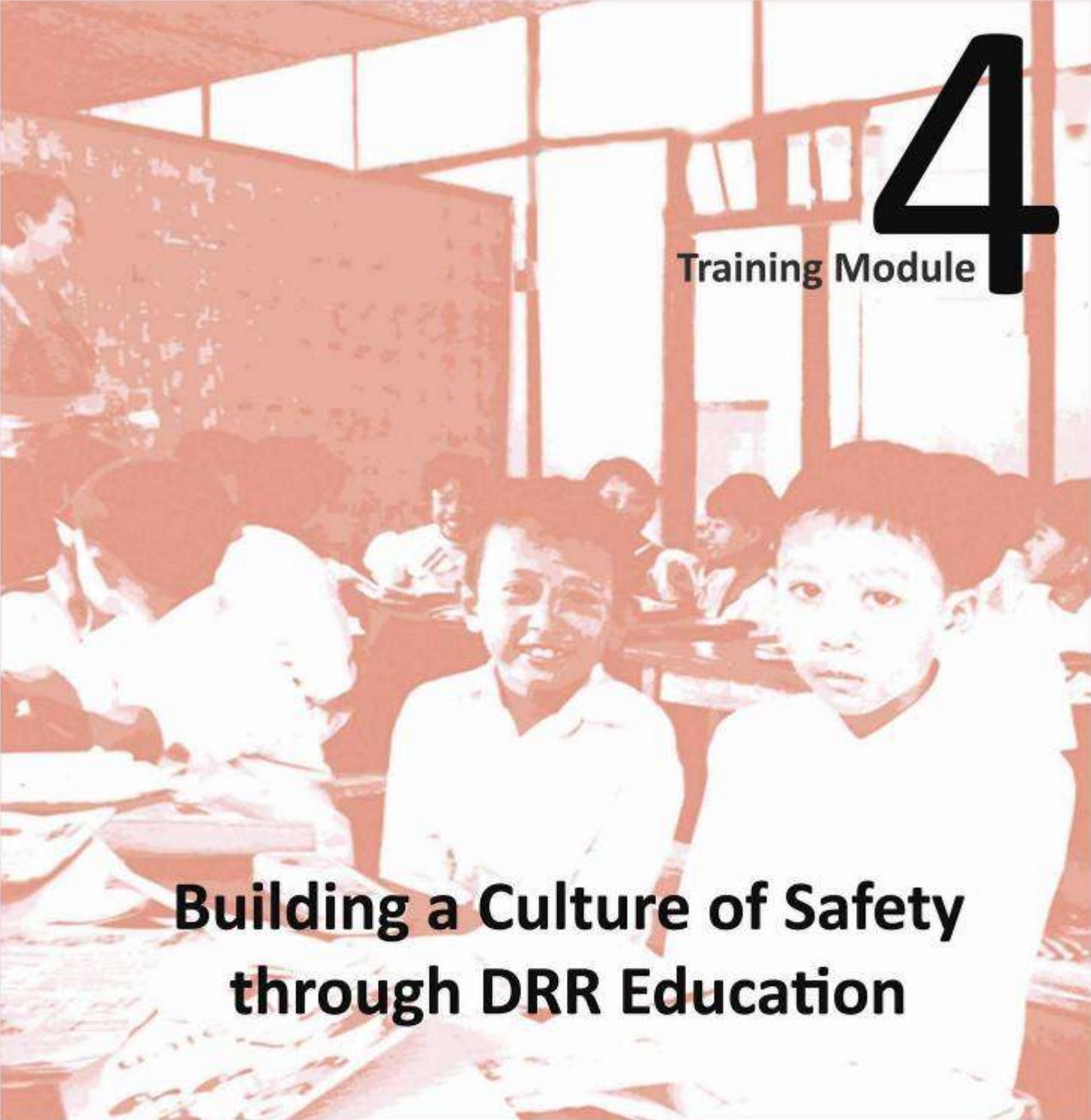




4

Training Module



Building a Culture of Safety through DRR Education

**Ministry of Education and UNESCO
(February 2010)**

Module (4) Building a Culture of Safety through DRR Education

Developed by
UNESCO in consultation with Ministry of Education, Myanmar
(January 2010)

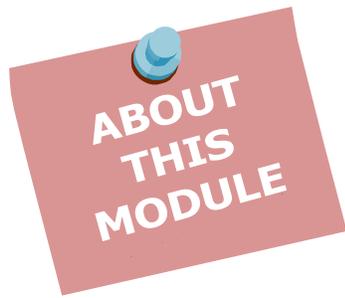
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Module 4
BUILDING A CULTURE OF SAFETY
THROUGH DRR EDUCATION

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LEARNING OBJECTIVES

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

- ❖ Understand the importance of DRR in education
- ❖ Develop an understanding on risk communication tools and methods of formal and nonformal disaster education
- ❖ Link indigenous knowledge with disaster risk reduction education

METHODOLOGY

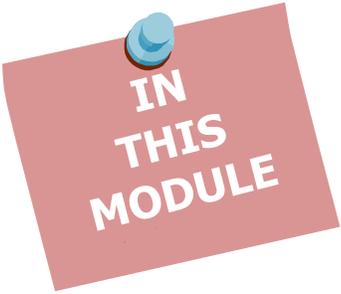
Focusing on the formal and nonformal methods of education, this session explains the role of disaster education. It elaborates on the link of disasters with education, environment and sustainable development. The exercise directs the participants to brainstorm over activities to be undertaken to reduce a school's vulnerability to disasters.

TIME

The total session will be of 2.5 hours, structured as follows:

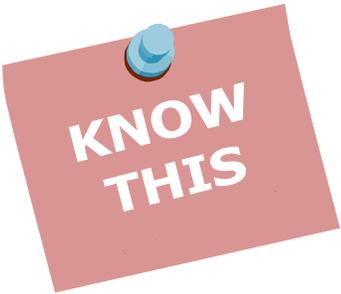
Presentation: 60 minutes

Exercise: 90 minutes



**IN
THIS
MODULE**

- Role of knowledge in school safety
- Formal, nonformal and informal DRR education
- Disaster – environment linkage
- Education for sustainable development
- Methods for disaster education
- Risk communication
- Environment and disaster mitigation course
- Indigenous knowledge and DRR applicability



**KNOW
THIS**

Module 4

**BUILDING A CULTURE OF
SAFETY THROUGH DRR
EDUCATION**

1

Hyogo Framework for Action

Priority 3:

“Use knowledge, innovation and education to build a culture of safety and resilience at all levels”

Looking through an education lens:

“Building a culture of safety through DRR education”

2

The HFA Action Priority 3 focuses on education (formal, nonformal and informal), public awareness and strengthening networks and promoting dialogue and cooperation among disaster experts, technical and scientific specialists, planners and other stakeholders. Its direct implication for the education sector is the need to address DRR issues in education, and to develop relevant content for that. Its effective implementation should help create a culture of safety.

Indicative Activities

- **Information sharing and cooperation within the education sector**
- **Networking and dialogue across disciplines and regions**
- **Use of standard DRR terminology**
- **Inclusion of DRR into school activities, formal and informal education**
- **Training and learning on DRR: community level, local authorities, targeted sectors; equal access**
- **Developing research capacity: multi-risk; socioeconomic; application**
- **Public awareness and media**

3

The HFA emphasizes on inclusion of disaster risk reduction subject matter in formal, non-formal, and informal education and training activities. Involving academic institutions is the sustainable way to introduce/mainstream risk reduction in the education process. Across government agencies, academia and the community, the range of activities can be wider, covering direct knowledge actions as well as indirect awareness and sensitization activities.

Indicators of Progress

- **A public awareness strategy for DRR exists that reaches all communities and people of all education levels**
- **School learning processes at all levels include DRR elements and instructors are trained in DRR through to local levels**

4

The existence of a strategy at the national level and the implementation of learning actions at the local level are the ultimate desirable impacts that need to be seen. The engagement of both national and local stakeholders is a necessity for this to be achieved.

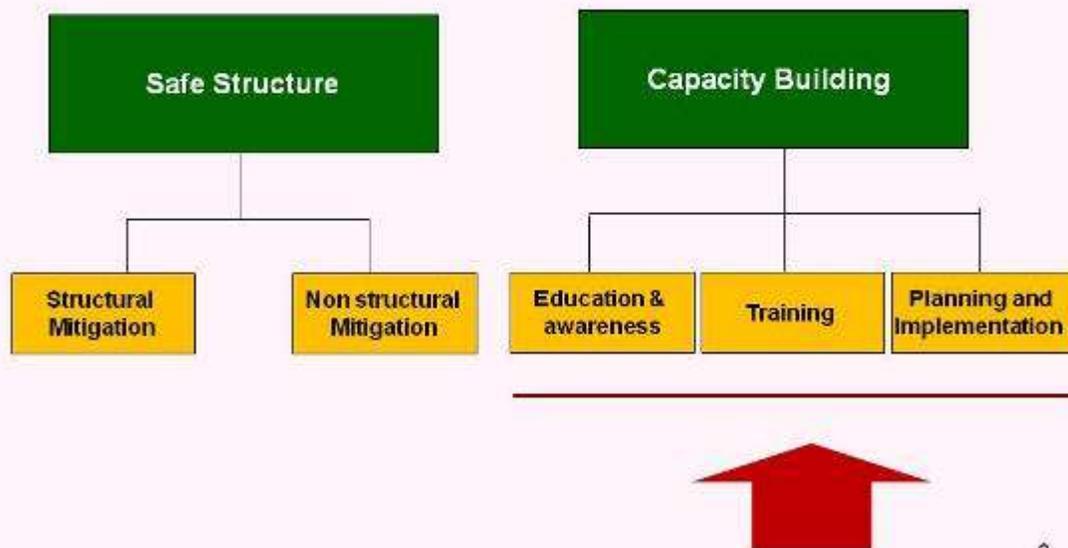
Culture of Safety

- **Capacity building** constitutes efforts aimed to develop human skills or societal infrastructure within a community or organization needed to reduce the level of risk.
- When the efforts address sustainable environment, development and education, they need to be at two levels:
 - **Safety**, covering specific steps to be taken
 - **Culture**, covering attitudinal approach to a lifestyle that is safe

5

A culture of safety can be built among students and teachers by means of planning and organising school disaster preparedness activities.

Role of Knowledge in School Safety



6

The knowledge and education component is an integral part of a larger school safety framework. School safety includes structural safety as well as human resource capacity building. It is advocated that while beginnings are made with DRR interventions through training and education, it may be targeted to eventually establish a national school safety programme that is holistic.

Note: Structural and nonstructural mitigation is explained in Module 6.

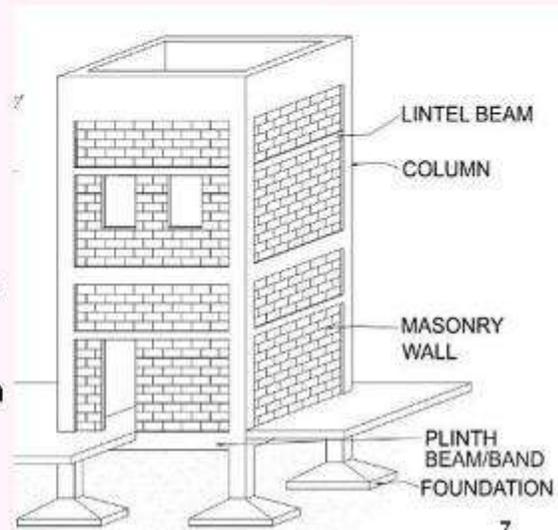
Building Safety through Retrofitting

Retrofitting is a set of safety actions taken to upgrade the disaster resistance of an existing building structure to make it safe in the event of a future disaster

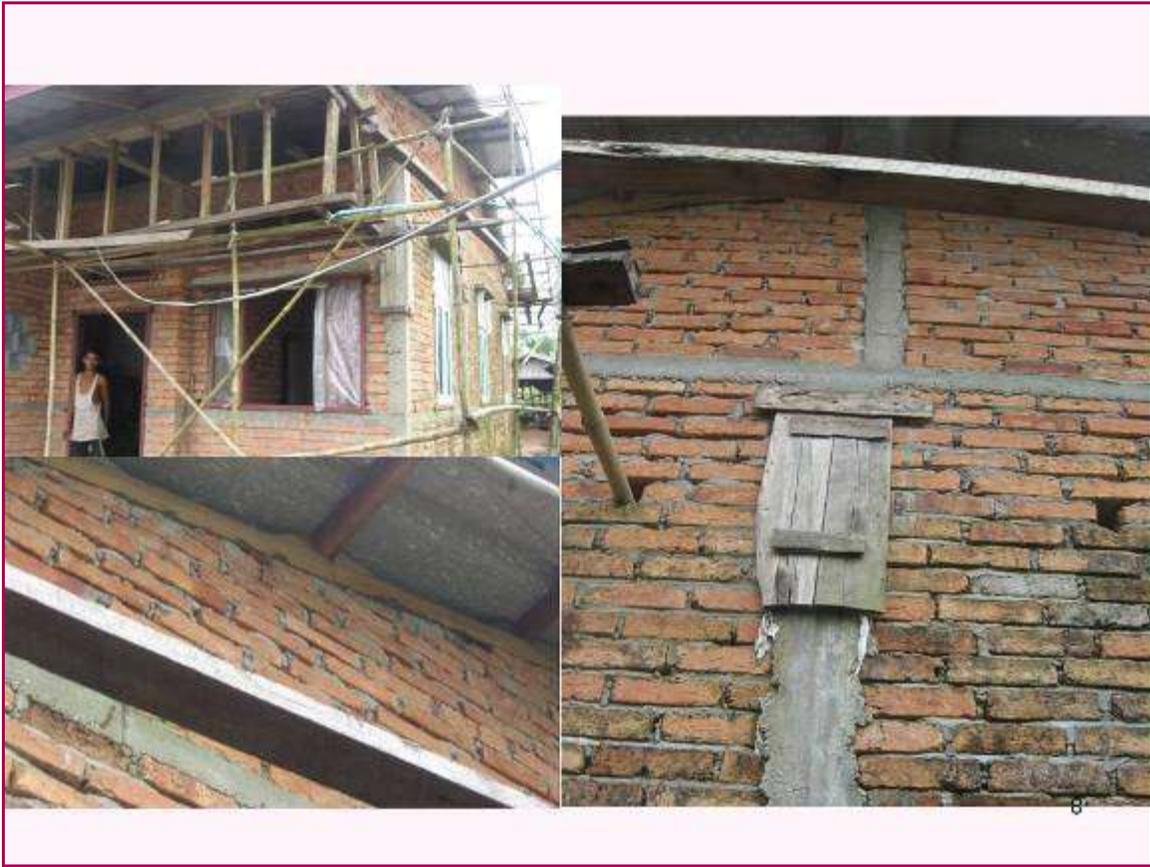
Source: SEEDS

It can be implemented by:

- Providing ring bands
- Adding shear walls or strong column points in walls
- Bracing roofs and floors
- Adequately connecting roofs to walls and columns
- Providing connections between walls and foundation



Building safety is best ensured at the time of construction of the building. There are, however, many existing buildings that are not safe enough. For such buildings the process of 'retrofitting' is used, which involves the introduction of disaster resistant features into existing buildings. It costs a small percentage of the cost of construction of a new building.



This example from a school in Shimla, India, shows how a brick and stone masonry building was retrofitted using simple techniques. The process, though simple and much less expensive than a new building, turned the old and unsafe building into a disaster resistant one.



As part of the retrofitting process, weak elements of the structure, such as corners, openings and roof joinery is strengthened with added structural elements such as reinforced bands, corner reinforcements, and through stones that bind walls together.



10

The retrofitted building is safe for children, and will not collapse in a disaster such as an earthquake. During the retrofitting process children see the masons at work and learn about the need for building safety and its basic principles. The local community also sees and learns from the process. Local masons can be trained with hands on sessions. Disaster resistant buildings are thereafter aspired by local house owners too.

Damages

Collapsed concrete block sidings

Staircase roof was directly hit by block sidings that collapsed from the gymnasium gable wall.

Collapsed Autoclaved lightweight (aerated) concrete panel and precast panel sidings

Exterior sidings was damaged and had fallen, when they could not follow the seismic deformation, or when they collided with adjacent structures (main structures were steel in both cases).



The building safety science for schools was taken very seriously in Japan after the Kobe earthquake of 1995. Retrofitting can be done in a very detailed and scientific manner, but that brings high costs. Scientific institutions in Asia have developed simpler and low cost technologies for retrofitting that are being extensively used for school buildings in India, Nepal, Indonesia and Afghanistan.

Safe Structures for Myanmar



Building safety for timber structures has also been studied in detail and simple and low cost technologies demonstrated. The images from Myanmar are of a prototype of a safe timber structure, which has been made safer by introduction of the cross bracings, roof ties and foundation anchorage that are shown in red.

Pre-disaster actions to educate on how to react when a disaster occurs:

- **Formal and Non-formal teacher trainings and pupil/student education, accomplished through guidebooks.**
- **Media education and training sessions, modules**
- **Developing and providing guide books and other teaching and learning materials.**
- **A pupil-to-parents initiative and other community based educational dissemination programmes.**

13

People react instinctively when a shocking thing suddenly happens. It is not possible to communicate to them or train them on the right ways of acting at that time. Such training or education needs to be done well in advance, and needs to be repeated so that it gets engrained in the minds. There are various tools and media for doing this, both through formal and nonformal means. Nonformal means are better for reaching out to the larger community.

Actions to educate on how to react in post-disaster situations:

- **Trainings shall pre-structure possible post disaster action-scenarios in the individual and collective minds of the vulnerable/ the people at risk.**
- **Formal and non-formal teacher trainings, accomplished through guidebooks.**
- **Providing guide books and other teaching and learning materials.**
- **A pupil-to-parents initiative, and other community based educational dissemination programmes.**

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Similarly, post disaster situations require appropriate actions. After a disaster there is usually chaos all around. Emergency response agencies cannot reach everyone immediately. People have to take care of themselves till external aid arrives. Education, training and awareness plays a useful role for this too. Again, nonformal education can reach out to larger community groups and have an attitudinal impact.

Function of DRR education

Disaster Cycle and School Functions

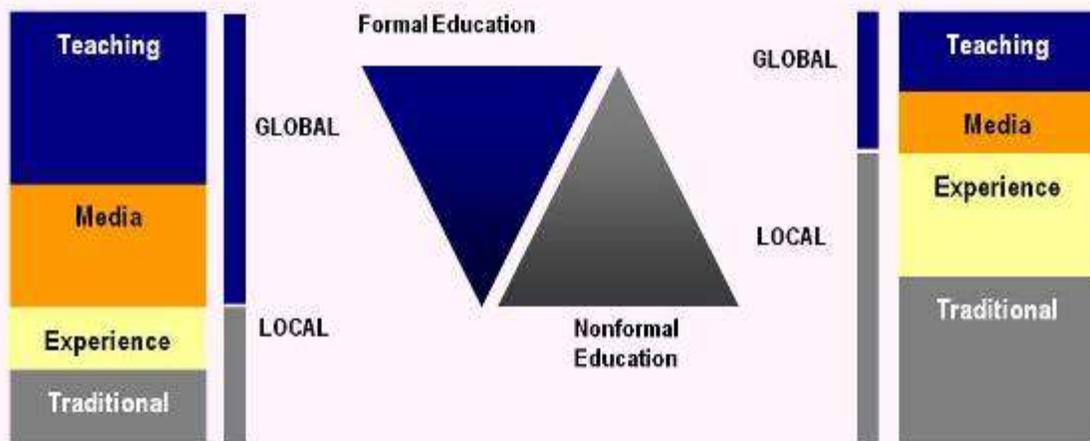


Disaster and School
Maiko High School, Environment and Disaster Mitigation Course
by: Sawa, Seiji

15

Disasters are repetitive events, but it is important to build capacity in the intervening time periods so that with every experience, the losses can be reduced. On occurrence of a disaster, the relief functions are most important for the first few weeks as part of emergency management to ensure survival of the affected communities. Disaster education, however, should also start in parallel with relief functions so that it gets mainstreamed in all activities right from the beginning. Thus DRR will become an integral part of recovery work, and will not be added as an extra element at the end of the rehabilitation process. This will make it more effective.

Knowledge through Formal and Informal Education



16

Within the knowledge component, there is a need to stress on both formal and nonformal education. At the local level, however, nonformal education has a greater potential and a role to play. It is not dependent on high tech systems and external resources. It relies more on traditional wisdom and experiential learning, which is in abundance at community level in Myanmar. It only requires minimal external assistance to channelise this knowledge into actionable programmes.

Disaster – Environment Linkage

- ❑ Poor environmental management increases the risks of disasters, and disaster events have negative impacts on the environment.**
- ❑ Environmental concerns are usually not incorporated in disaster management practices.**
- ❑ Decisions and actions on environment and disasters are often taken separately, and roles and responsibilities are distributed among different and separate institutions.**

17

Disasters are in fact often the result of environmental exploitation and degradation. When mangroves and vegetation is cut down, it gives rise to erosion and also allows storm surges to move inland faster, turning a storm into a devastating killer. Sound environmental management practices are actually very effective DRR mechanisms.

Disaster – Environment Linkage

- **The goal of Environment and Disaster Management is the safety and sustainability of human lives**
- **Safety is related to avoiding death and injuries to human lives during a disaster**
- **Sustainability is related to livelihood, socio-economic, cultural, environmental and psychological aspects**

18

The concept of SUSTAINABILITY is very important for disaster management that helps communities in the long run. Sustainable development ensures that the environment is not exploited beyond the point where it can regenerate and continue to provide benefits endlessly. Sustainability of lifestyles as we know them has to include income, social interactions, physical and mental health, and basic protection.

Disaster, Environment, Development and Risk Reduction



19

Development and Environment are very closely linked. Development is mostly dependent on utilisation of environmental components, and when it exceeds its limits, it becomes detrimental to the environment. This relationship is also directly linked to disasters, as it can increase capacities, or increase vulnerability depending on how sustainable it is. Often phenomena such as social conflicts and migration are also manifestations of poor development and environment management, and are disastrous to the local population.

Education and Development

Education is the key to development

“Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues.”

The World Summit on Sustainable Development (WSSD, 2002)

20

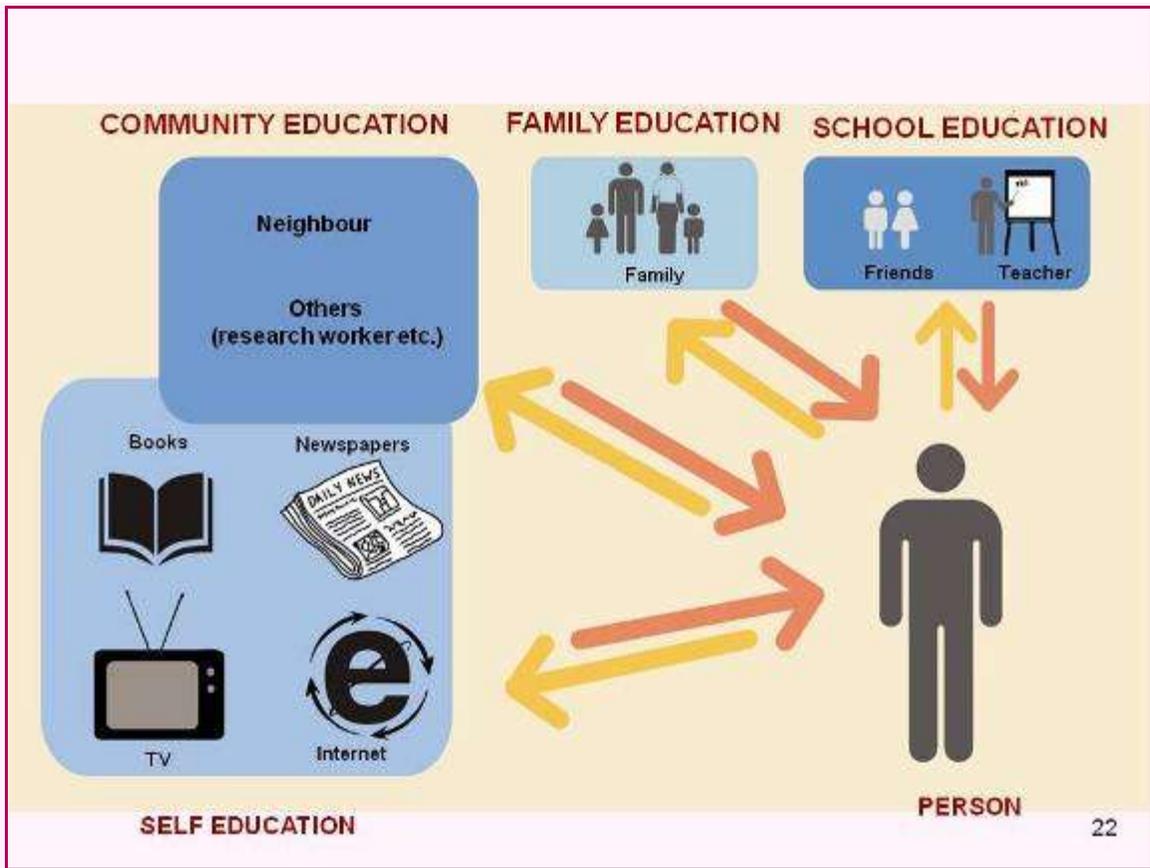
To turn sustainable development into reality, education is an important process, which can generate young professionals, who in turn can provide important tools and methodologies of expert knowledge. Besides creating agents of change, education also raises the basic level of understanding and sensitivity of the general masses, thereby making the work of promoting overall sustainability and DRR easier.

Tasks at institutional level

- **Making disaster education an integral component of school based learning through formal and non formal education.**
- **Promoting process based disaster education rather than text book teaching. Disaster education can be made part of co-curricular activities**
- **Conducting regular training of the teachers and review of action plans for different types of hazards**
- **Formulation of local awareness strategies and conducting of workshops, drills etc.**
- **Assessing the situation to know if activities are actually carried out**

21

At the institutional level, adopting an approach of integrating disaster risk reduction related education in the school system is the most important step for building resilience. For such introduction of educational content, it is desirable to keep a significant part of it in the non formal sector so that it does not create additional burden, but on the other hand is interesting to learn and spreads quickly beyond schools into surrounding communities.



The approach of giving importance to the nonformal education model is based on the priority to self learning, community education and family engagement besides school education. These media and stakeholder relationships will help make the programme sustainable and will hugely increase its outreach.

Useful methods for disaster education

- Workshops and events
- Games
- Integrated disaster reduction drills
- Town watching



23

In the nonformal education domain, there is a very wide range of methodologies and tools available according to the nature and level of message being conveyed. While workshops are best suited for teachers and active role players for education, public events, drills and field activities are best suited for community groups. For the school children, games are the most effective as they are interesting and engaging.

Useful methods for disaster education

- Dissemination of messages through IEC material
- Activities like essay competitions, plays, and contests
- Sharing of experiences from community elders



In line with the principle that participatory learning has greater impact than lecture based teaching, the focus of disaster education needs to be also on visual awareness material, activities and experience sharing. The high visibility material is attractive not only for school audiences but also for parents and the community at large, thus taking the message wider.

Knowledge is the key

- **On December 26th 2005, British girl Tilly Smith's geography lessons saved many lives in Thailand when a Tsunami struck.**
- **Tilly had learnt about tsunamis in her geography class a few days before she took a holiday to Thailand with her family. When she saw signs of a tsunami, she alerted her parents and they saved about 100 persons on that beach.**
- **Her knowledge of tsunami came in use even though there are no tsunamis in the country where she lives!**
- **Every bit of information can make a difference during a disaster.**

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Tilly smith's story has become an international good practice. A few days before she went to Thailand for a holiday with her family, she had been told about tsunamis by her geography teacher in a class at her school. Though there are no tsunamis in England, her teacher still taught the students about them. While at a beach in Thailand, she saw the sea receding, and could relate it to be a pre-tsunami phenomenon. She alerted her parents and other persons at the beach not to run into the receding waves but to go to higher ground. She thus saved many lives.

Risk Communication

- **An interactive process of exchange of information and opinion among individuals, groups and institutions regarding risks**
- **Discussion about risk types and levels and about methods for managing risks**

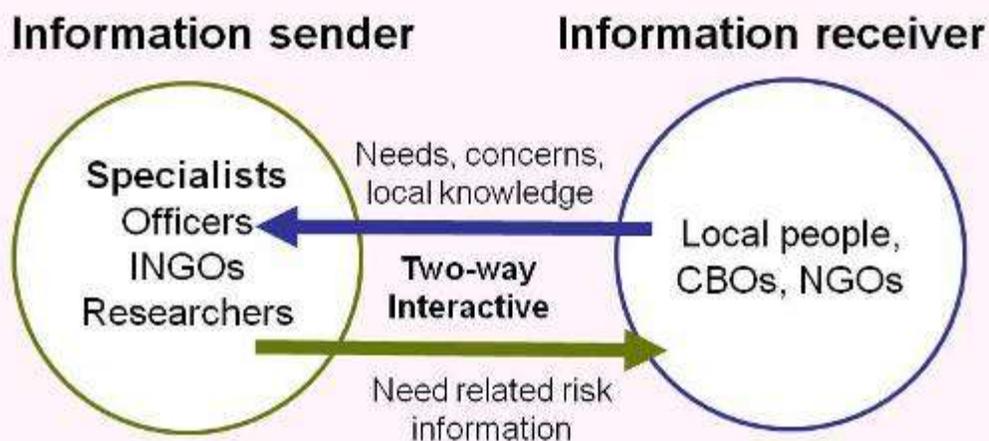
US National Research Council (1982)

Messages conveyed on risks and safety methods need to be properly delivered via appropriate communication media and interpreted by respective stakeholders.

26

Risk communication is a primary component of knowledge management in DRR. Often the knowledge generated by specialised technical institutions or research centres sits in bookshelves and does not reach out to the people who need it most. Risk communication is the process of translating it in a form that is understood well by the target audience, and sending it out to them through the most efficient medium.

Risk communication framework

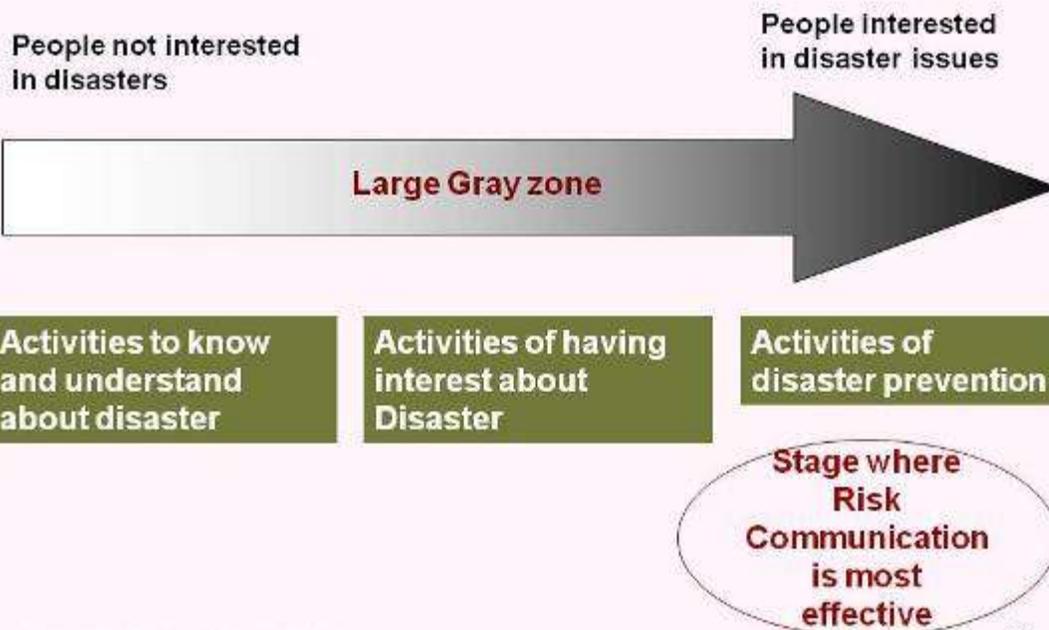


Source: Adapted from Kikizwa, 1993

27

The two nodes of a risk communication system are the sender and receiver. The sender has specific information based on warning forecasts, preparedness action or response action, that needs to be disseminated to the community at risk. The receiver is the community and agencies in the area under threat, who need to take action to reduce risk. The process, however, needs to be two way, since the specialists also need to learn from the community about their needs, concerns and local wisdom.

Process of risk communication



Source: Yukiko Takeuchi, IEDM, Kyoto University

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Risk communication is a staggered process, and everything cannot be told to a community in one go. As a first step, basic understanding and appreciation has to be created and very simple messages need to be given for this. Then, once the interest is generated, activities may be promoted that engage people in the subject of disaster management. Finally, when the condition is ripe, activities of disaster prevention, mitigation and preparedness need to be promoted.

Simple risk communication tools

Earthquake Shake Table



29

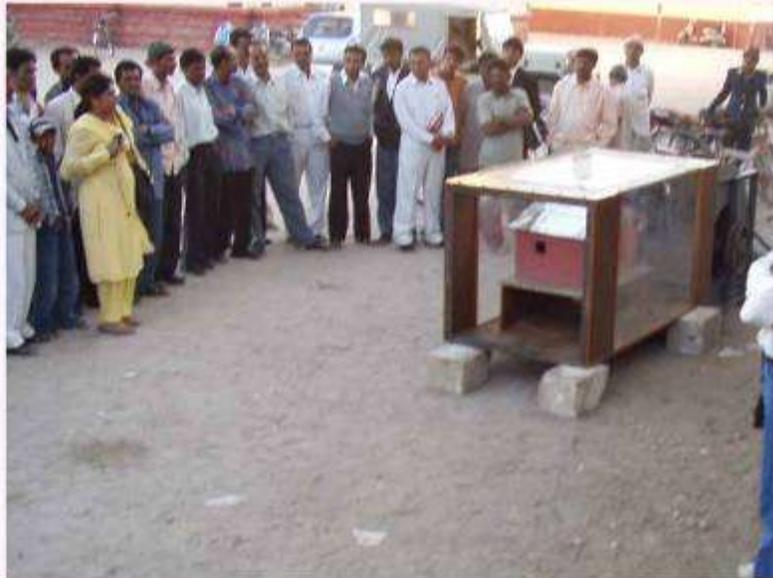
The kind of tools that have proven to be very successful for risk communication are simple tools that quickly communicate even complex and technical messages to everyone including common people in a visual way. The mobile shake table is one such tool for communicating earthquake risk. Extensively used in Nepal, India and Japan, the shake table has two house models of the local variety, one of them constructed with disaster resistant features and the other one without them. On shaking the table which is mounted on springs, an earthquake is simulated and everyone, including officials, masons and common people, can see how the unsafe building structure fails, leading to collapse of that house while the one with safety features stays standing.

Simple risk communication tools

Cyclone

Wind

Tunnel



30

A cyclone wind tunnel is a simple device with an acrylic tunnel that is open on one end and has an exhaust fan attached to the other end. When the exhaust fan blows air into the tunnel, it creates strong wind conditions, simulating a storm. House models are then kept inside the tunnel to see how they react to winds. The houses with weak roofs that are not anchored, get their roofs blown away and internal features damaged. A house with roof strongly tied, corners strengthened, and opening left on the leeward side proves to be much safer.

Environment and Disaster Mitigation course Maiko High School, Japan

- ❖ **Environment and disaster mitigation course started at Maiko High School in April, 2002, seven years after the Great Hanshin-Awaji Earthquake.**
- ❖ **Purpose of the course is to have the students think of how people live and exist in the symbiotic society by utilizing the lessons learned from the Great Hanshin-Awaji Disaster.**
- ❖ **The course gives the students disaster mitigation education concerning both :**
 - **natural environment, and**
 - **social environment**

31

A good example of environment and DRR in education is the environment and disaster mitigation course, started at Maiko High School in April, 2002, seven years after the Great Hanshin-Awaji Disaster. The purpose of the course is to have the students think of how we live and exist in the symbiosis society by utilizing the lessons learned from the Great Hanshin-Awaji Disaster.

Environment and disaster mitigation course

Fundamental concepts of the course:

- 1) Makes the students think of the importance of life, cultivates power to cope with disasters, and brings out leaders who can contribute to society**
- 2) Build an understanding about various environments (natural and social) by learning the mechanism of the natural phenomenon and the relationship between disasters and human society**
- 3) Deepen the understanding of the environment and disaster mitigation through experience based learning**

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The course gives the students the disaster mitigation education concerning both the natural environment and the social environment. Instead of being a theory driven course, it gives them real life information and experiences, and motivates them to learn about their environment and disaster mitigation. Such courses can be launched locally by any schools anywhere.

Indigenous Knowledge

Indigenous knowledge is the knowledge that people in a given community have developed over time, and continue to develop. It is based on experience, often tested over centuries of use, adapted to local culture and environment, dynamic and changing.

(Source: IRR, Philippines, 1996: Recording and using indigenous knowledge: A manual)

Transferable indigenous knowledge (TIK) is the traditional art of disaster reduction that is indigenous to specific region but having potential to be applied to other regions and having time tested reliability.

(Idea workshop, 2007.)
33

Local wisdom is available in all traditional societies, though it is now getting slowly lost because of the glamour attached to new media and high end technological concepts borrowed from developed societies. Indigenous knowledge is abundant in Myanmar, and can also be a very valuable resource for content in DRR and education programmes. For instance, although when over 250,000 people in Asia were killed by the Indian Ocean Tsunami in December 2004, thanks to the indigenous knowledge about tsunamis handed down from older generations, almost all on a small island, which is just 40km (25 mile) from the epicentre of the earthquake, survived.

Indigenous Knowledge

IK has high degree of acceptability amongst majority of populations. In Myanmar, people predict an impending disaster or change in season by noticing:

- **The height of birds' nests near rivers**
- **The colour of sky or clouds**
- **The movement of ants**
- **The movement of birds**

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Indigenous knowledge can be taken particularly from the older generation, and can be fed into the DRR strategy at various levels. There are many instances of indigenous knowledge for disaster risk reduction within the local communities in Myanmar. There is, however, no scientific validation of these. Care therefore has to be taken in blindly following these, since there is a risk of superstitions and incorrect information creeping in with sound indigenous knowledge.

Indigenous Knowledge in Education

▪ **Cross-discipline collaboration**

- Civil society: Document and analyze
- Education and Research Community: Validation and analyze
- Policy maker: Policy decision
- Regional and International organization: Policy advocacy

▪ **Steps**

- Education: link to curriculum
- Policy: regional, national and local advocacy and decision
- Pilot: Implementation and validation

(DRR, 2005)

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It can extend from supporting policy decisions, down to providing content for local education and training, and helping decide the course of action for locally implemented disaster risk reduction activities.

IK and DRR applicability in Myanmar



A good example of indigenous knowledge that exists in Myanmar is the traditional house construction technology, which utilises local materials, and is adaptable and resilient in accordance with local hazards. Such houses have been built locally for generations, and are inexpensive, and easy to build without much technology, tools or skills. They have a low carbon footprint. They are thermally comfortable inside than cement concrete houses.

IK and DRR applicability in Myanmar



Indigenous knowledge can be used along with appropriate technologies to provide solutions that take advantage of the old and the new. A prototype of such a shelter, built at the Myanmar Engineering Society, demonstrates how by adding very simple and low cost features to a timber house, it can be made much more resilient to cyclones and earthquakes.

Training of construction workers

- **Engineers, masons and local contractors should be trained in safe construction practices**
- **This would help to acquire new skills and enhance old skills and thus considerably raise their standard of construction.**
- **Engaging trained construction workers at all levels of the recovery process would ensure safe buildings.**
- **Principals, teachers, and the school committee should also be given training and manuals for knowledge about construction**

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Hazards such as cyclones and earthquakes lead to building collapses that kill people. It is therefore important to train and educate construction sector workers, particularly those working on construction and maintenance of school buildings and infrastructure, on disaster resistant construction techniques. Safety features should be brought into existing weak buildings, and should be included in reconstructed buildings from the start.



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Buildings do not have to be expensive for them to be safe. Safe buildings can be constructed with local materials and skills, and with minimal additional cost by simply using appropriate technologies. There are training programmes and demonstration models within Myanmar that show how safety can be brought into local buildings. These principles must be followed for all school buildings.

**READ
THIS!**

Linkage with HFA Priority 3

Use knowledge, innovation and education to build a culture of safety and resilience at all levels.

Implementing Priority 3 requires the development of information-sharing systems and services within the education sector that enable access to, and application of, information. It involves strengthening networks and promoting dialogue and cooperation among scientific communities, practitioners and education specialists, and using standard DRR terminology. It also calls for promoting the inclusion of DRR in school curricula, and developing training and learning programmes on DRR at a community level, for local authorities and targeted sectors. Finally, it requires strengthening research capacity and engaging the media to raise awareness.

Risk communication

Risk communication is a primary component of knowledge management in DRR. The two nodes of a risk communication system are the sender and receiver. The process, however, needs to be two way, since the specialists also need to learn from the community about their needs, concerns and local wisdom.

Disaster-environment Linkage

Disasters and environmental degradation create serious problems all around the world. They are inherently linked, but little attention is paid to their interaction, particularly at local levels. The degree of integration of disaster management and risk analysis with environmental management programs in relation to human vulnerability is necessary. Unsustainable agricultural practices, and inappropriate development programmes have contributed substantially to the increase of disaster risks.

On the other hand, disasters damage natural resources and reduce environmental quality, indirectly contributing to increasing poverty which in turn, adds to the vulnerability of both

natural and human systems, so further increasing disaster losses. Disaster, Development and Environment are very closely linked. Development is mostly dependent on utilisation of environmental components.

However, it exceeds its limits, it becomes detrimental to the environment. This relationship is also directly linked to disasters, as it can increase capacities, or increase vulnerability depending on how sustainable it is. Often phenomena such as social conflicts and migration are also manifestations of poor development and environment management, and are disastrous to the local population.

Education and development

Education at all levels can shape the world of tomorrow, equipping individuals and societies with the skills, perspectives, knowledge and values to live and work in a sustainable manner. Education for sustainable development (ESD) is a vision of education that seeks to balance human and economic well-being with cultural traditions and respect for the earth's natural resources. Education for sustainable development is a "dynamic concept that encompasses a new vision of education that seeks to empower people of all ages to assume responsibility for creating and enjoying a sustainable future." The overall aim of ESD is to empower citizens to act for positive environmental and social change, implying a participatory and action-oriented approach.

The United Nations Decade of Education for Sustainable Development (DESD, 2005-2014) has been established to recognize the increased need to integrate sustainable development issues and principles into education and learning.

ESD is a most appropriate framework for natural disaster preparedness in three important ways:

- ESD is interdisciplinary and holistic. Therefore, important consideration is given to the impacts on, and relationship between, society, the environment, economy and culture;
- ESD promotes critical thinking and problem solving that is essential to the empowerment of stakeholder groups threatened or affected by natural disasters;

- ESD seeks to be locally relevant, acknowledging that languages and cultures say and understand things differently, and addresses both local as well as global issues.

Key principles for safe buildings in cyclone prone areas

There are some key principles which needs to be kept in mind while constructing buildings in cyclone prone areas which will help them to reduce the risk in future disasters. Main damage is caused due to storm surge and because of heavy winds. Different principles to be followed during construction of buildings are described below.

The location of the building is important. Many people often have little choice in the matter, perhaps because of financial constraints. It is, therefore, important to recognize when a building is being located in a more vulnerable area. The rational response would be to build a stronger-than-normal building. It is also important to take the advantages of the existing topography such as mountains, buildings, trees, etc. to avoid the direct impacts of the wind force. Although cyclonic storms always approach from the direction of the sea towards the coast, the wind velocity and direction relative to a building remain random due to the rotating motion of the high velocity winds. In non-cyclonic region where the predominant strong wind direction is well established, the area behind a mound or a hillock should be preferred to provide for natural shielding. Similarly a row of trees planted upwind will act as a shield. (See Figures 1 & 2)

Construction on higher level near the coast

In cyclonic regions close to the coast, a site above the likely inundation level should be chosen. In case of non-availability of high-level natural ground, construction should be done on stilts with no masonry or cross bracings up to maximum surge level, or on raised earthen mounds to avoid flooding/inundation but knee bracing may be used. One of the major problems in delta regions is the inundation of water and it is very frequent it will always help to reduce the damage if you raise your floor above the inundation level. (See Figures 3 & 4)

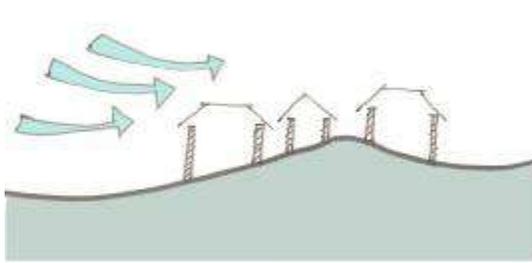


Figure 1- No shielding from high wind due to absence of barriers

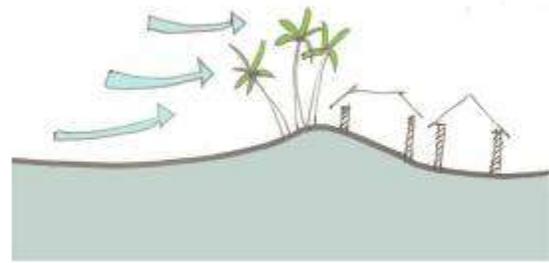


Figure 2- Shielding from high wind by permeable barriers like strong trees



Figure 3- Construction at ground level risk of inundation

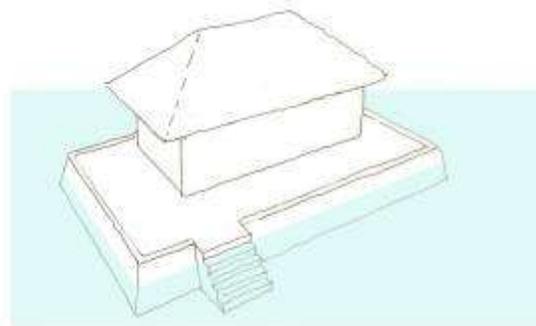


Figure 4- Construction on raised earth mounds

Construct a building with simple shape to reduce negative pressure

The shape of new buildings is the most important single factor in determining the performance of buildings in cyclones. Simple, compact, symmetrical shapes are best. The square plan is better than the rectangle since it allows high winds to go around them. The rectangle is better than the U or L-shaped plan. This is not to say that all buildings must be

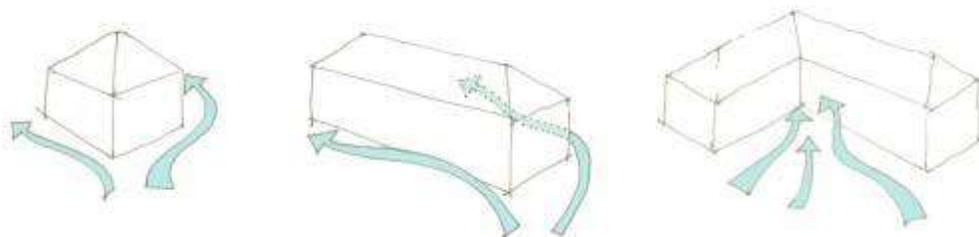


Figure 5- Wind direction and shape of buildings

square. But it is to say that one must be aware of the implications of design decisions and take appropriate action to counter negative features. The best shape to resist high winds is a square. (See Figure 5)

Ensure firm connections between foundation, walls, roof structure and roof covering

Make sure all components of the house are firmly fixed together:

- Between foundation and ground
- Between foundation and column
- Between foundation and wall
- Between column and wall
- Between rafter and column
- Between purlin and rafter
- Between common rafter and purlin
- Between lath and common rafter
- Between covering and lath or purlin

If any one of those above-mentioned connections is weak, the entire structure of the house will be affected. (See Figures 6)

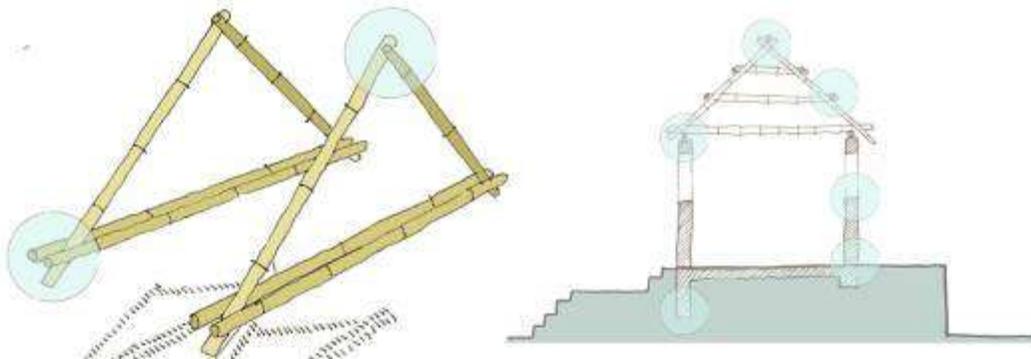


Figure 6- Sample connections of a building's components

Match opposing openings

Wind generating opening on the windward side during a cyclone will increase the pressure on the internal surfaces. This pressure, in combination with the external suction, may be sufficient to cause the roof to blow off and the walls to explode. Therefore, ensure the opposing openings have the approximate size because during a cyclone an opening may suddenly occur on the windward side of the house, and the internal pressure, which builds up as a result may be relieved by opposing opening on the leeward side. (See Figure 8)

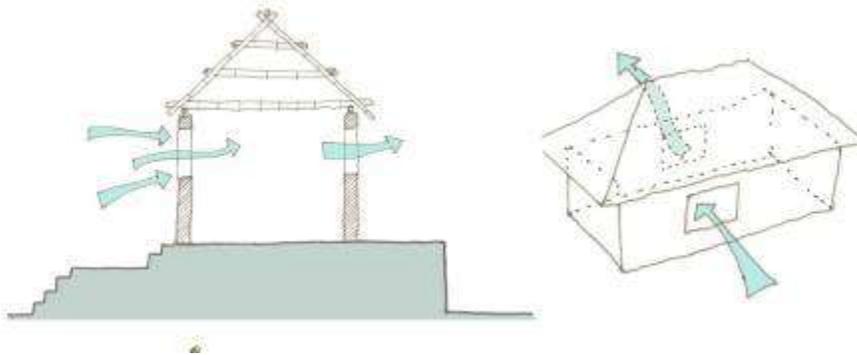


Figure 7- Opposing openings

Choose the appropriate materials available locally

One of the basic reasons of large damage to buildings in cyclone hit regions is that mud is used widely as walling materials and during flooding water comes in contact with mud and as a result the entire building collapses. There are ways to use mud in a better way by producing stabilized earthen blocks which can resist the water and reduce the damage of buildings. Other materials available locally in cyclone hit areas are Bamboo which can be used properly with right connections and can be promoted in the area. By using the local materials with some value additions you can reduce the risk for building damage at lower cost. (See figures 8) It is very important to promote right materials by keeping different hazards while designing the shelter strategy.

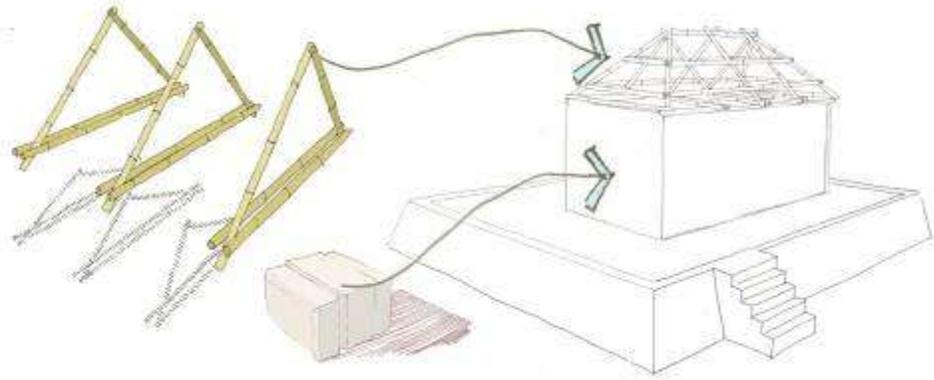


Figure 8- Construction with locally available materials

Better drainage and protection of plinth

It is very important to have a better drainage system around the house to protect the plinth and walling during the time of flooding. In many cyclone and flood prone areas people construct buildings on earthen mounds, but because of flooding these mounds also get damaged (see Figures 9). It would be a good idea to protect these mounds with materials like bricks, which will reduce the damage caused by flooding in future.

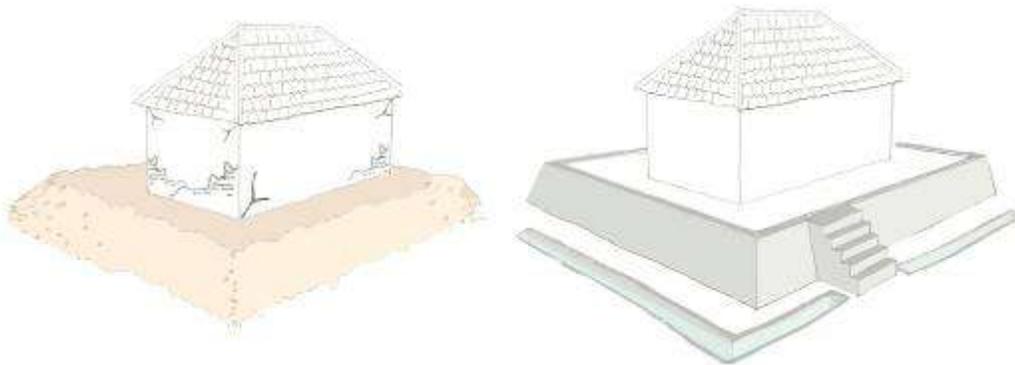
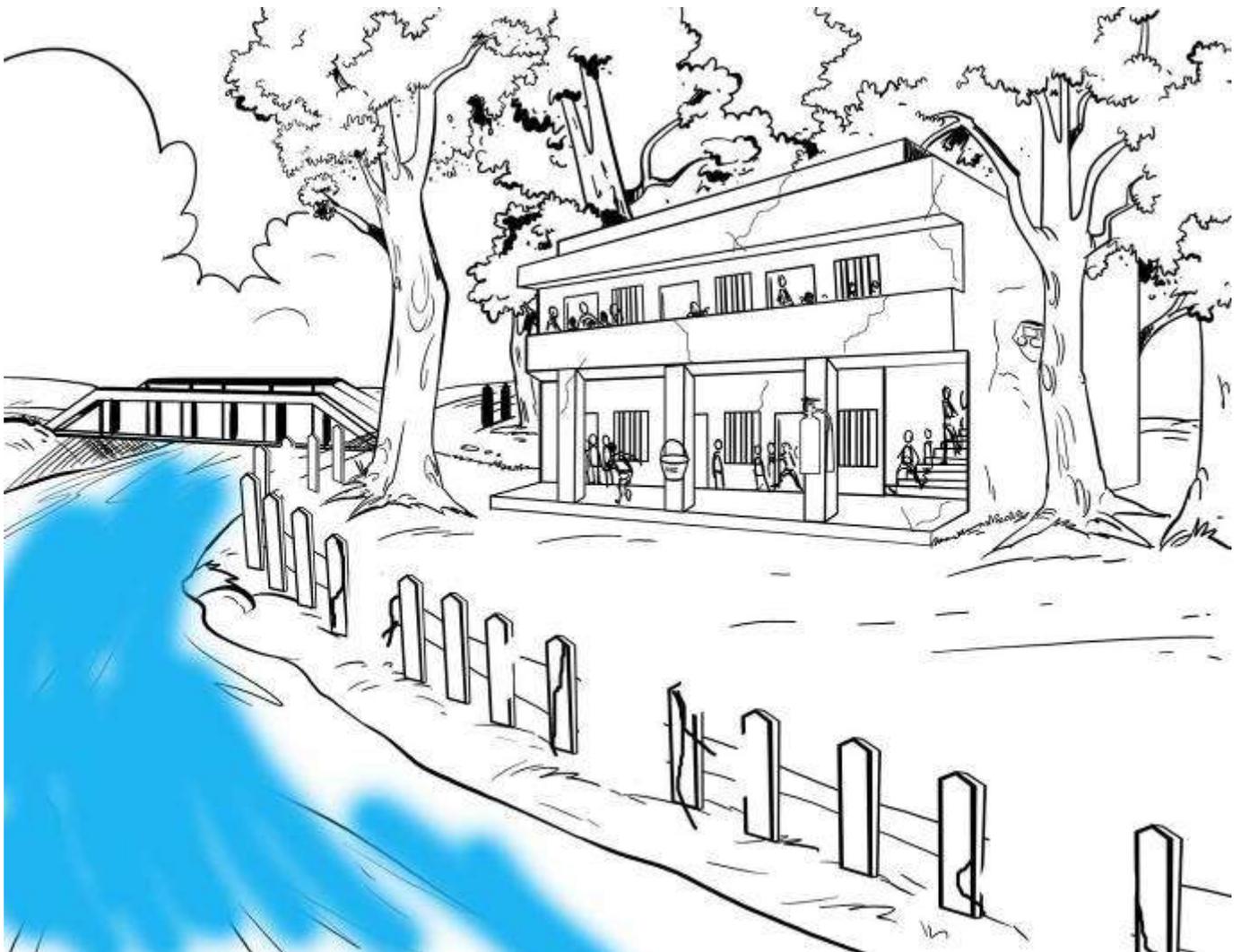


Figure 9- Comparison of buildings with and without drainage

**DO
THIS!**

Exercise 6

- Study the given school information and identify things that are not right
- Prepare a list of things that need to be improved to make this school safe
- You can assume conditions to be similar to a typical local school in your area



Exercise 7

- This exercise aims at making the group analyse the activities required to be conducted in schools for reducing risk
- The group should first put together different activities to be conducted for parents, teachers, students, administrative staff and principals
- Now list down the key people in charge for each of these activities
- Use the format given for the purpose of carrying out this exercise. Use the examples of activities and people involved that are given at below the format, and also add your own
- If any data / information is not available, you may make appropriate assumptions

Activities to be conducted in school for reducing risk	People responsible	Key In-charge

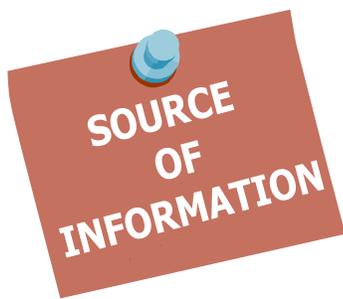
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Examples of Activities and People responsible

1. Preparation of school disaster management plan
2. Preparation and display of evacuation map
3. Conducting emergency drills
4. Formation of task forces
5. Training of task forces
6. Repair and strengthening of school building
7. Provision of alternate exits, and clearing of existing ones
8. Regular appraisal and revision of plans
9. Signage on risks and exits
10. Meetings with village and township stakeholders
11. Integration of school plan with village and township plans
12. Awareness campaigns within schools
13. Awareness campaigns outside schools
14. Discussion of risk reduction in PTA
15. Display of information material in school
16. Carrying out nonformal educational activities such as games on risk reduction
17. Inclusion of risk reduction in annual day, religious celebrations and all public celebrations
18. Others (If any) _____

A. Principles

- B. Teachers
- C. Parents
- D. Township Education Officers, Additional Township Education Officers
- E. Township Officers of other departments
- F. Village leaders
- G. PTA and Board members
- H. Students
- I. Residents in neighborhood of schools
- J. Local doctors
- K. Emergency services like police and fire department
- L. Construction workers and engineers
- M. Local eminent persons and knowledgeable old people
- N. Others (If any) _____



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1. EDUCATION FOR SUSTAINABLE DEVELOPMENT

ESD has direct implications in the field of DRR. It seeks to empower people and engage multiple sectors and stakeholders to assume responsibility for creating a sustainable future.

2. METHODS FOR DISASTER EDUCATION

Disaster education can be imparted through formal, nonformal and informal methods including games, town watching, drills and so on.

3. INDIGENOUS KNOWLEDGE AND DRR APPLICABILITY

Local wisdom has the highest degree of acceptability amongst majority of populations. Indigenous knowledge can be a valuable resource in disaster education programmes.

**SAMPLE
ANSWER
KEY**

Exercise 6

School with 350+ children

Low and broken boundary wall

Two storied block with six classrooms

Sixty children in each classroom

Each classroom has one door entry/exit, and grills on windows

Buckets installed for fire fighting, but no sand in them right now.

Fire extinguisher installed once, but its date has expired

Open space has many trees. Some trees very old and dry. Some leaning onto building.

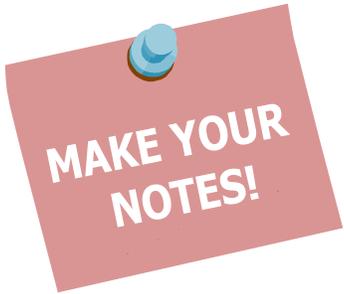
One entry/exit

River flows close to school, and into the sea nearby. Chances of flooding and tidal surge.

Only one bridge on the river gives access to township headquarter

Exercise 7

Activities to be conducted for reducing risk in school	People responsible	Key in-charge
Task force training	Principals, teachers, external experts	External experts
Formulation of SDMP	Disaster management committee	Principal
Mock drills	External experts, teachers, students	Teachers
Teacher training workshops	Principal, education officers	Education officers
Dissemination of IEC material like posters	Students and teachers	Teachers/Students
Organizing a disaster safety week	Principal, students and teachers	Teachers/Students



**MAKE YOUR
NOTES!**

A series of horizontal dotted lines spanning the width of the page, intended for writing notes.



United Nations
Educational, Scientific and
Cultural Organization

ယူနက်စကို-မြန်မာ ပညာရေးပြန်လည်ထူထောင်မှုအစီအစဉ်
UNESCO Myanmar Education Recovery Programme
Education for Sustainable Development Unit
UNESCO Asia and Pacific Regional Bureau for Education,
Bangkok.

• ကုလသမဂ္ဂအဆောက်အအုံ၊
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