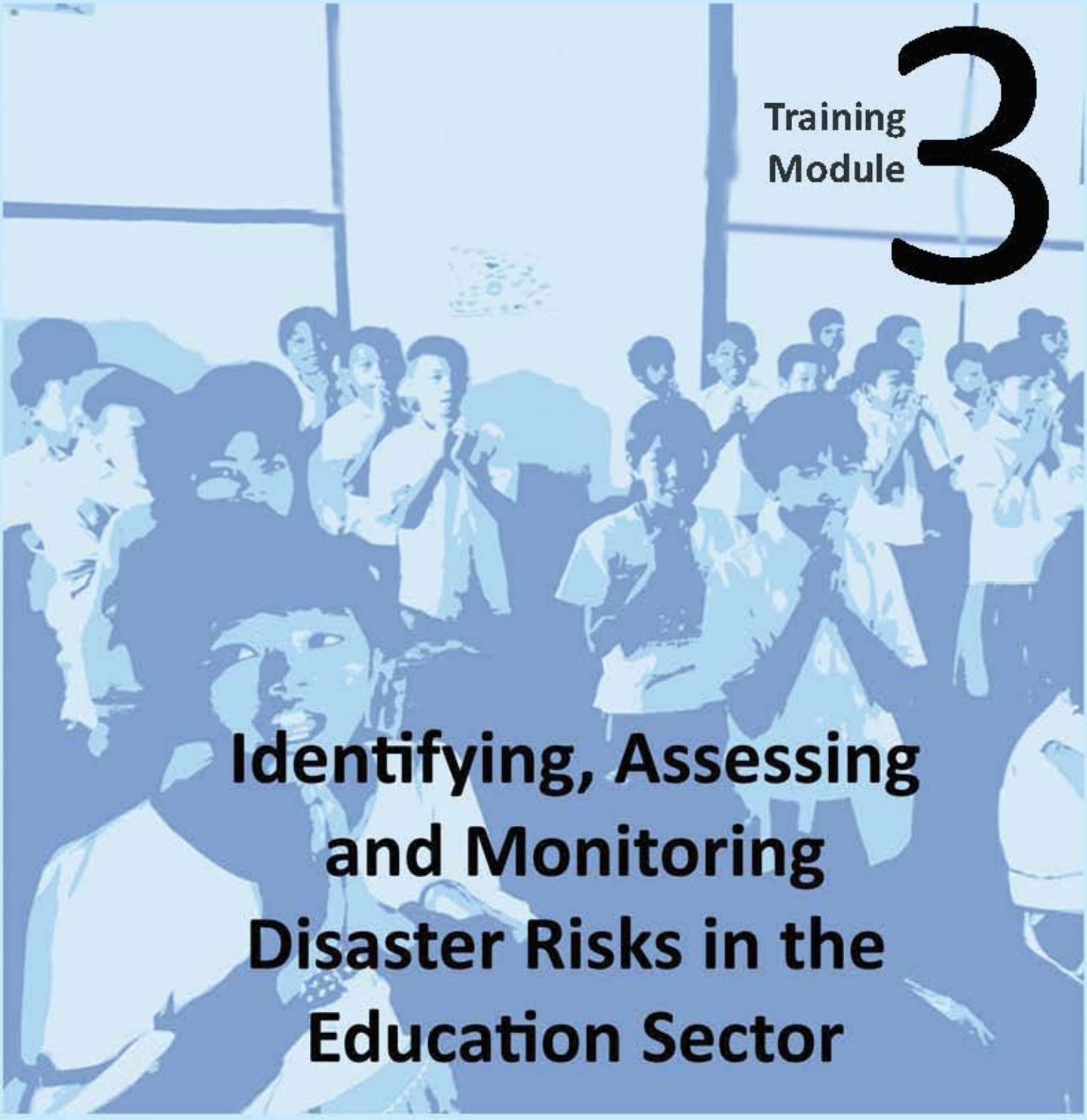
United Nations
Educational, Scientific and
Cultural Organization

Disaster Risk Reduction in Education
Resource Pack



Training Module 3

Identifying, Assessing and Monitoring Disaster Risks in the Education Sector

Ministry of Education and UNESCO
(February 2010)

Module (3) Identifying, Assessing and Monitoring Disaster Risks in the Education Sector

Developed by
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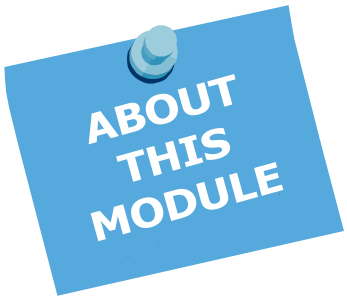
Module 3

IDENTIFYING, ASSESSING AND MONITORING DISASTER RISKS IN THE EDUCATION SECTOR



LEARNING OBJECTIVES

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

- Assess their surrounding risks and capacities
- Analyze disaster risks using a range of assessment tools
- Identify the information sharing systems and linkages in the dissemination system

METHODOLOGY

This session looks at the concepts of vulnerability and capacity in detail and helps the participants to identify vulnerability and capacity of their location. Completion of the exercise in this module would also bring forth the various structural and non-structural risks that a school is vulnerable to. Assessment of the risks would lead the participants to think over actions to reduce or remove that risk.

TIME

The total session will be of 3.5 hours, structured as follows:

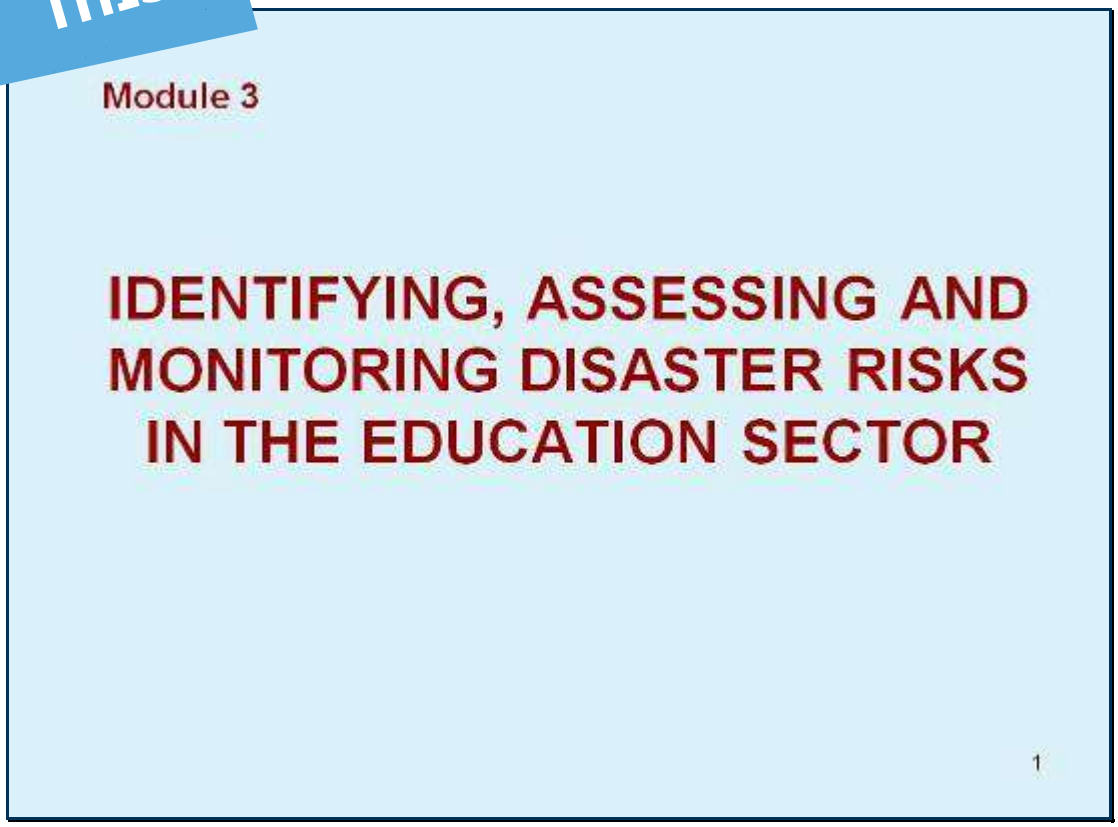
Presentation: 60 minutes

Exercise: 150 minutes

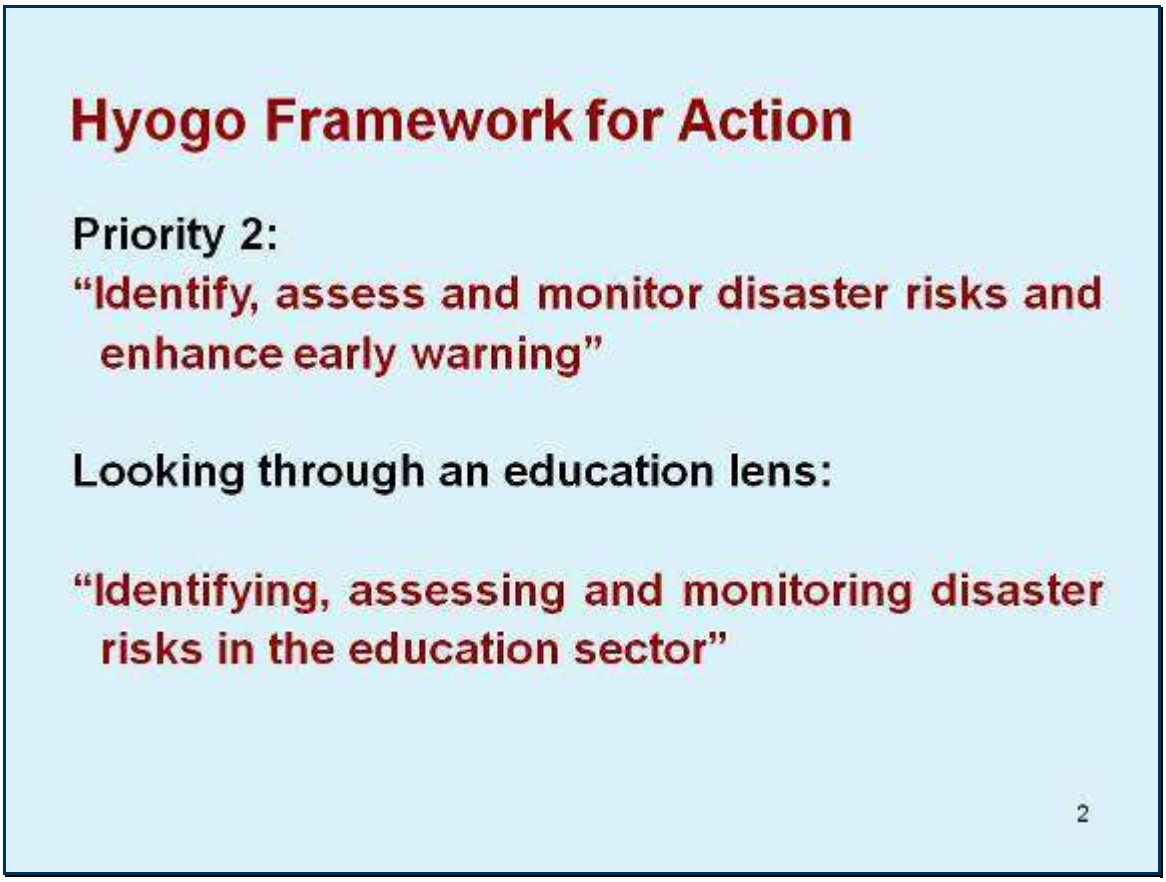
IN THIS MODULE

- Risk
- Vulnerability and capacity
- Hazard profile of Myanmar
- Capacity assessment
- Rapid environment assessment
- Town watching
- SWOT analysis
- Priority tasks
- Seasonal calendar
- Warning forecast and dissemination
- Information sharing systems

KNOW THIS!

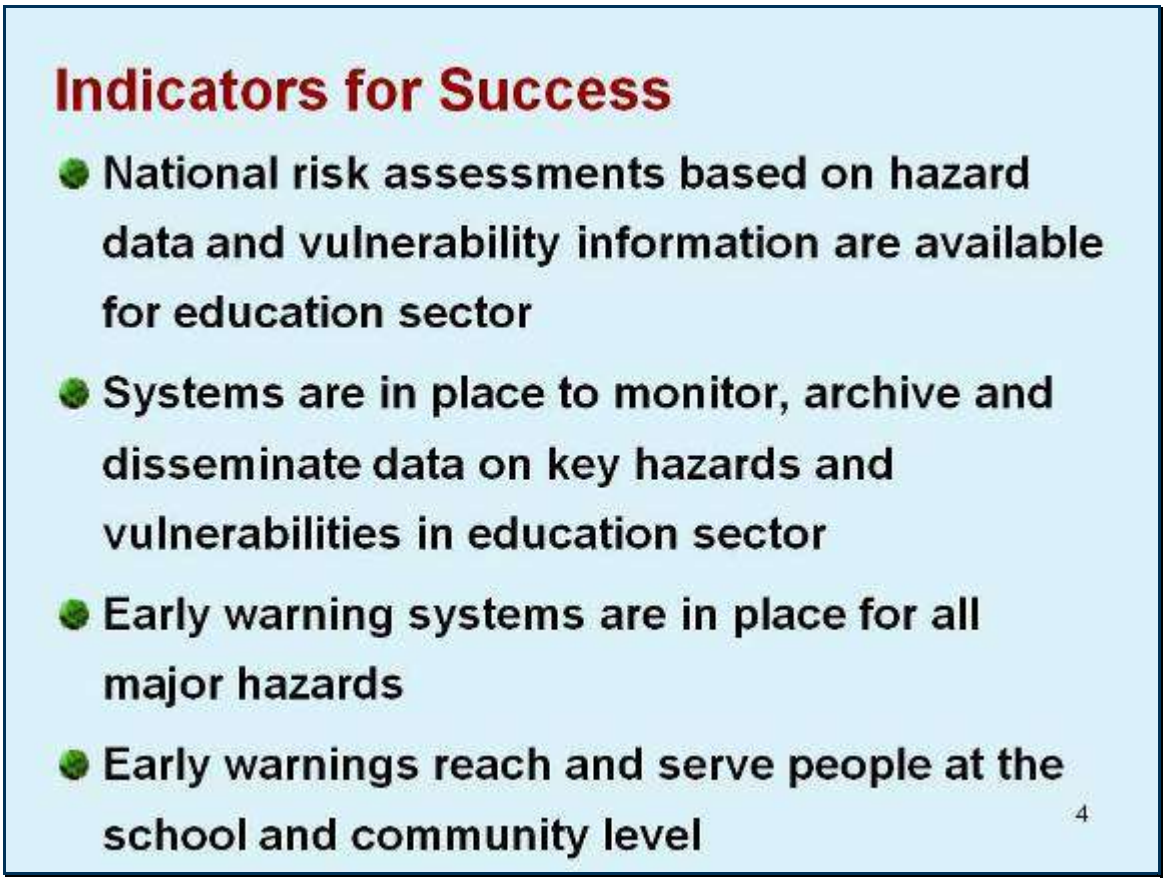


Module 3 is designed on the basis of Priority 2 of the Hyogo Framework for Action.



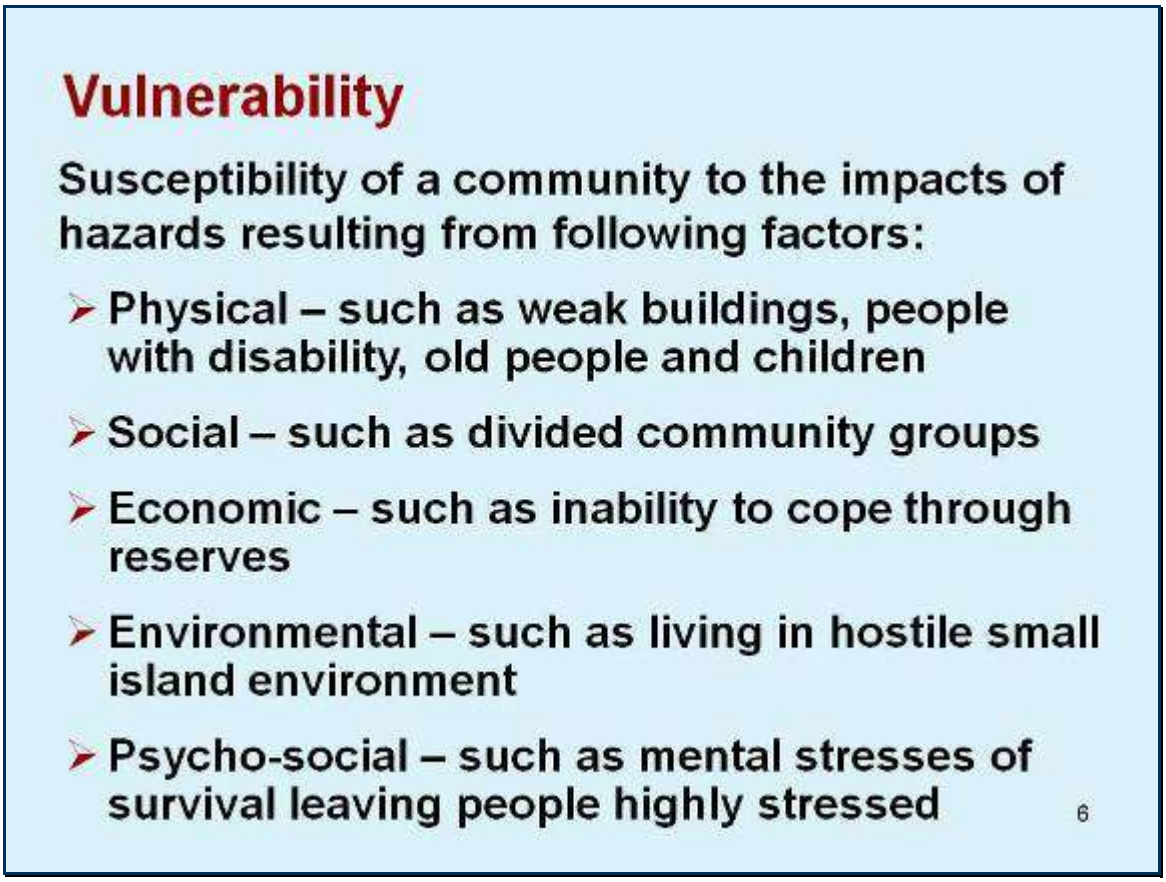
Priority 2 of the HFA deals with disaster risks and early warning, and this has direct relevance to the education sector in terms of risks to the educational infrastructure including school buildings, possibility of disruption in educational process, and threat of physical harm to the students and teachers in schools.

The indicative activities under this theme will mainly revolve around the creation of understanding in the school community about prevalent risks, and the processes deployed to understand them and to know of impending disasters in advance so that evasive action can be taken.

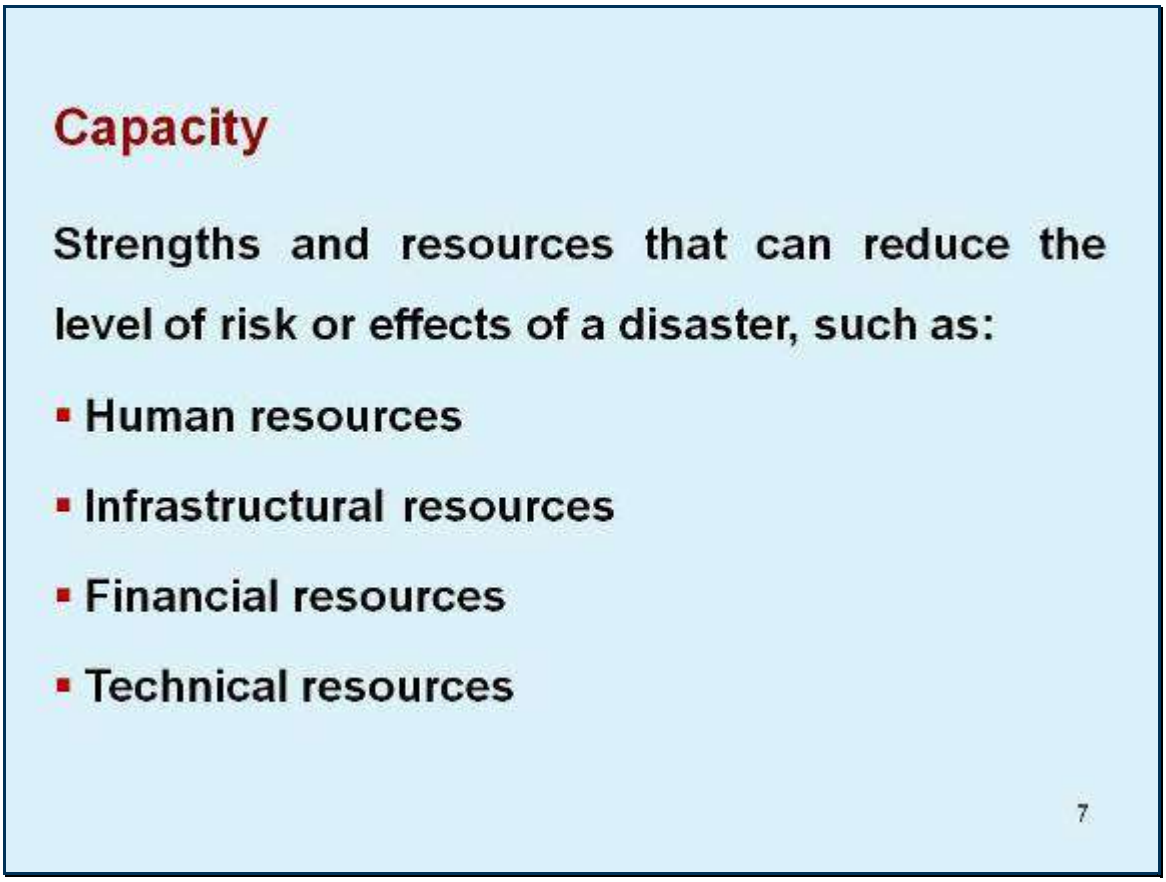


Indicators for such actions are based on availability of basic information and systems for deploying the risk assessment and early warning principles in the education sector and with specific reference to the operation of schools in the local areas. Integration of school and local community is also of importance here due to the strongly interlinked risk implications.

Risk is the probability of harmful consequences, or expected loss resulting from interactions between natural or human-induced hazards and vulnerable conditions. It is also interpreted in terms of exposure that creates conditions between hazards and vulnerabilities conducive for turning into a disaster.



Vulnerability is seen as a set of conditions and processes resulting from physical, social, economic and environmental factors, which increase the susceptibility of a community to the impacts of hazards.



Capacity refers to a combination of all the strengths and resources available within a community, society or organisation that can reduce a level of risk, or the effects of a disaster.

Types of capacities

Human resources	Sufficient number of trained people in task forces for relief and rescue operations, doctors, nurses, technical experts for timely forecast
Infrastructure resources	Functional hospitals, community centers, schools, proper sewage system, water storage systems, granaries or food storage, safe refuge shelters
Financial resources	Funds available with local authorities, funds generated by the community, money in form of charity, funds allocated to NGOs
Technical resources	Forecast system, functional communication network including ham radios

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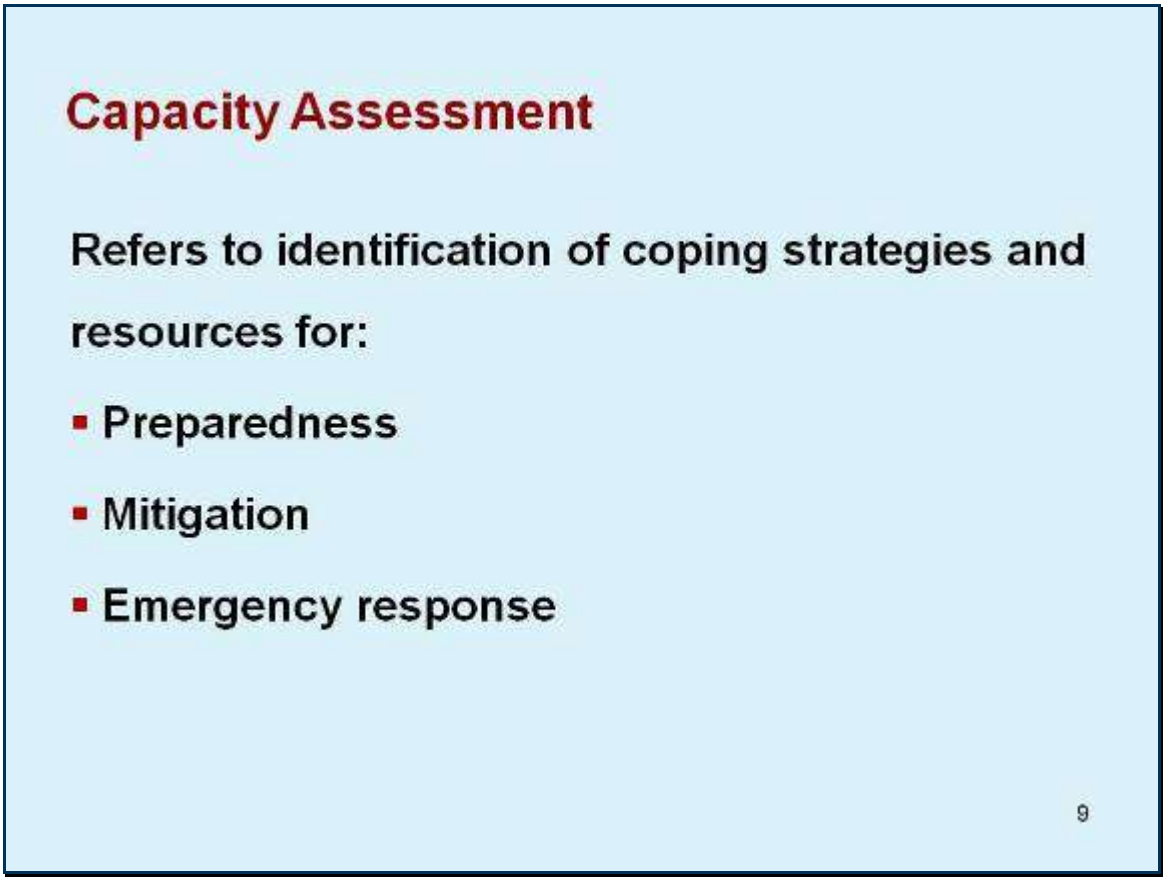
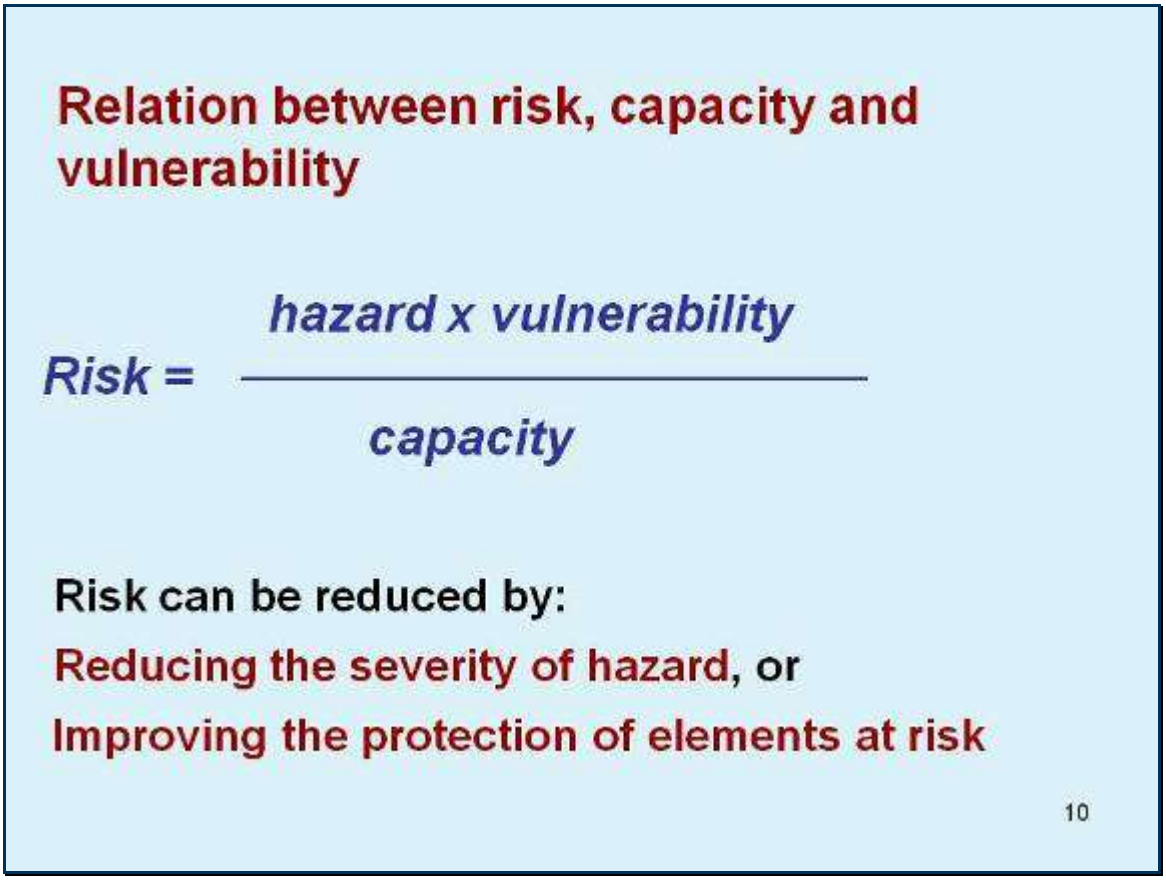
Identifying the types of capacities available in a location and with a society helps in understanding the vulnerability status better. Capacity is the opposite of vulnerability. Therefore it offsets the impacts of vulnerability in the development of a disaster scenario. Increasing capacities is the best way to reduce disasters, particularly in cases where it is not possible to reduce the hazard. Afore mentioned are broadly four types of capacities, though more categories and sub categories can be defined.

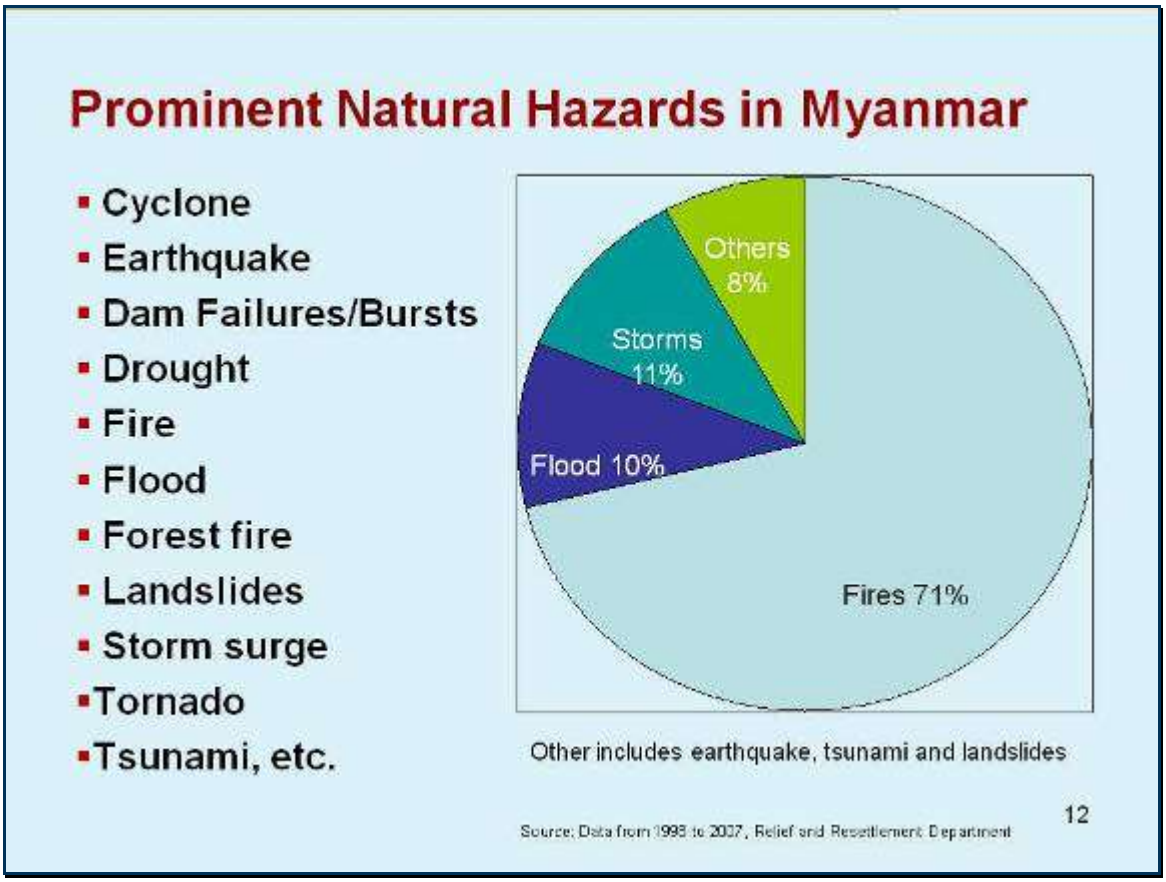


Capacity assessment is the identification of people's coping strategies, resources available for preparedness, mitigation and emergency response; and the analysis of who has control over the available resources.

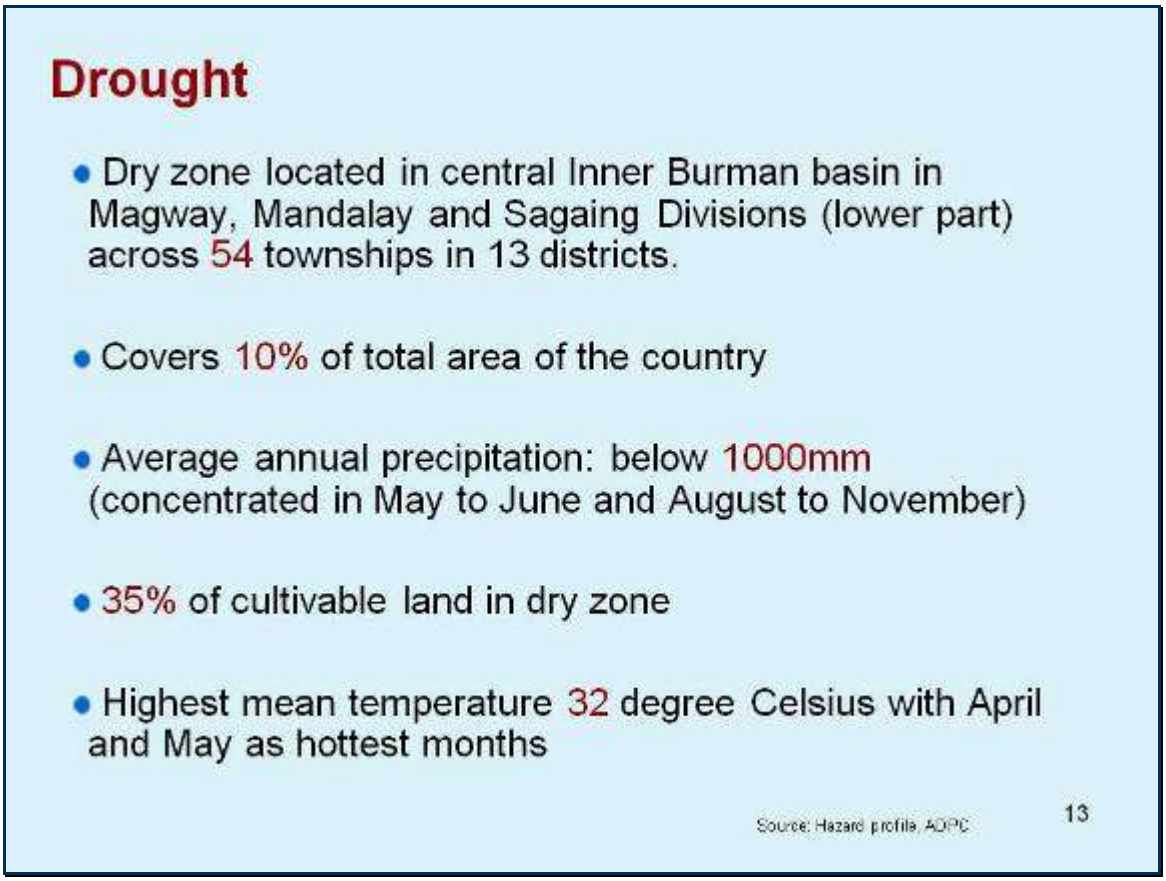


Risk is a consequence of three factors – hazards, vulnerability and exposure. The relationship between risk, hazard and vulnerability shows that risk can be reduced either by reducing the severity of hazard or by improving the protection of elements at risk.

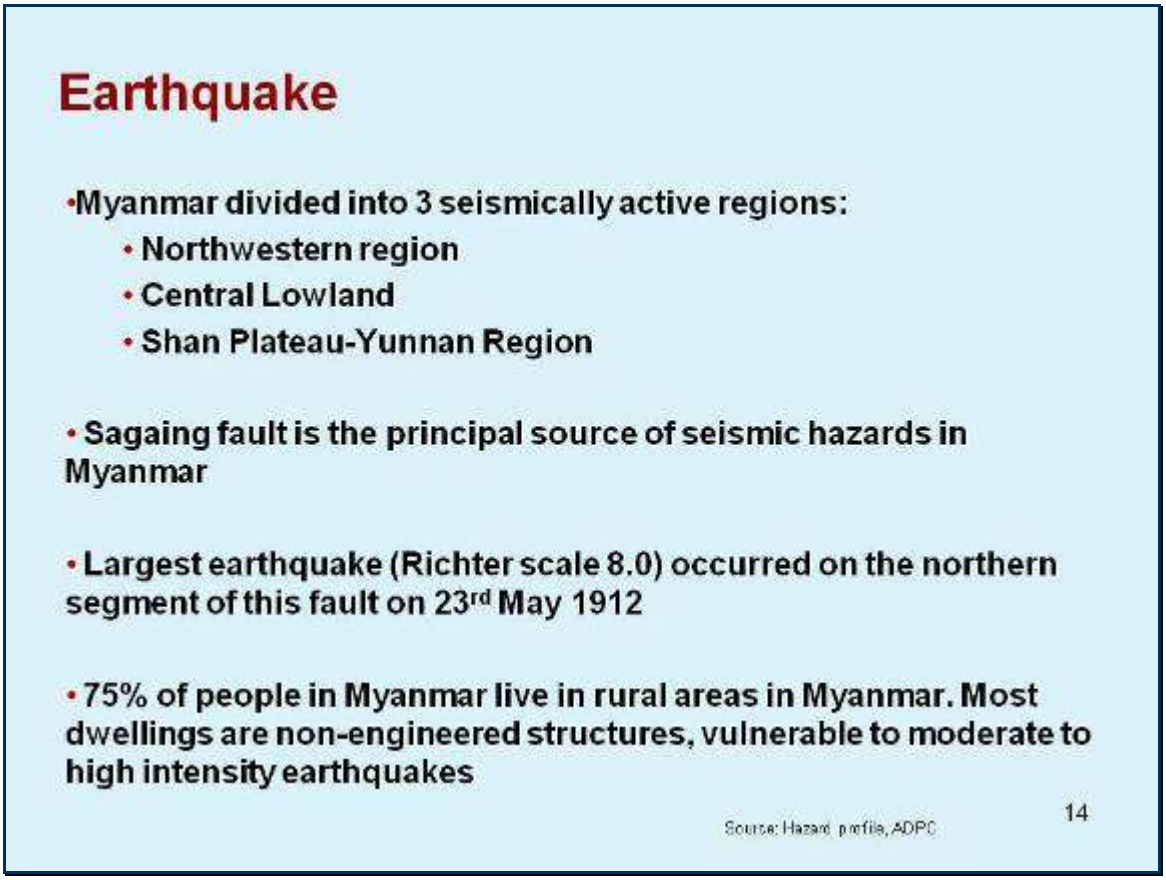
Myanmar is a wide ranging geological and climatic coverage. The different physiological units are prone to different kinds of hazards. Some units are multi hazard prone. This makes it important for DRR initiatives to be multi-hazard in character.



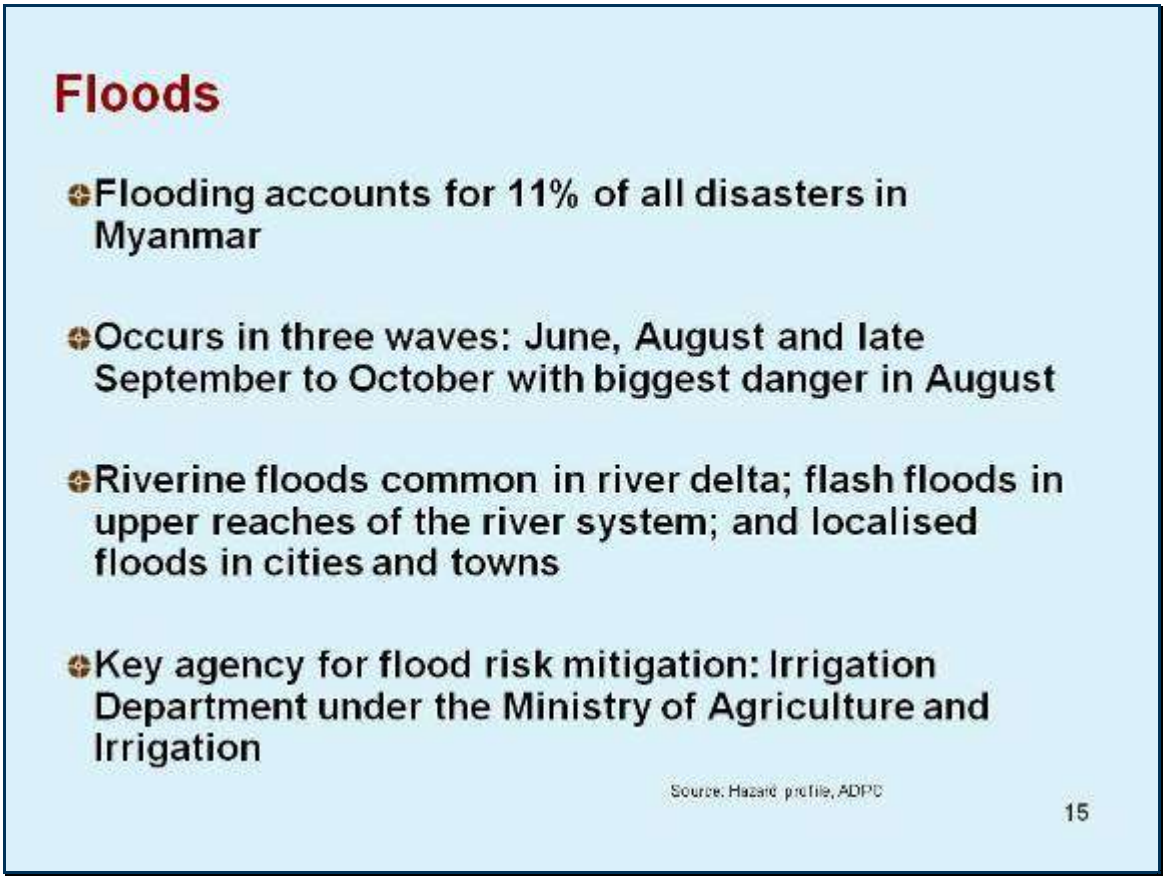
Of the nine primary types of hazards in Myanmar, fires are most common, followed by storms and floods. Storms and floods, however, affect the population in more diverse ways than urban fires. They impact livelihoods, natural resources, and disrupt developmental activities, thereby having a long term impact.



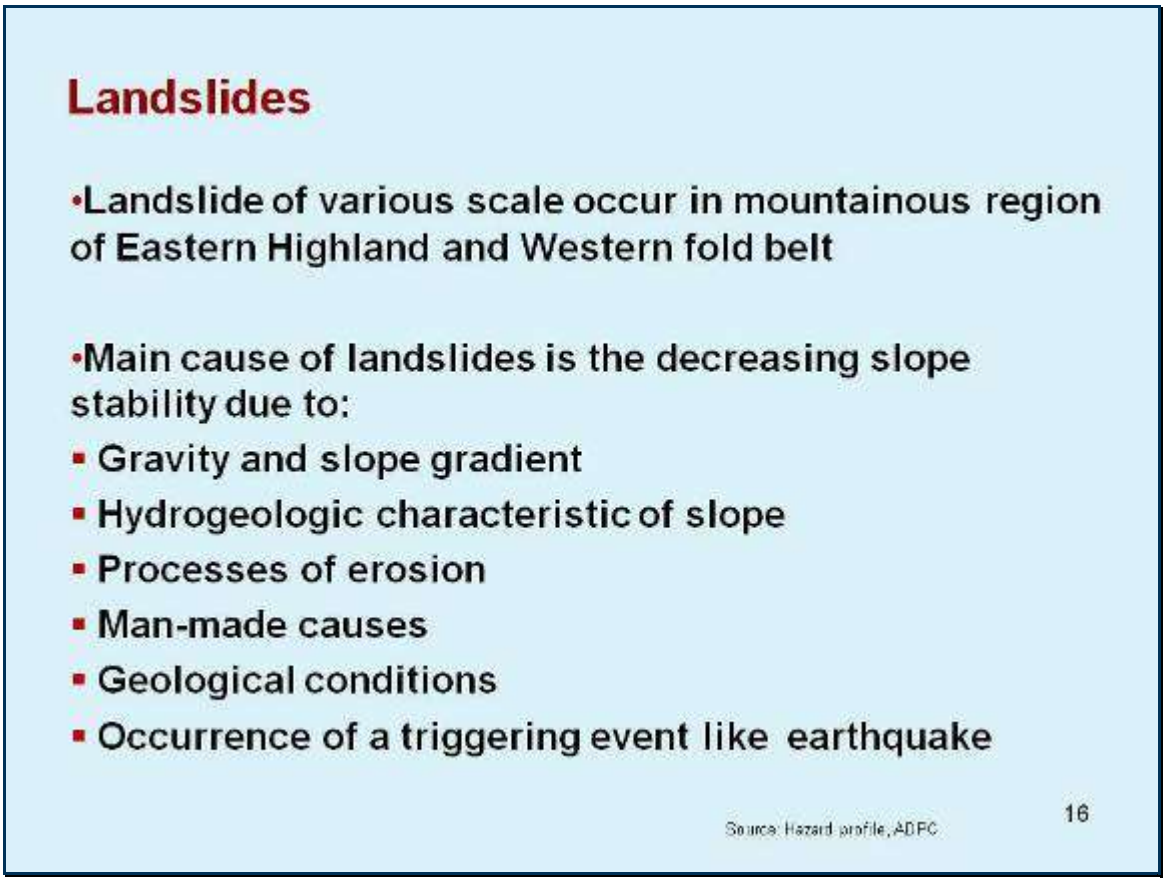
Drought is a creeping hazard that has less visible but deep impact on food security, social safety, assets and child nutrition levels. It triggers migration of population in search of livelihoods. It is also critical for the education sector as it triggers a surge in school dropout rates.



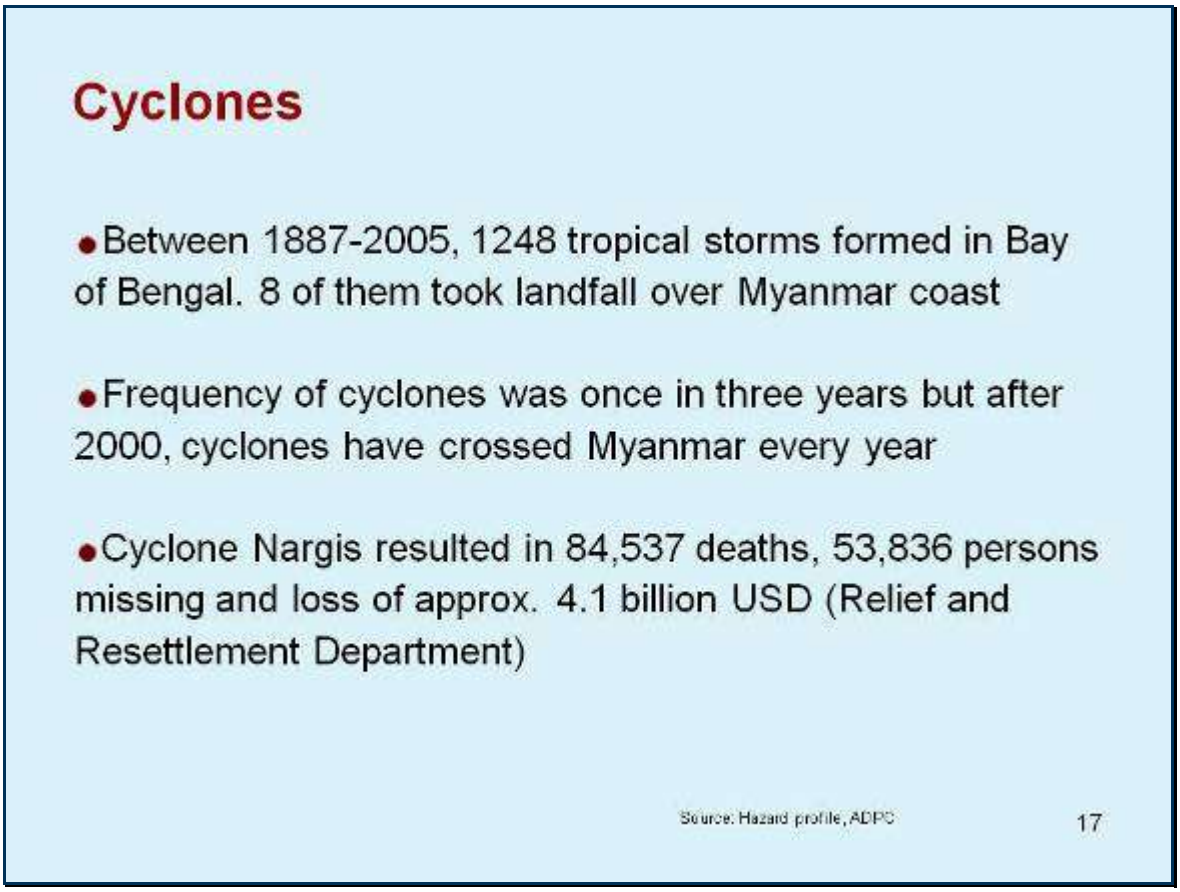
Earthquakes are the most severe of the low probability high impact disasters. They are also known as rapid onset disasters, and give no warning. Myanmar has had earthquakes of upto Richter 8, putting it in the very high seismic risk category. Non engineered structures, which form a majority of buildings in Myanmar, are particularly prone to damage in earthquakes. It is said that earthquakes don't kill people, buildings do!



Floods caused more damage and deaths than earthquakes and cyclones if seen over a period of time. However, they attract little attention since they are regular phenomenon, and the impact is spread over weeks in a given year, and across years for a given location.



Landslides are often considered as secondary disasters, since they happen as a consequence of heavy rains, flash floods, or earthquakes. Since they happen in hilly regions that have poor accessibility even in normal times, the disruption of transportation due to landslides is a major hurdle in mounting relief operations during emergency times.



Cyclones are another low probability high impact hazard for Myanmar. A very low percentage of the cyclones formed in the Bay of Bengal finally hit Myanmar, with a majority making landfall in coastal Bangladesh or eastern coast of India. The frequency of cyclones appears to have increased in recent years, which can be related to climate change though conclusive studies have yet to be carried out.

How do Cyclones form?

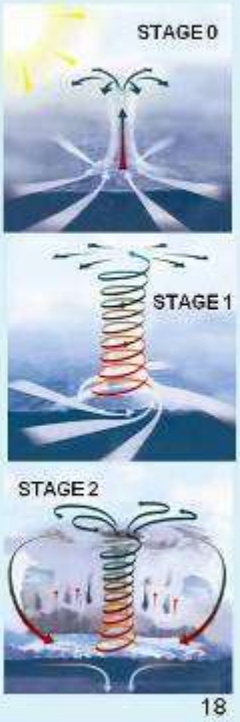
- The place is usually within ± 5° to 15° Latitude from the equator over the ocean.
- The surface temperature of the ocean/sea needs to be 27° C or above.

STAGE 0
Continuous cloud build up even during night time.

STAGE 1
A low air pressure system starts to pull clouds in and rotate.

STAGE 2
Clouds start to really rotate but there is sometimes a chance that it may not develop into a full cyclone.

After stage 2, cyclone is mature and developed and may increase or decrease in size.



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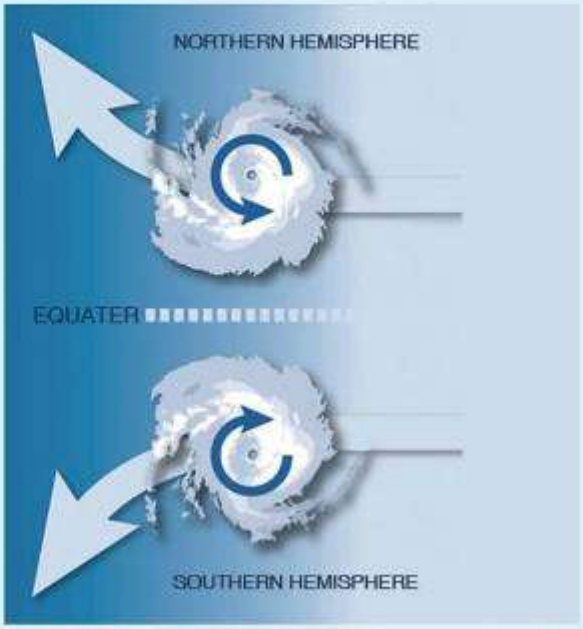
Nargis was a particularly devastating cyclone, and took the people and the system by surprise. It is useful to understand how cyclones form. They are born out of warm seas and conducive to atmospheric pressure and cloud conditions. Swathes are about 500 kilometers, but can vary. Wind speeds can reach up to 280 km per hour. The central part, or the eye, is relatively calm.

Why do Cyclones spin?

Cyclones spin because of Coriolis effect. The direction of cyclone depends on the hemisphere.

Northern hemisphere: Anti-clockwise direction.

Southern hemisphere: Clockwise direction



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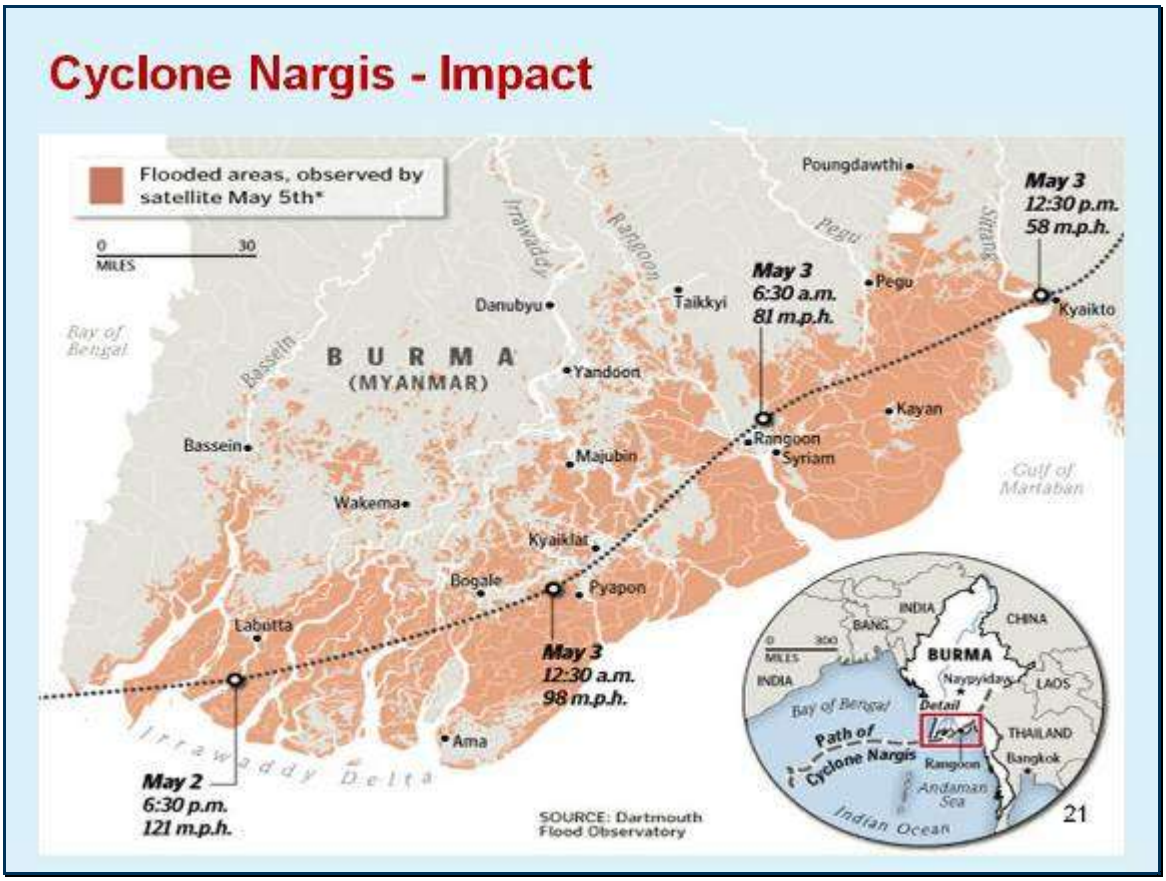
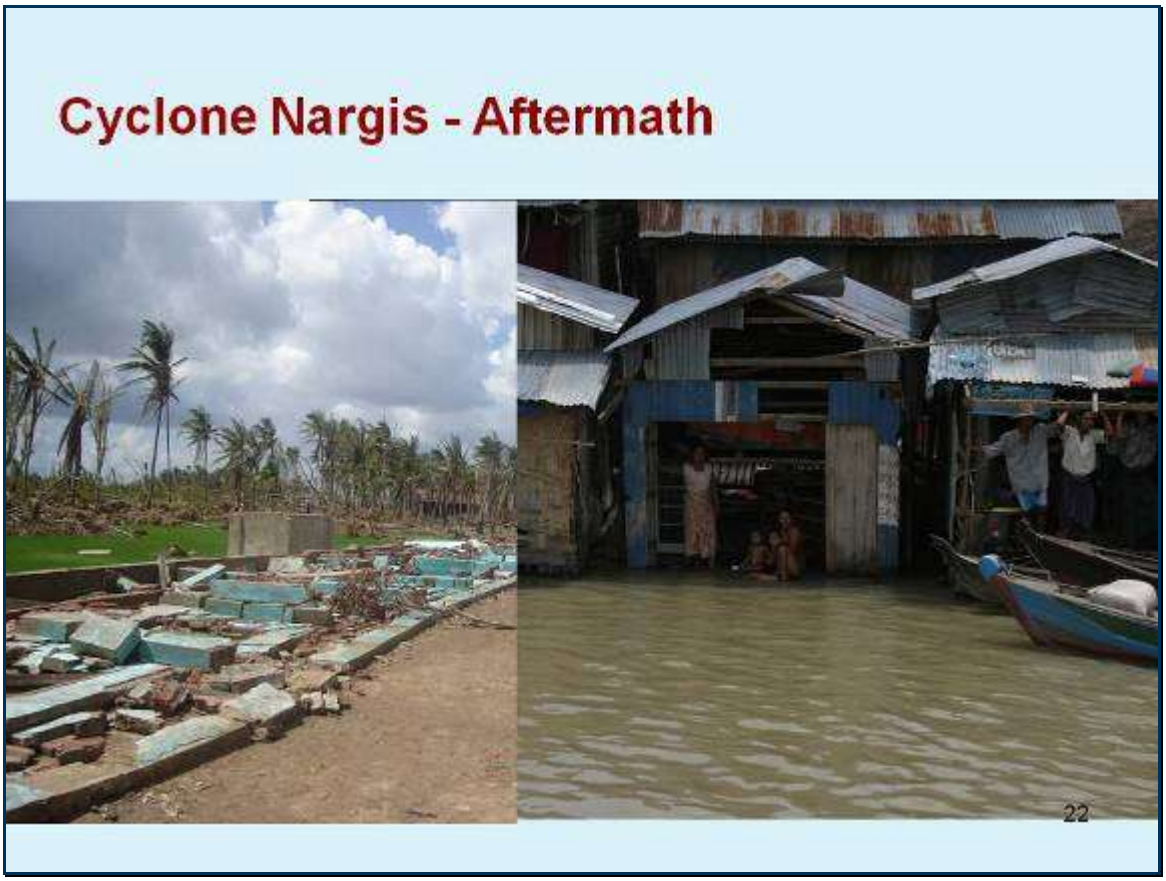
Cyclones spin because of prevailing wind directions and the rotation of the Earth. This is called the **Coriolis effect**. The direction in which they spin depends on which hemisphere they are in. In the southern hemisphere they spin in a clockwise direction and in the northern hemisphere they spin in an anti-clockwise direction.

Cyclone tracks are very erratic and difficult to predict. Depending on temperature, moisture and wind conditions, cyclones can suddenly change track to completely opposite directions. Their speed of movement also keeps varying, sometimes lingering at the same spot for days. Nargis, which was first headed to the Indian coast, and then to Bangladesh, kept changing its course till it finally hit Myanmar. It is not very common for cyclones to make landfall at the location where Nargis did.



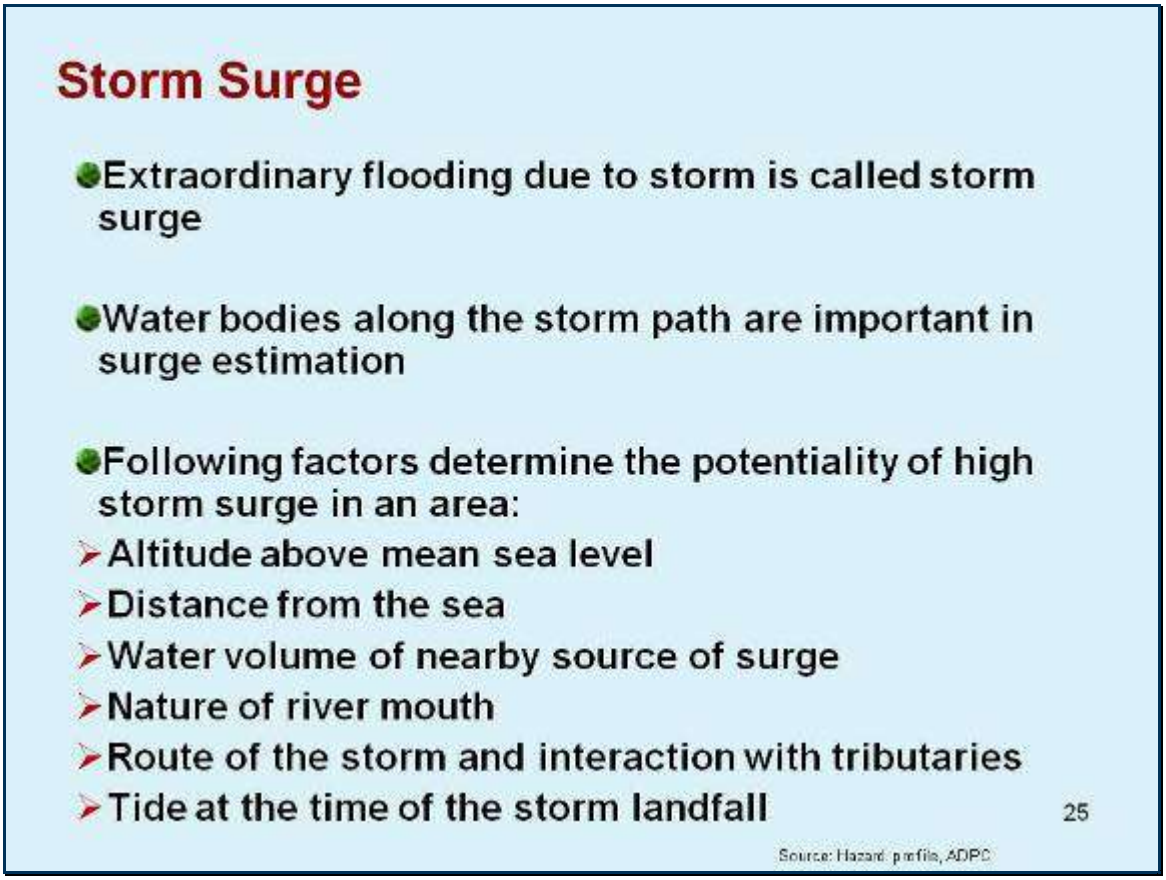
The Nargis path was along the coast and over low lying delta lands with very little protection of high elevations. Quick evacuation from these parts is also very difficult due to the terrain and the criss crossing water bodies. This is one of the reasons why Nargis had such high casualty and damage figures. Many people and huge amounts of material was swept into the seas by the sea-ward winds and the storm surges that accompanied the cyclone.



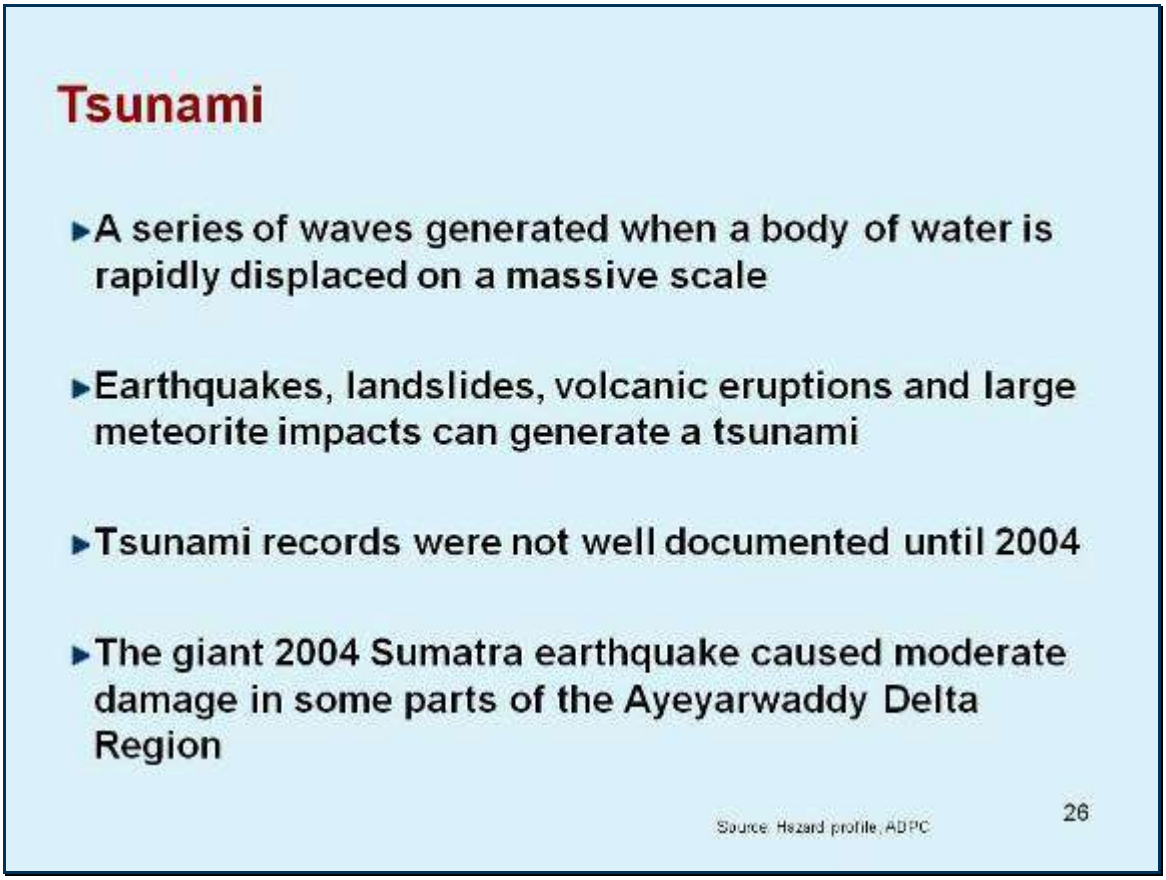
The force of the wind and the impact of the wall of water that comes inland as a storm surge can flatten concrete structures instantly. Many of the structures in the affected region were of timber and temporary materials, thus causing widespread destruction. The lack of shelter belt plantations, elevated ground or strong multi-storeyed buildings meant that there was nowhere to run and seek protection.

Many of the houses and other buildings are made of composite materials, with more permanent walls and temporary roof structures. The roof structures were completely destroyed in most cases. This also means that there was a large amount of flying debris which acts as missiles.

The damage to the trees, livestock and natural life forms was also huge, requiring years for regeneration. Environmental impact of disasters is often huge, but rarely studied and responded to. Rapid Environment Assessment (REA) is a tool for assessing this impact and formulating strategies.



Storm surges are different from tsunamis, as they are caused by wind and pressure conditions and not by under sea earthquakes or volcanic eruptions as is the case with tsunamis. The impact, however, is similar as they both involve huge waves of water moving far inland and causing damage to structures due to the force of the water and deaths of persons and animals due to drowning.



Tsunamis are mostly caused by undersea tectonic or volcanic activity. Tsunami waves move very fast through water, at speeds of over 800 km per hour in open seas. As they reach shallow areas they get slower and rise higher due to friction with the bed. They are more common in the Pacific Ocean than the Indian Ocean, but the Indian Ocean Tsunami of 2004 was one of the most devastating disasters in human history.

Fire / Forest Fire

- Most frequent disaster accounting for 71% of disasters
- Approx. 900 cases reported every year (Myanmar Country Report, ADRC, 2003)

High incidences of fire due to:

- Climatic conditions
- Use of flammable construction material
- Unplanned development

Source: Hazard profile, ADPC

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Urban fires and forest fires are very common phenomena. Urban fires may start due to cooking fuel, electrical short circuit, light sources, cigarettes and such sources. They spread fast due to the combustible nature of timber based buildings. Unplanned development, with buildings very close to each other, no open spaces to break fire advances, and poor access for fire fighting equipment increase the level of the problem.

Forest fires are more common in the dry season, and are very difficult to control once they start spreading. They cause heavy damage to forests and the life within. Forest fires may start due to carelessness with burning material, or sometimes are even intentionally started to clear an area and make it fertile with ash.

Early warning form a crucial part of risk management. Early warning process for disasters has two components: warning forecast and warning dissemination. Forecast is done by meteorological agencies using technology that may include satellite based monitoring systems, weather buoys floating in seas monitoring temperatures and pressure etc., and computer based modelling software. Indigenous knowledge can also forecast disasters in traditional communities. Cyclones can be forecast up to 96 hours in advance. Earthquakes can at best be forecast a few seconds or minutes in advance with the best available technology.

Warning forecasts and dissemination

- While forecasting is only one part of the exercise, sending information to everyone, as fast as possible, is also important.
- Warning dissemination is usually the weakest link of an early warning system
- Community level warning dissemination is the most successful method

Community Warning system in Bangladesh

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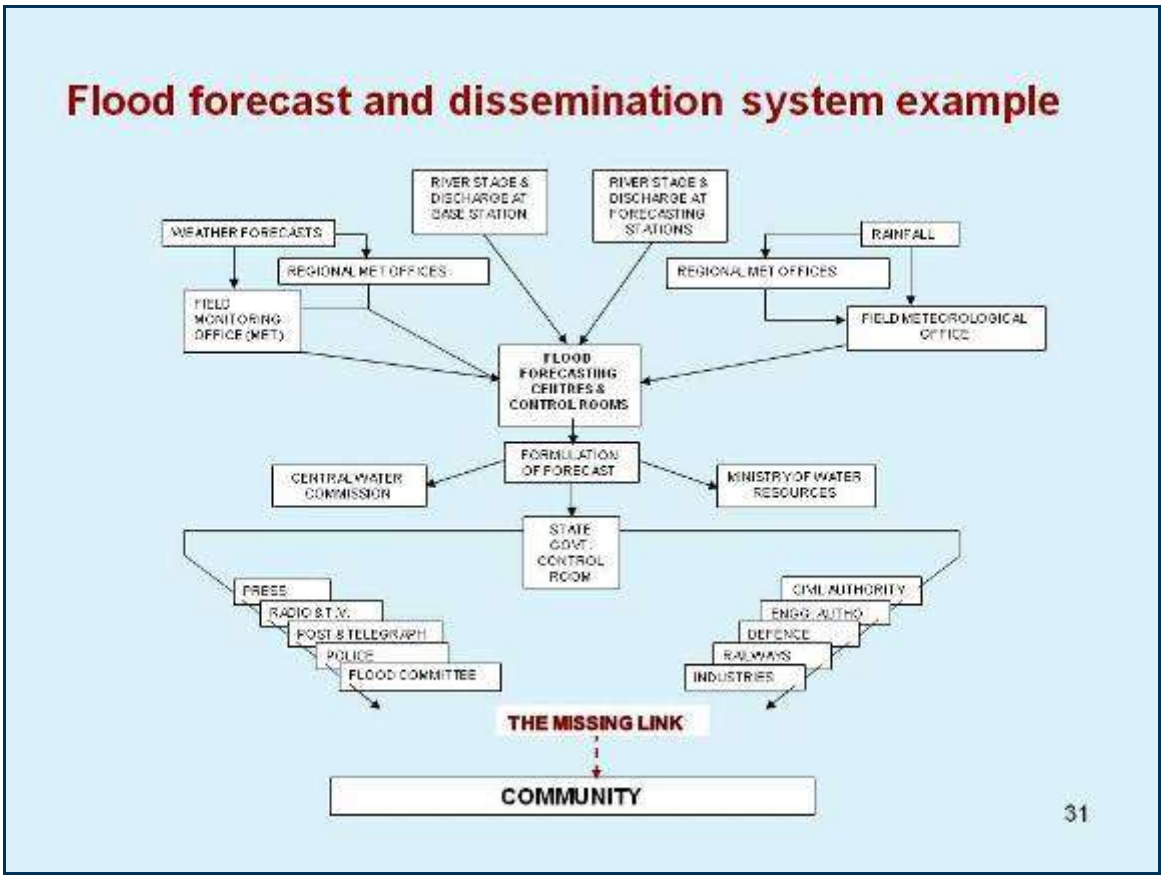
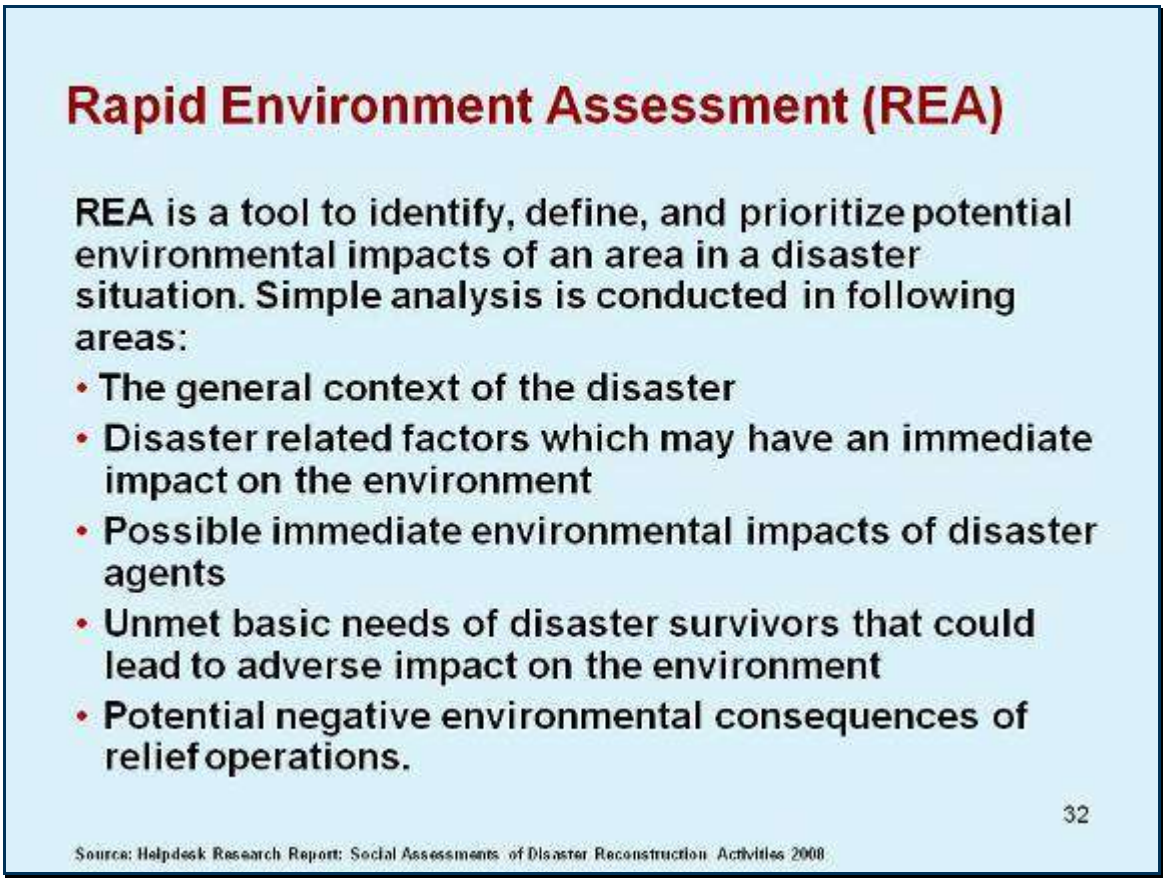
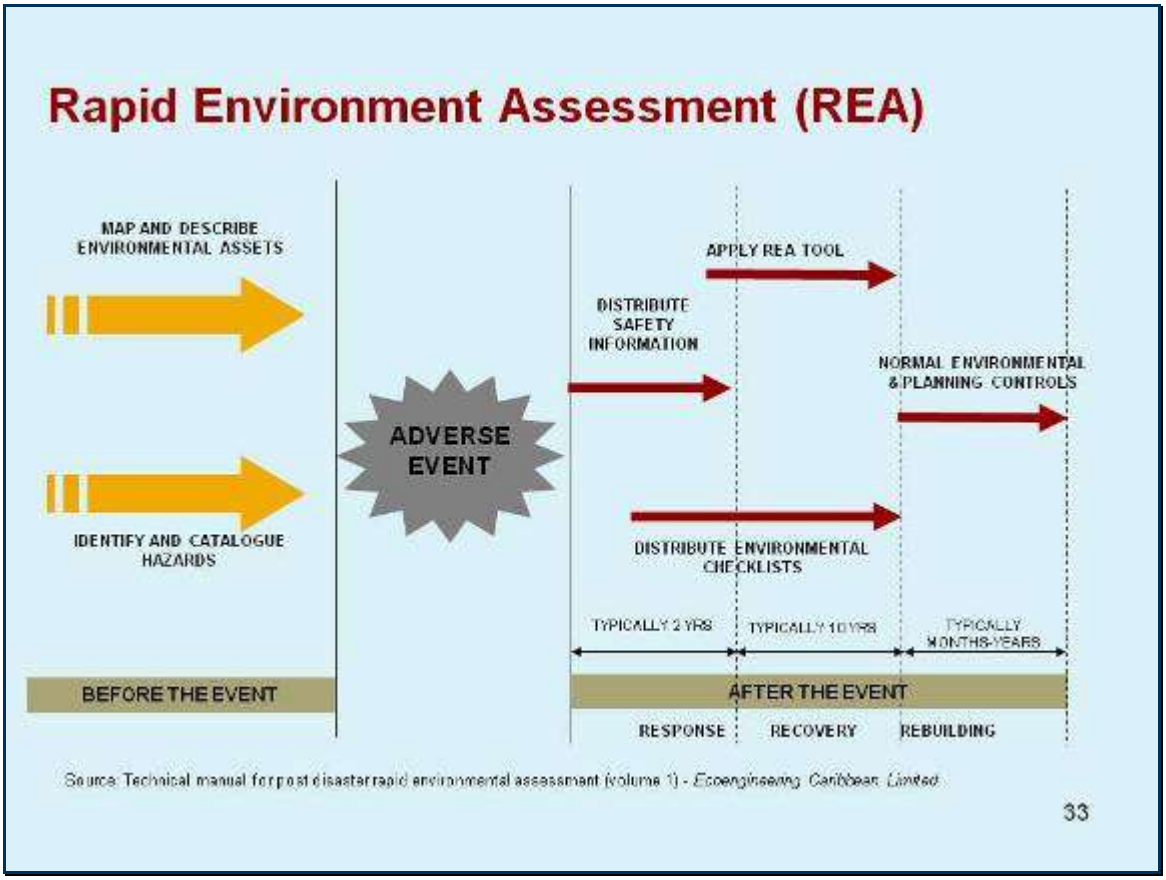
Warning dissemination is the second part, which is critically important in societies where vulnerable and poor communities at risk may not have access to print and electronic media for receiving warnings. There have been many instances in Asian countries where forecasts were generated but could not be disseminated to the people in remote areas. This has led to the killing of thousands of people who got caught unawares.



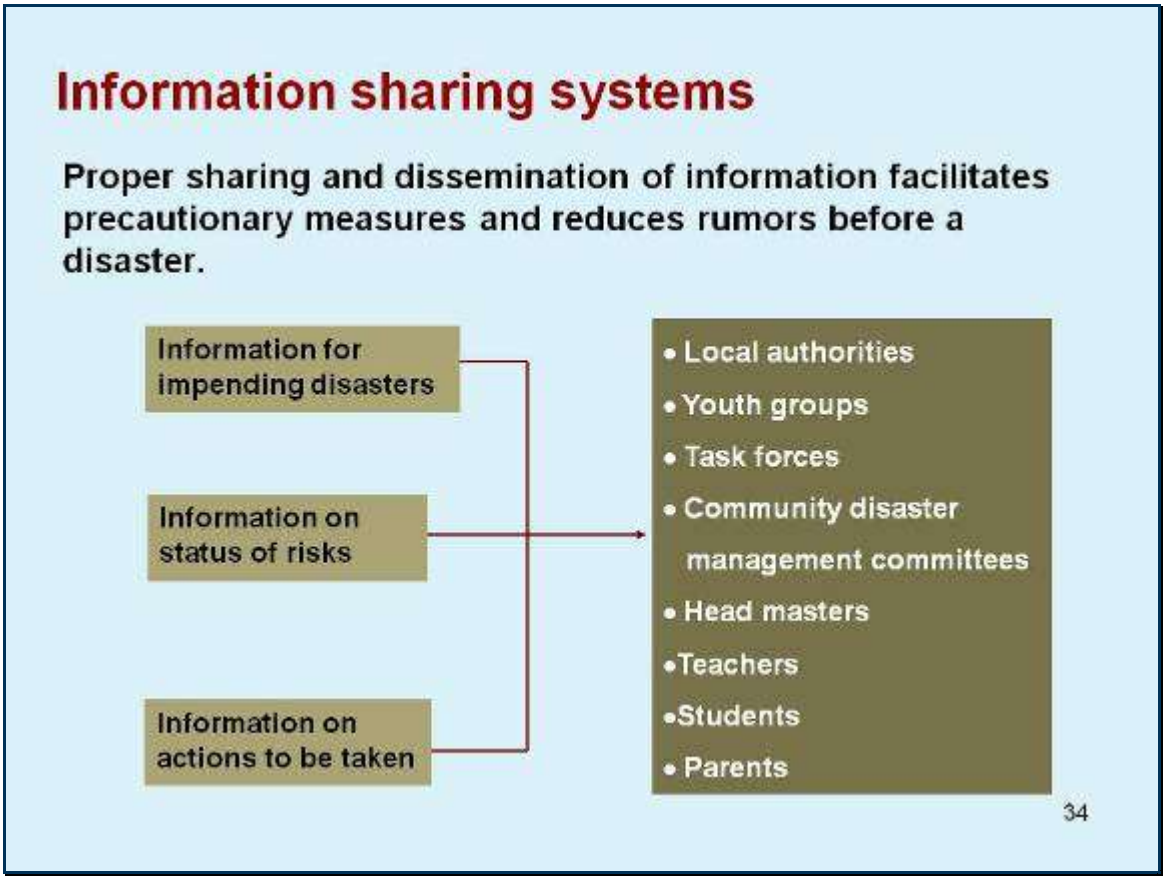
This sample flowchart shows the elaborate flood forecast and dissemination system that exists in most countries. While forecasting and dissemination involve many different agencies, the most crucial missing link is the last mile, which is the communication of the warning to the community at risk. The aim is to address this gap by making school communities capable and active in DRR.



The Rapid Environmental Impact Assessment in Disaster (REA) is a tool to identify, define, and prioritize potential environmental impacts in disaster situations. A simple, consensus-based qualitative assessment process, involving narratives and rating tables, is used to identify and rank environmental issues and follow-up actions during a disaster.

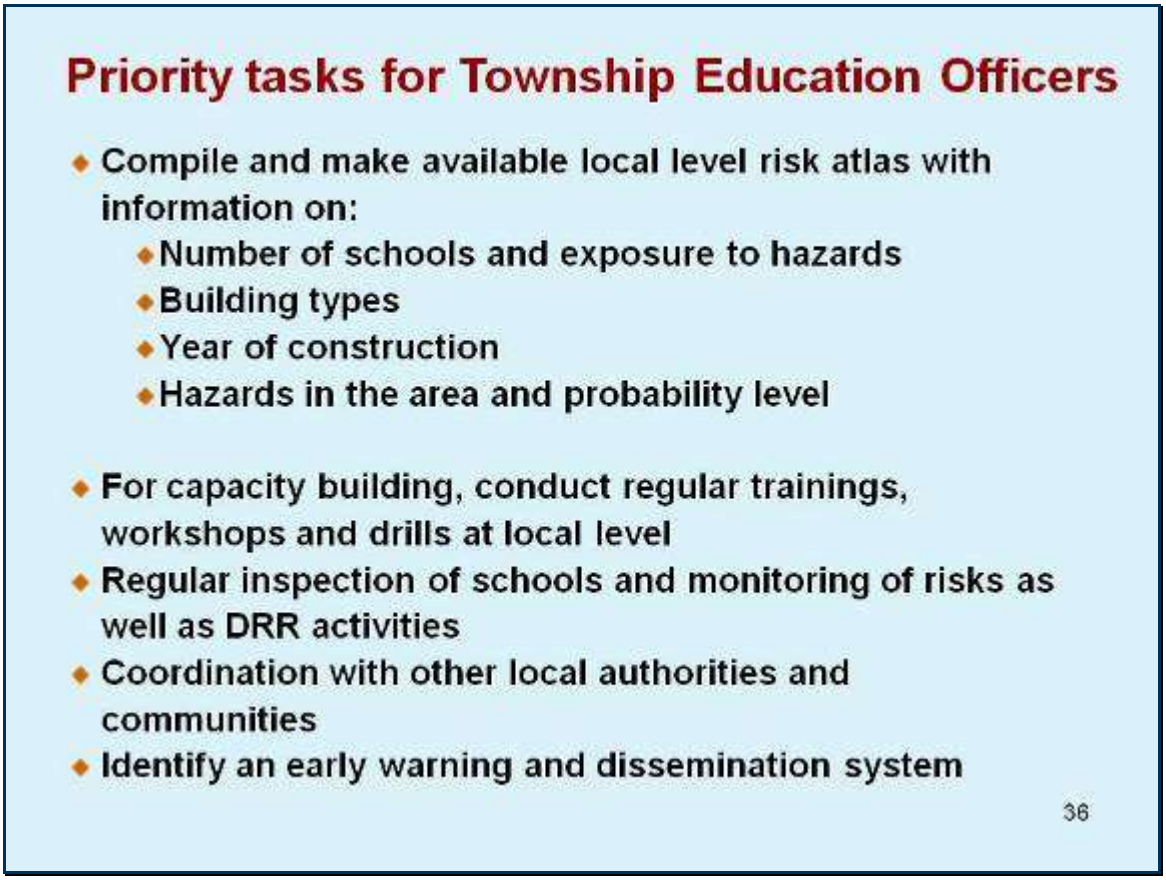


Environmental assessment needs to be carried out in comparison to the situation before the disaster. Local environmental assets that existed, and the prevalence of hazards is useful information for this. The impact of the disaster itself, as well as the impact of actions for response, recovery and rebuilding, all have adverse impacts on the environment.

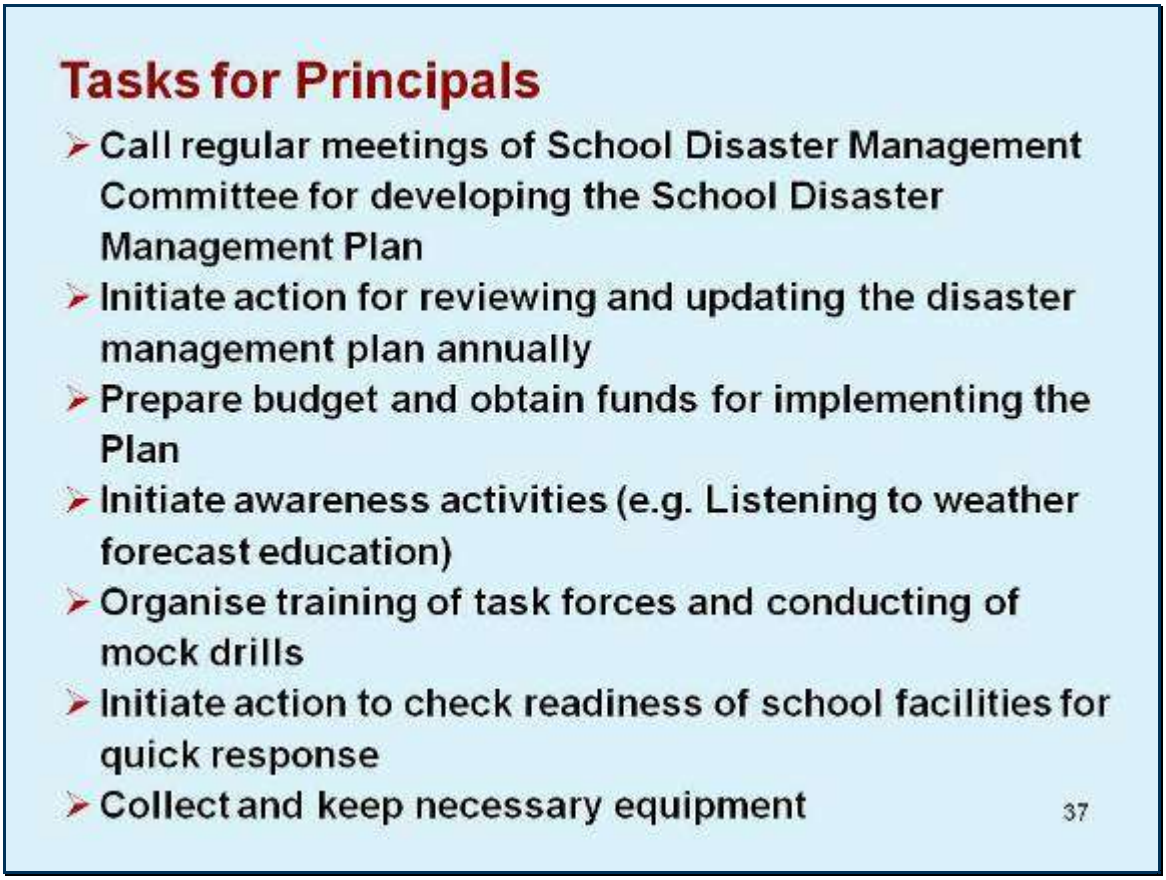


A clear line of communication and information sharing must be developed to support and early warning system and also for further communication for disaster management actions. Various groups need to receive this information, but each group may need to get it in a different format and packaging. While local authorities need more detailed and technical information to take action, school groups may need it in a very simple and easy to understand form.

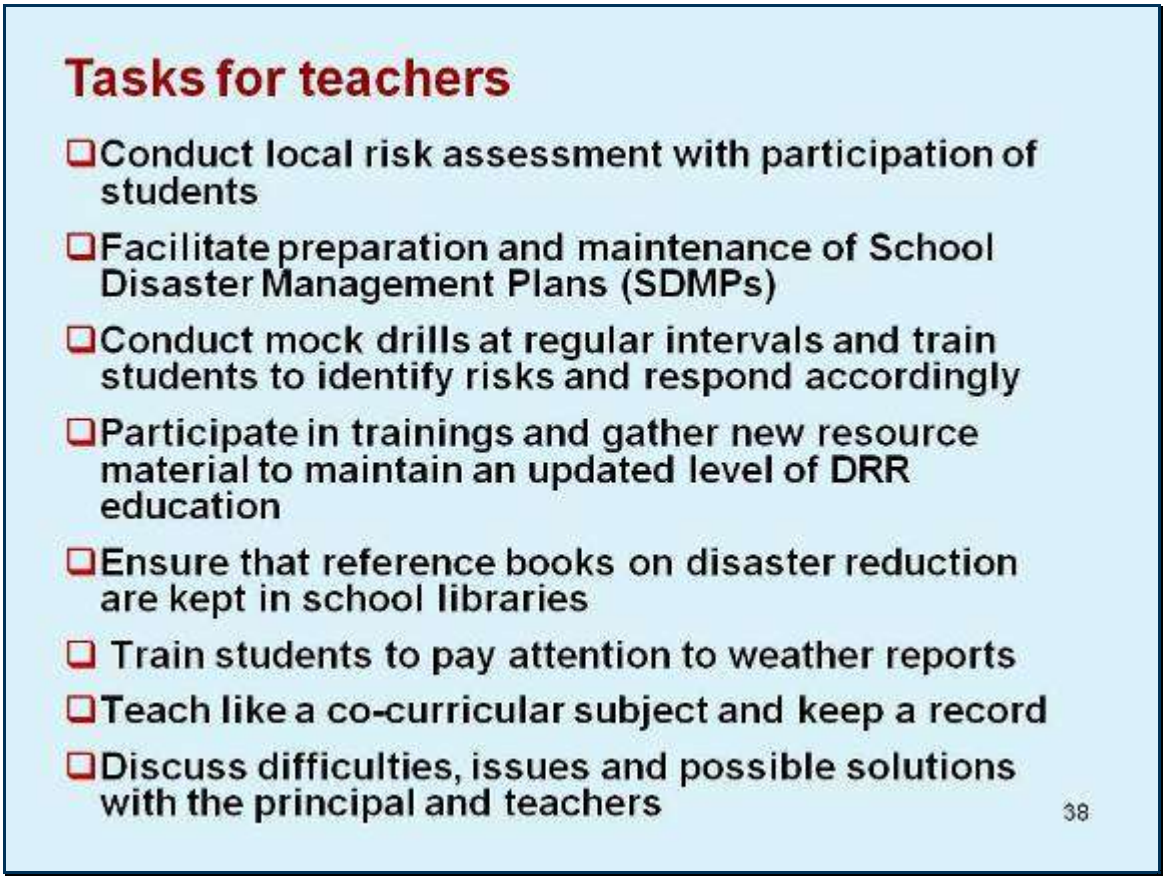
Institutionalisation is a long term process, but it needs to be kick-started with very focused actions to be taken at the national level on priority. The Ministry of Education, in association with relevant ministries and departments can catalyse the process through institutional, knowledge related and regulatory actions.



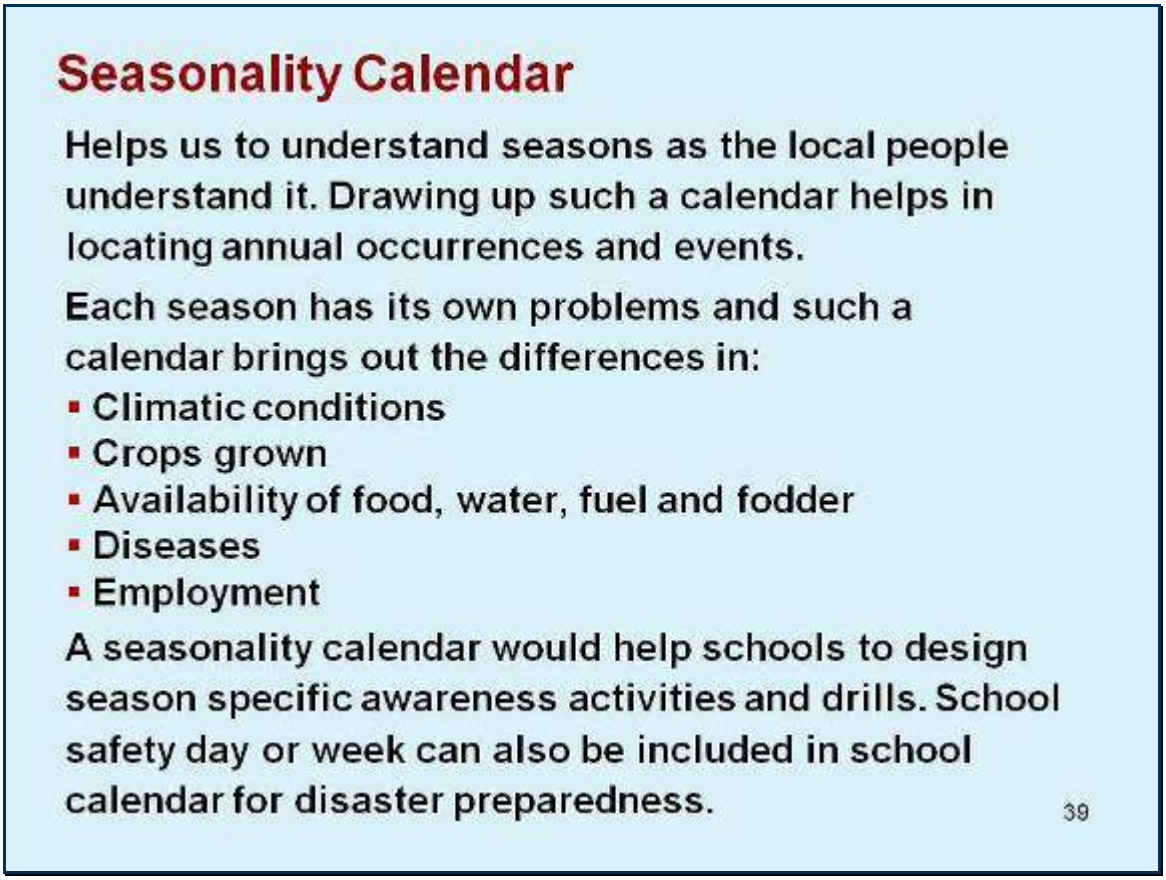
At the Township level, priority actions can not only get the process started at local level, but will also have a demonstrative effect that will play the dual role of institutionalisation as well as public awareness and engagement. Action at this level needs to be simple and community capacity oriented.



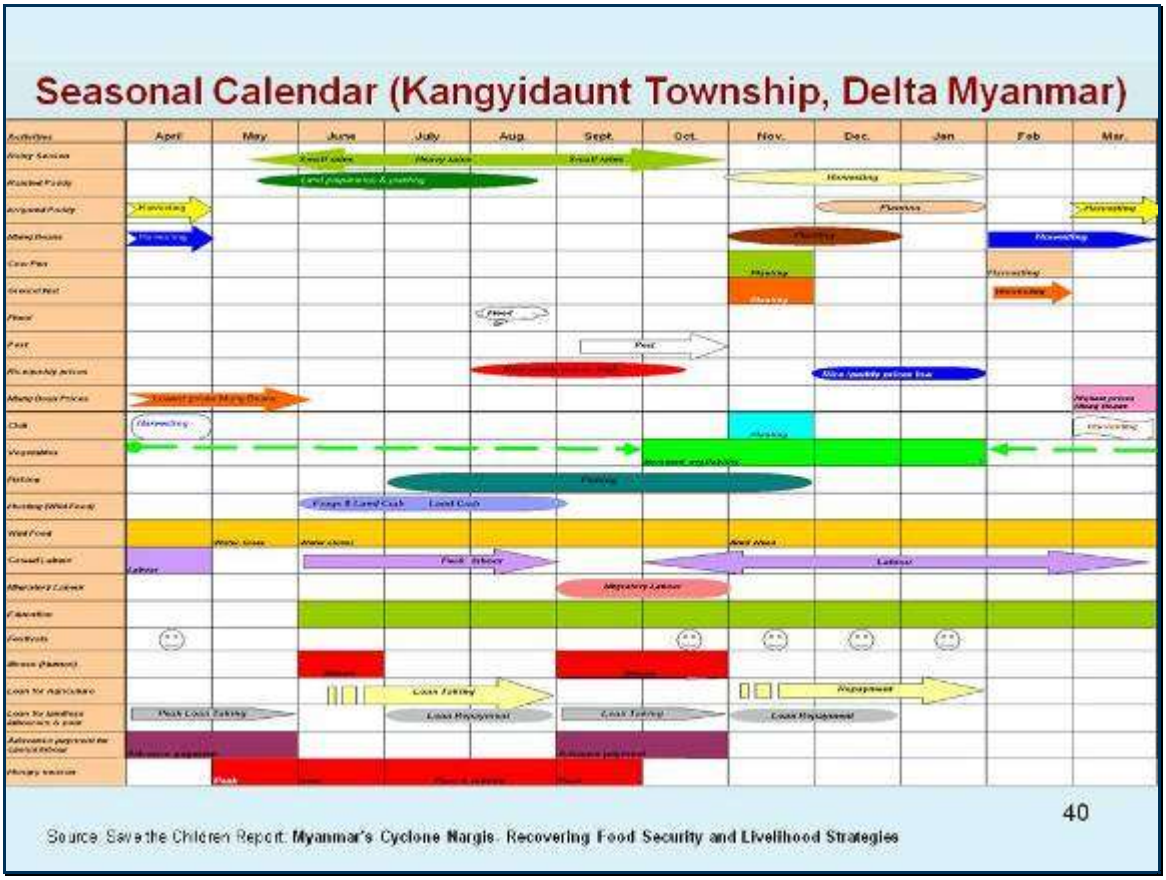
Principals are the main responsible person for school management of which performing and supervising school disaster preparedness activities is one of the important components.



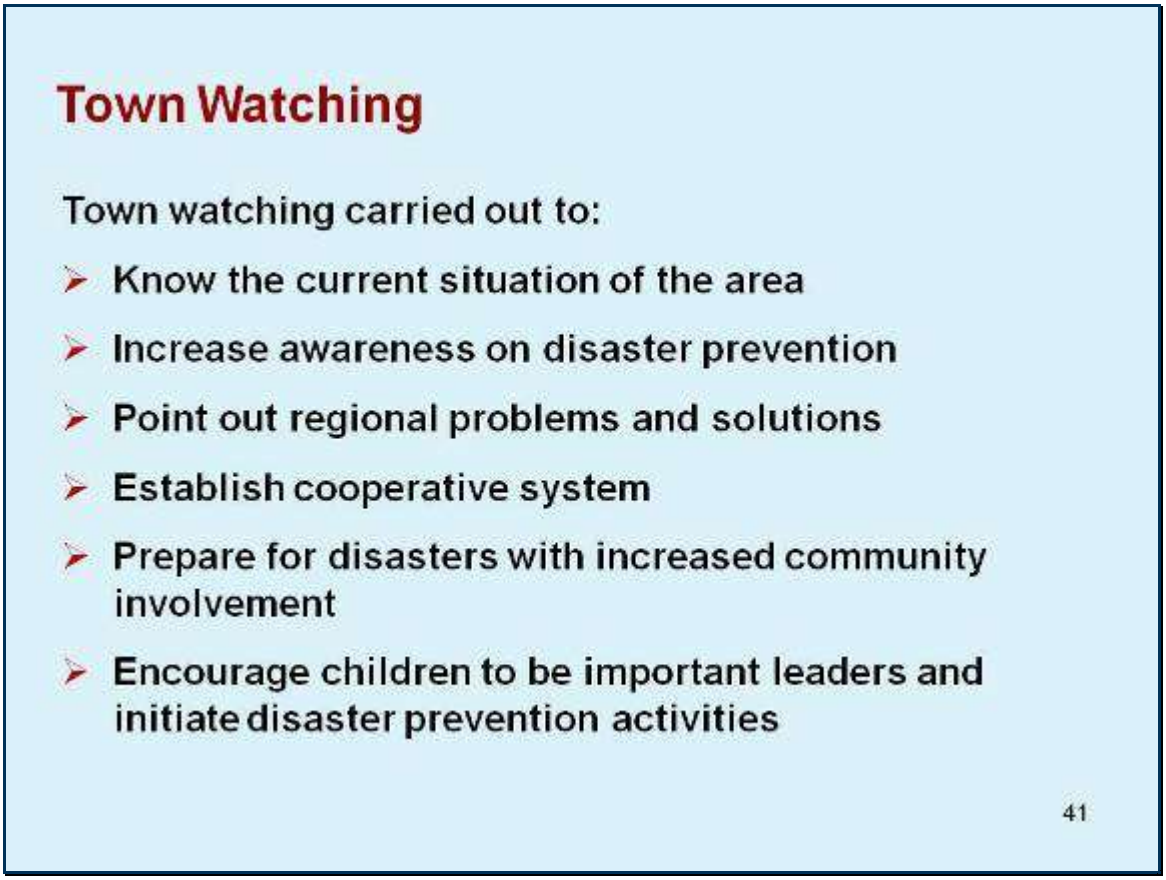
Teachers are the last mile in the DRR in education process. They have to enhance their own knowledge base above the level that they need to deliver to the students. Their role is important for three priority actions: teaching of DRR to students, establishing a learning process through non formal tools, and creating a learning environment through local action such as school safety activities.



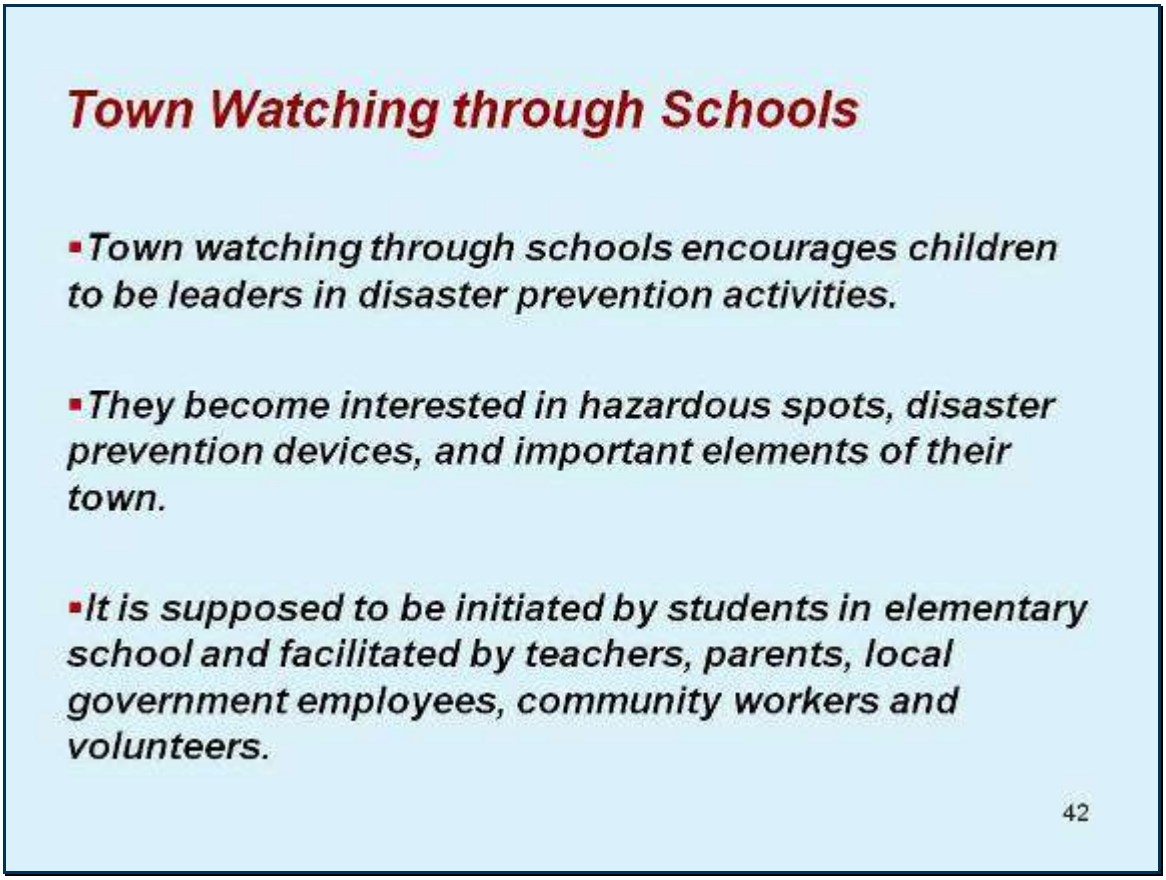
Many of the natural hazards such as floods, forest fires, cyclones and even related epidemics are more prominent in specific months of the year depending on temperature, rainfall etc. A seasonality calendar helps us to understand time as the local people understand it. Drawing up such a calendar helps in locating annual occurrences and events, linking up such events to their seasonality.



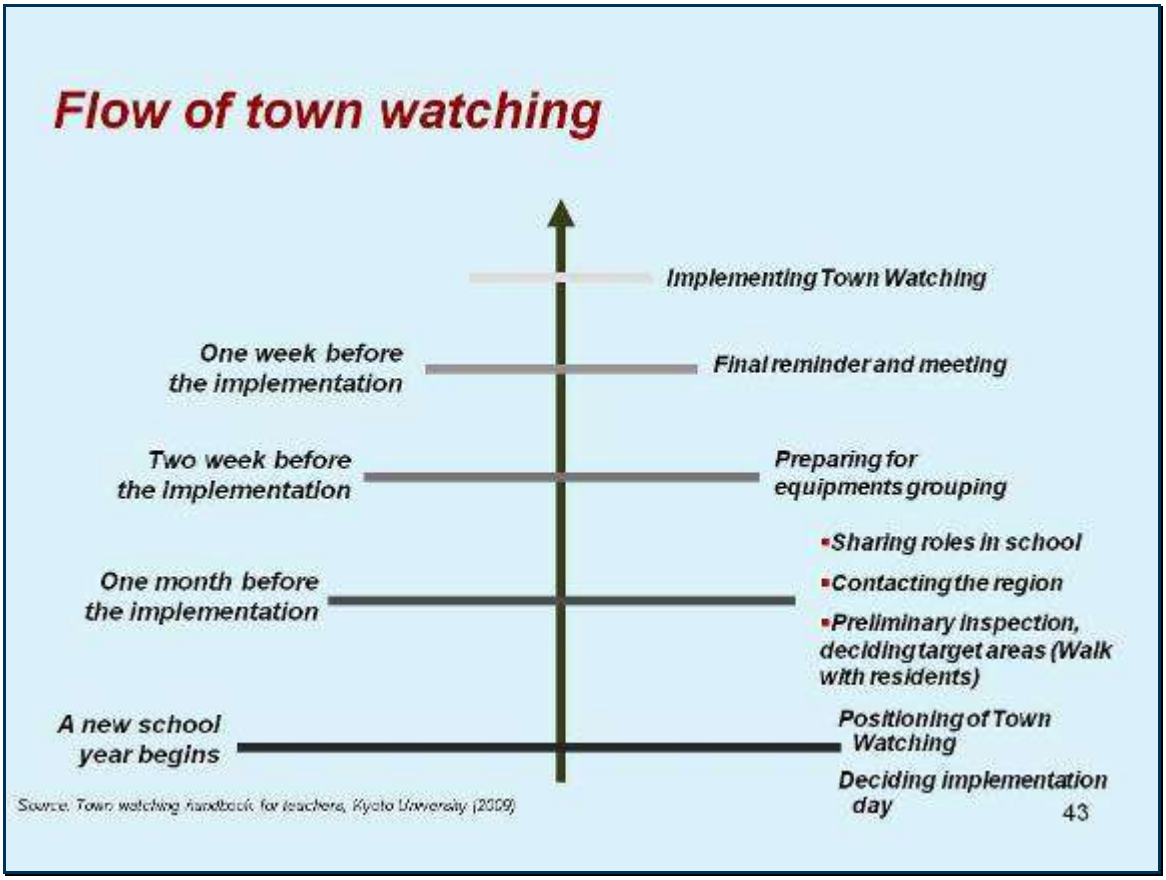
A sample diagram of the seasonal calendar for one of the townships in Myanmar shows how the disaster occurrences are staggered across the year. This information can be very useful for preparedness work. Awareness can be disseminated in advance for impending risks. Schools can conduct drills, stockpile materials, take preventive action, and be on alert according to the upcoming seasons.



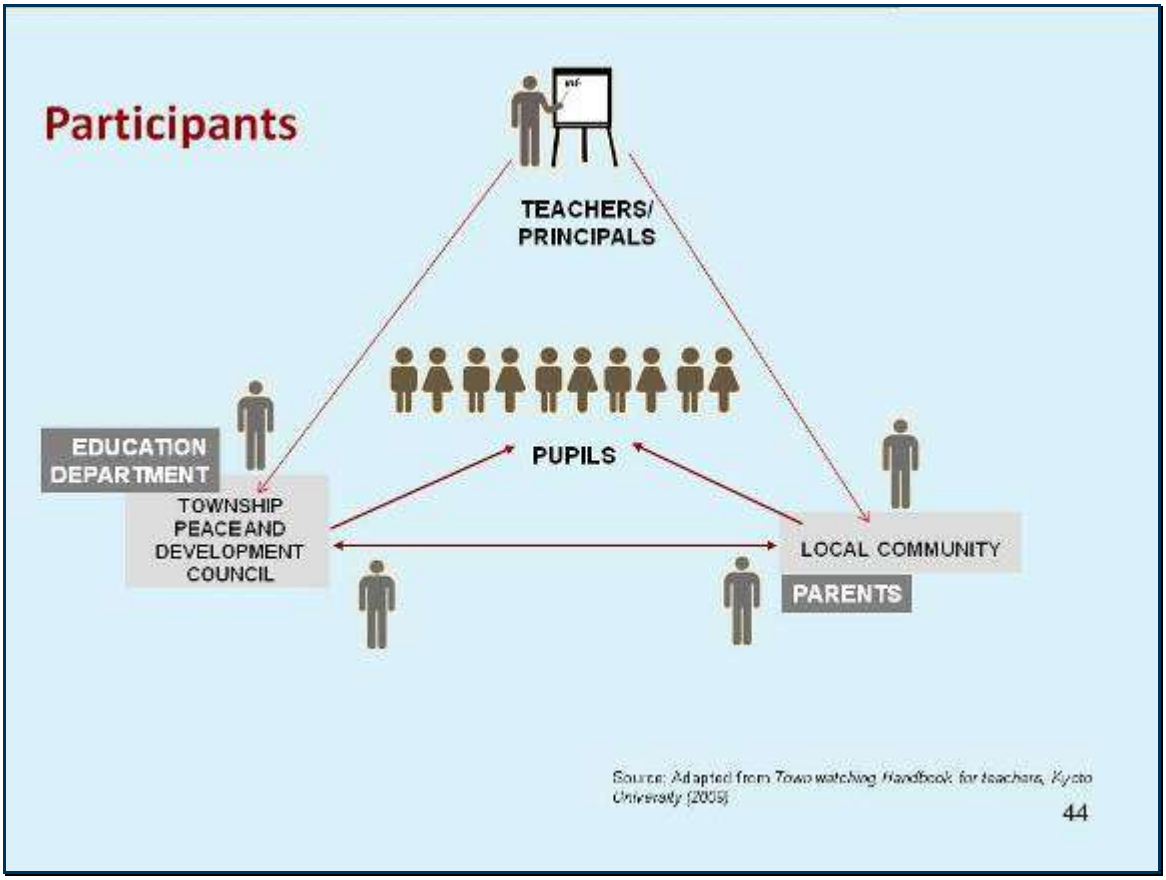
Town watching was originally used as a tool for urban planning. Looking at it from the context of school, it can be initiated by students in school and conducted through guidance by teachers and cooperation from parents, local government employees, community workers and volunteers.



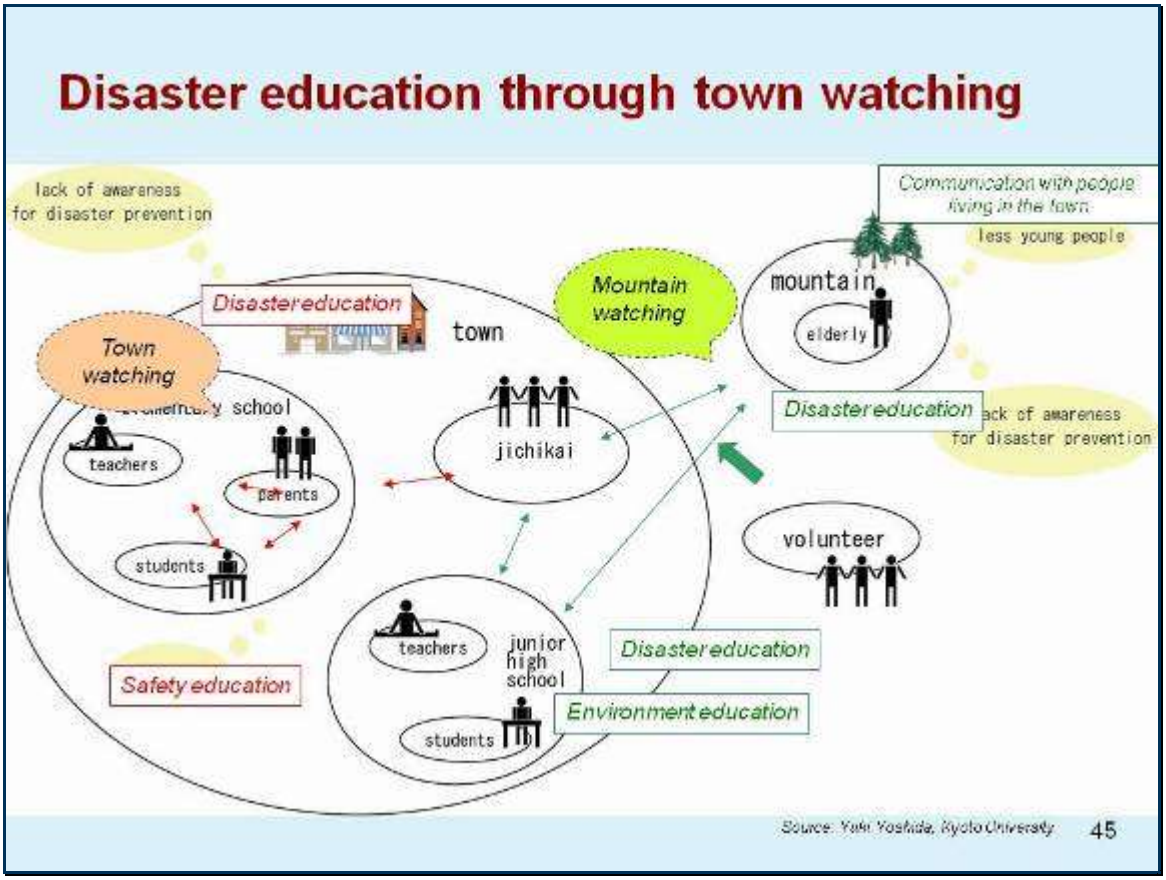
Town watching was originally used as an urban assessment and planning tool, but has emerged as a very effective methodology for risk assessment. It was further developed as a risk assessment tool by the Asian Disaster Reduction Centre, Japan, and is now being applied in many countries. It is gaining popularity because of its simplicity, and yet its ability to capture local nuances.



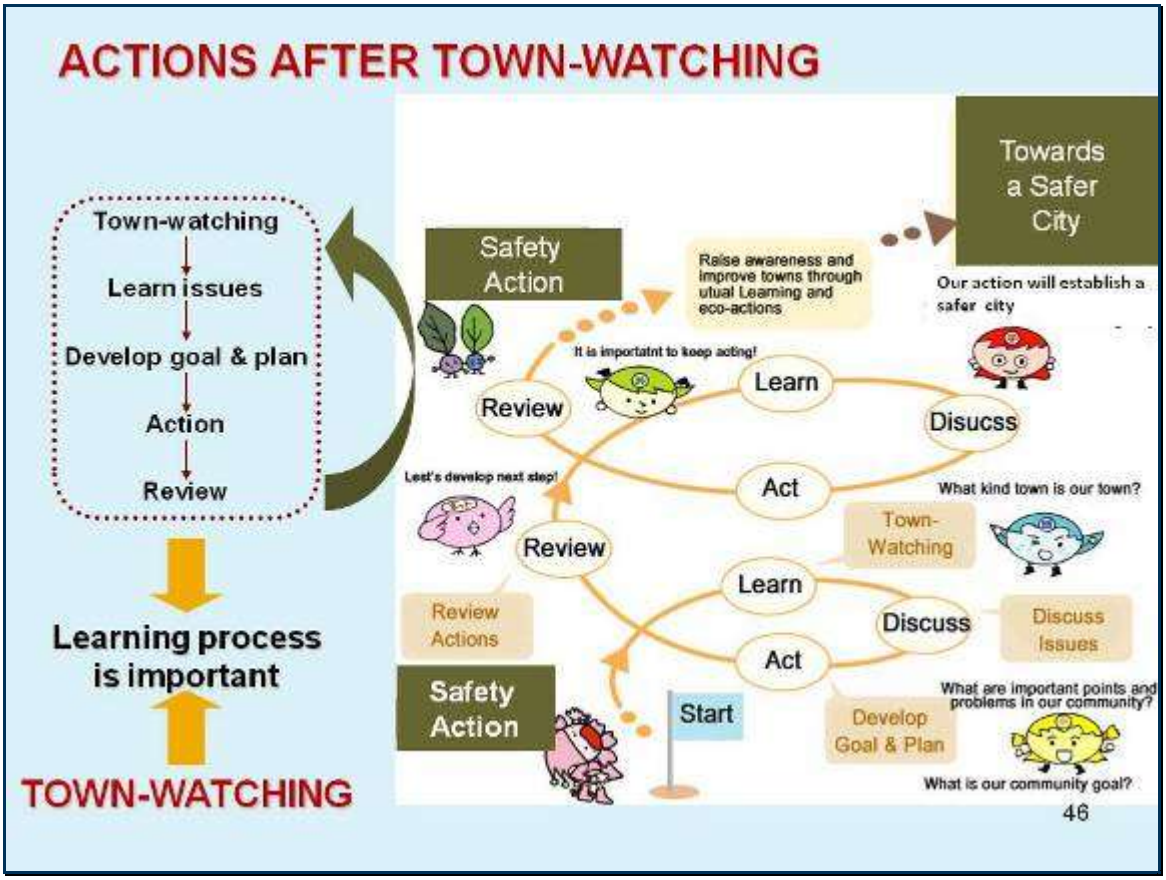
Town watching, though a simple tool, needs advance planning and preparation for being used effectively. It can be carried out at different points in time. The associated activities at different points of time can in fact help mobilise people and create greater cohesion at the local level. It also builds excitement and motivation in the local community.



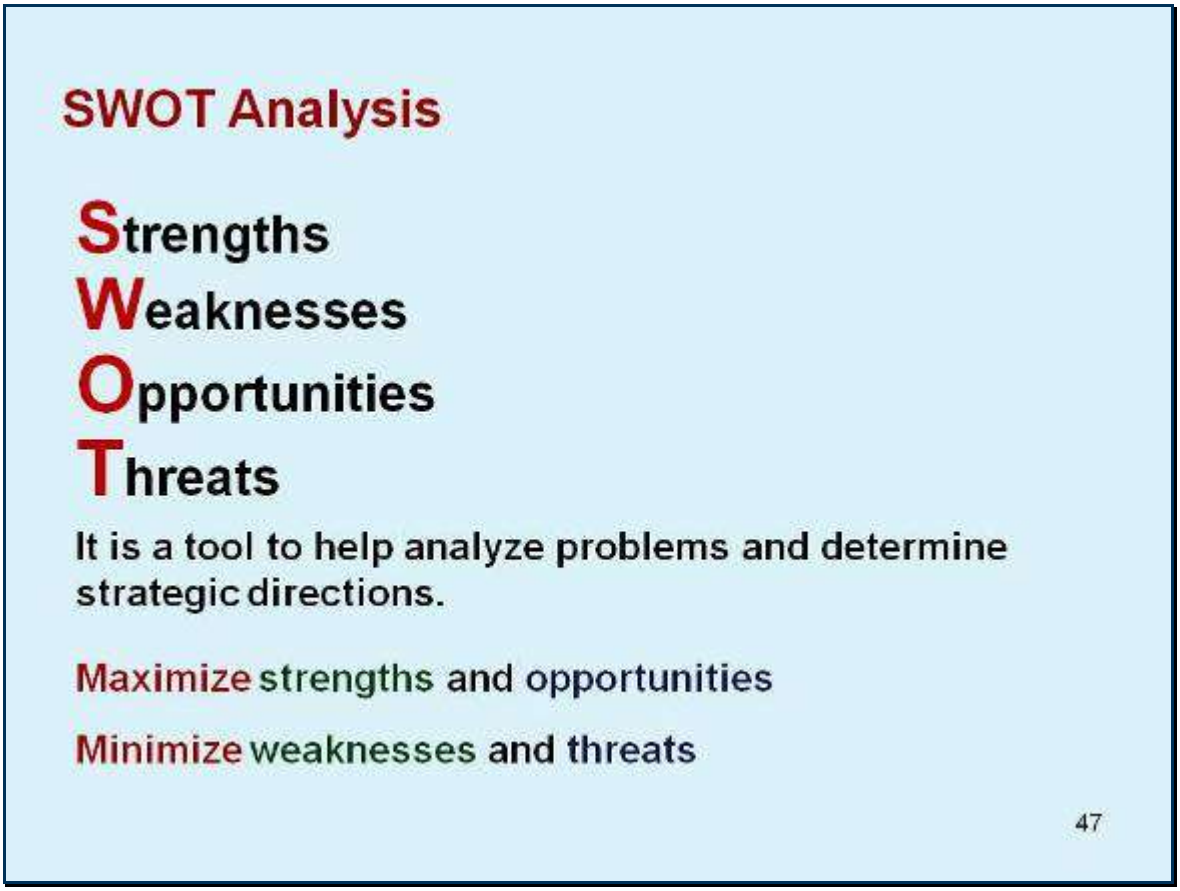
The role of education in the environment and disaster theme is very important. Education has the potential to be the binding factor that links community with government, and brings about disaster and environmental sensitivity in both groups. Education Boards, Parent Teacher Associations and Local Associations can all be organisational entry points for this relationship. All of these can be participants for a Town Watching exercise.



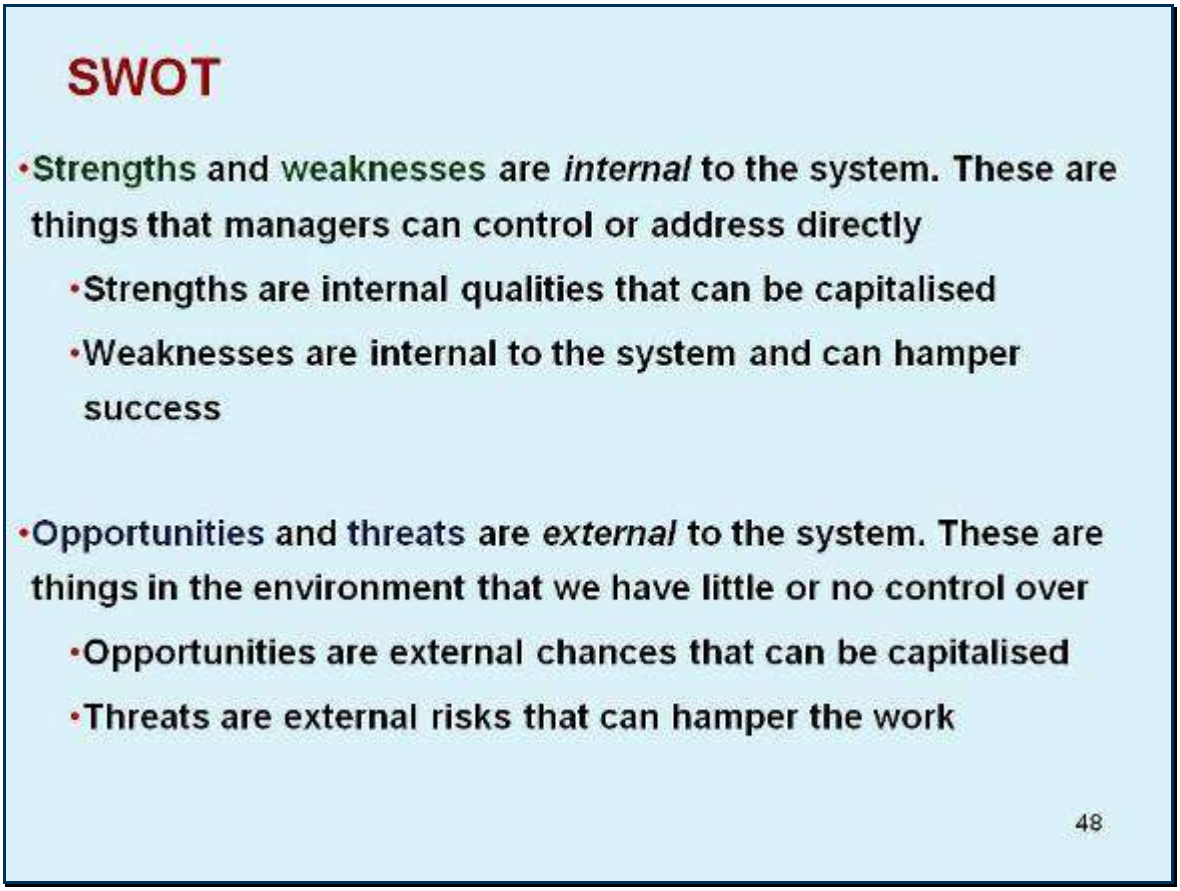
Town watching can be used in any kind of physical and social setting. When carried out in coastal communities it can be adapted to becoming an exercise on coastal watching, which can include observations related to coastal hazards and impacts of past disasters. Similarly, it can be appropriately adapted for use for mountain watching, river watching or even local neighbourhood watching.



Town Watching is much more than a learning process, though the learning component is very important. It can provide very actionable points to be taken up as local safety measures. Safety actions can start from very small scale and micro level, but can add up to a larger and township wide action agenda. In between there can be cycles of learning, discussion, action and review.



SWOT is a very useful tool for reflecting upon the internal and external potential. Its main objective is to determine proactive strategies for maximizing strengths and opportunities while minimizing weaknesses and threats. It is a simple tool and can be used by anyone. It is most effective when used by local persons, or in close consultation with them.



SWOT has to be an honest assessment of weaknesses and threats. Usually we tend to close our eyes to these, but knowing them helps us take action to counter them. Similarly, identification of strengths and opportunities has to be realistic and not over optimistic, so that a true assessment of the potential is made and actions can bear good results. A sample of SWOT analysis can be seen here.

SWOT Analysis

STRENGTHS	WEAKNESSES
1. Well established educational system with curriculum, teachers, administrators in place 2. A very iterate society with a culture of education 3. Importance given by parents to get their students educated 4. School infrastructure across the country, with administrative system from national to local level	1. Remote locations and inadequate access and linkage for many schools 2. Infrastructure in need for repairs and strengthening 3. Lack of local skills on disaster resistant construction 4. DRR being a new subject, not enough learning material available on this
OPPORTUNITIES	**THREATS**
1. Local awareness and interest created in disaster risk reduction after cyclone Nargis 2. Presence of resource groups such as UNESCO can facilitate state-of-the-art learning material 3. New initiatives on strengthening education system by MoE can include DRR 4. Expanding telephone, TV, radio and IT systems in the country can facilitate spread of knowledge	1. Vulnerable position of many areas means that future disasters can give setback to education efforts 2. Too many parallel efforts by many agencies can lead to confusion for the local residents 3. There can be unforeseen disasters that have not been anticipated so far 4. Financial allocations to DRR and education can get affected by other demands on the economy

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Linkage with HFA Priority 2

Identify, assess and monitor disaster risks and enhance early warning.

Implementing Priority 2 requires the collection and use of data on disaster risks, and hence the development and maintenance of capacities and infrastructure to observe, analyse and forecast hazards, vulnerabilities and disaster impacts on the education sector. It involves the use of risk maps, statistical loss information and systems of indicators of risk and vulnerability. It requires developing early warning systems that are people-centered and well integrated into decision-making processes. It calls for the assessment, monitoring and open exchange of information on regional and emerging risks, and the rapid dissemination of early warnings for the education sector. Finally it requires the engagement of local communities, which are the end users of any system and must be fully involved at all stages.

Drought / Dry Zone

Dry zone is part of the central Inner Burman Basin located between 19 to 23 degree north and between 94 to 96 degree east. It covers an area of 67,700 sq km, 10% of the country. The dry zone is surrounded on three sides by mountain ranges and opens towards south. The annual precipitation is less than 750mm. The dry zone receives 3.2% of the country's total rainfall, while geographically it comprises 10% of the total land area.

The dry zone was once a heavily forested region. forest destruction. The deterioration of natural resources such as soil erosion and deforestation has made the agricultural production base unstable. The main reasons include increased human as well as cattle population, demand of fuel wood for domestic as well as industrial use etc. the natural resources of the dry zone are being depleted more rapidly than nature can renew itself.

Earthquake

Geographically, large part of Myanmar lies in the southern part of the Himalayas and the eastern margin of the Indian Ocean. Due to this situation, the country is exposed to the hazards of large earthquakes. Earthquakes have resulted from two main causes:

- The continued subduction (with collision only in the north) of the northward-moving Indian plate underneath the Burma platelet (which is a part of the Eurasean plate) at an average rate of 3.5 cm/yr
- The northward movement of the Burma platelet from a spreading center in the Andaman Sea at an average rate of 2.5-3 cm/yr.

The major fault lines in Myanmar are in northwestern Myanmar, Kabaw fault along the Kabaw Valley; in western Myanmar, the well known Sagaing fault, and the Kyaukkyan fault situated west of Naungcho. The sagaing fault is the most prominent active fault in Myanmar, trending roughly north-south. It has been an originator of a large proportion of destructive earthquakes in Myanmar. This is due to the fact that many large urban centers lie on or near this fault. Most of their dwellings are still non-engineered structures, which are vulnerable to moderate to high intensity earthquakes. The rate of urban growth increases in some large cities like Yangon and Mandalay. Due to urbanization, vulnerability increases in cities and the level of disaster from earthquake would increase in major cities. On the other hand, some large segments of the active fault have not exhibited any significant seismic activity in the past 50-75 years, indicating that the faults are apparently locked and stress is accumulating in these segments.

The highest intensity zone designated for Myanmar is the **destructive zone** (with probable maximum range of ground acceleration 0.4-0.5g). There are four areas in this very vulnerable zone namely, Bago-Phyu, Mandalay-Sagaing-Tagaung, Putao-Tanaing and Kale Myo-Homalin areas.

Important cities and towns that lie in **Zone IV** (severe zone with probable maximum range of ground acceleration 0.3-0.4g) are Taungoo, Taungdwingyi, Bagan-Nyaung-U, Kyaukse, PyinOoLwin, Shwebo, Wuntho, Hkamti, Haka, Myitkyina, Taunggyi and Kunglong. Yangon straddles the boundary between **Zone II** and **Zone III**, with the old and new satellite towns in the eastern part in Zone III and the original city in Zone II.

The most memorable recent earthquake that ever struck the Myanmar territory is the Bagan earthquake of 8 July 1976 in central Myanmar. It had a Richter magnitude of 6.8 devastated Myanmar's royal capital.

On 22 September 2003, an earthquake with magnitude 6.8 occurred in central Myanmar, causing severe damage to rural houses and religious buildings. The earthquake occurred in mid-night, so most of the community centers and school buildings were empty which greatly reduced casualty in the affected areas.

Fire

Fire is the most frequent disaster of Myanmar as on average, approximately 900 cases are reported every year in Myanmar (country report, ADPC). Fire account for approximately 70% of the disasters (Relief and Resettlement Department).

The high incidences of fire in Myanmar are due to climatic conditions including temperature, use of flammable construction material, unplanned development and other social factors. In rural areas, people prefer to live in bamboo houses with thatched roofs made of bamboo shaves and Nipa palm leaves, which are highly inflammable. As these materials are locally and readily available, doesn't require sophisticated technology, and not expensive and above all suit the local weather condition, hence much preferred. The uncovered cinders left after cooking with wood and charcoal, candles left lit even after use, exposure of naked flames and unattended mosquito coils to diesel, petrol and engine oils to also led to many fires in Myanmar.

Flood

In Myanmar, majority of big cities and towns, economically strategic places in the country, are usually situated along four major rivers, namely Ayeyarwaddy, Chindwin, Sittaung and Thanlwin. While the existing river system provides easy access of water transportation, creating prosperous urban centers along the waterways, the flooding in these rivers devastate the lives of inhabitants. Flooding has always been one of the major hazards in Myanmar, accounting for 11% of all disasters. Threat of flooding occurs in three waves each year: June, August and late September to October with biggest danger arriving in August as peak monsoon rains occur around that time. There are 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 the heavy rainfall striking at head water region for considerable period of 1-3 days
- Flash floods in urban areas due to a combination of factors such as cloudburst, saturated soil, poor infiltration rates and inadequate or poorly build infrastructure and in rural areas due to the breakage of water resistance structures as dams, dykes and levees
- Flooding due to cyclone or 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. However, annual riverine floods are considered natural phenomenon in the river basins that help clean the farm lands and replenish the ground with nutrients carried from upriver.

Forest fire

Myanmar is endowed with one of the highest forest cover in Asia-Pacific region with actual forested area of about 344,237 square meter or 50.87% of the total land area. Different types of forest cover can be found in different parts of Myanmar depending on the variation of rainfall, temperature, soil and topography. In the southern part of the country, tropical evergreen forests are abundant whereas in the eastern, northern and western regions, where elevation exceeds 900 meters, moist temperature forests grow. In the central part of the country, as a result of the frequent dry spell and less rainfall, dry forest dominates the region.

In Myanmar, forest fire (referred to as wild fire locally) are mainly surface fire that can spread over a large area but do not turn into intensified burning and contribute to regional haze problem. Nonetheless, surface fires can destroy up to 10 tonnes of forest fuel in one hectare of area. In consequence, 30 to 70 tonnes of top forest soil loss every year occurs. Though Myanmar has high forest cover, in terms of the rate of siltation into rivers, country ranks at 5th place globally.

Due to the extensive forest coverage of the country, the incidents are found in almost all states and division though sporadic. They are more common in upland regions, particularly in Bago, Chin, Kayah, Mandalay, Rakhine and Shan.

The dominating types of forests in Myanmar are residual forest that sheds leaves during dry season. As a result, the associated forest fires, which are normally surface fire, are most frequent during the dry season starting from December until May. Two main sources of forest fire cases in Myanmar can be categorized in to natural and man-made. In Myanamr, foresfire is normally due to man-made forestfire than natural one.

Yet, natural causes of lightening and friction of tightly packed trees is rarely a reason and man-made causes are responsible for majority of the incidents:

- Shifting (slash and burn) cultivation
- Deliberate burning of the forest for hunting purposes

- Careless use of fire (smoking and cooking) in the forest
- Blazing the tree trunk intentionally for collection of seeds
- Purposeful burning of fodder ground to make room for the growth of new grass

Landslides

Geologically Myanmar has two mountainous provinces: the western ranges and the eastern highland. They have steep slopes, unstable geology, and intense monsoon rains. These reasons make these areas the most hazard prone regions in Myanmar. The major river of Myanmar, Ayeyarwady River flows from north to south in the central lowland. Because of flooding and erosion, landslides occur along the banks of this river and its distributaries. Main reasons of landslides are:

- Gravity and slope gradient
- Hydrogeologic characteristics of the slope
- Presence of troublesome earth materials
- Processes of erosion
- Man-made causes
- Geological conditions
- Occurrence of a triggering event

The principal methods in use for landslide mitigation systems are drainage system, construction of retaining wall, and well designed civil engineering infrastructures. At present, bio engineering measures are the most popular and interesting methods amongst them.

Cyclones

Geographical location of Myanmar is exposed to the threat of cyclones and associated severe weather phenomenon and sea waves. Frequency of cyclones that took place on Myanmar coast was just once in about three years but after 2000, cyclone crossed Myanmar coast every year. The cyclone tracks are unprecedented with respect to the latitude and pattern of re-curvature.

Cyclone warnings are issued in two stages. The first stage, known as “Cyclone Alert”, is issued at least 48 hours in advance of the expected commencement of adverse weather over the coastal areas. The second stage, known as “Cyclone warning”, is issues 24 hours before expected landfall. A pre-cyclone watch may be instituted prior to the cyclone alert and a post-landfall outlook is issued for areas in the interior which may be affected by the cyclone by the cyclone as it continues to move inland and dissipate.

Cyclone Bijli

Cyclone Bijli (JTWC designation: 01B, also known as Cyclonic Storm Bijli), was the first tropical cyclone to form during the 2009 North Indian Ocean cyclone season. Cyclonic Storm Bijli formed from an area of Low Pressure on April 14. A storm surge of 1.8 to 2.4 m (6 to 8 ft) was also expected to impact coastal areas of Myanmar close to the Bangladeshi border. An estimated 6,000 fishing trawlers were to return to port by the afternoon of April 17.Following the devastating results of Cyclone Nargis almost a year prior, officials in Myanmar urged residents along the coast to evacuate. Thousands of residents living in rural villages sought shelter in inland towns along the coast of Myanmar. The entire village of Aukpyunewa evacuated after hearing about an approaching cyclone on the radio. The storm produced little or no storm surge in Myanmar as it made landfall; however, the remnants of Bijli produced heavy rains over northern areas of the country before the storm dissipated. During the early morning hours of Saturday, April 18 (afternoon EDT on Apr. 17) NASA's Tropical Rainfall Measuring Mission (TRMM) satellite indicated that Tropical Cyclone Bijli was producing heavy rainfall over southeast Bangladesh as it moved ashore. These rainfall amounts of over 50 millimeters (almost 2 inches) per hour were the heaviest caused by Bijli in the countries that border the Bay of Bengal since Bijli formed.

Storm surge

Storm surge is the extra ordinary flooding due to storm. It generally occurs after waves are produced by strong wind in tropical revolving storm. The slope of the coast line is also an important factor controlling the intensity of storm surge..The storm surge or flooding accompanied with cyclone largely depends on the place of landfall and its path. In accordance with the last experience of Cyclone Nargis 2008, water bodies along the

storm path are undeniably important in surge estimation. Following factors control the 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

The highest surge during the cyclone was in Pyinsalu (Laputta Township) of 7.6 m which occupied 90% of land for several hours.

Warning forecast and dissemination

Technological advances make it possible to know about disasters before they hit. Satellites, weather observatories, rain gauges, river monitoring systems, floating equipment in the seas, earthquake recorders embedded in ground and computers are all very useful in forecasting disasters. However, forecasting is only a part of the exercise. The second part is of sending this information out to everyone concerned as fast as possible. This is known as warning dissemination.

The elements of early warning systems most likely to fail are the last two – dissemination and communications of warning, and response capability and preparedness to act. A people-centred approach is especially essential for these two elements, one that focuses not only on the science and technology behind the warnings, but also on the social and psychological aspects of early warning and early action and on activities to build a culture of prevention, rather than a culture of short-term response.

The devastation caused by Cyclone Nargis in Myanmar in 2008 was not due to a technical failure in the early warning service – warnings were provided by the Myanmar Meteorological Service – but to a failure in the other elements of effective early warning, especially communications and preparedness to act. However, the Cyclone Nargis case should not be oversimplified but used to illustrate the enormous challenges faced by efforts to create early warning systems. Whether due to climate change or not, Cyclone Nargis was highly unusual. It did not follow ‘normal’ cyclone tracks, but hit from the west and forced water up the Irrawaddy Delta, flooding the vast low-lying delta very quickly. And even if the warnings had reached the delta’s residents, it was such an unusual event that many people would not have believed or been prepared to act on the warnings. Their

capacity to evacuate the area would have been severely limited by poor roads and infrastructure.

(World Disaster Report, 2009)

Exercise 3

- For conducting this assessment exercise, organize yourself into groups of four.
- Now make a table and divide it into four parts each under the following heads: location, structural risks, non-structural risks and actions to be taken to reduce risks.
- List down each location within the school and detail out the structural and non-structural risks that the location is exposed to.
- After making this assessment, work towards recording the actions which must be taken to reduce or remove that risk.
- Use the format given below for the purpose of carrying out this exercise.
- If any data / information is not available, you may make appropriate assumptions

Location	Structural risks	Non-structural risks	Actions to be taken to reduce risk
Classrooms			
Laboratories			
Staircase			
Staff room			
Compound wall			
Corridor			
Roof			
Toilet			

Examples of risks:

- Weak and leaking building
- Cracks in wall
- Opening of joints
- Chemicals stored in glass bottles that can fall
- Only one exit
- Exit route hampered with furniture
- Big furniture that can fall and close exit
- Dark corridors with no light
- Exposed and hanging electrical wires
- Storage of combustible material
- Others (If any) _____

Examples of Risk Reduction Actions:

- Building retrofitting
- Strengthening and tying down of roof
- Fixing string stoppers to stop bottles and books from falling from shelves
- Put signage to warn of risks
- Put signage for exit routes
- Identify and create alternate exits for emergencies
- Map all risks and prepare disaster management plan
- Conduct drills to practice the plan
- Reorganize furniture and materials so that it is easy to move around
- Install firefighting equipment, like sand buckets
- Training of students and teachers on fire fighting and emergency drill
- Others (If any) _____

Exercise 4

SWOT analysis

- Allow the trainees in their remained groups
- Make a matrix on a chart paper, dividing it into four parts: strengths, weaknesses, opportunities and threats
- Now list down the strengths, weaknesses, opportunities and threats to the education sector
- After the matrix is complete, brainstorm over what strategies can be pursued to maximize strengths, reduce weaknesses, take advantage of the opportunities and minimize the threats

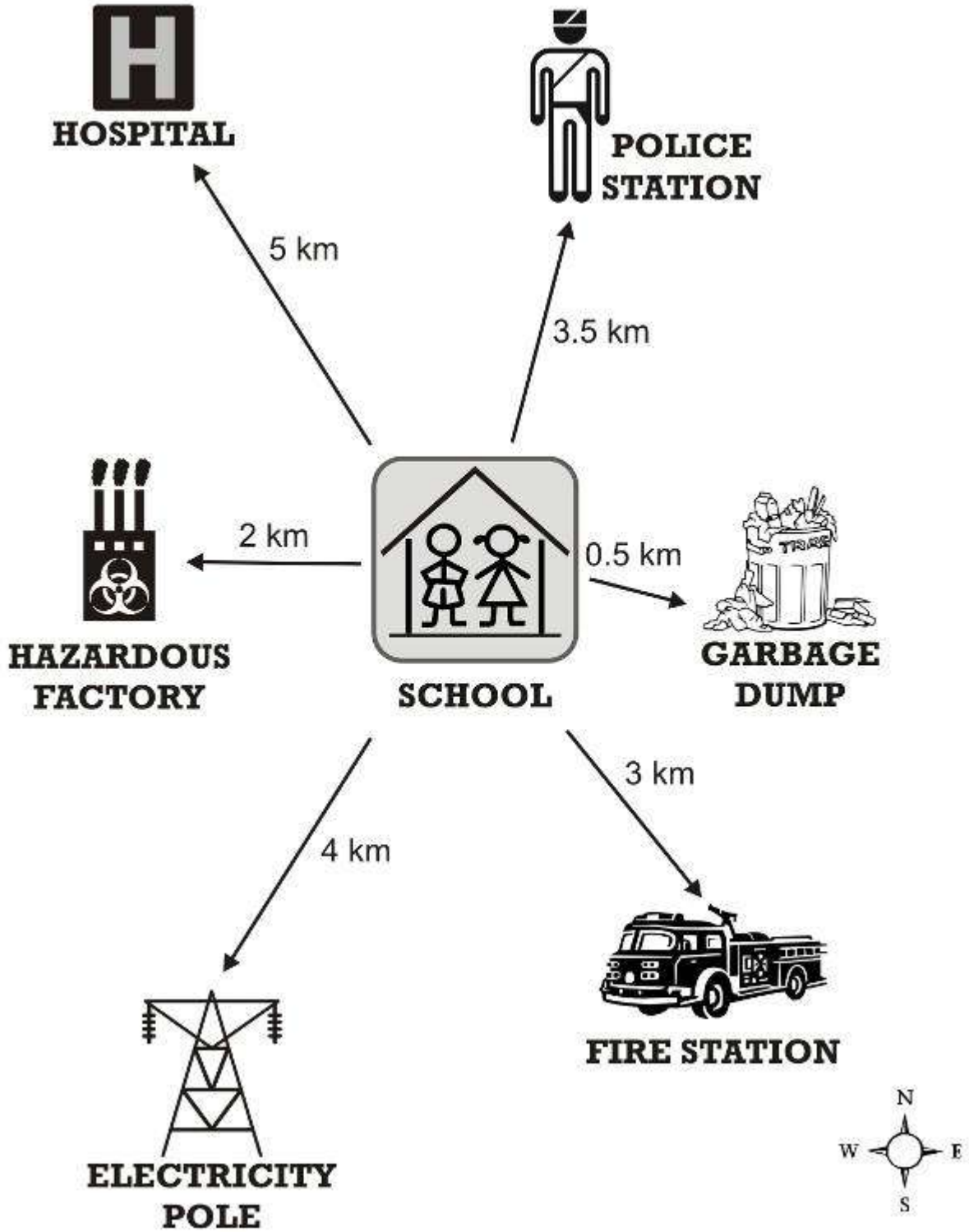
Strengths	**Weaknesses**
Opportunities	**Threats**

Exercise 5

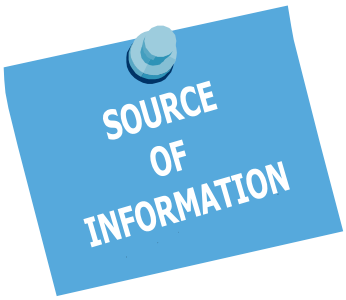
Risk and Facility Map

The school administration along with the students must map the facilities and risks that exists around the school

For example:



SCHOOL



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1. HAZARD PROFILE OF MYANMAR

This module gives a brief profile of the nine hazards prevalent in Myanmar: earthquake, drought, fire, forest fire, flood, landslide, cyclone, storm surge and tsunami.

2. CAPACITY ASSESSMENT

It is the identification of people's coping strategies, resources available for preparedness, mitigation and emergency response; and the analysis of who has control over the available resources.

3. WARNING FORECAST AND DISSEMINATION

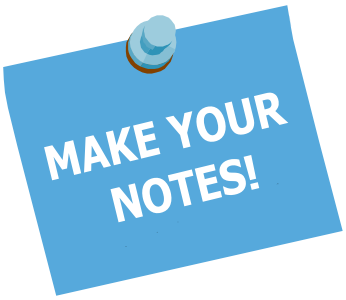
Though a disaster is predicted in advance with the use of technology, warning dissemination is usually the weakest link. A clear line of communication must be defined while planning the disaster management activities.

Exercise 3

Location	Structural risks	Non-structural risks	Actions to be taken to reduce risk
Laboratories	The building is 12 years old and has visible cracks	Gas cylinder unsecured	Secure cylinder Structural assessment, maintenance and repair
Staircase	Made of wood / completely decayed and can collapse under heavy usage		Need to be replaced or rebuilt immediately
Staff room		Cupboards used as partition walls are unsafe and can block exits	Remove immediately
Compound wall	The left compound wall perennially damp due to high tide, Water seepage		Need plastering
Corridor		Old cabinets placed in the open corridor can fall and hurt anyone	Proper storage to be identified
Roof	Made of thin asbestos sheets. Weak against cyclones and heavy winds		Identify more durable alternative / material and replace.

Exercise 4

Strengths	Weaknesses
Institutions Culture of reading and education Respect for teachers and schools Visibility of schools Linkages with government	Lack of resources Less availability of teachers Poor infrastructure Old buildings and infrastructure
Opportunities	**Threats**
Post Nargis attention and resources Higher level of local awareness Felt need for such programmes Government support	Increase in disaster events Climate change related disasters More population in high risk areas Cultural invasion of alien lifestyles


MAKE YOUR
NOTES!

United Nations
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UNESCO Myanmar Education Recovery Programme
Education for Sustainable Development Unit
UNESCO Asia and Pacific Regional Bureau for Education,
Bangkok.
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Plan
Be a part of it.

TH/2010/ED/003