Disaster Management Cycle

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Commentary

ABSTRACT

Last decade has been a decade (2000-2019) of some of the major disaster occurrences. Majority of these disasters were climate based. Between 2000-2019 there were 7348 major recorded disaster events worldwide as compared to 4212 between 1980-1999 These disasters claimed 12mn lives and affected more than 4.03 billion people (2000 – 2019). Asia suffered the highest number of disaster events due to size of the continents, its physiography and high density of population. In terms of affected countries globally, India with 321 events was third highest in terms of economic losses and loss of lives [1]. Widespread occurrences of disasters and heavy destruction in terms of loss of life and property and damage to ecosystems has highlighted the issue of understanding and managing the disasters effectively whether they are natural or caused by human neglect and interventions. Disaster management and overall development of a region should go simultaneously, in fact, development should include disaster management processes. Occurrence of disasters disrupt the process of development by causing damage to the developmental efforts which have taken long time to achieve. It often pushes the countries back by several decades. Thus, efficient management of disasters before their occurrence, rather than responding to them after the occurrence has, in recent times, received increased attention both within India and abroad.

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1. INTRODUCTION

Occurrence of disasters disrupt the process of development by causing damage to the developmental efforts which have taken long time to achieve. It often pushes the countries back by several decades. Thus, efficient management of disasters before their occurrence, rather than responding to them after the occurrence has, in recent times, received increased attention both within India and abroad. It has now been realized that disaster management should be the part of development process of any area [2] [3]. It will not only help in reducing the risk to disaster but also prepare the communities to respond to disaster effectively thus reducing the damage and destruction after the disaster. Levels of development and disaster risks of a country are closely linked. Appropriate development policies, by incorporating disaster risk concerns, can help reduce disaster losses, protect existing development gains and avoid new risks.

Disaster Management Act 1985, India define Disaster as,

"A disaster refers to a catastrophe, mishap, calamity or grave occurrence from natural or man-made causes, which is beyond the coping capacity of the affected community".

According to the Act, Disaster Management includes

"Disaster Management involves a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for:

- *Prevention of danger or threat of any disaster.*
- *Mitigation or reduction of risk of any disaster or its severity or consequences.*
- *Capacity building including research and knowledge management.*
- *Preparedness to deal with any disaster.*
- *Prompt response to any threatening disaster situation or disaster.*
- *Assessing the severity or magnitude of effects of any disaster.*
- *Evacuation, rescue and relief.*
- *Rehabilitation and reconstruction".*

Source: https://ndma.gov.in/sites/default/files/PDF/national-dm-policy2009.pdf

Disaster Management as a general term covers the range of activities designed to maintain control over disaster/emergency situations and to provide a framework for helping people to avoid, reduce the effect of, or recover from impact of a disaster. These activities may be related to preparedness, mitigation, emergency response, relief and recovery (reconstruction and rehabilitation) and may be conducted before, during or after a disaster.

It has been identified that a typical Disaster Management process comprises following stages;

- the pre-disaster phase which includes prevention, mitigation and preparedness,
- during the disaster or emergency phase, it includes evacuation, search, relief, and
- rehabilitation and post-disaster phase includes reconstruction and recovery.

In India since the Act was implemented we have moved from traditional approach of managing disasters with activities mainly focused on disaster relief to now building the resilience of people and structure, to be more prepared to handle the disaster so that loss of life and damages can be minimized. In recent decades there is a perceptible shift in focus from disaster relief to disaster preparedness and prevention [4]. The shift in approach has brought a significant positive change. It has helped in saving lives of people. Even though the multitude and frequency of disasters in the country has increase [5] [6].

2. DISASTER MANAGEMENT CYCLE – THREE STAGES

Disaster management can be defined as the body of policy and administrative decisions and operational activities which pertain to the various stages of a disaster at all levels. Broadly disaster management can be divided into pre-disaster, during the disaster and post-disaster contexts. These are three key stages of activities that are taken up within disaster management [7].

2.1 Pre-Disaster Stage (Before the disaster)

Activities taken to reduce human and property losses caused by the hazard and ensure that these losses are also minimized when the disaster strikes. Risk reduction activities are

taken under this stage and they are termed as preparedness and mitigation activities.

Some of the highlights of pre-disaster phase are

2.1.1 Preparedness

Disaster preparedness involves forecasting, issuing warning and taking precautionary measures prior to an imminent threat when advance warnings are possible. Preparedness planning improves the response to the effects of a disaster by organizing the delivery of timely and effective rescue, relief and assistance. Preparedness involves the development and regular testing of warning systems (linked to forecasting systems) and plans for evacuation or other measures to be taken during a disaster alert period to minimize potential loss of life and physical damage. Identifying and mapping the areas prone to disaster, land use planning, preparing disaster preparedness plans and creating awareness among community through IEC are part of preparedness
According to UNDP definition

> *Disaster preparedness minimizes the adverse effects of a hazard through effective precautionary actions, rehabilitation and recovery to ensure the timely, appropriate and effective organization and delivery of relief and assistance following a disaster.*

Disaster preparedness is as an active, on-going and continuous process. Preparedness plans are dynamic that change with situation and are flexible to be redesigned according to the requirements, they need to be reviewed, modified, updated and tested on regular basis.

Planning for disaster preparedness involves nine categories of planning activities as shown in the figure1[8]

1. Vulnerability assessment: Vulnerability of communities to disaster and vulnerability of regions and physical structures to disasters both are analyzed. Vulnerabilities of communities can be physical, economic or social and cultural whereas vulnerability of physical structures could be their location, building norms followed and material used and age of structures.

2. Planning: Long term and short term disaster management plans of regions area drawn which include land use zonation planning. These plans clearly demarcate goals and objectives which specify specific tasks and responsibilities for the communities as well as agencies in disaster emergencies and includes grassroots organizations, NGOs, local and national governments, donors and UN agencies which are engaged in DM activities[9] [10].

3. Institutional framework: It is important to have coordination among all institutions working for disaster preparedness of the region. There should be no repetition and no area should be left.

4. Information systems: Information is a two-way flow. The communities provide information regarding their needs and agencies looking into the DM planning make plans according to the feedback received from the local residents.

Fig. 1. Disaster preparedness framework
Source: UNDP: DHA: Disaster Preparedness, 2nd Edition Module: prepared by: Randolph Kent: Disaster Management Training Program 1994

5. Resource base: Inventory of resources needed and agencies which will provide the resources are specified in the plan so that in emergency from where to get help is known to the public and local government

6. Warning systems: Timely prediction, forecast and warning can tremendously reduce the loss of life and injuries to the public. The can be safely evacuated on time. Relief shelters can be arranged on time with all the basic facilities.

7. Response mechanisms: Response of public, the affected communities, their previous experiences can help in preparing plans which are better implemented. Their experiences and responses should be incorporated into the disaster preparedness.

8. Public education and training: Creating awareness among communities through variety of public education programs should be initiated from time to time. Various sections of communities like children, women and persons with special needs and elderly people should be made aware about safe evacuation during the occurrence of disaster. Communities should be actively involved [11] Community based disaster management practices have shown positive results during disaster in many countries [12].

9. Rehearsals: Mock drills help in identify gaps that may exist in the disaster response plan and help in updating the plan. It also helps in educating the public regarding how to respond to emergency situation.

2.1.2 Mitigation

Disaster mitigation is the term used to refer to all actions to reduce the impact of a disaster that can be taken prior to its occurrence, including preparedness and long-term risk reduction measures. It includes both the planning and implementation of measures to reduce the risks associated with known natural and human-made hazards, and the process of planning for effective response to disasters, which do occur [13].

Mitigation means taking actions to reduce the effects of a hazard before it occurs. The term mitigation applies to a wide range of activities and protection measures that include

- Structural measures, like constructing stronger buildings, adhering to building

norms and making old structures strong by retrofitting
- Nonstructural measures, like policies and planning to reduce disaster impact
- Rehabilitation or moving the people from disaster prone areas
- Adaptation to the disasters

Mitigation measures depend on the type of vulnerability that exists in the area. It requires identifying the nature of hazard and vulnerability assessment of the region. The most critical part of implementing mitigation is the full understanding of the nature of the threat. In each country and in each region, the types of hazards faced are different.

Thus, we can conclude that pre disaster phase of disaster management primarily involves preparedness and mitigation activities. These activities can be undertaken by the governments along with the overall development of the regions. If both activities are taken up simultaneously then it can have two benefits not only it will reduce the impact of disaster but also reduce the cost of development in the region.

Some of the highlights of pre-disaster phase are:

Preparedness

- Community awareness and education
- To prepare disaster management plans for community/school/individual
- Mock drill, training and practice
- Maintain list of material and trained human resources
- Develop efficient warning system
- Identify vulnerable groups in any area

Mitigation and planning for reducing impact of disasters

- Land –use zonation planning
- Discourage settlements in risky areas
- Disaster proof construction
- To identify factors to reduce the risk before occurrence of disaster

2.2 Emergency Stage (During the Disaster)

Activities taken immediately after the occurrence of disaster in any area are called as *emergency response activities* and they include Evacuation and Search and Rescue (SAR).
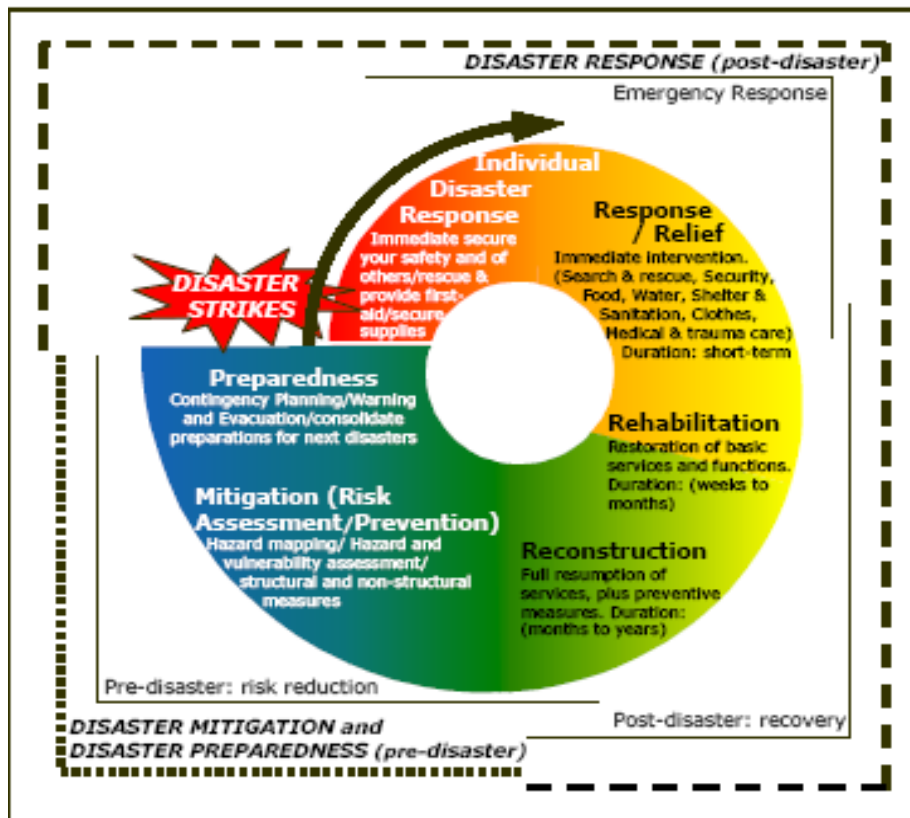
Fig. 2. Disaster management cycle
Source: Government of India, 2012 Hazards, Disasters and Your Community. A primer for parliamentarians.
Ministry of Home Affairs. National Disaster Management Division

Disaster response is the sum total of actions taken by people and institutions in the face of disaster. Disaster response includes the implementation of disaster preparedness plans and procedures.

The overall aims of emergency and post-disaster assistance are:

- To ensure the survival of the maximum possible number of victims, keeping them in the best possible health in the circumstances.
- To re-establish self-sufficiency and essential services as quickly as possible for all population groups, with special attention to those whose needs are greatest: the most vulnerable and underprivileged.
- To repair or replace damaged infrastructure and regenerate viable economic activities.

Immediately after the disaster has occurred there is need for following processes

2.2.1 Evacuation

Evacuation involves the relocation of a population from zones at risk of an imminent disaster to a safer location.

2.2.2 Search and rescue

Search and rescue, often known by the acronym SAR, is the process of identifying the location of disaster victims that may be trapped or isolated and bringing them to safety and medical attention.

2.2.3 Post-disaster assessment

The primary objective of assessment is to provide a clear, concise picture of the post-disaster situation, to identify relief needs and to develop strategies for recovery

2.2.4 Emergency relief

Emergency relief is the provision on a humanitarian basis of material aid and emergency medical care necessary to save and

preserve human lives. It also enables families to meet their basic needs for medical and health care, shelter, clothing, water, and food. Relief supplies or services are provided, immediately after disaster has occurred [14] [15].

2.2.5 Logistics and supply

The delivery of emergency relief will require logistical facilities and capacity.

2.2.6 Communication and information management

All of the above activities are dependent on communication. Efficient two-way communication between victims and relief providers is needed.

2.2.7 Survivor response and coping

disaster survivors may have new and special needs for social services to help adjust to the trauma and disruption caused by the disaster.

2.2.8 Security

Security of victims especially children and women is important in the relief camps to save them from sexual abuse and trafficking. The protection of the human rights and safety of displaced populations and refugees is important aspect of rescue operations in disaster affected regions

2.3 Post-Disaster Stage (After the Disaster)

Activities taken to achieve early and bringing back to same or better conditions are part of post disaster phase. Activities taken under this stage include reconstruction and rehabilitation.

Rehabilitation refers to the actions taken in the aftermath of a disaster to enable basic services to resume functioning, assist victims' self-help efforts to repair physical damage and community facilities, revive economic activities and provide support for the psychological and social wellbeing of the survivors. It focuses on enabling the affected population to resume more-or-less normal (pre-disaster) patterns of life. It may be considered as a transitional phase between immediate relief and more major, long-term development.

Reconstruction refers to the full restoration of all services, and local infrastructure, replacement of damaged physical structures, the revitalization of economy and the restoration of social and cultural life.

Reconstruction must be fully integrated into long-term development plans, taking into account future disaster risks and possibilities to reduce such risks by incorporating appropriate measures. Damaged structures and services may not necessarily be restored in their previous form or location. It may include the replacement of any temporary arrangements established as part of emergency response or rehabilitation.

The social and psychological recovery of the affected population are often assumed to be a community function and neglected in most post-disaster programs [16]. Disasters can impact some groups such as the women losing spouses, small children losing parents elderly living alone, orphans, single parents with young children and persons with special needs more vulnerable due to a lack of adequate support. In the aftermath of a disaster family support systems can break down due to life losses, loss of earning, dislocation and migration of some members in search of work, food etc. These groups would need special social support to survive the impact of disaster [17] [18].

Similar to social disruption, the psychological trauma of losing relatives and friends, the shock of the disaster event can take much longer to heal than physical recovery. It is, therefore, essential that social welfare and psychological support programs are considered immediately after a disaster as an integral part of recovery programs. The aid workers and the authorities operating in the disaster area can also become psychologically distressed from the event and working in difficult conditions [19-21].

Rehabilitation consists of the actions taken to enable basic services to resume functioning, assist victim's self-help efforts to repair physical damage and community services, revive economic activity, and provide psychological and social support for the survivors. Reconstruction is the full restoration of all services, local infrastructure, replacement of damaged structures, revitalization of the economy, and the restoration of social and cultural life.

The distinction between these two terms is in the extent to which they are integrated into a long-term development plan. *Rehabilitation* refers to repairs to pre-disaster status only, while *reconstruction* takes into account the reduction of future disaster risks.

Table 1. Tangible losses and consequential losses after a disaster

	Resulting Losses.	
	Tangible Losses	**Consequential Losses**
Buildings	Repair and rebuilding cost of housing, hospital, schools, offices, warehouses, hotels etc.	Bed –capacity, educational and health facilities, business, tourism, cottage industry ,homelessness
Infrastructure	Repair and rebuilding cost of communication lines, roads, ports, airports, water sewage	Transport of goods, supplies, energy sources production, epidemics due to breakdown in water and sewage facilities
Economic	Crops land, livestock, food stock, fisheries, premises such as warehouses, factories, ,storage barns	Economic outputs, opportunities and competitiveness in international and national markets, export, jobs, taxes, financial stability
Administrative Political	Archives, records, institutional structures, human resources, power and control	Decision making capacity, political stability, coordination diversion of staff and resources from other activities, loss of income due to loss of taxation records
Psychological	Mental and physical wellbeing of individuals	Productivity, social cohesion, health, coping capacity
Cultural	National heritage, places of worship, traditional ways of living and farming, homeland	National symbols, history, local and national identity, social cohesion, moral values continuity of traditions
Social	Neighborhood and community morale, law and order, social services	Cohesion, family structure, community coping capacity, breakdown of leadership, development of fatalism and dependency
Environmental	Forest, land, water resources, nature reserves, cleanup cost	Risk of future disasters, long term economic losses, health risk, dependence to outside provisions for resources, migration, relocation

Source: UNDP: DHA. Rehabilitation and Reconstruction.1st Edition Module prepared by Yasemin Aysan and Ian Davis. Disaster Management Training Program 1993

3. CONCLUSSION

All the three stages of disaster management are linked to each other they are not separate. The work on all stages can be done simultaneously in order to save resources. Most important is to implement the disaster management plan on right time so that maximum people are benefited. In all the stages there is requirement of up gradation and timely appraisal of the work being done and if required necessary changes to be made. The political will and commitment are the two important conditions for the implementation.

- Disaster management planning can be successfully implemented if it is integrated in overall development of the region
- Disaster management cycle represents the various stages of implementation of disaster management plans
- Focusing more on preparedness and mitigation reduces the amount of damage and destruction and avoid duplication of work and wastage of resources. There are

two sided benefits it reduces risk and also minimizes damage.

HRVC Analysis that is Hazard, Risk, Vulnerability and Capacity Analysis of region helps in implementing Disaster Management plans better. HRVC involves

- Listing of various HAZARDS to which geographical areas or communities are prone to
- Listing of various RISKS associated with listed hazard of the geographical area and community.
- Identify the VULNERABILITY of people, their livelihood their assets, public infrastructure
- Map the CAPACITIES of people in terms of their coping mechanism, status of preparedness, risk management tools adopted by them

COMPETING INTERESTS

Author has declared that no competing interests exist.

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WEB RESOURCES

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