# Ayubowan



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# Community Based Disaster Risk Management (CBDRM)

## Towards Disaster Resilient Community

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# Purpose of this activity

- To know the risks in community to prepare for future disasters

- To exchange knowledge with other stake-holders


- To make early warning and early evacua-tion plan



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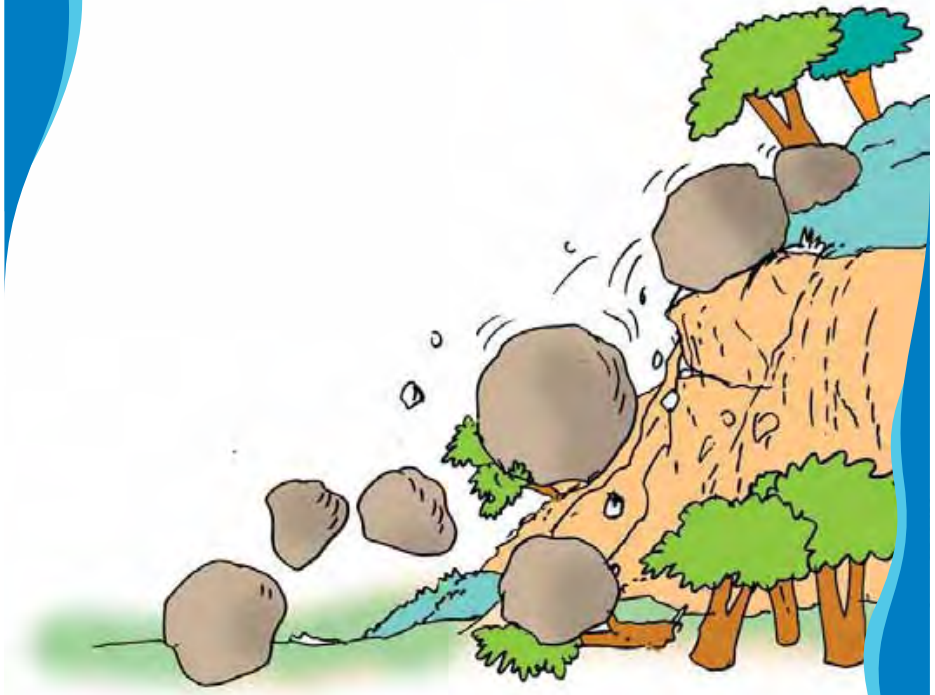
# Natural Hazard



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# Disaster

Human losses Property losses Environment losses



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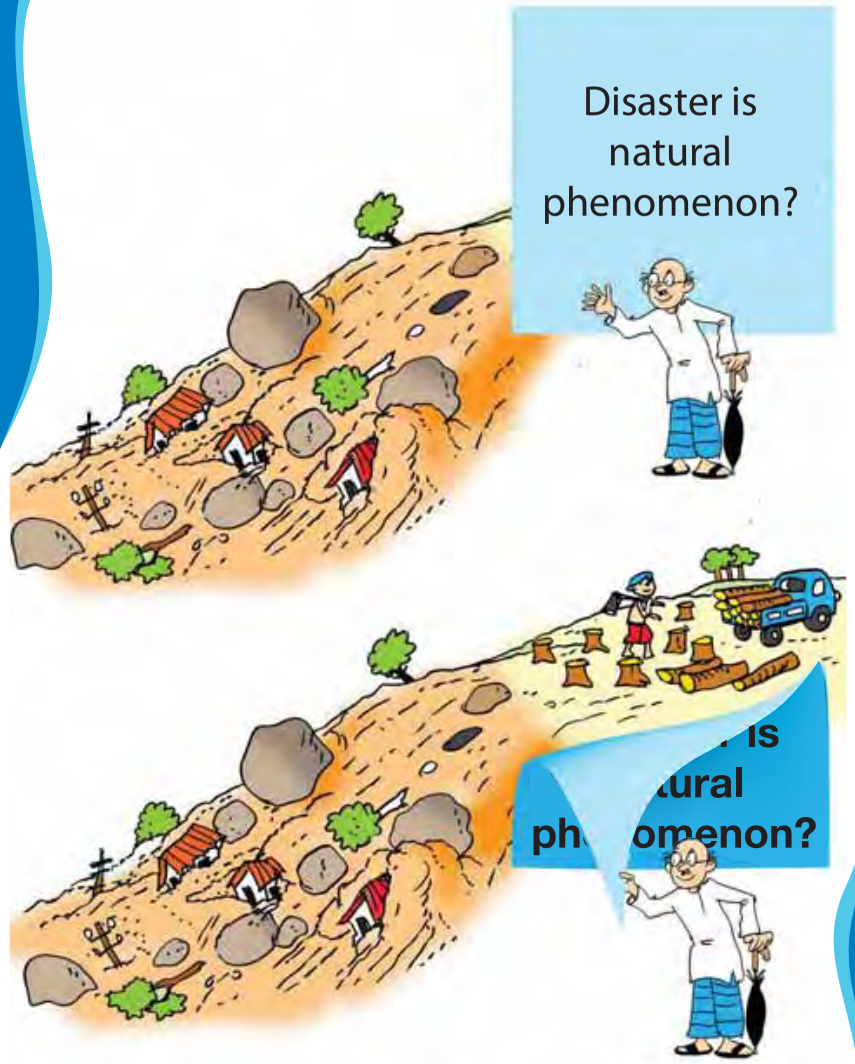


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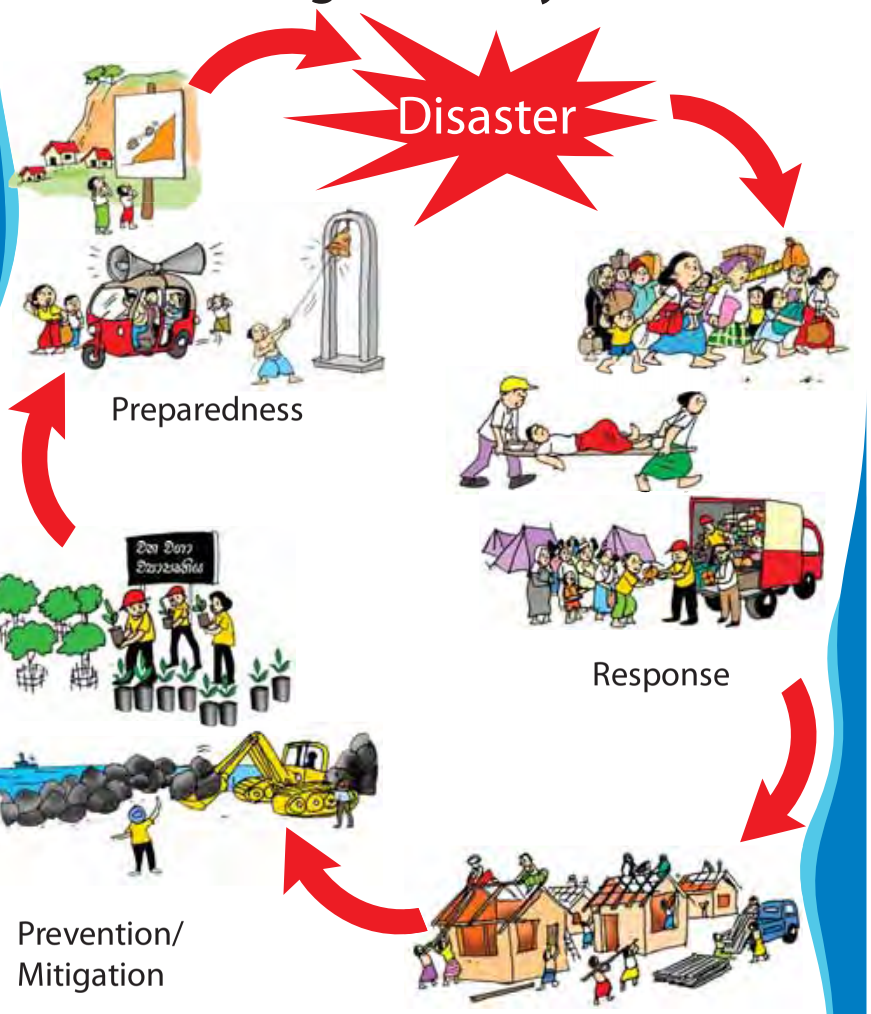
# Disaster Risk Management Cycle



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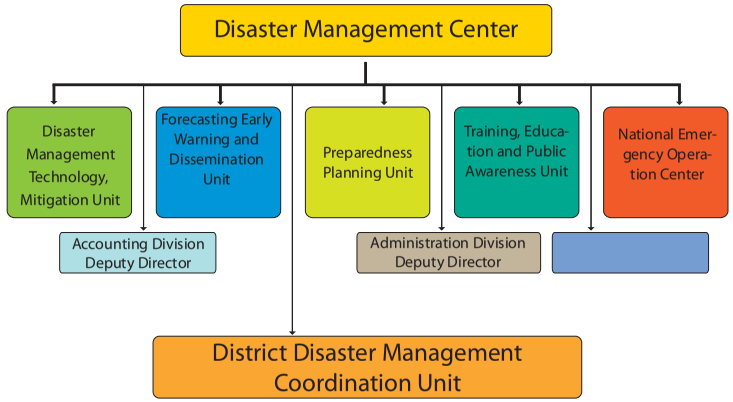
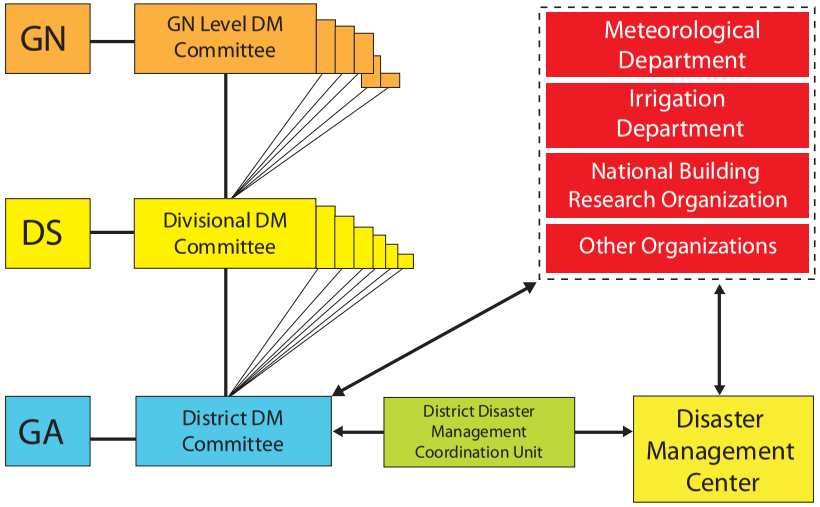
# National Disaster Management Mechanism

## Organizational Structure of Disaster Management Center

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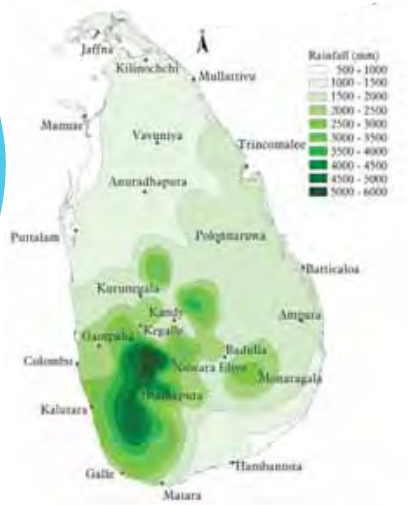
# Importance of Knowing Risks in Your Community

Flood prone areas




Landslide prone areas

Tsunami prone areas

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# Methods of Community Activities

Discuss disaster risks in community

Initial discussion for preparing a community map

Field Survey (Town Watching)

Develop a Community Based Hazard Map

Evacuation Drill

Develop a Community Disaster Management Plan and an Action Plan

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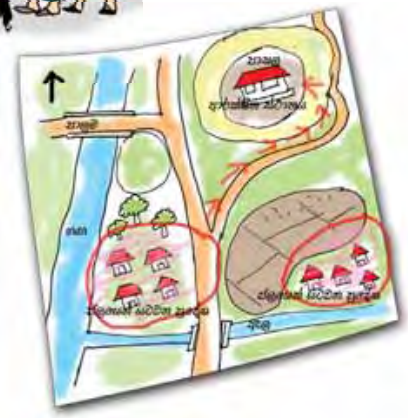
# Making A Community Hazard Map

Initial discussion for preparation of a Community Hazard Map

Field Survey



Draw a Community Hazard map



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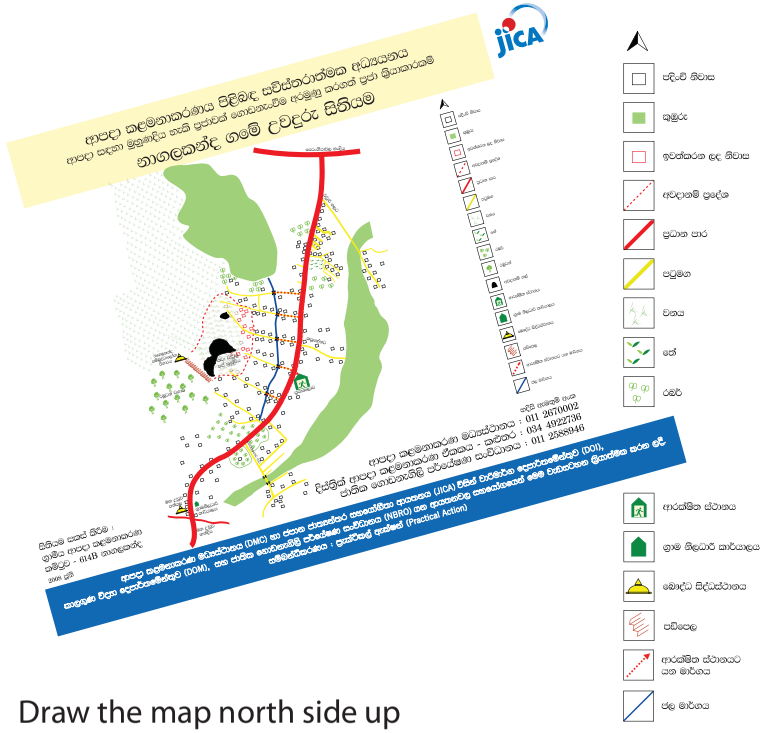
# Tips for Making A Hazard Map




- Draw the map north side up
- Use different color to draw
- Use same icon for important buildings
- Use same mark for location of siren and speaker
- Mark past disaster experience area where is flooded or landslide or tsunami affected area
- Make legend in the map

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# Form a Disaster Management Committee

1. Early Warning

2. Evacuation and Support

3. First Aid

4. Evacuation and Shelter

5. Patrol



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# How to Get Disaster Information?

## Community level

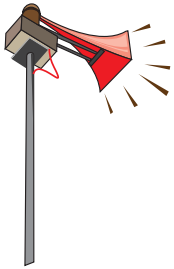
Rain Gauge


River Gauge

## National level

Radio

TV



Tsunami Tower

Telephone

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# How to Disseminate Information to the Community?



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# Conduct an Evacuation Drill

- Check evacuation routes and places
- Check proposed early warning system


- Through this evacuation drill, community will have the ability to face real disasters.

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# Let's Make an Action Plan

## Action Plan

| Problem | Solution | Responsibility | Time |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
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| | | | |

Confirm the community preparedness for Disaster Management through Action Plan.

- Check again the evacuation place and route.
- Provide awareness and training.
- First Aid training.
- Organizing to observe the village development activities.



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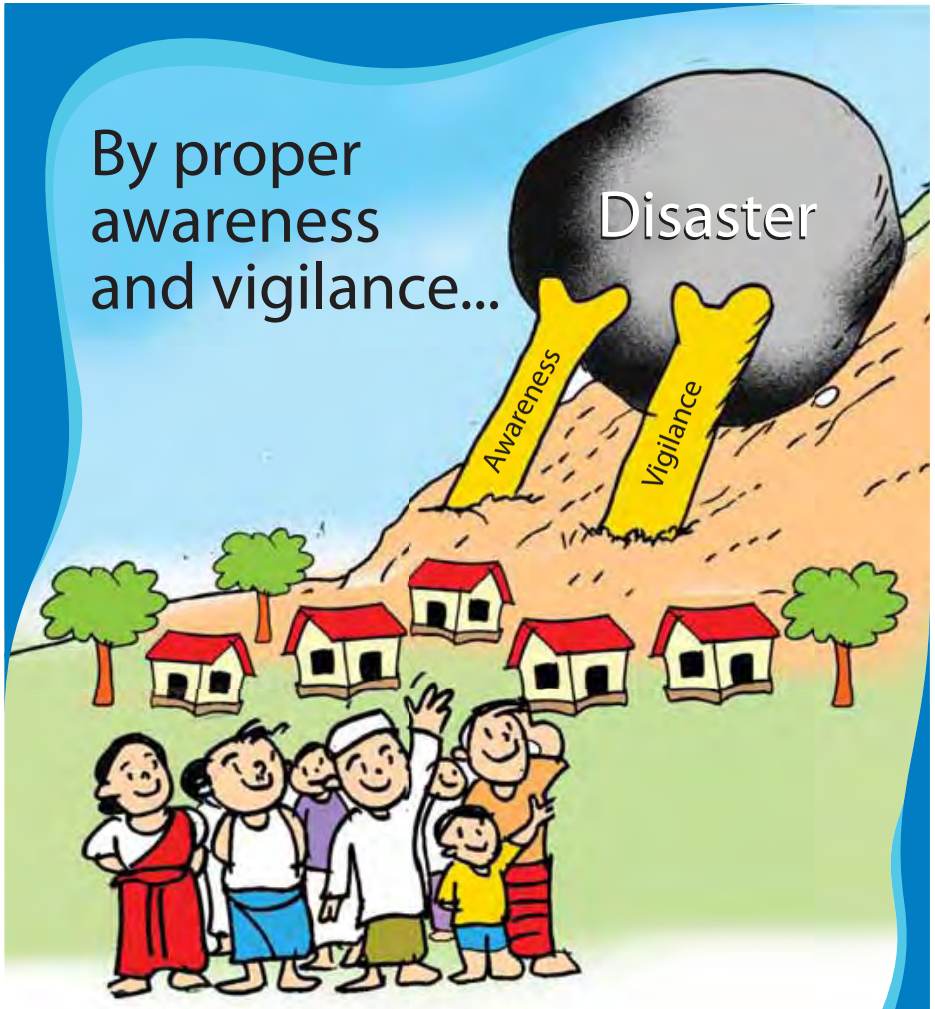


Let's mitigate disaster risk and let's save our village and the country.

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# LET'S LEARN ABOUT FLOOD



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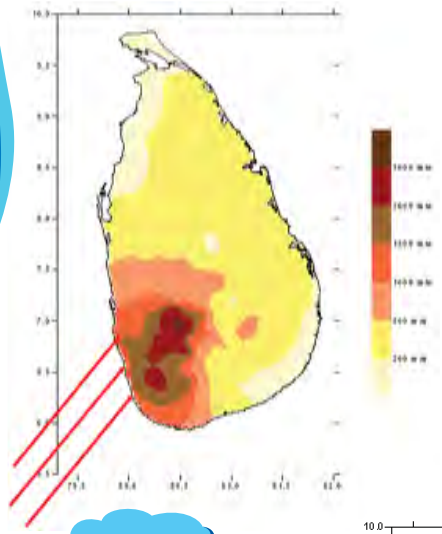
# When do we get rains?

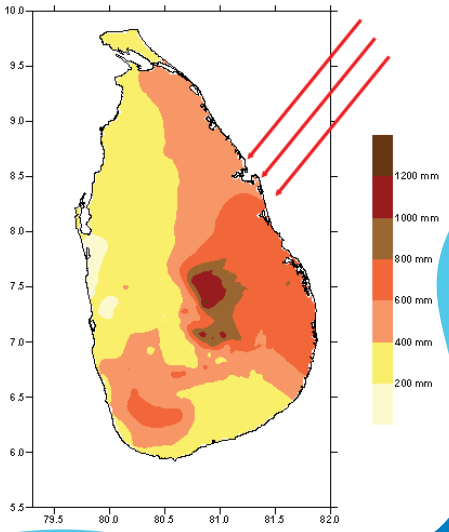
South-West Monsoon



May to September

November to January

North-East Monsoon

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# Flood Damages

- Drowning

- Assets are


- Damage to agriculture

- Epidemics

- Schools need to be temporarily closed



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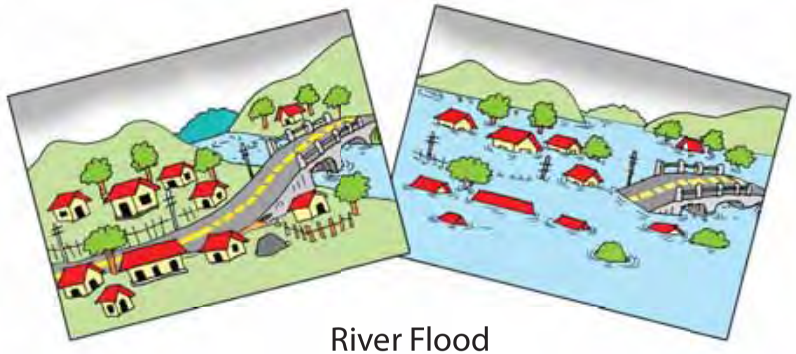
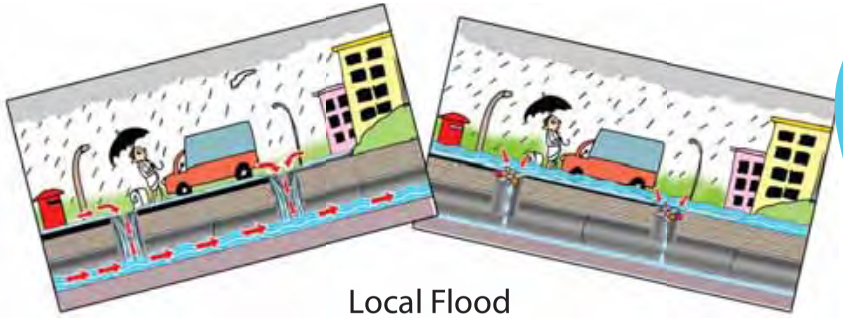
# Categories of Flood

Flash Flood



River Flood



Local Flood

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# Flood Mitigation: Structural Measures

Bank protection

Flood band

Station Pumping



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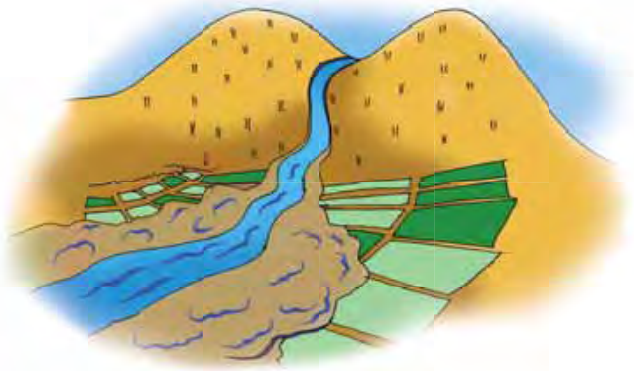
# Flood mitigation through Watershed Management and Land Use Regulation

Trees in the mountain keep balance of natural condition and river flow.



When you cut trees in the mountain, it loses the natural balance and causes flood in the downstream area.

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# Importance of low lands

Wetland functions as natural reservoir and hold excess water.

When you construct houses in the wetland, you are prone high risk of flood.



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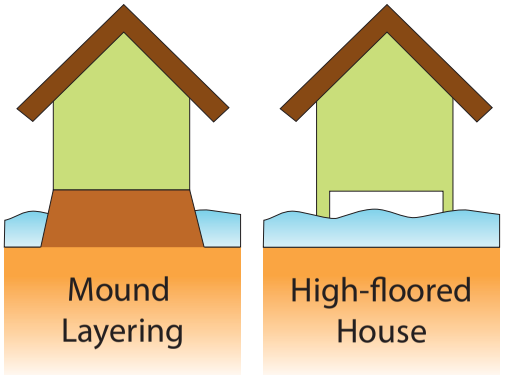
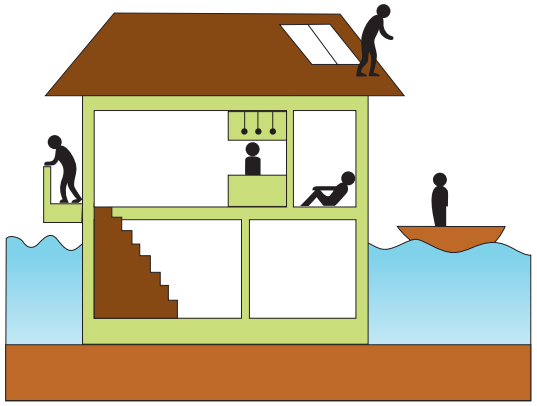
# Appropriate design to construct houses in flood prone areas



Construct 2nd stories building

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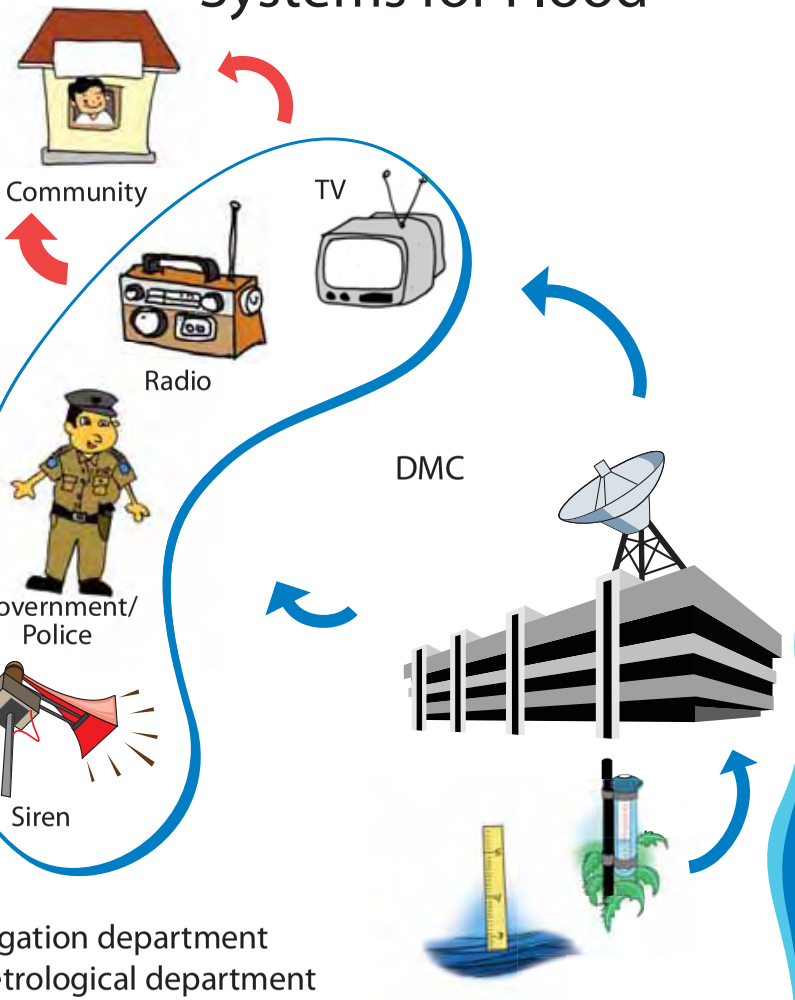
# Formal Early Warning Systems for Flood




- Irrigation department
- Metrological department
- Monitoring rainfall and water level
- DMC



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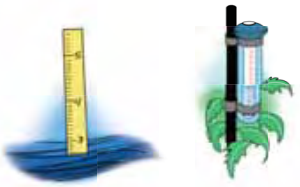
# Community Based Non Structural Measures

- Monitoring the rainfall and water level



- Cleaning and maintaining the drainage

- Discussion with community

- Make a hazard map

- information to the community

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# "LET'S LEARN ABOUT LANDSLIDES"



# Landslides

## Introduction to landslides:

A landslide is a movement of a mass of rock, earth or debris down a slope. Landslides can kill people and destroy property.

This landslide in Abepura, Palawela killed 75 people and destroyed more than 35 houses. It also filled a paddy field with the material it brought down the slope.

That tells us that landslides can cause an impact on our lives, resources, employment and economy also.

Therefore, let's learn about how a landslide can occur and what we can do to prevent or minimize the anticipated damage.

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# Landslide Prone Areas in Sri Lanka

INFORMATION ON A FEW SIGNIFICANT LANDSLIDES IN SRI LANKA

| | DISTRICT | LOCATION OF THE LANDSLIDE | DATE OF OCCURRENCE | DAMAGES |
|---|---|---|---|---|
| 1 | Ratnapura | Pathulpana kanda | June 08, 1982 | 9 deaths and damages to 3 houses and tea planted land |
| 2 | Badulla | Naketiya, Koslanda | July 1995 and November 19,1997 | Road traffic interrupted for weeks due to the damages on roads A16 and A4. (This the largest landslide in size in Sri Lanka) |
| 3 | Kegalle | Thiyambarahena, Malmaduwa | May 1985 | 10 deaths and property damages |
| 4 | Nuwara Eliya | Ketiyapathana, Mathurata | January 06, 1986 | 13 deaths and damages to 2 houses |
| 5 | Matale | Palindagama, Pansalthenna | October 02, 1982 | 11 deaths and damages to 10 houses |
| 6 | Kandy | Weldambala, Pooliyadda | May 16, 1995 | School building, a part of the irrigation system and 28 houses were destroyed |
| 7 | Hambantota | Saputhanthri kanda | May 17, 2003 | 19 deaths and damages to 5 houses |
| 8 | Matara | Diyadawa | May 17, 2003 | 19 deaths and damages to houses |
| 9 | Galle | Kolonthuduwa, Lankagama | May 19, 2003 | 3 houses and the temple were destroyed |
| 10 | Kalutara | Siridolawatta | June 01, 2008 | 4 deaths and property damages |



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# Different Types of Landslides

- Rock Fall

Falling of rock down a slope

- Debris Slide

Sliding down of rock and soil alongwith the trees and other material which were on them.

- Creep

A very slow movement within a slope

- Rock Slide

Sliding down of rock as sheets

- Debris Fall

Falling down of rock and soil along with the trees and other material whichwere on them.

- Rotational Slide

Sliding of soil layers rotationally down a natural or man made steep slope

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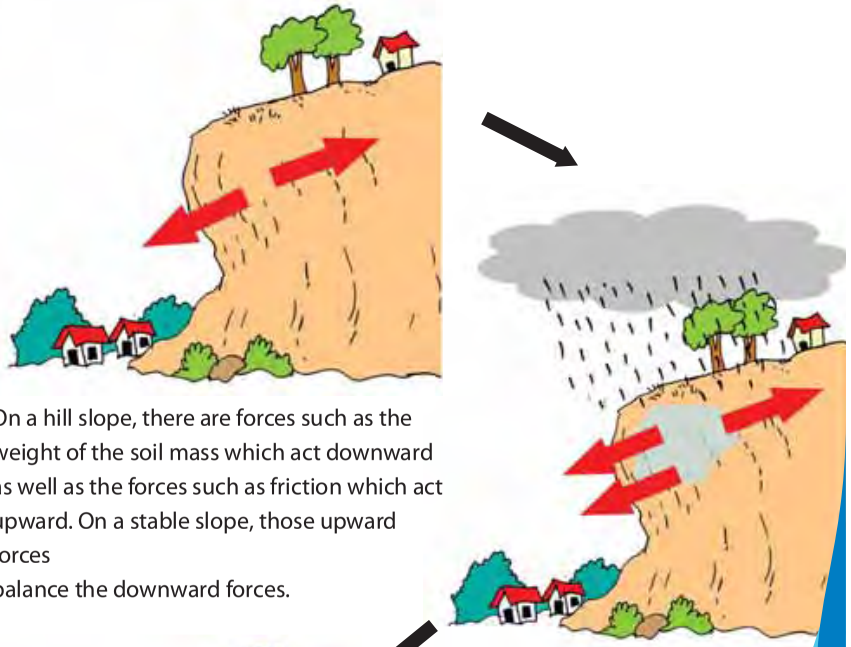
# Mechanism of Landslides



- On a hill slope, there are forces such as the weight of the soil mass which act downward as well as the forces such as friction which act upward. On a stable slope, those upward forces balance the downward forces.

- Because of the weight and the pressure of the infiltrated rain water, the forces that act downward will be increased.

- At the moment when the downward forces are higher or stronger than the upward forces, the balance between those forces will be lost and the soil or rock mass will move down the slope.



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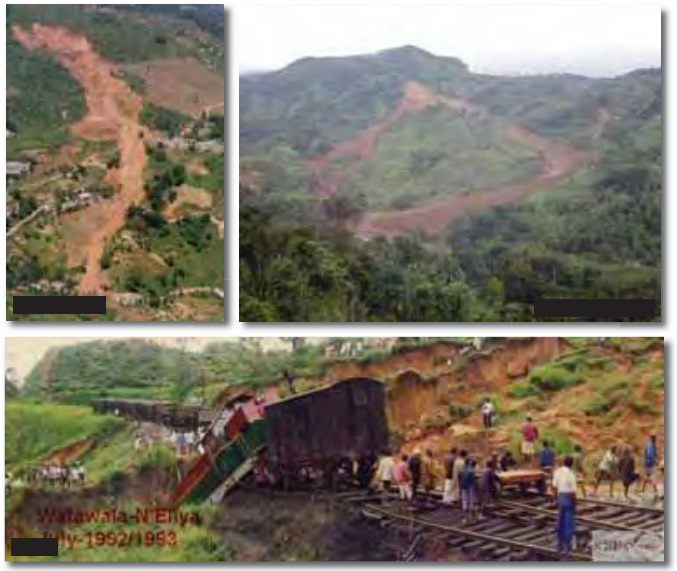
# Landslides Occured Due to Natural Causes

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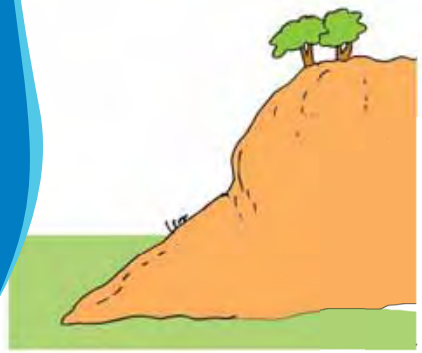
# Landslides Occur Due to Inappropriate Human Activities



- Certain human activities associated with hill slopes may destroy the natural force balance within that slope.

- Making steep cuts on hill slopes for construction of houses removes part of the soil or rock which naturally supported that slope at the toe region.

- As a result, the upper slopes eventually fail and slide down.



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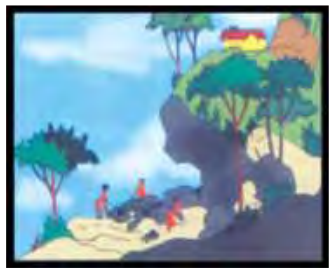
# Other Human Activities that Causes Landslides



- Uncontrolled rock quarrying and blasting

- Blocking natural water ways

- Removal of forest cover or arson

- Retaining water on upper slopes

- Unplanned land use

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# Landslides that Occurred Due to Inappropriate Human Activities

1. A steep cut made on the slope for road construction had lead to this landslide in Baduraliya.

2. This landslide in Kopala Kanda, Ella had been created due to a steep cut made on the slope

3. This landslide in Kopala Kanda, Ella had been created due to construction of houses on a natural water path.

4. This landslide in Bandarawela town was caused by illegal construction at an unsuitable place.



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# Some Landslides Can Slide Several Times

## Hela Uda Landslide

First occurred in 1993
Reactivated in 2003 and again 2006

When this landslide was first occurred in1993 it
Killed 48 people and destroyed 12 houses
Buried
1 hectare of paddy
4 hectare of coconut and several home gardens,
Damaged
About 350m stretch of main road, a culvert, utility poles.
Power supply and telecommunication also were interupted

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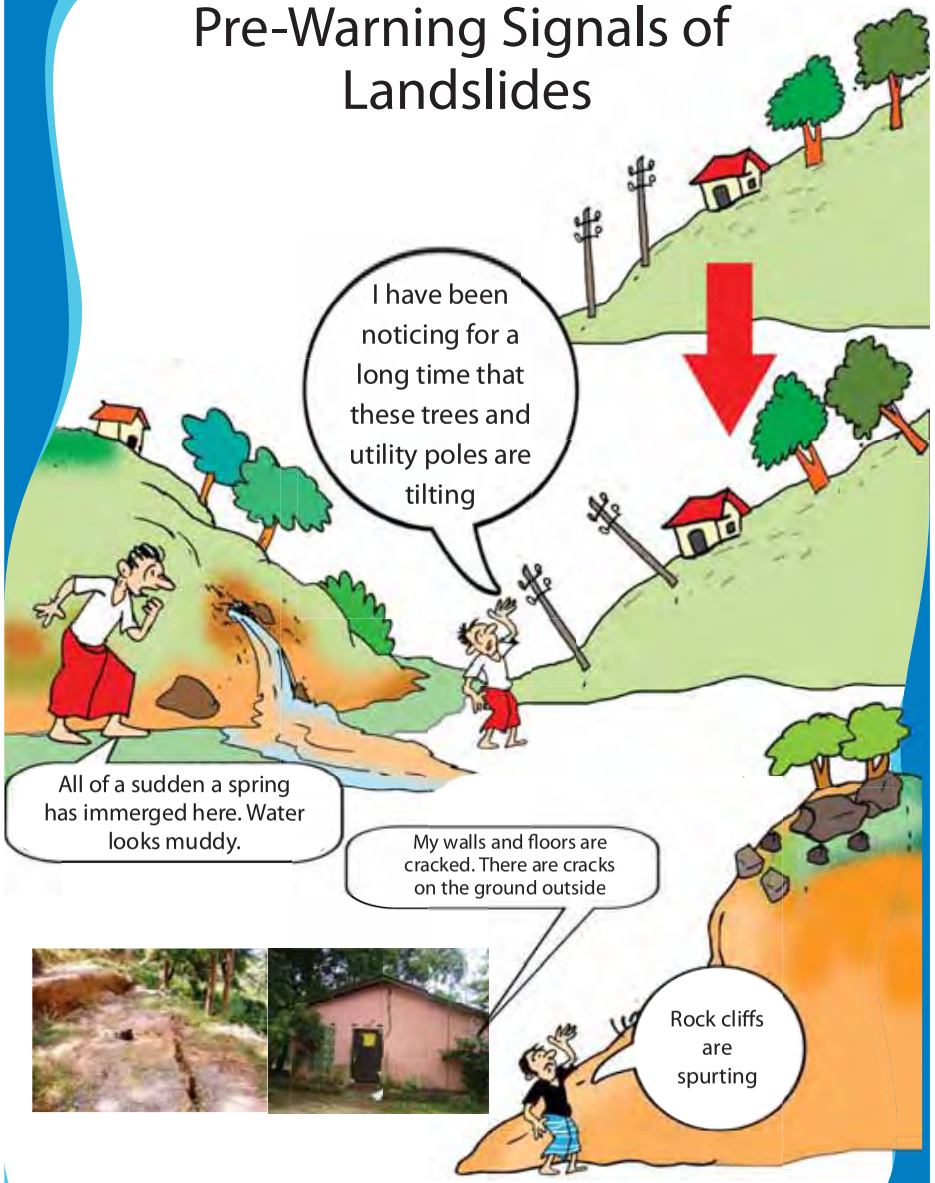
# Pre-Warning Signals of Landslides



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# What Can We Do to Prevent or Minimize Damages from Landslides

- Construction of retaining walls

- Replanting on exposed slopes

- Appropriate land use

- Application of good drainage system

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# What Can We Do to Prevent or Minimize Damages from Landslides

1. Avoid selecting land with past landsides for building houses.

2. Avoid making deep cuts on slopes for building houses and roads.

3. When building on slopes, always select a house plan that will need minimum slope modifications.

4. Protect the slope cuts using retaining walls and controlling erosion



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# Establish a Community Based Disaster Management Committee

- Make frequent checks to identify any warning signals of landslides.
- Take actions to prevent inappropriate land use,if practiced in your area.

- Evacuate to a safer place

- Identify safe places for evacuation during a disaster situation

- Measure rainfall

- Rain Gauge

- Establish a simple communication system to disseminate warning messages.

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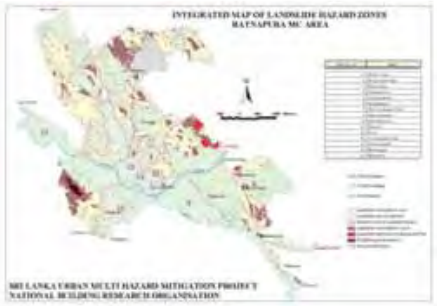
# Follow Construction Methods Suitable for Hill Slopes


- Contruction Guidlines




- Maps

- Model house built in Gluwavila,Ratnapura



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# LET'S LEARN ABOUT TSUNAMI



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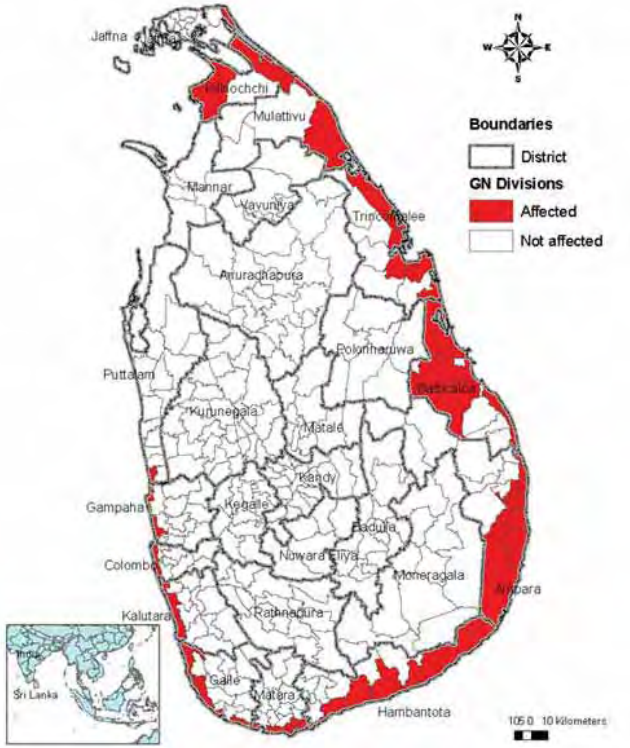
## Tsunami Prone Areas




### Observed tsunami in Sri Lanka

2004: Over 38,000 killed or missing
2007: Tsunami waves were observed in Colombo (56cm) and Trincomalee (46cm)

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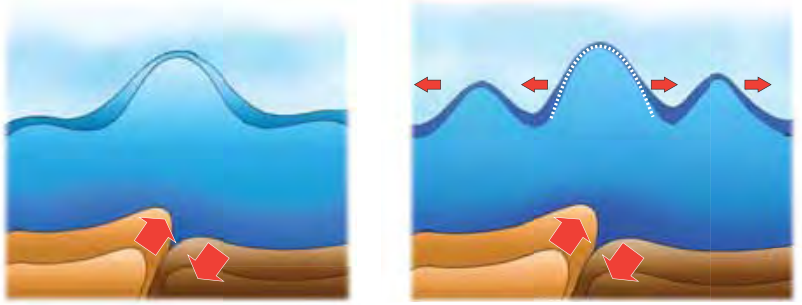
# Causes of Tsunami Generation

Earthquake

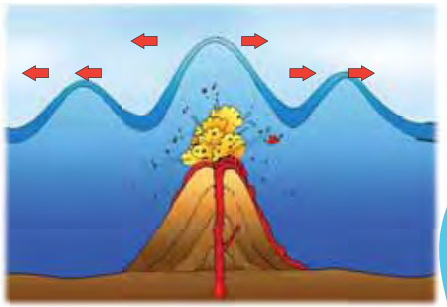


Earthquake generate tsunami is most common

Landslide

Landslide in the coastal area generate tsunami

Volcanic eruption



Volcanic eruption in ocean floor generate tsunami



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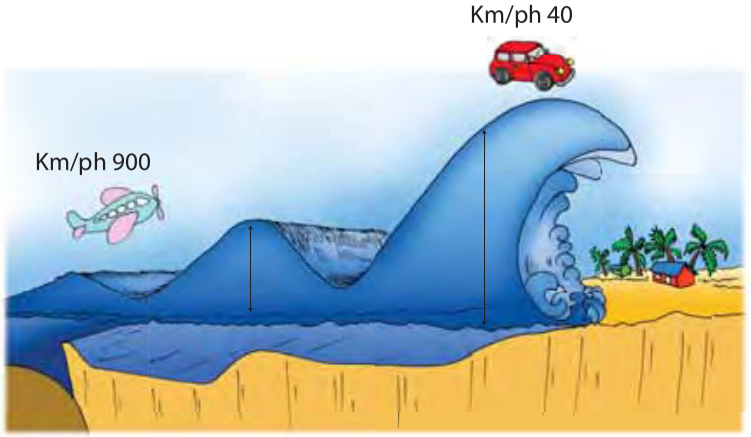
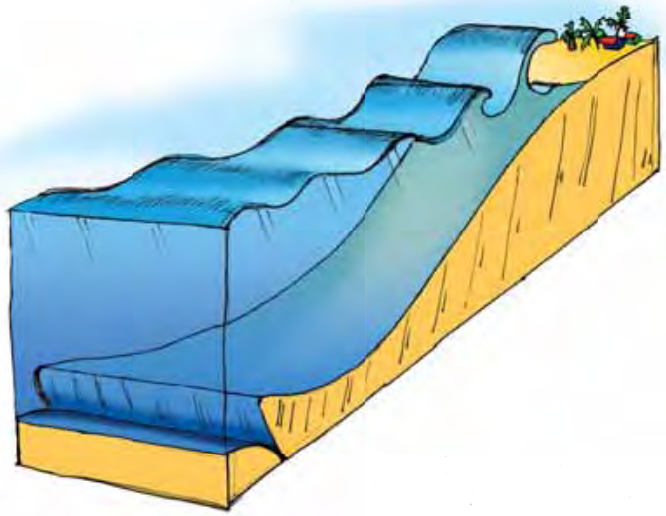
# Speed and Height of Tsunami Wave



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# Characteristics of Tsunami

Tsunami waves come several times

Tsunami forms into large wave and run over to the land

Tsunami comes suddenly

Tsunami has a great power



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# Warning Signs of Tsunami


There is no sign but tsunami come suddenly

Earthquake


Backrush: sea water thrown back to seaward

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# Structural Measures

Seawall

Bank protection

Bioshield and coastal vegetation



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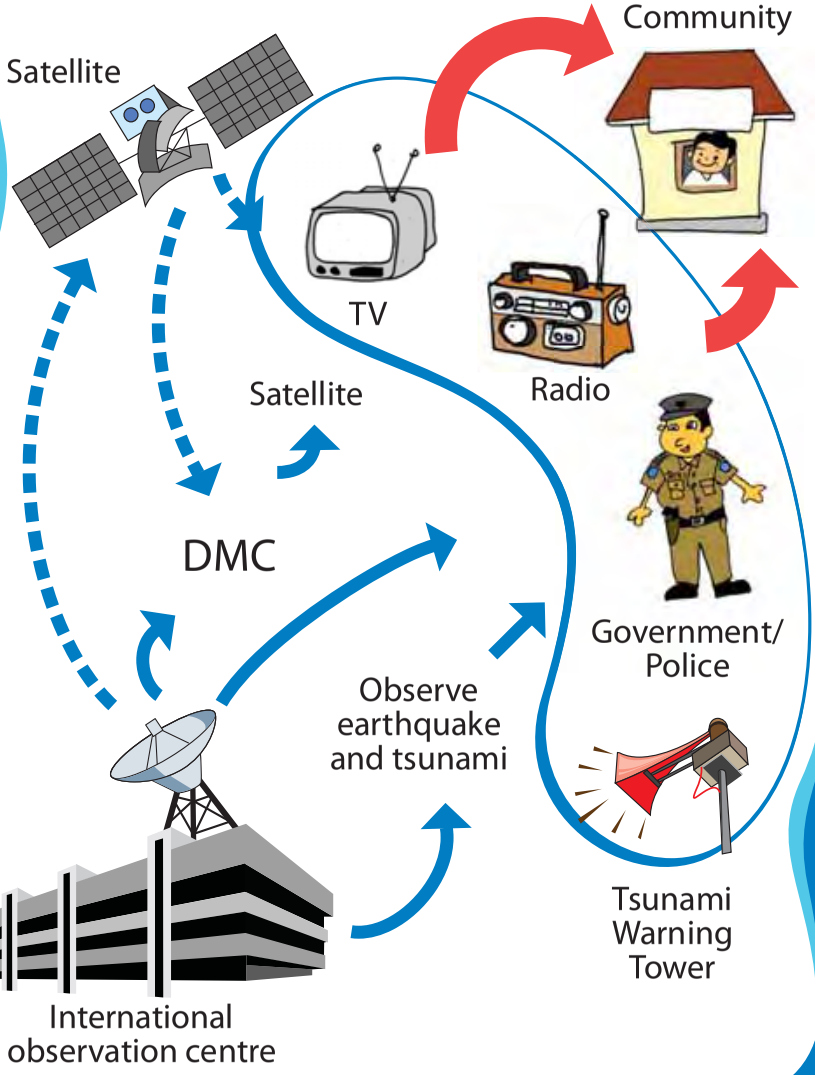
# Non-Structural Measures: Tsunami Early warning system

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# Let's evacuate to a safe place



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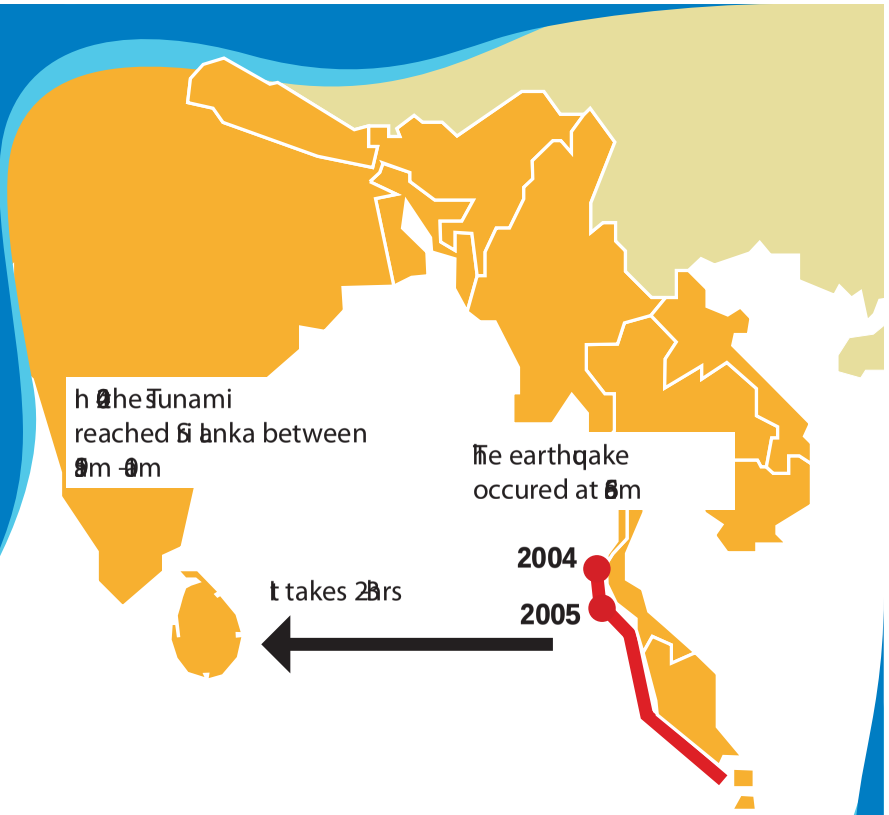


# Where Tsunami occured and How long it took to Reach Sri Lanka

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# Preparation – Community activities

- Meet and discuss about what to do within the community

- Establish early warning system

- Make hazard map

- Evacuate

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