

DISASTER MANAGEMENT COURSE

Participant
Handbook



Relief and Resettlement Department
Ministry of Social Welfare, Relief and Resettlement



Relief and Resettlement Department
Ministry of Social Welfare, Relief and Resettlement

Supported by



DISASTER MANAGEMENT COURSE



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ACKNOWLEDGEMENTS

The Disaster Management Course (DMC) of Relief and Resettlement Department has been delivered since 1977 at sub-national level with the aim to build capacity of government officials on Disaster Management. The DMC has been revised and updated to cater the needs in changing context. The revised course is comprehensive with 5 modules and field visit, which are interlinked and build on the preceding module. The course package includes Participant Handbook, Facilitator Guide and accompanying Power Point Presentation for each session. The training methodologies and tools include lectures, case studies, simulation exercise and group work.

The revision and updating of the DMC went through a rigorous process over December 2011 to September 2012 with a series of consultations. In total, 6 wider consultations with Government, UN Agencies and NGOs; 5 consultations with Technical Working Group members comprising UN Agencies and NGOs and more than 12 one-to-one consultations with Government Departments were held. In order to test the revised course, a pilot training was held in September 2012 and also 2 Training of Trainers (ToTs) Programs were held in July 2012 and November 2012 to create a pool competent facilitators for the updated DMC. Also, the draft documents were uploaded on Disaster Risk Reduction-Disaster Information Assimilation Source (DRR DIAS) to seek comments.

The process has been steered by an inter-agency team chaired by Relief and Resettlement Department, and supported by Disaster Risk Reduction Working Group. I would like to thank Department of Meteorology and Hydrology, Fire Services Department, Forest Department, General Administration Department, Irrigation Department, Department of Health, Department of Agriculture, Department of Educational Planning and Training, Care, UNDP, UNOCHA, UN-Habitat, ActionAid Myanmar, Oxfam, World Vision and Myanmar Red Cross Society for their dedicated support throughout the process. I would like to acknowledge ADPC Team which contributed as technical consultant for revising and updating Disaster Management Course.

Director General
Relief and Resettlement Department
Ministry of Social Welfare, Relief and Resettlement

A NOTE FROM COURSE DIRECTOR

Welcome Participants

On behalf of the Relief and Resettlement Department, I have the pleasure and honor to welcome you to this Disaster Management Course. This Course has long history and it started in 1977 and has been delivered since then with modification. The Course overall tries to give an overview of Disaster Management in context of Myanmar and provides practical guidance on application of Disaster Management knowledge and skill for risk reduction and management.

The Course is a judicious mix of theory and practical and uses a number of tools from lectures to field visit and facilitators include government official as well as development partners to bring the diverse knowledge.

The Course has five modules namely Introduction to Disaster Risk Management; Understanding Risks and Natural Hazards of Myanmar; DRM Approaches: Preparedness, Response and Recovery; Disaster Resilience and Safer Development; and Cross-Cutting Issues in Disaster Risk Management. The Course also includes field trip for better exposure of Disaster Management issues and also to interact with Disaster Management officials.

It is important to mention that to derive maximum benefit from this course, participation is the key as each of you brings certain knowledge and expertise.

Let me wish you a productive and pleasant learning.

Course Director
Disaster Management Course
Relief and Resettlement Department

DISASTER MANAGEMENT COURSE: AIM AND OBJECTIVES

Aim:

To enhance disaster risk reduction understanding of the government officers and equip them to apply suitable measures towards risk reduction and management of disasters at district and township levels and contribute towards increasing resilience of communities in Myanmar.

Objectives:

- To improve understanding of disaster risk management concept, framework and approaches
- To understand characteristics and identify causes of disaster risks in Myanmar and linkages with development
- To improve capacity on disaster preparedness, response and recovery
- To identify and apply suitable disaster risk reduction measures
- To understand the cross-cutting issues in disaster risk management and able to take appropriate measures to address them.

COURSE OVERVIEW AND MODULES

The Disaster Management Course has five modules namely Module 1: Introduction to Disaster Risk Management; Module 2: Understanding Risks and Natural Hazards of Myanmar; Module 3: DRM Approaches: Preparedness, Response and Recovery; Module 4: Disaster Resilience and Safer Development; and Module 5: Cross-Cutting Issues in Disaster Risk Management.

Module 1 Introduction to Disaster Risk Management

The module has 4 sessions aiming to enhance the understanding of the participants on Disaster Risk Management Terminology and Concept. The module also aims to provide an Overview of Disaster Risk Management including introduction to concepts of Disaster Risk, DRM Cycle and Disaster Model. This module will also discuss overview of Disaster Management Systems in Myanmar.

Module 2 Understanding Risks and Natural Hazards of Myanmar

The ultimate objective of Disaster Management is to address 'Risk', which requires in-depth understanding of risk and its causes. Module 2 focuses on enhancing better understanding on Risk, Drivers of Risks including Climate Change and introduction to compelling natural hazards in Myanmar including Hydro-Meteorological Hazard, Geological Hazards and Fire Hazard.

Module 3 DRM Approaches: Preparedness, Response and Recovery

The Module 3 focuses on post-disaster phase and preparedness and mainly deals with management of disasters. The module covers following issues namely Disaster Risk Management Approaches, Early Warning, Disaster Response, Damage and Loss Assessment system in Myanmar, Recovery and Reconstruction.

Module 4 Disaster Resilience and Safer Development

The Module 4 focuses on mitigation and prevention of risks including making safer development. The module covers following issues namely Awareness Generation, Disaster and Development Linkages and Mainstreaming Disaster Risk Reduction into Development planning and implementation.

Module 5 Cross-Cutting Issues in Disaster Risk Management

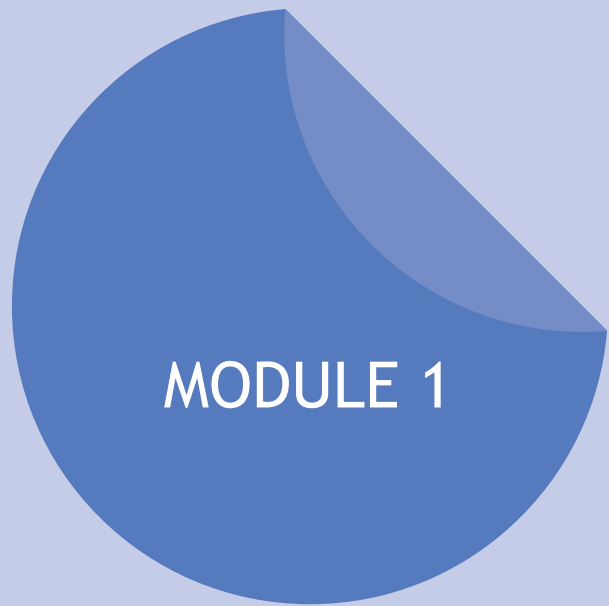
The cross-cutting issues in Disaster Risk Management are very important as impact of same disaster on different groups is different and hence need to be addressed. The module covers cross-cutting issues namely Gender, Aged and Disability issues in the context of Disaster Risk Management apart from Community-Based Disaster Risk Management and Health issues.

TRAINING METHODOLOGY

The DMC Training uses a number of tools for delivering the sessions and the Adult Learning principles have applied. The Course uses following tools namely PowerPoint Presentation, Group Discussion, Group Work, Case studies, Experience sharing and Field-work.

EXPECTATION FROM PARTICIPANTS

Active participation by participants in each session is recommended and expected. Also, it is expected that the participants should go through the reading materials before the session to derive maximum benefit. Last but not least, Disaster Risk Management is a continuous learning process and hence participants are expected to refer this Handbook as well as referred website and documents in future for up-dating the knowledge and skill.



INTRODUCTION TO DISASTER RISK MANAGEMENT

session
1.1

UNDERSTANDING DISASTER RISK MANAGEMENT TERMS

At the end of the session, you should be able to:

- Understand and define key DRM terms
- Understand the linkages of hazard, vulnerability and disaster risk

Key terms covered Hazard, Vulnerability, Capacity, Disaster, Risk, Disaster Management Cycle, Prevention, Mitigation, Preparedness, Response, Rehabilitation and Reconstruction, Disaster Risk Management (DRM), Disaster Risk Reduction (DRR), Community-based Disaster Risk Reduction, Climate Change and Climate Change Adaptation

TRAINING CONTENT

Introduction

There are many definitions of terms related to disaster management depending on the scientific, professional, organizational background and needs of the authors or practitioners involved. In achieving common ground, it is best to look into common elements in the definitions as well as how definitions are operationalized in practice.

As DRM has become a discipline on its own and is adopted at various levels, common language becomes important. The definitions of DRM terms provided are for explanatory purpose with some examples in contextualization for better comprehension. As well, the terms will be described for various use, possible meanings of the term in different aspects and explained in relation to other DRM terms.

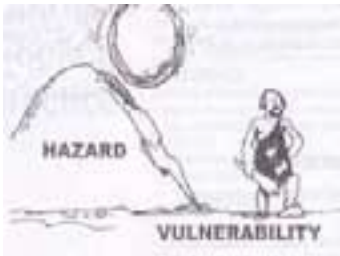
The complete citation of definition from the latest publication of *UNISDR's Terminology in Disaster Risk Reduction* published in 2009 and other addition sources are also presented for reference.

Hazard



Any phenomenon or situation, which has the potential to cause disruption or damage to people, their property and their services and environment. For example in Myanmar, earthquake, cyclone, flood, tsunami and landslides are major hazards.

Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydro meteorological and biological) or induced by human processes (environmental degradation and technological hazards). Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterized by its location, intensity, frequency and probability.



Processes such as urbanization, environmental degradation and climate change shape and configure hazards, which mean it is becoming increasingly difficult to disentangle their natural and human attributes. More and more human activities influence and induce natural hazards and at present days, these hazards are called physical hazards. As in GAR, 2011, hazard is not classified or referred to as 'natural or man-made hazard', rather it is viewed as 'Physical Hazard' - physical event which can be measured and modelled (GAR, 2011).

UNISDR's Terminology in Disaster Risk Reduction, 2009

Hazard Dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Vulnerability

Vulnerability is the conditions determined by physical, social, economic and environmental factors which increase the susceptibility of community to the impact of hazard. It can also be defined as the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.



There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors. Examples may include poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management. For example, cutting of mangrove and other trees in coastal area due to population density and farmland expansion cause the area more vulnerable. Lack of mangroves as wind breakers was likely to be a factor that increased vulnerability of areas hit by Cyclone Nargis. A community on the river bank could be more vulnerable to river flood compared to community located on hilly slope. At the same time, community on the hill slope is likely to be more vulnerable to landslide than riverbank community.

Vulnerability is determined by combining hazard awareness, condition of human settlements and infrastructure, public policy and administration, and organizational strength in disaster management. Poverty is one of the main causes of vulnerability in many parts of the world.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Vulnerabilities *The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.*

Comment: There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors. Examples may include poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management. Vulnerability varies significantly within a community and over time. This definition identifies vulnerability as a characteristic of the element of interest (community, system or asset) which is independent of its exposure. However, in common use the word is often used more broadly to include the element's exposure.

Capacity

The combination of all the strengths, attributes and resources available within a Community, society or organization that can be used to achieve agreed goals. It may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management. Capacity also may be described as capability.



For example the multi-hazard cyclone shelters in Ayerwaddy delta is one of the capacities, community's understanding on their local hazards and ability to plan accordingly to mitigate the impacts of the disaster is also capacity.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Capacity *The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals.*

Comment: Capacity may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management. Capacity also may be described as capability. Capacity assessment is a term for the process by which the capacity of a group is reviewed against desired goals, and the capacity gaps are identified for further action.



Disaster

A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources. It is either human-induced or natural, and can be a slow-onset (drought) or sudden (earthquake).





Disasters can be categorized in many ways and one of the categorization is as follows:

- Biological Disasters
- Accident related Disasters
- Chemical / Industrial / Nuclear Disasters
- Hydrological and Climatological Disasters
- Geological Disasters

Disasters are often the result of the combination of the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences.



For example, each year more than a million earthquakes vibrate on the earth surface, but those occur in uninhabited desert (no vulnerability) had not affected any impact and there is no disaster. If this same earthquake occurs in densely- populated and poor housing areas (vulnerability), it will cause deaths of human lives, injuries and damages (disaster). Similarly, in case of cyclone if doesn't cause damage beyond capacity of community, it will be a hazard but if it causes widespread damage then it is called disaster. Thus, Hazard alone is phenomenon, interaction of hazard with vulnerability becomes disaster.

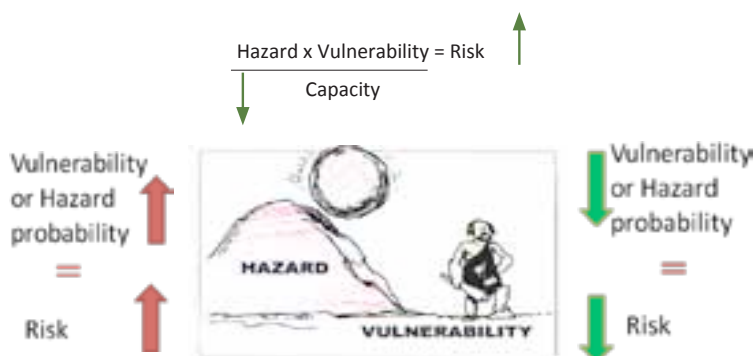


UNISDR's Terminology in Disaster Risk Reduction, 2009

Disaster A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

Comment: Disasters are often described as a result of the combination of: the exposure to a hazard; the conditions of vulnerability that are present; and insufficient capacity or measures to reduce or cope with the potential negative consequences. Disaster impacts may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being, together with damage to property, destruction of assets, loss of services, social and economic

disruption and environmental degradation.



Risk

Risk is the probability of harmful consequences or expected losses (deaths, injuries, properties, livelihood or environment) resulting from interaction between hazards and vulnerable conditions.

Hence to reduce risk, either vulnerability need to be reduced or capacity should be enhanced.

The elements at risk include People, buildings, crops or other such like societal components exposed to known hazard, which are likely to be

adversely affected by the impact of the hazard.

The risk can be categorised as:

- Intensive Risk (The risk of high severity, low frequency disasters) and
- Extensive Risk (The risk of low severity, high frequency disasters)

The risk can be managed by three approaches:

- Actions to avoid the risk (This would include not allowing the element that could be at risk to be located in the area of potential hazard)
- Actions to reduce the risk (This would include taking actions that would mitigate the risk)
- Actions to share the risk (This would entail shifting the risk-bearing responsibility to another party)

UNISDR's Terminology in Disaster Risk Reduction, 2009

Risk The combination of the probability of an event and its negative consequences.

Comment: The word “risk” has two distinctive connotations: in popular usage the emphasis is usually placed on the concept of chance or possibility, such as in “the risk of an accident”; whereas in technical settings the emphasis is usually placed on the consequences, in terms of “potential losses” for some particular cause, place and period. It can be noted that people do not necessarily share the same perceptions of the significance and underlying causes of different risks.

Acceptable Risk

The level of potential losses that a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Acceptable Risk The level of potential losses that a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions.

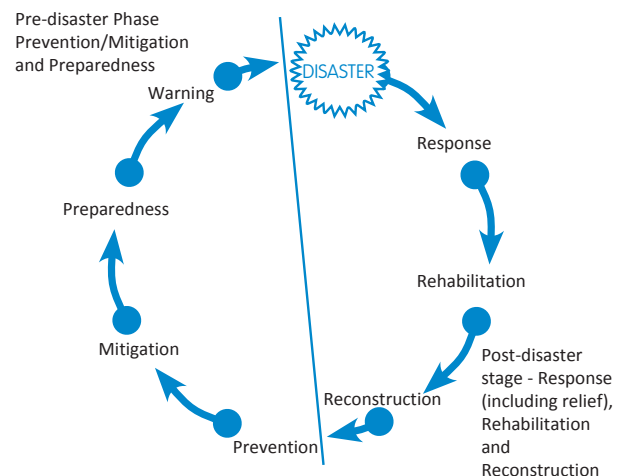
Comment: In engineering terms, acceptable risk is also used to assess and define the structural and non-structural measures that are needed in order to reduce possible harm to people, property, services and systems to a chosen tolerated level, according to codes or “accepted practice” which are based on known probabilities of hazards and other factors.

Disaster Management Cycle

The Disaster Management Cycle consists of mainly four phases. The Prevention and Mitigation and Preparedness are the pre-disaster phase while Response and Relief and Rehabilitation and Reconstruction are under post-disaster stage.

The Prevention and Mitigation efforts are made to prevent or mitigate the damage such as construction of dikes and dams against floods. The activities and measures for ensuring an effective response to the impact of hazards are classified as ‘Preparedness’ such as emergency drills and public awareness. These activities are not aimed at averting the occurrence of a disaster but to ensure an effective response.

The Response and Relief includes activities such as search and rescue, first aid, fire fighting and distribution of relief items. The Rehabilitation and Reconstruction include recovery and reconstruction of the damaged and destroyed elements. Also, Disaster Risk reduction can be integrated.



Prevention

Prevention is the outright avoidance of adverse impacts of hazards and related disasters. It expresses the concept and intention to completely avoid potential adverse impacts through action taken in advance. For example, dams or embankments that eliminate flood risks, land-use regulations that do not permit any settlement in high risk zones, and seismic engineering designs that ensure the survival and function of a critical building in likely earthquake.



UNISDR's Terminology in Disaster Risk Reduction, 2009

Prevention The outright avoidance of adverse impacts of hazards and related disasters.

Comment: Prevention (i.e. disaster prevention) expresses the concept and intention to completely avoid potential adverse impacts through action taken in advance. Examples include dams or embankments that eliminate flood risks, land-use regulations that do not permit any settlement in high risk zones, and seismic engineering designs that ensure the survival and function of a critical building in any likely earthquake. Very often the complete avoidance of losses is not feasible and the task transforms to that of mitigation. Partly for this reason, the terms prevention and mitigation are sometimes used interchangeably in casual use.



Mitigation

Mitigation includes a range of policy, legislation, professional practices, and social adjustment that are designed to reduce the effects of hazards in the community. The adverse impacts of hazards often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures encompass engineering techniques and hazard-resistant construction as well as improved environmental policies and public awareness.

Mitigation has two components namely structural and non-structural. The common **structural measures** for disaster risk reduction include dams, flood levies, ocean wave barriers, earthquake-resistant construction, and evacuation shelters. The common **non-structural measures** include building codes, land use planning laws and their enforcement, research and assessment, information resources, and public awareness programs.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Mitigation *The lessening or limitation of the adverse impacts of hazards and related disasters.*

Comment: The adverse impacts of hazards often cannot be prevented fully, but their scale or severity can be substantially lessened by various strategies and actions. Mitigation measures encompass engineering techniques and hazard-resistant construction as well as improved environmental policies and public awareness. It should be noted that in climate change policy, "mitigation" is defined differently, being the term used for the reduction of greenhouse gas emissions that are the source of climate change.



Preparedness

Preparedness includes all activities and measures taken in advance to ensure effective response to the impact of hazards. It can also be defined as the Knowledge and capacities developed to effectively anticipate, respond to and recover from the impact of imminent or current hazard or conditions.

It is based on a sound analysis of disaster risks and good linkages with early warning, the development of arrangements for coordination, evacuation and public information, and associated training and field exercises. These must be supported by formal institutional, legal and budgetary capacities.

The goal of disaster preparedness is to achieve a satisfactory level of readiness to respond to any emergency situations by strengthening the technical and managerial capacity of governments, organizations, and communities. Preparedness can also take the form of ensuring that reserves of food, equipment, water, medicines and other essentials are maintained in cases of disasters.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Preparedness *The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent or current hazard events or conditions.*

Comment: Preparedness action is carried out within the context of disaster risk management and aims to build the capacities needed to efficiently manage all types of emergencies and achieve orderly transitions from response through to sustained recovery. Preparedness is based on a sound analysis of disaster risks and good linkages with early warning systems, and includes such activities as contingency planning, stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation and public information, and associated training and field exercises. These must be supported by formal institutional, legal and budgetary capacities. The related term "readiness" describes the ability to quickly and appropriately respond when required.



Early warning

The provision of timely and effective information, through identified institutions, that allows individuals exposed to a hazard to take action to avoid or reduce their risk and prepare for effective response. The expression "end-to-end warning system" is also used to emphasize that warning systems need to span all steps from hazard detection through to community response.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Early warning system *The set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.*

Comment: This definition encompasses the range of factors necessary to achieve effective responses to warnings. A people-centred early warning system necessarily comprises four key elements: knowledge of the risks; monitoring, analysis and forecasting of the hazards; communication or dissemination of alerts and warnings; and local capabilities to respond to the warnings received. The expression “end-to-end warning system” is also used to emphasize that warning systems need to span all steps from hazard detection through to community response.



Photo credit: International Federation of Red Cross and Red Crescent Societies (p17604)
<http://www.flickr.com/photos/ifrc/2480827512/in/photostream/>

Response

Response can be defined as the provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected. Disaster response is predominantly focused on immediate and short-term needs and is sometimes called ‘disaster relief’. It is important to practice response activities in pre-disaster phase to ensure effective response during post-disaster situation. Hence, there is link between disaster response and preparedness.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Response *The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.*

Comment: Disaster response is predominantly focused on immediate and short-term needs and is sometimes called “disaster relief”. The division between this response stage and the subsequent recovery stage is not clear-cut. Some response actions, such as the supply of temporary housing and water supplies, may extend well into the recovery stage.

Rehabilitation

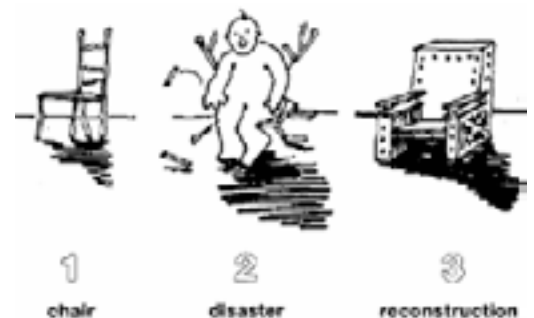
Rehabilitation is the operations and decisions taken after a disaster with a view to restoring a stricken community to its former living conditions, while encouraging and facilitating the necessary adjustments to the changes caused by the disaster. (UNDP/UNDRO, 1992).



Reconstruction

Reconstruction is permanent measures to repair or replace damaged infrastructure and to set the society back on course.

It is also defined as the actions taken to re-establish a community after a period of rehabilitation subsequent to a disaster. Actions would include construction of permanent housing, full restoration of all services, and complete resumption of the pre-disaster state. (UNDP/UNDRO, 1992)



It often provides an opportunity to improve a community rather than to simply reconstruct a pre-existing system and is widely known as ‘Build back better’. Increasing the reconstruction programs are not simply restoration of damaged and destroyed elements but are built better. The Cyclone Nargis recovery program also embraced the concept of ‘build back better’.

Disaster Management

It is the collective term for all activities that contribute to increasing capacities and will lead to reducing immediate and long-term vulnerabilities. It covers activities before, during and after a disaster. There is gradual shift and currently Disaster Risk Management is more in usage.



Early Recovery

Early recovery is a multi-dimensional process of recovery that begins in a humanitarian setting. It is guided by development principles that seek to build on humanitarian programmes. It aims to generate self-sustaining, nationally owned, resilient processes for post-crisis recovery. It encompasses the restoration of basic services, livelihoods, shelter, governance, security and rule of law, environment and social dimensions, including the reintegration of displaced populations.

Recovery

The process aimed at assisting affected people, livelihood, damaged facilities and structures, system failure (such as transportation system, communication system, etc.) and other affected elements to resume their normalcy and ensure resilience for potential disasters in the future. This could be done through various measures such as rebuilding, providing farm-based communities with necessary agricultural equipment and seeds for cultivation after disaster, adopting optional livelihoods, identify safer location for re-settlement.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Recovery *The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.*

Comment: The recovery task of rehabilitation and reconstruction begins soon after the emergency phase has ended, and should be based on pre-existing strategies and policies that facilitate clear institutional responsibilities for recovery action and enable public participation. Recovery programs, coupled with the heightened public awareness and engagement after a disaster, afford a valuable opportunity to develop and implement disaster risk reduction measures and to apply the “build back better” principle.

Disaster Risk Management

The use of wide range of options available to protect people, their assets, and the environment. The main purpose of DRM is to reduce and manage disaster risks, build disaster resilience, focus on how to stop potentially damaging disaster events, or, where this is not possible, and make the impact of potentially damaging disaster events as small as possible.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Disaster Risk Management *The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.*

Comment: This term is an extension of the more general term “risk management” to address the specific issue of disaster risks. Disaster risk management aims to avoid, lessen or transfer the adverse effects of hazards through activities and measures for prevention, mitigation and preparedness.

Disaster Risk Reduction

The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

UNISDR's Terminology in Disaster Risk Reduction, 2009

Disaster Risk Reduction *The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.*

Comment: A comprehensive approach to reduce disaster risks is set out in the United Nations-endorsed Hyogo Framework for Action, adopted in 2005, whose expected outcome is “The substantial reduction of disaster losses, in lives and the social, economic and environmental assets of communities and countries.” The International Strategy for Disaster Reduction (ISDR) system provides a vehicle for cooperation among Governments, organisations and civil society actors to assist in the implementation of the Framework. Note that while the term “disaster reduction” is sometimes used, the term “disaster risk reduction” provides a better recognition of the ongoing nature of disaster risks and the ongoing potential to reduce these risks.

Community based Disaster Risk Reduction

A process of disaster risk reduction in which at-risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities. This means that people are at the heart of decision-making and implementation of disaster risk reduction activities.



Climate Change

It refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. (IPCC)

A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. Distinction between climate change attributable to human activities altering the atmospheric composition and climate variability attributable to nature causes. (UNFCCC)

Climate change impacts would likely manifest in the form of

- i. Alteration of the mean state of climate
- ii. Increased frequency and intensity of extreme climate events
- iii. Combination of (i) and (ii) and;
- iv. Climate surprises, i.e. the emergence of historically unexpected and sudden climate change-induced patterns

UNISDR's Terminology in Disaster Risk Reduction, 2009

- a. The Inter-governmental Panel on Climate Change (IPCC) defines climate change as: "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use".
- b. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods".

Comment: For disaster risk reduction purposes, either of these definitions may be suitable, depending on the particular context. The UNFCCC definition is the more restricted one as it excludes climate changes attributable to natural causes. The IPCC definition can be paraphrased for popular communications as "A change in the climate that persists for decades or longer, arising from either natural causes or human activity."

Climate Change Adaptation

Adjustment in natural or human systems in response to "A change in the climate that persists for decades or longer, arising from either natural causes or human activity."

UNISDR's Terminology in Disaster Risk Reduction, 2009

The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Comment: This definition addresses the concerns of climate change and is sourced from the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC). The broader concept of adaptation also applies to non-climatic factors such as soil erosion or surface subsidence. Adaptation can occur in autonomous fashion, for example through market changes, or as a result of intentional adaptation policies and plans. Many disaster risk reduction measures can directly contribute to better adaptation.

Climate Change Adaptation and Disaster Risk Reduction

Complementarity

DRR	CCA
DRR practitioners are concerned about the increase in climate- and disaster-related risks in the past 3 decades, affecting developing countries and reversing hard-won development gains.	As evidence of global warming impacts continue to mount, climate change experts, policy makers and practitioners are convinced of the urgent need to respond to these changes by enabling governments and communities to adapt to their potential impacts.
DRR community has developed a significant body of knowledge and tools for managing climate-related risks associated with natural variability in the climate system.	Climate change scientists continue to improve models that predict the impacts of a changed climate under various scenarios - information of enormous value to those working at reducing risks from weather events.
DRR community has important experience in making the case to decision-makers about the benefits of preventive action and in "mainstreaming" such action into development and sustainable practices.	The issue of climate change enjoys global international attention and is supported by binding legal agreements.

Differences

Parameters	DRR	CCA
Scope	Goes beyond climate-related disasters hydro-meteorological (torrential rain, floods, droughts, storms) and geomorphological (earthquakes, volcanic eruptions) hazards	Focus on changes in average climatic conditions and climate variability, which may modulate the vulnerability to certain disasters
Physical Exposure	Natural hazards, onset cannot be prevented	Anthropogenic, hence within the capacity of humans to influence their exposure to climate change
Mitigation	Limiting the adverse impact of a particular hazard, but not the onset of the hazard itself	Amount of GHGs can be reduced or eliminated; will influence the rate and magnitude of climate change
Time horizon	More concerned with the present Emphasis is placed on vulnerabilities revealed through past disasters Focus tends to be more on near-term trends (the next 5-10 years) rather than long-term changes	In anticipating climate change, the scientific and policy debate usually takes a much longer time horizon than disaster risk management Climate projections are usually made for the next 20, 50 and 100 years. 2025, 2050 and 2100 often represent the reference years of comparison to present day situations.

Take Away

After this session, you should be able to:

- Understand and define key DRM Terms
- Understand the linkages of hazard, vulnerability, and disaster risk

Check your learning:

1. Select the term which explain the statements mentioned.

1.1 A process of disaster risk reduction in which at-risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities.

- (a) Disaster risk reduction
- (b) Capacity building
- (c) Community based Disaster risk reduction
- (d) Risk assessment

1.2 Activities and measures taken in advance to ensure effective response to the impact of hazards.

- (a) Climate change
- (b) Risk assessment
- (c) Preparedness
- (d) Response

1.3 The conditions determined by physical, social, economic and environmental factors which increase the susceptibility of community to the impact of hazard.

- (a) Vulnerability
- (b) Preparedness
- (c) Capacity
- (d) Elements at risk

1.4 A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

- (a) Disaster risk reduction
- (b) Capacity
- (c) Hazard
- (d) Disaster

2. The definition for DM terms is provided below, put T (True) or F (False).

2.1 Capacity is the combination of all the strengths, and resources available within a community, society or organization that can be used to achieve agreed goals.

2.2 Annual flood in Ayeyawaddy river is intensive risk, while the Cyclone Nargis is extensive risk.

2.3 In disaster management cycle, response and relief are in pre-disaster phase.

2.4 Building codes and land use planning laws are structural mitigation measures.

2.5 Food, clothes and blankets given to flood- affected communities are emergency rehabilitation items.

3. Define following terms:

3.1 Risk

.....
.....
.....

3.2 Prevention

.....
.....
.....

3.3 Explain the difference between Rehabilitation and Reconstruction?

.....
.....
.....

3.4 Please mention two key learning's from this session

.....
.....
.....

Correct answers of check your learning Exercises

1. 1.1 (c) Community based Disaster risk reduction 1.2 (c) Preparedness
1.3 (a) Vulnerability 1.4 (d) Disaster
2. 2.1 T
2.2 F (Annual flood is extensive risk, Cyclone Nargis is intensive risk)
2.3 F (Post-disaster)
2.4 F (Non- structural)
2.5 F (Relief)

Additional readings/references

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- Warfield. C.(2009) *The disaster management cycle*. http://www.gdrc.org/uem/disasters/1-dm_cycle.html

session
1.2

GROUP WORK ON DISASTER RISK MANAGEMENT TERMS

At the end of the session,

- Disaster Risk Management terms and concepts will be further consolidated

Group Work 1 - Matching Game

- Each group is provided with a set of photos with number written at the back and also a set of terms with numbers written in advance.
- Work in group to match the photo and the correct term and fill up number of photos and number of terms in the table below.

Number of Photograph	Number of Term

Group Work 2 - Tagging

- Each group is provided with a drawing.
- Each group to identify Hazard, Vulnerability and Capacity in the drawing.
- Then each group lists down Hazard, Vulnerability and Capacity in flip chart using the table below.

Hazard	Vulnerability	Capacity



The probable Hazard, Vulnerability and Capacity in the drawing are as follows:

Hazard	Vulnerability	Capacity
Tsunami	Houses on steep slopes vulnerable to landslide	Coconut trees along coast line can help during storm surge
Cyclone	Fishing boat near the sharks	Sign board for evacuation
Flood	Tourist in low-lying areas	Strong houses/buildings
Landslide		Boats
Sharks		House on higher ground is capacity against storm surge and tsunami.

session

1.3

OVERVIEW OF DISASTER RISK MANAGEMENT

At the end of the session, you should be able to:

- Understand Disaster Risk Management concept and Disaster Crunch Model
- Understand the paradigm shifts
- Acquaint with various measures towards Disaster Risk Management

Key points covered *Paradigm Shifts, Disaster Risk Management Concepts, Disaster Crunch Model and Pressure Release Model, Disaster Risk Reduction, Prevention, Mitigation and Preparedness, Measures to reduce risk*

TRAINING CONTENT

Introduction

Disaster Risk Management is term that encompasses a broad range of activities including prevention, mitigation, preparedness, warning, response, rehabilitation and reconstruction. To understand the Disaster Management Concepts, various Models have been developed including the Disaster Crunch Model and Pressure Release Model that view disaster as a relation of hazard and vulnerable aspects in the broader development context.

Over the last several decades, disaster was viewed as purely natural phenomena and a one-off event without taking into account the social and economic implications. Later on the focus has shifted to the 'contingency planning' or 'emergency management' approach which places emphasis on roles of governments and relief agencies on receptive actions mainly on providing relief services immediately after the disaster.

Since late 1990s, the progressive perspective has looked at disasters as part and parcel of the 'normal' development societies and triggered by various vulnerable factors; and hence the emphasis is placed on Disaster Risk Reduction which is proactive, focusing on converting the vulnerabilities to 'safer condition'.

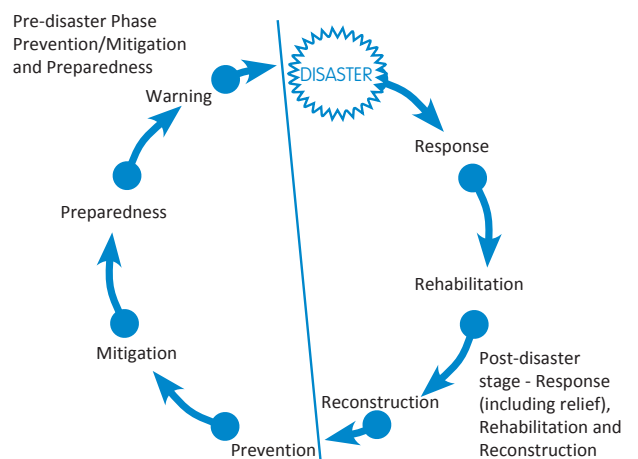
While Disaster Risk Management or Disaster Management are collective terms encompassing a broad range of activities (before, during and after a disaster) that contribute to increasing capacities and helping at risk persons avoid or recover from the impact of the disaster, Disaster Risk Reduction is concept and practice of reducing disaster risks with three key elements namely prevention, mitigation and preparedness.

Disaster Risk Management

What is Disaster Risk Management?

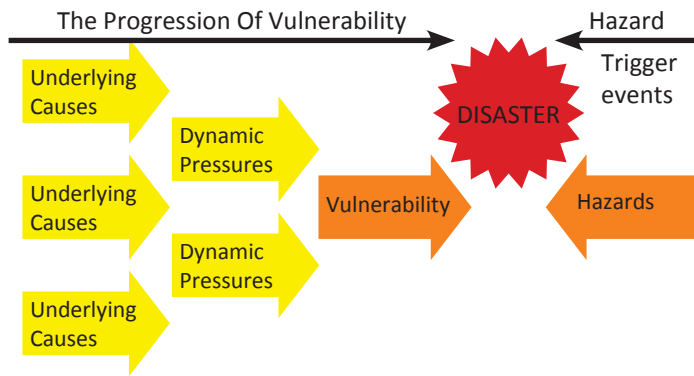
Disaster Risk Management is the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster. (UNISDR, 2009)

The main objectives of disaster risk management are to prevent and mitigate disaster and prepare effectively for occurrence of all hazards. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.



Disaster risk management encompasses all actions taken before, during, immediately after, and after a disaster. It is holistic and includes activities on mitigation, preparedness, emergency response, recovery, rehabilitation, and reconstruction.

Disaster risk management measures aim to reduce and manage disaster risks and build disaster resilience, and focus on how to stop potentially damaging disaster events, or, where this is not possible, make the impact of potentially damaging disaster events as small as possible.



A variety of models has been developed to illustrate how various development, socio-economic and political factors could contribute to and determine the impact of disasters. Some selected models are discussed as follow:

The Disaster Crunch Model

The model shows that the occurrence of disaster is triggered by 2 forces: Hazards and the Progression of Vulnerabilities. While, Hazard is natural phenomena which is somewhat beyond human control, 'The Progression of Vulnerability' is dynamic human-induced process, lying on socio-economic context:

Underlying Causes are:

- Weak linkages between communities to administration
- Limited access to resources
- Ideologies
- Political systems
- Economic systems

Dynamic Pressures

Lack of:

- Local institutions: health care, social services
- Markets, financial institutions, and investment
- Access to information
- Education and training
- Appropriate skills and technology
- Ethical standards in public life, etc.

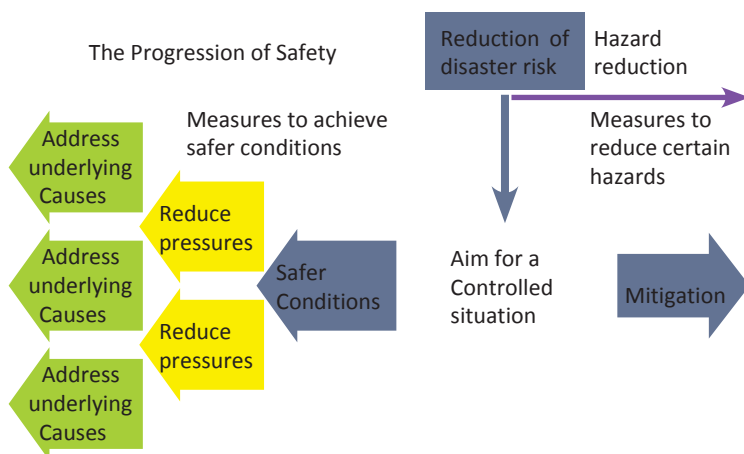
Macro forces:

- Population expansion
- Farms expenditure
- Debt profiles
- Deforestation, etc.

Vulnerabilities:

- Fragile physical environment
- Dangerous location
- Dangerous buildings and infrastructure
- Fragile local economy
- Livelihood at risk
- Low income level, etc.

The Pressure Release Model (Blaikie, P. et al. 1994)



Underlying causes generate *Dynamic Pressures*, which in turn causes **Vulnerability or Unsafe Conditions**. The 'Pressure Release Model' shows that to reduce disaster risk based on the particular conditions prevailing analyzed in the 'Disaster Crunch Model'. This stresses the need to reduce risks that primarily covers Prevention, Mitigation, and Preparedness for vulnerability reduction and increasing capacities. The outcome will be to reduce, control, convert or avoid the Underlying causes of Vulnerability and Dynamic Pressures that intensifies vulnerability, and turn 'unsafe conditions' to 'safe condition', 'vulnerable communities' to 'resilient or capable communities' and 'unsustainable livelihood' to 'sustainable livelihood'.

The Paradigm Shifts

Under the natural science approach, disaster was viewed as purely natural phenomena and the attempt has been made on prediction of disaster event. Till a few decades ago, disasters were viewed as one-off events and not related to the ongoing social and developmental processes. Disasters were responded to by governments and relief agencies placing an emphasis on preparedness measures such as stockpiling of relief goods, preparedness plans and a growing role of relief agencies. With the emerging of 'social science approach', disasters are no longer seen as extreme events, created entirely by natural forces, but as manifestations of unresolved problems of development. The rise in disasters and their consequences was related to the rise in the vulnerability of people that was related to development, the social and economic implications and other factors that contribute to trigger disaster events.

Hence, the disaster management practices have evolved from a largely top-down relief and response approach to **a more intersectoral risk management approach** taking into account socio-economic condition and vulnerable factors that determine the impact of disaster. The emphasis shifts to 'vulnerability analysis' and strategies for the reduction of vulnerabilities.

Approaches	Key Characteristics
Natural Science Approach	Disaster is natural phenomena, prediction of occurrence of Disaster Event
Contingency Planning or Emergency Management Approach	Emergency preparedness, stockpiling of relief items, contingency plans, and relief operations
Social Science Approach	Disaster is part of 'unresolved development', Disaster is triggered by hazard event on vulnerable factors in dynamic pressure societal environment
Intersectoral Risk Management Approach	Disaster Risk Reduction employing various inter-disciplinary measures with key goal to reduce vulnerabilities

Through time along with the paradigm shifts on Disaster Management, the focus has shifted from Relief and Rehabilitation (reactive and receptive) to Prevention, Mitigation, Preparedness, Response and Recovery (proactive and progressive).

Focus on Pre-disaster activities?

With attitude shifted to an emphasis on prevention, mitigation and preparedness measures, Disaster management practices have evolved from a largely top-down relief and response approach to a more intersectoral risk management approach which is Disaster Risk Reduction.

Appropriate and do-able disaster management activities to undertake before, during and after the disaster are as follows:

Structural and non-structural prevention and mitigation measures:

- Engineering works (bridges, protective dykes, embankments)
- Safe building design and construction
- Retrofitting
- Coastal wind breaks or shelter belts, Mangroves forest
- Safety measures at home, in the community and work places
- Strengthening livelihood and food security
- Strengthening community health
- Nutrition improvement and food security
- Literacy program
- Relocation to safer location
- Risk communication and public awareness
- Risk assessment
- Risk reduction planning
- Land use planning and zoning
- Legislation
- Strengthening institution and organizations
- Environmental management; advocacy on disaster and development issues
- Insurance and micro-insurance

Preparedness measures:

- Setting up systems for early warning
- Evacuation drill
- Training on evacuation center
- Training on emergency operations center management
- Strengthening coordination and institutional arrangements
- Stockpile of supplies and logistics
- Contingency planning

Emergency Response and Recovery:

- Search and rescue
- First aid
- Evacuation
- Evacuation center management
- Damage needs capacity assessment
- Immediate repair of community facilities and services
- Relief delivery
- Clearing the debris
- Psycho-social counselling and stress debriefing; Medical services
- Recovery after the disaster such as rehabilitation and reconstruction activities ('building back better' within the framework of mitigation)
- Identifying appropriate and adequate management measures

As per the Global Assessment Report 2011, the risk management measures can be categorized into the following three:

- *Prospective Risk Management* to avoid the construction of new risks (such as land use planning, construction law and building codes),
- *Corrective Risk Management* to address pre-existing risks (such as reservoirs and irrigation systems in drought affected areas) and
- *Compensatory Risk Management* to avoid disaster losses spilling over into poverty and other outcomes (such as insurance).

Take Away

After this session, you should be able to:

- Understand Disaster Risk Management concept and Disaster Crunch Model
- Understand the paradigm shifts
- Acquaint with various measures towards Disaster Risk Management

Check your learning:

1. Select the measure which encompasses the following activity:

1.1 Building bridges and protective dykes in coastal area is :

- (a) Preparedness measure
- (b) Emergency response measure
- (c) Structural prevention/ mitigation measure
- (d) Non-structural prevention/mitigation measure

1.2 Strengthening community health is:

- (a) Preparedness measures
- (b) Emergency response measure
- (c) Structural prevention/ mitigation measure
- (d) Non-structural prevention/mitigation measure

1.3 Evacuation in time of disaster is:

- (a) Preparedness measures
- (b) Emergency response measures
- (c) Structural prevention/ mitigation measure
- (d) Non-structural prevention/mitigation measure

- 1.4 Evacuation drills conducted in schools are:
- Preparedness measure
 - Emergency response measure
 - Structural prevention/ mitigation measure
 - Non-structural prevention/mitigation measure
2. Check whether the following sentences are True or False.
- 2.1 Disaster management practices have evolved from relief and response approach to a more inter-sectoral risk management approach.
- 2.2 The Pressure Release Model focuses on reduce of vulnerability, dynamic pressure and underlying causes.
- 2.3 Disaster risk reduction is stand alone issue and should not be integrated into development activities.
- 2.4 Under the inter-sectoral risk management, the key goal is to reduce occurrence of hazard.
- 2.5 For mitigation, only structural measures could be implemented to mitigate impacts of hazards.
3. Give 3 examples of the following terms.
- 3.a Vulnerability in urban Area
-
-
-
- 3.b Vulnerability in rural area
-
-
-
- 3.c Structural Mitigation Measures
-
-
-
- 3.d Non-structural mitigation measures
-
-
-
4. Please mention two key learning's from this session
-
-
-

Correct answers of check your learning Exercises

- 1.1 (c) Structural prevention/ mitigation measure
 - 1.2 (d) Non-structural prevention/mitigation measures
 - 1.3 (b) Emergency response measures
 - 1.4 (a) Preparedness measure
- 2.1 True
 - 2.2 True
 - 2.3 False
 - 2.4 False
 - 2.5 False

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session
1.4

DISASTER RISK MANAGEMENT SYSTEMS IN MYANMAR

At the end of the session, you should be able to:

- Understand Myanmar's Global and Regional Commitments on Disaster Risk Management
- Familiarize with the National and Sub-National level agencies on Disaster Risk Management, DRR Network and Development Partners
- Familiarize with National DRM Guiding Framework and other key documents

Key points covered: *Hyogo Framework for Action (HFA), ASEAN Agreement of Disaster Management and Emergency Response (AADMER), Disaster Risk Management Systems of Myanmar, Myanmar Disaster Preparedness Agency (MDPA), Committees on DRM, RRD, and other DRM line Ministries, Township Disaster Preparedness Committee, Village Tract Disaster Preparedness Committees, Myanmar Red Cross, UN Agencies, NGOs, Professional Bodies, Coordination and collaboration, Myanmar Action Plan on Disaster Risk Reduction (MAPDRR), Standing Order, Guidelines for Township Disaster Management Plan (TDMP)*

TRAINING CONTENT

Introduction

Situated in the Bay of Bengal, Myanmar is exposed to multiple natural hazards which include Cyclone, Storm surge, Floods, Landslide, Earthquake, Tsunami, Drought, Fire and Forest Fire. Its coastal regions are exposed to cyclones, storm surges and tsunamis while major parts of the country are at risk from earthquakes and fires. The flooding is a recurring phenomenon across the country while some parts of the country is exposed to landslide and drought risks.

Natural disasters have had destructive impacts on the developmental gains and hinder the development interventions. Disaster risk management has received greater attention and government effort could be seen in various interventions to address country's growing need to secure safety and reduce impacts of potential disasters.

As a member of global and regional entities, Myanmar Disaster Risk Management is aligned with global and regional initiatives - Hyogo Framework for Action (HFA) and ASEAN Arrangement for Disaster Management and Emergency Response (AADMER). The Union of Myanmar has disaster management set-up from national level, ministerial to local administration level. The institutional arrangement at national level has Myanmar Disaster Preparedness Agency (MDPA) as the supreme agency for policy and decision making with sub-committees to support operationalization. DRM guiding frameworks and actions such as *Myanmar Action Plan for Disaster Risk Reduction (MAPDRR)* and other key documents including *Standing Order* and *Guideline for Township Disaster Management Plan* were developed and updated to be effective tools in shaping DRM of the country.

Myanmar's Commitments to Global and Regional DRM Frameworks

Hyogo Framework for Action

During the World Conference on Disaster Reduction in January 2005 held at Kobe, Japan, 168 countries committed to *the Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters by achieving substantial reduction of disaster losses, in lives and in the social, economic, and environmental assets of communities and countries.*

Five HFA Priorities Actions:

- Priority 1 Making disaster risk reduction a priority with a strong institutional basis for implementation
- Priority 2 Improving risk information and early warning
- Priority 3 Building a culture of safety and resilience
- Priority 4 Reducing the risks in key sectors
- Priority 5 Strengthening disaster preparedness for effective response

A Guide for Implementing the Hyogo Framework:

1. States have the primary responsibility for implementing measures to reduce disaster risk.
2. Disaster risk reduction must be integrated into development activities.
3. A multi-hazard approach can improve effectiveness.
4. Capacity-development is a central strategy for reducing disaster risk.
5. Decentralize responsibility for disaster risk reduction.
6. Effective disaster risk reduction requires community participation.
7. Gender is a core factor in disaster risk and in the implementation of disaster risk reduction.
8. Public-private partnerships are important tools for disaster risk reduction.
9. Disaster risk reduction needs to be customized to particular settings.

ASEAN Agreement on Disaster Management and Emergency Response (AADMER)



In South East Asia region, all ten Member States of ASEAN have ratified 'ASEAN Agreement on Disaster Management and Emergency Response - AADMER'. Myanmar has signed ASEAN Agreement on Disaster Management and Emergency Response- AADMER on July 2005. AADMER has entered into force on 24 December 2009. The AADMER is a proactive regional framework for cooperation, coordination, technical assistance, and resource mobilization in all aspects of disaster management.

It also affirms ASEAN's commitment to the Hyogo Framework of Action (HFA) and is the first legally-binding HFA-related instrument in the world.

Examples of key activities in line with HFA and AADMER

- Being signatory to the HFA, Myanmar applies the Framework for disaster management in the country. Myanmar is also a signatory to ASEAN Agreement on Disaster Management and Emergency Response AADMER, which mentions identification of National Focal Point [NFP] and Competent Authorities [CAs] to ensure smooth response.
- Ministry of Social Welfare, Relief and Resettlement developed 30 years long-term Plan of MSWRR (2001-2030) in which DRR is mentioned as priority.
- Government of Myanmar has constituted National Disaster Preparedness Central Committee (NDPCC), constituted in 2005 up to 20 April 2011 under the chair of Prime Minister, which is the apex body for Disaster Management. NDPCC prepared the Standing Order on Natural Disaster Management to set and assign the roles and responsibilities of each ministry, department and Disaster Preparedness Committees under Normal Times, Warning stage, Disaster stage and Rehabilitation stage.
- Ministry of Health prepared National Strategic Plan for Prevention and Control of Avian Influenza and Human Influenza Pandemic Preparedness and Response document in consultation with Ministry of Livestock and Fisheries to prevent and control Avian Influenza and Human Influenza Pandemic.
- Relief and Resettlement Department is planning to establish Disaster Management Centre which is one of the priority projects listed under MAPDRR which is in line with the HFA and AADMER Framework, for implementation over 6 years period from 2009 to 2015.

National Disaster Management Systems of Myanmar

Constitution of Myanmar Disaster Preparedness Agency (MDPA)

On April 20, 2011, by **Order. No 23/ 2011 from Office of President, Myanmar Disaster Preparedness Agency (MDPA)** was constituted with the chairmanship by the Minister for Social Welfare, Relief and Resettlement and the Deputy chairmen are Minister for Defense and Minister for Home Affairs. And then, the Deputy Minister for Social Welfare, Relief and Resettlement is the Secretary and the Director General of Relief and Resettlement is the Joint-secretary with the membership of other eight Deputy Ministers from line Ministries.

Institutional Framework for Myanmar Disaster Preparedness Agency, Management Working Committee and Sub-Committees (MDPA structure as of March, 2012)

Myanmar Disaster Preparedness Agency

Chairman: Union Minister Social Welfare, Relief and Resettlement

Myanmar Disaster Preparedness Management Working Committee		Fourteen Sub-Committees	
Deputy Minister for Social Welfare, Relief and Resettlement	Chairman	Sub-Committee	Chairman
Deputy Minister for Defense	Second Chairman	News and Information	Deputy Minister for Information
Deputy Minister for Home Affairs	Second Chairman	Emergency Communication	Deputy Minister for Communications, Posts and Telegraphs
Ministers on Disaster Preparedness in respective State/Regions	Member	Search and Rescue	Deputy Minister for Social Welfare, Relief and Resettlement
Director General for Department of Educational Training and Planning	Member	Emergency Supply and Shelter	Deputy Minister for Transportation
Director General for Department of Health	Member	Confirmation of Damages and Losses	Deputy Minister for Central Statistical Organization
Secretary for Mandalay City - Development Committee	Member	Transportation and Route Clearance	Deputy Minister for Rail Transport
Secretary for Yangon City Development Committee	Member	Health Care	Deputy Minister for Health
Secretary for Nay Pyi Taw City Development Committee	Member	Rehabilitation and Reconstruction	Deputy Minister for Boarder Affairs
Director General for Relief and Resettlement Department	Secretary	Security	Deputy Minister for Home Affairs
Director General for Fire service Department	Deputy Secretary	Finance	Deputy Minister for Social Welfare, Relief and Resettlement
		Procurement	Director General, Department of Social Welfare
		International Relation	Deputy Minister for Foreign Affairs
		Psychological Support in the Rehabilitation Penriod	Deputy Minister for Information
		Emergency Supervising	Deputy Minister for Social Welfare, Relief and Resettlement

Role of MDPA

MDPA is the supreme agency for strategic guidance, decision making, plan formulation and oversees monitoring and supervision of Disaster Risk Management in Myanmar. MDPA is responsible for documentation of disaster incidents and experiences of natural disasters in Myanmar and other countries. It is also responsible for Planning of preparedness plans for natural disasters in the future, and giving guidelines for planning and implementing rescue and relief in natural disasters. MDPA is also responsible for the supervision of work plans for mobilization of manpower and materials for rescue and relief activities. Detailed roles and responsibilities are as follow:

- Documentation of incidents and experiences of natural disasters in Myanmar and other countries, Planning of preparedness plans for natural disasters in future, Giving guidelines for planning and implementing rescue and relief in natural disasters.
- Supervision of work plans for mobilization of manpower and materials for rescue and relief activities.
- Identifying relief areas for immediate and effective rescue and relief activities, to supervise the mobilization of manpower and materials of departments and social organizations in relief areas.
- Guidance for announcement of emergency situation in disaster affected areas, utilization of Myanmar Police Force and armed forces for security.
- Guidance for field supervision by central level for food security, prevention of epidemic and provision of emergency food items and medicines in affected areas.
- Guidance on systematic implementation of recovery by priority 1, 2,3 in crop cultivation, livelihood activities. Transportation, health and education sectors in affected areas.

- Guidance for information dissemination, so that other countries, international organizations and governments can know the situation of disaster impact, rescue and relief activities by Government
- Guidance for documentation, recording and supervision on managing materials and funding supported by foreign countries and activities of organizations
- Supervision of other activities related to natural disaster management
- To form and implement disaster response sub-committee as necessary.

For the effective disaster management mechanism, **Myanmar Disaster Preparedness Management Working Committee** and **(14) sub-Committees** have been organized.

Roles and responsibilities of **Myanmar Disaster Preparedness Working Committee** are:

- To implement Disaster Management activities such as reducing vulnerabilities, preparedness relief and rehabilitation activities according to guidelines and instruction from higher levels.
- To manage support from internal and external for relief, resettlement and reconstruction activities.
- To identify public awareness on disaster preparedness and guidance to mobilize national political groups and general public to participate in different levels.
- To submit report to Office of President every four months through MDPA.
- To identify responsibilities to Ministries and Organization according to intensity of hazards.

The 14 sub-committees to support operationalization under the MDPA are as follow:

- | | |
|---|--|
| • News and Information Sub-Committee | • Finance Sub-Committee |
| • Health Care Sub-Committee | • Confirmation of Damages and Losses Sub-Committee |
| • Emergency Communication Sub-Committee | • International Relation Sub-Committee |
| • Rehabilitation and Reconstruction Sub-Committee | • Transportation and Route Clearance Sub-Committee |
| • Search and Rescue Sub-Committee | • Psychological Support in the Rehabilitation Period Sub-Committee |
| • Security Sub-Committee | • Purchasing Sub-Committee and |
| • Emergency Supply and Shelter Rehabilitation Sub-Committee | • Emergency Supervising Sub-Committee. |

The roles and responsibilities of these 14 sub-Committees are defined as below:

Roles and responsibilities of **News and Information Sub-Committee**

- To disseminate awareness to public (in school text books, newspaper journals TV and radio broadcast)
- To release news and information on before, during, after disaster to responsible persons,
- To inform forecast of location and impact by disaster
- To timely release of printed news and instructions to affected location and people by airdrop or distribution of low cost radio and broadcasting news.

Roles and responsibilities of **Health Care Sub-Committee**

- To plan for emergency health care, and provisional of health care equipments in emergency including mobile clinic in affected areas
- To provide training on emergency health care for concerned officials
- To be responsible for preparedness plan on stockpiling of necessary medicines and plan for distribution during emergency
- To develop preparedness plan for contagious diseases.

Roles and responsibilities of **Emergency Communication Sub-Committee**

- To set up an emergency communication system and occasionally conduct mock drills
- To impart training on communication for the concerned organizations
- To maintain records of mobile phone numbers, fax numbers and specifications and frequencies of communication facilities and provide it to the responsible persons
- To make arrangements for immediate communication as soon as early warning is received
- To compile telephone number, mobile, fax and wireless frequency of responsible persons from Central committee, Sub committees, state, regions, districts and townships and distribute to responsible personnel.

- To prepare to communicate at the hazard warning.
- Besides the existing communication system, if it is necessary, an auxiliary communication system should be set up to get continuous weather forecast from neighboring countries and international Meteorology and Hydrology departments during the emergency period
- To set up a communication system which will be used by the supervisory organizations of the central committee to contact vertically and horizontally during their field trip to the disaster affected areas.

Roles and responsibilities of **Rehabilitation and Reconstruction Sub-Committee**

- To collect data on damage and losses
- To clear debris and undertake relief activities
- To coordinate on repair, reconstruction activities of education, health, agriculture and other sectors
- To give technical advice to disaster prone factories, work stations, building, roads and bridges on having early warning system and emergency plan

Roles and responsibilities of **Search and Rescue Sub-Committee**

- To prepare for search and rescue activities in the disaster prone regions, based on population and types of disasters (flood, storm, tsunami, fire, earthquake), and offshore islands, flooded plains, low plains, the shelter for victims, immediate relief materials, food and materials for live-saving.
- To constitute and train Regional Search and Rescue Teams
- To constitute Regional Teams of boats and assign duties to each member; Assign and dispatch Teams to the flood-prone regions
- To prepare and train Team members on rescue during fires and earthquakes To organize and train special teams on rescue from the collapsed buildings during earthquakes; To keep machines, tools and emergency life-saving tools in a state of readiness.

Roles and responsibilities of **Security Sub-Committee**

- To perform security measures/ activities in disaster affected areas
- To organize mock drills
- To prepare action plans on security
- In emergency, to report and act under Regional Authorities

Roles and responsibilities of **Emergency Supply and Shelter Rehabilitation Sub-Committee**

- Assess damage and losses of the affected region through satellite imagery, aerial photographs, reports from aviation and from the field
- Assess the need for relief materials based on the type of disasters and prepare for emergency period and regional transportation arrangements
- To make arrangements for distribution of relief materials in coordination with Regional authorities, Security forces and Police forces
- To systematically constitute relief materials distribution teams at Township Wards/Village Tracts levels
- To ensure availability of drinking water, fuel and emergency medicines
- To get data on human death toll, losses and damages
- To make arrangements for Emergency treatment, cremation, restoration of family units and other social activities

Roles and responsibilities of **Finance Sub-Committee**

- To submit necessary funding to MDPA based on the type of disaster
- To manage and supervise the funding allotted for relief sub committees and getting approval from MDPA for emergency funding.
- To supervise the use of funding to be in line with financial regulation and manage financial accounts with suggestion and cooperation of Accountant General Office.

Roles and responsibilities of **Confirmation of Damages and Losses Sub-Committee**

- To collect, analyze and confirm data on death, damage and losses
- To estimate and verify data on requirement of relief and rehabilitation activities
- To keep record of long-term damage such as farms flooded by salt water
- To keep record of losses in economy and livelihood, damages and loss of buildings in national and private sectors.

Roles and responsibilities of **International Relation Sub-Committee**

- To inform all Myanmar embassies and Consulates and make appeals for relief aids.
- To coordinate in disaster risk reduction, prevention, relief and coordination
- To participate in international and regional disaster management programs.
- To participate in ASEAN, UN and International relief organizations.
- To coordinate in entry visas and airports and ports entries.
- To review and suggest on necessary preparation, education, rehabilitation and cooperation based on International and Regional experience sharing.

Roles and responsibilities of **Transportation and Route Clearance Sub-Committee**

- To maintain lists of regional transportation vehicles, boats and equipment and machinery for use in emergencies, to manage transportation facilities assigned by the higher level.
- To maintain lists of approach roads and auxiliary approach roads and monitor their condition and carry out maintenance work as necessary.
- To study main water way and approach water ways.
- To keep lists of airports and helipad.
- To make arrangements for fuel at the right place and in the amounts required.
- To identify vehicles stops check-points and communication machine.
- To provide a communication device for each vehicle group.
- To maintain lists of vehicles, water tank vehicles, fuel tank vehicles, ambulances, etc.

Roles and responsibilities of **Psychological Support in the Rehabilitation Period Sub-Committee**

- To conduct speech, discussions and encouraging to affected people for psychological support
- To support in family unification of missing and separated children
- To cooperate with social organizations for children to attend schools and to finish education for orphans in affected areas.
- To broadcast radio program for separated family members for reunification.
- To entertain by movies, music and drama for psychological support
- To give religious services for deceased by their religions
- To cooperate with social organizations for single children, women and aged persons survived in the family.

Roles and responsibilities of **Purchasing Sub-Committee**

- To purchase appropriate relief, shelter items, construction materials and medicines for affected people based on the type of disaster and location.

Roles and responsibilities of **Emergency Supervising Sub-Committee**

- To manage timely travel and conduct search and rescue in affected areas
- To cooperate with state, regional authority and identify and coordinate to fulfill the needs of people
- To check whether relief items, drinking water. Food and shelters are sufficient and coordinate for timely support of provisions
- Data collection of damaged households, homeless, and report to higher authorities
- To arrange in providing supports and funding to affected people
- To base at Fire Service Department headquarter in Yangon

Moreover, **Myanmar Disaster Preparedness Advisory Group** was organized with the personnel from Academia, various Institutions and Agencies.

Roles and responsibilities

- Combine, study and give suggestions on technological management, DRR, preparedness emergency response and rehabilitation activities National level disaster management committee, disaster management ministries, coordination committee and Social welfare, Relief and Rehabilitation Ministry.
- Motivation of awareness dissemination, workshops, trainings and researches on natural hazards and probable measures to reduce hazard risks.
- Giving solutions and suggestions to the problems identified by Social welfare, Relief and Rehabilitation Ministry.
- Planning and submitting of Long term plans for rehabilitation of disaster affected areas.

Also, **Myanmar National Search and Rescue Committee** was recently organized by **Order No 17/2012 Office of President on 20 April 2012** and the Chairman is the Minister for Home Affairs and the Vice Chairs are the Minister for Social Welfare, Relief and Resettlement and the Minister for President's Office. The Secretary is the Deputy Minister for Social Welfare, Relief and Resettlement and the Director General of Relief and Resettlement is the Joint Secretary. Other thirteen members from line Ministries, concerned Departments and Social Organizations are comprised in this Committee.

Role of Search and Rescue Committee

- Taking action on the Updating of National Disaster Prevention Plan
- Taking preparedness measures on search and rescue of the disaster affected people by the observation of the disaster prone areas and the population, compiling the necessary vehicle, fuel, food and non-food items, and emergency kit to undertake the immediate search and rescue activities, identifying the evacuation places depending on the topography of the disaster prone area
- Formation of special troops in the regions enable to do the search and rescue of the victims who are blocked in the earthquake and fire broke-out
- Preparing the coordination on emergency search and rescue among the government departments, countries in the region, International Organizations and INGOs, and LNGOs
- Managing, coordinating, taking actions and practicing mock drills in order to rescue the disaster affected people
- After undertaking the search and rescue, transferring to the relief and resettlement committee
- Providing guidance/policy on the collaboration of matters on requesting the aids from other countries
- Coordinating and collaborating on search and rescue activities for the disaster occurred in the neighboring countries by forming of special teams
- The team leader of search and rescue in the disaster affected area should provide the instruction for keeping in touch with the high level authority.

Myanmar National Search and Rescue Committee

Sr. No.	Organization	Designation
1	Union Ministry, Ministry of Home Affairs	Chairman
2	Union Minister, Ministry of Social Welfare, Relief and Resettlement	Vice Chairman
3	Union Ministry, Ministry of President's Office	Vice Chairman
4	Deputy Minister, Ministry of Home Affairs	Member
5	Deputy Minister, Ministry of Foreign Affairs	Member
6	Deputy Minister, Ministry of Information	Member
7	Deputy Minister, Ministry of Transport	Member
8	Deputy Minister, Ministry of Rail Transport	Member
9	Deputy Minister, Ministry of Health	Member
10	Deputy Minister, Ministry of Livestock Breeding and Fisheries	Member
11	Commander-in-chief (Army)	Member
12	Commander-in-chief (Navy)	Member
13	Commander-in-chief (Air)	Member
14	Director General, Department of Civil Aviation	Member
15	Director General, Department of Marine Administration	Member
16	Director General, Department of Transport	Member
17	Director General, Fire Services Department	Member
18	Chairman, Myanmar Red Cross Society	Member
19	Chairman, Myanmar Women Affairs Federation	Member
20	Chairman, Myanmar Maternal and Child Welfare Association	Member
21	Deputy Minister, Ministry of Social Welfare, Relief and Resettlement	Secretary
22	Director General, Relief and Resettlement	Joint Secretary

Relief and Resettlement Department (RRD)

Relief and Resettlement Department (RRD) is the department for Disaster Management in Myanmar. Under the Ministry of Social Welfare, Relief and Resettlement (MSWRR), Relief and Resettlement Department works together with Fire Service Department and Social Welfare Department with the aims to support

relief assistance to disaster affected people and to reduce loss of human lives and property by disaster impact.

One of RRD key mandates is delivering of relief assistance to affected people including rice, clothing and other relief items. RRD also takes lead role as technical disaster management agency and enhancing knowledge and understanding for effective disaster management. Disaster Management Training/Course of RRD has been conducted at Division and State level alternatively to educate concerned officials on Disaster preparedness and management, which is one of its mandates.

In Cyclone Nargis, RRD was the focal agency to coordinate search and rescue activities with manpower by armed forces, construction of over 10,000 low cost houses, and 28 cyclone shelters, livelihood rehabilitation activities in agriculture, fisheries and salt farms in delta area. In Cyclone Giri, RRD has distributed relief assistance comprising 4057 tons of food stuffs, drinking water, shelter and construction materials and medicines. RRD also provides relief assistance to affected people in Pakokku in the recent flash flood.

Besides RRD, there are key ministries with mandates relevant to disaster risk management who have led, coordinated, complemented or supported various disaster management activities as follows:

Key Roles of Ministries in Disaster Management

Ministries	Departments	Key role in Disaster Management			
		Normal time	Warning stage	Disaster stage	Rehabilitation
Ministry of Defence	The Armed Forces (Army)	√	√	√	√
	The Armed Forces (Navy)	√	√	√	√
	Armed Forces (Air Force)	√	√	√	√
Ministry of Social Welfare, Relief and Resettlement	Departments of Relief and Resettlement	√	√	√	√
	Fire Service Department	√	√	√	√
Ministry of Health	Department of Health		√	√	√
Ministry of Information	Myanmar Radio and Television	√	√	√	√
	Information and Public Relations Department	√	√	√	√
	Printing and Publications Enterprise	√	√	√	√
	News and Periodicals Enterprise	√	√	√	√
	Myanmar Film Enterprise	√	√	√	√
Ministry of Agriculture and Irrigation		√	√	√	√
Ministry of Industry 1		√	√	√	√
Ministry of Industry 2		√	√	√	√
Ministry of Commerce		√	√	√	√
Ministry of National Planning and Economic Development		√	√	√	√
Ministry of Finance and Revenue		√	√	√	√
Ministry of Foreign Affairs		√	√	√	√
Ministry of Forestry	Forestry Department	√	√	√	√
	Myanmar Timber Enterprise	√	√	√	√

Ministry of Construction	Public Works (Administration)	✓	✓	✓	✓
	Public Works (Roads)	✓	✓	✓	✓
	Public Works (Bridges)	✓	✓	✓	✓
	Public Works (Buildings)	✓	✓	✓	✓
	Public Works (Electricity)	✓	✓	✓	✓
	Public Works (Engineering)	✓	✓	✓	✓
	Department of Human Settlement and Housing Development	✓	✓	✓	✓
Ministry of Cooperatives		✓	✓	✓	✓
Ministry of Home Affairs	General Administration Department	✓	✓	✓	✓
	Myanmar Police Force	✓	✓	✓	✓
Ministry of Rail Transportation		✓	✓	✓	✓
Ministry of Transport	Water transport sector		✓	✓	✓
	Airway transport sector		✓	✓	✓
	Department of Hydrology and Meteorology	✓	✓	✓	✓
Ministry of Culture		✓	✓	✓	✓
Ministry of Communications, Posts and Telegraphs		✓	✓	✓	✓
Ministry of Energy	Myanmar Oil and Gas Enterprise	✓	✓	✓	✓
	Myanmar Petrochemical Enterprise	✓	✓	✓	✓
	Myanmar Petroleum Products Enterprise	✓	✓	✓	✓
Ministry of Electric Power 1		✓	✓	✓	✓
Ministry of Electric Power 2		✓	✓	✓	✓
Ministry of Education	Higher Education	✓	✓	✓	✓
	Basic Education	✓	✓	✓	✓
Ministry of Livestock Breeding and Fisheries	Livestock Breeding and Veterinary Department	✓	✓	✓	✓
	Fisheries Department	✓	✓	✓	✓

At Township level, Township Disaster Preparedness Committee is the specialized committee set up for disaster management. Composition of Township Disaster Preparedness Committee, Maubin Township is as follow:

Sr. No.	Organization	Designation
1	Township Officer, General Administration Department	Chairman
2	Township Police Officer, Myanmar Police Force	Member
3	Township Engineer, Public Works	Member
4	Staff Officer, Irrigation Department (Township)	Member
5	Staff Officer, Myanmar Agricultural Services (Township)	Member
6	Staff Officer, Myanmar Electric Power Enterprise (Township)	Member
7	Township Medical Officer	Member
8	Township Executive Officer, Development Affairs Department	Member
9	Staff Officer, Planning Department (Township)	Member
10	Staff Officer, Fire Service Department (Township)	Member
11	Staff Officer, Internal Revenue Department (Township)	Member
12	Deputy Staff Officer, General Administration Department	Member
13	Deputy Head of Township Myanmar Police Force	Member
14	Responsible Person, Myanmar Posts and Telecommunications	Member

15	Staff Officer, Forest Department (Township)	Member
16	Township Education Officer	Member
17	Township Manager, Myanmar Agricultural Produce Trading	Member
18	Chairman, Transportation Supervision Committee	Member

Institutional Arrangements for Disaster Management in Myanmar (2009)

Roles and responsibilities of the Township Disaster Preparedness Committee are:

- Information and awareness campaign for preparedness
- The early warning dissemination to masses shall be ensured and kept updated.
- Relief camps shall be identified and kept in the state of readiness.
- The data related to disaster shall be collected and updated regularly.
- Shift people to evacuation shelter in case of any impending disaster.
- Animals including cows, buffaloes, etc to be evacuated to safer place during floods or other disasters.
- Search and rescue operation shall be undertaken at the earliest.
- Medical response shall be started at the earliest.
- Relief assistance shall be started immediately.
- It shall be ensured that the law and order and security is maintained.
- Dead bodies shall be disposed of properly.
- Damage and loss due to disaster shall be recorded including photographs.
- Higher authority shall be informed at the earliest.
- Rehabilitation shall be undertaken after rescue activities.

Township Disaster Preparedness Committee has following sub-committees:

- News and Information Sub-Committee
- Emergency Communication Sub-Committee
- Search and Rescue Sub-Committee
- Confirmation of Damages and Losses Sub-Committee
- Emergency Supply Sub-Committee
- Emergency evacuation and transportation Sub-Committee
- Rehabilitation and Reconstruction Sub-Committee
- Health Care Sub-Committee
- Security Sub-Committee

Township Disaster Preparedness Sub-Committee (Bogale)

Information Sub-Committee	Transportation Sub-Committee
Emergency Communication Sub-Committee	Mitigation and Establishment of Emergency Shelter Sub-Committee
Relief and Resettlement Sub-Committee	Health and Education Sub-Committee
Information of Losses and Emergency Assistance Sub-Committee	Rehabilitation and Reconstruction Sub-Committee
Assessment of Losses Sub-Committee	Accepting Relief Materials and Fund Sub-Committee
Security Sub-Committee	

Institutional Arrangements for Disaster Management in Myanmar (2009)

At Village Tract/Ward Level, Village Tract/Ward Disaster Preparedness Committees were formed with the composition of members as follow:

Village Tract/ Ward Disaster Preparedness Committee

Sr. No.	Member	Designation
1	Administrator, Village Tract/Ward	Chairman
2	Clerk, Settlement and Land Records Department	Member
3	Member, Myanmar Red Cross Society	Member
4	Member of Auxiliary Fire Brigade	Member
5	Head, Police Sub-Station, Ward/Village Tract, Myanmar Police Force	Member
6	Member of Veterans' Association	Member
7	Member of Myanmar Women Affairs Federation	Member

8	Member of Myanmar Maternal and Child Welfare Association	Member
9	Primary school teachers	Member
10	Respected personnel from Village Tract/ Ward	Secretary
11	Clerk (Village Tract/Ward), General Administration Department	Secretary

Institutional Arrangements for Disaster Management in Myanmar (2009)

Roles and responsibilities of the Village Tract/Ward Disaster Preparedness Committee

- To implement the guidelines and instructions of the Township level committee.
- To coordinate with NGOs and mobilize human resources for relief and rescue.
- To arrange for emergency shelter and evacuation.
- To coordinate with departments.
- To transport and distribute relief materials.
- To disseminate Do's and Don'ts on disasters to the public.
- To arrange for the rescue training.
- To arrange for continuous practice on relief activities

The DRM agencies and committees as mentioned in this session are the updated institutional structures as of June, 2012. The institutional arrangements and disaster management structures at national, state/region, district, township and village tract level might be undergone modification with revised roles and functions later on.

Participants should refer to the latest government Orders, Regulations and other DRR related legislations for the most updated information.

Development Partners and other Agencies on DRR

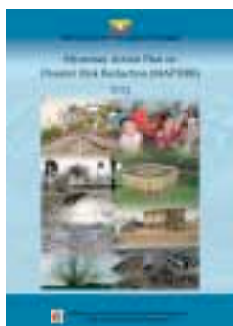
The 2008 Cyclone Nargis gave rise to the need for increased preparedness for and response to disasters in Myanmar. In the event that large numbers of people are affected, it is important that Disaster Risk Management activities of all the humanitarian organizations and various stakeholders are carried out in a more coordinated manner. Therefore, networks and agencies concerning Disaster Risk Management have organised themselves to work hand in hand with government and the people of Myanmar in preparing for and responding to any of the potential natural hazards that may affect Myanmar. The agencies are such as UN agencies, NGOs/CBOs, professional bodies, and development partners including the followings:

Development Partner and other Agencies	Roles and supports on DRR
MAPDRR Task Force led by RRD	Mechanisms to support and facilitate government interventions on Disaster Risk Management
Inter Agency Standing Committee (IASC) -coordinated by UN OCHA	Emergency response
DRR Working Group Myanmar - chaired by UNDP (2012)	A platform to share, update, coordinate and discuss various DRR activities and way forward
Myanmar Red Cross Society	Emergency response First Aid Relief distribution
UNDP	Early Recovery Rehabilitation Reconstruction
UN-OCHA	Coordination in Disaster Response
UN-Habitat	Rehabilitation Reconstruction (Shelter)
Myanmar Engineering Society (MES)	Hazard Assessment Preparedness
Myanmar Geosciences Society (MGS)	Hazard Assessment (Geological) Preparedness

National Disaster Risk Management Guiding Frameworks and Other Key Documents

Myanmar Action Plan on Disaster Risk Reduction (MAPDRR, 2012)

Recognizing the need for national framework, Relief and Resettlement Department had drafted 'Myanmar Action Plan on Disaster Risk Reduction - MAPDRR' with technical support from Bangkok-based Asian Disaster Preparedness Centre (ADPC). The MAPDRR will be the National DRR Strategic Action Plan comprising 7 components and 65 sub-components which link to priorities actions from 'Hyogo Framework for Action' and 'ASEAN Agreement on Disaster Management and Emergency Response- AADMER.



7 components of MAPDRR and related HFA priority to each component:

Component 1: Policy, Institutional arrangements and further Institutional Development (HFA 1)

Component 2: Hazard, Vulnerability and Risk Assessment (HFA 2)

Component 3: Multi-hazard Early Warning Systems (HFA 2)

Component 4: Preparedness and Response programs at National, State/Division, District and Township levels (HFA 5)

Component 5: Mainstreaming of Disaster Risk Reduction into Development (HFA 4)

Component 6: Community based Disaster Preparedness and Risk Reduction (HFA cross-cutting issue)

Component 7: Public awareness, Education and Training (HFA 3)

Standing Order (2009)



Short and long term plans need to be developed to ensure preparedness in the face of unexpected natural disasters in order to minimize losses. Based on Cyclone Nargis experience, National Disaster Preparedness Central Committee has released 'Standing Order on Disaster Management' on January 2009. The 'Standing Order' for Natural Disaster Management in Myanmar is issued with the aim of ensuring that once disaster strikes, emergency relief and rehabilitation work is carried out according to the prepared plan and that the people are mobilized at the national level for participation in such efforts. The Standing Order includes national level institutions and other sub-national committees and assigned roles and responsibilities.

It is necessary that practical and comprehensive action plans should be prepared for the following situations and types of activities to ensure effective implementation in times of emergency.

- a. **Mitigating natural disaster risks** This includes measures to prevent loss of life and property during natural disasters (such as construction of sufficient fire breaks to prevent forest fires from spreading into urban areas) as well as precautionary and mitigating measures (such as planting trees as wind breakers and breakwaters, planting rows of trees and groves to reduce damage, using fire-proof materials as much as possible in construction to reduce fire hazards, and using earthquake resistant designs to reduce damage caused by earthquakes)
- b. **Preparedness** Natural disaster preparedness should include planning based on the characteristics of natural disasters, preparedness to overcome them or making preparations for evacuation and shelter. The following steps are generally involved:
 1. Early Warning systems- setting up systems for horizontal and vertical communications. Providing management, and conducting rehearsals and drills for the Inter-Department Relief Team to enable it to provide assistance during natural disasters from the nearest location in the field.
 2. Providing training from the grassroots level organizations to the Township/Division/State to ensure preparedness for emergency activities during natural disasters; brainstorming possible solutions for different scenarios during training.
 3. Building safe shelters, artificial mounds and high embankments for use in times of emergency, and making evacuation plans and conducting drills.
 4. Stockpiling food, water, clothing, supplies, construction materials, shelter and ready-made tents, tools, etc. that will be necessary during emergencies or arranging access to them and designating transportation routes.

- c. **Preparing and conducting drills for measures to be taken during disasters and in the post-disaster period** Activities to be conducted during disasters include emergency relief, preliminary care and protection, emergency medical treatment, and evacuation to safe locations. Activities to be conducted in the post-disaster period include provision of health care, water, food, clothing, and shelter. As planning is required for these activities, projects should be in place for the provision of education and training to the grassroots level.
- d. **Rehabilitation** As it is necessary to know the type and scale of loss or damage in order to carry out rehabilitation activities, a form should be prepared for use in systematic information-gathering and reporting at the grassroots levels; and practice in filling in the form and understanding what information is required should be provided. Livelihood, education, health, social and economic life can return to normal conditions speedily only if action plans are implemented systematically without delay. The action plans should include organizations that will be involved in each task, individuals in the organizations who will carry out the implementation work and their individual duties, the communication system to be used, the assignment of administrative and logistic responsibilities, the name, position and contact details such as telephone numbers, addresses and office locations of responsible persons with supervisory duties. They should also contain provisions for occasional team practice.

The Standing Order also determines the mandates, roles, and responsibilities of disaster risk management concerned government agencies and committees as well as identified and detailed out the hazard-wise preparedness, mitigation prevention and response actions to be performed by assigned agencies and committees.

Guidelines for Township Disaster Management Plan (2010)

To provide township authorities on guidance to develop Disaster Management Plan specifically for respective township context, the *Guidelines for Township Disaster Management Plan (2010)* was developed, jointly by RRD and GAD with technical support by ADPC, as guiding principles and providing key considerations for:

- Township Disaster Management Planning, Process for developing Township Disaster Management Plan
- Methodology for Development of the Guideline
- Roles and responsibilities of Township Disaster Preparedness Committee and Sub-Committees
- Mitigation, Preparedness, Recovery and Rehabilitation Measures
- Monitoring, Review and Updating of Plan



IASC (Inter-Agency Standing Committee) Contingency Plan

The **Inter-Agency Standing Committee (IASC)** is an inter-agency forum of UN and non-UN humanitarian partners founded in 1992, to strengthen humanitarian assistance. The overall objective of the IASC is to improve the delivery of humanitarian assistance to affected populations. The Committee was established following UN General Assembly Resolution 46/182 and resolution 48/57 confirmed that it should be the primary method for inter-agency coordination.

Contingency planning is a management tool used to ensure adequate arrangements are made in anticipation of a crisis. This is achieved primarily through the participation in the contingency planning process itself, as well as through follow-up actions and subsequent revisions of plans.

Experience from previous emergencies clearly indicates that effective response to humanitarian needs at the onset of a crisis depends on the level of preparedness and planning of agencies in the field, as well as the capacities and resources available to them. The overall objective of the Inter-Agency Contingency Planning Guidelines is to assist UN Country Teams and partners in planning how to respond to potential emergencies with appropriate humanitarian assistance and protection.

These guidelines provide recommendations on how to engage in the contingency planning process, in order to develop common strategies and approaches to potential emergencies, and how to record the deliberations and results of this process in contingency plans.

What is contingency planning?

In general, contingency planning is the process of:

- a. Analyzing potential emergencies and their humanitarian impact;
- b. Prioritizing potential emergencies;
- c. Developing appropriate plans, including establishing clear goals, setting objectives, policies and procedures to deal with prioritized potential emergencies; and
- d. Ensuring necessary preparedness measures and follow-up actions are taken.

Other key documents on Disaster Risk Management

Humanitarian Accountability Partnership-International is an international self-regulatory body, works towards the promotion of “Humanitarian Accountability”. It is involved in identifying, testing and recommending alternative accountability approaches and mechanisms, and making humanitarian action accountable to intended beneficiaries.

Sphere - Humanitarian Charter describes the core principles that govern humanitarian action and reasserts the right of disaster-affected populations to life with dignity and Minimum Standards reflect a continuing determination to ensure that human rights and humanitarian principles are realized in practice.

LNGO Contingency Plan -Contingency Plan is a detailed outline of the common analysis, preparedness planning and response measures that the Myanmar NGO identified. The main goal of the CP is to mitigate the impact of disasters and save as many lives as possible from preventable causes. Some lessons learnt from the Cyclone Nargis response are identified that will assist in developing the preparedness and response actions.

DRR Working Group Information Portal (<http://themimu.info/DRRWG/>) - an online information hub hosting documents relevant to disaster management of Myanmar.

Take Away

After this session, you should be able to:

- Understand Myanmar’s Global and Regional Commitments on Disaster Risk Management
- Familiarize with the National and Sub-National Level agencies on Disaster Risk Management, DRR Network and Development Partners
- Familiarize with National DRM Guiding Framework, DRM Plans and other Key Documents

Check your learning:

1. Select the right word for the following sentences:

1.1 Hyogo Framework for Action is building resilient nation and communities with priority actions.

- (a) 6
- (b) 3
- (c) 5
- (d) 4

1.2 Myanmar Disaster Preparedness Agency (MDPA) was constituted on:

- (a) December 20, 2010
- (b) April 20, 2011
- (c) June 11, 2011
- (d) April 10, 2011

1.3 AADMER is the framework for cooperation, coordination, technical assistance, and resource mobilization in all aspects of disaster management.

- (a) Local
- (b) International
- (c) Global
- (d) regional

1.4 Ministry of Social Welfare, Relief and Resettlement developed 30 years long-term Plan of MSWRR (2001-2030) in whichis mentioned as priority.

- (a) Relief
- (b) DRR
- (c) Search and Rescue
- (d) Capacity Building

2. Check whether the following sentences are True or False.

2.1 Ministry of Livestock and Fisheries prepared National Strategic Plan for Prevention and Control of Avian Influenza and Human Influenza Pandemic Preparedness and Response document.

2.2 Myanmar Disaster Preparedness Agency (MDPA) have been organized Myanmar.

2.3 Disaster Preparedness Management Working Committee and (12) Sub- Committees.

2.4 One of the responsibilities of International Relation Sub-Committee is to participate in international and regional disaster management programs.

2.5 The Secretary of Myanmar National Search and Rescue Committee is the Deputy Minister for Social Welfare, Relief and Resettlement.

3. Explain the following terms.

3.a ASEAN Agreement on Disaster Management and Emergency Response - AADMER

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3.b Myanmar Disaster Preparedness Management Working Committee

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3.c Relief and Resettlement Department

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3.d Standing Order on Disaster Management

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4. Please mention two key learning's from this session

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Correct answers of check your learning Exercises

1. 1.1 (c) 5 1.2 (b) April 20, 2011 1.3 (d) regional 1.4 (b) DRR
2. 2.1 False 2.2 False 2.3 True 2.4 True 2.5 True

Additional readings/references

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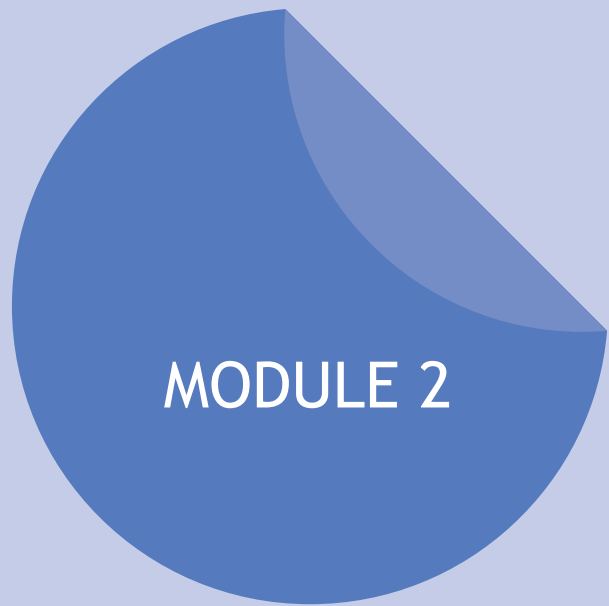
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Understanding Risks and Natural Hazards of Myanmar

At the end of the session, you should be able to:

- Understand Concept of Disaster Risk
- Understand causes of risk including Climate Change

Key points covered *Definition of Risk, Disaster Risk, Elements at Risk, Extensive risk and Intensive risk, Perception of risk, Underlying causes of risks- poverty and weak governance, vulnerable rural livelihood, destroying ecosystem, and climate change*

TRAINING CONTENT

Introduction

Risk is the probability of negative consequences which can be damages to property, injuries or loss of human lives and destruction of natural environment. However people have different perception of risk according to their socio-economic status, knowledge and experiences. Intensity of risk is proportionate to the vulnerability of the people and location.

From 1990's one of the factors that triggers natural hazards is Climate Change which refers to short-, medium-, and long-term changes in weather patterns and temperature as a result of man induced emissions of greenhouse gases such as carbon dioxide. Climate Change includes a higher frequency of extreme weather events such as drought and floods, as well as variability in the seasons and in rainfall.

To come up with appropriate risk treatment, risk assessment is primarily key process to understand what hazard type likely to occur in particular location, the elements at risks and the existing capacity. These risk assessment results would collectively bring all concerned to the same picture of 'disaster risk' and to further identify necessary risk reduction measures.

What is Risk

Risk is the probability of something happening in the future which has a negative consequence. It is a prediction of suffering harm or loss or of meeting danger. Risk could also be defined as the combination of the probability of an event and its negative consequences. (UNISDR, 2009)

Disaster risk in Myanmar

Myanmar is exposed to diversity of disaster risks all over the country. Earthquake affected whole country especially in central Myanmar, Tsunami, Cyclone and storm surge affected all coastal areas. Heavy rain, flood and fire affected whole country, landslide affected hilly regions and drought affected central Myanmar.

Natural Disasters in Myanmar (1901- 2011) (RRD)

Period	Type of Disaster	No of Disaster	Total Killed	Total affected	Damaged property US\$,(,000)
1901-1910	windstorm	1	600	-	-
1021-1930	earthquake	2	586	-	-
	windstorm	2	2,706	40,000	-
1931-1940	windstorm	1	1,000	150,000	-
1941-1950	earthquake	1	15	-	-
1951-1960	Windstorm	1	-	-	-
1961-1970	Epidemic	1	-	-	-
	Flood	2	124	-	-
	Windstorm	5	1,448	747,719	11,700
1971-1980	Flood	4	3	1,613,000	-

	Wild Fire	1	-	30,000	11,000
	Windstorm	2	200	132,000	-
1981-1990	Earthquake	1	730	-	1,000
	Epidemic	1	10	800	-
	Wild Fire	1	8	48,588	-
	Windstorm	1	11	36,000	-
1991-2000	Earthquake	2	11	136	36,100
	Flood	6	190	584,697	553,915
	Windstorm	1	17	64,970	10,000
2004	Tsunami	1	600	-	-
2006	Cyclone(Mala)	1	37	-	428.56 million
2008	Cyclone(Nargis)	1	133,000	3.2 million	4.1 billion
2010	Cyclone(Giri)	1	-	260,000	-
2011	Earthquake (Shan)	1	74	18,000	-

Disaster Risk

The potential disaster losses in lives, health status, livelihood, assets and services, which could occur to a particular community or a society over some specified future time period.

Disaster Risk is the likelihood of harmful consequences or losses (death, injuries, destroyed property, economic activities disrupted or damaged environment) resulting from interaction between a hazard and vulnerable conditions/capable conditions (UNDP). Disaster risk can be expressed as a function:

$$\text{Disaster Risk} = \text{Hazard} \times \text{Vulnerability} \times \text{Exposure of Elements at risk}$$

This equation emphasizes particularly to the physical aspects of vulnerability. However, beyond expressing a possibility of physical harm, it is crucial to recognize that risks are inherent or can be created or exist within social systems. *It is important to consider the social contexts in which risks occur and that people do not necessarily share the same perception of risk and their underlying cause.* Disaster risk is presented by the simple formula:

$$\text{Disaster risk} = \frac{\text{Hazard} \times \text{Vulnerability}}{\text{Capacity}}$$

Hazard is a dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Exposure is the situation in which people, property, systems, or other elements are present in hazard zones that they are subject to potential losses. Measures of exposure can include the number of people or types of assets in an area.

Vulnerability is the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard. There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors. Examples may include poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management. Vulnerability varies significantly within a community and over time.

Element at Risk: who and what can be damaged and/or affected

- People (their lives and health)
- Household and community structures (houses, community center, school, public buildings, etc)
- Public facilities and services (access roads, bridges, hospital, electricity, water supply, communication system, etc.)
- Natural environment and natural resources



Perception of Risk

Risk has different meanings to different groups of people. Perception of risk is the subjective judgment that people make about their characteristics and severity of a risk and explains why people make different estimates of the danger and decisions to avoid, reduce or accept.

Understanding people's prioritization of risks is a necessary component of coming to a common understanding of disaster risk in the locality as basis for appropriate and adequate risk reduction measures which are owned by the affected population and communities. Community people may regard real everyday concerns or problems such as livelihood, health, family (drinking, gambling) as more immediate threats than the infrequent natural hazard.

Factors which account for varying perceptions of risks:

1. Socio-economic characteristics: age, gender, ethnicity, income, education, employment, health
2. People's knowledge of their environment resulting in adopting local coping strategies
3. Lack of knowledge (and experience) about the hazards or threats
4. Ability to cope with hazards and risks through technology, financial attributes, education, political power and having a voice
5. Ability to access help from outside



Acceptable Risk is level of loss acceptable or tolerable to a community relevant to their condition (including both vulnerability and capacity). For a highly vulnerable community, high level of loss is acceptable due to its high vulnerable condition.

In UNISDR, 2009, *Acceptable Risk* is defined as the level of potential losses that a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions (Comment: In engineering terms, acceptable risk is also used to assess and define the structural and non-structural measures that are needed in order to reduce possible harm to people, property, services and systems to a chosen tolerated level, according to codes or "accepted practice" which are based on known probabilities of hazards and other factors.)

Absolute and Relative Risk



Absolute risk is the exact figure/amount of certain damage or impacts on population (dead, injuries, missing, etc.), social and economy of disaster event.

Relative Risk refers to the number of people killed as compared to total population, or economic loss as a share of national GDP (UNISDR, 2009).

Myanmar is considered as one of the countries with high absolute Cyclone risk (taking into account the high number of people killed from Cyclone Nargis) along with country such as India, Philippines, Madagascar and China. Small Islands Developing States (SIDS) such as Haiti, Fiji, and Vanuatu have a high relative risk, but because of their small population, a relatively low absolute mortality risk. (GAR, 2009)

Intensive risk and Extensive risk

Intensive risk: The risk of high severity, low frequency disasters such as earthquake, cyclone, etc, mainly associated with major hazards. Intensive risk is the risk associated with the exposure of large concentrations of people and economic activities to intense hazard events, which can lead to potentially catastrophic disaster impacts involving high mortality and asset loss.

Extensive risk: The risk of low severity, high frequency disasters such as urban fire, etc mainly associated with highly localized hazards. Extensive risk is the widespread risk associated with the exposure of dispersed populations to repeated or persistent hazard conditions of low or moderate intensity, often of a highly localized nature, which can lead to debilitating cumulative disaster impacts.

Residual risk

The term is defined in UNISDR, 2009 as the risk that remains in unmanaged form, even when effective disaster risk reduction measures are in place, and for which emergency response and recovery capacities must be maintained. (Comment: The presence of residual risk implies a continuing need to develop and support effective capacities for emergency services, preparedness, response and recovery together with socio-economic policies such as safety nets and risk transfer mechanisms.)

Underlying Causes of Risk

There are many causes or drivers of risk which contribute to disaster risks are:

- Poverty and weak governance
- Vulnerable rural livelihood
- Destroying ecosystem

Poverty and weak governance

The extensive poverty inevitably leads to increased vulnerability in the face of various natural hazards. People with economic instability are more prone to suffer impacts of hazards incidences than the better-off ones. Governance unable to adequately address need of the most needy population, extend development shares to marginalized people and provide them with better access to public services would be a factor contributing to continued poverty.

Vulnerable rural livelihood

Livelihood of rural communities relies heavily on weather and climate of the region and rural communities are more exposed to weather related hazards such as tropical cyclone, flood and drought.

Destroying ecosystem

Many disasters are either caused or exacerbated by environmental degradation. Deforestation leads to rapid rain run off, which contributes to flooding. The destruction of mangrove swamps decreases a coast line's ability to resist tropical winds and storm surges.

Drought conditions may be exacerbated by poor cropping patterns, overgrazing, the stripping of topsoil, poor conservation techniques, depletion of both the surface and subsurface water supply.

In Ayeyarwaddy delta region, due to population growth and expansion of human settlement, forest and mangroves are depleted. When Cyclone Nargis affected the area, there was no natural wind breaker and barriers and storm surges can penetrate far inland and demolished the communities in the area.

Climate Change as a Driver of Risk

In the 1990's, about three-quarters of all natural disasters were triggered by weather-related events. Such events are likely to increase both in numbers and in frequency in the years to come - one of several consequences of climate change.

Climate change and its impacts

Climate change refers to short-, medium-, and long-term changes in weather patterns and temperature that are predicted to happen, or are already happening as a result of anthropogenic emissions of greenhouse gases such as carbon dioxide. These changes include a higher frequency of extreme weather events such as drought and floods, as well as greater unpredictability and variability in the seasons and in rainfall. Overlying this increased variability are expected longer-term changes, such as temperature and sea level rises, and lower (or in some cases higher) rainfall.

Observations of Recent Climate Change:

- Increase in Temperature
- Changes in Precipitation and Humidity
- Increase in Sea Level
- Changes in Climate, Extreme Weather and Climate Events

Poor countries and communities are more vulnerable to climate change because they tend to be located in geographically vulnerable areas, such as flood-prone, drought-prone, or cyclone prone, and in more vulnerable locations.

Rural communities which make up the majority sector in developing countries are heavily dependent on natural resources for their livelihoods. Smallholder farmers have much experience of adapting to their complex, diverse, and risk-prone environments. However, farming is now becoming even more difficult and risky because of greater unpredictability in the timing of rainy seasons and the pattern of rain within seasons, making it more difficult to decide when to cultivate, sow, and harvest, and needing more resources to seize the right time for planting, and to maintain crops and animals through dry spells.

Heat stress, lack of water at crucial times, and pests and diseases are serious problems that climate change appears to be exacerbating. These all interact with ongoing pressures on land, soils, and water resources that would exist regardless of climate change (Jennings and McGrath, 2009). At risk communities already struggle to cope with the existing challenges of poverty and natural disasters, but climate change could push many beyond their ability to cope or even survive. It is vital that these communities are helped to adapt.

Take Away

After this session, you should be able to:

- Understand Concept of Disaster Risk
- Understand causes of risk including Climate Change

Check your learning:

1. Select the best answer for the following questions

1.1 Which statement is true in describing risk equation

- (a) Risk will reduce if capacities reduces
- (b) Risk will increase if vulnerability decreases
- (c) Hazard will increase if risk increases
- (d) If capacity increases, risk will reduce

1.2 Which of the following is not element at risk

- (a) Children and elderly
- (b) Transportation system
- (c) Wild Land with no human inhabitant
- (d) Coastal ecosystem

1.3 rural communities are more exposed to

- (a) Industrial hazards
- (b) Fire hazards
- (c) Weather related hazards
- (d) Geological hazards

1.4 What is correct about Extensive Risk

- (a) Low frequency
- (b) Non-localized hazard
- (c) Low severity
- (d) Confined (not wide spread)

2. Check whether the following sentences are True or False.

- 2.1 Residual risk is the risk that was managed.
- 2.2 Vulnerable rural livelihood and poverty are among underlying causes of risk.
- 2.3 Recent trend of climate change observes decrease in temperature.
- 2.4 Extreme weather events such as cyclone due to influence of climate change has increased.
- 2.5 People's perception of risk might be diverse depending on various aspects such as sex, age, location, economic status, etc.

3. Provide concrete example of the following

3.a Intensive risk in Myanmar

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3.b Underlying causes of risk in rural setting

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3.c Underlying causes of risk in urban setting

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.....

3.d Potential impacts of climate change on agriculture-based livelihood

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.....

4. Please mention two key learning's from this session

.....

.....

.....

Correct answers of check your learning

- | | |
|--|--|
| 1. 1.1 (d) If capacity increases, risk will reduce | 1.2 (c) Wild Land with no human inhabitant |
| 1.3 (c) Weather related hazards | 1.4 (c) Low severities |
2. 2.1 False 2.2 True 2.3 False 2.4 True 2.5 True

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GROUP WORK ON RISK ASSESSMENT

At the end of the session, you should:

- Have better understanding on various components which contribute towards '**disaster risk**'

Task 1

- Each group selects one development sector such as agriculture, road/bridges, health, education, forestry, tourism, etc.
- Each group selects three hazards in Myanmar and identify possible 'elements at risk' of the sectors selected and list down using the table below.

Hazard	Elements at Risk of the Sector Selected
Hazard 1	
Hazard 2	
Hazard 3	

Task 2

For each element at risk identified in Task 1,

- Discuss in group 'why these elements are at risk?' and 'what are the underlying factors contributing to vulnerability?'
- Then list down in the table below.

Elements at Risk	Why these elements are at risk / Effects on different elements at risk	Underlying factors contributing to vulnerability
Houses	Collapse of houses	Poor construction material used

- Each group presents the results.
- Work in group to make concise Statements of Risk to summarize the assessment such as: *There is a risk that the house will collapse because of the ground shaking generated by the earthquake.*

session

2.3

GEOLOGICAL HAZARDS IN MYANMAR

At the end of the session, you should be able to:

- Understand major Geological Hazards in Myanmar- Earthquake, Landslide, and Tsunami, Causes and Impacts

Key points covered *Earthquake, Landslide and Tsunami, causes and impacts of these hazards, Plate Tectonic, Sagaing Fault, Types of Landslide, Nature of Tsunami, characteristics, frequency of occurrence, vulnerable areas.*

TRAINING CONTENT

Introduction

Myanmar is one of geological hazard prone countries as it lies on the earthquake belts of the world stretching from the northern Mediterranean in the west and extending eastward across Myanmar. As well, the western coastal line is exposed to Tsunami of the Indian Ocean and the several parts of the country has experienced landslides in steep slopes and unstable geology due to intense monsoon rains and impacts of earthquake. This session will discuss these geological hazards of Myanmar in term on occurrences, physical characteristics, prone locations and impacts.

Earthquake

Earthquakes are the shaking, rolling or sudden shock of earth's surface. They are the Earth's natural means of releasing energy. Seismologically, earthquake is defined as a trembling or shaking of the ground caused by the sudden release of energy stored in the rocks beneath the earth's surface.

Technologically, earthquake is defined as vibrations induced in the earth's crust due to internal or external causes that virtually shake up a part of the crust and all the structures and living and non living things existing on it.

Earthquakes are one of the most destructive of natural hazards. They may occur at any time of year, day or night, with sudden impact and little warning. They can destroy buildings in seconds, killing or injuring the inhabitants. Earthquakes not only destroy entire cities but may destabilize the government, economy and social structure of a country.

The smaller earthquakes or *aftershocks* occur afterwards in the same place. These *aftershocks* can continue for weeks, months, and even years after the *mainshock*.

Causes of Earthquake

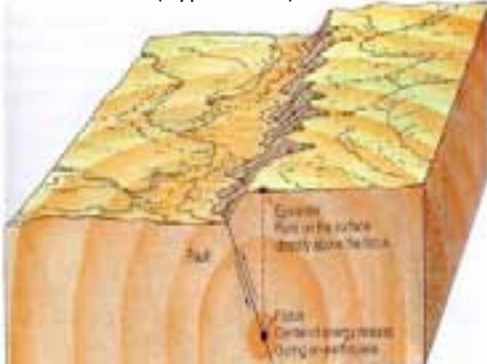
The earth's crust is a rock layer of varying thickness and the crust is not one piece but consists of portions called plates which vary in size. The theory of plate tectonics states that the plates are driven by some unconfirmed mechanism. When the plates contact each other, stresses arise in the crust.

These stresses may be classified according to the type of movement along the plates boundaries:

- a. pulling away from one another,
- b. sliding sideways relative to each other, and,
- c. pushing against one another. All of these movements are associated with earthquakes.

The causes of earthquakes may be either natural or man-induced.

FOCUS (hypocenter) vs. EPICENTER



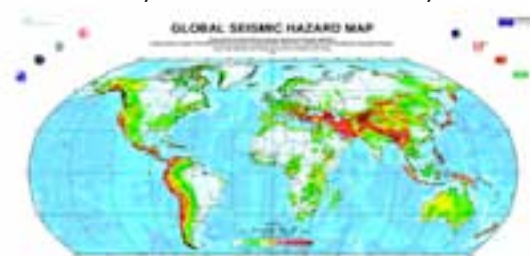
The **natural causes** are **endogenous**, which are due to the earth's inner energy (volcanic or tectonics phenomena) and **exogenous**, which are due to several external factors (meteorite falls, collapse of cave roofs, sudden changes in the atmospheric pressure, the attraction of the Moon or of the Sun).

The **man-induced causes** are generated by several human activities that disturb the equilibrium of the crust (e.g. nuclear energy-blast, quarry explosions, impounding of water into large reservoirs, intensive water pumping from the underground, etc). (Non-Tectonic)

The points where two plates strike is called Focus (Hypocenter) and the point on earth surface directly above the Focus (Hypocenter) is Epicenter. The severity of the local effects depends on the complex combination of the earthquake *magnitude*, the distance from the

epicenter, and the local geological and geomorphological conditions. The ground-shaking is measured by *ground acceleration*.

Seismicity and Seismic Hazard in Myanmar



Earthquake scales

Earthquakes can be described by use of two distinctly different scales of measurement demonstrating magnitude and intensity. *Earthquake magnitude or amount of energy released is determined by use of a seismograph, and instrument that continuously records ground vibrations.* The scale was developed by a seismologist named Charles Richter and The Richter scale is logarithmic. An increase of one magnitude signifies a 10-fold increase in ground motion or roughly an increase of 30 times the energy.

A second type of scale, the earthquake intensity scale, measures the effects of an earthquake where it occurs. The most widely used scale of this type was developed in 1902 by Mercalli, an Italian seismologist. The scale was extended and modified to suit modern times. Called the Modified Mercalli Scale, it expresses the intensity of earthquake effects on people, structures and the earth's surface in values from I to XII.

Impacts of Earthquake

Primary impacts

Earthquakes create slopes, fissures, or subsidence of coastlines, changes in the courses of streams, and origin of new springs.

Secondary impacts

- Many landslides are triggered mainly due to shaking vibrations. Due to these vibration buildings, bridges, dams, poles and posts and fences, etc., may be slightly or heavily damaged. Telegraphic and electric cables, water and gas pipes may get broken.
- Ground movement displaces stoves, breaks gas lines, and loosens electrical wires, thereby causing fire break out. Because of breaking water mains and damaged water supply facilities caused by the shake, often there is no water available to put out the fires.
- Liquefaction: Conversion of formally stable cohesionless soils to a fluid mass, causing damage to the structures.
- Tsunamis: large waves created by the instantaneous displacement of the sea floor during submarine faulting.

Earthquakes in Myanmar

Myanmar lies in one of the two main earthquake belts of the world known as Alpide Belt and bounded by Indian plate in the west and Myanmar platelet in the south. Seismologically, very active Sagaing Fault is the most prominent active fault in Myanmar, trending roughly north - south. It has been the major source of a large proportion of destructive earthquakes in Myanmar.



(far left) Seismic zone map of Myanmar; (left) Sagaing Fault and cities

Sagaing fault passes through Northern to Southern Myanmar and many large urban centres lie on or around this active fault. Local historic records of earthquake indicate that the Sagaing fault is the principal source of seismic hazards in Myanmar. Myanmar ancient royal capitals were incidentally located along the Sagaing fault zone. These capitals were perhaps the most crowded areas in the country in those days.

On 24th March, 2011, a strong earthquake of 6.8 Richter has occurred with the centre at 18 miles north from Tachileik township, eastern Shan State. Buildings and houses from Tarlay and Mailin sub-townships and from villages are damaged and 74 people lost lives.

Landslide

Landslide means "Down-slope movement of soil, rock and debris or earth under the influence of gravity, and also the land form that results." It occurs when part of a natural slope is unable to keep its own weight. *Three distinct physical events occur during a landslide: the initial slope failure, the subsequent transport, and the final deposition of the slide materials.*

The movement of falling, sliding and flowing rate may range from very slow to rapid. The mass of moving material can destroy property along its path of movement and cause death to people and livestock.

Many different types of movement, materials and triggering events such as heavy rain, floods, vibration of earthquakes and blasting, volcanic eruptions, and human activities may be involved.

Causes of landslides

Causes of landslides can be natural causes or man-made causes.

- Natural causes include soil erosion, water content in soil, vibration of earth from earthquake, volcanic eruptions.
- Man made causes are excavation of slopes, deforestation, construction of houses and buildings, construction of dams and reservoirs and burning of vegetations on slopes

CAUSES OF LANDSLIDES

Natural causes

- Geological conditions
- Erosion Processes
- Hydrogeological characteristics
- Earthquake vibration
- Volcanic eruptions
- Blasting vibration
- External factors

Man-made causes

- Excavation of slope and its toe
- Large-scale indiscriminate deforestation
- Large-scale indiscriminate blasting and quarrying
- Mass-scale construction of houses and heavy structures
- Construction of dam, reservoirs and canal
- Burning down of vegetation for cultivation

Landslides occur when slopes undergo these changes;

- Increase in water content caused by heavy rainfall or rising ground water.
- Increase in slope angle for new construction or by stream erosion.
- Vibrations from earthquakes, machinery, traffic and thunder. The most disastrous landslides have been triggered by earthquakes.
- Removal of vegetation by fires, logging, overgrazing, and deforestation which causes loosening of soil particles and erosion.
- Loading with weight from rain, hail, snow, accumulation of loose rock or volcanic materials, and weight of buildings.

Types of Landslides

Different types of landslides:

Landslides usually occur as secondary effects of heavy storms, earthquakes and volcanic eruptions. The materials that compose landslides are divided into two classes, bedrock or soil (earth and organic matter debris). A land-slide may be classified by its type of movement:

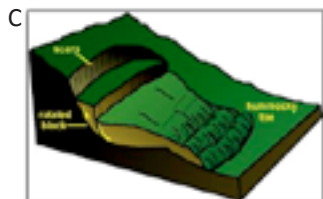
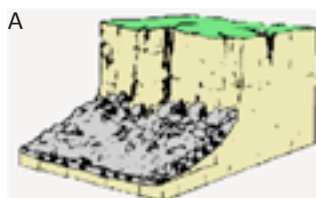
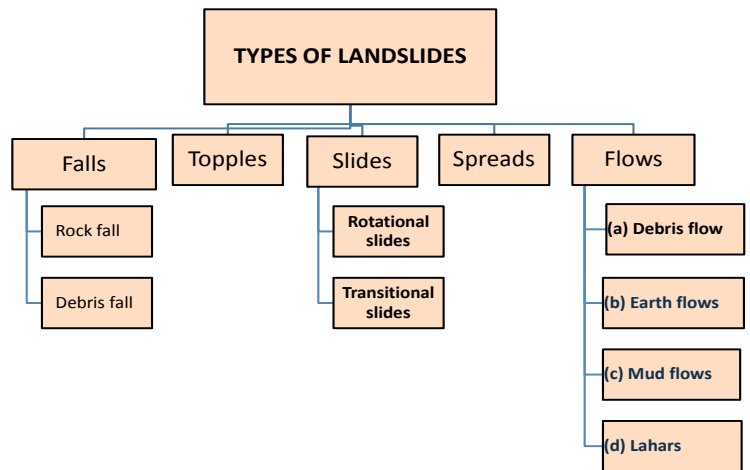
- a. **Falls** - A fall is a mass of rock or other material that descent downward by falling or bouncing through the air. Large individual boulders can cause significant damages.

- b. **Topples** - A topple is stumbling of the rock out of its original position. The rocks, which stayed balanced on a point, tilt or roll forward. A topple may not involve much movement and it does not necessarily trigger a rockfall or rockslide.

- c. **Slides** - Soil materials slipped along one or several surfaces. The slide material may remain intact or may break up.

- d. **Lateral spreads** - Large blocks of soil spread out of the original base. Lateral spreads generally occur on gentle slopes.

- e. **Flows** - This is the most destructive form of landslide. Flows have a high water content which causes the slope material to lose cohesion and flows move like a viscous fluid, sometimes very rapidly, and can cover several miles. Most flows form after heavy rain.



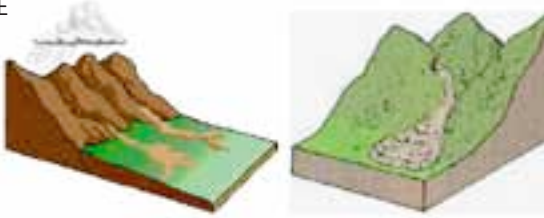
Rotational slides



Transitional slides



E



Impacts of landslides

Direct impacts of landslides are physical damages to structures and casualties and loss of lives to humans and animals.

Indirect impacts are flood surges caused by movements of large masses of soil into the reservoir. Increased sedimentation in the reservoir results in loss of water storage and increased likelihood that

the dam will be overtopped during periods of excessive runoff.

List of Some Historical Landslide Events in Myanmar

Year	Location	Name and Type	Triggering Process	Impact
1912	North of Taunggyi	Maymyo landslide	Earthquake	serious landslides and ground cracks
1946	Tagaung	Landslides	Earthquake	380 acres of crop damaged
1991	Tagaung	Landslide	Earthquake	some buildings destroyed
1999	Along the western slope of the Tanintharyi Ranges	Landslides	Torrential rain	buried some villages
2001	Nansang	Subsidence	Heavy rain	two circular graven about 50 feet diameter appeared
2003	Taung-dwingyi	Landslides	Earthquake	some slopes and rail roads along the western abutment of Bago Yoma failure
2004	Kalewa-Kale road	Chaungkyin Landslides	Heavy rain	bridges and about 30 km of the main road destroyed
2008	Mogok	Mogok Landslides	Heavy rain and excavation	about 11 people killed
2009	Kyauktaw-Ann road	Kyauktaw landslides	Heavy rain	about 120 km of the main road destroyed

Tsunami

Tsunamis are series of ocean waves generated by abrupt, large disturbances of the ocean surface such as earth-quakes, volcanic eruptions, landslides, slumps, and meteorite impacts. Since 1850, tsunamis in the Pacific have caused the death of over 120,000 coastal residents. Tsunamis are a major hazard to coastal residents in earthquake-prone regions.

A tsunami starts when a huge volume of water is quickly shifted. As the result of an underwater earthquake (when the sea floor quickly moves up or down), a rock slide, a volcanic eruption, or another high-energy event. After the huge volume of water has moved, the resulting wave is very long (the distance from crest to crest can be hundred of miles long) but not very tall (roughly 3 feet tall). The wave spreads across the sea in all directions; it can travel great distances from the source at great speeds.

Many, but not all, of these tsunamis are preceded by an abrupt lowering or draw down of the ocean surface, exposing the coastal sea floor. As the wave approaches the exposed coast, it produces a loud roar similar to a speeding train.

Causes

Most tsunamis are formed as a result of large submarine earthquakes, which displace large amounts of water. Tsunamis may also result from the eruption or collapse of island or coastal volcanoes, and from the formation of giant landslides on marine margins. Even the impact of a cosmic body like a meteorite may cause a tsunami.

The Types of Geological Causes

The geological movements that cause tsunamis are in three major ways.

The most common of these is fault movement on the sea floor, accompanied by an earthquake.

Probably the second most common cause of tsunamis is a **landslide** either occurring underwater or originating above the sea and then plunging into the water. A massive rock slide produced a wave that reached a high water mark of 535 meters above the shoreline.

The third major cause of tsunamis is **volcanic activity**. The flank of a volcano, located near the shore or underwater, may be uplifted or depressed similar to the action of a fault.

Or, the volcano may actually explode. In 1883, the violent explosion of the famous volcano, Krakatoa in Indonesia, produced tsunamis measuring 40 meters which crashed upon Java and Sumatra. Over 36,000 people lost their lives as a result of tsunami waves from Krakatoa.

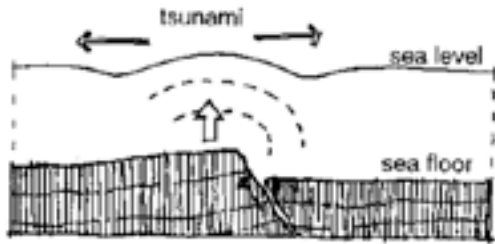
Characteristics of a tsunami

Because of wave physics, tsunamis tend to be small - even imperceptible -- while travelling over open water, and do not "size up" until they approach a shoreline. As a tsunami approaches shore, it begins to slow. Often, the sea begins to recede abnormally. Tsunamis still reach the coast with tremendous amounts of energy because their height increases as they reach the continental shelf (the part of the earth's crust that slopes, or rises, from the ocean floor up to the land). Tsunamis may reach a maximum vertical height onshore above sea level of 10, 20, and sometimes even 30 meters - in other words, they can be HUGE.

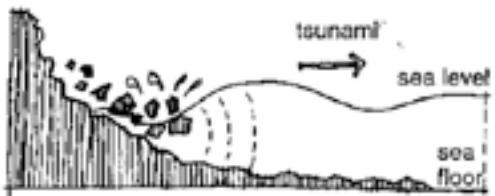
A tsunami is a series of waves and the first wave is not necessarily the biggest. Because tsunamis can travel very far without losing much energy, they can affect places that are a great distance from their source. Generally, tsunamis that are the result of water displacement from above (e.g. landslides, meteor strikes) tend to dissipate quickly and have little impact on far away coastlines. There are more destructive tsunamis in the Pacific Ocean because of the many major earthquakes along the margins of the Pacific Ocean and also because dip-slip earthquakes (which involve vertical rather than lateral ground motion) are more common in the Pacific than elsewhere.

Impact of Tsunami

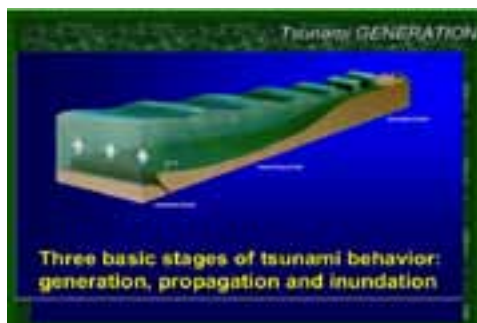
Capable of inundating (flooding) hundreds of meters inland past the typical high-water level, the fast-moving water associated with the incoming tsunami can crush homes and other coastal structures. Tsunamis can sweep boats onto shore. Obviously, they can drown people and animals too. Tsunamis can strip beaches of sand that may have taken years to accumulate and undermine trees and other coastal vegetation.



1 — Fault movement tsunami genesis



2 — Landslide tsunami genesis



Record of damage and casualties in 2004 Tsunami at the Ayeyarwady Delta Region



Stages of Tsunami

Tsunami hazards in Myanmar

There were records of moderate Tsunami generated by two large magnitude earthquakes, which originated in the Andaman-Nicobar Islands. These are 31 December 1881 Car Nicobar Earthquake (7.9 RS) and 26 June 1941 Andaman Island Earthquake (7.7 RS). Tsunami generated by the giant 2004 Sumatra Earthquake also caused moderate damage in some parts of the Myanmar Coast.

Take Away

At the end of the session, you should be able to:

- Understand major Geological Hazards in Myanmar- Earthquake, Landslide, and Tsunami, Causes and Impacts

Check your learning:

1. Select the correct words for the following sentences:

1.1 One of the factors that causes earthquake is :

- (a) Wind storms
- (b) Heat waves
- (c) Rise in sea level
- (d) Volcanic eruption

1.2 The earth's crust is not one piece but consists of portions called :

- (a) Slopes
- (b) Vibration
- (c) Plates
- (d) Fault

1.3 The most destructive form of landslide is:

- (a) Fall
- (b) Slide
- (c) Spread
- (d) Flow

1.4 Most tsunami are caused by:

- (a) Drought
- (b) Heavy rain
- (c) Gravity of the moon
- (d) Earthquakes.

2. Check whether the following sentences are True or False.

2.1 Earthquake is a trembling or shaking of the ground caused by the cooling of gases stored in the rock.

2.2 Earthquake magnitude or amount of energy released is determined by Mercalli scale.

2.3 Sagaing fault is major source of destructive earthquakes in Myanmar.

2.4 Landslide occurs when part of a natural slope is stable and able to keep its own weight.

2.5 Tsunamis are series of ocean waves generated by tide.

3. Explain the following terms.

3.a Tectonic Plates

.....

.....

.....

3.b Sagaing Fault

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.....

.....

3.c Removal of vegetation

.....

.....

.....

3.d Fault movement

.....

.....

.....

4. Please mention two key learning's from this session

.....

.....

.....

Correct answers of check your learning

1. 1.1 (d) Volcanic eruption 1.2 (c) Plates
1.3 (d) Flow 1.4 (d) Earthquakes
2. 2.1 False 2.2 False 2.3 True 2.4 False 2.5 False

Additional readings/references

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http://portal.unesco.org/ci/fr/files/19996/11273684099Disatser_Information_Kit_for_Media.pdf/Disatser%2BInformation%2BKit%2Bfor%2BMedia.pdf
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- UNDP (1997) *Disaster Management Training Program: Introduction to Hazard*. 3rd Ed. <http://iaemeuropa.terapad.com/resources/8959/assets/documents/UN%20DMTP%20-%20Hazards.pdf>
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session
2.4

HYDRO-METEOROLOGICAL HAZARDS IN MYANMAR

At the end of the session, you will be able to:

- Understand major Hydro-Meteorological Hazards in Myanmar-Cyclone, Storm Surge, Floods and Drought, Causes and Impacts

Key Concepts Hydro-meteorological hazards of Myanmar-flood, cyclone, storm, drought, the characteristics of occurrence, geographical and seasonal distribution, impacts, underlying causes of the hazards.

TRAINING CONTENT

Introduction

Hydro-meteorological hazards make up high proportion of disaster events of Myanmar. Flood hazard accounts for 11% of all disasters, second only to fire. The more frequent landfall hit of cyclone from once in every three years to annual landfall since 2000 has increased cyclone risks in coastal western areas. The accompanying storm surge with waves up to 10 meter-high is one of destructive impacts on vulnerable communities along the coast line, while the central part of the country has seen increasing adverse impacts of drought due to delay onset of monsoonal rainfall. This session will discuss these major hydro-meteorological hazards of Myanmar including the Cyclone, Storm Surge, Flood and Drought. Each hazard will be explained in term of their characteristics, occurrence, and impacts.

Hydro-meteorological Hazards

Hydrological hazards in Myanmar are Riverine floods, Flash floods, Heavy rain spells and Drought. Meteorological hazards are Tropical revolving storms, Cyclone, Heavy rains, Storm surges, Continuous rain spell, Tornadoes/ Waterspouts, Thunderstorms, Continuous Dry spell (Drought) and Heat waves/ Cold waves.

Hydrological hazards

- Riverine Floods
- Flash floods

Meteorological hazards

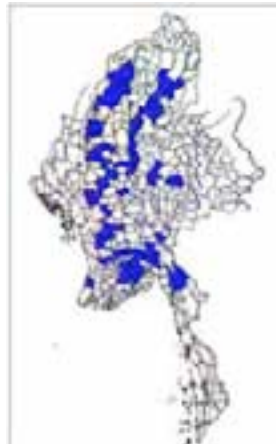
- Tropical revolving storms
- Cyclone
- Heavy rains
- Storm surges
- Continuous rain spell
- Tornadoes
- Thunderstorms
- Continuous Dry spell (Drought)
- Heat waves/Cold waves

Hydro-meteorological hazards prone areas

Cyclone



Flood



Drought/Dry zone



Seasonal Rainfall Distribution in % of Annual

Area (Annual rainfall-mm)	Mar-Apr Hot Season	May-Sep Monsoon	Oct-Nov Post Monsoon	Dec-Feb Cool wx
N and NW (2600)	7	80	10	3
West (4000)	10	72	15	3
East (1200)	8	60	20	12
Central (800)	5	70	20	5
Delta (2700)	2	85	10	3
South (400)	6	78	10	6

Cyclone

Myanmar is exposed to the threat of cyclones and associated sea waves. Previous frequency of cyclones that made landfall on Myanmar coast was just once in about three years, but since the year 2000, cyclones crossed Myanmar coast every year. The cyclone tracks are with respect to the Latitude and pattern of re-curvature. Latitude of re-curvature becomes lower year after year and drastic change of direction of the course took place within a few hours. In the case of Cyclone Nargis, the impact was extremely severe. It is due to very high vulnerability of the area. Enhancement of strong coordination among the responsible agencies, community participation and capacity building need to be expanded in the context of disaster risk reduction in Myanmar.

The cyclone is accompanied by three destructive powers:

- Strong winds (as high as 120 mph), heavy rains (more than 5 inches in 24 hours) and storm surges (higher than 10 feet).
- Storm surge is the main cause of damage, which depends on the vulnerability of the place of landfall.
- Torrential Rain

Table 1: Categories of Cyclonic Storm in the Bay of Bengal according to wind speed (NMC) and their Size



Generally maximum surface wind may reach (100) mph to (130) mph during crossing to Myanmar Coasts. However, it depends on intensity and size of the land falling Cyclone.

No.	Category	Wind speed (mph)	Size Diameter (mile)
1.	Low Pressure Area	≤ 32	
2.	Depression	32-38	100
3.	Cyclonic storm	55-72	300-400
4.	Severe Cyclonic Storm	>73	400-500
5.	Severe Cyclonic Storm with Hurricane wind force	>120	

The severe Cyclonic storm will accompany strongest wind, localized heavy rain and higher storm surge. Rakhine Coasts and Ayeyarwaddy Deltaic areas pose vulnerable areas by Cyclones.

Causes and Characteristics of Cyclones in the Bay of Bengal

Myanmar is situated in the western part of the South-East Asia, bordering the Bay of Bengal and the Andaman Sea with its 2400 km long coast line. It is potentially rich with marine natural resources and also potentially threatened by the waves, cyclones and associated weather. As a tropical agricultural country, the majority of the people live in the fertile plain land which is often inundated by river floods and coastal areas exposed to stormy weather.

Table 2 Month-wise break-up of cyclone formed in Bay of Bengal

Month	No. of Cyclone formed in Bay of Bengal along with % of total	No. of Cyclone which hit Myanmar along with % of total
JAN	16 (1%)	2 (2%)
FEB	3 (0%)	1 (1%)
MAR	8 (1%)	-
APR	32 (3%)	15 (19%)
MAY	89 (7%)	24 (30%)
JUN	111 (9%)	1 (1%)
JUL	180 (15%)	-
AUG	192 (15%)	-
SEP	209 (17%)	-
OCT	190 (15%)	14 (18%)
NOV	141 (11%)	14 (18%)
DEC	77 (6%)	9 (11%)
Total	1248 (100%)	80 (100%)

two cyclone seasons annually about a month before and three months after the South-West monsoon.

Frequency and Impact

During the period 1887 to 2005, 1248 tropical storms were formed in the Bay of Bengal, of which 80 storms (6.4 percent of total) hit the Myanmar coast. May and April account for 30 and 18 percent of the cyclones, respectively, while October and November each accounts for 18 percent cyclones that hit Myanmar.

Seasonal Profile of Tropical Cyclone Occurrence

The global seasonal profile of cyclonic and other storms over a 30 to 103 year period (depending on basin data sets) is presented in the tabel. The data is presented over a 15 day linear moving average and shows, three major peak seasons. The data shows that majority of the cyclones which have landfall over Myanmar delta are during pre monsoon or post moonsoon months.

The origin of storms in the Bay of Bengal

Month	Location
Late April	The vicinity of Andaman Sea (originate more and more to the North)
June	15°N
August	18°N
October- end of	Bay of Bengal
December	Some from South China Sea
February/ March	without Storms with C.S

Total Number of storms (%) formed in the Bay of Bengal and that had crossed Myanmar coast during the period 1887 to 2009

Month	Storms formed in the Bay of Bengal	Storms which crossed Myanmar coast
JAN	16(1%)	2(2%)
FEB	3(0%)	1(1%)
MAR	8(1%)	0(0%)
APR	32(3%)	15(19%)
MAY	98(7%)	27(30%)
JUN	111(9%)	1(1%)
JUL	180(15%)	0(0%)
AUG	192(15%)	0(0%)
SEP	209(17%)	0(0%)
OCT	190(15%)	14(18%)
NOV	141(11%)	14(18%)
DEC	77(6%)	8(11%)
Total	1267(100%)	83(100%)
Total	10.49	0.66

APRIL-MAY IS FIRST STORM PERIOD FOR MYANMAR WITH POSSIBILITY OF 49% CHANCE OF LAND CROSSING.

OCT-NOV-DEC IS SECOND STORM PERIOD FOR MYANMAR WITH POSSIBILITY OF 47% CHANCE OF LAND CROSSING.

Storm Surge

Storm surge is basically a flood that is caused by strong storm wind pushing sea water ashore. It generally occurs due to waves generated by the strong wind in tropical revolving storms. The slope of the coastline is considered as one of the important factors controlling the intensity of storm surge.

Myanmar, bordered with the Bay of Bengal and the Andaman Sea with its 2400 km long coast line, is potentially threatened by the waves, cyclones and associated weather.

Characteristics

Storm surges in one of the destructive forces of cyclone or tropical storms accompanying with the other two forces - strong winds which could be as high as 120 mph and heavy rains of more than 5 inches collected within 24 hours. The storm surges with waves higher than 10 feet may be experienced due to a landfall cyclone. Extent of damage is mainly due to the storm surge, which depends on the vulnerability of the place of landfall.

The Bay of Bengal has two cyclone seasons annually about a month before and three months after the southwest monsoon. Scientists estimated the possible heights of the storm surge based on origin and path of the storm, average velocity, water depth, time, density of seawater and other technical factors. For a generalized model for a certain area, water depth is the most important controlling factor while other information is conditional.

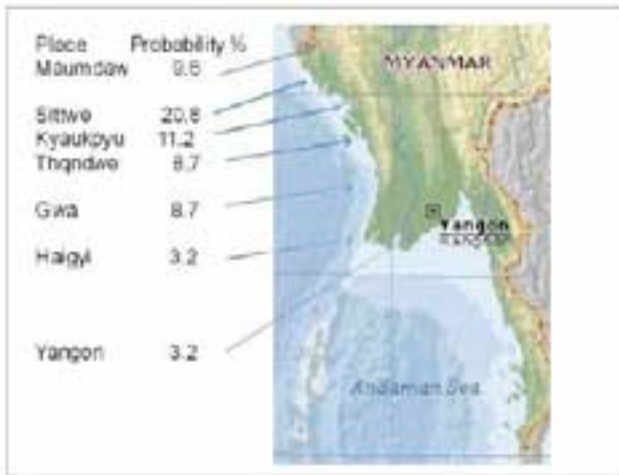
The storm surge or flooding accompanied with cyclone largely depends on the place of landfall and its path. From the experience of Nargis Cyclone in 2008, water bodies along the storm path are undeniably important in surge estimation.

The following factors are some of those controlling potentiality of high storm surge in an area:

- Altitude above mean sea level
- Distance from the sea
- Water volume of nearby source of surge
- Nature of the river mouth
- Route of the storm and interaction with tributaries

Historically in Rakhine, there have been several incidences of the storm surge. In the 1982 Gwa Cyclone, the storm surge was as high as 4 meters near the landfall point near Gwa. The 1992 Thandwe Cyclone resulted in the maximum surge of 1.5 meter near Thandwe, and in Sittwe at 0.7 meter in surge height. During the 1994 Sittwe Cyclone, the maximum surge occurred near Sittwe was 4 meters. In addition, there also occurred two more events viz. Kyaukphyu (2003), Gwa (Mala Cyclone) (2006).

Figure 3 Cyclone landfall probability along Myanmar Coast (1947-2008)



Storm Surge observed along the Myanmar Coast (1947-2008)

- Myanmar has a very long coastline.
- The densely settled low-lying lands are particularly vulnerable to rising sea levels.
- Even diminutive rises in sea level vertically can lead to enormous erosion horizontally. As per the IPCC report, a rise in sea level of one centimeter can result in beach erosion of one meter horizontally.

Possibility of storm surge for Myanmar Coast:

1. Potential of cyclones and
2. Potential flood hazard for a certain area.

Floods

Floods in Myanmar generally occur during the Southwest Monsoon season (June- October). Widespread flood mostly occurs in the large and medium rivers in Myanmar,

caused by the heavy rainfall striking at head water region during (1-3) days. The flood wave forming at the head water starts to move downward causing flood along the river up to the delta area.

Flash floods usually occur in the small rivers and streams in Myanmar, caused by heavy rainfall on the source and the flood wave move downward and swiftly.

In Myanmar, majority of big cities and towns, economically strategic places in the country, usually situate along four major rivers, namely Ayeyarwady, Chindwin, Sittaung and Thanlwin. While the existing intricate river systems provide easy access of water transportation, creating prosperous urban centers along the waterways, the flooding in these rivers devastate the lives of the inhabitants.

Floods in Myanmar

Flooding has always been one of the major hazards in Myanmar, accounting for 11% of all disasters, second only to fire. Between 1910 and 2000, there were 12 major floods. The Ayeyarwady River basin alone, the largest in the country, covers 404,200 square kilometer of the country. Over 2 million people are exposed to flood hazard in Myanmar every year.

Flooding leads to loss of lives and properties, damage to critical infrastructure, economic loss and health related problems such as outbreak of water borne diseases when the lakes, ponds and reservoirs get contaminated. The country receives practically all its rainfall in the rainy season between mid-May and October during which flooding and landslides are common.

In Myanmar, the threat of flooding usually occurred in three waves each year: June, August and late September to October with biggest danger arriving in August as peak monsoon rains occurred around that time.

Different types of floods can be seen in different areas of Myanmar:

- **Riverine floods** in the river delta;
- **Flash floods** in the upper reaches of the river systems, normally the mountainous areas, caused by heavy rainfall striking at head water region for considerable period of 1-3 days.

- **Localized floods** in urban area due to a combination of factors such as cloudburst, saturated soil, poor infiltration rates and inadequate or poorly built infrastructure (such as blocked drains) and in rural areas due to the breakage of water resistance structures as dams, dykes and levees.
- **Flooding due to cyclone and storm surge** in the coastal areas.

Riverine floods are most common among all and they happen when the monsoon troughs or low pressure waves superimpose on the general monsoon pattern resulting in intense rainfall over strategic areas of the river catchments.

- In **Ayeyarwady** and **Chindwin** rivers, the flooding occurs when intense rain persists for at least 3 days over northern Myanmar, the headwaters of the rivers. Most of the flooding in the lower Ayeyarwady and the delta is by Chindwin, when its flood coincides with upper Ayeyarwady floods.
- In **Sittaung** and **Thanlwin** rivers, floods are duly caused by rainfall associated with low-pressure waves (the remnants of typhoons and tropical storms of South China Sea) moving from east to west across the country.

In addition to above mentioned four, other rivers such as Bago and Dokethawady (tributary of Ayeyarwady) rivers also set off major floods.

Causes of River Floods

Ayeyarwady and Chindwin

Intense heavy rain due to pronounced monsoon trough persisting for at least 3 days over Northern Myanmar areas. Heavy rainfall due to Cyclonic Bay Storm crossing Myanmar and Bangladesh coasts during pre-monsoon and post-monsoon

Sittaung and Thanlwin

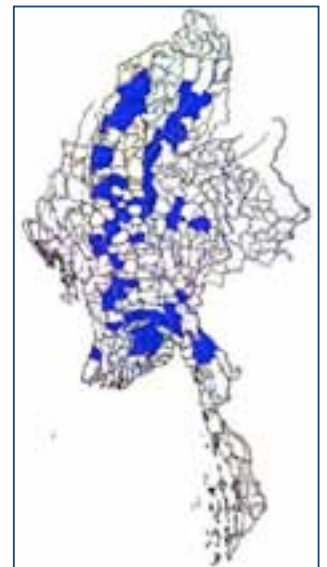
Mostly due to rainfall associated with low pressure waves (the remnants of typhoons and tropical storms of South China Sea) moving from east to west across the country

Flood Vulnerable Locations

In general, the catchment areas of major rivers in the north and central zone are prone to riverine floods. The Southern Delta faces riverine floods when there is flood tide and high river water flow at the same period. In these areas, the lands are protected from floods by earthen dykes, but there were times when flood overpower the dykes and cause losses of lives and properties.

The mountainous and hilly areas in Kayin, Kachin, Shan, Mon and Chin States are threatened by flash floods. In Kachin State, at the confluences of the Ayeyarwady River, the snow in the higher altitude melt and flash floods occur quite frequently at the beginning of summer.

Along the coastal region in Rakhine State, floods are secondary hazard generated by cyclones. Furthermore, the Ayeyarwady River basin and the catchment occupy 60% of the country area traversing Chin, Kachin, Shan States and Mandalay, Magwe, Bago, Yangon and Ayeyarwady Divisions. Floods, in consequence, can occur over a wide range of region.



Drought

Drought is normally the results from reduced rainfall over an extended period of time and a climatic aberration, compared to aridity which is a permanent feature of climate

While droughts are most often associated with low rainfall and semi-arid climate, they also occur in areas with normally abundant rainfall. Humans tend to stabilize their activities around the expected moisture environment, thus, after many years with above average rainfall, humans may perceive the first year of average rainfall as a drought.

Further, a rainfall level which meets the needs of a pastoralist may constitute a serious drought for a farmer growing corn. In order to define drought in a region, it is necessary to understand both the meteorological characteristics as well as the human perception of the conditions of drought.

Drought Characteristics

- Slow onset, hence offers opportunity for mitigation
- No single indicator or index to identify onset and severity of event
- Spatial extent much greater, impacts spread over large geographical area, making assessment and response difficult
- Duration may range from months to years
- Core area affected changes over time, hence the need for continuous monitoring
- Impacts are cumulative

Drought and Dry Zone

The Dry zone of Myanmar is located in central part of the country in Magway, Mandalay and Sagaing (lower) Regions and covers approximately 10 percent of total area of the country. It falls under arid to semi-arid zone as per different zonation criteria. As it is located in rain fed area, the average annual precipitation is below 1000mm. Fifty-four Townships spread across 13 Districts in 3 Divisions falls under the Dry zone as per the Dry Zone Greening Department. Some other reports have identified 60 Townships under dry zone.

Dry-zone Townships in Mandalay

District	Townships
Nyaung Oo	Nyaung Oo, Taung Thar, Ngazun
Myin Gyan	Kyauk Padaung, Nadoe Gyi, Myin Gyan
Meikhtila	Meikhtila, Mahlaing, Wan Twin, Tharzi
Yamaethin	Yamaethin, Tat Kone, Pyaw Bwe
Kyauk Se	Kyauk Se, Tadar Oo, Myit Thar

Dry-zone Townships in Magway

District	Townships
Magway	Magway, Taungdwingyi, Natmauk, Myo Thit, Yaenanchaung, Chauk
Min Bu	Min Bu, Salin, Pwint Phyu, Nga Phe
Thayet	Thayet, Sinpaungwe, Mindon, Kanma, Aung Lan, Min Hla
Pakkoku	Pakkoku, Seik Phyu, Pauk, Yesagyo, Myaing

Dry-zone Townships in Sagaing

District	Townships
Monywa	Monywa, Pale, Salin Gyi, Butalin, Chaung Oo, Yinmarpin, A Yar Daw
Sagaing	Sagaing, Myin Mu, Myaung
Shwe Bo	Shwe Bo, Kant Balu, Wet Let, Khin Oo, Depaeyin, Yae Oo, Ta Sei

The deterioration of natural resources such as soil erosion and deforestation has made the agricultural production base unstable. The main reasons include increased human and cattle population and demand of fuel wood for domestic as well as industrial use. The natural resources of Dry zone are being depleted more rapidly than nature can renew itself.

Take Away

At the end of the session, you will be able to:

- Understand major Hydro-Meteorological Hazards in Myanmar-Cyclone, Storm Surge, Floods and Drought, Causes and Impacts

Check your learning:

1. Select the correct word for the following sentences:

1.1 The life span of cyclone is

- (a) More than 1 month
- (b) Less than 1 month
- (c) More than 1 week
- (d) Less than 1 week

1.2 In Myanmar cyclone affected

- (a) Coastal areas
- (b) Hilly regions
- (c) Central Myanmar
- (d) Whole country

1.3 The majority of the cyclones which have landfall over Myanmar are

- (a) During Monsoon months
- (b) During Pre-monsoon and Post-monsoon months
- (c) During Dry season months
- (d) All year round

1.4 Flood in Myanmar generally occurs during

- (a) April-May
- (b) June-October
- (c) December-January
- (d) Anytime

1.5 Flooding in Myanmar accounting for

- (a) 13% of all disasters
- (b) 71% of all disasters
- (c) 31% of all disasters
- (d) 11% of all disasters

2. Check whether the following sentences are True or False.

2.1 Myanmar is not exposed to the threat of cyclones hazard.

2.2 Severe Cyclones occurred during the monsoon period.

2.3 Storm surge is basically a flood that is caused by strong wind pushing sea water ashore.

2.4 Drought normally happens very quickly.

2.5 Drought prone areas in Myanmar are central part of the country.

3. Explain the following.

3.1 Three destructive forces which accompanied by cyclone:

.....

.....

.....

3.2 Two major scopes of possibility of storm surge for Myanmar are:

.....
.....
.....

3.3 Explain the different types of floods:

.....
.....
.....

3.4 Explain the different types of drought:

.....
.....
.....

4. Please mention two key learning's from this session

.....
.....
.....

Correct answers of check your learning Exercises

1. 1.1 (d) Less than 1 week 1.2 (a) Coastal areas 1.3 (a) During Monsoon months
1.4 (b) June-October 1.5 (d) 11% of all disasters
2. 2.1 False 2.2 False 2.3 True 2.4 False 2.5 True

Additional readings/references

RRD (2009) *Hazard Profile of Myanmar*.

UNDP (2011) *Multi Hazard Risk Assessment in Nargis-affected Areas (Ayeyarwady, Bago, Yangon): Hazard Risk and Vulnerability Assessment Report*. <http://www.gripweb.org/gripweb/?q=countries-risk-information/documents-publications/multi-hazard-risk-assessment-nargis-affected-areas>

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2.5 FIRE HAZARD IN MYANMAR

At the end of this session, you will be able to:

- Understand the overview of Fire Hazards in Myanmar
- Understand the nature of Fire Hazards, occurrence, various types of fire hazard (Urban Fire, Forest Fire), characteristics, causes, related factors contributing to risk of fire and impacts

Key Concepts Fire hazard -the most frequent hazard in Myanmar, Statistic Record of Fire Incidences, Geographical Distribution of Occurrences, Types of fire and impacts, Methods and Equipments for Fire Extinguish

TRAINING CONTENT

Introduction

Historical data shows that Myanmar has suffered serious incidences of fires considering number of the forest and rural fires which usually occur between December to end of April when the weather is hot and dry. In the last 15 years, frequency of fires in rural area where 70% of the population dwelled, accounts about 25% (as one fourth) of the total incidences of fires all over the region i.e. a total of 444 events. Fire loss in rural area has increased about 40% of the total loss surprisingly since fire cases in rural area usually become big fire by spreading through the whole village.

Fire Hazard in Myanmar

- Accounts for 73 % of Disasters (by numbers of event)
- The number of Fire cases is decreasing while financial losses are increasing over years.
- Five Regions (Yangon, Mandalay, Ayeyarwady, Sagiang and Bago) accounts for 63 % of the cases. Approximate financial loss is US\$ 0.9 million annually.

Myanmar has a long history of fire and fire fighting, as there are some historical evidences of constitution of fire fighting forces since 11th century in Bagan. Fire is the most frequent disaster of Myanmar as on average, approximately 900 cases are reported every year in Myanmar. Fire Services Department, under the Ministry of Social Welfare, Relief and Resettlement maintains a record of fire cases.

The high incidences of fire in Myanmar are due to climatic conditions including temperature, use of flammable construction materials, unplanned development and other social factors.

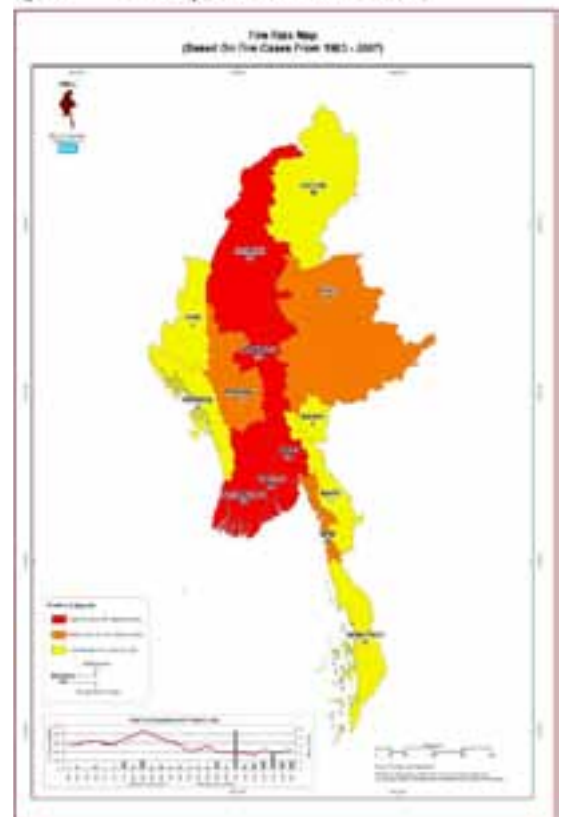
In rural areas, people prefer to live in bamboo houses with thatched roof made of bamboo shaves and Nipa palm leaves (*Dha-Ni*), which are highly inflammable. As these materials are locally and readily available, do not require sophisticated technology, and are not expensive, and above all suit the local weather condition, hence much preferred. The uncovered cinders left after cooking with

Fire Incidents in Myanmar in 10 years from 2002-2011

Sr	Type of Incident	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average
1	Kitchen fire	184	170	205	194	171	236	193	191	232	247	202.3
2	Negligence	462	419	486	462	508	529	433	308	467	403	447.7
3	Spontaneous fire	5	14	7	3	3	10	5	11	16	50	12.4
4	Electrical	110	91	152	103	106	108	116	146	107	149	118.8
5	Arson	28	37	36	38	18	29	44	34	33	50	34.7
6	Wild fire	38	18	52	31	25	32	7	22	64	17	30.7
7	Fire alert	10	9	16	3	2	-	-	-	-	-	4.0
	Total	843	760	956	835	833	944	799	714	928	923	852.7

Source – Fire Service Dept

Figure 11 Fire Risk Map (Based on Fire Cases from 1983 to 2007)



The Fire Risk Map, based on the fire cases of last 25 years, categorizing Regions/States into High Risk, Medium Risk and Low Risk zones is at the map.

wood and charcoal, candles left lit even after use, exposure of naked flames and unattended mosquito coils to diesel, petrol and engine oils also led to fire cases.

The fire risk-wise Divisions/ States, Number of Districts, Townships, Area and Population are in Table 19. (Hazard Profile of Myanmar)

Table 19 Area²³ & Population²⁴ in Fire Risk Zone

Fire Risk Zone	Divisions/ States	²³ No. of Townships	Area In sq. miles	% total area	Population	% of total population
High	Yangon, Bago, Ayeyardwady, Mandalay, Sagaing	167	83,338	32	33,431,000	60
Medium	Magway, Mon, Shan	89	82,208	31	13,361,000	24
Low	Rakhine, Kachin, Kayah, Kayin, Chin, Tanintharyi	68	96,812	37	8,604,000	16
Total		324	261,228	100	55,396,000	100

Nature of Fire

A fire requires three components to ignite and burn. These are **fuel** to burn, air to supply **oxygen**, and a **heat source** to bring the fuel up to ignition temperature. Heat, oxygen and fuel form the **fire triangle**.



Types of Fire

Fires have been classified into 6 categories based upon the fuel.

Type A = A fire that is burning from wood, rubbish, paper and other ordinary.

Type B = Fires that involve flammable liquids such as gasoline, petrol and paint.

Type C = Gas fire caused by flammable and ignitable gases or vapors.

Type D = Fires that are burning from combustible metals such as magnesium.

Type E = Fires that involve electrical equipment, transformers and electrical appliances.

Type K = Fires stemming from animal/ vegetable fats, etc.

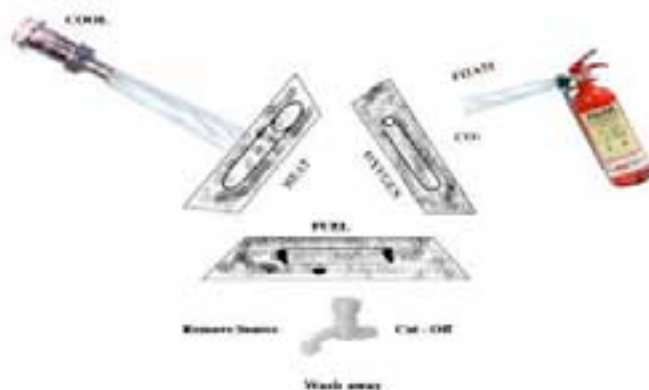
Causes of Fire in Myanmar

- Due to climatic conditions including temperature,
- Use of flammable construction materials,
- Unplanned development
- And other social factors (*bamboo houses with thatched roof, kitchen related fires and negligence*)

Methods of Extinguishing Fire

Fire extinction, in principle, consists in the limitation of one or more of these factors, and methods of extinguishing fire may therefore be classified conveniently under the following headings:

- Starvation - Limitation or removal of fuel
- Smothering - Limitation or removal of oxygen (air)
- Cooling - Limitation or reduction of temperature.



Extinguishing fire in rural villages uses the traditional fire hooks and fire beater flats.

In urban areas, appropriate fire extinguishers should be used in fire hazard.

Types of Fire Extinguisher are:

- Soda - acid / Water Type
- Foam Type
- Dry Chemical Powder type
- Carbon dioxide type

Types of the fire and extinguishing agents

The type of the fire determines how and what you can do to fight against it. Just as there are different types of fire there are different types of fire extinguisher, the wrong choice can be ineffective, cause injury or make the fire worse. Suitable extinguishing agents are:

- Type A - Water, Foam, Dry Chemical Powder, CO₂
- Type B - Foam, Dry Chemical Powder, CO₂
- Type C - Foam, Dry Chemical Powder, CO₂, Closing Main valve
- Type D - Foam, Dry Chemical Powder, CO₂
- Type E - Dry Chemical Powder, CO₂, Shutting Main switch
- Type K - Foam, Dry Chemical Powder, CO₂

Using Fire Extinguisher

Fire extinguishers can be used by the following steps:

PASS

- P**ull the safety pin
- A**im the nozzle
- S**queeze the handle
- S**weeping to the base of fire

Forest Fire

Forest fire, also known as a wild fire or wild land fire, is an uncontrolled fire often occurring in wild land areas, but which can also consume houses or agricultural resources.

Forest fires can occur anywhere, but are common in the forested areas. Wildfires are particularly common in the summer and during droughts, when fallen branches, leaves, and other material can dry out and become highly flammable. Wildfires are also common in grasslands and bushlands.

Forest Fire in Myanmar

- The forest fires in Myanmar are normally surface fires, most frequent during the dry season, starting around December until May.
- They occur in almost all States and Regions sporadically, but are more common in upland regions, namely, Bago, Chin, Kayah, Kachin, Mandalay, Rakhine and Shan.

Causes of Forest Fire

Human causes for forest fires are;

- Campfires
- Discarding lit cigarettes,
- Improperly burning debris
- Playing with matches or fireworks

Natural causes of forest fires are;

- Lightning
- Volcanic eruption
- Underground coal fire
- Drought

But, more than four out of every five wildfires are caused by people.



Types of Fire extinguishers

CO₂ Extinguisher



Dry Chemical Powder Extinguisher



There are several factors that determine how the fire spreads. These factors include **fuel, weather** and **topography**. Depending on these factors, a fire can quickly burn out or turn into a raging blaze.

Fuel Loads

Wildfires spread based on the type and quantity of fuel that surrounds it. Fuel can include everything from trees, underbrush and dry grassy fields to homes. The amount of flammable material that surrounds a fire is referred to as the fuel load.

Weather

Weather plays a major role in the birth, growth and death of a wildfire. Drought leads to extremely favorable conditions for wildfires, and winds aid a wildfire's progress weather can spur the fire to move faster and burn more land. There are three weather ingredients that can affect wildfires:

- Temperature
- Wind
- Moisture

Topography

The third big influence on wildfire behavior is the lay of the land, or topography and its slope. Unlike humans, fires usually travel uphill much faster than downhill. The steeper the slope, the faster the fire travels. Fires travel in the direction of the ambient wind, which usually flows uphill. Additionally, the fire is able to preheat the fuel up the hill because the smoke and heat are rising in that direction.

Types of Forest Fire

There are three basic types of wildfires and these are ground fire, surface fire and crown fire.

Ground fires are the most frequent type of fire and are very intense blazes that destroy all vegetation and organic matter, leaving only bare earth. These largest fires actually create their own winds and weather, increasing the flow of oxygen and "feeding" the fire.

Surface fires typically burn rapidly at a low intensity and consume light fuels while presenting little danger to mature trees and root systems. Generally the height of fire is about 4 feet.

Crown fires generally result from ground fires and occur in the upper sections of trees, which can cause embers and branches to fall and spread the fire.

Impacts of wildfire

- loss of invaluable woodland
- threat to watershed areas
- threat to wildlife
- threat to recreational facilities and resort located within
- threat to forest reserves
- threat to economy
- loss of fodder ground
- Death and injuries of people in the area
- Wildfire damages farmland, and also homes and property including death and injuries of animals on its path.
- Forests are burnt and increase deforestation.
- Reduced trees and plants can increase erosion and landslide.
- Wildfires can affect climate and weather and have major impacts on regional and global pollution.
- Wildfires release greenhouse gases and a number of pollutants affecting human health.

Extinguishing Forest Fire

- Direct Attack- water, sand, Fire Retarded Chemical
- Indirect Attack- Fuel Reduction, Indirect Fire Line, Wetting unburned Fuel

Preventing measures for villages

- 5ft width fire line around perimeter of village boundary
- 15ft width fire trace outside of fire line

The Fire hazard is the most frequent hazard and it also accounts for approximately 70 percent of the disasters. The number of fire cases is decreasing while the losses due to fire is showing increasing trend. The fire cases are mainly in Yangon, Mandalay, Ayeyarwady, Sagaing and Bago. These divisions account for 63 percent of the total fire cases of the country, while the financial loss is approximately 38 percent. The main causes of fire are kitchen related fires and negligence which account for 83 percent of the fire cases. The period from January to May is the high season for fires as per the Fire Services Department.

The average annual fire cases are 900, which leads to loss of properties to the tune of 1 billion kyats or US\$ 0.91 million. Based on the fire incidents from 1983-2007, the States and Divisions have been categorized into High, Medium and Low Fire Risk Zones. Following criteria has been used for zoning: *High Risk Zone*: More than 100 average annual fire cases, *Medium Risk Zone*: Between 100 and 50 average annual fire cases and *Low Risk Zone*: Less than 50 average annual fire cases.

Take Away

After the session, you could be able to:

- Understand the overview of Fire Hazards in Myanmar.
- Understand the nature of Fire Hazards, occurrence, various types of fire hazard (Urban Fire, Forest Fire), characteristics, causes, related factors contributing to risk of fire and impacts

Check your learning:

1. Select the correct answer for the following sentences:

1.1 Fire hazard has accounted for following percentage of all the disasters in Myanmar :

- (a) 85%
- (b) 70%
- (c) 71%
- (d) 67%

1.2 In Myanmar Fire affected

- (a) All coastal areas
- (b) Hilly regions
- (c) Central Myanmar
- (d) Whole country

1.3 Fire basically has

- (a) 3 types
- (b) 4 types
- (c) 5 types
- (d) 6 types

1.4 The Fire extinguishers are used by the following steps:

- (a) PSAA
- (b) PSAS
- (c) PASS
- (d) PSSA

2. Check whether the following sentences are True or False.

2.1 There are several factors that determine how the fire spreads. These factors include fuel, weather and topography.

2.2 A fire requires 4 components to ignite and burn.

2.3 In rural villages, appropriate fire extinguishers are used in fire hazard.

2.4 Wildfires are common in urban area.

2.5 Wildfires are common in the summer and during droughts.

3 Explain the following.

3.a Human causes for wildfires

.....
.....
.....

3.b Natural causes of wildfires

.....
.....
.....

3.c Types of Wild Fires

.....
.....
.....

4. Please mention two key learning's from this session

.....
.....
.....

Correct answers of check your learning Exercises

1. 1.1 (c) 71% 1.2 (d) Whole Country
 1.3 (d) 6 types 1.4 (c) PASS
2. 2.1 True 2.2 False 2.3 False 2.4 False 2.5 True

[Additional readings/references](#)

RRD (2009) *Hazard Profile of Myanmar*.

Fire Service Department. *Beware of Fire Hazard(Fire Prevention Talk) ppt*

Fire Service Department. *School based Fire Safety education ppt*

Forest Department. *Fire Protection(Forest Fire Prevention and Management) ppt*

session

2.6

OVERVIEW OF RISK ASSESSMENT AND CASE STUDY

At the end of the session, you will be able to:

- Understand overview of Risk Assessment
- Understand application of Risk Assessment
- Appreciate examples of Case Study on Risk Assessment in Myanmar

Key Concepts *Overview of Risk Assessment, Definition, and Methodologies adopted for Risk Assessment, Application of results from Risk Assessment, Case Study of Multi-Hazard Risk Assessment in Rakhine State*

TRAINING CONTENT

Introduction

To come up with strategic formulation of DRM planning and arrive at informed decision on DRM interventions, it's crucially important that risks of that particular location are identified and assessed so that all concerned stakeholders have the same understanding on types of risks, elements or sectors at risk and extent of risks. This session will discuss overview of Risk Assessment, definition and methodologies adopted. As risk is the relations of 'Hazard', 'Vulnerability' and 'Capacity', Risk Assessment includes analyzing of these three components.

The session will also present A case study on risk assessment - **the Multi-Hazard Risk Assessment in Rakhine State** which is implemented by UNDP, ADPC and Myanmar Engineering Society in 2011. The case study identifies and quantifies elements at risks of the sectors most vulnerable to each hazard type in Rakhine State. The case study includes objectives, methodology employed, summary of findings and application of the results.

In addition to the case study, this session will also briefly discuss community-based disaster risk assessment and provide examples of common used participatory appraisal tools to elicit disaster risk information at community level.

Disaster Risk Assessment

Assessment is a process (usually undertaken in phases) of collecting, interpreting and analyzing information from various sources.

Risk assessment/analysis is a process to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability/capacity that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend. (UNISDR)

The process of conducting a risk assessment is based on a review of both technical features of hazards such as their location, intensity and probability, and the analysis of the physical, social and economic dimensions of vulnerability, while taking particular account of coping capabilities and resources.

Risk identification means we should be clearly aware what kind of risks we are facing. The risks can be identified from the historical data or the past disasters, for example, an earthquake will occur periodically at the same place and, if an area has been affected by tsunami, typhoon, flood, it has the possibility to be affected again.

Risks can also be identified from the geological or geographical conditions through observations and investigations. A house near a slope may have the risk of land slide. Due to climate change and global warming, the new risk may appear in some cases and the glacier lake outburst flood is the example, which is becoming a new risk for the Himalaya mountain areas. In order to taking the appropriate countermeasures against the risks identified, it is necessary to have the risk to be quantitatively evaluated, i.e. risk assessment.

The outputs of risk assessment are quantifiable probabilities and the estimation of damage/loss to life, property and the environment. Based on criteria, the risk measurement can then be summarized with categories such as severe, moderate and minor or high, medium and low. Disaster risk management begins from the risk identification followed by risk assessment and, finally, the risk treatment.

Purpose of Risk Assessment

- Risk assessment provides a systematic process for identifying, estimating, and ranking community risks.
- Risk assessment contributes to the community's awareness about potential risks they didn't know before.
- Risk assessment is an essential precursor to proper decision making in disaster risk reduction and development policies, strategies, plans, and projects.
- Risks need to be prioritized to identify the risks which need to be reduced.
- Actions and resources can be prioritized based on the frequency, extent of damage and other considerations.
- To ensure that risk reduction planning incorporates a balance between preparedness and long term mitigation measures.
- To ensure that risk reduction will be cost effective and sustainable.

Components of Risk Assessment

Hazard Assessment: determines the likelihood of experiencing any natural or human-made hazard or threat in the community. Assessment includes the nature and behavior of each of the hazards a community is exposed to.

Hazard Assessment Process - The Hazard Matrix (or Table) helps us to systematize information regarding the properties of the community's hazard exposure. It is a useful guide when conducting hazard assessment workshop with community members. Discussion can then continue to take up hazard intensity (potential destructive force, adverse effects) and extent (geographical coverage, range of impact). Such discussion flows to the next step in the Participatory Risk Assessment-the Vulnerability Assessment.

Example of Hazard Matrix (or Table) for Flood and Earthquake

Hazard Type	Origin	Warning	Fore-warning signs	Force	Speed of	Frequency onset	Seasonality (when)	Duration
Flood	Rain, River Over flow	Rainfall duration, intensity, quantity, speed of the wind, temperature, movement of animals, insects and birds	Relatively short but can vary from a few hours (overnight) to a few days	Volume of water	Can often be predicted a few days in advance	Seasonal	Wet/ monsoon season June-August	Days/Weeks
Earthquake	Seismic activity	Gas emissions, movement of animals, changes in level of wells	None	Earth moving, ground shaking	Sudden	(specific to location)	(specific to location)	(depends on magnitude) With aftershock

Some Guidelines in Hazard assessment

1. Look at scientific and statistical data
2. Take action to translate scientific data into practical information
3. Integrate local knowledge with scientific and technical information
4. Approach knowledgeable sources/people
5. Understand the various intensities of the same hazard
6. Look out for secondary hazards

7. Be on the look out for new or emerging hazards
8. Be aware of local threats: the increasing number of small scale, localized hazards which do not hit the headlines or appear in disaster statistics. Cumulatively, these can present a more serious problem than a catastrophic event. For example, in densely populated shanty towns, regular fires, floods, landslides, and epidemics are increasingly common events.
9. Bring available maps to facilitate drawing of hazard maps
10. Specifying the nature and behavior of the hazard is specifically important
11. Designing early warning system, especially at the local and community

Vulnerability Assessment: identifies what elements are at risk and why they are at risk (unsafe conditions resulting from dynamic pressures which are consequences of root or underlying causes).

Elements at risk are the people, households, houses, property, crops, livelihood, community facilities, even the environment which may be damaged by the hazard. During vulnerability assessment, the elements at risk are detailed and why these can suffer damage and loss are studied.

Basically, vulnerability assessment answers the questions:

- Who are at risk or can incur damage and loss?
- What are other elements at risk?
- What damage or loss can these people or elements at risk suffer/incur? (physical damage, deaths, injuries, disruption to economy, social disruption, environmental impact, need for emergency responses)
- Why will these people and elements suffer or incur damage and loss?

Major Hazard Consequences in Urban and Rural Settings

Setting	Elements at risk (EAR)	Effects on Different EARS	Characteristics of EAR that contribute to Vulnerability
Urban	People	Injured, died, starvation, trauma	Age, gender, physical health, social, economic and demographic
	Buildings (houses, others)	Partial damage/full damage	Construction materials, design, location, height
	Infrastructure (roads, bridges, telecommunications, electricity)	Partial damage/full damage	Size, height/depth, design, materials, level of exposure
	Industry	Damage to building, products, raw materials, machinery (labor, management)	Size, type of products, type of raw materials
Rural	Crops and fodder	Destroyed, put on fire	Height, water dependent/non-dependent
	Environment	Destroyed to vegetation, harm to flora and fauna, damage to waterways, mountains, etc.	Terrain type, nature of flora and fauna
	Land	Erosion, salinity, deposits, desertification	Location, elements of soil terrain
	Irrigation system	Deposit of silt, breaking of channels, damage to machinery (tube-wells, tractor)	Location, design, construction materials
	Animals	Injured, died, disease	Location, characteristics of species, health

Capacity Assessment: identifies the people's coping strategies; resources available for preparedness, mitigation and emergency response; who has access to and control over these resources.

Capacity Assessment is a participatory study to understand how people cope with and survive in times of crisis and to identify resources which can be used to prepare for, prevent and/or reduce damaging effects of hazards. Basically capacity assessment answers the questions:

- What are existing coping strategies and mechanisms during times of crisis? How have individuals, households and the community survived and responded to disasters in the past?
- What are resources, strengths, local knowledge and practices can be used for disaster preparedness, mitigation and prevention or to quickly recover from a disaster?
- Resources are things which a person, household, community or country has and that it uses too protect or increase its well-being and wealth. It also denotes a power or ability to do a particular thing (Kotze and Holloway, 1996).

People's perception of risk: identifies the perception of risks of the heterogeneous groups and sectors, which make up the community; and measurement of the community's disaster risks based on people's perception.

Guidelines for conducting participatory risk assessment

Participatory Risk Assessment should combine local disaster experience and knowledge (of insiders or local people) with science and technology (which are usually brought to the community by outsiders and experts). **Risk communication** or the imparting and exchange of information about disaster risk (and risk reduction) among various stakeholders is important at each stage of this process.

- Risk assessment is a sound basis for disaster risk reduction
- Involve the target population in the various stages of risk assessment and risk reduction planning
- Integrate local knowledge with scientific and technical information
- Risk Assessment includes Hazard Vulnerability Capacity Assessment and understanding of people's perception of risks and local coping strategies
- Risk Communication is important throughout the whole process of risk assessment
- Rapid Participatory Risk Assessment at the local and community level should utilize current scientific/technical hazard and damage estimation studies

The results of the Participatory Risk Assessment are usually maps which indicate or delineate areas or zones which are at high, moderate or low risk to various hazards or threats, or which are safe and unsafe areas for settlements, economic activities, and other community functions. As part of the disaster preparedness planning, evacuation centers, life lines and safe routes to them are also indicated.

Community-Based Disaster Risk Assessment

At community level, the risk assessment is undertaken with highly community participation. Disaster Risk Assessment at community level or the so-called *Participatory Community Disaster Risk Assessment (PDRA)* is a participatory process of determining the nature, scope and magnitude of negative effects of hazards to the community and its households within an anticipated time period' (CBDRR Field Practitioners' Handbook, 2004).

Step 1 Identify hazards in the community. Its output should identify, list down and describe the nature of hazards in terms of its recurrence, seasonality, location, possibility of early warning and general knowledge of the people about the hazard.

Step 2 Capture the hazards, vulnerability and natural resources and facilities of the community in community and/or digitized maps

Step 3 Identify and assess the vulnerabilities and capacities of the community in general but makes sure that there is gender disaggregation of data; special needs groups like the children, elderly and people with disabilities are given utmost considerations as well.

The PDRA adopts Participatory Rural Appraisal which aims to optimize community participation, lively exchange of ideas, and negotiated discussion among community members and between the community and other stakeholders such as local authorities, the private sectors and development sector presenting in the community, etc.

Common tools could be used for PDRA such as:

- Historical Profile
- Venn Diagram
- Seasonal Calendar
- Mapping
- Ranking

Historical Profile - to learn what are the disaster events that happened and other significant events in the community.

Hazard Map - to identify areas at risk from specific hazards and the vulnerable members of the community and identify available resources that could be used in community disaster risk management. The PDRA will be elaborated in Session 5.3.

Township risk assessment can be developed based on the results of community level risk assessment of villages and village tracts. If the townships are included in scientifically conducted risk assessment, its findings can be integrated in Township risk assessment.

Case Study *Multi-Hazard Risk Assessment in the Rakhine State of Myanmar*

Introduction

Rakhine State, situated on the western coast of Myanmar, is prone to several hazard types. Cyclones that originated in the Bay of Bengal could make a direct hit to the state, resulting in damage and losses due to strong wind as well as coastal flood. Cyclone Giri (October 2010) and cyclone Mala (April 2006) are prime examples of recent cyclones that heavily affected Rakhine State. Moreover, the mountainous areas of the state have faced a landslide problem in the past, especially in the rainy season. In June 2010, a total of 46 people were killed in a landslide triggered by heavy rain in Maungdaw Township of the state.

Initiatives have been taken to reduce the disaster risk at different levels ranging from national, regional and local arenas after cyclone Nargis. However, the recent 2 cyclones that heavily affected Rakhine State revealed the needs to further improve disaster preparedness system of the state both at the state as well as the local levels. The United Nations Development Programme (UNDP) of Myanmar, in collaboration with the Rakhine State government and the Relief and Resettlement Department of the Myanmar government, has taken initiative to conduct a multi hazard risk assessment for Rakhine State. *The project was implemented by the Asian Disaster Preparedness Center (ADPC) in partnership with the Myanmar Engineering Society (MES) as its local partner. The project was largely implemented by consultation and coordination with all focal government departments, academia, international agencies and local NGOs.*

Project Objectives

The main goal of the project “Multi-Hazard Risk Assessment in the Rakhine State of Myanmar” is an understanding of the vulnerability of communities to various natural hazards and a comprehensive picture of the impact of natural hazards as well as the determined degree of exposure to future hazardous events.

The major objectives of the project however are as followed.

1. To map out all hazard prone areas of the Rakhine State specifically district, township, covering geological, hydro-meteorological hazards and other types of hazard specified.
2. To assess the exposure of people, property, infrastructure and economic activities to these above mentioned hazards.
3. To assess full range of vulnerabilities of the exposed elements experienced throughout the state with reference to above hazards.
4. To identify programming gaps and opportunities that will enable Government and other humanitarian and development agencies to formulate disaster risk reduction plans and strategies.
5. It is expected that the study will provide most useful information which will allow decision makers to prioritize risk mitigation investments and measures to strengthen the emergency preparedness and response mechanisms to hydro-meteorological, geological hazards and other types of hazards as identified.

Project Methodology

The methodology has been compartmentalized into several sections. The project incorporated data collected from existing hazard and vulnerability studies, disaster databases, and field survey. In addition, hazard mapping was conducted by modeling for cyclones, storm surge, floods, landslides, earthquakes, tsunamis, and forest and rural fires. The vulnerability assessment followed a semi-analytical, semi-

empirical approach utilizing the Analytical Hierarchy Process (AHP) and was complimented by subject-matter expert opinions. **The degree of vulnerability was estimated for the Social and Human sector, Physical Infrastructure sector, and Production sector, with respect to each hazard. Lastly, state-level disaster risk reduction recommendations were evolved.**

The project began by studying a number of past disasters and their impacts in Rakhine State. Data from secondary sources as well as field survey was collected. There are several important sectors which govern the growth of Rakhine State on which disasters can have serious impacts. It is thus necessary to assess such impacts on these identified sectors. Key sectors such as population, livelihood, housing, and agricultural production are considered in this report. However there remain several other important sectors in the state which could not be considered in this project due to the unavailability of data and time constraints.

The hazard assessment and mapping have been carried out for cyclones, storm surge, floods, landslides, earthquakes, tsunamis, and forest/rural fires. A variety of well-established **scientific tools and techniques have been used to assess the hazards and mapping** accordingly. For each hazard type, assessment and mapping were done for short and long return periods as each one serves a different purpose. A short-return-period hazard, representing a 'frequent' hazard case, would be appropriate for DRR planning, while the long-return-period hazard represents a 'rare' case, which is suitable for consideration in the design and construction of important buildings and infrastructures. At the end, multi-hazard assessment was carried out.

The next component is **the vulnerability and risk assessment**. This is essential in policy-making, planning and strategy development. **Each hazard type has a specific impact on particular sectors.** The risk associated with all combinations of hazards and sectors was calculated and presented in a map format. An attempt was made to aggregate the risk for all hazards and derive a Composite Risk Index.

Finally, the project provides recommendations for using the resulting hazard, vulnerability, and risk indicators for disaster risk reduction based on the completed scientific analysis.

Summary of Key Findings

With respect to the hazard assessed, there are 71 village tracts that are prone to 3 or more hazard types. Seven are prone to 4 hazard types. These village tracts include Taung Yin of Kyaukpyu township; Hpa Tu Gyi of Pauktaw township; Ah Ngu, Kyun Kya, Nga Man Ye Gyi, Ohn Chaung, and Pyin Chaung of Myebon township. Actions need to be taken in these village tracts to raise awareness of the residents, to have emergency response planning in place, to have some mitigation measures planned, and to have long-term plans to manage their risk. All these should be done to reduce the sensitivity and increase the capacity in these village tracts.

The calculated Composite Risk Indices indicate the level of hazard risk, considering all kinds of hazards and also the vulnerability. It was found that Pauktaw, Maungdaw, and Ann are the townships that their village tracts are most at-risk. The Composite Risk Maps supplied in this report also will help identifying the locations of high-risk village tracts. More importantly, this study made available the formulation as well as the data needed for users to compute their own Composite Risk Indices. This is particularly important since users may have more reliable data to rank the hazard types, which will fit best to their needs.

Applications of the Study Results

- Hazard mapping from this project will allow authorities to make plan for proper locations of emergency shelters in an event of disasters.
- Methodologies for vulnerability assessments of various assets at the village tract level have been developed. These will aid in the identification of the most vulnerable sectors and the measures necessary to reduce disaster impacts.
- The risk indication will aid concerned stakeholders in prioritization within disaster risk reduction strategies.
- The study results will bring out existing gaps in disaster risk reduction strategies. In addition, it will recommend measures to build decision-making capacities.
- This study results will be a useful tool in mainstreaming disaster risk reduction into various sectors at all levels in the future.
- The assessment will help township and state decision-makers, policy-makers and development agencies in preparing disaster risk reduction planning.
- Based on the outcomes of this study, the government may take actions toward capacity building for disaster risk reduction. The study developed a robust methodology for hazard, vulnerability and risk assessment in close collaboration with national technical departments and agencies. These models may now be replicated in other regions of Myanmar. Ideally, the study will encourage the financial support of international organizations for measures and actions that will reduce the risk associated with natural hazards in Rakhine State.

Example of Output - Multi-Hazard Risk Assessment in the Rakhine State of Myanmar

The most potentially affected sectors to each hazard identified and exposure and vulnerability assessment by sector.

Table 1: Sectors affected by the Hazard Type

Hazards	Affected Sectors	
	Primary	Secondary
Cyclone	Population, Housing, Health	Education
Storm Surge	Population, Health	Education, Housing
Riverine	Population, Health	Education, Agriculture, Housing
Landslide	Population, Health	Education
Fire	Population, Health	Education, Agriculture
Earthquake	Population, Housing, Health, Transport	Education
Tsunami	Population, Health	Education, Housing

Storm surge hazard map for the Rakhine State of Myanmar (Northern part) developed corresponding to a tropical cyclone event of maximum wind speed 270 km/h. The classification of flow depths includes the color coding.

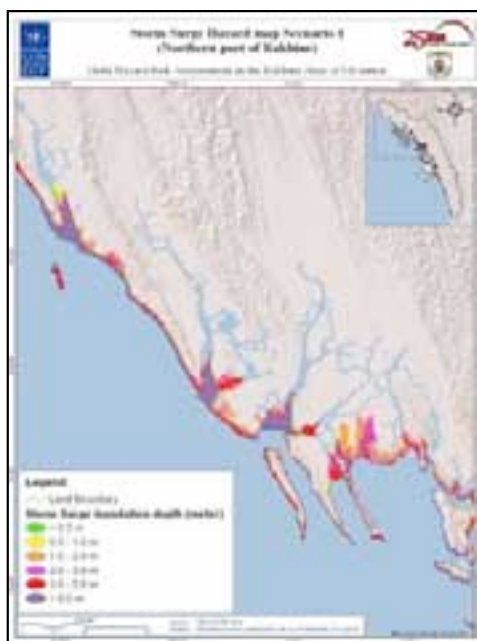


Table 6: Classification of storm surge inundation depth

Inundation depth (m)	Color code	Hazard Level
< 0.3 m	Light Green	Low
0.3 – 1.0 m	Yellow	Moderate
1 – 2 m	Orange	High
2 – 3 m	Red	Very High
> 3 m	Dark Red	

Each color of flood inundation area represents different levels of flood depth

Color	Flood Depth
Dark Green	Less than 0.3 meter
Light Green	Between 0.3 and 1.0 meter
Light Blue	Between 1.0 and 2.0 meters
Dark Blue	More than 2.0 meters

Take Away

At the end of the session, you will be able to:

- Understand overview of Risk Assessment
- Understand application of Risk Assessment
- Appreciate examples of Case Study on Risk Assessment in Myanmar

Additional readings/references

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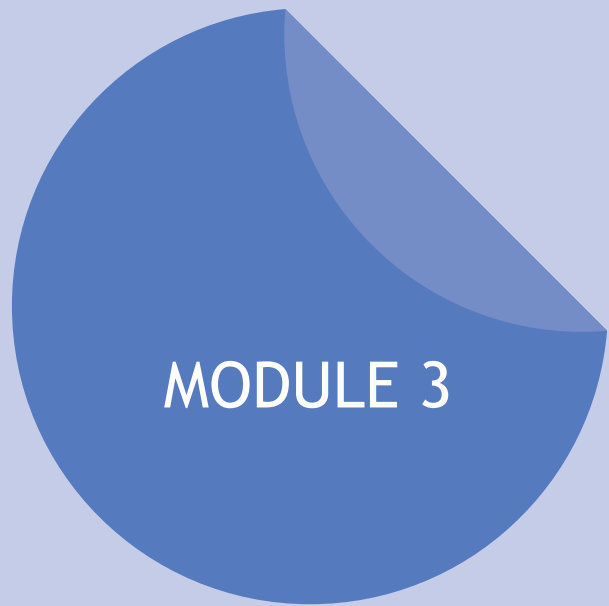
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DRM Approaches: Preparedness, Response and Recovery

DISASTER RISK MANAGEMENT APPROACHES

At the end of the session, you should be able to:

- Understand Disaster Risk Management Approaches
- Understand various measures for Disaster Risk Reduction (DRR) - Prevention, Mitigation, Preparedness
- Explore examples of possible measures to reduce risks adopted by selected sectors

Key points covered *Disaster Risk Management, Disaster Risk Reduction, mitigation measures, preparedness, structural/non-structural measures, integrated measures to reduce risk*

TRAINING CONTENT

Introduction

This session will explore various Disaster Risk Management measures that cover the whole activities of DM cycle. The session will also discuss Disaster Risk Reduction as part of Disaster Risk Management. Disaster Risk Reduction (DRR) has specific focus on reducing disaster risks and underlying factors the risks are originated from. When disaster risks are assessed, the next step is to consider a wide range of options available to protect people, their assets, and the environment. These risk reduction measures aim to reduce exposure to hazard, lessen vulnerabilities and increase the capacity, and hence build disaster resilience.

The measures to be adopted are often integrative in nature to effectively manage disaster risks, various measures could be used together to supplement each other. As well, when seeing the risk posed on specific sector, each sector might come up with various measures that work well, responsive to characteristic of risks and potential sectoral impacts.

Disaster Risk Management (DRM)

The **systematic process** of using **administrative directives, organizations, and operational skills and capacities** to implement **strategies, policies** and **improved coping capacities** in order to **lessen the adverse impacts** of hazards and the possibility of disaster. (UNISDR, 2009)

Disaster Risk Reduction (DRR)

The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. (UNISDR, 2009)

Once the risk identified we need to address the risk by

- Actions to **avoid** the risk (This would include not allowing the element that could be at risk to be located in the area of potential hazard)
- Actions to **reduce** (lessen) the risk (This would include taking actions that would mitigate the risk)
- Actions to **share** the risk (This would entail shifting the risk-bearing responsibility to another party)

Focusing on Risk Reduction

Of these measures, Risk Reduction is most important for Myanmar

- Avoiding Risk is often very resource intensive
- Sharing Risk is more common in developed countries

Risk reduction can be achieved by Mitigation measures and Preparedness measures to

- Reduce exposure to hazards
- Lessen vulnerability
- Manage land and environment
- Improve preparedness

‘Risk Treatment or Treating the Risk’ is concerned with what will be done. There are 4 major types of Risk Treatment as follows:

Risk Avoidance: Actions to **avoid** the risk would include not allowing the element that could be at risk to be located in the area of potential hazard. The measures used are such as relocation or land use regulation.

Risk Control: Actions to **reduce** the risk would include taking actions that would mitigate the risk. The measures adopted are such as retrofitting of building, drills and simulation exercises.

Risk Transfer such as re-insurance, catastrophic bond and *Risk Retention* such as disaster or calamity fund and self-insurance are mainly financial tools to **share** the risk which would entail shifting the risk-bearing responsibility to another party.

Risk Reduction Measures

Risk is the combination of hazard and vulnerability. To reduce disaster risk could be either to reduce likelihood of hazard or reduce exposure and vulnerability.

Prevention measures

To provide permanent protection from disasters or reduce the intensity/frequency of a hazard event. While natural hazards cannot be prevented, human-made hazards such as those associated with industries, technological failures, pollution and civil strife can be prevented.

Mitigation measures

The lessening or limitation of the adverse impacts of impact and related disasters.

There are two primary mitigation objectives:

Hazard Likelihood Reduction

This objective is only appropriate for a few natural hazards, as it is not possible to reduce the occurrence of many hazards. However, the likelihood of flood occurrence can be reduced by mitigation measures such as dykes and levees.

Risk Consequence Reduction

This is a reduction in the impact of a hazard, via a reduction in exposure and/or vulnerability. It involves ensuring that the population, structures, or other systems are able to withstand such an event with as few negative consequences as possible. For example, the cyclone resistant construction school in Ayeyarwaddy.

Preparedness measures

The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions

Structural and non-structural prevention and mitigation measures:

- Engineering works (bridges, protective dykes, embankments)
- Safe building design and construction
- Retrofitting
- Coastal wind breaks or shelter belts, mangroves reforestation
- Relocation to safer location
- Risk communication and public awareness
- Risk assessment
- Risk reduction planning
- Land use planning and zoning
- Legislation
- Safety measures at home, in the community and work places
- Strengthening livelihood and food security;
- Strengthening community health
- Nutrition improvement and food security
- Literacy program
- Access and control over natural resources by community
- Access to government services
- Strengthening institution and organizations
- Environmental management; advocacy on disaster and development issues
- Insurance and micro-insurance

Preparedness measures:

- Setting up systems for early warning
- Evacuation drill
- Training on evacuation center
- Training on emergency operations center management
- Strengthening coordination and institutional arrangements
- Stockpile of supplies and logistics
- Contingency planning

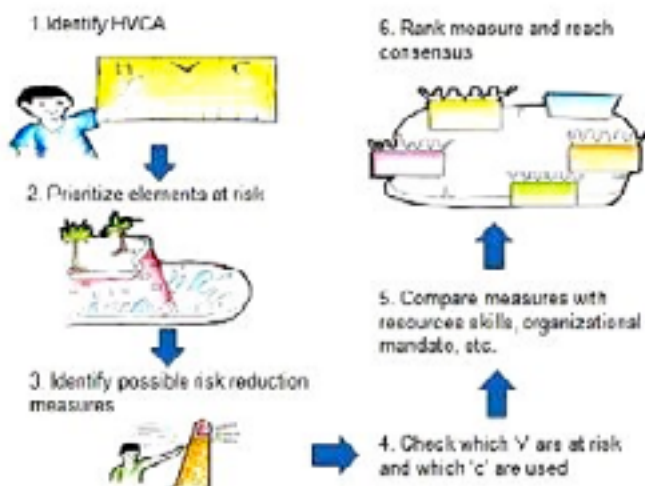
Measures could be at different levels

- Household level
- Village and Village Tract level
- District and Region/State level and
- National Level

Identifying appropriate and adequate risk reduction measures

Risk management measures can be identified following these basic steps:

- a. Identify the hazards
- b. Determine the elements at risk (people and health; property; livelihood; community structures; critical facilities; environment)
- c. Determine conditions and factors of vulnerability. Why can the elements at risk be damaged? (physical, economic, social, motivational, reasons)
- d. Identify existing coping strategies and capacities/resources (material, human, institutional/organizational, motivational)
- e. Identify measures or solutions to reduce the vulnerability of the elements at risk. How to protect and strengthen the elements at risk and how to reduce the impact of the hazard?
- f. Prioritize risk reduction measures to undertake: immediate, short-term, medium-term, long-term
- g. Using the Disaster Release Model: short-term, medium and long-term measures for progression of safety.



The figure (left) represents the steps for identification of disaster risk management measures:

In the same way that *the Disaster Crunch Model* helps to understand how vulnerability is built up, *the Disaster Release Model* helps to understand how the risk of disasters can be reduced. (see also Session 1.3). It provides a framework to transform unsafe conditions to safe conditions, unsustainable livelihood to sustainable livelihood and vulnerable communities to capable and resilient communities as follows:

1. *Examine the disaster event itself or the hazard.*
Natural phenomena cannot be prevented but the risk of their getting out of control and causing damage and loss of life can be reduced.

Measures can be undertaken to modify or reduce the hazards. For example, to reduce the risk of river flooding, protective dykes or bunds can be built and the system of river control can be linked to flood warning systems.

2. *Turn unsafe conditions into safe conditions.*
Households can be encouraged to strengthen their houses and vacate particularly dangerous locations and/or build new houses in a safe manner to resist local hazards.
3. *Reduce dynamic pressures* that directly or indirectly contribute to the growth of vulnerability
These include initiation of income generating activities and market support for products, protection of the environment, land use planning and management, participation in political decision making, etc. These are also basic development activities.

4. *Address underlying or root causes of vulnerability with positive action*

This covers increasing the access and control of vulnerable groups to resources and power structures.

This is usually done through advocacy for changes and reforms in the socio- economic political system.

Examples include land reform programs and peace negotiation in conflict situations.

Release of 'Pressures' to Reduce Disaster Risk: Progression of safety				
Reduce Hazard	Reduce Disaster Risk	Achieve Safe Conditions	Reduce Pressures	Address Root Causes
A range of measures to reduce the intensity of certain hazards: dykes/dams, wind breaks, mangrove protection, etc.	<ul style="list-style-type: none"> Aim: resilient communities Minimize loss of life Limited damage Sustained family income Social fallback mechanisms Aware of hazard risks Counter disaster plan exists Functional community organization Ability to influence policies that form root causes of their vulnerability, etc. 	<ul style="list-style-type: none"> Safe place to go Effective warning Diversification of livelihood sources Enforcing coping strategies Raise public awareness Community organizing Seasonal preparedness Literacy Skilled Community Health Workers Village Pharmacy Community spirit 	<ul style="list-style-type: none"> Protected environment Land-use planning and management Participation in political decision making Capacity to negotiate resources for local NGOs Advocacy on local level Resettlement Human Rights Land Tenure, etc Usurer system bypassed Employment opportunities 	<ul style="list-style-type: none"> Increase the access and control of vulnerable groups to power structures and resources (land, services, budget, markets, etc.). Through advocacy challenge and ideology, political or economic system that causes or increases vulnerability.

Risk Reduction in specific sector

When considering what should be the appropriate, adequate and effective measures to reduce potential risk of a particular sector, it's important that risk assessment could be undertaken to understand disaster risk and potential impacts on the sector before identifying, selecting and prioritizing effective measures to reduce the risks.

If taking the agricultural sector as an example, the following steps could be considered:

Step 1 Hazard, Vulnerability and Capacity Assessment

- What are disaster risks with potential harmful impacts on the sector? What are the typical hazards in the area, what hazard has the most severe impacts, what are other hazards with lesser impacts, when they are likely to occur, etc.
- What are the vulnerable factors existing in the sector? What type of crops/agricultural activities tends to be impacted most? What are elements at risk?
- What are the existing coping mechanisms of the sector to address the risks, considering capacity in term of human - knowledge and skills, local strategies, indigenous knowledge, available constructions, equipments, supplementary resources to be accessed and mobilized and other enabling factors to support and promote existing capacity.

Step 2 Select measures to mitigate risk in agricultural sector

- Diversification of crops and livestock and the use of integrated production systems, which are more hazard resistant. Farmers' technological and strategic options include:
 - Diversify crop types in line with variations in environmental requirements and hazard resistance levels.
 - Alter plantation and harvesting schedules in line with changing season timelines associated with climate change.
 - Diversify livestock in line with variations in environmental requirements and hazard resistance levels.
 - Promote proper pasture management through rotational grazing.
 - Selection of faster growing livestock breeds.
 - Improve construction standards for animal shelters, including spatial location guidelines.
 - Improve local storage practices including hazard resilient farm level food, animal feed and local seed storage systems.

- Land Conservation to prevent increased run off and subsequent flood risk. Stubble Retention can be used to help prevent the impacts of hazards on soil, aiding in eliminating land degradation in agricultural areas. It involves protecting the ground with a cover of residue straw from previous harvests to reduce the impact of torrential rainfall on the surface but maintain infiltration, and reduce wind speed at soil surface. It helps maintain the organic matter in the soil, improves soil structure, and reduces atmospheric pollution.
- Increase and improve irrigation coverage, ensuring that this takes place where water resources are available with no negative impacts on ground water.
 - Construction of levees and other barrier or deflection methods to allow for the irrigation of land in a controlled manner.
 - Land use management (zoning) imposes restrictions on how land may be used. In relation to agriculture, this could include floodplain development restrictions or hillside and slope management.
 - Discourage agricultural labour settlement in flood prone areas.

Step 3 Select the measures which will help the sector be better prepared

- Create end to end early warning systems to allow climate forecasting to help the sector be better prepared and ensure improved communication between farmers, and farmers and scientists to ensure timely dissemination of early warning information.
- Promote insurance practices for crops and livestock.
- Create a strategic emergency buffer stock of seeds, food and agricultural outputs in the District Agricultural offices or other sufficient location.

Often one single measure or the other is not sufficient; and it is a need for an integrated approach taking into account the followings:

- No particular measure can be responsible to all hazards or appropriate for all location
- Choices will involve trade-off especially if eco-system based measures are involved
- Thus need to
 - Link with district authority, local institutions, adhering to local policies
 - Link with ongoing developments in neighboring and surrounding areas are needed
 - Partner with a wide range of stakeholders

Key Considerations while choosing risk reduction measures

- Low cost, locally suitable, possibility of scaling up
- Builds on local technology, indigenous knowledge
- Local population has the capacity to implement, manage and maintain the measure
- Reduces risk of vulnerable population such as women, children, elderly

Take Away

After the session, you should be able to:

- Understand Disaster Risk Management Approaches
- Understand various measures for Disaster Risk Reduction (DRR) - Prevention, Mitigation, Preparedness
- Explore examples of possible measures to reduce risks adopted by selected sectors

Check your learning:

1. Choose the correct answer for each question

1.1 Disaster Risk Reduction has the following activities as its focus except

- (a) Mitigation
- (b) Preparedness
- (c) Response
- (d) Prevention

1.2 Which sentence below correctly describes DRM and DRR?

- (a) DRR cover wider ranges of activities than DRM
- (b) DRM refers to activities limited to only post-disaster phase
- (c) DRR is part of DRM
- (d) DRM is an independent discipline that doesn't include DRR

1.3 Which of the following is not the purpose of DRR?

- (a) Reduce exposure to hazard
- (b) Lessen vulnerabilities
- (c) Treat underlying factors contributing to disaster risks
- (d) Reactive in nature in treating risk

1.4 Which of the following is not structural mitigation measure?

- (a) Weirs to provide sufficient water supplies for household consumption during drought
- (b) Irrigation facilities for better water management for crop growing
- (c) Reinforced concrete for roads construction in earthquake prone area
- (d) Land use regulation for resettlement of vulnerable communities to other safer areas

1.5 Which of the following is not part of the process for identifying DRR measures?

- (a) Hazard, Vulnerability and Capacity Assessment
- (b) Considering needs of various vulnerable groups
- (c) Identifying causes of vulnerability
- (d) None of the above

3. Check whether the following sentences are True or False.

3.1 Strengthening livelihood and food security is non-structural mitigation measures

3.2 Capacity building for search and rescue and improved management of stock piling systems for response is part of preparedness.

3.3 Response aims to meet the immediate demand of affected victims right after the disaster event, hence elements of disaster risk reduction might not be included in such activities.

3.4 While DRR primarily focuses on Prevention, Mitigation and Preparedness, the post-disaster reconstruction activities could also address existing and anticipated risks and exhibits DRR elements in reconstruction work.

3.5 To identify effective measures for DRR, only vulnerable factors need to be considered independent from the underlying causes such as social, economic and environment context.

3. Explain the following.

3.a DRR as part of DRM

.....

.....

.....

3.b Preparedness Measures

.....

.....

.....

3.c Complementarity of structural and non-structural measures to mitigate impacts of drought on agricultural sector and provide 2 examples of each

.....

.....

.....

4. Please mention two key learning's from this session

.....

.....

.....

Correct answers of check your learning Exercises

1. 1.1 (c) Response
1.2 (c) DRR is part of DRM
1.3 (d) Reactive in nature in treating risk
1.4 (d) Land use regulation for resettlement of vulnerable communities to other safer areas
1.5 (d) None of the above
2. 2.1 True 2.2 True 2.3 True 2.4 True 2.5 False

[Additional readings/references](#)

- ADPC and USAID (2005) *A Primer: Disaster Risk Management in Asia*.
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session

3.2

OVERVIEW OF EARLY WARNING SYSTEM

At the end of the session, you should be able to:

- Understand Concepts and Elements of Early Warning
- Understand Early Warning System in Myanmar

Key points covered *Elements of Early Warning, monitoring and prediction, Disseminating Information, Technical components, Societal components, ways of giving warning*

TRAINING CONTENT

Introduction

It is clear that natural phenomena cannot be prevented, but their human, socio-economic and environmental impacts can be minimized through appropriate measures, including risk and vulnerability reduction strategies, early warning, and appropriate action plans.

Most often, these problems are given attention during or immediately after a disaster. Disaster risk reduction measures require long term plans and early warning should be seen as a strategy to effectively reduce the growing vulnerability of communities and assets. The information provided by early warning systems enables authorities and institutions at various levels to immediately and effectively respond to a disaster.

Definitions

Early Warning System is the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss (UNISDR, 2009).

Warning is given to;

- Inform about hazards and elements at risk.
- Advise on means of protection, preparedness mitigation, and response to the threat.
- Instruct what must be done, where to go, who must act, when to start, or how to act.

Elements of Early Warning Systems

Risk Knowledge: Risk assessment provides essential information to set priorities for mitigation and prevention strategies and designing early warning systems.

Monitoring and Predicting: Systems with monitoring and predicting capabilities provide timely estimates of the potential risk faced by communities, economies and the environment.

Disseminating Information: Communication systems are needed for delivering warning messages to the potentially affected locations to alert local and regional governmental agencies. The messages need to be reliable, synthetic and simple to be understood by authorities and public.

Response : Coordination, good governance and appropriate action plans are a key point in effective early warning. Likewise, public awareness and education are critical aspects of disaster mitigation.

Failure of any part of the system will imply failure of the whole system.

Effective early warning systems embrace all aspects of emergency management, such as: risk assessment analysis, which is one of early warning system's design requirements; monitoring and predicting location

RISK KNOWLEDGE
Systematically collect data and undertake risk assessments
Are the hazards and the vulnerabilities well known?
What are the patterns and trends in these factors?
Are risk maps and data widely available?

MONITORING and WARNING SERVICE
Develop hazard monitoring and early warning services
Are the right parameters being monitored?
Is there a sound scientific basis for making forecasts?
Can accurate and timely warnings be generated?

DISSEMINATION and COMMUNICATION
Communicate risk information and early warnings
Do warnings reach all of those at risk?
Are the risks and warnings understood?
Is the warning information clear and useable?

RESPONSE CAPACITY
Build national and community response capabilities
Are response plans up to date and tested?
Are local capacities and knowledge made use of?
Are people prepared and ready to react to warnings?

Four Elements of People-centred Early Warning Systems
Source: UN/ISDR Platform for the Promotion of Early Warning

and intensity of the natural disaster waiting to happen; communicating alerts to authorities and to potentially affected; and responding to the disaster.

Monitoring and predicting is only one part of the early warning process. This step provides the input information for the early warning process that needs to be disseminated. Early warnings may be disseminated to targeted users (local early warning applications) or to communities, regions or to media (regional or global early warning applications).

The main goal of early warning systems is to take action to protect or reduce loss of life or to mitigate damage and economic loss, before the disaster occurs. To be effective, this warning must be timely so as to provide enough lead-time for responding, reliable so that those responsible for responding to the warning will feel confident to take action, and simple so as to be understood.

Key considerations in Early Warning System

- Common understanding of meaning of signs and symbols
- Hazard, area, culture specific
- Continuous monitoring and updates
- Advise on precautionary and protective actions
- Early and timely relay of advisory and warning
- Methods to communicate and disseminate warning

An Early Warning System (EWS) is described as end-to-end if it connects the technical and societal components of warning through identified institutions.

1. Technical components: The technical components of an EWS are:

- The understanding and mapping of hazards and vulnerabilities (risk mapping)
- Monitoring and forecasting of impending events (technical monitoring and warning, including information and communication technology).

2. Societal components: The societal components are:

- Processing and disseminating understandable and actionable warnings to political authorities and the population at-risk (dissemination)
- Undertaking appropriate and timely actions in response to warnings

Early Warning System in Myanmar

The Department of Meteorology and Hydrology (DMH) is the nodal agency responsible to issue timely warnings to public on **Cyclone, Flood and Tsunami**.

DMH cooperates with international organizations, such as:

- World Meteorological Organization (WMO)
- Japan International Cooperation Agency (JICA)
- China Earthquake Administration
- China Meteorology Administration
- UNESCO/ Intergovernmental Oceanographic Commission
- Pacific Tsunami Warning Centre

Other agencies supporting the early warning system in Myanmar

- Joint Typhoon Warning Center (JTWC)
- India Meteorological Department (IMD)
- Thai Meteorological Department (TMD)
- National Centers for Environmental Prediction (NCEP)
- Japan Meteorological Agency (JMA)
- Tropical Storm Risk (TSR)

The following hazards are not included in the warning systems of Myanmar:

- **Earthquake:** There is no system to predict earthquake in the world, hence early warning for earthquake is not possible.
- **Landslide:** Landslide is a localized hazard and warning system is cost intensive compared to its effectiveness.
- **Fire:** Urban Fire - Localized hazard and no warning system.
Forest Fire - Forest fire in Myanmar is not very common and warning system is cost intensive.

Tropical Cyclone Forecasting Procedure by DMH

- **Observational Tools are** Conventional Observation and Satellite Observation
- **Monitoring for the** Location, Intensity of the hazard and
- **Prediction of** Movement, Intensity of hazard and of Storm Surge and Landfall

Forecast, Warning, Bulletin and News issued by DMH

- Daily, Monthly and Seasonal Weather and Water level forecast
- Aviation Weather Forecast
- Shipment Weather Forecast
- Squall Wind Weather Forecast
- Coastal Area Forecast
- Storm Warning
- Storm Surge Warning
- Flood warnings and Flood Bulletin
- Untimely Rainfall Warning
- Fog Warning
- Heavy Rain Warning
- Tsunami Warning
- Earthquake News
- Minimum alert WL in Low flow period
- Agro-meteorological Bulletin

Weather Alerts and Forecasts

DMH issues the following forecasts, special weather news and alerts.

Regular Daily Weather News

Voice of Myanmar (Myanmar Language) daily weather news broadcasts four times a day:
in the morning at 07:00 hours
in the afternoon at 13:00 hours,
in the evening at 18:00 hours and at night at 20:00 hours.

Voice of Myanmar (English Language) daily weather news broadcasts:
in the afternoon at 14:00 hours and at night at 21:30 hours.

The above programmes in Myanmar and in English can be tuned in at the following frequencies.

Yangon Radio makes weather news broadcasts for sea-going vessels at 15:45 hours at 156.6 MHz.

Myanmar Radio and Television (MRTV) and **Myawady Television (MWD)** make weather news broadcasts after the 8:00 p.m. News.

MRTV-4 makes weather news broadcasts 4 times a day on a flexible schedule.

Alerts/Warnings

The Department of Meteorology and Hydrology issues the following alerts/Warnings:

- | | |
|-----------------------|-----------------------------|
| 1. Gale Alert | 4. Unseasonable Rains Alert |
| 2. Heavy Rains Alert | 5. Storm Alert |
| 3. Scarce Rains Alert | 6. River Floods Alert |

Storm Warnings

Storm warnings are issued depending on the **severity of the storm and the likelihood of making landfall** along the Myanmar coast and are carried by the Voice of Myanmar 3 to 6 times every hour and by the MRTV and MWD in real time as a news bar.

Storm warnings include the following storm-related details.

- | | |
|--|--|
| 1. Current location of the storm | 4. Forecast on the probable rainfall due to the storm |
| 2. Forecast on the probable path of the storm | 5. Forecast on the probable winds inland and at sea due to the storm |
| 3. Forecast on the time and location of landfall | 6. Forecast on the probable storm surge |

Designating an emergency (Tropical Storm)

Yellow Stage	The formation of a tropical storm in the Bay of Bengal and the Andaman Sea.
Orange Stage	When a tropical storm has formed in the Bay of Bengal and the Andaman Sea and starts moving toward the Myanmar coast.
Red Stage	When a storm moving towards Myanmar coast is expected to make landfall in 12 hours
Brown Stage	When a storm makes landfall on the Myanmar coast
Green Stage	When a storm has weakened and the storm hazard has passed

Yellow Stage

The formation of a tropical storm in the Bay of Bengal and the Andaman Sea is designated as the Yellow Stage.

Orange Stage

When a tropical storm has formed in the Bay of Bengal and the Andaman Sea and begins moving toward the Myanmar coast, the Orange Stage is designated.

Details to be included in a storm warning

- Level of the storm
- Location
- Forecast on the probable path of the storm
- Forecast on the time and location of landfall
- Forecast on the probable rainfall due to the storm
- Forecast on the probable winds inland and at sea due to the storm
- Forecast on the probable storm surge

Red Stage

When a storm moving towards Myanmar coast is expected to make landfall in 12 hours, the Red Stage is designated

Details to be included in a storm warning

- | | |
|--|--|
| a. Level of the storm | e. Forecast on the probable rainfall due to the storm |
| b. Location | f. Forecast on the probable winds inland and at sea due to the storm |
| c. Forecast on the probable path of the storm | g. Forecast on the probable storm surge |
| d. Forecast on the time and location of landfall | |

Brown Stage

When a storm makes landfall on the Myanmar coast, the Brown Stage Emergency is designated.

Details to be included in a storm warning

- | | |
|-------------------------|---|
| a. Level of the storm | c. Forecast on the probable path of the storm |
| b. Location of landfall | d. Forecast on the probable rainfall due to the storm |

Green Stage

When a storm has weakened and the storm hazard has passed, the Green Stage is designated.

There is also **Storm Alert levels to give detail updated information of storms.**

Storm Alert levels

Alert Level 1: There is a possibility of a storm in the area and the public should pay particular attention to weather news updates and comply with instructions.

Alert Level 2: A storm has begun forming and the public should pay particular attention to weather news updates and comply with instructions.

Alert Level 3: There is a likelihood of severe weather conditions caused by a storm and the public is advised to pay particular attention to alerts/warnings, news updates and comply with instructions.

Alert Level 4: A storm of modest strength is imminent and the public is advised to pay particular attention to alerts/warnings and comply with instructions.

Alert Level 5: A weak storm has become one of moderate strength and the public is advised to stay alert.

Alert Level 6: Weather conditions are likely to worsen due to the storm and the public is advised to comply with alert/warnings.

Alert Level 7: Weather conditions are likely to worsen due to a storm of moderate wind speeds in the area and the public is advised to follow the weather updates and comply with alert/warnings in a timely manner.

Alert Level 8: The storm is gaining strength and the public is advised to begin evacuations.

Alert Level 9: A severe storm will strike the area and evacuations are advised.

Alert Level 10: A severe storm is imminent and everyone should evacuate to safe locations.

Alert Level 11: The storm has struck and communications have been disrupted.

Flood Warnings

The Hydrology Section of the Department of Meteorology and Hydrology has river water monitoring stations along the major rivers of Myanmar: the Ayeyarwady River, the Chindwin River, the Duhtawady River, the Sittaung River, the Bago River, the Thanlwin River and the Shwe Kyin River.

- River Flood Warning is issued when the river waters reach about 1 meter below the danger level.
- River Flood Warnings give at least 24 hours to 72 hours of advance notice.
- The Warnings are included in the weather news broadcast by Voice of Myanmar (Radio), MRTV, MWD and MRTV-4. In addition, advance warnings are transmitted using telephone, fax and Single-SideBand modulation (SSB).

Medium for Early Warning dissemination

- Radio and television
- Newspaper
- SMS/Mobile phone
- Social Media (Facebook/Twitter)
- Internet/Twitter
- House to house relay
- Ringing of bells, sirens
- Community sound system
- Putting up flags

Early Warning at Community level

Rural communities are more exposed to meteorological and hydrological hazards and more affected due to lack of adequate housing and infrastructure. Their livelihood also depends on natural environment. Given the existing high vulnerability, it's crucial that early warning must be effective for the communities.

Effective early warning systems require strong technical foundations and must be essentially "people centered" with clear messages, dissemination systems that reach those at risk, and practiced and knowledgeable responses by the public. Public awareness and education are critical to enhance effectiveness of early warning systems.

Community approach is essential to identify needs, patterns of vulnerability and to develop the legitimacy required to ensure that warnings are acted upon. At the other end, information on regional weather conditions or other factors relating to a specific risk need to flow down from regional and global monitoring systems.

Some good practices from Central America, Haiti, Africa and other regions demonstrated that data collection by local people using readily available technologies can provide information which is of critical use for the early warning system.

Early Warning in Community

- Radio and television
- House to house relay
- Ringing of bells, sirens
- Community sound system whereby different parts of the community receive the warning at the same time
- Putting up flags

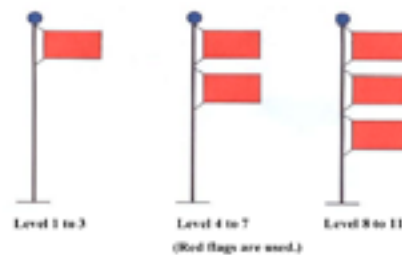
House to house relay



Community sound system whereby different parts of the community receive the warning at the same time;



Designation of Flag Signals Indicating Storm Hazards for Display in Wards/Villages



Take Away

After this session, you should be able to:

- Understand Concepts and Elements of Early Warning
- Understand Early Warning System in Myanmar

Check your learning:

1. Select the correct word for the following sentences:

1.1 Early warning is the provision of timely and effective....., through identified institutions, that individuals exposed to a hazard can take action to avoid or reduce their risk.

- (a) Construction materials
- (b) Capacity building
- (c) Health care
- (d) Information

1.2 Elements of Early Warning Systems includes:

- (a) Group discussion
- (b) Psycho social support
- (c) Disseminating Information
- (d) Relief distribution

1.3 Components of Early Warning Systems are, Technical and:

- (a) Environmental
- (b) Societal
- (c) Financial
- (d) Cultural

1.4 Government agency responsible to issue timely warnings to public is:

- (a) RRD
- (b) Education
- (c) DMH
- (d) Information

2. Check whether the following sentences are True or False.

2.1 Early warning is the set of capacities needed to generate and disseminate timely warning information to individuals and communities threatened by a hazard.

2.2 Risk assessment must be based on recent historic experience.

2.3 For predicting potentially catastrophic events, a sound scientific basis is required.

2.4 Random monitoring of possible disaster precursors is necessary to generate accurate warnings on time.

3. Explain the following terms.

3.a Risk Knowledge

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.....

3.b Disseminating Information

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3.c Components of warning

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3.d Different ways of giving warning in the community

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4. Please mention two key learning's from this session

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.....

Correct answers of check your learning Exercises

- | | |
|------------------------|-----------------------------------|
| 1. 1.1 (d) Information | 1.2 (c) Disseminating Information |
| 1.3 (b) Societal | 1.4 (c) DMH |

2. 2.1 True 2.2 False 2.3 True 2.4 False

Additional readings/references

ADPC (2010) *CBDRR 19 Participant's Workbook - Community Based Early Warning System*.

ADPC (2011) *DMC 40 - Early Warning*.

UNEP *Early Warning Systems: State-of-Art Analysis and Future Directions*. http://na.unep.net/geas/docs/Early_Warning_System_Report.pdf

UNISDR (2009) *Terminology on Disaster Risk Reduction*. <http://www.unisdr.org/we/inform/terminology>

UNISDR (2004) *Developing Early Warning Systems: A Checklist*. <http://www.unisdr.org/2006/ppew/info-resources/ewc3/checklist/English.pdf>

At the end of the session, you should be able to:

- Understand the principles and concepts of emergency response
- Understand key emergency response management considerations
- Understand the importance of establishing an emergency coordination

Key points covered *Search and rescue, Relief delivery, Institutional disaster planning, Disaster response plan, Contingency plans, Standard Operating Procedures (SOPs), Alert/Warning Stage, Mock drill, Emergency Response Coordination Centre, Relief Aid, Targeting criteria*

TRAINING CONTENT

Introduction

The aim of emergency response is to provide immediate assistance to maintain life, improve health and support the morale of the affected population. Such assistance may range from providing specific but limited aid, such as assisting refugees with transport, temporary shelter, and food, to establishing semi-permanent settlement in camps and other locations. It also may involve initial repairs to damaged infrastructure. The focus in the response phase is on meeting the basic needs of the people until more permanent and sustainable solutions can be found. Humanitarian organisations are often strongly present in this phase of the disaster management cycle.

Disaster Response

Disaster Response is a set of activities undertaken to deal with the effects of a specific disaster event, including search and rescue, evacuation, medical care, provision of emergency water, food and shelter, debris removal and stabilization of unsafe buildings and landforms.

The management of the response to a disaster is shaped by the special nature of disaster events. The most significant characteristics for emergency response purposes are as follows:

- Relatively unexpected
- Substantial distress and trauma
- Potentially overwhelming scale of effects
- Strong potential for the situation to worsen without appropriate intervention

In line with the above general characteristics of disaster events, disaster response can involve some or all of the following:

- Many urgent and significant tasks involving injuries, deaths and/or property loss/damage
- Large numbers of personnel and agencies required
- High levels of public interest and/or controversy
- Many examples of information mishandling
- Potential for some key tasks to be overlooked or under-resourced
- Potential for some key tasks to be over-resourced
- Potential for some of the available key resources to not be used

Disaster response planning

Disaster response planning which is part of Disaster Management Plan *leads to organizational readiness in anticipation of an emergency*. This includes management of human and financial resources, availability of emergency supplies, and communication procedures. It involves identifying, strengthening and organizing resources and capacities so as to reach a level of preparedness for timely and effective response to a potential disaster.

Response Management

Response management is the process of dealing with the problems which arise when an emergency event impacts on a community. In order to deal with the above requirements, emergency response management requires:

- Identify the range of problems occurring
- Set priorities
- Generate appropriate solutions to identified problems
- Implement agreed solutions, often working within tight time-lines
- Monitor and review the situation and the actions being taken
- Keep comprehensive records of information received, decisions taken and actions carried out

Disaster Response includes;

- Search and rescue
- First aid and emergency medical care
- Evacuation
- Evacuation center management
- Standard Operation Procedure
- Immediate repair of community facilities and services
- Relief delivery
- Coordination and Communication
- Psycho-social counseling and stress debriefing
- Medical services

Search and Rescue

- An operation conducted by emergency services, often well trained volunteers, to find someone believed to be in disasters, lost, sick or injured either in a remote or difficult to access area, such as mountain, desert or forest or water body.
- The activities directed at locating endangered persons at an emergency incident, removing those persons from danger, treating the injured, and providing for transport to an appropriate health care facility.

Search and Rescue Sub-Committee is one of the 14 Sub-committees under **Myanmar Disaster Preparedness Agency**;

The roles and responsibilities of Search and Rescue Sub-Committee are as follows

- To prepare for search and rescue activities in the disaster prone regions, based on population and types of disasters (flood, storm, tsunami, fire, earthquake), and offshore islands, flooded plains, low plains, the shelter for victims, immediate relief materials, food and materials for live-saving.
- To constitute and train Regional Search and Rescue Teams.
- To constitute Regional Teams of boats and assign duties to each member; Assign and dispatch Teams to the flood-prone regions.
- To prepare and train team members on rescue during fires and earthquakes.
- To organize and train special teams on rescue from the collapsed buildings during earthquakes; to keep machines, tools and emergency life-saving tools in a state of readiness.

First aid and emergency medical care

First aid is the provision of initial care for an illness or injury. It is usually performed by non-expert, but trained personnel to a sick or injured person until definitive medical treatment can be accessed.

Emergency medical care is immediate paramedic attention to severe wounds and the rapid transportation of the ill or injured to a hospital.

Evacuation

Evacuation is an organized movement of people from an area at risk to a safer place. Evacuation is not always needed in emergency events.

Types of Evacuation

1. Protective evacuation before disaster
2. Protective evacuation after disaster
3. Evacuations for reconstruction purposes

Evacuation Center Services

- Registration
- Water, food, clothing
- Blankets and personal items
- Assistance in contacting family/friends
- Emergency financial assistance
- Information
- Assistance with financial and legal queries
- Rest Areas
- Interpreter services
- Services for animals
- First aid, medical and health

Contingency Plans

Contingency plans - These are based on specific events or known risks at local, national, regional or even global levels (e.g. earthquakes, floods or disease outbreaks), and establish operational procedures for response, based on anticipated resource requirements and capacity.

Standard Operating Procedures (SOPs)

These are a set of standard procedures that “operationalise” the disaster response and/or contingency plans. In other words, SOPs specify the way in which individuals or units will carry out their functions under the plan (e.g. alerting and mobilizing National Disaster Response Team, deploying assessment teams and carrying out the assessment process). The SOPs set out what should be done, how it should be done, who is responsible for implementing what, and specifies available resources.

Standard Operating Procedures (Example)

Ministry of Home Affairs, General Administration Department

Normal Times

- Formulate and distribute disaster preparedness plans, and conduct drills in all areas;
- Produce maps of Wards/Village Tracts showing areas most vulnerable to storms, floods and other natural disasters;
- Make a list of vehicles and motor boats that can be used for emergency work;
- Compile a list of departments, NGOs, and members of People’s Strength that will take part in relief operations in the pre-disaster, disaster and post-disaster periods and designate representatives for contact;
- Obtain beforehand the required relief and aid supplies;
- Form the necessary disaster preparedness committee and organizations;
- Create shelters and safe locations for use during disasters depending on local conditions;
- Conduct educational talks on natural disasters and rehearsals periodically for the local community depending on local conditions;
- Coordinate with departments concerned to form Auxiliary Fire Brigades and Red Cross Societies, and to provide organizing and training activities;

Alert/Warning Stage

- Emphasize the dissemination of news obtained through early warning systems to the community
- Assign duties to administrative bodies and NGOs to fly warning flags as part of the disaster preparedness programme in the vulnerable areas of the Ward/Village Tract;
- Alert and mobilize the members of the Auxiliary Fire Brigade, the Red Cross, Youth, members of People’s Strength and NGOs;
- Make the necessary arrangements to evacuate the public to safe locations (shelters) in a timely manner;
- Increase security sentries as required;
- Ensure that all levels of supervisors have all teams at the ready for assigned duties;
- Keep the office operational 24 hours a day in the emergency period.

During Disasters

- Alert the community in areas the natural disaster is likely to strike;
- Safeguard the road and water transport routes, keep relief and medical teams at the ready and arrange transport to affected areas at short notice;
- Evacuate the community from vulnerable areas to safe locations or designated shelters as quickly as possible;

- Operate relief camps and supervisory centres at designated shelters as quickly as possible;
- Ensure that administrative personnel and NGOs in areas vulnerable to storms give disaster warnings door to door as a matter of urgency;
- Keep available relief and aid supplies at the ready to launch relief operations quickly and effectively;
- Evacuate the public remaining in the area to designated safe locations;
- Make arrangements to evacuate movable property including cattle to designated locations;
- Ensure the well-disciplined implementation of orders received from the MDPA and Sub-Committees with the help of members of the Fire Brigade, Red Cross Youth members, and members of People's Strength, social organizations and NGOs.

Rehabilitation stage

- Conduct field inspections in affected areas as soon as possible and provide the necessary assistance and support;
- Submit immediate preliminary reports with population figures, death and injury figures of cattle and animals, data on socio-economic losses, and carry out further systematic data collection;
- Make arrangements to provide health care and social protection to disaster victims;
- Clear collapsed buildings and trees as quickly as possible;
- Prioritize the restoration of transportation, electricity and water supply and telephone and telegraph services as soon as possible;
- Make arrangements as quickly as possible to reclaim contaminated wells and ponds for access to clean water and dig new wells for drinking water;
- Make arrangements to bury/cremate the remains of disaster casualties and animal carcasses;
- Manage and systematically utilize disaster funds and supplies, as well as cash and supplies donated by well-wishers, social organizations and NGOs;
- Support the local population for the resumption and recovery of economic activities to previous conditions;

Relief Aid

- Relief Aid is any provision of aid during an emergency that is meant to attend to a person's immediate requirements for survival or recovery, which include food, clothing, housing, medical care, necessary social services, and security when a person is faced with circumstances beyond her or his control.
- Relief Aid should always target the most vulnerable first: Vulnerable children or orphans, female or child headed households, pregnant or lactating women, sick or elderly populations.

Coordination and Communication

- Coordination is key to successful disaster response, and is essential in ensuring timely and appropriate scaling-up of resources. Coordination activities can take place at different levels and in different forms.

Emergency Operation Centre (EOC)

An emergency operation centre (EOC) is a facility, adequately staffed and equipped, from which a disaster can be managed in an appropriate and effective manner. Emergency Operation Center coordinates, facilitates and functions as the main focal point of contact for disaster response.

The Emergency Operation Center

- Provides strategic direction: as all key decisions will be made in the EOC it will be possible to influence the management of the response in a strategic overall manner. The EOC should continuously monitor the emergency and adjust to changes accordingly.
- Manage Information: The EOC provides a central information facility for the whole response phase, and will therefore provide an entire picture of the response and relief effort.
- Manage Task and problem: The EOC can be used to:
 - identify tasks and problems
 - decide the best courses of action
 - implement plans of action
- Plan forward: The EOC can be used to identify possible future tasks and problems and, in doing so, will be able to self-monitor its own effectiveness

Summary of EOC key functions are:

- Key decision-making
- Provision and/or coordination of advice
- Establish liaison
- Information analysis
- Forward planning
- Media coordination if not otherwise covered

Communication Facilities

The effectiveness of the EOC will be severely limited if it does not have adequate communication. Information management relies on having a communication system, and any restriction in communications will necessarily limit the required collection and dissemination of information.

Information Management

Effective and efficient information management is vital for the successful execution of an emergency response operation. It is more than having communication equipments available to the people who are operating in the ERCC (Emergency Response Coordination Center), or those who are communicating with it. Rather, its importance lies in the fact that information needs to be efficiently and accurately passed between people and agencies in order to plan and implement appropriate response actions.

Emergency events, however, can significantly affect the ability of those involved to handle information efficiently and effectively. This could be due to the need to cope with excessive volumes of information, or the fact that the consequences of information transactions may be acute or even life threatening. There may also be severe time pressures or large-scale equipment failures.

For all these reasons, there must be a simple and robust information management system available to ERCC personnel to ensure that information is collected, collated and disseminated in the most effective manner possible.

Types of Information

There are different types of information that are significant for Emergency Operation Center (EOC) personnel in an emergency, including:

- Baseline information about the communities affected by the hazard
- Baseline information about government plans, capabilities and resources
- Information about the hazards involved in the emergency
- Information about the impact of the emergency
- Information about the affected population's needs and wants

Some of this information will be accumulated before the disaster occurs, and made available in the EOC for use as required during the emergency. Other information will be linked to what is happening in the disaster event, and will come into, or go out from, the EOC via messages, briefings and meetings.

Psycho-Social impacts of Disasters

Psychosocial support services play a crucial role in responding to crises that involve large populations, as they cater for the needs of the majority of the affected population. They help in the recovery process and reduce the development of mental health problems. In this way, psychosocial support services contribute to broadening outreach services, whilst also easing the overload on health systems.

Impacts on social problems are;

- Emergency induced social problems
 - Family separation
 - Disrupted social networks
 - Increased gender based violence
 - Reduced security
- Aid induced social problems
 - Undermining traditional support mechanisms

Impacts on psychological problems are;

- Emergency induced psychological problems
 - Grief/non-pathological distress
 - Depression/anxiety disorders/PTSD or Post-traumatic stress disorder
- Aid induced psychological problems
 - Threatened basic needs
 - Stress/anxiety due to lack of information

Impact of Disaster on Public Health

- Death
- Injuries
- Loss of clean water
- Loss of shelter
- Loss of sanitation
- Loss of routine hygiene
- Disruption of solid waste management
- Public concern for safety
- Increased pests and vectors
- Damage to health care system
- Worsening of chronic illnesses
- Toxic/hazardous exposure
- Loss of food supply
- Standing surface water

Public Health services in disasters

- Mass casualty management
- Mental health
- Environmental health
- Reproductive health
- Managing and continuation of existing health services
- Managing and continuation of medication on chronically affected diseases(HIV, TB, Leprosy etc)
- Management of the dead and missing
- Emergency feeding
- Communicable disease surveillance and response
- Sanitation

Take Away

After this session, you should be able to:

- Understand the principles and concepts of emergency response
- Understand the key emergency response management considerations
- Understand the importance of establishing an emergency coordination

Check your learning:

1. Select the suitable word for the following sentences:

1.1 Search and Rescue is the operation conducted by emergency services, to find someone believed to be in disasters, lost, sick or injured either in a remote or difficult to access area, desert or forest often by

- (a) New Red Cross member
- (b) Health staffs
- (c) Well-Trained Volunteer
- (d) Household head

1.2 Myanmar Disaster Preparedness Agency has constitutedSub-committees.

- (a) 11
- (b) 12
- (c) 13
- (d) 14

1.3 A set of actions which specify the way individuals or unit will carry out their functions under the plan, what should be done, how it should be done, who is responsible for Implementing what etc, is called:

- (a) Contingency plans
- (b) Standard Operating Procedures
- (c) Disaster response plan
- (d) Institutional disaster planning

1.4 Standard Operation Procedure of Ministries for disaster preparedness coversstages of disaster.

- (a) 2
- (b) 3
- (c) 4
- (d) 5

2. Check whether the following sentences are True or False.

- 2.1 The primary principle of search/rescue is to maintain rescuer safety at all times.
- 2.2 Disaster response planning is preliminary in nature, address specific disaster scenarios.
- 2.3 Coordination activities can take place at only top levels and in standard form.
- 2.4 During disaster, several sub-committees or agencies work simultaneously, which require coordination.
- 2.5 In relief distribution, it is important to target the nearest and easiest to reach areas as first priority.

3. Explain the following terms.

3.a Contingency plans

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3.b Standard Operating Procedures

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3.c Relief Aid

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4. Please mention two key learning's from this session

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Correct answers of Check Your Learning Exercises

- 1. 1.1 (c) Well trained volunteer 1.2 (d) 14 Sub committees
1.3 (b) Standard Operation Procedures 1.4 (c) 4 stages
- 2. 2.1 True 2.2 False 2.3 False 2.4 True 2.5 False

Additional readings/references

ADPC (2012) *DMC 41 Participants Workbook Module 5*.
UNDP, DFID, ADPC (2010) *Manual on Community Search and Rescue*
IFRC(2007) *Disaster Response and Contingency Planning Guide*. <http://www.ifrc.org/Global/Publications/disasters/disaster-response-en.pdf>
Save the Children *Cyclone Nargis Emergency Operation- Distribution Guidelines*

Reference for Facilitators

Haigh, Richard - Disaster Resilience in the Built Environment-Learning Package 3: Disaster Management lifecycle.
<http://www.orbee.org/teaching-learning-resources.html?view=fiveccresource&id=260>
IFRC (2009) *Psychosocial interventions-A handbook*. <http://psp.drk.dk/sw40688.asp>

session

3.4

CASE STUDY ON DISASTER RESPONSE

At the end of the session, you should be able to:

- Appreciate different aspects of Disaster Response from Pakistan Earthquake 2005
- Understand components of disaster response in actual operationalization

Key points covered *Search and rescue, Relief delivery, Institutional set up for Response, Emergency Response Coordination Centre, Relief Aid, Targeting criteria*

Basic information of Pakistan Earthquake 2005

When it occurred:	Saturday 8 October 2005
Epicentre:	Muzaffarabad, Kashmir, Pakistan
Magnitude:	7.6 Richter Scale
Death Toll:	73,320
Injured:	128,288
Affected Area:	28,000 square kilometers
Population Affected:	Over 3.5 million
Source:	UN/Pakistan Federal Relief Commission Report

At the end of the session, you should be able to:

- Understand Concept of Damage and Loss Assessment
- Discuss Damage and Loss Assessment System in Myanmar

Key points covered *Damage, Loss, Macroeconomic effects, Pre-disaster baseline information, Estimate Damage and Loss, Sectors to be assessed*

TRAINING CONTENT

Introduction

The Damage and Loss Assessment (DaLA) methodology was developed originally by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) in the early 1970s. This methodology has been continuously expanded and updated over the past three decades, and in recent years has been simplified and customized for application in different regions of the world. It has been applied by the World Bank and other international organizations in numerous cases of recent disasters, and provides a satisfactory framework to identify and quantify the socio-economic and environmental impact of disasters.

The DaLA methodology is based on the utilization of the system of national accounts of the affected country as a means for valuation of the damage and the losses caused by the disaster. The session will explore concepts of Damage and Loss, introduce to process in conducting DaLA and will also provide examples of DaLA methodology for Post-Nargis Joint Assessment (PONJA).

Damage

Total or partial destruction of physical assets existing in the affected area. Damage occurs during and immediately after the disaster and is measured in physical units.

The main items in this category include the total or partial destruction of physical infrastructure, buildings, installations, machinery, equipment, means of transportation and storage, furniture, damage to farmland, irrigation works, reservoirs and the like.

Loss

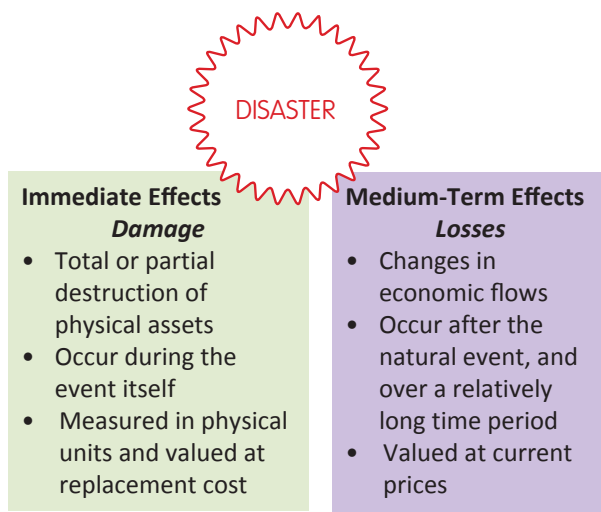
Changes in economic flows arising from the disaster. They occur until full economic recovery and reconstruction is achieved.

Examples include the decline in output in productive sectors (agriculture, livestock, fisheries, industry and commerce) and the lower revenues and higher operational costs in the provision of services (education, health, water and sanitation, electricity, transport and communications)

Macroeconomic effect

It includes effect of disaster on functioning of the economy and the resulting macroeconomic imbalance arising from the event.

Total Effects: Damage and Losses



The Macroeconomic effect could be:

- Reduction in Gross Domestic Product (GDP)
- Reduction in sectoral domestic product
ex. Tourism sector, agricultural sector
- Unemployment rate
- Gross Household Income
- Price and Inflation
- Household income
- Interest rate
- Public finance and Gross Investment
- Monetary reserves

Methodology for DALA

- The Damage and Loss Assessment (DaLA) Methodology was initially developed in 1972.
- It has since been improved and currently Need assessment aspects is being included.
- DaLA includes the following
 - Damage as the replacement value of totally or partially destroyed physical assets
 - Losses in the flows of the economy that arise from the temporary absence of the damaged assets
 - The resultant impact on post-disaster macroeconomic performance, with special reference to economic growth/GDP, the balance of payments and fiscal situation of the Government.
- Damage and Loss Assessment methodology provides for the estimation of the destruction of assets caused by the natural event that caused the disaster, the changes in the flows of the economy caused by the temporary absence of the destroyed assets, and the modifications in the performance of the affected economy.

Objectives of the Damage and Loss Assessment

The assessment of damage and losses after disasters is essential for the estimation of financial needs for recovery. Priorities are defined in terms of the most affected sectors of the economy, geographical areas of the country and population groups to be attended during recovery.

Furthermore, the assessment of damage and losses provides a quantitative basis to monitor progress in the execution of post-disaster programmes.

The assessment of damage and losses would be used by government and concerned partners to design, plan and implement the activities including:

- Define Post Disaster Needs
 - Post-disaster urgent activities:*
 - Economic recovery
 - Reconstruction of assets
 - Economic recovery program required to restore*
 - Personal and family income
 - Essential services or lifelines
 - Production activities in affected sectors
 - Reconstruction program required to repair or replace physical assets*
- Provide framework for recovery
- Identify specific interventions for reconstruction and recovery
- Support informed decision-making on formulation of recovery and reconstruction programme based on the assessment results
- Prioritize the most affected sectors of the economy, geographical areas of the country and population group during recovery, financial needs for recovery.
- Estimation of financial needs for recovery
- A mean to secure financial and other provisional support for recovery efforts at international and regional level
- Provide the quantitative inputs required for planning and monitoring progress in the execution of post-disaster programmes.

The scope and financial needs of the economic recovery and reconstruction programs, must be defined on a solid quantitative basis.

Financial needs must be assigned on the basis of the following criteria

- Spatial
- Sectorial
- Affected population groups

Key features of DALA methodology:

- Multi-sectoral and multidisciplinary damage evaluation and quantification method for disaster affected sectors
- Standard sectoral procedures that allows comparability of results
- A stock-flow conceptual model that measures damage to assets and changes or losses in economic flows
- Makes use of the national accounting system
- Enables the analysis of disaster impact on macro-economic aggregate, on personal income and on the environment
- Instrument for the decision making process and for policy formulation as it identifies more severely affected sectors, geographical areas and vulnerable groups

Sectors to be assessed in estimation of Damage and Losses

Social Sectors

- Housing
- Education
- Health

Infrastructure

- Transport and Communication
- Electricity
- Water Supply And Sanitation

Productive Sectors

- Agriculture
- Livestock
- Fisheries
- Industry
- Commerce

Social Sectors

- Housing

The housing sector includes housing units in both urban and rural areas, as individual household units or multi-family apartment buildings. These housing units, and the household goods they contain, may sustain total or partial destruction (damage) from disasters.

Damage is measured in physical terms and is later converted into monetary units using prevailing pre-disaster repair or replacement cost (cost to bring about the same standards of construction as prior to the disaster).

Losses in this sector normally refer to the costs of providing temporary shelter after the disaster, other unexpected expenditures and lower rental revenues of housing units.

- Education

All levels of education-including pre-school, primary, secondary, technical, and university-are included in this sector, and must be addressed separately.

Existing physical facilities-including schools, other associated buildings and their contents may be fully or partially destroyed from the disaster. The value of damage is estimated in terms of physical units that have been damaged, combined with the pre-disaster unit costs of repairs or reconstruction of buildings, and with the replacement cost of the goods that were contained in the buildings at the time of the disaster.

Losses refer to possible higher temporary costs and lower revenues incurred during the recovery and reconstruction period in order to provide adequate access to education services

- Health

During an assessment for this sector, damage should be estimated for:

- Hospitals, health centers, other buildings
- Furniture
- Medical equipment
- Medical supplies

Losses to be estimated include:

- Cost of treatment of injured persons (physical and psychological injuries), over and above the regular workload of the sector.
- Possible lower revenues in affected hospitals and other centers.
- Possible unexpected costs to monitor prevent and control higher rates of disease and the corresponding vectors.

Infrastructure

- Transport and communication

Damage refers to the total or partial destruction of physical assets, and losses refer to changes in the sector's economic flows that arise as a result of the interruption or temporary modifications to transport and communications flows.

Damage is measured in physical quantities or units, later to be converted into monetary value using the pre-disaster rehabilitation or reconstruction cost of the affected assets. Losses include the value of traffic interruption and the value of higher operational costs incurred by the users when temporarily adopting different means or modes of transport.

The following sub-sectors are addressed separately when undertaking an assessment of damage and losses:

- | | |
|--|----------------------------|
| - Road transport; | - Railroad transport; |
| - Water transport (including maritime, river and lake navigation) and ports; | - Multimode transport; and |
| - Air transport and airports; | - Communications |

- Electricity

The electrical sector may also sustain damage and losses as a result of disasters. Damage refers to total or partial destruction of physical assets, while losses refer to changes in the economic flows that arise from the interruption of electrical supply and of the temporary decline in consumer demand.

Damage is initially measured in physical quantities or units, which later are converted into monetary values using the pre-disaster replacement cost of the affected assets. Losses include the possible decline in revenues that arise from the temporary interruption of electricity supply, and the possible increase in operational costs until normal operations are achieved. These losses are expressed in current values.

- Water Supply And Sanitation Damage

The water and sanitation sector includes three separate sub-systems required for the provision and treatment of drinking water, as well as the collection, treatment and disposal of wastewater and solid waste.

Damage refers to the total or partial destruction of physical assets; losses refer to the changes in economic flows in the sector that may arise as a result of the disruption of normal operations.

Productive Sectors

- Agriculture

The agricultural sector usually consists of four sub-sectors: crops, livestock, fisheries and forestry.

Disaster damage in the crop sub-sector typically happen to physical assets such as the following:

- | | |
|--|--------------------------------------|
| - Agricultural land (e.g. soil erosion, sedimentation, salinization) | - Storage facilities |
| - Drainage system and infrastructure | - Stored agricultural inputs |
| - Irrigation system and infrastructure | - Farm buildings and sheds |
| - Irrigation equipment (e.g. engines, electric motors, pumps) | - Farm equipment and machinery |
| | - Internal farm roads |
| | - Perennial trees (e.g. plantations) |

Losses in the agricultural sector include,

- Crop production losses
- Crop output quality decline (main as well as by-product)
- Crop yield decline
- Higher production costs

- Livestock

The main categories of assets that are damaged by a disaster are livestock infrastructure, animals, pasture, equipment and machinery, and stocks. Specifically, the most common damages are to the following:

- Animal deaths or disappearance
- Storage buildings
- Pasturelands
- Stored feed and fodder
- Livestock sheds
- Livestock equipment and machinery

The most common losses are the following:

- Production loss
- loss of wool production; and
- Loss of milk production;
- loss of draft power due to stress.
- Loss of meat production;
- Higher production costs
- Loss of egg production;
- higher use of inputs (e.g. feed);
- Loss of honey production;
- veterinary cost (medicine and consultation fees) for ill animals

- Fisheries

The fisheries sector is very important in low income developing countries since it deals with high value agriculture (e.g. fish and shrimp aquaculture). It is an important source of cash flow and household income for the landless fishers' communities (including women), and it makes up an important contribution to human nutrition and export earnings.

Any damage or loss to the fisheries sub-sector has serious consequences for the rural household income and poverty. The fisheries sub-sector broadly consists of (a) aquaculture for fish or shrimp; (b) artisan fisheries (both inland capture and marine); and (c) commercial fisheries (mainly marine).

Typical effects of a disaster: damage

- Fish and/or shrimp ponds
- Fish and fish feed
- Hatcheries (fish and/or shrimp)
- Engines and boats
- Fish fry and fingerlings
- Fisheries equipment
- Freezers and storage buildings

The typical losses, due to disaster in the fisheries sub-sector, are the following:

- Production loss
- Higher input cost for aquaculture
- Loss due to decline in fish yield
- Higher production cost due to equipment rental
- Loss due to decline in fish catch
- Higher cost of fuel to reach fish after their migration to other areas
- Higher production costs

- Industry

The value of damage in industry is initially measured in physical terms and subsequently converted into monetary terms by using the reconstruction or replacement cost of the destroyed assets.

Losses in the manufacturing sector refer to the value of the industrial output decline, and increases in operational costs that may arise as a consequence of the disaster. The assessment of damage and losses for this sector is more complex than in other sectors in view of the usually large number of different size and type industrial shops, across the various branches of industry.

- Commerce

The value of damage in this sector is estimated on the basis of the cost to rebuild or repair totally or partially destroyed buildings and other associated facilities, and on the basis of the replacement value of the destroyed furniture, equipment and stocks of goods to sell, assuming that they are being replaced with the same capacity and quality as prior to the disaster.

Damage and Loss Assessment forms used in Cyclone Nargis (Private Building)

44 (a)

နာဂဒိဝယနှင့်တိုင်းခတ်ကြောင့် ဣတ္ထိယကိုလည်းခေါ်ဆိုခဲ့ရသည်။ ထိုသို့ခေါ်ဆိုမှုမှာ

अपराध

[illegible]

Damage and Loss Assessment forms used in Cyclone Nargis (Death, Missing, Injuries)

24 (d)

နာမိဝေပုဂ္ဂိုလ်မူလိက ဘီစီကြာညီ လူလေးချင်း/လျောင်းချင်း/မိမိတို့၏အင်္ဂါအစွယ်စာချင်း

specific

[illegible]

Damage and Loss Assessment forms used in Cyclone Nargis (Public Building)

24 (p)

နာဂါစသမ္ပုဒ်ဘိဇ္ဇာ၊ ဇောဘိဇ္ဇာနှင့် အဗျာဒနာဘိဇ္ဇာတို့သည် နာဂါစသမ္ပုဒ်ဘိဇ္ဇာ၊ ဇောဘိဇ္ဇာနှင့် အဗျာဒနာဘိဇ္ဇာတို့သည်

अपेक्षित

[illegible]

Example of Post-Nargis Joint Assessment (PONJA)

ASEAN coordinated the Damage and Loss Assessment (DALA) with support from the World Bank and the Asian Development Bank (ADB). The PONJA was an extraordinary and pioneering opportunity for different parties to work together towards achieving a collaborative approach to needs assessment. The Government was a key participant of the assessment process and was involved throughout all stages of the PONJA exercise. For example, more than 50 officials from 18 ministries supported the assessments and report writing processes. Furthermore, the Government eased access to the affected areas and provided some transport and vital communications equipment.

The PONJA's aims were to assess:

1. the current vulnerabilities and needs of the population living;
2. the damage done to major assets; and
3. the losses of income.

Post-Nargis Joint Assessment					
Table 10: Overall Summary of Damage and Losses					
Sector	Sub sector	Damage	Losses	Total	
				Kyats billion	USD million
Infrastructure		831.5	89.3	920.8	837.1
	Housing	606	25.9	711.9	647.2
	Transport and Communications	122	62.7	184.7	167.9
	Water Supply	8.1	0.4	8.5	7.7
	Electricity	15.4	0.3	15.7	14.3
Social Sectors		128	7.2	135.2	122.9
	Education	115.3	1	116.3	105.7
	Health	12.7	6.2	18.9	17.2
Productive Sectors		736	2,352 to 2,475	3,088 to 3,211	2,806 to 2,918
	Agriculture, Livestock, Fisheries	186.3	385 to 508	571 to 694	519 to 630
	Industry	512.5	1,483.50	1,996.00	1,814.5
	Commerce	37.2	483.4	520.6	473.3
Cross-Cutting Issues		234.2	46.1	280.3	254.8
	Environment 1/	16.8	46.1	62.9	57.2
	Public Buildings 2/	217.4	0	217.4	197.6
Total	In Kyats billion	1,930	2,495 to 2,618	4,424 to 4,547	
	In USD million	1,754	2,268 to 2,380		4,022 to 4,134

1/ Includes damage to embankments (estimated at K 2.8 billion).

2/ Includes damage to administrative buildings as well as religious buildings.

Source: Estimates by PONJA Team (using secondary data as of June 27, 2008)

The procedure used in the Myanmar assessment involves many steps and activities, beginning with the collection of baseline information and of data on damages provided by the government through its different technical and service delivery ministries and offices. Immediately after, the DaLA assessment team carried out plausibility reviews of the data, including triangulation and independent verification of the data.

The PONJA team relied on two approaches to gather the data for its analysis:

Primary data were collected through the Village Tract Assessment (VTA), a survey of households, key informants (for example, teachers, village leaders), and focus groups in the worst affected townships. The survey included questions on health, food and nutrition, education, women and children, water and sanitation, agriculture, livelihood, temporary settlements, and emergency shelter.

Secondary data were provided by a range of Ministries, UN agencies, past household surveys, satellite imaging, and other sources and form the basis for the Damage and Loss Assessment (DaLA). This provides a basis for defining the needs for recovery and reconstruction following any disaster. DaLA estimates:

- Damage as the replacement value of totally or partially destroyed physical assets that must be included in the reconstruction program;
- Losses in the flows of the economy that arise from the temporary absence of damaged assets;
- The resulting impact on post-disaster economic performance, with special reference to economic growth, the fiscal position and the balance of payments

The assessment analysed information on disaster effects in a total of 79 townships located in Ayeyarwady, Yangon and other affected Divisions, and the macro-economic analysis covered the entire country with special reference to the Ayeyarwady and Yangon Divisions for which the system of national accounts provides adequate coverage. The total amount of damage and losses caused by Cyclone Nargis in the affected areas of Myanmar is estimated at about US\$ 4,057 million of which 43% is damages and 57% is losses (Post-Nargis Joint Assessment, 2008)

Take Away

After the session, you could be able to:

- Understand Concept of Damage and Loss Assessment
- Discuss Damage and Loss Assessment System in Myanmar

Check your learning:

1. Select the suitable word for the following sentences:

1.1 Damage is total or partial destruction ofexisting in the affected area.

- (a) Participation
- (b) Indigenous knowledge
- (c) Response activities
- (d) physical assets

1.2 Losses is changes in economic flows arising from the

- (a) Low production
- (b) Lack of income
- (c) Disaster
- (d) difficult transportation

1.3 The assessment of damage and losses after disasters is essential for the estimation of financial needs for

- (a) Emergency response
- (b) Recovery
- (c) Preparedness measures
- (d) mitigation measure

1.4 First step in Damage and Losses Assessment is:

- (a) Risk assessment
- (b) Awareness generation
- (c) Structural prevention
- (d) Define a pre-disaster baseline

2. Check whether the following sentences are True or False.

2.1 Damage occurs many months after the disaster.

2.2 Macro-economic effects are the effects of disaster on the functioning of the economy.

2.3 The housing sector includes housing units in urban areas.

2.4 In Education, all levels of education-including pre-school, primary, secondary, technical, and university-are included in this sector.

2.5 Water supply and sanitation sector includes disposal of solid waste.

3. Explain the following terms

3.a Damage

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3.b Loss

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3.c Baseline on physical assets

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3.d Impact on personal/household employment and income

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4. Please mention two key learning's from this session

.....

.....

.....

Correct answers of Check Your Learning Exercises

1. 1.1 (d) Physical assets 1.2 (c) Disasters
 1.3 (b) Recovery 1.4 (d) Define a pre-disaster baseline
2. 2.1 False 2.2 True 2.3 True 2.4 True 2.5 True

Additional readings/references

Global Facility for Disaster Reduction and Recovery (GFDRR) - *Conducting Damage and Loss Assessments after Disasters (Damage, Loss and Needs Assessment Guidance Notes)*

Global Facility for Disaster Reduction and Recovery (GFDRR) Website: Damage and Loss Assessment (DaLA) and Post-Disaster Needs Assessments (PDNA) <http://www.gfdr.org/gfdr/Track-III-TA-Tools>

Joint Assessment on Earthquake in Shan State, Myanmar April 4, 2011. http://reliefweb.int/sites/reliefweb.int/files/resources/Full_Report_91.pdf

Tri-Partite Core Group (2008) *PONJA- Post-Nargis Joint Assessment.* http://www.mm.undp.org/UNDP_Publication_PDF/PONJA%20full_report.pdf

UN-Habitat (2011) *Shelter Assessment: Shan State Earthquake Affected Areas.* <http://themimu.info/Earthquake/index.php>

UN-Habitat (2011) *Annex 1.3 Shan State Earthquake Damage Assessment.*

World Bank Website: Damage and Loss Assessment. <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTDISMGMT/0,,contentMDK:20196047~menuPK:1415429~pagePK:210058~piPK:210062~theSitePK:341015,00.html>

session
3.6

GROUP WORK ON DAMAGE AND LOSS ASSESSMENT

At the end of the session, you should be able to:

- Consolidate understanding on Damage and Loss Assessment
- Practice and discuss on Damage and Loss Assessment

Task 1

- Each group represents a specific geographical location, which is impacted by a hazard
 - Cyclone in coastal areas of Rakhine State
 - Prolonged drought in Eastern Shan State
 - Earthquake in Mandalay Division
 - Flood in communities along Ayeyarwaddy river in the Delta
- Each group to undertake Damage and Loss Assessment in the area and list down 'damage' and 'loss' in the table below:
 - 'Damage' of 'Physical Assets' and
 - 'Loss' - what to be considered on loss estimation, think about Production/Sale/Economic Activities of the area that are likely to be suffer impacts of certain disaster

Area:	Hazard:
Damage (Physical Assets)	Loss

Task 2

- Discuss in group and indicate the 2 most affected sectors and list down 'damage' and 'loss' of the sectors

Sector 1	
Damage	Loss
Sector 2	
Damage	Loss

- Each group discusses how damage and loss assessment results help in recovery planning for the sector/area recovery and makes presentation.

session
3.7

OVERVIEW OF DISASTER RECOVERY AND RECONSTRUCTION

At the end of the session, you should be able to:

- Understand the concepts of disaster recovery
- Appreciate framework and elements of disaster recovery

Key Concepts *This session will discuss concepts, framework and elements of recovery. This is continuation process from damage and loss assessment, the result of which will be used for designing and planning recovery activities.*

TRAINING CONTENT

Introduction

Recovery involves the decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk. Recovery (rehabilitation and reconstruction) affords an opportunity to develop and apply disaster risk reduction measures.

Disasters destroys years of development gain and hamper development initiatives. However, rebuilding after a disaster can provide windows of opportunity to initiate development programs that incorporate disaster risk reduction measures/elements in the design and implementation to enhance resilience of the affected communities in future disaster.

However, the overlapping stage of humanitarian response that needs to meet immediate demand of the affected victims and recovery phase emphasizing the long-term effect of ‘build back better’ in term of structure, people, social including lives and livelihood is the crucial concern. Important to note that recovery initiatives should demonstrate the inclusion of disaster risk reduction to ensure resilience for future hazards and also contribute to sustainable development. The session will explore case studies from post-Nargis recovery with specific focus on sectoral-recovery.

Concepts of Disaster Recovery

In the post-disaster context, following the initial shock of the disaster, returning lives and livelihoods to normalcy becomes a primary concern of the affected communities and nations. *Traditionally, this has been known as recovery phase, where “normalcy” referred to a situation prior to the disaster event.*

Recent definitions of recovery takes this process further, with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk (UNDP, 2004).

Recovery is defined as *the restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.* (UNISDR, 2009)

Often, in the case of large-scale disasters, there are tremendous pressures of time for return to ‘business as usual’. This poses extraordinary challenges to professionals working in the field, namely development planners, builders, financiers, disaster risk managers and community representatives. Unfortunately, more often than not the choice made is to rebuild quickly, albeit to a lower standard, in order to cater to large numbers of people for the same cost.

Quoting a dialogue between a development planner and a disaster manager, Haiti, December 2000, “We are rich enough to build it twice, but we not rich enough to build it right”, clearly emphasizes the need

for risk resilient recovery processes so that the shelter and infrastructure thus creates are safe for use in a future disasters. (ADPC DM News, 2005, Risk Reduction in Recovery)

Approach for Recovery

Approach for disaster recovery could be illustrated as follow:



Disaster recovery may start immediate after the disaster or after the emergency response right after the disaster has been completed. The process covers:

- Pre-disaster recovery planning
- Damage and Loss Assessment (DaLA)
- Post Disaster Needs Assessment (PDNA)
- Planning/Programming of Recovery and Implementation
- Re-planning or re-adjustment of the initial planned projects/programmes to meet emerging needs and Implementation
- Monitoring Impacts

Sectors in Recovery

Some Sectors or 'Recovery Themes' addressed in recovery planning are:

Rehabilitation/Recovery of infrastructure and critical facilities: The rapid rehabilitation of core infrastructure such as primary roads, bridges, water supply and sanitation systems, primary power generation and distribution facilities, irrigation and agricultural facilities, health, education and other social facilities will lead to economic revitalization of the affected region.

Employment and livelihoods: Support agriculture and livestock production, through the provision of seeds, tools, micro-credits and other means. Support small business by providing credits or through other means. Support reconstruction of the housing sector using local technologies, construction materials and local know-how in order to ensure that construction activities have a direct positive impact upon the local economy. Support generation of short-term, gender- sensitive alternative employment to compensate lost livelihoods in the immediate post-disaster period.

Housing: Housing rehabilitation is a key element in closing the gap between emergency relief and sustainable recovery. It is a first step toward reactivating the productive economy. Building the capacity of local authorities to promote, supervise and guide planning and construction processes helps ensure a successful and sustainable reconstruction process. Local authorities should be enabled to set up legislative and regulatory frameworks to promote local initiative and local involvement in planning and construction issues.

Resettlement of families: A note of caution on resettlement - often in the aftermath of a disaster, experts and government officials promote a safer location for settlement of people at risk. Experience shows, however, that resettlement of populations on new sites presents major challenges, and often leads to resettled people returning back to their original sites.

Governance: It's a need for establishing organizational structures and or adjust the existing ones to support, facilitate and coordinate recovery actions. Hence organizational issues, operational management, human resources mobilization for recovery operations, policy and regulations, as well as institutional capacity could be reviewed and improve to be an effective mechanism toward achieving recovery goal.

Environment: Various environmental issues such as waste management, water and sanitation, pollution, etc and environmental aspects related to other recovery themes could be considered and incorporated into recovery interventions. As well, concerning policies and regulations and other legal provision could be reviewed and modified as deem necessary to adequately address certain environmental issues emerging in recovery phase.

Cyclone Nargis Recovery

For Cyclone Nargis Recovery, Post Nargis Recovery and Preparedness Plan (PONREPP) was prepared.

Following eight sectors were identified in PONREPP:

- Livelihood
- Shelter/Housing
- Education
- Health
- Water/sanitation
- Disaster Risk Reduction
- Environment
- Protection

Framework for Disaster Recovery

Recovery covers response (including relief), rehabilitation and reconstruction. A term 'RandR' or **Recovery and Reconstruction** has been increasingly used among disaster recovery practitioners with 'Recovery' encompassing response and rehabilitation actions on non-physical aspect and 'Reconstruction' signifying physical rebuild and structural improvement.

The Framework for **Sustainable Recovery and Reconstruction Framework** (GFDRR, The World Bank)



Pre-disaster recovery planning and Recovery and Reconstruction Policy

Local level and National Disaster Management Plans, which currently address primarily the issue of preparedness for emergency response, need to integrate recovery concerns for guiding formulation of a Recovery and Reconstruction policy (RandR). They should include baseline data on physical, social, economic and environmental context, so that immediately post disaster assessment of relative impact may be made, which will guide the identification of additional financial, material and human resources required for catalyzing recovery. Post-disaster recovery needs must also be integrated into the response-planning framework. An analysis of impacts of past disasters over the long term is also essential in guiding the planning process for recovery in terms of identifying priority sectors for economic intervention, which have traditionally been more vulnerable.

The national DM Plans must therefore provide enough information for guiding the Recovery and Reconstruction policy after a disaster that is responsive to the community needs and local context. The recovery process must extend across all affected sectors, such as shelter, infrastructure, economy and social development.

Policies in relation to RandR need to recognize the prime responsibility of governments to facilitate, at the national and local level, to direct and allocate resources to disaster rehabilitation and recovery. The policy needs to:

- State the main measures involved in recovery and rehabilitation
- Include a shared long-term vision for the affected community
- Clarify responsibilities for the implementation of the policy and RandR Program for individual departments, agencies, and the affected population
- Encourage and enhance the possibility of locally based efforts at RandR
- Build local capacity for sustainable economic, social, and physical development long after the disaster
- Undertake to involve all relevant stakeholders in the process, namely communities, private and public sector, NGOs, media, etc.
- Prioritize community recovery needs and services

- Provide guidance on possible options for integrating mitigation and preparedness measures into recovery and rehabilitation
- Incorporate a detailed plan of action, including an exit strategy for gradually reducing intervention in recovery

Recovery Planning (UNISDR, 2007)

Recovery efforts are most effective when they are informed by the lessons learned from previous disasters as well as by knowledge of risk reduction measures. Recovery plans that incorporate these aspects reduce disaster losses, in lives as well as in the social, economic and environmental assets of communities. Without such a plan, the longtime spans required for the negotiation and approval of development funding generate a gap between humanitarian assistance and the initiation of reconstruction programming, a gap in which affected people are usually left without support for recovery. Additionally, reconstruction that is not supported by an effective recovery plan frequently leads to rebuilding the conditions of risk which existed before the disaster.

The key for an effective rehabilitation program is an accurate and thorough damage and loss assessment, which also provides the information to determine the methods for including risk reduction in rehabilitation and recovery. (see Session 3.5 for details)

Monitoring Impacts

MandE systems are essential elements of Recovery as it would:

- Provide data to decision makers on programme progress and effectiveness
- Improve decision making by providing critical information that allows for programme/project adjustments
- Support transparency and improve accountability to all stakeholders
- Allow lessons to be captured that improve future programme/project implementation

Information systems for monitoring funds and activities during recovery phases are used as tools to track and evaluate progress of wide range of different sectors. Such tools are required for further development for more effectiveness.

For Cyclone Nargis recovery, the Recovery Information and Accountability System (RIAS) was set up to provide the Myanmar government donors and implementing partners with comprehensive up-to-date information on the delivery and the status of projects that received funding.

Monitoring criteria adopted for monitoring impacts of recovery could be varied depending on characteristic of damage and loss, prioritized sectors, and certain recovery project identified for each disaster event.

The following criteria were applied for monitoring impacts of post-Nargis early recovery (Early Recovery Cluster Myanmar, 2008):

- An optimal geographic coverage
- Cyclone-affected populations meet their basic needs by themselves
- Cyclone-affected populations have access to and make use of pre-existing basic infrastructure and social services, and have access to adequate psychosocial support
- Cyclone-affected populations have shelter and are less vulnerable to disasters
- Individual or household-based interventions have positive impacts on communities (local society and economy)
- Early recovery interventions have minimum negative impacts on the environment, social cohesion or economic networks
- Early recovery interventions avoid creating or reinforcing inequality and inequity between cyclone-affected and non-affected areas and populations
- Early recovery interventions take into account existing inequalities and inequities between different social categories
- Early recovery actions are based on pre-existing local capacities and take into account existing coping strategies
- Early recovery actions continuously adjusted when contexts and needs evolve or are re-evaluated

- Different stakeholders 'strategies and early recovery actions are combined in an integrated approach to cover a diversity of needs.

Opportunities and Challenges in Recovery

Post-disaster recovery presents great opportunities for introducing vulnerability reduction and hazard mitigation measures, which can create more risk resilient communities and nations. It has been observed that several countries have utilized the momentum generated by post-disaster situations for reforming their institutional setup for addressing disaster risk management.

The elements that make 'Recovery' as a unique opportunity for positive change

- Acute awareness
- Disruption of status quo
- Pressure on decision makers
- Openness to change
- Availability of resources

An example of this is the Gujarat State Disaster Management Authority in Gujarat, India which was established after the 2001 Gujarat Earthquake, and Task Force for Rebuilding the Nation (TAFREN) in Sri Lanka as well as the BRR in Indonesia for Tsunami 2004 recovery. It is important to identify and understand the key beneficiaries of the recovery effort, their needs, capacities and available resources, as well as the economic and financial impacts of the same on the local and national economy.

Some Challenges to Successful Recovery

Conventional Approaches to Recovery Fail to Grasp Opportunities:

1. Response

- Response dominated by humanitarian assistance and emergency management.
- Emergency relief doesn't address the underlying causes to vulnerability.

2. Conceptualization

- Reconstruction conceptualized to return a country to the conditions of normality before a disaster, and might not cater treatment of existing vulnerable factors of the situation before a disaster.
- This may lead to the rebuilding of the conditions of risk.

3. Time Factor

- Long time span for studies, recovery program design, negotiation of loans and approval of development funding.
- Gap between end of humanitarian assistance and initiation of recovery and reconstruction.
- People recover spontaneously, rebuilding and reproducing conditions more risk prone than before the disaster.

4. Visibility

- Rapid and visible solutions to restore normality at the cost of sustainability.
- Rush works against grasping opportunities for change and risk reduction.

Recovery Stakeholders

- Affected Communities
- National and Local Government
- UN agencies with recovery roles (i.e. UNDP, UNICEF, UNESCO, UNCHS, ISDR etc.)
- International Development Banks
- National and International NGO's.
- Private Sector (Construction, Small Business Sector, Agriculture, Financial Investment, Insurance, etc.)
- Donors supporting Disaster Recovery

Other factors related to R and R

Human factors in Recovery and Rehabilitation (RandR)

This is key factor in RandR, given the complex and varying human needs and vulnerabilities depending on socio-economic context.

Problem areas in Recovery and Rehabilitation

One of the key concerns or challenges in Recovery and Rehabilitation is the timeframe for implementation. There are invariably delays in formulating the policies for RandR due to the varying nature of each disaster, and complex human needs. Additional confusion is created by myths that are generated in post disaster due to limited public and media awareness.

Transfer of responsibility from Response to RandR

Smooth transition between the post disaster stages from response to recovery is required. While the response phase is likely to be primarily driven by the government, in the recovery phase the government should assume the role of a facilitator and gradually capacitate the community and NGOs to undertake action.

What constitute a successful recovery process?

The successful recovery process should be based on realities of affected communities, build on local consultation and participation, supported by government planning and resources and responsible use of nature resources.



Key considerations towards successful recovery

Social Inclusion	→	Recovery programming should encourage and support the equal participating of all community members regardless of wealth, gender, ethnicity, age, etc.
Gender Awareness	→	All aspects of recovery programming should employ gender-sensitive approaches, given the socio-economic constraints commonly faced by women.
Stakeholders Inclusion	→	Recovery programmes should seek ways of complimenting recovery efforts of other stakeholders as well as strengthening traditional knowledge and resources.
Social Mobilization	→	Recovery programmes should develop local capacity to organize, network, define goals, access resources, plan for emergencies, and resolve conflict.
Demand Based Approach	→	Recovery programmes should be based on clear priorities defined through participation and involvement of stakeholders
Environmental Protection	→	Recovery activities should incorporate environmental safeguards and protection of natural resources.

To sum-up, for successful recovery, the key elements as follow need to be put in place.

Key elements	Functions
Institutional Framework	Design mechanisms to coordinate, implement and monitor recovery
Recovery Policy	Define and endorse including principles and desires to guide recovery activities
Recovery Framework	Formulate and identify needs, priorities and capacities
Recovery Plan	Develop and detail general and sectoral programmatic requirement
Partnership Strategy	Define for implementation
Implementation Capacity	Identify surge capacity needs and potential resources

Take Away

After this session, you should be able to:

- Understand the concepts of disaster recovery
- Appreciate framework and elements of disaster recovery

Check your learning:

1. Choose the correct answer to the following questions.

1.1 Which of the following is not part of Sustainable Recovery and Reconstruction Framework

- (a) Local participation
- (b) Cross-cutting issues
- (c) Risk Reduction
- (d) None of the above

1.2 Traditional way of defining 'recovery' doesn't incorporate

- (a) 'normalcy'
- (b) 'restoration'
- (c) 'risk reduction'
- (d) 'rebuild quickly'

1.3 Which of the following is not an element that makes 'Recovery' as a unique opportunity for positive change?

- (a) Acute awareness
- (b) Pressure on decision makers
- (c) Constraint of timeframe
- (d) Openness to change

1.4 Which of the following is not key element for successful recovery?

- (a) Recovery plan
- (b) Institutional framework
- (c) Implementation capacity
- (d) None of the above

2. Check whether the following sentences are True or False.

2.1 DaLA is one of key elements for effective recovery program.

2.2 Recovery provides opportunity for introducing risk reduction mitigation measures.

2.3 Recovery comprises restoring of physical items and structures such as houses, bridges, roads and doesn't cover activities to restore social and economic well being.

2.4 Recovery process should be led and facilitated by the government.

2.5 As recovery will be undertaken only after disaster, recovery planning before disaster occurrence is not necessary.

3. Provide 2 examples of recovery activities for each of the following sector

3.1 Rural housing sector

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3.2 Agricultural sector

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3.3 Education sector

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3.4 Road sector

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4. Mention 2 key learning of this session

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Correct answers of Check Your Learning Exercises

1. 1.1 (d) None of the above 1.2 (c) 'risk reduction'
1.3 (c) Constraint of timeframe 1.4 (d) None of the above
2. 2.1 True 2.2 True 2.3 False 2.4 True 2.5 alse

Additional readings/references

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session
3.8

CASE STUDY ON RECOVERY AND RECONSTRUCTION

At the end of the session, you should be able to:

- Get exposed to Recovery and Reconstruction in the aftermath of Gujarat State Earthquake in 2001
- Understand key activities for Recovery and Reconstruction, concerned stakeholders involved in the process, lessons learned and good practice

Case Study *The Gujarat Earthquake Recovery, India¹*

1. Background

On 26th January 2001, an earthquake measuring 6.9 on the Richter scale occurred in western India. It followed by hundreds of aftershocks with a magnitude of 3.0 and above. The death toll was 13,805 and it was estimated that about 167,000 people were injured. About 1.2 million houses were damaged or destroyed. Social infrastructure was also severely hit with destruction or damage to over 1,000 health clinics and about 12,000 schools. Civil administration was greatly affected with official buildings and records destroyed and staff either killed or suffering loss of family members. Physical infrastructure was also severely damaged including small and medium earthen dams providing drinking water and irrigation to local communities, urban and rural water supply systems, public buildings, municipal infrastructure, roads, power and telecommunications. Thousands of small and cottage based industries and agricultural assets were destroyed or damaged. Kachchh district was the worst affected as nearly 70 percent of the buildings got destroyed. Other seriously affected districts included Ahmedabad, Patan, Jamnagar, Rajkot and Surendranagar. These six districts accounted for over 95 percent of the deaths caused by the earthquake. Towns such as Bhachau and Rapar of Kachchh suffered nearly 100 percent damage.

Primary losses are estimated at US\$ 3189 million. Secondary losses are estimated to be US\$ 635 million. Tertiary losses are estimated at US\$ 2097 million.

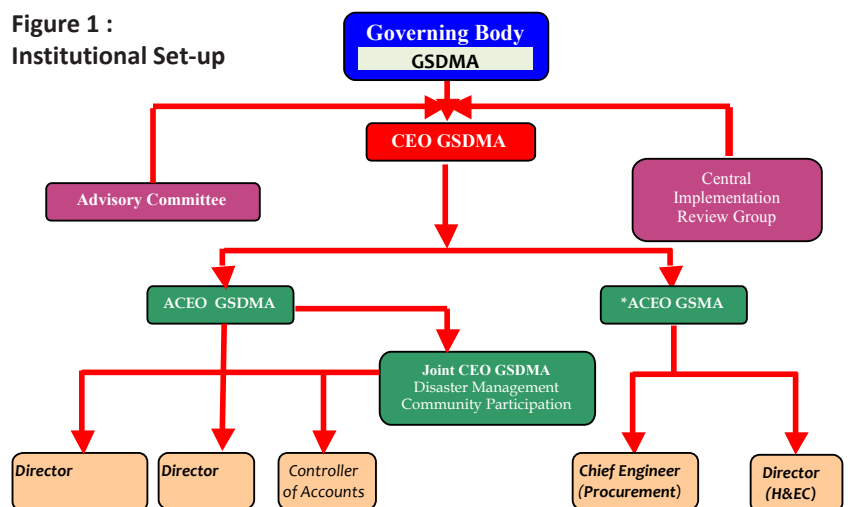
2. Institutional set-up for undertaking Recovery

The Gujarat State Disaster Management Authority (GSDMA) was created on 8th February 2001 to coordinate the overall recovery and long term Disaster Risk Reduction. The Chief Minister of the State is *ex-officio* chairman of the Governing Body and other members include two senior ministers, senior secretaries, Commissioner of Relief, etc. A decision of the Governing Body is *at par* with a decision of the Cabinet and this helped in speedy and timely decisions.

The Advisory Committee reviews the progress of RandR work, and ensures a participatory approach by involving all stakeholders. It comprises experts from different fields such as Industries, Education, and Health, and includes two Voluntary Agencies.

For time-bound implementation, a state level central implementation review group was formed under the chairmanship of the Chief Secretary of Gujarat. The institutional set-up and co-ordination facilitated the participatory, hassle-free and speedy implementation of the program.

Figure 1 :
Institutional Set-up



¹ Extracts of 'Gujarat Earthquake Reconstruction and Rehabilitation Programme-Lessons Learnt', by Kumar, Sudhir, Prabuddha Bharat, Ramkrishna Order, India, 2006.

3. Housing Recovery

Housing was the worst affected sector as 1.2 million houses destroyed or damaged, out of which 2.1 lakhs requires reconstruction and the rest require repair or retrofitting. The salient features of the program are:

- *Choice to beneficiary:* Beneficiaries have been given a wide range of choices for reconstruction such as the Owner-driven approach *in-situ*, Public Private Partnership Program [PPPP] for partial relocation or complete relocation. Under the owner-driven approach, reconstruction activity is undertaken by the beneficiary while in the PPP Program, NGOs work in consultation with the government and the beneficiary for the reconstruction task. Thus the bottom line is CHOICE to the beneficiary.
- *Participatory approach:* Participation of the community has been the key in the housing reconstruction program. The *Gram Sabha's*² approval was mandatory for the identified relocation site, in case of relocation of an affected village.
- *Decentralised approach:* The reconstruction program is spread across 21 districts, hence a decentralised approach for implementation has been used. The program is being coordinated by the concerned District Collectors/District Development Officers at district level and by the Mamlatdar/Taluka Development Officers at taluka level.
- *Rights of Women:* Registration of the reconstructed house under the joint ownership of husband and wife has been made mandatory.
- *Insurance:* All reconstructed houses are being insured against risk from 14 types of perils including the earthquake, cyclone, fire, etc.
- *Multi-hazard construction:* The reconstructed houses are multi-hazard resistant.
- *Quality Control:* To keep tabs on the quality of construction, a two-pronged approach was put in place. The assistance amount to the beneficiary (except G-1 category) is given in two or three instalments. The final instalment was released to the beneficiary only after quality certification by the engineer.
- *Third party quality audit:* Apart from inspection and certification by the engineer, NCCBM,³ an independent quality audit agency was hired. All reconstructed houses were audited by the agency at various stages of reconstruction.

The four worst affected towns of Kachchh are being reconstructed as state-of-art towns. The urban infrastructure of ten towns are being reconstructed with upgraded facilities.

- *Town Planning/Development Plan:* The four worst affected towns were reconstructed as state-of-the-art towns. High quality infrastructure was laid in the old unplanned and unregulated towns. Development plans were prepared with a 50 years perspective and town planning with 20 years growth in view.
- *Material Banks:* Material banks were set up so that the beneficiaries can get cement at an affordable price.
- *Grievance redressal:* To address grievances, an Ombudsman, a Village level committee, a District level committee, etc was set up. The District Judge was declared as the Ombudsman and more than 46,000 applications have been already addressed by the same.
- *Training:* The multi-hazard reconstruction task would not get completed in the stipulated time with the existing number of Engineers and Masons; hence massive training programs were undertaken. More 6,000 engineers and 26,000 masons were trained.
- *Other features:* The assistance amount has been derived through unambiguous guidelines and hence very less grievance. The affected houses were classified into five categories according to the severity of the damage: G1-Buildings with minor damage of about ½ “ cracks G5- Buildings with damages more than 50% (fully collapsed). However, resurveys were also done if any beneficiary asked for the same.

Assistance was calculated based on the basis of damage / carpet area of the affected house. The ceiling amount for assistance was fixed in different packages; for example cash assistance was provided up to a ceiling Rs. 1.75 lacs for house reconstruction in urban areas, and up to Rs. 90,000 for rural houses.

4. Livelihood recovery

Over 84,000 self-employed persons such as artisans, handicraft artisans, those from the small business community, etc. lost their livelihood, and the farming activity of around 80,000 farmers was affected.

2 A Gram Sabha comprises all adult members of the village

3 National Council for Cement and Building Materials.

Restoration of livelihood and its sustainability were the two principles in the formulation of livelihood restoration packages.

Cottage Industries: To restore the livelihood of the affected people, over US\$ 15 million have been spent. For sustainability, measures to hone the skills of artisans were undertaken. A few important ones are:

- Students of the National Institute of Design (NID) and National Institute of Fashion Technology (NIFT) were involved for upgrading and improving the design and quality of products.
- Central Leather Research Institute (CLRI) was involved in training the artisans in making leather products using the latest technology.
- NID was involved in training leather workers on improvement of products.

Women's Livelihood: Women's Livelihood Restoration Project (WLRP) was started to ensure that the 20,000 women of the most affected districts would have access to a wide range of services pertaining to their livelihoods. The uniqueness of this project was to look for integrated solutions involving capacity building, and enabling women to earn higher and sustainable levels of income through a process that empowers.



Some important activities undertaken under this project were Agri-inputs, Tailoring, Handicraft, SHG formation, Dairying, Training in embroidery, etc.

Self-Employment Activities: A special scheme for providing self-employment activities has been designed wherein; women will be assisted as per their requirement of working capital assistance, revolving fund or their entrepreneurial skills. Four of the projects have been especially taken up with objective of spreading the movement of co-operatives and best practices in milk sector to Surendranagar and Jamnagar districts of Saurashtra. These activities created self-employment opportunities for 5,000 poor women leading to their sustainable development. Women were assisted as per their requirement of working capital assistance, revolving fund or their entrepreneurial skills. Some important activities covered in the program are: Paper dish and cup making, broom making, flour mills, machine embroidery, catering service, tiffin service, carts, handloom, stitching of Rexene bags, potato/banana chips, masala making, cotton carding machine.



These self help have taken up savings and credit activities. Internal lending has commenced in 70 SHGs. Process of opening of bank accounts of SHGs has been initiated. Awareness training covering principles and philosophy of SHGs and importance of savings and credit given to 146 SHGs.

Industries: Small industrial units, small cabins and shops, and service and trade units that were affected in the earthquake were identified. Several schemes such as loans for repair and reconstruction; rescheduling of loans; insurance claims; subsidy and interest subsidies to industrial units; financial assistance to small industrial units; and small cabins and shops are being implemented for the rehabilitation and long-term sustainability of these units. Cash assistance up to Rs. 3,000 to 6,000 for each affected shop and cabin unit has been disbursed to 13,164 units. Subsidy and interest subsidy has been disbursed to 3,465 affected service and trade units. Depending on the damage, compensation has been paid to salt farmers. Lease rent and royalty are exempted on salt production in the affected areas.

Agriculture: In order to bring farming activity back to normal, assistance has been provided in the form of input kits; and financial assistance for rehabilitation of farm structures and irrigation assets. Input kits such as tarpaulins, spray pumps, farming tools, storage bins, seeds, chemical fertilizers and pesticides have been distributed to the 58,163 affected farmers. Assistance has been provided for rehabilitation of 46,872 damaged / destroyed farm structures such as engine rooms, store rooms, etc.

The scope of livelihood programs was limited not only to restoration but also its long-term viability, i.e. sustainability is the key.

5. Awareness generation initiatives

Almost all the available media of mass communication were utilized for awareness generation on Disaster Risk Management. Advertisement in newspapers, hoardings, pocket-size booklets, shake table demonstrations, folk dances and music, jokes in the local language, and other similar activities were carried out on a wide scale for awareness creation and capacity building for disaster management. A few notable ones were:

- Messages on hazard-resistant construction and retrofitting were displayed on buses plying in the affected areas.
- A disaster calendar with Do's and Don'ts.
- Shake-table demonstrations were held for inculcating the value of multi-hazard construction
- Cassettes on reconstruction and retrofitting of houses were prepared and shown in public gatherings.
- A videocassette of the local folk dance was prepared and shown.
- Street plays were also used for inculcating the disaster management culture.
- Essay competition for children to increase awareness about earthquakes.
- Photography and videography competitions on destruction caused by the earthquake.
- Distribution of caps carrying messages of safe construction.
- Pamphlets on safe housing repair and reconstruction were distributed.
- Booklets on 'Guidelines related to multi-hazard construction' were distributed.
- A number of NGOs (about 100) in an awareness campaign.

6. Capacity Building initiatives

Gujarat Institute of Disaster Management (GIDM) was established GIDM as the Centre of Excellence in disaster management and training. This institute imparts training to different stakeholders of disaster management.

Institute of Seismological Research: is aimed to become an international level Institute, with deemed university status. The Institute network with similar centres within the state, country-wide and all over the world for research and sharing of best practices. Major areas of emphasis is earthquake information.

Feasibility Studies/Plans on Disaster Management Themes: GSDMA hired international experts/consultants for carrying out feasibility studies, preparing plans, models, etc on various themes of disaster management. Some of the studies are: Hazard Risk and Vulnerability Assessment, Feasibility of Seismic micro-zonation, Damage and Loss Assessment Methodology; Early Warning System and Emergency Communication and Revision of Building Codes.

Masons' training: Training modules and material (which included both theoretical and practical components) were standardised to maintain uniformity of content. Training was arranged at villages and taluka headquarters to facilitate easy access for masons attending these programs. Considering the loss of income to the masons during the training period, food, travel expenses, and a daily per-diem allowance was arranged to compensate for their loss of wages.

Engineers' training: Specialised training was provided to government engineers, private practitioners, and for engineers working with NGOs. Training programs were conducted at various places

Modernisation and Strengthening of Fire department was also undertaken and advanced rescue and search equipment have been acquired for the same.

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session

3.9

TABLE TOP EXERCISE ON DISASTER RESPONSE

At the end of the session, you should have:

- Improved understanding of Disaster Response and will be able to appreciate the complexities and linkages in response

Key points covered *Tabletop Exercise, Exercise Facilitator, Scenario*

TRAINING CONTENT

Introduction

A tabletop exercise is a focused practice activity that places the participants in a simulated situation requiring them to function in the capacity that would be expected in a real event. Its purpose is to have the participants apply overall understanding on DRM (from all the previous sessions) into action-oriented activity, which will further promote preparedness by testing policies and plans and by training personnel.

Tabletop exercise was defined as, “one method of exercising teams in which participants review and discuss the actions they would take per their plans, but do not perform any of these actions. The exercise can be conducted with a single team, or multiple teams, typically under the guidance of exercise facilitators.” (The Disaster Recovery Institute International -DRII)

Exercise

The exercise is a written scenario containing a set of circumstances and facts that create the need for the participants in the exercise to problem solve and make decisions that will bring the event to a conclusion with as few negative consequences as possible. By practicing and training with problem-solving tabletop exercises, it is possible for staff members to be able to establish a knowledge base that may help them to be able to develop the automatic responses which they will need when analytical thinking skills are compromised during an actual event.

Planning the Exercise

No matter what type of exercise is being presented, it's best to have an exercise planning coordinator assigned. This person selects the type of exercise to be performed and is responsible for selecting the components of the plan to be exercised. For a tabletop exercise, it's the responsibility of the coordinator to:

- Identify the objectives;
- Develop an initial exercise scenario and narrative;
- Identify the participants;
- Chair the exercise participants meetings;
- Distribute minutes;
- Facilitate the exercise;
- Perform a post exercise analysis;
- Develop a scoring method relative to the response of the participants as their plans are implemented during the exercise.

Exercise Facilitator

The primary role of the facilitator is to ensure that the tabletop exercise proceeds on schedule and achieves the desired result of determining the viability of Disaster Response Plans. To achieve that result, there are several questions that can be asked as the exercise begins and through the discussion of issues and assignment of responsibility for corrective actions. The facilitator may also add additional failure conditions during the exercise.

The Exercise Facilitator's responsibilities include:

- Keeping the session flowing
- Keeping the session on schedule;
- Introducing failure conditions during the exercise
- Providing summary comments at the conclusion
- Ensuring issues are documented
- Discussing next step activities and time frames.

The Scenario

The key to the tabletop exercise is the scenario. It must be definitive and sensible; a scenario related to threats that could occur and one that matches the organization's need at the time of the exercise.

The scenario should identify and describe the type of disaster that has occurred and the extent of damage or disruption to the area. In addition, the scenario should include what recovery capabilities are available and the status of backup or recovery resources. Finally, it should outline the time of the event and duration of the exercise.

During the exercise

During the exercise, the scenario should enable the response teams to test the procedures (call trees and contact lists), recovery management, recovery operating procedures (tasks and responsibilities), the staffing of the teams and overall communications. Consideration must also be given to limitations as to what can be done in the exercise. It's best to identify any assumptions that need to be in place for the exercise.

A chronological sequence of events will illustrate the mock disaster by identifying:

- The hypothetical moment of the disaster (time of day, day of month, part of year);
- The cause of the disaster;
- The method of notification;
- A description of the events of the disaster leading to the declaration and activation of the plan;
- A description of the regional implications;
- A description of the role of the civil authorities and their activities during and after the disaster;
- Any actions that have been taken prior to activation of the plan;
- The damage to the facility;
- The status of all personnel;
- The status of alternate processing locations, vendors and suppliers, backup storage arrangements and utilities.

Based upon the effectiveness of the pre-exercise meetings, the exercise will almost run by itself with team members knowing what has to be accomplished. Exercising is a primary means of training. In any actual response effort, the best team members are usually those who have participated in exercises.

Post-Exercise Analysis

As soon as possible after the exercise, all participants should meet to discuss, evaluate, and document the exercise results. Topics would include a review of the exercise schedule (i.e., date, time, location), exercise objectives both logistically and operationally and the identification of personnel who supported exercise activities.

The planning team should then formulate recommendations based on the events that occurred during the exercise and start planning for next exercise.

Table Top Exercise I

- Step 1** • Group 1 members should move to the front and undertake the Tabletop Exercise 1.
- Step 2** • Group 1 members are **Ayer** Township Disaster Preparedness Committee members.
 - The committee members started meeting at 9.00 am are discussing about the Standing Order on Disaster Risk Management at Township Office of GAD.
- Step 3** • An earthquake occurred at 9.10 am.
 - Identify steps to be taken by the Committee members from 9.10 am to 9.15 am.
 - Please discuss and make a presentation to the class.
 - Group 2 members can provide comments and suggestions on the steps taken by the Committee.
 - Total time: 20 minutes
- Step 4** • The committee receives a note.
 - Copy of the note is also given to Group 2 members

Note

The earthquake was of magnitude 6.3 on RS. The **Ayer** is a coastal Township, about 300 miles from the capital, with population of 200,000. The Township has office of almost all government departments. There are a few local NGOs working in the Township and 2 International NGOs have project office.

The earthquake led to death of 4600 people and injured 65,000 people in **Ayer** and other surrounding Townships. It also badly affected almost all schools, hospitals, infrastructure including communications, roads, bridges, etc. Tourism is a major source of revenue and there are more than 100 hotels/resorts are in it's coastal area. The Township has an industrial park where more than 40 chemical factories are located. The nearest airport is 400 miles. The Port of **Ayer** Township is functional.

- Step 5**
- Identify steps to be taken by the Committee members from 9.15 am to 9.00 pm.
 - Discuss and make a presentation to the class.
 - Group 2 members can provide comments and suggestions on the steps taken by the Committee.
 - Total time: 30 minutes

Table Top Exercise 2

- Step 1**
- Group 2 members should move to the front and undertake the Tabletop Exercise 2.
- Step 2**
- Group 2 members are **Kantha** Township Disaster Preparedness Committee members.
 - The Township Officer, GAD received a call from Daw Khin Moe, Head of Green earth and Safe society, NGO.
 - Message: A category 3 cyclone is likely to hit **Kantha** Township and it's other Townships
- Step 3**
- Identify steps to be taken by the Committee members in next **30** minutes.
 - Discuss and make a presentation to the class.
 - Group 1 members can provide comments and suggestions on the steps taken by the Committee.
 - Total time: 20 minutes
- Step 4**
- The Township Office, **Kantha** receives a note.
 - Copy of the note is also given to Group 1 members.

Note

The Cyclone Gaale, category 4, hit **Kantha** Township and it's neighbouring 10 Townships and caused severe damage and loss. **Kantha** Township has hilly terrain and has population of 150,000. It is about 80 miles from the capital. The Township has office of some of the government departments. More than 30 local NGOs, International NGOs, UN agencies are working in the Township.

The cyclone led to death of 110 people and injured 3,000 people in **Kantha**. Surrounding Townships have been very badly impacted and number of injured is approximately 130,000. The public buildings of **Kantha** Township had minor damage. The Industrial zone has been severely impacted. The **Kantha** Port is functional and it is the biggest Port of the country.

- Step 5**
- Identify
 - Steps to be taken after 30 minutes of the telephone call before the Cyclone makes landfall
 - Steps to be taken in next 12 hours of the cyclone making landfall.
 - Discuss and make a presentation to the class.
 - Group 1 members can provide comments and suggestions on the steps taken by the Committee.
 - Total time: 30 minutes

Take Away

At the end of the session, you should have:

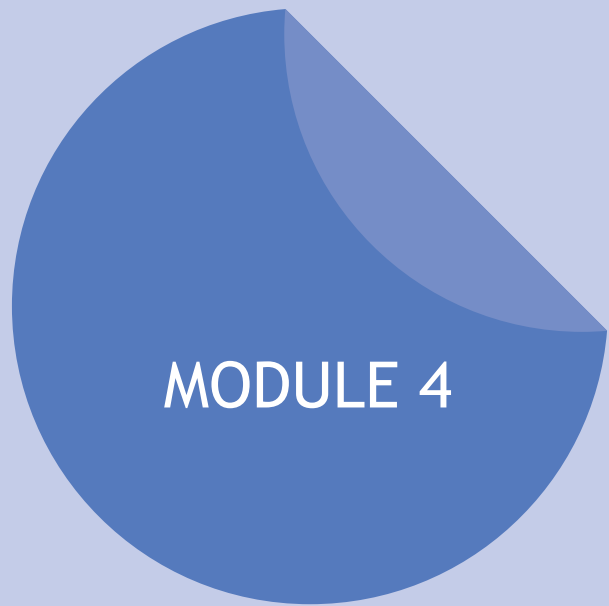
- Improved understanding of Disaster Response and will be able to appreciate the complexities and linkages in response.

Additional readings/references

Southside Virginia Community College - Information Technology Security Plan

EU funded programme for the Prevention, Preparedness and Response to natural and man-made disasters -

Concept of planning, preparation and conducting Table Top Exercise (TTX).



Disaster Resilience and Safer Development

At the end of the session, you should be able to:

- Explain the importance and processes of public awareness
- Describe various forms and channels for effective public awareness in risk reduction at all levels, not just limited to community level, but also in different levels of government and organizational level

Key Concepts *Public awareness involves the processes of informing the general population, increasing levels of consciousness about risks and how people can act to reduce their exposure and vulnerability to hazards.*

TRAINING CONTENT

Introduction

Sharing the word, spreading the knowledge!

Helping communities understand the need to prepare themselves for future hazards and ways to decrease their vulnerability are some of the themes for awareness generation. These awareness generation activities also try to help communities learn from their experience and help them prepare for future disasters. Dissemination of information through discussions, leaflets, brochures and drama is part of the strategy for awareness generation.

Awareness generation is the process through which people living in hazard-prone areas:

- Come to understand that they live in areas of risks;
- Realize the specific dangers that they are exposed to;
- Understand the warnings that are issued; and
- Know the appropriate actions to take to protect their life and minimize property damage

Awareness Generation

It should advise about:

- means of protection
- means of preparedness
- means of mitigation
- responses to threats

and instruct the public about:

- what
- when
- how ...to do or act in the personal and public interest

Advantages of Awareness Generation

Disasters can be substantially reduced if people are well informed and motivated toward a culture of disaster prevention and resilience, which in turn requires the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities.

Public Awareness

The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken individually and collectively to reduce exposure and vulnerability to hazards.

Public awareness is a key factor in effective disaster risk reduction. Its development is pursued, for example, through the development and dissemination of information through media and educational channels, the establishment of information centers, networks, and community or participation actions, and advocacy by senior public officials and community leaders. (UNISDR, 2009)

It can simply be defined as the processes of informing the general population, increasing levels of consciousness about risks and how people can act to reduce their exposure to hazards.

Public awareness and the creation of widespread understanding about disaster risk reduction have always been crucial elements in disaster risk management strategies. The Hyogo Framework for Action 2005 - 2015: Building the Resilience of Nations and Communities to Disasters indicates the way forward to reduce disaster losses. It states as part of Hyogo Framework for **Action Priority 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels**. Priority Action 3 can be implemented by the following tasks:

1. Develop a plan or programme to raise awareness of disaster risk reduction
2. Enhance the compilation, dissemination and use of disaster risk reduction information

As means for assessing progress in implementing Priority Action 3, the following indicators are suggested:

1. A national public awareness strategy for disaster risk reduction exists that reaches all communities and people of all education levels.
2. School curriculum at all levels includes disaster risk reduction elements and instructors are trained in disaster risk reduction at national to local levels.

The purpose of the task of developing a programme on awareness raising is to make disaster risk reduction an accepted value among opinion makers and the community, and to empower all levels of society to reduce their risks.

Objectives of Public Awareness Generation

Public awareness is important because it allows people to protect themselves in their everyday lives and responsibilities. Understanding of disaster risks also increases the effectiveness of early warning and policy implementation.

Objectives of public awareness generation at the community level:

- To increase the public knowledge about hazards, their nature and the possible consequences of their impact
- To increase knowledge about practical preparedness and mitigation measures
- To inform the public about the warning system that will be employed and what they should do when they receive it
- To increase knowledge on how to respond to an emergency situation
- To mobilize support for disaster risk reduction plans or response activities

Elements and Features of Public Awareness

Awareness raising is an interactive process in which different parties are engaged, each with its own roles, responsibilities, and ways to make its voice heard and to create social influence.

Elements of Public Awareness Generation

1. Purpose
 - Message
 - Audience
 - Means
 - Intended result
2. Structure
 - Has long term and repetitive approach
 - Is consistent
 - Utilizes a wide variety of methods and media

Key Features of Public Awareness

- On-going Process - Public awareness is an on-going process, not simply a set of products such as posters, brochures, etc.
- Participatory - Target population are active participants in program design and implementation phases, in partnership with individuals having the necessary technical skills.

- Community Specific - An assessment of specific hazards is the essential basis for developing public awareness programs.
- Target Population Specific - Must be based on need of specific user groups for information, which are essential to them (women, children, and indigenous people).
- Integral Part of Local Warning and Response System

Principles of Public Awareness

Basic principles of public awareness programmes:

- They should be designed and implemented with a clear understanding of local perspectives and requirements with all materials reflecting local conditions.
- They should target all community members including political leaders, village leaders and individuals living in at-risk communities.
- Different types of messages, locations and delivery systems are necessary to reach the various target audiences.
- Sustained efforts are crucial to success, although single activities such as commemorative disaster reduction events and special issue campaigns can be useful if they are part of a larger consistent programme.

Processes in Setting up a Public Awareness Program

1. Establish the need
 - What do people know about the hazards they are prone to?
 - What do they do to prepare for such hazards? Are these adequate?
 - Do people understand the meaning of warnings and what they should do when they hear these?
2. Planning the Program
 - Define without bias how people will behave before the hazard impact, during the impact and after the impact.
 - Define the critical elements of the program.
 - Who should be informed? Who are the most vulnerable? What are their habits, preferences, what is the common means through which they get information?
 - What type of hazard, potential effects?
 - Who will be involved in the implementation?
 - How can it promote self-reliance and uphold sound indigenous practices?
 - How can results be sustained?
3. Resource Mobilization
 - List down resources needed and sources
4. Implementation
5. Evaluation
6. Improvement of the program

Tools for Awareness Generation

- | | |
|--|---|
| • Training programs on disaster preparedness | • Films, film clips and videos |
| • Radio talks and short feature broadcasts | • Meetings (formal and informal) and other community gatherings |
| • SMS | • Youth Drama, Street Theatre |
| • FM Radio | • Cartoon series or short illustrated stories (comic magazines) |
| • Booklets, Brochures, Competitions, Exhibitions | • Posters and billboard notices |
| • Verbal and pictorial messages (telephone directories, and mass transportation) | |

Key Elements of Public Awareness Program

- | | |
|--|------------------------------|
| • Has long term and repetitive approach | • Hazard specific |
| • Should consistent and reliable | • Target population specific |
| • Utilizes a wide variety of methods and media | |

What Community Organizations can do to promote Public Awareness

In partnership with Community Based Organizations (CBOs), the government and private sector, the community can do all sorts of public awareness activities:

- Community Meetings, community dialogues with government, scientists, academe; forum
- Community discussion groups
- Disaster preparedness orientation and training
- Demonstrations especially of innovative technologies which can be used for early warning, for construction (like shake table exercises)
- Sharing and learning with other communities and organizations; learning from practice visits (seeing is believing)
- Wall sheets, posters, newsletters
- Plays, street plays
- Leaflets, manuals, handbooks, brochures, books, comics
- Press releases, national or local newspaper, radio or television
- Transparencies, slide presentations, film, photos exhibition
- Public speeches, letters to the editors, articles in the printed media
- Radio program, scripts aired on radio
- Disaster preparedness messages on vehicles, rickshaws, etc.
- Post cards, disaster preparedness messages on envelopes sent by mail
- Use or call for development of board games, computer games for children on disaster risk
- Safety day events; disaster consciousness month; awards for best prepared community/government unit; national bravery awards for those who saved lives in times of emergency and disaster
- Drills, commemoration of events; high visibility activities

Some Examples of Public Awareness Programs and Activities in Myanmar

1. *DRR day Drawing Competition and Essay Written Competition* which was organized by the UNDP engaging school children from different parts of the country. Participating in such activity, children will have more awareness on Disaster and its Risks, and then how to mitigate the impacts and reduce the vulnerability. The competitions were undertaken one month prior to the DRR Day and the winners were awarded the prizes at the event of DRR day, (every second Wednesday of October). The winning drawings and essays were displayed at the DRR Event. Moreover, Relief and Resettlement Department has also initiated the States and Divisions level (RRD offices) cartoons, drawing and article competition on DRR and awarded on DRR day. Likewise, Action Aid Myanmar has also conducted the competitions of Plays and Essays on DRR at the project areas, any individual can participate and it allows people to have more understanding on DRR and its consequences and ways to mitigate them.
2. *Social Mobilization Activities of Myanmar Red Cross Society*, in conjunction with the International Day for Disaster Reduction, MRCS mobilized communities and school children in targeted areas for the CBDRM and SBDRR programmes to engage in social mobilization activities. In this connection, village-level teams trained in CBDRM repeated VCA exercises for their respective villages and revised their disaster preparedness plans on that particular day. IEC materials were put on display at village level with the support of local authorities. At SBDRR-targeted schools, an essay competition was organized.
3. *Myanmar Red Cross Society's School Based DRR*, the SBDRR teams have been formed by teachers who comprise the largest group of facilitators. Each team consists of 30 students with equal membership of girls and boys, who are trained in basic vulnerability and capacity assessments which include village-level hazards and capacity mapping. They are also being guided to identify available resources, develop seasonal calendars within their respective communities and possible counter-measures to reduce the impact of disasters. The teams are being encouraged to raise disaster awareness and disseminate preparedness messages among the remaining student population as well as their individual families and wider communities.

The teams have each been provided with an SBDRM kit to be used to strengthen school-level disaster preparedness plans and in awareness-raising activities. Each kit contains disaster risk reduction (DRR) materials such as ropes, life jackets, a stretcher, hand-held loud speaker, buckets, tarpaulins, first aid kits,

fire beaters, DRR manual, and information, education and communication (IEC) materials. As a result of this intervention, approximately 20,000 students in 20 schools have learnt how to identify risks, reduce them and be better prepared for disasters. The families of students have also experienced improvements in their awareness of risks and the action needed to minimize them, as a result of knowledge received from the students. In some cases, parents of students have been actively involved in helping schools take action to minimize risks.

Take Away

At the end of the session, you should be able to:

- Explain the importance and processes of public awareness
- Describe various forms and channels for effective public awareness in risk reduction at all levels, not just limited to community level, but also in different levels of government and organizational level.

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session

4.2

CASE STUDY ON AWARENESS GENERATION

At the end of the session, you should be able to:

- Consolidate understanding on Community Mobilization on Awareness Raising
- Appreciate the approach to enhance awareness at community level as demonstrated in the case

Case Study on Awareness Raising

REACHING THE UNREACHABLE:

MYANMAR EXPERIENCES OF COMMUNITY-BASED DISASTER RISK REDUCTION (SEEDs Asia)

The Need for MKRC (Mobile Knowledge Resource Center) and WKRC (Water Knowledge Resource Center)**Overview**

- Educational materials of different types and topics were mounted on the MKRC and WKRC in order to make it mobile and enable its transport to different locations.
- This enabled children and community members to understand the importance of DRR more easily with its practical activities and visual presentation of posters, videos, and miniature models for understanding hazards and risks of disasters.
- The KIDA Approach In order to realize the aim that people will be able to take appropriate measures to prepare for emergency, the KIDA (Knowledge-Interest-Desire-Action) tree model was adapted for developing the MKRC and WKRC.⁷

You will be provided with the Case Study and spend 30 minutes for Group Work to discuss:

- Importance of the Awareness Generation in disaster risk reduction
- Key Activities
- Achievements and lessons learned

At the end of the session, you should be able to:

- Understand linkages between disaster and development
- Explore how disaster and development are emphasised in the HFA and MDGs
- Discuss the challenges in understanding the linkages and acting upon them

Key Concepts: *Linkages between disasters and development, evolving factors in development context, how development is emphasized in the Hyogo Framework for Action and the Millennium Development Goals, Key challenges in acting upon the issues and way forward.*

TRAINING CONTENT

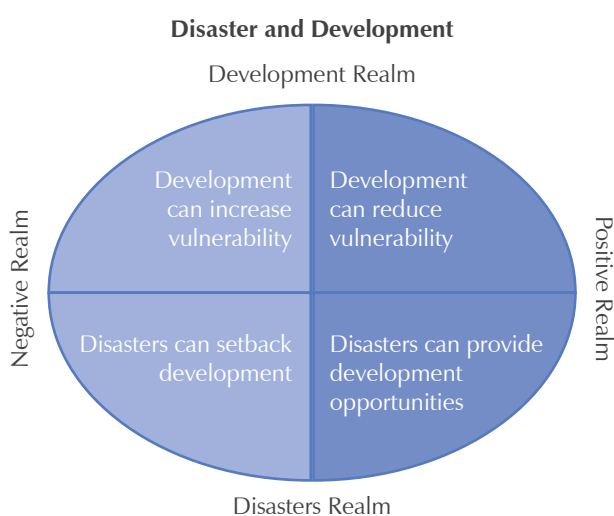
Introduction

Viewing disaster within the broader development context, this session will enhance understanding on linkages of disaster and development in various aspects. Disaster poses adverse impacts on population, economic, social, and environment of the affected country; and hence destroy years of development initiatives and gains. On the positive side, disaster could lead to more secured development as collective awareness on disaster impacts is significantly raised and needs to address these through inclusion of DRR considerations in future development will see prospect increase.

Whilst countries relentlessly strive for development- reducing poverty and achieving economic growth, development programs can increase susceptibility to disaster such as vulnerable location for urbanization and housing projects making it highly prone to future hazard, environmental degradation, increasing demands of shared resources and more constraint access to land utilization or natural resource, etc. This could intensify poverty and lessen capacities to absorb or manage the shock from disasters. From this angle, disaster is not considered as a one-time incident or isolated event, but it reflects unmanaged and unresolved problems in development.

Development Program could also be designed to decrease the susceptibility to disaster and their negative consequences. Structural, non-structural measures, legal provision and law enforcement, sustainable livelihood could be promoted to ensure resilience and safeguard development from disaster risk.

Linkages between Disaster and Development



'Disaster can setback development'

Example from Cyclone Nargis

Economic impact

The cyclone wiped out the livelihoods of families overnight, flooding over 600,000 hectares of agricultural land, submerging 60% of all paddy fields and damaging 63% of freshwater ponds, killing up to 50% of draught animals, destroying fishing boats and sweeping away food stocks and agricultural implements. These damages were mainly in the Ayeyarwady and Yangon Divisions, where local livelihoods are heavily reliant on the natural resource base. Recovery needs, which were estimated at just over a total of US\$1 billion over the next 3 years, include the most urgent priorities of significant food, agriculture, housing, basic services and support to communities for restoring their livelihoods and rebuilding assets.

As seen from the Nargis experience, Myanmar has suffered severe damage and loss; the total economic losses were amount to about 2.7% of the projected 2008 GDP. Farming infrastructure can be damaged in disaster events. The destruction of current crops and future yields by hazards hinder the economic growth of the agricultural-dependent economy.

Development projects and programs had to give way and resources to reconstruction and recovery needs in post-disaster. The shift in priority from development initiatives to post-disaster recovery actions is also an example of 'Disasters set back development'.

Social Impact

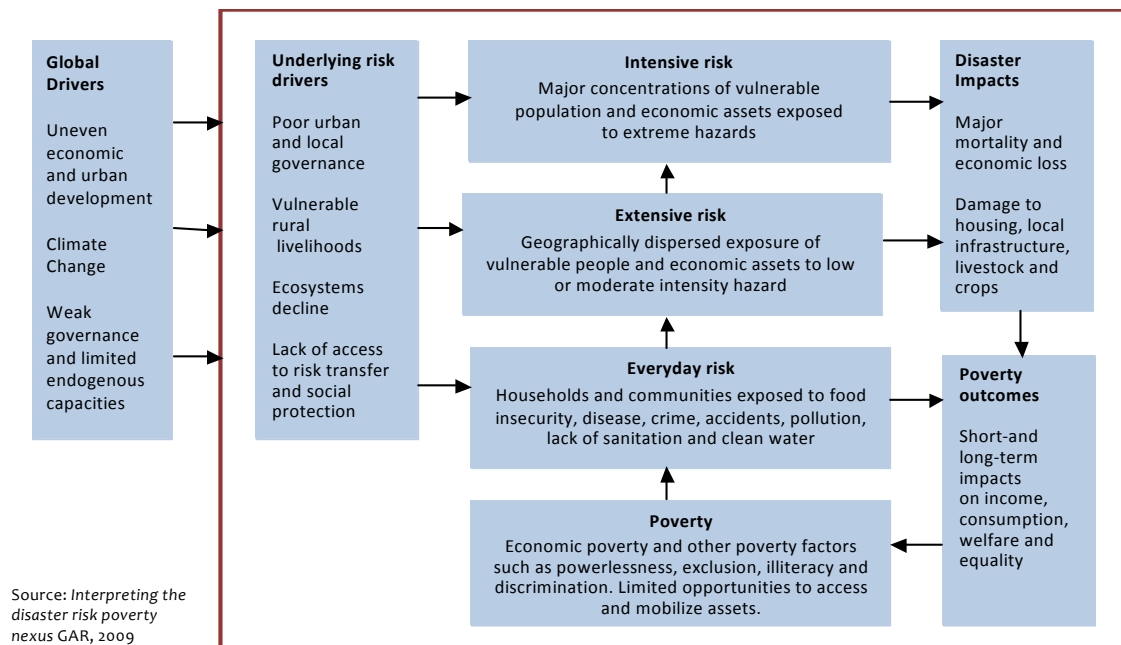
At local level, poor areas has demonstrated a number of vulnerable factors and lack of capacities to manage or absorb the shock from disasters. Vulnerable attributes of local communities are such as living in unsafe houses, prone location, poor access to public services such as health care, transportation, and lack of social protection. Due to the existing vulnerabilities, people could not absorb the shocks and suffer the intense impacts driving them to more severe condition such as homelessness, malnutrition, deteriorated health. People also face other social issues associates to household poverty and limited source for livelihood generating activities. The subsequent recovery process would still have a long way to complete.

Enviornmental Impact

Environment and natural resources makes major source of livelihood espically the agriculture-based and land-based livelihood. Environemntal impacts would have significant implications on livelihood, productive sector and economic-well being. Major environmental impacts of Cyclone Nargis:

- Damaged 35,000 ha of natural and planted mangroves and other trees;
- Pollution of surface and groundwater sources - 43% of ponds damaged;
- Salination and erosion of agricultural lands - 63% of paddy flooded by storm surge;
- Impact on fisheries by winds and storm surge;
- Sedimentation of rivers;
- Waste generation - debris from shelters, jetties (UNEP, 2009)

The figure below illustrates the underlying risk drivers, poverty, disaster risks and key interactions between them (GAR, 2009).



A range for underlying risk drivers, such as poor urban governance, vulnerable rural livelihoods and declining ecosystem, contribute to the translation of poverty and every risk into disaster risk, in context of boarder economic and political process. (GAR, 2009)

The Millennium Development Goals (MDGs) indicate eight ambitious goals to be achieved by 2015. It's globally agreed framework for monitoring human development and the achievement of time-bound and measurable targets. When considering the Millennium Development Goals against disaster impacts, it's obvious that disaster could be one of key factors that hampers, delay or interrupt on achieving the MDG.



Goal 1: Eradicate extreme poverty

Disaster has adverse effect on poverty reduction

Goal 2: Achieve universal primary education

Disaster hit families often fail to send children to school

Goal 3: Promote gender equality and empower women

Disaster leave women and girls with heavier workload and poor health

Goal 4: Reduce child mortality

Children are in greater danger in floods.

Goal 5: Improve maternal health

Contributing to better sanitation, education, nutrition and food security

Goal 6: Combat HIV/AIDS, malaria and other diseases

Disaster cause disease and damage to health infrastructure

Goal 7: Ensure environmental sustainability

Disaster increase rural-urban migration, and squatter settlement

Goal 8: Develop a global partnership for development

- Each of the development initiative is originally designed with an objective to achieving the MDG
- With the impact of disaster on the initiative, the objective of achieving the MDG is also impacted

‘Disaster could provide development opportunity’

The adverse impacts of disaster create acute awareness on existing vulnerable elements and the need for recovery interventions that will address these elements for safer conditions and resilience in the future. This is such a unique opportunity to rebuild ‘safe’ from hazards. Recovery and reconstruction activities should cater the inclusion of disaster-resistant elements such as build to higher standard following building codes and strict enforcement, adopting risk-sensitive land use planning in the process of rebuilding. As well awareness raising of people involved in decision making on recovery activities could be significantly enhanced; capacity and skills of professional much improved from the lesson-learned and experience from engagement in recovery process could be further adopted for future disaster risk reduction efforts in the future.

However, some typical challenges after disasters prevent from pushing new safer development such as

- Urgency after disaster to meet the immediate demand of affected victims might lead to ‘taking less safe but easy to do options’, rather than ‘go for long term resilient options’
- Donor pressure to spend money quickly and constraint timeline to close post-disaster recovery projects
- Multisectoral reconstruction plans take too long to develop
- Institutional arrangements not in place to be designated bodies in taking recovery forward
- Lack of skilled manpower (planning, management and implementation)

‘Development can increase vulnerabilities’ in various aspects; and hence increase disaster risk. Improper sectoral development plans and projects could make it susceptible to disaster risks.

Increased Disaster Exposure

Taking public infrastructure and housing project as an example, wrong site selection for construction projects in high hazard prone area will increase exposure to disaster.

In July 2009 heavy rain caused landslides, destroying settlements in northern areas of Kachin State. The location of these settlements in these areas was due to the land being economically beneficial to the inhabitants. Populations settled here to benefit from the growing jade mining industry as many mining employment opportunities are available in the area. However, as a result, it left the settlements more exposed to landslides. Scores died and over a 1,000 people were left without homes.

Increased development and competition for space may lead to farmers locating closer and closer to a low flood plain area, making their resources, and therefore their livelihoods, more exposed to the impacts of flood.

Increased Disaster Vulnerability

Increased built environment without adequate enforcement of development regulations increases the chance of people being injured by falling structures. Poor structural design due to lack of employed building regulations, structures are not resistant to earthquakes or flood impact.

There are also many examples of the drive for economic growth and social improvement generating new disaster risks.

- Rapid urbanization could create the growth of informal settlements and inner city slums, whether fuelled by international migration or internal migration from smaller urban settlements or the countryside, has led to the growth of unstable living environments. These settlements are often located in ravines, on steep slopes, along flood plains or adjacent to noxious or dangerous industrial or transport facilities.
- For agricultural projects, improper cropping pattern could cause greater risk on crop production damage due to drought and flood. However, need to compete in a globalizing economy, which at present rewards productive specialization and intensification over diversity and sustainability.

How should development initiatives be safe and contribute to DRR?

'Development can reduce vulnerability'- Country development plans and sectoral development plans should include provision of DRR elements to ensure sustainability of development projects. For example, housing program for the poor with appropriate retrofitting structures located in safer location would lessen vulnerabilities of poor communities in earthquake prone areas. Communication services that are reachable and accessible to remote rural areas and properly maintained will help connect people and support risk communication, early warning and effective coordination in disaster time; and hence reduce vulnerabilities.

As such, all development projects should address risk/vulnerability reduction as part of its sustainability component. Certain aspects and entry points to integrate DRR in projects of each respective sector could be explored such as:

- Structural measures
- Land use planning
- Resilient livelihood
- Sustainable farming to preserve soil fertility health care
- Legalization such as building codes, municipality regulation on housing and construction, ownership and utilizing of public resources, etc.
- Social protection such as expand coverage of services, and other forms of social welfare

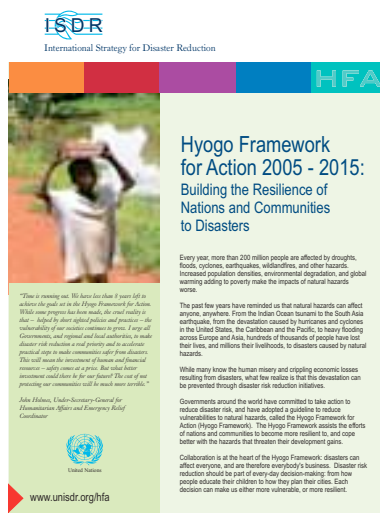
EXAMPLE: Engineered buildings mostly protected from 2003 earthquake damage

The September 2003 6.8 magnitude earthquake occurred in central Myanmar near Taungdwingyi City, about 360 kilometres north of Yangon. It caused severe damage to rural houses and religious buildings and extensive liquefaction failure of building foundations. The majority of buildings the earthquake damaged or destroyed were non-engineered brick structures and rural houses (Myanmar Earthquake

Committee, 2003). However, engineered structures saw very little damage in comparison. In Myanmar, structures from 4 to 8 stories are required to undertake both structural analysis and design, as well as soil investigations. Structures nine storeys and higher are required to possess seismic resistance. The structural analysis and design process is controlled by CQHP (Committee for Quality Control of Highrise Building Projects).

The negative and positive realms demonstrate the intricate interrelationships between disasters and development and therefore the importance of considering disasters in development processes.

Globally, the evolution of disaster as a development concern has progressed in three stages: the first involved viewing hazards as disasters; the second emphasized the physical protection of assets from hazards; the third and contemporary stage emphasizes strengthening people's capacity to absorb and recover from hazards - by reducing the negative effects of development practices on vulnerability. Accordingly, the idea is to move forwards disaster risk reduction **through stronger integration with development. This movement entails a shift from managing disasters to reducing disaster risks.**



1. Development policies and institutions integrate disaster risk reduction
2. Undertake assessment of disaster risk before every development project is finalized especially in hazard prone areas
3. Raise awareness among people on disaster risk reduction
4. Identify the root factor contributing to risk of any development initiative
5. Be prepared for effective response

The 5 Priorities of the Hyogo Framework for Action set the DRR framework, guidelines and strategic formulation for a range of DRR interventions under each priority to address the underlying causes of disaster, linkages of DRR and development to strive for disaster resilience. The HFA provides various suggested measures to be adopted by country.

Challenges and Way Forward

Although Disaster and Development has significant impacts over each other, but there is still a long way until disaster risk reduction - aiming at reducing vulnerability - is given sufficient priority and becomes an integral part of development process. As well, sustainable development¹ could not be achieved unless sufficient actions are in place to ensure vulnerability-free development.

A number of challenges emerged as follow:

- Conflict of interest - who owns development, macro-level VS local-level, urban level VS rural level, etc.
- How do we know if the development initiative is located in a safe area? - Comprehensive hazard maps/ risk maps in appropriate scale needs to be developed.
- How do we factor in physical, economical and environmental factors of vulnerability?
- Budgetary constraint and competition for scarce funds. There is always competition for funds as may be observed from past incidents, funding resources for risk reduction activities was much smaller compared to those for response and relief operations.
- Limited of resource while increasing in demand for economic development.
- Investment and political will

We are also confronted with a complex reality and there are many other factors at play:

Population growth - *Despite rapid decreasing of fertility rate in most countries over the past decades, yet in absolute numbers, the yearly population increase is bigger than ever before - on average eighty million per year - and 95% of that increase occurs in less developed countries. Many of the new inhabitants end up in risk-prone areas.*

Rapid urbanization has led to a dramatic change in vulnerability. While the global population has doubled over the past forty years, the number of people living in urban areas has increased five-fold. And this trend is continuing. Most of the new citizens in urban environments end up in various slums, more often than not areas most prone to the devastation caused by natural hazards such as earthquakes, flooding and tropical storms.

Environment degradation - The irony is that while disasters are triggered by natural phenomena, a healthy natural environment is very often the best possible protection against storms, heavy rains or droughts turning into disasters. The sad fact is that so relatively few decisions-makers are conscious about this.

Climate Change - In the 1990's, about three-quarters of all natural disasters were triggered by weather-related events. Such events are likely to increase both in numbers and in frequency in the years to come - one of several consequences of climate change.

Hence as the way forward, recommends that;

1. Disasters should be looked at as a part of ecology and they should be managed rather than controlled.
2. There should be fewer linear structural response to disasters such as construction of embankments, dykes, spurs and so on. Instead, the response should be of an integrated nature addressing the non-structural issues such as enhancing entitlements and negotiating power of the most vulnerable.
3. Disasters should be treated as the pending issues of development and governance and these forums should be made responsive and sensitive to the demands of disaster-prone communities by streamlining rights-based social mobilization of the vulnerable.
4. Disaster management policies should be redirected towards poverty and vulnerability reduction instead of compensation and relief responses.
5. Disaster mitigation risk assessment to be included into development planning ensuring risk free development at the macro and micro level (*Source: Making the case for people centered disaster management, excerpts from the discussion paper for a South Asia Policy Document, prepared by several Duryog Nivaran members*).

To sum up, since development is human centered and reducing disaster impacts involves regulating human actions that create the conditions in which disasters happen, disasters risk reduction should be seen as a development issue. Disaster reduction makes development sense for the many reasons:

- The underlying causes of poverty, unsustainable development and disasters are related and all originate from factors that cause or increase the vulnerability of people;
- Disasters can put development at risk and make it unsustainable, thereby reducing the already low development potential of the continent. Hence, effective disaster risk management contributes to sustainable development;
- Development can cause or reduce disaster risks. Failed development contributes to poverty because development objectives are not realized and disaster reduction interventions also fail. In contrast, sustainable development strengthens the security of populations so that disaster reduction interventions can effectively help them to alleviate or avoid disaster risks to themselves and the supporting physical, economic, and social bases of their livelihoods.

Take Away

After this session, you should be able to:

- Understand linkages between disaster and development
- Explore how disaster and development are emphasised in the HFA and MDGs
- Discuss the challenges in understanding the linkages and acting upon them

Check your learning:

1. Select the correct answer for the following questions:

1.1 Disasters could make negative impact on.....

- (a) Livelihood
- (b) Local trade activities
- (c) Macro-economic such as employment opportunity and GDP
- (d) All of the above

1.2 To ensure that post-disaster recovery and reconstruction will be more resilient to future disasters, the following should be done except

- (a) Undertake risk assessment before resettlement planning of affected people
- (b) Survey of existing structures, houses and building to assess structural vulnerabilities and appropriate retrofitting
- (c) Relocate earthquake affected people to settlement in highly drought prone area with insufficient water supplies and sanitation facilities
- (d) Introduce cash for work program and optional livelihood for income generation for affected households

1.3 Investment in engineered structures that enhance more resilient to future hazard is an example of

- (a) Disaster can provide development opportunity
- (b) Development can increase vulnerabilities
- (c) Disaster could set back development
- (d) Development can reduce vulnerabilities

1.4 Elevating houses above the level of the recent severe flood is an example of:

- (a) Disaster can provide development opportunity
- (b) Development can increase vulnerabilities
- (c) Disaster could set back development
- (d) Development can reduce vulnerabilities

1.5 Land use planning taking into account the needs for relocation of vulnerable people to safer areas is an example of

- (a) Disaster can provide development opportunity
- (b) Development can increase vulnerabilities
- (c) Disaster could set back development
- (d) Development can reduce vulnerabilities

2. Check whether the following sentences are True or False.

2.1 Disasters pose only negative impacts on development.

2.2 Development should only address the needs to meet the current demands on economic growth without concern on sustainability.

2.3 Awareness raising in the aftermath of disaster could be considered as a positive force of disaster.

2.4 Population growth, rapid urbanization and environmental degradation are complex reality that could induce risks.

2.5 To consider integrating DRR into development planning will be a way forward to reduce underlying causes of risks.

3. Explain the following.

3.1 Discuss in brief 2 examples of development projects in road sectors that can increase vulnerabilities and why.

.....

.....

.....

3.2 Give 3 examples of livelihood activities that could be affected by flood.

.....

.....

.....

3.3 Suggest 2 measures to be adopted by farmers to mitigate impacts of drought on cattle rearing.

.....

.....

.....

3.4 Give example of 3 vulnerable factors in urbanization setting

.....

.....

.....

4. Please mention two key learning's from this session

.....

.....

.....

Correct answers of check your learning exercises

1. 1.1 (d) All the above
 1.2 (c) Relocate earthquake affected people to settlement in highly drought prone area with insufficient water supplies and sanitation facilities
 1.3 (d) Development can reduce vulnerabilities
 1.4 (a) Disaster can provide development opportunity
 1.5 (d) Development can reduce vulnerabilities
2. 2.1 False 2.2 False 2.3 True 2.4 True 2.5 True

Additional readings/references

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At the end of the Group Work, you will have better understanding of:

- Disaster and Development linkages in the context of Myanmar

Group Work 1

- Each group can select one sector
 - Agriculture
 - Forestry
 - Education
 - Health
 - Roads/Bridges
 - Hotel and Tourism
- Each group should identify one project/development activity corresponding to the selected sector thinking about location of identified projects, expected outputs, steps for implementation, benefits, target beneficiaries, duration, timeline, resources required and other related details.

Group Work 2

- Given the situation that following disasters happen and affect the sectors
 - Agriculture : Floods
 - Forestry : Forest Fire
 - Education : Cyclone
 - Health: Cyclone
 - Roads/Bridges : Earthquake
 - Hotel and Tourism : Floods
- Discuss possible impacts of the disaster on the chosen project/development activity.
- Now that the disaster is over, how will the sector rebuilt? Consider any advantage of the situation, as well as potential things to address: construction, location, education/training/advocacy etc.
- Each group presents the results.

session

4.5

MAINSTREAMING DRR IN DEVELOPMENT PLANNING
AND GROUP WORK

At the end of this session, you will be able to:

- Have common understanding on 'mainstreaming disaster risk reduction'
- Appreciate Mainstreaming DRR into Development planning in Myanmar
- Explore how DRR could be integrated into township development

TRAINING CONTENT

Introduction

In the last 10 years, and increasingly since the conception of the Hyogo Framework for Action in 2005, there has been increasing recognition of the need to mainstream disaster risk reduction into development. That is to consider and address risks emanating from natural hazards in medium-term strategic frameworks and institutional structures, in country and sectoral strategies and policies and in the design of individual projects in hazard-prone countries.

There has been some initial work in different countries in region (to various extents) which focuses on national government responsibility to mainstream DRR into their development planning processes. This session seeks to discuss the following:

- Understand what is mainstreaming DRR
- Broad aspects of development planning framework and its relation to disaster risk reduction
- Identifying entry points in the development planning framework for mainstreaming DRR
- Creating an enabling environment for mainstreaming DRR

What is mainstreaming DRR?

Mainstreaming DRR means significantly expanding and enhancing DRR so that it becomes normal practice, and fully institutionalised within the national and sectoral development agenda of nations at risk from natural hazards (Trobe and Davis, 2005).

Trobe and Davis (2005) outline three key purposes of mainstreaming DRR:

- To make certain that all national and sectoral development programs and projects are designed with evident consideration for potential disaster risk and to resist hazard impact
- To make certain that all national and sectoral development programs and projects do not inadvertently increase vulnerability to disaster in all sectors: social, physical, economic and environment
- To make certain that all national and sectoral development programs and projects are designed to contribute to developmental aims and to reduce future disaster risk

Mainstreaming risk reduction should result in appropriate measures being taken to reduce disaster risk and ensure that development plans and programmes do not create new forms of vulnerability (ProVention consortium, 2009). Mainstreaming is not however an end in itself but an approach or a means to achieve the overall objective of reducing risks to natural disaster.

What is Development Plan?

- A development plan is a document that contains and embodies the aspirations, vision and hopes of the people for the future.
- Its preparation undergoes a process that varies according to the thinking, beliefs and ideology of the government or people preparing the plan. There are no prescribed forms or templates for development plans but usually they contain:

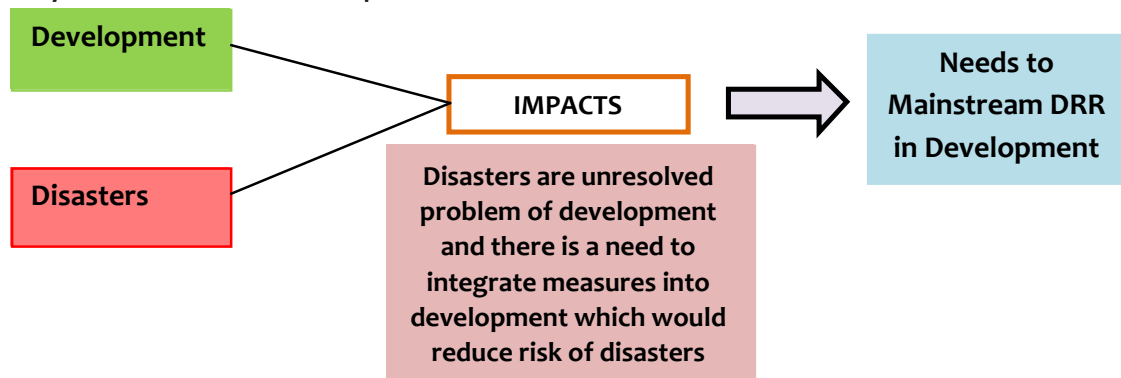
- Goals, Objectives and Targets	- Implementation/management arrangements
- Policies and strategies to be adopted to achieve the goals and objectives	- Sources of financing
	- Time frame

Why mainstreaming is necessary?

Disasters have an enormous impact on development. With every disaster, there is a significant impact on various sectors of development like agriculture, housing, health, education and infrastructure. This results in a serious social and economic setback to the development and poverty reduction priorities of the developing countries, and poses a threat for achieving the *Millennium Development goals*.

- Various findings indicate that poor people (usually rural population) are the most vulnerable to impacts of natural disasters.
- Local communities are rarely consulted or able to influence decision-making;
- The main objective of DRR mainstreaming into development planning is to reduce the vulnerability and create resilience at the local/community level.
- Lack of local human and financial capacities to deal with disasters.
- Protection of the population and key infrastructure;
- Ad hoc responses (short-term responses, uncoordinated processes, isolated projects, etc.) are NOT a solution.
- Mainstreaming DRR will facilitate in identifying a comprehensive all hazards and all agency approach by achieving a balance between preparedness, awareness, relief and response.
- All levels of the government apply effective corporate governance and are committed to continuous improvement of policy, programs, practices and service delivery to improve community safety.

Why Mainstream DRR in development?



What does Mainstreaming Include?

Some of the strategies outlined include;

1. Identify, support and resource research priorities.
2. Capture lessons learned to develop policies and manage research allocation framework.
3. There is also a need to establish a knowledge management framework.
4. One can also translate knowledge into practice through review of plans and procedural systems and processes.
5. One can establish a formal relationship with the researchers to incorporate disaster management framework into effective policy and practice.

Basic Mainstreaming Approach

Mainstreaming from top-down:

- General awareness building
- Addressing adaptation concerns in new and existing national (and regional) development policies, plans and projects
- Working within key policy and planning “entry points”
- Working with key “enabling” figures (influential policy-makers, ministries, etc.)

Mainstreaming from bottom-up:

- General awareness building
- Revising existing local development projects and activities to address maladaptive elements
- Working within key local development “entry points”
- Working with key local development “enablers” (e.g., decision-makers, NGOs, vulnerable populations)

Identifying entry points in the development planning framework for mainstreaming DRR

Each of the stages in the planning framework serves as an entry point for mainstreaming DRR. This would include:

- National Development Plans and Poverty Reduction Strategy Papers
- Physical framework/Land use plans
- Development Plans at sub-national levels
- Processes related to implementation of plans; Investment Programming, Budgeting and financing, Project appraisal, Implementation, Monitoring and Evaluation
- Project cycle of individual projects
- Environmental policies and plans
- Sectoral policies, plans and programs

Creating an enabling environment for mainstreaming DRR

Following are some of the factors which would contribute towards creating an enabling environment for mainstreaming DRR into development:

Legislation provides the framework around which strategies to build risk reduction into development and reconstruction activities can be empowered. The law can be used to provide penalties and incentives by enforcing standards in construction, land use, tenants rights and by defining people's right during relief and reconstruction. Legislation can also empower agencies with new responsibilities for risk reduction or establish new bodies to advise or undertake risk reduction work. Budget lines as well as policy remits can be set by legislative acts. The legislative process should be constructive period for generating informed support for disaster risk reduction among the policy community and those who will be entrusted and implementation. (Pelling and Holloway, 2006)

Disaster risk management strategy to implement the legislative framework and to provide coordination and monitoring mechanism and arrangements. The strategy should involve stakeholders at all levels of government as well as the private sector, local communities and civil society. (Benson, 2009)

- Institutional arrangements and capacity for disaster risk management both at national and local level (Benson, 2009)
- Strengthening partnerships between various agencies thus ensuring horizontal and vertical linkages
- Finances available for implementing DRR measures/Budgetary considerations
- Political commitment (will) for DRR at the highest government levels and for support from the donor and development community is central to enabling the mainstreaming process.
- Setting disaster risk reduction goals and indicators: Capacity to monitor and evaluate disaster risk reduction initiatives, generate hard evidence on related inputs, outputs, results and impacts and learn lessons for the future is an essential component of the enabling environment for mainstreaming. (Benson, 2009)

Though it is realized that it is important to integrate DRR in all sectors, the following paragraphs provides brief description on ways of integrating DRR in some of the key sectors such as:

- | | | |
|---------------|------------------|------------------------|
| • Agriculture | • Infrastructure | • Education |
| • Housing | • Health | • Water and sanitation |

Advantages of having a national framework for mainstreaming DRR into development

- Better articulation of common objective for DRR and Development such as sustainable development/ safe development
- Better understanding of interdependency: risk assessment will reveal risks, planning will help prioritize investments and budgets, investment programming will drive resource mobilization if there are budget constraints
- Strengthening Horizontal linkages: multi-stakeholders talking of common risks result in complementary initiatives
- Strengthening Vertical linkages: from national to local

Group Work

- Each group looks into current development activities at Township level.
- Identify entry points for mainstreaming DRR into Township level development planning process in Myanmar and 'How' to integrate DRR.
- Group presentation and discussion.

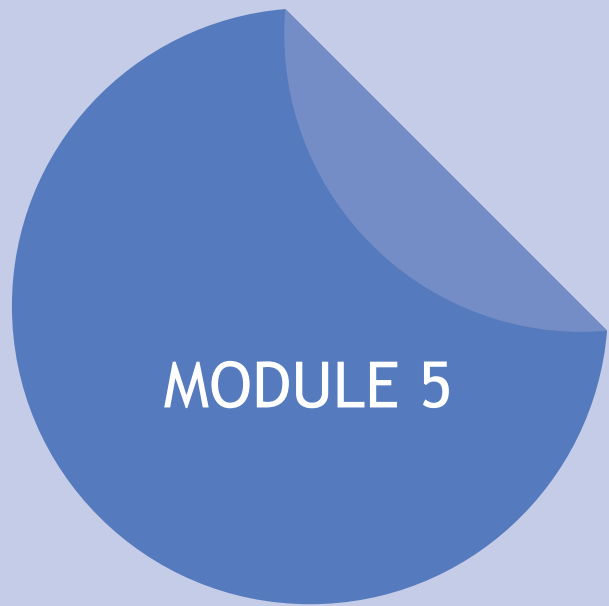
Take Away

After this session, you should be able to:

- Have common understanding on 'mainstreaming disaster risk reduction'
- Appreciate Mainstreaming DRR into Development planning in Myanmar
- Explore how DRR could be integrated into township development

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CROSS-CUTTING ISSUES IN DISASTER RISK MANAGEMENT

KEY CONSIDERATION FOR VULNERABLE GROUPS IN DISASTER RISK MANAGEMENT

At the end of this session you will be able to:

- Appreciate the special needs of the vulnerable groups in the context of Disaster Risk Management
- Identify measures to address these needs in the context of Myanmar

TRAINING CONTENT

Introduction

Disasters have different impacts on different populations. Accordingly approaches for risk reduction should be socially inclusive and address the different needs of the communities and especially cater to the most vulnerable in the community. The key cross-cutting issues to discuss are gender issues, people with special needs and highly vulnerable including elderly, people with disabilities and children. The discussion will cover considerations on how to effectively address particular needs of each specific vulnerable group, supportive measures to help them cope with adverse impacts of disasters and how to involve and optimize their participation in disaster management.

Children

Despite their dependency on adults and physical constraint, children could be one of active community members that contribute to effective disaster management. They could be engaged in disaster preparedness and be trained on appropriate skills for response to save their own lives and immediate families. Moreover, children could be medium of risk communication within the community as well as conveyor of knowledge and skills developed from various school-based such as safety tips, do's and don'ts for certain disasters to parents and other in their household, peer groups, and community members.

However, most often children's perspective, needs and capacities are neglected or taken for granted. Child-participation oriented DRR approach and various school-based DRR activities and other non-formal education activities have been adopted to address the issue to ensure children's perspectives on disaster risk, and their particular needs are heard and included in DRR projects and programs as well as their capacities.

Some DRR activities which cater to child-sensitive issues are:

- Awareness raising through essay and drawing competition, community campaign, child-forum on DRR and related issues which also provide opportunity for children to share their perspectives and realize their capacity to be an agent to reduce risk and promote safety culture.
- Child-friendly awareness raising materials and medium such as tales on hazards and disaster, stories, songs, comic books, cartoon billboard and leaflets, TV or radio series, etc.
- School curriculum has DRR integrated such as having frequent or important hazards at locality included in certain subjects at primary and secondary level to teach children on how to prepare and what to do in time of disaster, develop text book, teaching and learning materials for DRR curriculum and extra curriculum activities such as swimming lesson for highly flood prone area, evacuation drill.
- Promote and make school safer by school retrofitting, building codes for school facilities, plan and provision of equipments and necessary items available for emergency situation at school premise.
- Community disaster preparedness activities inclusive and sensitive to children's perspective and specific needs such as community risk assessment, preparedness for response, etc.

People with Disabilities

Disabilities can take many forms. Whilst there is no single agreed definition of disability, a person with disability may have difficulty moving, hearing, seeing, communicating and/or learning. The nature of the disability may be relatively mild or it could be more severe. People with Disabilities have the same needs and perform the same activities as other members of the community (eating, dressing, working, etc.).

However, Persons with Disabilities (PWDs) may need specific support related to their disability and their living environment. People with disabilities however, in common with the wider community, will not all have the same needs. Apart from specific needs determined by the specific nature of disability, people with disabilities will have differing social needs. Disabled men's and disabled women's needs will differ as will the needs of the elderly and the young.

Key Concepts

- People with disabilities are often disproportionately vulnerable due to societal or cultural constraints. These can include discrimination and exclusion from opportunities.
- It is often assumed that the needs of People with Disabilities need to be addressed by specialist organizations, outside of mainstream programming. This can exacerbate discrimination and exclusion.
- People with Disabilities are often excluded from processes. It is important for people with disabilities to be engaged fully in the CBDRR process to ensure their needs are addressed effectively. Involving People with Disabilities at all stages of CBDRR programming will ensure that their needs are addressed within mainstream programmes.
- Promoting awareness of special needs that may apply to People with Disabilities and improving overall 'Disability Confidence' will improve inclusion for People with Disabilities needs into CBDRR processes.

Specific additional assistance that a person with disability may require includes:

- Assistive devices, such as walking frames, wheelchairs etc.
- Carers
- Modified physical environment, such as specially designed housing, ramps etc. (This infrastructure is also vulnerable to disaster.)

In a disaster a person with disability may also require:

- Extra clothing, blankets etc (due to lack of mobility or poor circulation)
- Specific dietary requirements
- Alternative care arrangements if usual carer cannot reach them

Sources of Vulnerability

"Disasters don't discriminate people do" (World Disasters Report, 2007)

People with Disabilities are among the most vulnerable groups to disaster. This can be due to their disability itself and any special requirements that they may have, that can be interrupted in times of disaster, but also due to pre-existing social constraints. People with Disability tend to be disproportionately poor barriers, discrimination and exclusion from opportunities that they face in day-to-day life. Marginalized by laws, customs, practices and attitudes, in addition to having a difficult physical environment, they are excluded from educational and livelihood opportunities. Poor people have limited access to health care, shelter, food, education and employment, and are more likely to work in hazardous conditions - all factors that increase the risk of illness, injury and impairment. Discrimination and exclusion also make it much harder for people with disabilities to break out of poverty.

Persons with disabilities are doubly vulnerable to disasters, both on account of impairments and poverty; yet they are often ignored or excluded at all levels of disaster preparedness, mitigation and intervention. They are particularly at risk of marginalization and discrimination in such situations due to exclusionary policies and practices by communities and the agencies involved in providing humanitarian aid and intervention. People with Disabilities are often excluded from all levels of preparedness, mitigation, response and recovery. Policies, practices and procedures of both public institutions and humanitarian agencies are often not inclusive of people with disabilities. Disaster can also create more people with disabilities through injury.

Strengthening involvement of People with Special Needs in Community-Based Disaster Risk Reduction (CBDRR)

Ben Wisner (2002) found in his study "Disability and Disaster: Victimhood and Agency in Earthquake Risk Reduction" that there were three main ways that people with disabilities needs were met in relation to disaster. Firstly their needs were ignored and the people themselves were ignored. Secondly, what assistance was available was delivered in a Top-down way. This has been shown to be less effective than

community-based bottom-up schemes. Thirdly, schemes that invited the participation and input of people with disabilities. Of the three the third was by far the least common.

There are a number of practical recommendations that will not only do much to overcome the challenges relating to disability in all kinds of disaster contexts, but will also stimulate the kinds of attitudinal and institutional shifts that are ultimately needed to ensure their full inclusion in society and development. Persons with disabilities need to be actively engaged at all levels (national and international) of disaster and emergency planning, disaster risk reduction, and recovery and reconstruction projects. DPO capacity in disaster-prone countries needs to be strengthened, and included at all levels of planning, prevention and disaster risk reduction.

Inclusion of people with disabilities and their needs and concerns can be improved through:

- Actively engaging people with disabilities:
 - (a) through mainstreaming the needs of people with disability into policy development and
 - (b) inviting input from people with disability at local, regional and national levels
- Training of NGO and other staff in order to improve “disability confidence”. This will improve attitudes to people with disabilities and ensure that wherever possible their people with disabilities are included in mainstream, rather than specialist, programs.
- Dissemination of information regarding the needs of people with disabilities and also that people with disabilities are not one homogenous group who all need the same treatment.
- Recruitment of professional staff specialized in disability (e.g. physiotherapist, occupational therapist, Braille teacher, psychologist, etc.).

Disaster Impacts on Vulnerable Population

Women

- Disaster has differential impact on men and women
- More than 90 percent of 140,000 total deaths in 1991 Bangladesh Cyclone were women
- In case of Cyclone Nargis, 61 % of victims women.
- Some of the reasons for high death: Women’s restrictive clothes, customary inability to swim or climb trees and traditional roles as care-givers.
- Special needs of women such as accessible toilets, safety, reproductive and maternal health care are often forgotten in relief efforts.
- Many women are left out in the distribution of relief
- ‘Property-owner-centric’ approach in recovery and in patriarchal societies property owners are mostly male.

Key considerations to address

- Mainstreaming gender in preparedness and response which requires analyzing situations through a gender lens.
- Incorporating gender-sensitive strategies and initiatives in disaster management Plans, SOs, etc
- Gender segregated data in MandE of Disaster Management activities
- Active participation of women in decision making processes
- Putting system for protecting women from sexual violence and exploitation
- Use recovery as opportunity to empower women such as Joint ownership of assets (houses, boats) in the name of husband and wife.

Children

- Trauma-Prolonged anxiety and stress
- Orphaned Children
- Inheritance right to property and land of orphaned Child
- Child Abuse
- Children work but Contribution to livelihood not recognized
- No proper documentation in village of child being moved to institutions
- Vulnerabilities of non orphaned child as severe: especially those with unemployed parents

Key considerations to address ...

- Reducing trauma by encouraging the child to express and talk and facilitating their participation in disaster, relief and recovery.
- Setting up of orphanages and Institutionalization of Children should be the last option for affected children. Initiatives to support to surviving family members and relatives to help maintain themselves and the child are preferred.
- Identify informal care systems that exist in the community for e.g. relatives or neighbors taking care of children.
- Priority must be given to family reunification in the case of separated children
- Protect children's inheritance right to land and property, and administration hereof by legal guardian until the child reaches maturity.
- Special efforts to prevent abuse in camps and families.

Aged People

- Age discrimination, not recognizing old people as vulnerable.
- Not being included in Relief activities and Reconstruction need assessment. A lack of consultation means older people excluded from livelihood rehabilitation programme and more dependent either on their family or on government.
- Property Rights
- Exclusion from credit and income generation programs which exacerbates their isolation.
- Social protection
- Poor health, have lost medical histories, spectacles and walking aids
- Trauma and stress

Key considerations to address

- Recognize old people as vulnerable, take care of their lack of mobility and health problems.
- Recognize old people as experienced capable, and active contributors to family life and livelihood.
- Include them in decision making, encourage them in taking up roles and task achievement
- Restoration of lost property records is an urgent need
- Ensure that special needs of elderly people are catered during disaster preparedness and response
- Link people up with their families and loved ones.
- Include them in credit and income generation programmes.

People with Disability

- Lack of mobility, ability to express themselves, make them more vulnerable
- Lack of mobility often do not allow relief to reach them
- Exclusion from livelihood programs makes them burden to the families
- Social protection
- Poor health, have lost medical histories, walking aids and wheel chairs
- Trauma and stress

Key considerations to address ...

- Recognize physically challenged as vulnerable, take care of their lack of mobility and health problems.
- Include them in decision making, encourage them in taking up roles and task achievement
- Reconstruction design should incorporate mobility of physically challenged for e.g construction of ramps in houses
- Special design features for the paraplegics after a disaster like earthquake
- Include them in credit and income generation programmes so that they do not become a burden to the family

Take Away

After this session, you should be able to:

- **Appreciate the special needs of the vulnerable groups in the context of Disaster Risk Management**
- **Identify measures to address these needs in the context of Myanmar**

Additional readings/references

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session
5.2

GROUP WORK ON DISASTER AND VULNERABLE GROUPS

At the end of the session, you will have better understanding of:

- Key consideration for Vulnerable Groups in Disaster Risk Reduction and able to plan actions accordingly in response to the specific needs of each group.

Group Work

- Each group can select one situation
 - Women and Disaster: Earthquake
 - People with Disability and Disaster: Earthquake
 - Children and Disaster: Earthquake
 - Aged People and Disaster: Earthquake
- Each group should identify
 - Vulnerabilities and special needs
 - Measures to address them of the target group **in context of the given disaster**
- Each group makes a presentation on the results

At the end of the session, the you should be able to:

- Understand Concept and Essential Elements of CBDRM
- Understand six-step Process involved in adopting CBDRM
- Appreciate example of CBDRM initiatives in Myanmar

Key points covered *CBDRR Concept, Essential Elements, Six-Step Process of CBDRR, Outcomes and Key Indicators of disaster resilient community*

TRAINING CONTENT

Introduction

Whether a disaster is major or minor, of national or local proportion, it is the community who suffers most from its adverse effects. Community members use coping and strategies to face and respond to the disaster situation, even before outside help from the government or non-government agencies arrives. Having experienced damage and loss, communities are keen in protecting themselves from harm and suffering through disaster risk reduction.

The application of community based approach in disaster risk management also complements the top-down and traditional aid approach. While the top-down and traditional aid approach might focus on provision of aid or delivering of relief services to the affected communities and overlook communities' capacities, the CBDRM realized the potential of local capacities and resources as well as the proactive roles of communities to adopt coping mechanisms and enhance community resilience.

Community-Based Disaster Risk Management

Whatever the scale of hazards, big or small, it is the community that either suffers the devastation or survives from hazards effects. The community is the first to be affected and, as such, also becomes the first/initial responders who manage the emergencies at the household and at the community levels. By managing emergencies well, it prevents the escalation of these emergencies into disasters. But more than this, local communities take measures to manage risks long before the hazards strike.

CBDRM Concepts

Creating Resilient People in Resilient Environments

CBDRM is an approach and process of disaster risk management in which at risk communities are actively engaged in the identification, analysis, treatment, monitoring and evaluation of disaster risks in order to reduce their vulnerabilities and enhance their capacities. This means that people are at the heart of decision making and implementation of disaster risk management activities. The involvement of the most vulnerable is paramount and the support of the least vulnerable is necessary.

Simply put, the aim of CBDRM is to reduce vulnerabilities and strengthen people's capacity to cope with hazards. A thorough assessment of the community's hazard exposure and analysis of the specifics of their vulnerabilities as well as capacities is the basis for activities, projects and programs to reduce disaster risks. Because the community is involved in the whole process, their felt and real needs as well as inherent resources are considered. There is more likelihood that community problems will be addressed with appropriate interventions.

Why CBDRM?**Applying lessons in CBDRM from Development Practice on the bottom-up approach vs. the top-down approach:***Practical considerations*

- Nobody can understand local opportunities and constraints better than the local residents themselves;
- Community is the first responder in any disaster.
- Nobody is more interested in understanding local affairs than the community whose survival and wellbeing are at stake;
- People are the country's most abundant and valuable development resource, which should be harnessed and developed.

General elements of the bottom-up approach

- Local people are capable of initiating and sustaining their own community development.
- While role of government, private sector and NGOs are important, the primary requirement for grassroots development is local leadership and local responsibility.
- A successful bottom-up strategy will include broad-based local participation in comprehensive planning and decision-making, activities that promote motivation.
- Educational opportunities should correspond to identify local needs.
- It addresses different vulnerabilities and capacities of different individuals, families and groups in the community.
- It focuses to enhance capacities and resources of most vulnerable groups and reduce their vulnerability.
- Responsible utilization of outside financial assistance is required.
- CBDRM brings together the many local communities and other stakeholders for disaster risk management to expand its resource base.
- Replication of a community's success is a powerful factor in continuing local initiative.
- Responsibility for change rests with those living in the local community.
- Sustainability of the CBDRM interventions as community is the key actor as well as the primary beneficiary of the disaster risk management process.

Essential Features and Elements of CBDRM

Experiences in the implementation of CBDRM point to these essential features:

- *Centrality of the role of the community disaster management.* The focus of attention in disaster management is the local community. The CBDRM approach recognizes that the local people are capable of initiating and sustaining their own development. Responsibility for change rests with those living in the local community.
- *Disaster risk reduction is the aim.* The main strategy is to enhance capacities and resources of the most vulnerable groups and to reduce their vulnerability in order to avoid the occurrence or lessen the impact of disaster in the future.
- *Recognition of the link between disaster risk management and the development process.* CBDRM should lead to general improvement in people's quality of life and of the natural environment. The approach assumes that addressing the root causes of disasters, e.g. poverty, discrimination and marginalization, poor governance and bad political and economic management would contribute towards the overall improvement of the wellbeing and quality of life of people and of the environment.
- *Community as the key resource in disaster risk reduction.* The community is the key actor as well as the primary beneficiary of the disaster risk reduction process.
- *Application of multi-sectoral and multi-disciplinary approaches.* CBDRM brings together the community members, community groups, local as well as national stakeholders to expand its resource base for disaster risk reduction.
- *CBDRM as an evolving and dynamic framework.* Lessons learned from practice continue to build into the theory of CBDRM. The sharing of experiences, methodologies and tools by communities and CBDRM practitioners continues to enrich practice.
- *CBDRM recognizes that different people have different perceptions of risk.* Specifically, men and women, adult and children who may have different understanding and experiences in coping with risk may have a different perception of risk and therefore may also have different views on how to reduce the risks. It is important to recognize these differences.
- *Various members and groups in the community have different vulnerabilities and capacities.* Different individuals, families and groups in the community have different vulnerabilities and capacities. These

are determined by age, gender, class, occupation/sources of livelihood, ethnicity, language, religion and physical location.

Closely related to the above mentioned features, the following elements also serve as overall targets to work for and parameters/indicators to keep track of in CBDRM.

- *Participatory process and content*: involvement of community members, particularly the most vulnerable sectors and groups in the whole process of risk assessment, identification of mitigation and preparedness measures, decision making, implementation; the community directly benefits from the risk reduction and development process
- *Responsive*: based on the community's felt and urgent needs; considers the community's perception and prioritization of disaster risks and risk reduction measures so the community claims ownership
- *Integrated*: pre-, during and post-disaster measures are planned and implemented as necessary by the community; there is linkage of the community with other communities, organizations and government units/agencies at various levels especially for vulnerabilities which the local community can not address by itself
- *Proactive*: stress on pre-disaster measures of prevention, mitigation and preparedness
- *Comprehensive*: structural (hard, physical) and non-structural (soft, health, literacy, public awareness, education and training, livelihood, community organizing, advocacy, reforestation and environmental protection, etc) preparedness and mitigation measures are undertaken; short-, medium- term and long-term measures to address vulnerabilities
- *Multi-sectoral and multi-disciplinary*: considers roles and participation of all stakeholders in the community; combines indigenous/local knowledge and resources with science and technology and support from outsiders; addresses concerns of various stakeholders while upholding the basic interest of the most vulnerable sectors and groups
- *Empowering*: people's options and capacities are increased; more access to and control of resources and basic social services through concerted action; more meaningful participation in decision making which affects their lives; more control over the natural and physical environment; participation in CBDRM develops the confidence of community members to participate in other development endeavors
- *Developmental*: contributes to addressing and reducing the complex relation of conditions, factors and processes of vulnerabilities present in society, including poverty, social inequity and environmental resources depletion and degradation

Six-Step Process of Community Based Disaster Risk Management

The goal of CBDRM is to transform vulnerable or at-risk communities to be safe, disaster resilient and developed communities. Although steps may vary from community contexts and organizational mandates, the process for community based disaster risk management can be generalized as follows:

6-Step CBDRM Process

- | | |
|---|--|
| 1. Selecting the Community | 4. Participatory Risk Management Planning |
| 2. Building Rapport and Understanding the Community | 5. Community Managed Implementation |
| 3. Participatory Community Risk Assessment | 6. Participatory Monitoring and Evaluation |

1. Selecting the community

How does a community start with disaster risk management?

Presently, NGOs, disaster management agencies, the government and other intermediary organizations such as national or regional level people's organizations play a key role in initiating the process of Community Based Disaster Risk Management. They either respond to requests coming from vulnerable communities or select at-risk communities where disaster risk management programs should be prioritized. Criteria for their selection of at-risk communities may include the following: most disaster prone area, most vulnerable to a particular hazard, least served by the government and/or NGOs, additional consideration such as possibility of replication or spread effects of the program to neighboring communities, presence of existing development projects or community partners.

In some cases, several community members or an organization in the community approaches an intermediary organization for assistance after experiencing a disaster or in preparing for an impending disaster threat.

In order to make sound decision to select the community, a set of criteria should be developed. Some suggestive criteria are:

- Severity of the community's exposure to risk (most vulnerable community)
- Accessibility of the community
- Number of people to benefit from the program
- Safety of the project team
- Readiness of community to engage in the program
- Lack of safe shelters

Using matrix ranking, decision makers can make better decisions on community selection.

In many instances, an impending disaster threat can be turned into an opportunity to start a community-based disaster risk management program. When the knowledge, skills and experiences in disaster risk reduction which are in communities are systematized and disseminated, surely there will be more community-to-community sharing on how to get started and implement Community Based Disaster Risk Reduction.

2. Building rapport and understanding the community

Outsiders who support the community in disaster risk management need to build a picture of the nature, needs and resources of the community. This step usually involves building rapport/trust with the community through integration with them and gathering basic information to have a general description and understand of the community. This step will lead to open sharing about issues, problems, concerns and solutions as well as help in better understanding of the local culture, way of life, economic and social context of the community, which is the essential component of CBDRM process.

How to Socialize with the Community

- Staying in the community and identifying oneself with it.
- Informal meeting with village Head, Youth Club, Women Association, etc.
- Door-to-door informal meet with community
- Being transparent and open about who they are and what is being done
- Participating in daily life in the community, cultural events and community activities
- Listening to local people about their lives, issues and problems
- Learning new skills from local people

An understanding of the community's development position and the context upon which disasters will impact includes the following basic elements:

- Social groups
- Cultural arrangements
- Economic activities
- Spatial characteristics
- Vulnerable households and groups

How to Understand the Community

Social groups

- What are the main ethnic groups, class and religion in the community?
- Who is in the majority, who is in the minority, what is the nature of their relationships?
- Status of women?

Cultural arrangements

- How are the family and community level structures organized?
- What hierarchies exist?
- What are the common ways of behaving, celebrating, and expressing?

Economic activities

- What are the major livelihood sources (e.g. fishing, agriculture, livestock, etc) and what are the associated activities that people carry out?
- What is the division of labour?
- What is the relationship between livelihood activities and seasonality?

Spatial characteristics

- What are the locations of housing areas, public service facilities (e.g. primary/middle schools, pagodas, sub-rural health center, station hospital and evacuation centers), agricultural land etc.?

Vulnerable households and groups

- Who might be the most vulnerable groups or households, given the locations of their houses, sources of livelihoods, ethnic and cultural positions, etc?

3. Participatory Community Disaster Risk Assessment (PDRA)

Community risk assessment is a participatory process to identify the risks that the community faces and how people overcome those risks using local knowledge and resources. The Participatory Community Risk Assessment unites the community in common understanding of its disaster risks, the size of its problem as well as the resources and opportunities involved are identified and analyzed.

Community Risk Assessment has four components as follows:

- *Hazard assessment* - determines to likelihood of experiencing any natural or human-made hazard or threat in the community. Assessment includes the nature and behavior of each of the hazards the community is exposed to
- *Vulnerability assessment* - identifies what elements are at risk and why they are at risk (unsafe condition resulted from dynamic pressure which is consequences of root or underlying causes).
- *Capacity assessment* - identifies the people's coping strategies, resources available for preparedness, mitigation and emergency response; who has access to and control over these resources
- *People's perception of the risks* - is the subjective judgment that people make about their characteristics and severity of risk. It also explains why people make different estimates of the danger and decisions to avoid, reduce or accept. Understanding people's prioritization of risk is necessary component of coming to a common understanding of disaster risk in the locality as basis for appropriate and adequate risk reduction measures which are owned by the affected population and communities.

A community is not homogeneous. Few formal leaders, or community figures may not represent the community as a whole, hence sample should be from

- Differences of class
- Gender
- Ethnic groups
- Age
- Religions
- Disabilities/PWDs

Various commonly used tools for PDRA are:

Hazard Map (A) - to identify areas at risk from specific hazards and the vulnerable members of the community and identify available resources that could be used in community disaster risk management

Historical Profiles (B) - to learn what are the disaster events that happened and other significant events in the community



A



B



C



D



D

Seasonal Calendar (C) - to depict seasonal activities, hazards and disasters. The seasonal calendar contains information about seasonal changes and related hazards, diseases, community events, livelihood related activities (start of cropping season, harvesting, fishing season, etc) and other information related to specific months of the year.

Institution and Social Network Analysis (D) - use of pictorial representation to identify different individuals, groups and organizations associated with the community, degree of relationship (close or distance), influence or level of support received from, etc

Ranking (D) - to know the priorities of community members or the most significant problems faced by the community

Transect Walk - involves walking in the community following certain path or direction and draw a map to get a picture of community vulnerability and resources

Livelihood Analysis - to analysis various aspects of livelihood in the community such as timeline for certain livelihood activities, vulnerabilities and capacities

Focused-group discussion - to cross-check the results derived from other tools, as well as to have detailed discussion with particular group of community members such as elderly, households in the most vulnerable location, etc. to get the insight understanding on their perception of risk, particular needs and other related issues.

Summary of Steps for PDRA

Objective	Outputs
Describe hazards in the community	List the nature of hazards
Conduct hazard mapping	Community hazard and resource map
Describe vulnerabilities and capacities of community (women, men, old people, physically challenge, etc.)	Capacities Vulnerabilities Analysis
Determine disaster risks	Comprehensive list of risks faced by the communities
Rank disaster risks	Prioritized list of risks
Decide on acceptable level of risks	Agreed levels of risk for family and community security
Decide whether to prevent, reduce, transfer, or live with the disaster risk/s	Agreed activities

The result of the PDRA will be used to develop community planning including identification of adequate, appropriate and effective risk reduction measures at community level.

4. Participatory Disaster Risk Management Planning (Action Planning)

The Community Disaster Risk Management Plan unites the community (and with other stakeholders) in commitments and actions to reduce disaster risks. The plan is the blue print, road map, or guide in changing or transforming their at-risk community to become a disaster resilient community through various preparedness and mitigation measures.

Participatory Disaster Risk Management Planning is a process where all parties propose concrete risk reduction measures based on the following:

- Vision of their ideally prepared and resilient community
- Determining the acceptable level of risk
- Decision as to whether identified risk can be prevented, reduced, transferred or lived with
- Their own capacities and other resources that can be generated outside of their community.

These measures are not necessarily big projects. The important point is to start off the risk reduction process through community mobilization based on existing capacities and resources within the community's immediate reach.

Overall objectives and strategies are translated to operational plans and activities. The people, timetable, resources within and outside the community needed to turn the intent of the plan into reality are identified. Community targets in undertaking preparedness and mitigation measures in terms of particular capacities increased and vulnerabilities decreased are also identified.

At the planning stage, agreements with intermediary organizations are formalized regarding their supports in the risk reduction plan implementation and their expectations/requirements for resources, which they commit to mobilize. Outsiders are usually expected to assist the community in the following areas:

- Community capacity building through training and education activities and materials;
- Resource mobilization to supplement the community's efforts to generate resources to realize the risk reduction plan;
- Facilitate linkages with concerned government agencies and NGOs for access to information, resources, etc.

Example of simple template for Community DRM Plan

Community Disaster Risk Management Action Plan

The community may not be able to formulate an elaborate Disaster Risk Management Plan. However, the community is able to document the results of the Participatory Disaster Risk Management Planning into a Community Disaster Risk Management Action Plan format.

Community Disaster Risk Management Action Plan

(July - December 20.....)

Hazards:

Objectives:

Element at Risk	Activities	Schedule/ Timetable	Responsible			Resources	Support Agencies	Completion date
			Organization	Committee/ Task Force/ Action Team	Person			

Note: If doing the action plan for several hazards, do the action plan for each hazard first, then organize into a multi-hazard action plan.

5. Community Managed Implementation

The formation and/or strengthening of a community disaster management machinery is usually helpful in the implementation of the risk reduction plan. *The Community Disaster Risk Management Plan will just remain on paper or in the minds of those who participated in the planning activities, if there is no group/s of people, organization or team at the community level to put the plan into practice.* A wide range of organizational arrangements - a so called Community-Based Organizations or CBOs - to be set up to undertake implementation of the activities indicated in the plan include the following:

- Committee of an existing community organization
- Village Disaster Management Team, a community organization
- Disaster Management Taskforce
- Search and Rescue Group
- Project management committee
- Network of community organization
- Volunteer Group for disaster management, etc.

Formation and organizational development of CBOs could be facilitated to enhance the followings:

- People's participation and consensus building to be encouraged
- Simple organization structure, clear and practical
- Keep scale of activities small and do-able and expand activities later
- Define roles, responsibilities and functions for pre, during and post disaster
- Appropriate tasks assigned to responsible committees, sub-committees, volunteer teams, etc.
- Gender distributions in activities/tasks assigned

This core groups/teams usually motivate the community through the translation of plan objectives and targets into disaster management activities. This group also leads in monitoring the progress of plan implementation, necessary adjustment of targets and plans when necessary to keep on course with set objectives to reduce vulnerabilities and increase capacities in the immediate and long term.

Capacities building of CBOs aims to enhance understanding on responsible activities, expected roles and functions as well as to increase skills in operations. Trainings and other activities could be carried out to serve the purposes such as

- Training for Preparedness and Emergency Response
 - Search and rescue
 - Community first aid
 - Relief coordination and distribution
 - Emergency shelter management
 - Evacuation management
 - Warning dissemination
- Training on Risk Reduction
 - Designing and conducting risk communication
 - Designing local early warning systems
 - Structural mitigation
 - Livelihood sustainability

Management skills building such as skills for facilitating meetings, planning and assessment, financial management, conflict resolution skills, etc.

Key Considerations for Community-Managed Implementation

- Ensure the effectiveness and timely implementation of CBDRM actions
- Enhance engagement of stakeholders - ways to harness the support of those in favor of local and community-based disaster risk reduction while managing the risk posed by stakeholders against local and community based disaster risk reduction
- Using Resource Analysis, strategies and intervention for Resource mobilization - human, equipments, vehicles, local capacities, network, partnership, organization

6. Participatory Monitoring and Evaluation

Monitoring is the continuous or periodic review to ensure that input deliveries, work schedules, target outputs and other required actions are proceeding according to the plan.

Evaluation is an assessment of the results and effects of the project/activity focusing on outputs (or - the immediate results the disaster risk management project achieves), to what extent objectives have been met, and especially on impact, and concerned with long term outcomes. (Impacts or Outcomes - the significant or lasting changes in people's lives brought by a given action or series of actions)

For DRM activities, evaluation is concerned with the effects of the risk management measures in terms of reducing the vulnerability situation of the community, considered against the inputs (human, financial and technical resources deployed for disaster risk management). If vulnerability has not been significantly reduced, the reasons for this are analyzed. The significance of building on existing capacities and those which have been actually increased are also analyzed.

It is concerned with the difference the results of the risk reduction measures have made to the community situation and its overall quality of life. Lessons are drawn and best practices are shared with other groups and communities to promote the CBDRM framework and strategy.

Outcomes of the CBDRM Process

The CBDRM process should lead to progressive improvements in public safety, community disaster resilience or resistance, and equitable and sustainable community development.

While respecting diversity of community based approaches in disaster risk management, key indicators, standards or benchmarks for successful CBDRM process and outcomes have been developed by about 25 NGO leaders in 2006 as part of the Partnership for Disaster Reduction South East Asia project (PDR-SEA3) undertaken by ADPC and UNESCAP with DIPECHO support.

Related key outcomes of the CBDRM process are as follows:

1. *Community Based Organization* - To establish, strengthen and sustain an organizational mechanism at the community level to implement CBDRM activities. This CBO will be comprised of local residents in the community.
2. *Community Disaster Risk Reduction Fund* - To ensure availability of resources for the implementation of community disaster risk reduction and preparedness measures.
3. *Community Hazard, Vulnerability, Capacity Map (HVCM)* - To form the basis for community based disaster risk reduction and community learning.
4. *Community Disaster Management Plan* - To ensure collective action by community for disaster risk management through mobilization of local resources.
5. *CBO Training System* - To enhance the technical and organizational capability of the community based organization and its committees on community first aid, search and rescue, evacuation, relief operations management, emergency shelter management, damage and needs assessment, and safer construction.
6. *Community Drills System* - To ensure the readiness of communities for disaster response.
7. *Community Learning System* - To enhance the understanding of individuals, families and communities about hazards, disasters, vulnerabilities, risk reduction and preparedness.
8. *Community Early Warning System* - To contribute to the safety of the community through facilitating precautionary measures.

Take Away

After this session, you should be able to:

- Understand Concept and Essential Elements of CBDRM
- Understand six-step Process involved in adopting CBDRM
- Appreciate example of CBDRM initiatives in Myanmar

Check your learning:

1. Select the correct words for the following sentences:
 - 1.1 Which of the following is not a characteristic of CBDRM
 - (a) Inclusiveness of various stakeholders
 - (b) Cater and responsive to different vulnerabilities and capacities of individuals, families and groups in the community
 - (c) CBDRM project implementation is completely dependent on external resource mobilization
 - (d) Community empowerment through various capacity building activities
 - 1.2 For rapport building and understanding the community, which of the following elements is to be considered
 - (a) Economic activities
 - (b) Spatial Characteristics
 - (c) Vulnerable households and groups
 - (d) All of the above
 - 1.3 The first step to conduct CBDRR is.....
 - (a) Participatory Risk Reduction Planning
 - (b) Community Managed Implementation
 - (c) Selecting the Community
 - (d) Community Organization set-up
 - 1.4 Participatory Community Risk Assessment (PCRA) identifies the community's.....
 - (a) Perception of Risk
 - (b) Hazard and Vulnerability
 - (c) Local Capacities
 - (d) All of the above

2. Check whether the following sentences are True or False.

- 2.1 CBDRM process only focuses on emergency response and relief.
- 2.2 CBDRM is multi-sectoral and multi-disciplinary, hence supports and participation of various stakeholders is to be pursued.
- 2.3 Local capacities and local resources are essential for implementation of CBDRM activities.
- 2.4 Community participation and community empowerment is one of the key elements for the success CBDRM.
- 2.5 Several tools should be used for PDRA rather than attempting only single tool.

3. Explain the following terms.

3.a The aim of CBDRM

.....

.....

.....

3.b Mention 4 essential elements of CBDRM

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3.c Steps in Rapport Building

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3.d Mention 3 outcomes of CBDRM Process

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4. Please mention two key learning's from this session

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.....

Correct answers of check your learning Exercises

- 1. 1.1 (c) CBDRM project implementation is completely dependent on external resource mobilization
- 1.2 (d) All of the above
- 1.3 (C) Selecting the Community
- 1.4 (d)All of the above
- 2. 2.1 False 2.2 True 2.3 True 2.4 True 2.5 True

Additional readings/references

- ADPC (2011) *CBDRR 20 Participants Workbook Module 4*.
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By I.Abarquez and Z. Murshed.
- ADPC and UNESCAP for PDRSEA3 (2006) *Critical Guidelines Community-Based Disaster Risk Management*.
- Ariyabandu, M. (1999) *Defeating Disasters*. Intermediate Technology Development Group, Sri Lanka on behalf of Duryog Nivaran: Colombo.
- AUDMP ADPC, *Safer Cities 2, Coping with flood in Cambodian communities*.

At the end of the session, you will be able to:

- Understand roles of Health Sector in Disaster Management
- Understand management on Public Health aspect at camp and hospital

Key Concepts *Most common health consequences of Disaster are: Serious threat to the health status of the community, more casualties or patients in number and the loss of services, which prevent a healthcare facility from continuing to care for its patients.*

After a massive disaster the quantity and severity of injuries will overwhelm the handling capacity of health facilities

TRAINING CONTENT

Introduction

Disaster overwhelms local resources and threatens the function and safety of the community. The physical effects of a disaster are usually obvious. Tens or hundreds or thousands of people lose their lives. The survivors suffer pain, injuries and disability. Homes, workplace, livestock and equipments are damaged or destroyed and infrastructure failure (electricity, telephones, water, gas, roads, etc.).

While the infrastructural damage from disasters is greatest in industrialized countries, more than 95% of all deaths caused by disasters occur in developing countries. Infants and young children are more vulnerable to various diseases and malnutrition leading to high morbidity and mortality unless immediate action is taken.

Documents and Framework of Health Sector in Disaster

- Regulatory Frame Work 'Standing Order on National Disaster Management, 2009'
- Institutional Frame Work
- Committee/sub-committee at township level
- Disaster Management centre
- Technical Task Committee
- NGOs, CBO, GPs

Main Activities of Health Sector in Disaster Response

- Mobilization and/or deployment of manpower to emergency sites/different wards including for PH
- Evacuation - patients, hospital equipments, important records, families, etc.
- Search and rescue - Rescue of victims in collaboration with relevant organization; Transportation of patients to hospital/ treatment sites; Proper registration of victims; grading of severity of patients; Health care for evacuees in temporary shelters/camps
- Safety and security
- Assessment of needs and request to S/D, Central level if necessary
- Camp management on Public Health aspect
- Dead body certification (with police) and burial services
- Communication network and daily reporting

Management on Public Health aspects at camps

- Water safety and supply including drinking water
- Drinking water supply should be planned for long term use
- Food Safety for adults and infants- relief food items are not suitable for infants
- Quality of food
- Latrine-Lift up the latrine holes, Pump out excretion
- Proper sanitary disposal of waste and refuse.
- Prevention and control of epidemics
- Gender based health care
- First aid services and treatment of minor illness
- Recording and reporting of damaged health facilities and equipment
- Sexually Transmitted Diseases in camp
- Mobile clinics (depending on type of disaster), mobile public health services

- Health education and moral support
- Capacity building of volunteers (CHW, AMW)
- Vector borne diseases control (fogging, fumigation)
- Immunization and vaccination (measles)
- Restoration of existing health services delivery
- Psycho-social support in pre- and post-disaster
- Post-camp management

Factors Influencing Health

1. Overcrowding and poor shelter: Increasing risk of rapid spread of diarrhoeal disease and measles; malaria and ARI, risk of hypothermia in infants.
2. Poor sanitation, hygiene and contaminated water supply: Lack of soap and water and clean protected container to carry them.
3. Animals: During such upheavals, even animal populations are displaced and they rush to human habitations carrying with them diseases.
4. Generation of extra waste: Remains of the relief rushed to the affected areas generate extra waste, e.g., plastics, bottles, cans, used food packets, papers, clothes etc.
5. Disposal of dead bodies: Dead bodies could be invisible under the mass rubble and such structures and fast decompose.
6. Inadequate food supply and storage: This increases the risk of malnutrition and susceptibility to infectious illnesses. Food may be contaminated with fungus and bacteria; or may be rotten and fermented.
7. Vulnerability to physical injuries: Especially in children, elderly persons and pregnant mothers
8. Social, emotional and psychological problems: family separation, displacement, violence or abuse and personal loss of lives and livelihoods
9. Lack of financial resources at personal level: Loss of living place and working place, physical disability, loss of earning member of family etc. lead to inability to spend on health

Rehabilitation

Rehabilitation is the action taken in the aftermath of a disaster to enable basic services to resume functioning, assist victims with self-help efforts to repair physical damage and community facilities, revive economic activities and provide psychosocial support to survivors.

- Water supply
- Waste disposal
- Public Health
- Roads and transportation
- Power supply
- Communications etc.

Experience sharing of Nargis Affected People in Mawlamyaing-gyun

- Identify only one entry point to the town. (jetty)
- First aid care was attached to entry point, service run by health sector and Red Cross.
- Registered the affected people and send to pre-determined camps together with list of people. Red Cross took care of sending the people to camps.
- At the camp - Name of camp, no. of people village wise was wrote on the board. Up dated day by day. Representative from each village was identified. Easy to manage to the villagers through these representatives.
- Most of the camps are monastery, school, rice-mill.
- Hospital management - ward assignment, SandE, sanitation, admission/ DC policy, meal, emergency operation.
- Collaboration and coordination with other sectors, NGOs, CBOs.
- Regular township level coordinated health meeting (chaired by TMO) - Who is doing What? Where? How? - to avoid overlapping, supplementary to each other.
- Mobilization of volunteers for treatment of minor illness at the village level (e.g., flood, cyclone)

Hospital

- Many patients at the hospital. No proper OPD place. In patients - mostly the whole family stay within the hospital. Congested. No one wants to get DC from hospital.
- Most common diseases - Injury/trauma, Gastritis, general illnesses related to mental trauma, Birth asphyxia. Later, cases became more medical. Hypertension is one of the common NCDs in this geographical area. New TB cases were detected from OPD.
- Most common surgery - orthopaedic cases, CS (Caesarean Section).

Hospital Administration

- Man power - mobilize from other areas arranged from central level.
- Some role conflict - Specialist AS, ASs from other areas, not wanted to take night duty. But their team work was good. Need proper instruction/guideline from central level before leaving from Yangon.
- General environmental sanitation was done by mobilizing the patients' attendances. Proper sanitation (cutting trees, removing trees/destroyed roof, etc) was done by Army persons. It was difficult to maintain environmental sanitation.
- Meal was provided by well-wishers to all in - patients and their attendances. Later, it was not allowed by local authority. They categorized the patients as Nargis affected and non-Nargis affected depending on geographical area and nature of disease and then provided the meal only to the Nargis affected people.
- One water-purification plant was established by local authority.
- Damaged parts of the hospital were repaired by one company with the arrangement of local authority.

Health care services by Ship during distribution of food and clothes

- Services need daily for common health problems - dressing of wounds, treatment of water, and treatment of minor illness like diarrhoea/dysentery, common cold/ ARI, care of feet. - provision of some medicine and dressing materials after short duration training to volunteer. (VHW, village leader, teacher, retired HA, some knowledgeable person)
- Provision of clean delivery kits to nearly full term pregnant women.
- Findings - reached to larger villages, distribution of nutritious biscuits without explaining the value. (not accepted by community to eat because of taste and hard), distribution of food/clothes according to their procedure - take time, some need clothes immediately (some children presenting with chill and rigor, cold and clammy, cyanosis waiting to get the clothes under the rain - hypothermia)

Supplies and Equipment

- First few days - electricity was run by generator especially for operation.
- X-Ray machine was repaired within 2 weeks from CMSD.
- Drugs and equipment were not registered in time because of huge amount and no experiences of handling it. Mainly managed by compounder.
- TMO did not provide the available drug list to health care providers (Specialist, MO)
- Specialist requested 3rd generation drugs especially antibiotics although 1st generation drugs were available for some items. Sometimes - directly requested to local commander.
- Although BP cuff and stethoscopes were available in the store, these were not issue to wards. Only one set of BP cuff and stethoscope was used for the whole hospital as usual.

Disease Control Activities

- Severe diarrhea/dysentery, DHF, Tetanus were identified as surveillance diseases related to Nargis.
- All possible diarrhea outbreak areas were identified and environmental sanitation measures were under taken by public health teams.
- Mass chlorination was done in these areas after advocacy meetings with ward authorities and mobilization of community.
- Those villages from which Tetanus case was admitted to the hospital were identified as Neonatal tetanus risk areas and provided clean delivery kits to these villages.

Coordination

- Coordination meetings were conducted with specialist team and local health staff for technical issues and administrative issues.
- Following points were instructed to TMO.
 - Plan to no interruption of drugs supply to leprosy/TB patients.
 - Revitalization of RHC/sub RHC functions.
 - To contact BHS staffs who are working at the villages.

The following information should be obtained from national, United Nations, international and nongovernmental organizations working in the affected area.

- What is the existing local response capacity?
- What is the presence and activities of international or local organizations?

- Who is in charge of coordinating health, water and sanitation activities?
- Who supplies which services in these sectors?
- Who coordinates food delivery to the area and its distribution to the affected populations?
- What have they achieved to date?
- What are the additional needs in terms of financial and material resources, and of implementation capacity?
- What are the priorities for immediate action?

Referral of patients

- Referral of patients to tertiary hospital (Yangon) was done in coordination with local authority for transportation and through direct contact with central office for reception of patients.

Evacuation of camps and post camp-evacuation Management

- Evacuated the people on 8 May 2008. (too early). (Wakhaema, or their residential villages)
- No idea on post camp-evacuation management on health aspect.
 - cleaning of campus, cleaning of water containers, removal of waste (fly-louse were found under the waste)
 - Trench latrine were left behind, not fill up by earth.
 - manpower requisition to local authority for post camp management - not easy, Red Cross - more interested in distribution of relief goods.
- Mobilize the people residing near-by camps.

Integrating DRR in Health Sector

- Integrating risk reduction measures and reinforcement in construction of health facilities/buildings
- Integrating risk reduction measures and reinforcement in building water and sanitation constructions
- Capacity building and awareness raising
- Preparedness plans in hospitals

Considerations for Site selection of Health Facilities

- Build above the highest water level in flood prone areas
- When building in hilly region, considering the stability of slope to avoid landslide
- When building in coastal areas, considering the highest water level in previous tsunami and storm surge.
- Considering the topography and growth of forest. Dense forest can be windbreaker.
- Storage of chemicals, inflammable materials should be considered to avoid industrial hazards. Also electrical power stations and industrial zones should be considered in building.

Take Away

After the session, you could be able to:

- Understand roles of Health Sector in Disaster Management
- Understand management on Public Health aspect at camp and hospital

Check your learning:

1. Select the correct word for the following sentences:

1.1 Activities of Health Sector in Disaster Response include :

- (a) Debris clearing
- (b) Evacuation of patients
- (c) Power supply
- (d) Camp construction

1.2 Most of extra waste in affected areas includes.....

- (a) Debris
- (b) Used clothes
- (c) Plastic, food packets
- (d) Branches and leaves

1.3 Inadequate food supply increases susceptibilities to

- (a) Malaria
- (b) Gastric diseases
- (c) T.B
- (d) Influenza

1.4 During Nargis Cyclone, First aid care was attached to entry point run by.....

- (a) Village authority
- (b) Teachers
- (c) health staffs and red cross
- (d) evacuees

2. Check whether the following sentences are True or False.

2.1 Management at camp do not include proper sanitary disposal of waste and refuse.

2.2 Water supply is one of the activities in rehabilitation.

2.3 Management at camp includes post-camp management.

2.4 Psycho-social support is not needed in camp management.

3. Explain the following.

3.a Immunization

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3.b Vector borne diseases

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3.c Mobile clinics

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4. Please mention two key learning's from this session

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Correct answers of check your learning Exercises

1. 1.1 (b) Evacuation of patients 1.2 (c) Plastic, food packets
1.3 (b) Gastric diseases 1.4 (c) health staffs and red cross
2. 2.1 False 2.2 True 2.3 True 2.4 False

Additional readings/references

World Health Organization (2005) *Communicable disease control in emergencies- A field manual*. http://www.who.int/infectious-disease-news/IDdocs/whocds200527/ISBN_9241546166.pdf

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