural disaster. The principal leg of the pipeline is usually transport and freight transport is generally a key 'driver' of the relief supply chain in most cases. A variety of transport modes are likely to be used in order for aid to reach a crisis area rapidly.

Over the past few years, the literature related to relief supply chain has greatly expanded. A number of models have been identified which incorporated many of the key stages of the emergency relief cycle and are discussed in detail by Pettit and Beresford (2005). Relevant models include the Disaster Management Cycle (Carter, 1999) and the Recovery Model of Haas *et al.* (1977). The latter identifies overlaps occurring between each of phases of the full emergency relief cycle. Military involvement in the early stages of an emergency is usually greater due to the capability of military organizations to respond rapidly to severe needs.

A GENERIC RELIEF SUPPLY CHAIN RESPONSE MODEL

The work of Jennings *et al.* (2000) detailed some of the basic principles surrounding the movement of food and commodities into areas where assistance is required. The authors developed a response model expressed in terms of the selection of transport modes and networks required for effective delivery of assistance to refugees. Pettit and Beresford (2005) expanded the earlier Jennings model with the purpose of developing a better understanding of relief supply chain needs by splitting a specific emergency into different stages or phases. In their model, the focus was on the participation of military and non-governmental organisations (NGOs) in emergency situations. During the initial stages following any disaster, the body playing a pivotal role is the relevant government, often initially activating military resources but as the situation stabilises so the importance of military assistance declines; NGOs then take over, commonly leading specific aspects of the relief operations. Other situational factors that could either facilitate or hinder relief operations were also accounted for in the model such as, for example, the underlying political situation or physical geography/accessibility.

Although each crisis is unique in its characteristics, most crises exhibit similar logistical elements. These elements allow the relief logistician to follow a structured response pattern when dealing with the majority of crisis. This response pattern is illustrated in a generic disaster response model.

Crisis situations share similar logistical elements. Wherever the crisis occurs, the need for first aid and food is immediate and ongoing. According to the World Food Programme it can take on average it approximately 4 months for food aid to reach recipients in crisis area through a fully charged transport pipeline. Therefore the relief agency either has to divert cargo that is already afloat, borrow or buy food from a neighbouring country or geographical area, or even transport first aid and food by air. This method of supplying the first aid and food can continue until aid from various donors arrives.

In order to establish the relief pipeline, the relief supply chain planner must first assess vari-