Disaster Safety Education Booklet

National Institute of Education

Science, Health and Physical Education Department
Social Science Department

Ministry of Education and National Institute of Education

Education for Social Cohesion (ESC) Programme

Disaster Safety Education Booklet

Sri Lankan-German Development Cooperation

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Objective

To facilitate learning and teaching about natural hazards in Sri Lanka and thereby enable children and youth to participate in disaster preparedness and prevention.

For Whom

School children from grade 6 to 9.

Teachers in Science, Geography, Life Competencies and Physical Education.

What is included

- ★ Information on natural hazards in Sri Lanka
- ★ Basic concepts of Disaster Risk Management
- ★ Teacher's resource material
- ★ Student's learning material
- ★ School Disaster Safety Guidelines
- ★ Related links
- ★ Emergency contacts

How it was developed

This interactive DVD was developed by the 'Education for Social Cohesion' Programme of the Ministry of Education and German Technical Cooperation. The Department of Social Science and the Department of Science at the National Institute of Education, Maharagama, were responsible for the contents of the kit. The Disaster Management Center was consulted for technical guidance and their contribution was substantial.

The Teachers Instruction Guide includes all Disaster Management related topics in the syllabus (Grade 6-11). In addition, suggestions for student's activities and supplementary material for teachers are included (games, books, posters, etc.).

The children's section is made for school children from grade 6 to 9. They are introduced to disaster safety in a playful way, through stories, games, quiz and audio/ video inputs.

Contributions

The idea for the media kit was born when the ESC team found a CD for schools from New Zealand (Ministry of Civil Defense & Emergency Management/ New Zealand: 'What's the Plan Stan'). NIE officers and teachers wished such a learning tool for their students and ESC programme initiated the development of the Sri Lankan media kit.

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Contents

Disaster Safety Education

Dangerous natural events such as floods, landslides and droughts have been increasing over the past decades in Sri Lanka and worldwide. As children we need to know about these hazards and be able to protect ourselves and our families. Our teachers in school help us to learn and to practise what to do in an emergency and how to keep us safe.

Flood

Flood is the inundation of an area, which is usually not covered by water. This can also happen in the coastal area.

A flood results from heavy rains that cannot run off in time and subsequently cause rivers and streams as well as sewers to overflow. Some floods develop slowly over a period of days and allow for evacuation, while flash floods cause immediate disasters.

What are the causes of floods?

In general floods are caused by nature and human behaviour.

Natural Causes

- ⋆ High intensity of rainfall can increase the frequency and intensity of floods.

Man-made Causes

- ⋆ Rapid city development (urbanization) and improper drainage canals.
- ⋆ Lack of maintenance of water and drainage canals.
- ⋆ Unauthorized constructions (squatter slums alongside canals, river banks), littering of canals and rivers.
- ⋆ Filling of marshy lands for commercial and residential purposes results in depletion of water supply functions and blocking the water ways leads to slow down the water flow.
- ⋆ Deforestation results in increased runoff, soil erosion, unstable slopes and silting of water bodies.
- ⋆ Rivers are silted and with heavy rains the river cannot carry the excess water. So they overflow.
- ⋆ Improper land use and absence of appropriate soil conservation practices increase soil erosion and lead to siltation of reservoirs, reducing existing water capacity, which leads subsequently to floods.
- ⋆ Opening of sluice gates of the reservoirs to remove the excess water.

Different types of floods

- ⋆ **River Floods** - A flood is caused when a river overflows its banks. This is caused by rainwater draining into the river faster than the river can discharge water into the sea.
- ⋆ **Coastal Floods** – Occur when storm surges or sea waves arise suddenly in combination with high tides. The sediment deposition or silting of riverbeds and the synchronization of river floods with sea tides compound the problem of floods in the coastal plains.
- ⋆ **Urban Floods** – Basically these floods are caused by the inadequate drainage facilities in the urban areas. Haphazard construction of buildings with poor planning, which does not allow sufficient retention and percolation areas. In some cases people encroach drainage areas, even obstructing drainage paths and disrupting natural drainage patterns.

- **Flash Floods** - This is a flooding process within very short time and can happen through high rainfall in a relatively small area or through breach of a dam.

Consequences of floods

Flooding is one of the most destructive of all forms of natural disasters causing heavy economic and human losses, especially through damages to human life, livelihood and property. Some flood impacts can be listed as below:

- Injury or death to human and animals.
- Damage to houses, property and important possessions such as furniture, electrical appliances etc.
- Creates pressure on livelihoods as floods destroy crops, farmlands and livestock due to inundation and as a consequence food shortage in the affected communities.
- Damage to infrastructure and facilities like hospitals, schools, roads, railways, telephone lines and electricity supplies.
- Contamination of water sources. Triggering of epidemics, waterborne diseases, help mosquitoes to breed resulting in the spread of malaria and dengue.
- Government has to bear a huge cost for the recovery, provision of relief and compensation to the affected community and to improve the sanitation.
- Create stress conditions to affected people.

Anu's Story

Anu was listening very attentively to the radio news broadcast.

"…. Due to heavy rainfall in the central hills, the Meteorological Department forecasts that there may be a threat of floods in several areas in the island…"

Anu ran down to the meadow where her parentswere working, shouting excitedly: "There is a radio announcement of a possibility of floods."

"Well daughter" said her mother "Let's hurry up and do the needful!" Everybody started to act fast. Beds, tables, chairs and the like were tied up to the beams of the roof.

Mother turned off the main fuse and opened the windows. She said: "Daughter, you arrange that parcel of things needed in an emergency. Take the packets of biscuits also from the cupboard and some water."

The father joined in: "Don't forget to take the torch and the radio. Where are those certificates… the bag that contains the deeds and our wedding pictures?"

"We have kept them at the rock temple. Remember, last time all the villagers handed over their documents to the clerk there." replied Anu.

Meanwhile, the village elder could be seen assembling everybody by speaking over a megaphone.

Do's and Don'ts

Preparedness

- ⋆ Find out if your home, school, workplace, or other frequently visited places are in flood prone areas.
- ⋆ Prepare an evacuation plan: Identify safe places (high places in and outside the house) and evacuation routes.
- ⋆ Prepare an emergency kit.

During a flood alert

- ⋆ Keep watch on weather and listen to radio or TV.
- ⋆ Remain awake during nights of heavy continuous rain and be ready to move to a safer location.
- ⋆ Put some food and clean water as well as valuable items in the highest possible place.
- ⋆ Put dangerous goods (e.g. chemicals) in a safe place.
- ⋆ Keep alert about the community warning systems: loudspeakers, bells, sirens.

During the Flood

- ★ Be calm and listen to elders.
- ★ Remind adults to turn off main water, electricity and gas.
- ★ If your house is in danger move out to an identified safe shelter in the area. Take your emergency kit with you.
- ★ Keep windows open once you evacuate from your house.
- ★ Avoid wading even in shallow waters as it may be contaminated. If you must enter, wear appropriate shoes and use a stick to know the water level before moving ahead.
- ★ Do not play or swim in flood waters.
- ★ Do not eat food which has been in contact with the flood water or stale food.
- ★ Collect rain water until you get fresh water supplies. Boil all water before drinking it.
- ★ Beware of poisonous reptiles such as snakes, spiders which may move into drier areas in your premises.
- ★ Help to rescue the victims, if any.

After the Flood

- ★ Return home only once you are told it is safe.
- ★ Clean and disinfect your home and surrounding.
- ★ Do not go sightseeing through flooded areas.
- ★ Drink boiled water until the water wells/ supplies have been declared safe.
- ★ Watch out for wild animals and poisonous snakes that may come with the water.

Landslide

The term “landslide” (or landslip) describes a wide range of slope down movements of rock, earth or debris due to gravity, especially in the rainy season. There are natural causes of landslides (such as the slope angle, rock erosion, undercutting, etc.), but also human activities (inappropriate construction, deforestation, mining, etc.) significantly increase the probability of a landslide.

Rapid development projects, which are not planned environment friendly, cause landslides in short term.

What are the causes of landslides?

There are several reasons which cause landslides. They are basically categorized into two main groups.

Natural Causes

- ⋆ Intense rainfall will raise the ground water table, decrease the soil's coherence and increase the weight of associated materials
- ⋆ Lowering of the water levels in rivers, reservoirs, etc.
- ⋆ Erosion caused by continuous run off over a slope
- ⋆ Deposition of the loose sediments in a delta area
- ⋆ Decomposition of rocks
- ⋆ Fluctuation of water levels due to tidal action
- ⋆ Ground vibration creating during an earthquake
- ⋆ Volcanic activity

Man made Causes

- ⋆ Constructions done without proper engineering inputs
- ⋆ Farming practices
- ⋆ Removal of vegetation cover and deforestation

Consequences of landslides

Direct Losses

- ⋆ **Loss of life**
  Landslides can result in death and injury of people and animals. The moving mass can bury people and animals under debris.
- ⋆ **Loss of property and assets**
  The force and speed of debris, mud or earth mass generated due to mass movement may destroy houses, buildings and other properties in its path.
- ⋆ **Loss of infrastructure and lifeline facilities**
  Earth mass can block or damage infrastructures such as roads, railway, bridges, telecommunication and electrical supply lines, etc.

- **Loss of resources**
  Earth mass can affect water resources in the area by blocking rivers, diverting water ways, blocking irrigation channels, reducing storage capacity of tanks and reservoirs, etc.
- **Loss of farmland**
  Productive lands such as paddy and other crop fields may be covered with debris or blocked from access.
- **Loss of places with cultural importance**

Indirect losses

- **Loss in productivity of agricultural or forest lands**
  It is due to being buried by debris and lack of access.
- **Reduced property values**
  Due to unwillingness of people to purchase disaster prone land
- **Loss of revenue**
  Due to loss of productivity, transport problems, etc.
- **Increased cost**
  Due to investments in preventing or mitigating future landslide damage
- **Adverse effect on water quality**
  Water sources may be contaminated.
- **Loss of human productivity**
  Due to death and injury
- **Reduction in quality of life**
  Due to death of family members and destruction of personal belongings
- **Impacts on emotional wellbeing**

Types of landslides

1 **Slump**
  Type of rock fall in which a downward and outward rotational movement of rock or soil occurs along a curved concave surface

2 **Rock fall**
  Free falling of detached bodies of bedrock (boulders) from a cliff or steep slope

3 **Rock Slide**
Sudden down slope movement of detached masses of bedrock

4 **Debris fall**
Free falling is not only rock but also overlying sediments and vegetation

5 **Creep**
Unnoticeably slow down slope movement of earth cover. Utility poles, fence posts and gravestones etc. appear tilted or deformed on the surfaces

Rajitha's Story

Rain! Rain! Rain!

Rajitha was on his door step, watching the rain. The water level had risen considerably in the rain gauge, kept on top of a log placed in the middle of the large open garden. Meanwhile Stanley uncle, who came under an umbrella, stepped into the veranda.

"Stanley uncle, I'm afraid! According to the readings of the rain gauge, there is the possibility of a land slide in the nearby hill."

Stanley uncle looked at the rain gauge. "In fact I too came to inform that. Two coconut trees in the middle of the hill were also slanted."

"Really?"
Grandpa, who was lying on the sofa, stood up with excitement.

“If so we have to evacuate the villagers from the hill immediately. Gather the youth. Hurry up.” Advising Rajitha, Stanley uncle hurried out with grandpa.

“Rajitha, this time we should not allow spread of diseases after the landslide, as it happened last time. Organize a group and do the needful. I am leaving now to help evacuate people.”

Rajitha formed a group of twelve with the help of his sister Thamali and Sriyani aunty.

“Most essential need is drinking water. Let’s clean the tank in the school and fill in water. Then we will put a cover on top.”

“Let’s form a first aid unit, too. For that our District Medical Officer will help us.”

On the following day a huge mass of earth slipped down the hill. By that time all the people had been provided shelter in the school.

Rajitha had collected drinking water and organized a first aid unit as well. The casualties were minimal as the preventive measures had been taken in advance.

Do's and Don'ts

- ★ Listen to weather forecast on the radio, TV etc. about heavy rains.
- ★ Observe unusual signs such as appearance of cracks and their rapid expansion over the slope. Move away and inform elders when such signs are recognized. Never go closer to observe cracks on the slope.
- ★ Remain awake during nights of heavy continuous rain and be ready to move to a safer location.
- ★ Listen for abnormal sounds of soil and rock movement or breaking of trees. They may be associated with landslide movements.
- ★ Prepare safe water facilities (covered with a lid).
- ★ Prepare first aid facilities.

During

- ★ In case you have to evacuate, do so immediately. Do not try to collect belongings. Landslides can occur suddenly.
- ★ When you see falling rocks, seek cover behind trees and other solid objects.
- ★ Landslides, as a result of ground shaking, can create a large volume of mud flow along the slope into the valley. Therefore, do not move in the direction of the valley if you are requested to evacuate, move to elevated areas.
- ★ If escaping is not possible, seek shelter, curl into a tight ball and protect your head.

After

- ★ Remember: One slide can follow another. Be careful and stay in a safe place.
- ★ Help people who need help.
- ★ Use the telephone only for emergency calls.
- ★ Do not go through the loose and new deposits of debris. You might sink in or cause more sliding.
- ★ Do not enter the area or damaged buildings without permission from the authorities.

Cyclone

A cyclone is a tropical storm that builds up over warm water. It is characterized by heavy rains, strong winds and often increased tides at the shore with waves travelling up rivers and streams. In Sri Lanka, cyclones are most effective in the Northern and Eastern regions during the period of North-East monsoons.

In 2000 a cyclone hit Sri Lanka with top wind speeds of 75 mph. destroying some 10.000 houses and leaving 500,000 people homeless.

Heavy rains may make rivers and canals overflow. The subsequent flooding can damage crop fields, destroy infrastructure (buildings, electricity and telephone lines), wash away cars, livestock, etc. Fast-flowing water filled with debris might even cause injuries and human deaths. Strong winds can damage and unroof buildings and send objects flying.

Double attention is needed: flooding and flying objects may cause severe injuries or even kill people. As a cyclone can take several days, it is important to prepare a safe shelter and go there as soon as the cyclone warning is issued. Remain there until further notice. After a cyclone pay attention for fallen power lines and do not enter the flood waters.

Shakthi's Story

That beautiful Sunday, which was long awaited by everyone, dawned. It was the day of kite competition of the village. Paddy field after harvest was an amazingly pleasant sight. It was like a flock of butterflies fluttering in the sky.

"Shakthi, look here, Samila is trying to surpass your kite... Hurry up... Hurry up." Shakthi's kite was flying high up piercing the clouds. There were more than twenty five competitors. The entire village had gathered in the field in hundreds. There, tea was brought from Mallikas aunty's house.

"Shakthi, it's tea time now. " "Look at the sky. It's like a flock of butterflies!" Janaka uncle took a cup of tea served by Mallika aunty.

"You are watching only this direction of the sky. But see the other direction. On my way from home, I was observing another beautiful scene in the other direction of the sky. Look the other side. There's a beautiful mushroom like cluster of clouds." Shakthi turned at once to that direction. The thread of the kite slipped from his hands. The kite wandered lonely far away.

"A TORNADO! TORNADO!"

Shakthi shouted. Everybody looked in amazement.

"What's it my son?" Sheela aunty could not understand anything.

"It's something like a cyclone. Hurry up, hurry up... Let's run for safety."

"Where would be the safe place?"

"Let's run to the ground floor of the garment factory nearby. It's safe to be under a concrete roof."

No one was bothered about the kites. Everybody rushed towards the factory. People who were at their homes were also asked to come there. All the employees of the factory were assembled in the ground floor by that time.

After a short while tornado arrived.

“Oh! Look, roofs of houses gushed by the wind.” Thatched cadjans and roofing sheets were among debris and dust flew up in sky.

“What a calamity! “

The roof of the factory was also shattered. The machinery also was thrown about. It is not going to stop. With Tornado there was a heavy downpour. The trees were whirling and falling.

“Did you see, the sign of tornado could be identified by the shape of the clouds? I learnt it in Science.” Shakthi made everyone aware of it.

“But you must not get excited in a dreadful situation like this. We cannot stop the natural disasters. Isn’t it so?” Shakthi spoke furthermore:

“The next thing to do is reconstruct the damaged things together with others. We must face the challenges successfully. I learnt it for my health lessons.”

Do's and Don'ts

Before

- ⋆ Keep watch on weather and listen to radio or TV. Keep alert about the community warning systems - loudspeakers, bells, sirens
- ⋆ Prepare an emergency kit
- ⋆ Trim dry tree branches, cut off the dead trees, and clear away anything out side that may start flying and cause injury or damage during extreme wind
- ⋆ Put tape across large windows to prevent them from shattering
- ⋆ Store enough food for 4-5 days. Preferably bread and biscuits as no preparation is required
- ⋆ Store enough water for about 2-3 days in clean containers. The minimum requirement for a person per day is half a gallon

During

- ⋆ Close all the windows and keep one window open on the side of the house away from the wind. It will reduce the pressure on the roof
- ⋆ Stay inside the house or shelter
- ⋆ Stay away from doors or windows
- ⋆ Stay away from metal or electrical fixtures
- ⋆ Disconnect all electrical appliances

After

- ⋆ Do not go outside until officially advised it is safe
- ⋆ Listen to the radio for official warnings and advise
- ⋆ Beware of fallen power lines, damaged bridges, buildings and tree
- ⋆ Pay attention to all warnings and do not go sightseeing
- ⋆ Assist others

Lightening

A thunderstorm accompanied by lightning and thunder is a spectacular event - but highly dangerous!
In Sri Lanka, thunderstorms mainly occur in the inter-monsoon seasons March/April and September/October and hit all regions in the island.

A bolt of lightning is a bright (white-yellowish) flash. It results from discharge of high voltage electricity in the clouds or between ground and clouds. Thunder comes from the rapid expansion of the air surrounding and within a bolt of lightning, creating a sonic shock wave. As lightning is always attracted by the highest point, it can strike buildings or trees and may cause damage or fire. Likewise, lightning can hit a water surface and energize the water. For humans thunder may create a shock, but a stroke of lightning will cause severe and long-lasting injuries or even death.

As lightning always comes with thunder, this roaring sound is your danger signal: Don't be outside, when lightning could strike! Avoid contact with water, metal structures and electric applications.

Iranganee Aunty's Story

The group of friends, who were inside the playhouse in the middle of the clump of coconut trees, was shaken by the sound of a sudden thunderbolt.

"Kids come on! Get inside the house!" Iranganee aunty rushed towards the playhouse, shouting. She gathered the little ones into one single bunch with her hands and leapt into the house in a wink.

Just then a heavy rain fell down with thunder and lightning. All were busy with disconnecting plugs of the electrical appliances. Aunty pulled out the TV antenna.

BANG!!!
There was a big explosion.

"That should be a heavy lightning strike. It struck to a nearby place." Iranganee aunty said.

After rain ceased, Iranganee aunty opened the door.

"My goodness! The lightning had struck the coconut tree beside the play house. Look, how the crown of the coconut tree had been severely burnt! Keep in mind: Never stay near tall trees when there is lightning."

Do's and Don'ts

During

- ⋆ Seek shelter immediately: in a house or in a car.

If you are inside:

- ⋆ Disconnect electrical instruments from the main power supply.
- ⋆ Disconnect television antennas from the television sets.
- ⋆ Do not use telephones or other electric appliances while a thunderstorm is overhead.

If you are outside:

- ⋆ Avoid isolated tall trees or poles and high grounds.
- ⋆ Avoid touching water surfaces and metal structures.
- ⋆ Do not ride bicycles or travel by any open vehicle such as a tractor.
- ⋆ If you are in open ground, squat low to the ground and minimise the contact by resting on the balls of your feet and putting your feet close to each other; place your hands over your ears and put your head between your knees.
- ⋆ If you are in a forest take shelter under the shorter trees.
- ⋆ If in an open boat keep a low profile.
- ⋆ If you are swimming get to land and find shelter immediately.
- ⋆ Staying inside a car is the best option.

Earthquake

An earthquake is a movement of the earth's surface. Most earthquakes are minor tremors. Larger earthquakes are aggressive shocks, followed by smaller tremors, called aftershocks, gradually reducing the magnitude. Earthquakes can be felt over large areas.

Earthquakes mainly occur in specific areas, precisely at geological faults where the tectonic plates making up the earth crust drift apart, collide or pass each other.

How to determine an earthquake?

Earthquakes can be determined by their causes, the seismic waves, or their impacts.

The Moment Magnitude Scale (MMS; formerly Richter Scale) refers to the energy released by the earthquake. Its logarithmic scale has no upper limit to the possible measurable magnitude.The earthquake leading to the tsunami in 2004 was measured 9.3 at the Richter Scale, called a "great" earthquake with devastating effects several thousand kilometres across. Following statistics, an earthquake of this intensity normally occurs in one out of twenty years. The seismic waves can be recorded with a seismometer. A global net of seismometers helps to located tectonic activities.

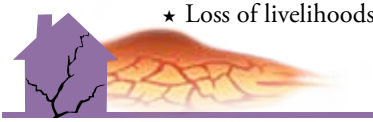
The Modified Mercalli Scale (MM) is a judgmental measure of intensity based on the effects the earthquake on people and structures. This scale ranges from MM1 (smallest) to MM12 (largest).

Seismometer

How do earthquakes affect people?

A small earthquake feels like a distant rumble, but the most serious ones can cause a huge destruction.

- ⋆ Death and injuries due to collapsing buildings and falling debris.
- ⋆ People are more likely to be injured or die where large numbers of people live close together and where buildings are not designed to resist earthquakes.
- ⋆ Loss of livelihoods.



- ⋆ Roads, bridges, power lines and telecommunication facilities are damaged.
- ⋆ Earthquakes are most dangerous when they happen at night. This is because people are usually asleep indoors and are more likely to be hit by the falling objects and roof.
- ⋆ Earthquakes can cause other dangers such as landslides, fires and tsunamis.

Earthquake Project

"Shall we go to play in the ground today, brother?" asked Sandali.

"Of course not! Today my friends are coming to study." answered Pawan. "All right then. Can I help you?" said Sandali.

"We have a group work today; to draw up a poster about earthquakes." Pawan said.

Pawan welcomed his friends Supun, Umesh and Disira: "We are lucky, today my elder sister Sandali is also here to help us."

"All right; what details have you got?" asked Sandali.

"We have details of the regions that earthquakes occur, the causes and effects." explains Disira.

"Sister, actually what are earthquakes? I can't remember, it's so complicated." Pawan asks Sandali "Listen, it's not complicated at all. Earthquakes are tremors that occur on the surface of the earth." the sister said.

"Do you all know that the earth's surface consists of huge plates of rock that move around in very very slow pace? Earthquakes occur along the edges of these plates if they crush together or slide past each other and get stuck."

"That is the most important fact. That should be at the centre of the poster!" shouted Disira excitedly.

"And I will write down that four out of five earthquakes occur in the Ring of Fire in the Pacific Ocean. And also the Himalaya mountain range is quite often hit by earthquakes, that is close by!" said Umesh.

"Please add that Sri Lanka is classified as low risk country because it is not very close to the fringe of a plate," Sandali added.

“But our home country can be affected by tsunamis triggered by earthquakes. Do you remember the disaster in 2004, when the tsunami cost more than 30.000 people’s lives in Sri Lanka?”

“Listen now what I read from the book” said Supun “In addition to the damage done by the trembling, an earthquake can lead to tsunamis, landslides and floods.”

Disira took the pen. “The effects of an earthquake should definitively be noted on our poster. All right, you read, Supun and I will write.”

“Weak buildings and infrastructure that are not constructed appropriately may collapse. Even a big city can be destroyed. This is why in countries such as Japan and India they work on construction designs to endure earthquakes.”

“Let’s see your work.” Sister looked at the poster.

“Very good, but there is one thing missing. You should mention what you should do in case of an earthquake.”

“Then listen, I have the details” Umesh started to read: “If you are indoors, stay there and immediately drop to the floor and take cover under a table or an elevated bed. Cover your head and neck with a pillow or your arm. Hold on the table or bed until the shaking stops, so that you do not go sliding. If you are outside, go to an open area, and take the cover-position.”

“Now the poster is complete.” said sister.

Do's and Don'ts

Before

- ⋆ Identify safe places in your house.
- ⋆ Practice your earthquake drill: drop, cover and hold.
- ⋆ Help your parents to bolt or tie cupboards and bookcases to the walls and keep heavy objects on the lower shelves so they don't fall on people.

During

If you are indoors, stay there and

- ⋆ Immediately drop to the floor and take cover under a strong table or an elevated bed. Cover your head and neck with a pillow or your arm.
- ⋆ Hold on the table or bed until the shaking stops, so that you do not go sliding.
- ⋆ If there's no table or desk nearby, get under the doorway, hold on to the door frame and protect your head with your arm.
- ⋆ Stay away from windows, bookcases, almairahs, heavy mirrors, hanging plants, fans and other heavy objects that are not properly strapped to the building.

If you are outside

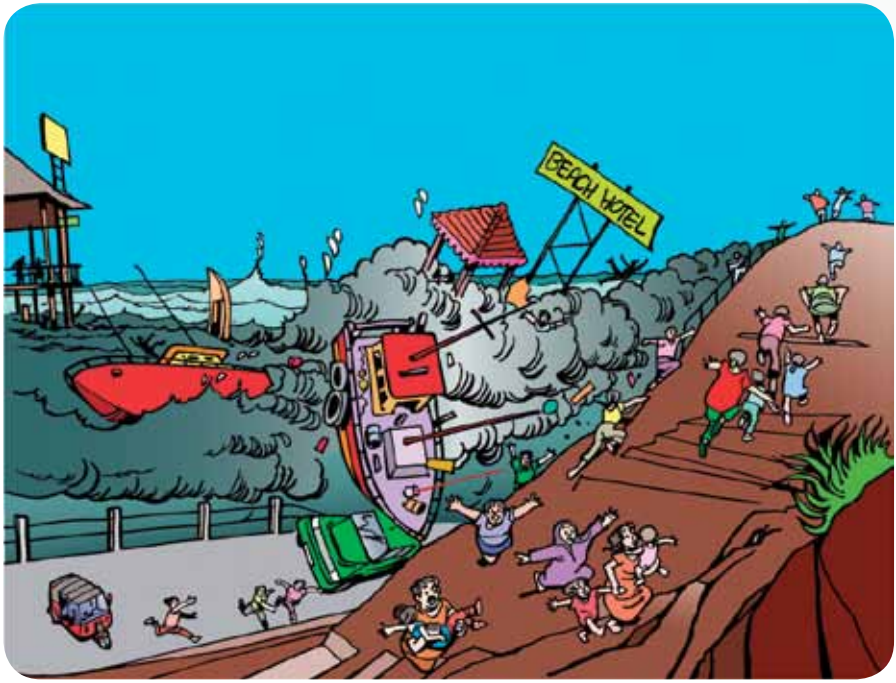
- ⋆ Go to an open area while keeping away from falling debris, sign boards, buildings, electrical wires and poles and trees.
- ⋆ Take up the safe position – Drop, Cover, Hold.

After

- ⋆ After the shaking stops, exit your home or school building and move to open areas to be prepared for after shocks.
- ⋆ Check yourself for injuries and get first aid if necessary.
- ⋆ Remain calm and self assured and help others.
- ⋆ Use the telephone only for emergency calls.
- ⋆ Do not go sightseeing. Damaged infrastructure and trees may continue to collapse.

Tsunami

A tsunami (pronounced as (t)sunämi/) is a series of mighty water waves that is caused by the displacement of a large volume of a body of water due to earthquakes, landslides and volcanic eruptions that can take place in the sea floor or bottom of the ocean.



How does a Tsunami occur?

A Tsunami can be caused by,

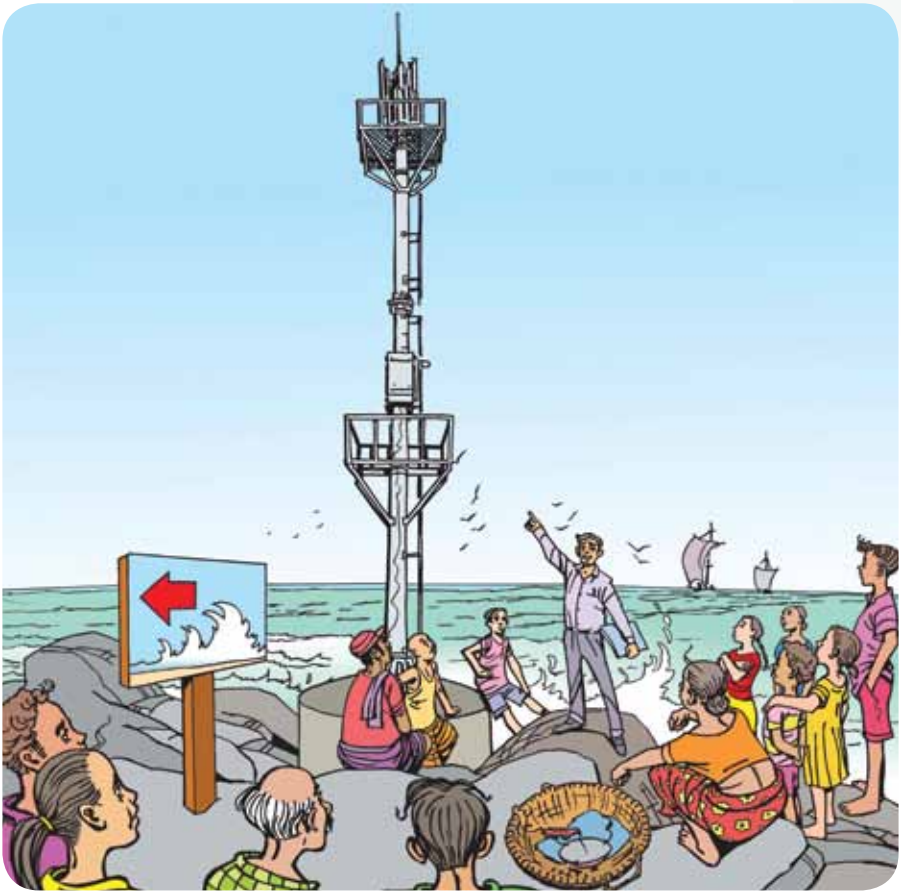
- ⋆ An earthquake in the sea bed (depending on the magnitude and nature of the earthquake)
- ⋆ Underwater landslide
- ⋆ Volcanic eruption in an island
- ⋆ A severe explosion including nuclear testing in the sea bed
- ⋆ Disturbance in the sea bed due to a meteorite or an asteroid hitting the sea bed

Important Facts about Tsunami

- ⋆ The waves can travel many thousands of kilometres across the oceans at great speeds of up to 800 kilometres per hour but they loose speed upon arriving at the land. Even these waves move up to 50km per hour, faster than a person can run.
- ⋆ A tsunami may pass unnoticed as it crosses deep oceans, but it loses speed and gains height when it reaches shallow water. Large waves up to 15 meters or more in height (30m in extreme cases) can come crashing onto the land and can move inland several hundred meters. The effects may become worse in narrow bays and inlets.
- ⋆ The tsunami danger period can continue for many hours after a major earth quake. It consists of a series of waves. Often the first wave may not be the largest. The danger from the subsequent tsunami waves can last for several hours after the arrival of the first wave.
- ⋆ Sometimes a tsunami causes the water near the shore to recede, exposing the ocean floor. This is nature's tsunami warning and we should pay attention to it. Whether the sea water level may fall very quickly, it will return just as quickly. If this happens, there won't be enough time to issue a warning, so it is important that you know what to do, and that you act quickly.
- ⋆ Tsunamis can travel up rivers and streams that go ahead to the ocean.
- ⋆ Tsunamis can occur at any time of day or night.

Effects of tsunami

- ⋆ Tsunami waves are rapidly-moving tides with very strong currents that can wash people and objects out to sea, or are large breaking waves that can cause significant damage at the shoreline.
- ⋆ The force of some tsunamis is enormous. Large rocks weighing several tons along with boats and other debris can move several meters inland by the wave activity.
- ⋆ Homes and other buildings are destroyed.
- ⋆ Floating materials and water moving with higher speeds can injure or kill people.



Community awareness for Tsunami warning and evacuation

Niroshan's Story

Niroshan, who lives in Japan with his parents, came to Sri Lanka for his school vacation. On 26th of December 2004 dawned another day of his holiday. Niroshan and his family were staying in a luxurious guest house in the southern coast. Niroshan was still fast asleep and his mother and father were chatting in the balcony.

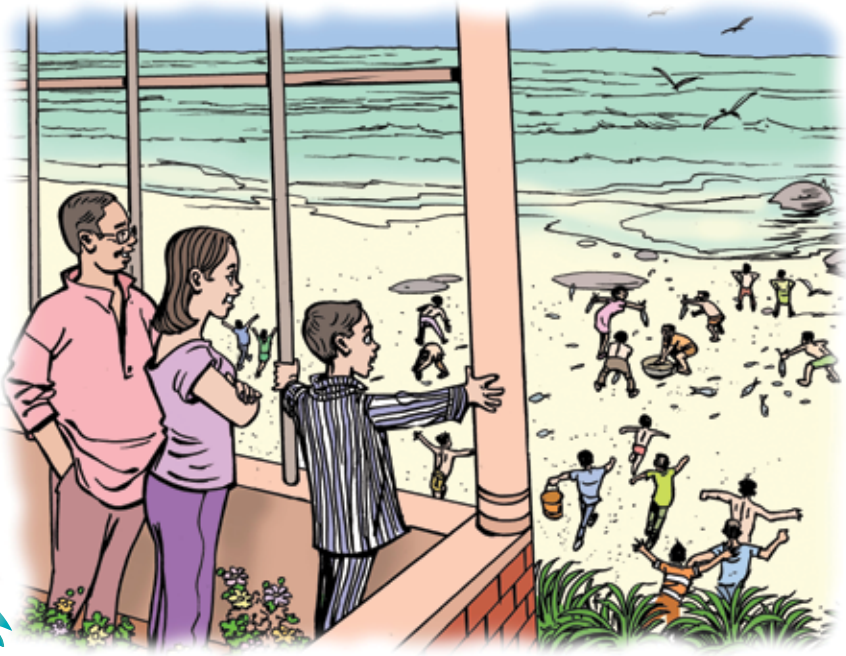
Niroshan's father noticed a change in the rolling waves of the sea. "Look, it seems that the sea is shrinking. Isn't it?"

"Oh! Very strange, mother said... I have never seen such a thing. There are fish jumping all over the cleared sea bed."

A large number of people ran towards the sea, shouting with amazement. Some collected fish, while some others tried to demarcate the boundaries to own the emerged land.

Niroshan's mother and father woke him up hurriedly to experience this wonder. "Niroshan, get up soon. Look at what's happening on the beach. Sea bed is emerging and the beach is expanding..."

"What?" Niroshan jumped out of the bed and peeped through the window.



“That’s exactly what we learnt in school last summer in Japan. That is called a Tsunami. After the water front moves away from the beach like this, the waves will roll back to the land and hit the coast horrendously. It will be a great disaster. Those people are in danger! Why doesn’t anyone in this country know about this? ”

Niroshan yelled at the people who were at the shore: “Hurry up, hurry up. This is a tsunami. The huge wave will roll back very quickly. Rush to high elevation to save your lives. It might kill you!”

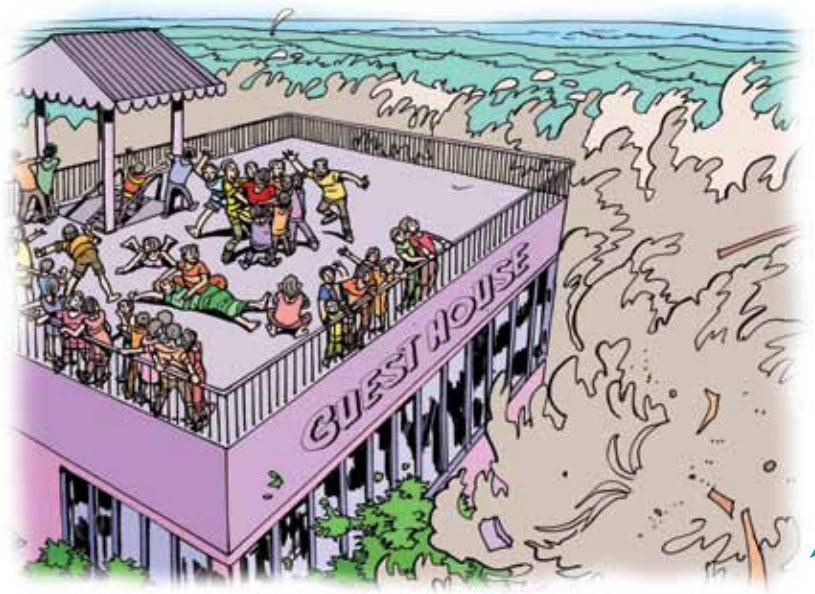
Also, Niroshan alerted the guest house manager over the phone.

Niroshan’s loud voice spread across the area. Everyone was quickly directed to the top floor of the guest house.

Niroshan started to explain. “Can you see a black wall like thing far away in the sea? That is the Tsunami wave.” Only that’s what Niroshan could utter...

A gigantic black wave rushed on the beach in a fraction of a second with an enormous force. All the things on its path were destroyed instantaneously submerging two floors of the guest house. People who looked on from the upper floors screamed in agony while some fainted.

The lives of hundreds were saved, due to Niroshan’s timely action.



Do's and Don'ts

Preparedness

- ⋆ Find out if your home, school or workplace are in tsunami prone areas
- ⋆ Identify safe routes to leave from such areas using a hazard map
- ⋆ If you are in tsunami prone area you have to keep an emergency kit which includes all the necessities such as ID cards, certificates, medicines and other important items

After Tsunami warning given

- ⋆ Listen to the radio for more information
- ⋆ Pay attention to the warning signs, siren sound, etc.
- ⋆ If you are at home and hear there is a tsunami warning, alert your family
- ⋆ Before a tsunami hits, you may feel the earth shake, or notice sudden rise or drop in the sea level
- ⋆ Immediately go to higher ground and stay there. Move uphill, away from the beach and away from any rivers or streams

During Tsunami

- ⋆ If you can't reach high ground, then go to the top floor of a tall concrete building or climb a tall tree
- ⋆ Do not go back to the shore after the first wave, there might be another one following
- ⋆ If you are swept away by a tsunami, look for some help to stay float and to protect you from other dangerous floating objects
- ⋆ If you are in a boat, stay out at sea. Do not try to come back to the shore

Tsunami emergency evacuvation map

After Tsunami

- ⋆ Check yourself for injuries and get first aid if necessary.
- ⋆ Help people who need help.
- ⋆ Use the telephone only for emergency calls.
- ⋆ When re-entering home or buildings, examine walls, floors, stair cases and windows to make sure that the building is not damaged and in danger of breaking up.
- ⋆ Watch out for snakes and other reptiles who have come with the flood water.

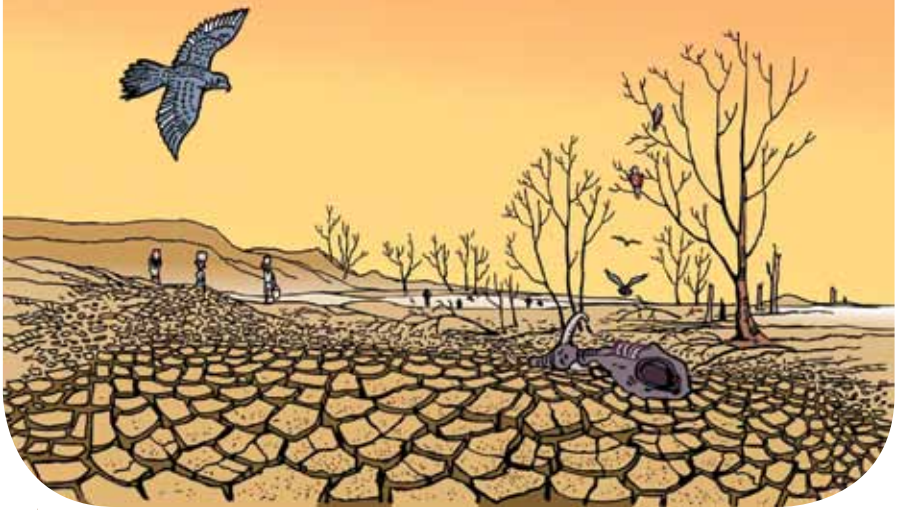
Drought

In Sri Lanka, droughts are the second frequent happening disaster causing significant costs. In 2003/04, Sri Lanka was hit by a drought; seven districts in the South-Eastern and North-Central areas were severely affected and Rs. 477 Mio were allocated to more than 230,000 affected families to buffer the effects.

A drought means that there is not enough water compared to the needs. Drought can stretch over a period of months or even years. Naturally, a drought occurs when rainfall stays below expectation. E.g. in December 2003 the weather stations in Sri Lanka recorded the lowest amount of rainfall since 125 years. But drought can as well occur through overuse of available water resources and cutting of trees.

Even a short drought can already cause massive damage to the local economy, especially agricultural activities. Persisting droughts lead to malnutrition and famine, loss in water quality and spread of diseases.

Droughts are hardly predictable and there is not much to do against lack of rainfall. However, wise use of water and careful maintenance of forests and your natural surroundings builds up the environment's buffering capacity.



Causes of drought

A drought occurs when there is not enough rain to support people or crops. With the increase of population, the demand for lands is increasing. As a result people clear the forests (Deforestation). That also causes to reduce the rainfall. And global climatic changes also have an effect on prevailing drought conditions.

Effects of a drought

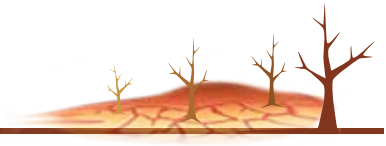
Drought and loss in forest cover and soil erosion are mutually reinforcing effects.

Direct effects

- Lack of drinking water, leading to dehydration and sicknesses
- Lack of water for hygiene, leading to secondary diseases
- Lack of water for crop irrigation, leading to reduced/failed harvest, famine as well as economic losses
- Lack of water for livestock and fish breeding, leading to malnutrition as well as economic losses
- Lack of water for hydro-electricity generation
- Habitat damage and loss of biodiversity
- Increase in wildfires

Indirect effects

- Migration
- Economic losses affecting households in the longrun, e.g. payment of school fees
- Soil erosion and continued soil degradation



Subodha's Story

A cloud of dust sprang high up to the sky, as the vehicle of Irrigation Department stopped in front of the Community Hall. The drought that prevailed for months had not spared a single drop of water in the soil.

Irrigation engineer Mr. Kodithuwakku, started his lecture:

"It's true that we cannot control this drought. Nevertheless, there is no evidence that this area experienced droughts in the distant past as it is today. What is your opinion regarding this?" He asked from the gathering.

It was little Subodha who responded.

"Now see, Kurulu Kelle, is totally cleared. Once our grandma said, there were also waterfalls in Kurulu Kelle at that time. We can't even imagine such an era. There had not been any water problem in the village those days, grandma said.

As the days passed by so many trees were cut and houses built and everything changed. These days we are using the harvested rain water in the vessels made for us last time by uncle Kodithuwakku. I think it's none other than we responsible for this situation."

The elders at the gathering looked at each other. The lady doctor who had come with Mr. Kodituwakku joined in the discussion.

"I am very proud of you, Subodha. The elders also must understand what you understood as a child. Look at the health problems we are faced with today. Measles is spreading like an epidemic in this area. A farmer, who was depressed as his crops were destroyed, committed suicide. We have to strengthen the people to confront these challenges."

Do's and Don'ts

Before

As drought is a slow onset disaster, it gives us more time to prepare unlike in sudden disasters. Hence we cannot prevent drought, we can certainly reduce its intensity and impact through individual and collective actions.

What can we do?

- ⋆ Conserve water and use it efficiently in your household, e.g. have broken pipes repaired quickly, wash with a cloth
- ⋆ Harvest rain water at home and in school and encourage reuse of water, e.g. for watering the garden, flushing toilets
- ⋆ Use water efficiently in your garden, e.g. mixed-crop-planting, watering in the evening hours to avoid evaporation, drip irrigation
- ⋆ Plant trees and care for them
- ⋆ Inform family members on drought-related hazards

What not to do?

- ⋆ Do not waste water, e.g. do not leave the water tap running
- ⋆ Do not cut trees

During

- ⋆ Minimize your water use
- ⋆ Purify drinking water
- ⋆ Eat fruit and vegetables, they also contain water

School Disaster Safety Programme

In Sri Lanka schools are vulnerable for many types of natural and man made hazards, like tsunami, floods, landslides and bomb threat. When school teachers and students are prepared and know what to do in an emergency, the damage caused by disasters can be reduced.

With this understanding the Ministry of Education has started many activities towards a safer school environment. In this context, the "National Guidelines for School Disaster Safety" have been developed in 2009 by the Ministry together with the DMC.

This School Disaster Safety programme includes to establish a school safety committee, find out about dangerous places in the school environment and make them safe, train teachers and students on fire safety, first aid etc., develop an emergency plan and conduct mock drills.

Teachers and students learn in evacuation simulation how to save themselves from different disasters such as tsunami, earthquakes, fire. They develop confidence for safe evacuation and learn to follow different safety procedures, e.g. evacuate to a higher ground for tsunami.

Parents, teachers and students shall participate in this programme and reach out to the community in order to create awareness among them about natural hazards and to motivate them to engage for a safer school.

Prevention

Avoid specific circumstances that could lead to an event of this nature. Keep lime out of reach of children.

However, if it occurs:

- ⋆ Wash the eye thoroughly with clean water for about 10 – 15 minutes.
- ⋆ Take the person to a government hospital. If there is hospital, where eye care is available (a general hospital or any hospital where an eye surgeon is available), you can directly take the victim to such a hospital.
- ⋆ Don't rub the eye !
- ⋆ Don't pour anything other than water into the eye (milk, indigenous oils, fruit juices, etc).

Prevention

Remove all fish bones before eating.

However, if it occurs

- ⋆ Open the mouth as widely as possible and have a good look at the throat. In case of a child, an adult can have a good look at the throat. In case of a big child or an adult, use a mirror to see. If the fish bone is seen, it is good news, you may try with your fingers to remove it. If not possible or if the fish bone is not visible, please take the person to an OPD of government hospital.
- ⋆ You can try with a few forceful bouts of coughs. This will happen naturally if a bone is stuck or give the victim a light clap on the back.
- ⋆ Don't blame the person or child !
- ⋆ Don't use a sharp or dangerous item to remove the fish bone at home. This is not safe, it can perforate the gullet (oesophagus)!

Prevention

Use footwear at high risk places, leave the snakes alone.

However, if it occurs

- ⋆ Call for help.
- ⋆ Reassure the person with words of encouragement.
- ⋆ Remove the victim to a safe place.
- ⋆ Wash the bite site thoroughly with water for 10 -15 minutes (if water is available).
- ⋆ If the site of the bite is a hand or a leg, wrap (not very tightly) the hand/leg just above the site with a handkerchief, belt, tie etc.
- ⋆ Remember to look at the bite site and the hand/leg again after 20-30 minutes and if there is swelling, remove the tourniquet and wrap it above the previous site.
- ⋆ Remove wrist watches or rings in case the bite is on a hand.
- ⋆ While you are handling the victim with First Aid measures, ask somebody to look for the snake and try to identify it. If the snake is already killed, take it to the hospital with the patient.
- ⋆ At the time, please do not blame the child for being there. Talk to the child with love. Never frighten the person (victim).
- ⋆ Do not keep the hand or leg wrapped for more than 30 minutes.
- ⋆ Do not forcefully put anything into the mouth if the victim is unconscious.
- ⋆ In case the victim is unconscious, all the care should be given to him/her (protect the air way, make sure breathing is not obstructed, eyes should be protected etc.).

Prevention

Avoid such high risk areas and take necessary clothing etc.

However, if it occurs

- ★ Take the victim away from the environment.
- ★ Reassure the victim, talk to the person/child nicely.
- ★ Remove wedding rings etc.
- ★ Identify the sting sites, it may be multiples.
- ★ Remove all darts (what remains after a sting) as quickly as possible – this is very important. You can do this while other measures are taken. If numerous, get help from others. You can use finger tips, blunt blades, plastic pieces, etc.
- ★ If available, give any antihistamines like Piriton.
- ★ In case of multiple bee stings or even a single wasp sting, take the person to a hospital.

Prevention

Don't keep any unsafe plug points, any faulty electrical appliances at home. Take extreme precautions when you handle electrical items. Do not do it alone, any work that involves electricity. When you handle risky activities, always keep a person to help you in any eventuality. Let him/her
BE PREPARED - Prior instructions should be given to the person. Identify the main switch to cut off the power supply.

However, if it occurs

- ⋆ Turn off the power supply immediately.
- ⋆ Call help.
- ⋆ If the power supply cannot be disconnected (location of the switch is not know, etc.), the first aider should stand on dry insulating material like a door mat and push the victim away. You can use a a wooden stick, e.g. broom stick, to push the victim away.
- ⋆ After removing the victim from the power supply, immediately check the pulse or heart beats and respiration.
- ⋆ If the pulse is not felt or heart beats are absent, start heart massage, after a firm blow to the left side of the chest.
- ⋆ If the victim is not breathing, start giving mouth to mouth breathing.
- ⋆ While carrying on with your first aid management, take the victim to the hospital.
- ⋆ Reassure the victim.

Prevention

Avoid high risk situations, take all preventive measures.

Causes for fire outbreaks

Heat, spreading flames, chemical reactions and electricity.

However, if it occurs

- ★ Douse flames by throwing water or use heavy clothing, sand or gunny bags.
- ★ Remove the victim from the environment to a safe place.
- ★ Call help.
- ★ Avoid contamination of the burnt areas of the body with soil – be mindful.
- ★ Remove unnecessary clothing (unless it is stuck with the skin).
- ★ Remove wedding ring, shoes, belt, etc.
- ★ Reassure the victim.
- ★ Take the victim to a hospital.

In case of chemical burns

- ★ Again remove the person from the environment. Use water to clean the areas of burn.
- ★ Take the victim to a hospital.

Fire

Fire is a chemical reaction between three elements: Oxygen, heat and fuel. Shortage of any one restricts the occurrence of fire. If conditions are right, a fire can start almost anywhere at any time. Most fire hazards occur when the weather is dry and hot.

In less than 30 seconds a small flame can be completely out of control and turn in to a major fire. It takes only one minute for thick black smoke to fill the inside of a room and in a few minutes a room can be in flames, and then in another few minutes turn into ashes. Fire produces heat, smoke, light and toxic gases harmful to human.

Causes of fire

- ⋆ Matches, lighters, candles, coockers, heaters can easily cause fire outbreaks, therefore should be used with caution.
- ⋆ Cooking accidents are a major cause of home fires. Fires can result due to unattended cooking or due to mechanical failure of the cooking equipments.
- ⋆ Electrical wiring can cause a fire if it is not large enough to carry the load being supplied. Over heating of electrical appliances, poor wiring connections, use of unauthorized appliances, multi-point adaptors can result in starting fires.
- ⋆ Rubbish and waste materials that are left to accumulate can easily contribute to spread of fire.
- ⋆ Combustible materials such as packing materials, glues, flammable liquids, or gasses.
- ⋆ Hazardous materials such as paints, solvents, adhesives, chemicals or gas cylinders.

Classification of fire in four types:

Type A – Garbage, Wood, Paper (wood, cloth, paper, rubber, many plastics)

- ⋆ This type of fire can be extinguished using pressurized water that cools burning material below the ignition point

Type B – Liquids, Grease (gasoline, oil, grease, tar, oil-based paint, lacquer, flammable gases)

- ⋆ This type of fire can be extinguished using carbon dioxide, foam and dry chemical powder that inhibits the chemical reaction. Pressurized water would only lead to scattering the fuel.

Type C – Electrical Equipment (energized electrical equipment)

- ⋆ This type of fire can be extinguished by any fire fighting material, but water and foam should be avoided as they conduct electricity and will cause harm to the fire fighter.

Type D – Explosives (magnesium, sodium, potassium, zirconium, other flammable metals)

- ⋆ This type of fire can be extinguished using dry powder that absorbs the heat. Common fire fighting materials might make the fire even worse.

Fire causes huge losses of life and property every year.

Effects of fire

- ⋆ Causes death or injury.
- ⋆ Breathing even a small amount of smoke and toxic gases can make you drowsy and you may fall into a deep sleep before the flames reach your door.
- ⋆ The odourless, colourless gases can make you disoriented and short of breath.
- ⋆ Inhaling of the hot air will scorch lungs.

Dilip's Story

It's New Years Eve and Dilip is so happy. He has received a packet of fire crackers on his own.

"Son" says the mother, "move outside and be careful. Fire crackers are dangerous. If they land on something that catches fire, it's quickly out of control! I put a bucket of sand in front of the door. Please throw in all the used stuff, ok?"

Outside Dilip meets his older friend Nalin.

"Look, Nalin, what uncle gave me, a huge packet of fire crackers! There are rockets, too."

"I'll show you how to do it right!" says Nalin and swoosh the first rocket is lighted and flies high, and another one swoosh...

"Oh, that's so beautiful" shouts Dilip.

"I'll try one of these." and he lights the sparkler with a match. Dilip is very careful not to burn his t-shirt by shoving up his sleeves. He holds the sparkler at arm length, as Nalin has told him.

"Look, what I can do!" Dilip writes eights and circles in the air with his sparkler.

But, what's that? Oh, his buttocks feel hot. Dilip turns around and sees a small fire where he threw the match.

"Nalin, help" he cries "there is fire!" Nalin takes the bucket of sand and pours it over the fire and it dies. Lucky enough there was no waste lying around to fuel the fire.

The parents come running and tell the boys off. To add, poor Dilip has strong pains. Mother puts a towel soaked with cold water on his back. That soothes the pain but the party is spoiled.

Do's and Don'ts

Before

- ⋆ Remember: Even a small match stick can create a large fire. Do not play with match sticks.

Rules for playing with fire crackers:

- ⋆ Only in open grounds and open places, never close to thatched houses and hay stacks.
- ⋆ Wear tight cotton clothes while playing fire crackers.
- ⋆ Light fire works at arms length, turning your face away.
- ⋆ Always keep a bucket of water and sand ready.
- ⋆ Always immerse the used fireworks like sparkles, lighted matches into a bucket of water or dry loose sand.

During

If you are in the house

- ⋆ Stay calm. Don't panic and don't run.
- ⋆ If the fire is small, put it out immediately: Cover it with a wet towel/ blanket/ gunny bag or pour sand on it.
- ⋆ If it seems to be a big fire, sound an alarm and alert everyone in your premises.
- ⋆ Escape first and then call for help.

If you have to evacuate

- ⋆ Close all doors and windows.
- ⋆ Cover your mouth with a wet cloth.
- ⋆ Do not stop to collect belongings.
- ⋆ Crawl low and fast to escape smoke. 'Get Down, Get Low, Get out.'
- ⋆ Use the nearest available exit route but change towards your second option if you feel heat and smoke increasing.
- ⋆ Use staircases if you are in a high building. Don't use lifts.
- ⋆ If there is a small fire between you and the exit, then you should run quickly through.
- ⋆ Once out, stay out — never go back inside.

If you are outside

- ★ Move to an area with low fuel, such as a clearing, lake or previously burnt ground.
- ★ Move downhill away from the fire – the most intense fire will be at the top of hills.
- ★ Stay low and cover your mouth and nose with a wet cloth.
- ★ Don't try to outrun the fire – move across the front of the fire to the sides.

If your clothing is on fire

- ★ STOP- Never run, running will make the fire worse.
- ★ DROP- To the floor. Cover your face with your hands.
- ★ ROLL- Back and forth covering your face. This will make the fire go out.

After

- ★ Check yourself for injuries and get first aid if necessary.
- ★ Help people who need help. If someone was caught by fire, cool the burn with water as long as possible.
- ★ Do not go sightseeing. Beware of hotspots as they can flare up again. Damaged infrastructure may continue to collapse.
- ★ If the house is too badly damaged to live in, board up openings to discourage trespassers and arrange security patrols to protect it from burglary.

Emergency kit

If flood or cyclone might hit your area, the government issues a warning by radio two days or one day before the possible disaster. If the danger is high for your community, they will be asked to evacuate their homes. Then you have to take your emergency kit with you and go to the safe place or shelter, where you stay until the danger is over.

In case of a Tsunami, the warning comes only a short time before the wave will hit the coast and you must immediately move to a safe place on higher ground. It is good to prepare the emergency kit in advance so you do not loose time when you have to leave your home.

The following things you will need in an evacuation:

Washing Bowl and Soap, Walking sticks and Spectacles for elderly, Baby food and clothes, Battery operated torches, Transistor radio and batteries, Drinking water, Dry rations, Spare clothes, Essential medicine, Money, Mobile phone with charger, Identity cards and Important documents.

For more infomation

Disaster Management Centre (DMC)

2nd Floor, No. 498, R.A.de Mel Mawatha, Colombo 03

Tel (General)	: +94-112-136136
Fax (EOC)	: +94-112-670079
Fax (General)	: +94-112-670025
E-mail	: info@dmc.gov.lk, dgdmc@sltnet.lk
Emergency Operation Centre	: +94-112-136222

Department of Meteorology

383, Bauddhaloka Mawatha Colombo 07

Tel	: +94-112-694846, 2694847, 2681647
Fax	: +94-112-698311
Web	: www.meteo.gov.lk
E-mail	: meteo1@sltnet.lk, meteo@slt.lk meteo2@slt.lk

National Building Research Organization

99/1, Jawatte Road, Colombo 05

Tel	: +94-112-588946, 2503431
Fax	: +94-112-502611
E-mail	: www.nbro.gov.lk

Irrigation Department

P.O. Box: 1138 Baudhaloka Mawatha Colombo 07

Tel	: +94-112-584984, - 1164/ 6311
Fax	: +94-112-584984
Web	: www.irrigation.gov.lk
E-mail	: infor@irrigation.sltnet.lk

Emergency contact list

Institution	Contact No
Disaster Management Centre (DMC)	011 2670071, 011 2670051, 011 2670076, 011 2670077
Emergency Operation Centre (EOC)	011 2670002, 077 3957900
Ministry of Disaster Management	011 2695012
Ministry of Education	011 2785141 - 50
Sri Lanka Police	011 2854880, 011 2854885
Sri Lanka Army	011 2431779, 077 3082583
Fire Department – Sri Lanka Air Force	011 2441044 (Ext - 22606)
Sri Lanka Fire Brigade	011 2422222
National Building Research Organization	011 2588946, 011 2503431
Department of Meteorology	011 2694104
National Hospital	011 2698443, 072 2281092
Emergency – Police	119 / 118