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Effective Supply Chain Strategies for Integrated Disaster Management

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Abstract

During the disaster, many organizations often face too many important problems in Supply Chain such as transporting large amounts of many different items as like food, clothing, medicine, medical emergency, machinery, and people from one place to several destinations from the disaster area. The transportation of supplies and relief persons should be planned and made quickly and efficiently to retain the survival rate of the affected population and minimize the cost of such operations. When it comes to efficiency of supply deliveries, the modeling and optimization techniques established in commercial supply chain management seem to be the most relevant approach to strategize Integrated Disaster Management.

Key Words: Disasters, Supply Chain, Emergency Management, Recovery, Planning

Introduction

In today's society that disasters seem to be striking all corners of the States and the world. There is a need to concentrate on the importance of emergency management. More number of human losses and irresistible destruction of infrastructure can be avoided with more foresight and specific planning as well as a precise execution. The Classification of Natural Disasters is detailed below

- Meteorological Disasters

  Floods, Tsunami, Cyclone, etc.
- Topographical Disasters

Earthquake, Volcanic Eruptions, Landslides, etc.

- Environmental Disasters

  Global warming, Ozone depletion, Solar flare, etc.

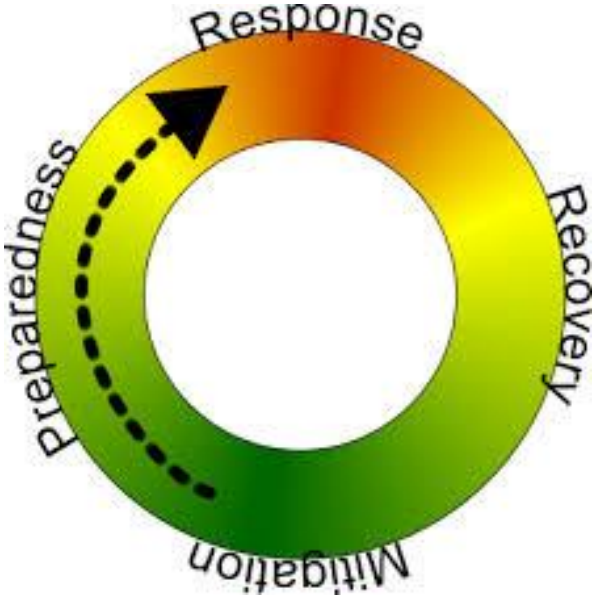
Some of the Disasters in India

Chennai Floods	October 2015	Chennai	500 Death toll
Jammu and Kashmir Floods	October 2014	Jammu & Kashmir	400 Death toll
Cyclone Hud Hud	September 2014	Andhra Pradesh & Odisha	400 plus
Odisha Floods	October 2013	Odisha	21
Andhra Floods	October 2013	Andhra Pradesh	53
Cyclone Phailin	October 2013	Odisha and Andhra Pradesh	23
Floods/Landslides	June 2013	Uttarakhand and Himachal Pradesh	4,094
Cyclone Mahasen	May 2013	Tamil Nadu	08
Cyclone Nilam	October 2012	Tamil Nadu	65
Uttarakhand Floods	Aug – Sep 2012	Uttarkashi, Rudraprayag and Bageshwar	52
Assam Floods	July – Aug 2012	Assam	---
Cyclone Thane	December 2011	Tamil Nadu, Puducherry	47

Sikkim Earthquake	September 2011	Sikkim, West Bengal, Bihar	60
Odisha Floods	September 2011	19 Districts of Odisha	45
Sikkim Earthquake	2011	North Eastern India with epicenter near Nepal Border and Sikkim	97 people died (75 in Sikkim)
Cloudburst	2010	Leh, Ladakh in J&K	257 people died
Drought	2009	252 Districts in 10 States	-----
Krishna Floods	2009	Andhra Pradesh, Karnataka	300 people died
Kosi Floods	2008	North Bihar	527 deaths, 19,323 livestock perished, 2,23,000 houses damaged, 3.3 million persons affected
Cyclone Nisha	2008	Tamil Nadu	204 deaths
Maharashtra Floods	July 2005	Maharashtra State	1094 deaths , 167 injured 54 missing
Kashmir	2005	Mostly Pakistan, Partially Kashmir	1400 deaths in Kashmir (86,000 deaths in total)
Tsunami	2004	Coastline of Tamil Nadu, Kerala, Andhra Pradesh, Pondicherry and Andaman and Nicobar Islands of India	10,749 deaths 5,640 persons missing 2.79 million people affected 11,827 hectares of crops damaged 300,000 fisher folk lost

			their livelihood
Gujarat Earthquake	2001	Rapar, Bhuj, Bhachau, Anjar, Ahmedabad and Surat in Gujarat State	13,805 deaths 6.3 million people affected
Orissa Super Cyclone	1999	Orissa	Over 10,000 deaths
Cyclone	1996	Andhra Pradesh	1,000 people died, 5,80,000 housed destroyed, Rs. 20.26 billion estimated damage
Latur Earthquake	1993	Latur, Marathwada region of Maharashtra	7,928 people died 30,000 injured
Cyclone	1990	Andhra Pradesh	967 people died, 435,000 acres of land affected
Drought	1987	15 States	300 million people affected
Cyclone	1977	Andhra Pradesh	10,000 deaths hundreds of thousands homeless 40,000 cattle deaths
Drought	1972	Large part of the country	200 million people affected

According to Alexander (1999), natural disaster is some rapid, instantaneous impact of the natural environment of the socio economic system. Turner's (1976) defines Natural disaster as an event which threatens a society with major unwanted calamities as a result of the collapse of precautious measures. American Red Cross defines Disaster in an occurrence or situation that causes human suffering or creates human needs that the victims cannot alleviate without assistance. Some of the major activities during four phases of emergency management cycle are



Preparedness

Plans or Activities to improve the ability to respond quickly in the immediately after the incident for example preparedness plans, emergency exercises and training, warning systems It also includes development of response procedures, design and installation of warning systems, evacuation planning, exercises to test emergency operations, and training of emergency personnel.

Response

Response is responding to the affected situation during emergency period such as search and rescue, emergency operations etc. the activities during or immediately following a disaster to meet the urgent needs of disaster victims which involves mobilizing and positioning emergency supplies, equipment and personnel; includes time-sensitive operations such as search and rescue, evacuation, emergency medical care, food and shelter programs, and bringing damaged services and systems back online

Recovery

Recovery is the process or activities following the disaster that is when there is urgent need to help and restore normal operations recovery actions are designed to serve the affected community which includes repairs to roads, bridges, and other public facilities, restoration of power, water and other municipal services, and other activities

Mitigation

Mitigation is the process which is made to reduce the effects of disaster or to prevent a disaster, reduce the chance of a disaster happening, or lessen the damaging effects of unavoidable disasters and emergencies. It includes engineering solutions such as dams and levees; land-use planning to prevent development in hazardous areas; protecting structures through sound building practices and retrofitting; acquiring and relocating damaged structures; preserving the natural environment to serve as a buffer against hazard impacts; and educating the public about hazards and ways to reduce risk.

Supply Chain Management during Disaster

Disaster is any occurrence that causes damage, destruction, ecological disruption, loss of human life, suffering, health deterioration. During this occurrence there is need for sufficient service from outside the affected area. Supply Chain Management involves the Distribution and Logistics Process determines how products are retrieved and transported from the storage warehouse to retailers. These products may be transported to retailers directly, or may be shipped to distribution facilities first and then being delivered to the retailers. This process includes the management of inventory retrieval, transportation, and final product delivery.

One of the areas of emergency response to be considered is the problems with that of logistics. Most of the jurisdictions really don't deal in logistics and they deal in purchasing. Where we locate vendors and the responsibility for transporting, warehousing and in some cases, distributing the resulting resources lies with them. . If we scale both the magnitude of the disaster and the level of response, There is a need for true High logistics management. Logistics

management plans, implements and controls the flow and storage of goods and services between the point of origin and the point of consumption by which the process concentrates on

SCM	Process
Demands	types, locations, amounts
Supply	types, locations, amounts
Permanent Facilities	types, locations, capacities
Temporary Facilities	set of potential sites for each type, capacities of each type
Network	link-node incidence matrix for each transportation mode
Vehicles	number available for each mode and their initial location, capacity of each vehicle
Travel Times	travel time on each link for each transportation mode.

According to Young and Peterson, there are five crucial differences commercially that distinguish emergency supply change management

1. The unpredictability of demand
2. Short lead times due to suddenness of occurrence
3. The need for timely delivery to mitigate human suffering
4. Damage to the logistics infrastructure caused by the disaster and
5. A lack of resources to implement such a system (trained personnel, technology, transportation capacity, etc.).

It is necessary to develop an emergency supply chain system during this suffering, Young and Peterson applied the Supply Chain Council's Supply Chain Operations Reference model to various disasters and identified a series of best practices that could be applied by emergency managers.

1. Plan/enable – develop overall plans to operate an emergency management supply chain.
2. Source – plan and execute the procurement and receipt of emergency materials and services.
3. Make – plan and execute the conversion of material into emergency responder and survivor support kits.
4. Deliver – plan and execute the receiving, scheduling, picking, packing and shipping of orders for life-saving and life-sustaining material and equipment.
5. Return – plan and execute demobilization.

During Disaster many agencies are activated for continuous recovery and FEMA Federal Emergency Management Agency is the primary agency for Logistics Management and is responsible for Material management that includes determining requirements, sourcing, ordering and replenishment, storage, and issuing of supplies and equipment, transportation management that includes equipment and procedures for moving material from storage facilities and vendors to incident victims, particularly with emphasis on the surge and sustainment portions of response. Transportation management also includes providing services to requests from other Federal organizations. Facilities management includes the location, selection, and acquisition of storage and distribution facilities. These facilities include Logistics Centers, Mobilization Centers, and Federal Operations Staging Areas. Personal property management and policy and procedures guidance for maintaining accountability of material and identification and reutilization of property acquired to support a Federal response operation. Management of Electronic Data Interchange provides end-to-end visibility of response resources. Planning and coordination with internal and external customers and other supply chain partners in the Federal and private

Conclusion

Creating an emergency supply chain system clearly is something that will need to be accomplished at the national level. However, the concept provides food for thought and the best

practices defined by Young and Peterson could be applied at any level. Thinking in terms of supply chains forces us to consider the larger issues involved in providing goods and services following a disaster and moves us beyond simple purchasing.

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