CHAPTER FOUR

DISASTER MANAGEMENT

Learning Objectives:

At the end of this chapter students will be able to:

- ❖ Define disaster preparedness
- ❖ Discuss different risk reduction measures
- ❖ Define disaster response, disaster mitigation and disaster recovery
- ❖ Explain disaster mitigation strategies

4.1 Introduction

The scope of disaster management can include all disaster-related activities. These activities are categorized as disaster preparedness, disaster response, disaster recovery, post disaster epidemiological surveillance, environmental management and disaster mitigation. The details of these activities are treated in the subsequent sections of this chapter.

Aims of disaster management are to:

- Reduce (avoid, if possible) the potential losses from hazards;
- Assure prompt and appropriate assistance to victims when necessary;
- Achieve rapid and durable recovery.

4.2 Disaster preparedness

Disaster preparedness is defined as a **state of readiness to respond to a disaster**, crisis, or any other type of emergency situation. More broadly it is stated as the leadership, training, readiness and exercise support, and technical and financial assistance to strengthen citizens, communities, state, local and tribal governments professional emergency workers as they prepare for disaster, mitigate the effects of disaster, respond to community needs after a disaster, and launch effective recovery efforts (www.fema.gov).

All measures and policies taken before an event occurs that allow for prevention, mitigation, and readiness constitutes disaster preparedness. **Preparedness** includes designing warning systems, planning for evacuation, and reallocation, storing food and water, building temporary shelters, devising management strategies, and holding disaster drills and exercises,. **Contingency planning** is also included in preparedness as well as planning for post-impact response and recovery.

The aim of disaster preparation is to be able to reduce the immediate mortality and morbidity with a better prepared, well equipped service. The preparation includes *early warning systems for seasonal changes in climate*, and risk of flood or drought, such as electronic information systems and satellites that can provide information over large regions and continents. Separate systems are needed to cater for the agricultural sector, cities and people in rural

or remote communities. The *public health infrastructure* is particularly important for the immediate measures needed and for public information on reducing the health risks.

The most important challenge is to change from concentrating solely on post-disaster relief and to **focus on pre-disaster preparedness**. Thanks to disaster-preparedness schemes, particularly to an increasingly sophisticated early warning system, the comparative losses of life due to weather-related disasters are declining. All the evidence shows that, for every dollar spent on prevention and preparedness, about $100 or more is needed for relief efforts after the disaster has taken place.

Where such forecasting and warning systems are installed as part of disaster-management programs, evidence shows that more lives can be saved and damage is drastically reduced

Being prepared also means having thorough disaster contingency plans comprising of:

- Covering emergency housing, repairs, replacement of essential equipment and protection of the most vulnerable people in the community: **the sick, the very young and the old.**
- Improvement of *water supply* and *sanitation systems*

- *Logistics* of the predicted need for health and social services need to be laid down in advance, including *early warning systems to detect health effects*.
- *Planning for climate change*: as global warming and its effects on water will increase the frequency of water related disasters.
- *Public information and education*: to ensure early warnings to communities at risk; and give information about how to conserve water and keep it safe from contamination.

Preparedness consists of three basic steps: **preparing a plan**, **training to the plan**, and **exercising the plan**. Preparedness deals with the functional aspects of emergency management such as the response to and recovery from a disaster, whereas **mitigation** attempts to lessen these effects through pre-disaster actions as simple as striving to create "disaster-resistant" communities.

Planning for various disasters:

Two strategies for disaster planning include the **agent-specific** and **the all-hazards approaches**. In agent-specific planning, communities only plan for threats most likely to occur in their region. Since many disasters pose similar problems and similar tasks, an all-hazards approach involves planning for the common problems and tasks that arise in the majority of disasters.
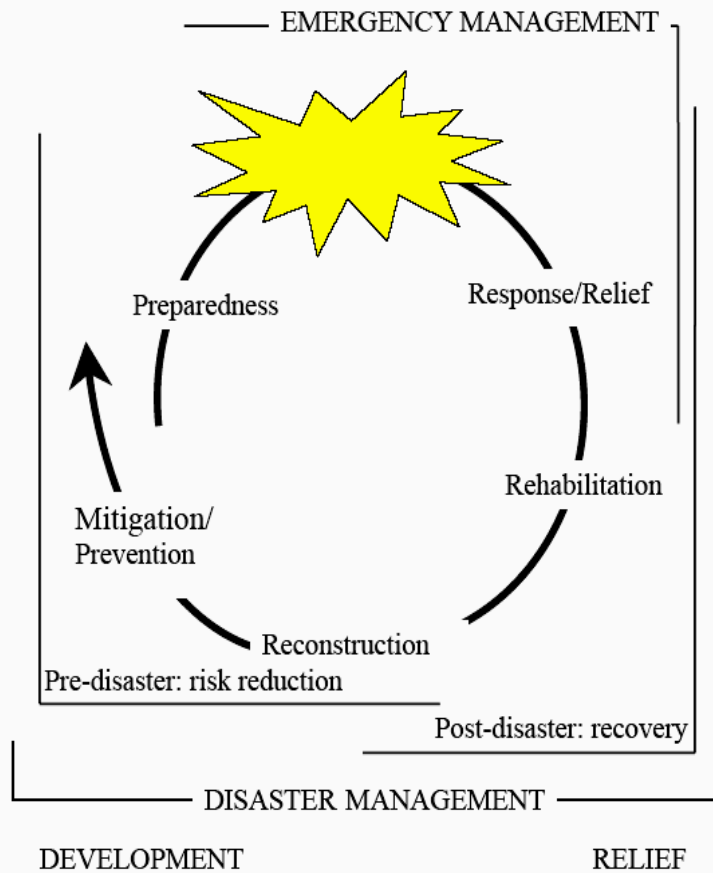
Figure 8 Phases of Disaster Management

The following are some of the means to plan for disastrous situations:

- Escape routes
- Family communications
- Utility shut-off and safety
- Insurance and vital records
- Special needs
- Safety Skills

Escape Routes

Identify and prepare escape routes such as alternative doors, windows, and path ways.

Family Communications

It is important to contact police departments, Red-Cross, radio/Television (media) stations to find family members. Pick also a friend or relative who lives out-of- woredas, zone, and region for household members to notify that they are safe.

Utility Shut-off and Safety

In the event of a disaster, you may be instructed to shut off the utility service at your home. Below is some general guidance for shutting off utility service:

Natural Gas: Natural gas leaks and explosions are responsible for a significant number of fires following disasters. It is vital that all household members (who have natural gas) know how to shut off natural gas.

Water: Water quickly becomes a precious resource following many disasters. It is vital that all household members (who have water pipe lie) learn how to shut off the water at the main house valve.

- Cracked lines may pollute the water supply to your house. It is wise to shut off your water until you hear from authorities that it is safe for drinking.

Electricity: Electrical sparks have the potential of igniting natural gas if it is leaking. It is wise to teach all responsible household members where and how to shut off the electricity.

Preparing to Shut Off Electricity

- Locate your electricity circuit box.
- Teach all responsible household members how to shut off the electricity to the entire house.

For Your Safety: always shut off all the individual circuits before shutting off the main circuit breaker.

Insurance and vital records:

Households should be encouraged to have insurance for property, health and life. Such vital records, including insurance, bank… books need to be kept in safe place.

Planning for Special Needs

If you have special needs, find out about special assistance that may be available in your community.

- Create a network of neighbors, relatives, friends, and coworkers to aid you in an emergency. Discuss your needs and make sure everyone knows how to operate necessary equipment.

- Discuss your needs with your employer.
- If you are mobility impaired and live or work in a high-rise building, have an escape chair.
- If you live in an apartment building, ask the management to mark accessible exits clearly and to make arrangements to help you leave the building.
- Keep specialized items ready, including extra wheelchair batteries, oxygen, catheters, medication, food for service animals, and any other items you might need.
- Be sure to make provisions for medications that require refrigeration.
- Keep a list of the type and model numbers of the medical devices you require.

Additionally, under each specific disaster, the necessary preparedness to be made is discussed accordingly and readers are advised to refer to chapter two for more information regarding specific disaster.

4.3 Disaster Response

Response is the immediate reaction to disaster. It may occur as the disaster is anticipated, as well as soon after it begins. Examples include **mass evacuation**, **sandbagging buildings and other structures**, **securing emergency food and water**, **covering windows**, **providing emergency medical services**, search and rescue, firefighting, and restoring public order to prevent looting.

Extrication, triage, stabilization, and transport

Extrication has evolved into a fire services function in most of the country. In addition to specialized technical and trench rescue teams, fire services have more experience with building collapse and secondary hazards (eg, floods, fires) than other organizations.

The concept of **triage** involves providing the most help for as many as possible. Medical personnel are accustomed to providing extensive, definitive care to every patient. When confronted by a number of patients simultaneously in a disaster situation, it is easy to become overwhelmed, even for an experienced disaster worker. Triage must occur at multiple levels, and patients must be reassessed during every step of the process.

Transport must be both organized and orchestrated.

Definitive scene management

While scene control and containment may be relatively simple in a local, static disaster, dynamic and paralytic disasters may take several days to contain and stabilize. As the length of time of the disaster increases, additional resources must be made available, as rescue crews reach exhaustion, supplies become spent, and additional hazards develop.

There is often theoretical debate over when the response function ends and recovery function begins. For the time being, the response function is classified as the immediate actions to save lives, protect properties, and meet basic human needs.

Activation

Notification and initial response: During this phase, organizations involved in disaster response and the potentially affected populations are notified.

Organization of command and scene assessment: The prearranged command and staff structure for responding to the disaster should be arranged and initial communications nets established.

Emergency Response Activities:

Emergency response activities are those carried out during the actual emergency or immediately prior to it. This may involve evacuation of threatened communities, emergency assistance during the disaster, and actions taken in the immediate aftermath during the time when the community is rather disorganized and basic services and infrastructure are not fully functioning. Because the emergency period is both dramatic and traumatic, most attention by the press and international community is focused here. Yet in most disasters (with the exception of droughts and civil strife), the emergency passes rather quickly and, in reality, only accounts for a very small percentage of the total picture.

Twelve tasks or problems are likely to occur in most disasters are summarized below:

➢ *Interorganizational coordination is* important.
➢ *Sharing information among organizations*,
➢ *Resource management*,
➢ When advance *warnings* are possible, *evaluations* from areas of danger can be the most effective life-saving strategy in disaster.
➢ The public tends to underestimate risks and downplays *warnings* if messages are ambiguous or inconsistent.
➢ *Search and rescue*
➢ *Using the mass media*: to deliver warnings to the public and to educate the public

- ➢ *Triage*: is a method of assigning priority for treatment and transport for injured citizens.
- ➢ *Casualty distribution*: in most domestic disasters, several medical resources can handle the casualty distribution.
- ➢ *Patient tracking*: is complicated by the fact that most persons evacuating their homes do not seek lodging in public shelters where their presence will be registered.
- ➢ *Caring for patients when the health care infrastructure has been damaged requires careful advance planning.*
- ➢ *The management of volunteers and donations*: is a common problem in disasters. Procedures should be established to manage large number of resources.
- ➢ *Plan for organized improvement in response to the disruption of shelter, utilities, communication systems, and transportation.*

4.4. Declaration of disaster:

The social disorganization surrounding a disaster and the number and types of responding organizations and groups create the need for a well-ordered mass response system. Consequently, a complex organizational environment has to be developed to respond in disaster situations. To mobilize these organizations, **a declaration of disaster is initiated** according to an increasing level of emergency (disaster).

Disaster shall be declared when convincing and complete socio-economic reports from regional councils and the National Early

Warning System are provided. National level declaration for disaster will be made only by the National Disaster Prevention and Preparedness Committee (NDPPC). The commencement of relief measures shall automatically follow the declaration of disaster in the area. However, it is not always necessary to wait such formal declaration, or NDPPC's decisions on measures to be taken. Having regard to the policies of the Government, relief operation may commence with the available local resource before a formal declaration if the state of distress warrants immediate intervention. Subject to its enforcement by NDPPC and depending on the context of the disaster, the Relief and Rehabilitation Commission (RRC) may also authorize certain essential measures to be taken in such situations.

4.5. Disaster Recovery (Rehabilitation and Reconstruction):

The primary aim of recovery is to assist the affected community to regain a proper level of functioning following a disaster both initially and in the long term. It is "the coordinated process of supporting emergency-affected communities in reconstruction of the physical infrastructure and restoration of emotional, social, and physical well-being" (Emergency Management Australia, 2004). Recovery essentially concerns rehabilitation as well as developing the tools to mitigate against the future impact of a disaster, and should return the community to an improved state of post-disaster. This includes those activities that continue beyond the emergency period to restore lifelines. Examples include providing temporary shelters, restoring power, critical stress debriefing for emergency responders

and victims, job assistance, small business loans, and debris clearance.

Recovery involves decisions and actions relative to rebuilding homes, replacing property, resuming employment, restoring business, and permanently repairing and rebuilding infrastructures. Since the recovery function has such long-lasting effects and usually high costs, the participants in the process are numerous. They include all levels of government, the business community, political leadership, community activists and individuals.

The recovery phase is frequently underemphasized in disaster plans, but it is crucial for the affected community. Recovery efforts should identify opportunities for community development, especially in terms of creating sustainable, safer, and more resilient communities.

The four elements of recovery are:

1. Community recovery (including psychological recovery);
2. Infrastructure recovery (services and lifelines);
3. Economy recovery (including financial and political considerations, and business continuity);
4. Environment recovery.

1. Community recovery:

- ❖ Have we considered the specific needs of our community? That is, the cultures, traditions, demographics, etc as identified.
- ❖ What mechanisms and resources will be required to aid in the psychological recovery of the community?
- ❖ What financial assistance is available to the community? For example, government payments and public appeals.
- ❖ What government and non-government agencies would you consider necessary to rebuild your community following disaster?
- ❖ What are likely to be the medical and health requirements of the community?

2. Infrastructure recovery:

- ❖ How will we ensure the restoration of essential services?
- ❖ How will our community access essential services?
- ❖ How will we ensure or facilitate restoration of living conditions and housing security?
- ❖ How will we rebuild our community infrastructure? This includes ports, airports, dry storage, roads, public transport, fuel, gas, water, electricity, telecommunications, garbage and sewerage, waterways, parks, flora and fauna.
- ❖ How will we communicate with our community and external agencies? This includes gathering, processing and

circulating information to and from the community. It also encompasses communication with disaster workers (staff and volunteers), media, local government management, suppliers, groups and authorities including the local disaster management group.

❖ Are our recovery plans adequately integrated and/or considerate of plans of other relevant services (such as health, energy, telecommunications, etc)?

3. Economic recovery:

❖ What impact will disaster have on job security in our community? (that is, both for displaced community members and volunteers in the recovery process.)

❖ What mechanisms and resources will be required to assist and ensure the economic recovery of the community?

❖ Who needs to be involved in re-establishing economic validity in our community?

4. Environmental recovery:

❖ What issues do we need to consider in preparing for and managing environmental damage caused by a disaster event?

❖ Who needs to be involved in this process?

Principles of disaster recovery and reconstruction:

Three phases describe as to what happens to post-impact in the affected community:

1. *Emergency phase*: activities should focus on saving lives through search and rescue, first aid, emergency medical assistance and over all disaster assessment. Efforts immediately begin to repair critical facilities, to restore communications, and transportation networks, and in some cases, to evacuate residents from areas still vulnerable to further disaster.

2. *Transition or recovery phase*: during this phase, people return to work, repair damaged buildings and infrastructure, and initiate other actions that allow the community to return to their normal as soon as possible. Victims begin emotional recovery and may experience depression and post-traumatic disorder.

3. *Reconstruction phase*: is characterized by physical reordering of communications, utilities, roads and general environment. Residents repair or rebuild their housing and agricultural activities resume.

Community participation is essential for planning the rehabilitation phase because local people better understand their own needs and the problems that create these needs.

4.6 Disaster mitigation

Mitigation is defined as a sustained action to reduce or eliminate risk to people and property from hazards (disasters) and their effects. The function of mitigation differs from other emergency management disciplines since **it looks at long-term solutions** to reduce risk as opposed to preparedness for hazards, the immediate response to hazards, or the short-term recovery from a hazard event.

Disaster mitigation includes those activities designed to prevent or reduce losses from disaster. It is usually considered the initial phase of emergency management, although it may be a component in the other phases. Examples include **land-use planning**, to limit or prevent development in floodplains, **building codes to reduce losses from earthquakes** and fires, dam and levees to prevent flooding.

The mitigation efforts must include:

- *Emergency housing,* especially after floods, but also if drought has caused mass population movement in an attempt to find better water and food supplies.
- Provision of *emergency supplies of safe drinking water.*
- *Emergency repairs to homes, drains and water supply and sanitation infrastructure.*

- *Early warning systems to identify health effects* and to detect rise in mosquito borne diseases, such as malaria, and diarrheal diseases, such as cholera.

Both disaster preparedness and its mitigation require multisectoral cooperation and joint planning. Both need evaluation after a disaster to reduce the ill effects of later crises.

The goal of mitigation is to **create economically secure, socially stable, better built,** and **more environmentally sound communities** that are out of harm's ways. The following widely accepted tools are used to reduce risks:

> ➢ Hazard identification and mapping,
> ➢ Design and construction applications
> ➢ Land-use planning,
> ➢ Finical incentives,
> ➢ Insurance,
> ➢ Structural controls.

In certain cases, some of the devastating effects of disasters can be reduced before the actual event. For example, evacuations may be orchestrated before hurricanes or floods. Early warning allows residents to seek shelter from tornadoes.

Disaster Mitigation Strategies

Risk Identification

To reduce the threat of droughts and to lessen their impact should they occur, a number of measures can be taken. The first step in disaster mitigation is to identify areas that are at risk to drought. Once the priority zones have been identified, comprehensive and integrated rural development programs should be initiated. Among the usual activities are:

- Agricultural improvements including modifying cropping patterns and introduction of drought-resistant varieties of crops;
- Rangeland management including improvement of grazing lands, and grazing patterns, introduction of feedlots, and protection of shrubs and trees.
- Water resource development including improved irrigation, and water storage facilities, protection of surface water from evaporation, introduction of drip irrigation systems, and water containment methods such as retention dams and subsurface dams.

Animal husbandry activities including maintaining smaller herds, eliminating unproductive animals, and upgrading the quality and productivity of stock through improved breeding practices.

Land-Use Planning

Another approach to reduce the impact of droughts on human settlements (including nomadic communities) is to employ land-use planning techniques.

Land-use controls similar to zoning regulations could be created and adopted by governing bodies. These controls can include:

- numbers of livestock per unit area;
- maximum population density;
- limits on amounts of water taken from public water supplies for agricultural or industrial use;
- authority to declare a state of emergency during which time animal herds are required to be depleted or transported to non-emergency areas, more stringent water usage allowances are imposed, etc.

Impediments to Mitigations

There are several factors, including denial of the risk, political will, cost and lack of funding.

4.7. Post disaster epidemiological surveillance:

Post-impact needs assessment provides information necessary to begin recovery. The first step is to **assess community capacities and vulnerabilities**, including physical environment (i.e. intact infrastructure, resources), social conditions (i.e. existing

organizations, support, networks), and population attitude towards and motivation to recover. Communication must be established between the people affected by the disaster and the responding jurisdictions and organizations. Needs are determined by visiting representative areas, by talking to selected groups in affected communities, and by conducting rapid health assessment surveys.

Principles of the undertaking are to:

- ❖ Maximize use of pre-existing surveillance data for "baseline" information, and to modify conditions
- ❖ Coordinate efforts after disaster with the normal surveillance activities in the health sector.
- ❖ Avoid duplication of efforts
- ❖ Be familiar with the epidemiology of endemic diseases and with the national surveillance system.
- ❖ Coordinate the relief surveillance of communicable disease with activities of national health authorities.
- ❖ Strengthen the reporting systems.
- ❖ Strengthen the documentation system at the central level, in hospitals and clinics at the intermediate level.

Steps in Epidemiologic Surveillance that should be taken before and after a Rapid-Onset Disaster

1. Identification of the diseases and other conditions to be monitored, and selection of suitable indicators.
2. Delineation of the areas affected by the disaster.

3. Rapid statistical sampling of sites (ideally including unaffected localities for control purposes).
4. Rapid, gross detection of cases or presumptive cases based on the presence of a symptom or complaint.
5. Monitoring and reporting by local health services of the selected diseases or symptoms.
6. Interpretation of data at the national level by a health unit of the disaster-affected country that is experienced in data analysis and has direct access to relief authorities.
7. Investigation of any "unusual" occurrence of disease by local health workers, assisted when necessary by epidemiologists.

Requirements

For surveillance to be most effective, there are four requirements.

1. Establishment of priorities for investigating unusual occurrences of diseases, whether confirmed or rumored.
2. Establishment of a mechanism for dissemination of surveillance information to both encourage taking of appropriate measures and discourage expenditure on inappropriate measures.
3. Training and involvement of local health workers at all levels of the health system.
4. Pre-disaster planning, including identification of real health risks in various disaster situations, assignment of

responsibilities, and development of an assessment and surveillance plan.

The Collection, Interpretation and Utilization of Data

Participation of field health units in the surveillance system must be as complete as possible after a disaster. **It is critical to motivate reporting units**. The participation of units operating before the disaster should be continued when possible, with emphasis in reporting placed upon the diseases or symptom complexes targeted for surveillance. Health teams mobilized for the relief effort should be adequately briefed about the importance of surveillance. They should be given the case definitions to be used (according to IDSR) and be amply provided supplies of reporting forms.

Two operational aspects of data collection deserve emphasis. First is **the importance of regularly sending "negative" reports** whenever no patients with notifiable diseases are seen in a unit. A **report form with a line of zeros provides valuable information**. It also permits assessment of the number of units participating in the surveillance system. Failure to report, on the other hand, can either mean a lack of disease, or that a unit has dropped out of the surveillance effort. Speed of reporting is always critical in communicable disease surveillance and is especially vital following disaster. In general, **weekly reporting from all units by telephone**, telegraph or shortwave radio is preferable to reporting by mail. Immediate consultation about any unusual condition or suspected epidemic, at any time during the week, should be encouraged.

Innovative ways to facilitate rapid reporting during the period of severe disruption in transportation and communication should be sought by members of the epidemiology unit. Egs include:

- Daily or weekly radio reporting of selected diseases from the field;
- The distribution and retrieval of reporting forms by members of the drug and/or food distribution system;
- Gaining access to the national security force's communication network;
- Incorporating disease surveillance into a more general regular report required by the relief coordinator;
- Regular visit to field units by the epidemiologist-in-charge or a member of the surveillance team.

It is important that incoming notifications are evaluated immediately upon receipt by the epidemiology unit to provide prompt response to rumors or enquiries

The epidemiologists should also develop **maps and graphs** for visual appreciation of disease trends. This is frequently a more productive investment of the scarce time of staff members than is generating columns and figures. **Maps with pins indicating the geographic clustering of cases** are particularly useful for following the spread of a disease. Well charted graphs can more sensitively indicate disease trends than numbers.

Providing Feedback to the Field from the Central Level

Providing feedback is an important aspect of post-disaster surveillance. The weekly report provides more than feedback to field workers. The epidemiologist should ensure that the weekly report and adequate background information (personal visit or covering note) are circulated to the relief coordinator and other national authorities and local representatives of voluntary agencies. The overall relief coordinator should be responsible for distributing the report to members of the media and the community.

Presenting Epidemiologic Information to Decision Makers

It is critical to present information from surveillance and the field investigations to key decision makers. Epidemiologic information, implications and an outline of alternatives of action must be summarized in non-technical terms understandable to lay people.

Surveillance During and After the Recovery Phase

With increasing passage of time after a disaster, both decision makers and the public become progressively less concerned with the probability of epidemic disease. The phasing out of the intensified, disaster-related surveillance activities should take place after consultation with members of the national epidemiology group.

4.8. Environmental health management

The impacts of disasters, whether natural or man-made, not only have human dimensions, but environmental ones as well. Environmental conditions may exacerbate the impact of a disaster, and vice versa, disasters have an impact on the environment. Deforestation, forest management practices, agriculture systems etc. can exacerbate the negative environmental impacts of a storm or typhoon, leading to landslides, flooding, silting and ground/surface water contamination.

Emphasizing and reinforcing the centrality of environmental concerns in disaster management has become a critical priority, requiring the sound management of natural resources as a tool to prevent disasters or lessen their impacts on people, their homes and livelihoods.

There is a clear need to reinforce the importance of environmental concerns in the entire disaster management cycle of **prevention, preparedness, assessment, mitigation** and **response** and to integrate environmental concerns into planning for relief, rehabilitation, reconstruction and development. This will also require the enhancement of capacities to undertake short and medium-term activities in disaster management based on long-term environmental considerations.

Comprehensive understanding of natural systems coupled with the application of management tools such as environmental evaluation

and risk assessment can make a major contribution to a reduction of risks and mitigation of any impacts.

Specifically, we need to examine the need for a multi-stakeholder partnership that links local governments, private sector entities, and civil society organizations in order to facilitate more effective disaster prevention and mitigation.

Environment management is a critical strategy to prevent disasters, and reduce risks/vulnerabilities of disaster prone countries and communities. Disaster risks and vulnerability can be considerably reduced through effective and long-term environmental and natural resource management practices.