Disaster Management

Goals
- To instill an understanding of the disaster management process

Learning outcomes
After completing this session, you will be able to
- Affirm the usefulness of integrating management principles in disaster mitigation work
- Distinguish between the different approaches needed to manage pre- during and post- disaster periods
- Explain the process of risk management
- Relate to risk transfer

Learning objectives
As you work through this session you will learn to
- Distinguish between disaster management and risk management
- Explain selected models of disaster management
- Describe the strategies for risk mitigation
- List activities needed for post-disaster management

1. What is Management?

Management consists of decision-making activities undertaken by one or more individuals to direct and coordinate the activities of other people in order to achieve results, which could not be accomplished by any one person acting alone.

Management is required when two or more persons combine their efforts and resources to accomplish a goal, which neither can accomplish alone.

2. Disaster Management

2.1. What is disaster management?

Disaster management includes administrative decisions and operational activities that involve
- Prevention
- Mitigation
Disaster management involves all levels of government. Non-governmental and community-based organizations play a vital role in the process.

Modern disaster management goes beyond post-disaster assistance. It now includes pre-disaster planning and preparedness activities, organizational planning, training, information management, public relations and many other fields. Crisis management is important but is only a part of the responsibility of a disaster manager. The newer paradigm is the Total Risk Management (TRM) which takes a holistic approach to risk reduction.

Note: This session would focus more on managing the pre-disaster phase.

Disaster management can be defined as the effective organization, direction and utilization of available counter-disaster resources.

The traditional approach was to provide immediate humanitarian aid (usually rescue teams, materials and medical services) as quickly as possible after the onset of a disaster. There has been a paradigm shift over the last decade.

The modern view is that there must be pre-disaster mitigation measures to avoid or reduce impact of disasters. Pre-disaster measures to prevent or mitigate disasters are called Risk Management.
Table 1
Changing Values in Relief Agencies

<table>
<thead>
<tr>
<th></th>
<th>Traditional</th>
<th>Current</th>
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<tbody>
<tr>
<td>Performance measured only by economic standards</td>
<td>Application of both economic and social measures of performance</td>
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<tr>
<td>Emphasis on quantity of relief</td>
<td>Emphasis on quantity and quality</td>
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<tr>
<td>Pyramidal management</td>
<td>Participatory management</td>
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<tr>
<td>Short-term relief programs</td>
<td>Long-term comprehensive pre- and post-disaster programs linked to development goals</td>
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<tr>
<td>Centralized decision making</td>
<td>Decentralized and small-group decision making</td>
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<tr>
<td>Agency viewed as a single relief system</td>
<td>Agency viewed as a system within a larger “development” system</td>
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<tr>
<td>Agency focus on short-term impact of relief</td>
<td>Increasing awareness of long-term impact of relief program on development potential</td>
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2.2. Models of disaster management

2.2.1. Disaster management cycle

The traditional approach to disaster management has been to regard it as a number of phased sequences of action or a continuum. These can be represented as a cycle.

Figure 1
Traditional model – sequences of action
In this model, disaster management occurs in stages, in sequence. The focus is more on activities immediately before and after the onset of the disaster event.

Mitigation and preparedness precede a disaster. Pre-disaster management is called **Risk Management**.

### 2.2.2. Expand-contract model

In this model, disaster management is seen as a continuous process. There is a series of activities that run parallel to each other rather than as a sequence.

These are represented as different strands in the Figure 2 above. Actions continue side by side, expanding or contracting on demand. As an example immediately after a disaster the ‘relief and response strand’ will expand. But with time this activity would reduce and the ‘recovery and rehabilitation strand’ will expand. The relative weighting of the strand will vary depending on the relationship between the hazard event and the vulnerability of the community at risk.

### 2.2.3. The Disaster Crunch and Release Models

**The Disaster Crunch Model**

It is a framework for understanding and explaining the causes of disaster and adopts a cause-effect perspective. It is a pressure model. Vulnerability (pressure) is seen as rooted in socio-economic and political processes.
These have to be addressed (released) for disaster risk reduction.

The model reveals a progression of vulnerability. It begins with underlying causes in society that prevents satisfying demands of the people.

**Underlying root causes of a disaster scenario**

Let us consider a scenario. Population expansion leads to inadequate housing and land needs. Prices of urban land appreciate. Low-income people may not be able to afford it. Rural – urban migration adds more pressure. There is thus expansion of urban areas outwards. The result is ad-hoc urban sprawling.

**Translation of root causes by dynamic pressure into unsafe conditions**

The low-income people may occupy land with low demand that may be disaster-prone. They may not have the income to adhere to safe practices and building codes. They may not have proper sanitary conditions, water supply and other utilities. The local governments may come under pressure to provide them but would be unable to do so. But these are dynamic communities that grow and change adding more and more pressure on limited resources. They may show low literacy rates, lack of awareness of disaster potential or preparedness, lack of proper health care which decrease strength to withstand disaster impact, malnutrition, lack of training for livelihoods, disaster prone housing etc.

These are unsafe conditions which increase the vulnerability of these communities. They would have no capacity to face a hazard event.

When a hazard event happens these communities would bear the brunt of impact and their losses would be greater. Their capacity to recover is minimal.

The crunch is on these more vulnerable communities due to the unsafe conditions they live in.

The Disaster Crunch Model proceeds from the premise that a disaster happens when and only when, a hazard impacts on a vulnerable community or people.

A hazard is the Trigger Event, which sets off the disaster. It could be an earthquake, volcanic eruption, landslide, flood or civil conflict. The Unsafe Conditions are the vulnerable context where people and property are exposed to risk of disaster. They may be
Fragile Physical Conditions: 
- Disaster-prone locations
- Unsafe buildings
- Unsafe infrastructure etc.

Fragile Local Economy: 
- Livestock at risk
- Low-income levels
- Low health status etc.

This may be diagrammatically represented as follows.

**Figure 3**

The Crunch Model

![Diagram of the Crunch Model]

**The Disaster Release Model**

Through the reverse of the crunch model, the Disaster Release Model shows how the risk of disasters can be reduced. This would involve preventive or mitigation action to reduce risk. These measures would begin by studying

- The nature of hazard(s) threatening the community
- The nature of underlying causes.

This would allow the reduction of dynamic pressure e.g. Tendency to occupy disaster prone land, lack of awareness to implement mitigation etc by taking appropriate action. In other words the underlying causes are being addressed as issues. This in turn would lead to safer conditions. E.g. Health and awareness could be enhanced. Proper land use practices and appropriate building practices would be implemented. The mitigation of risk is dealt with in a later section. The result is that the community takes control of the situation.
The release process is represented diagrammatically below.

### Figure 4
**The Release Model**

![Diagram of the release model with categories: Community Preparedness, Hazard Mitigation, Safer Conditions, Reductions in Dynamic Pressures, Address Underlying Causes, Risk Reduction, Hazard Prevention with text: The Progress of Safety as a reverse of the Progression of Vulnerability.]

3. **Risk Management**

*The process, by which assessed risks are mitigated, minimized or controlled through engineering, management or operational means. This involves the optimal allocation of available resources in support of group goals.*

Risk management has three components.
- Risk identification
- Risk reduction
- Risk transfer

Risk identification has already been discussed.
It is usual to allocate risk management to a special body at national level. Usually it is a National Disaster Management Organization (NDMO)

At local level it may be the responsibility of a Disaster Mitigation Committee, which administers risk management. This varies in different countries depending on administrative patterns and needs.
3.1. Risk reduction

Effective risk reduction involves mitigation measures in hazard prone areas. It may also involve overcoming the socioeconomic, institutional and political barriers to the adoption of effective risk reduction strategies and measures in developing countries.

3.1.1. Mitigation

Measures taken prior to the impact of a hazard event to minimize its effects (which may be structural and non-structural) - ADPC

The following non-structural and structural means may be listed (Carter, 1991)

**Non-structural mitigation**

*Legal framework*
Examples are building codes for built structures to withstand impact such as cyclones or earthquakes etc.

*Land-use planning*
Controlling human activities in hazard prone areas (zoning) to avoid fatalities and loss. This may involve re-location of communities to safer locations.
It may be achieved by passing legal statues
E.g. Ordinances

*Incentives*
Often provide better inducements for mitigation than legal impositions. Government grants or subsidies may help to persuade commercial and other institutions to include mitigation measures in their building and reconstruction. Insurance companies may be persuaded to offer reduced premiums for buildings that incorporate hazard resistant measures.

*Training and Education*
Provide awareness and know-how to those government officials involved in disaster management, construction experts, craftsmen, land use planners and the general public.

*Public Awareness*
This is necessary to ensure
- A good public knowledge and understanding of natural hazards and vulnerabilities
- Awareness of effective mitigation measures
- Public participation in community preparedness programs.
Institution building
This is the strengthening of national or community social structure. This can work through
- Identifying and strengthening organizations that serve as coping mechanisms: by increasing capacity and skills to face a crisis.
- Increasing the number of coping mechanisms within a country or community and by linking them to outside resources and
- Encouraging actions that promote cooperation among different groups within society.

Structural mitigation

Engineered structures
These involve architects and engineers during the planning, designing and construction phases. The application of sound technical principles is achieved through
- Site planning
- Assessment of forces created by natural hazards
- Planning and analysis of structural measures to resist such forces
- Design and proper detailing of structural components
- Construction with suitable material
- Good workmanship under adequate supervision
Most countries have building codes for engineered construction.

Non engineered structures
These are constructions by owners using local masons and carpenters who lack formal training.
The design may be improved according to traditional ways. Their location on hazard prone areas may be controlled.

3.2. The mitigation plan

The disaster mitigation committee should ‘brainstorm’ on all possible measures that might help to reduce risk. The alternatives should be weighed and the more acceptable ones selected which are appropriate to satisfy community needs. Then a plan must be formulated to facilitate the implementation of the selected risk reduction measures.

How would this plan look like?
A basic outline is given below. This is not a universal format but points to major items that must be included in a mitigation plan.
Components of a Mitigation Plan

<table>
<thead>
<tr>
<th>Introduction</th>
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<tbody>
<tr>
<td>I The reason for developing mitigation plan</td>
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<tr>
<td>II How it was prepared</td>
</tr>
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<td>III Who was involved</td>
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<table>
<thead>
<tr>
<th>Problem description</th>
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<tbody>
<tr>
<td>For each hazard provide</td>
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<tr>
<td>I Hazard description</td>
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<tr>
<td>II Impact on property</td>
</tr>
<tr>
<td>III Impact on human life, injury and health</td>
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<thead>
<tr>
<th>Community considerations</th>
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<tbody>
<tr>
<td>I Economic development</td>
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<tr>
<td>II Environment</td>
</tr>
<tr>
<td>III Future needs</td>
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<tr>
<td>IV Other considerations</td>
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<table>
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<tr>
<th>Goals and objectives</th>
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<table>
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<tr>
<th>Proposed risk reduction measures</th>
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<tbody>
<tr>
<td>For each include</td>
</tr>
<tr>
<td>I Description</td>
</tr>
<tr>
<td>II Objectives supported</td>
</tr>
<tr>
<td>III Who is responsible</td>
</tr>
<tr>
<td>IV When it must be done</td>
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<td>V Who can help</td>
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<tr>
<td>VI Budget</td>
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<tr>
<th>Implementation and Evaluation</th>
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<tbody>
<tr>
<td>I Implementation schedule</td>
</tr>
<tr>
<td>II Monitoring (How? Who? What?)</td>
</tr>
<tr>
<td>III Evaluation (How? who? Scope? When?)</td>
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</table>

4. Prevention

Prevention is more applicable to man-made and technological disasters. Stringent safety precautions through technological innovation can bring these about.

Natural hazard events cannot be prevented. But if the vulnerability of the community is reduced, one can prevent the hazard event becoming a disaster.

The government departments or municipalities can prevent disaster impact by conducting selected mitigation activities before a disaster strikes.

A dam could control floodwater. Controlled burning of fire belts could prevent the spread of a wild fire. Stringent building code imposition can reduce collapse of buildings during an earthquake. Proper socio-economic development and active ownership and participation of
communities in the disaster management continuum and the development of adequate warning systems where applicable, can also bring positive results.

5. Crisis management

Crisis management applies to emergency operations and covers
- Preparedness and
- Immediate post-disaster period.

To avoid confusion during the emergency period immediately after the disaster strikes, disaster management places heavy emphasis on advance planning. This is called disaster preparedness and include
- Strategic planning
- Contingency planning
- Forward planning

**Strategic planning** consists of preparing the organization to respond to disaster threats in locations that are not specified and not immediately threatened.

**Contingency planning** is site-specific and recognizes that a disaster could occur at any time.

**Forward planning** occurs when a disaster is imminent and where the crisis manager knows some details regarding the threat.

A variety of different management systems have evolved to respond to different types of disasters. Most agencies borrowed military and or business organizational models to manage disasters. These used a pyramidal hierarchy of upper-level managers, middle managers and field managers. The upper-level and middle managers dealt with managing the organization and facilitating field operations. The field manager was responsible for development of programs that directly assisted people of the disaster impact area.

Recently, new management models have appeared which emphasize community participation in decision-making and response.

6. Response and Relief

If a disaster occurs, response and relief have to take place immediately. Rescue of affected people, distribution of basic supplies such as food water, clothing, shelter and medical care become urgent need of the hour. Delays will occur if government departments and municipalities have no clear plans to manage such events. It is therefore important to have plans in place.
Take a simple example. A flood has occurred in a mountainous area and there is very strong wind and continuous heavy rain. The possibility of landslides is real. Members of the public are panicking and the mayor is under pressure to take emergency action.

A well-managed team of government and local players should be prepared and know where to go, what to do. If the situation is managed in an ad-hoc way, the affected people will rush off in all directions, waste valuable time, and even make serious mistakes with fatal consequences.

Search and rescue plans need to be clear and all role players need to know their role and functions in such activities. Basic needs such as emergency shelter, water, food, and medical care have to be provided. A plan must be in place.

7. Rehabilitation and Reconstruction

The rehabilitation period involves the weeks and months after the disaster. The focus is to enable the area to start functioning again. This involves debris removal, restoration of public services and provision of temporary housing.

Reconstruction is a much longer-term activity. This phase involves permanent rebuilding, improved infrastructure and better disaster planning.

Both rehabilitation and reconstruction phases demand good management. Diversion of national and international aid prudently, prioritization of activities, proper coordination and monitoring as well as prevention of corruption and abuse of scarce funds become priorities.

8. Risk Transfer

The private insurance sector contributes important funding for natural disaster reconstruction in developed countries. But in developing countries, the social welfare arm of the government and the individual carry much of the cost of disasters.

In developing countries the rising cost of disaster aid and insurance payouts are driving governments away from comprehensive insurance schemes.

Development funding is diverted for disaster relief in an ad-hoc manner, which postpones progress towards long-term economic and social improvement.

Tools have to be developed to assist the very poor to more effectively manage disaster risk. This includes micro-finance mechanisms that can deal with covariate risk such as disasters.
They must also try to build social capital and encourage risk mitigation for the very poor. In addition to that, measures must include safety nets and calamity funds and informal mechanisms.

References


4. Web based course material on Disaster Management of the University of Wisconsin Disaster Management Center [http://epdweb. engr. wise. sedu/dmc](http://epdweb. engr. wise. sedu/dmc)