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# AYUBOOWAN

All living being may have a long life



Country presentation

## Disaster Management Mechanism and the Current Early warning System in Sri Lanka



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Disaster Management Center



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Asian Disaster Reduction Center



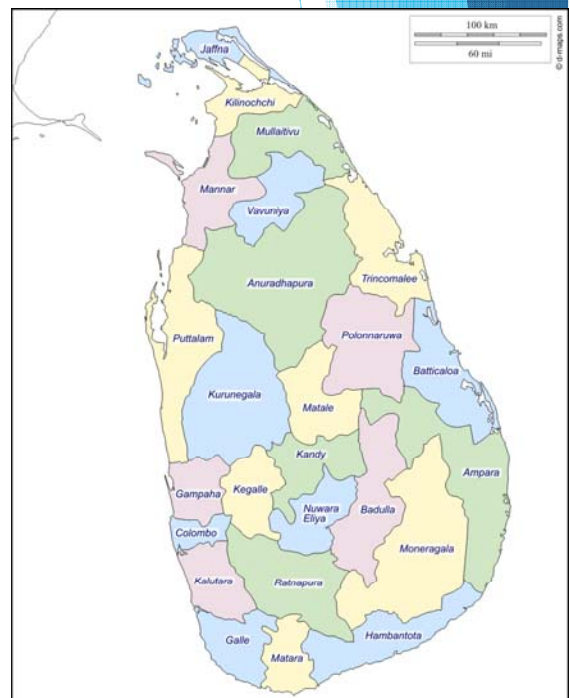
### Current Situation In Sri Lanka

Sri Lanka facing drought in 2017 due to dry weather and no rain from December to end of March

Affected Families – **228,831** as at **27/02/2017**

Affected people - **899,697**

**16** districts out of 25



# Presentation Outline



- Profile of Sri Lanka
- Disaster Events and Impacts
- Institutional Arrangements
- DRR activities
- Lesson learned
- International Corporation framework and Assistant
- Challenges.
- My Research Area



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இலங்கை

Sri Lanka


Area – 65,610 **km<sup>2</sup>**

Population -20,560,00


# Profile of Sri Lanka



## Sri Lanka



Flag



Emblem

**Area**

- Total : 65,610 km<sup>2</sup>
- Water : 4.4

**Population**

- 2010 estimate : 20,238,000
- Mid 2010 census : 20,653,000
- Density : 308.4/km<sup>2</sup>

**Gross Domestic Product**

- 2010 estimate
- Total : \$106.5 billion
- Per capita : \$5,220

**Capital** : Sri Jayawardenapura - Kotte

**Largest city** : Colombo

**Official language(s)** : Sinhala, Tamil

**Demonym** : Sri Lankan

Gini Coefficient : 36 (medium)

Human Development Index : 0.658 (medium)

Currency : Sri Lankan Rupee (LKR)

Time zone : Sri Lanka Standard Time Zone (UTC+5:30)

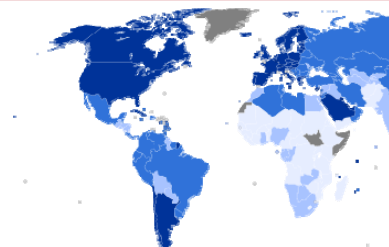
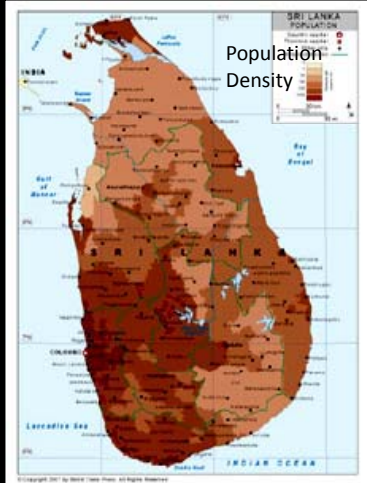
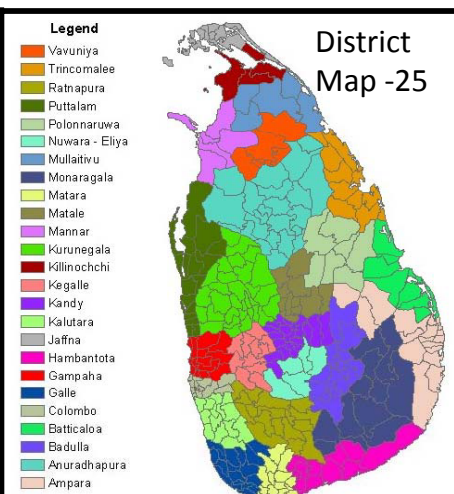
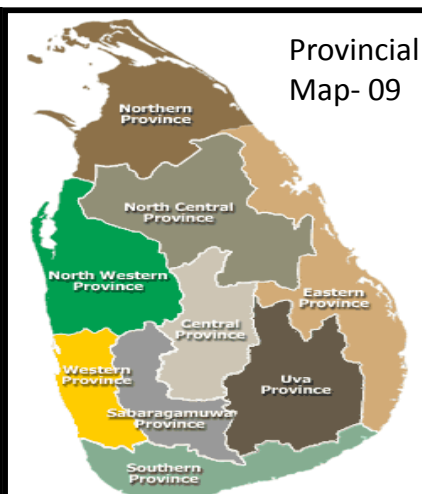
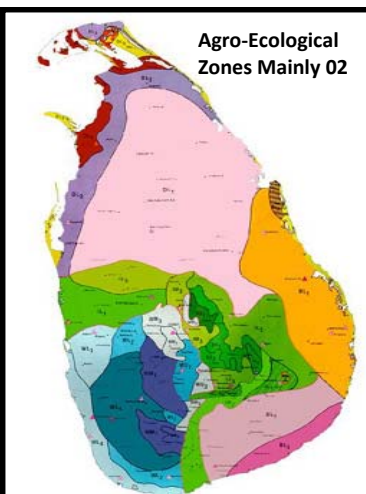
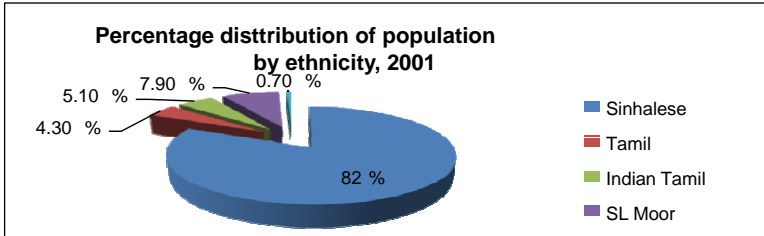
Date formats : yyyy/mm/dd

Drives on the left : left

ISO 3166 code : LK

Internet TLD : .lk, .ලංකා, .இலங்கை

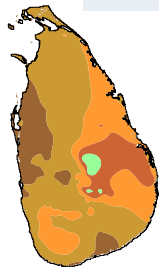
Calling code : 94



# Overview of Climatology

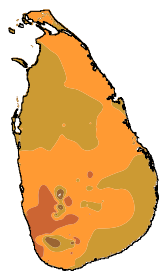
Monsoon Season	From	To
First Inter Monsoon	March	April
South West monsoon	May	September
Second Inter Monsoon	October	November
North East Monsoon	December	February



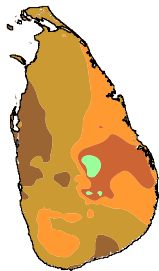
**First Inter-Monsoon (Mar-Apr)**  
268 mm/  
14%



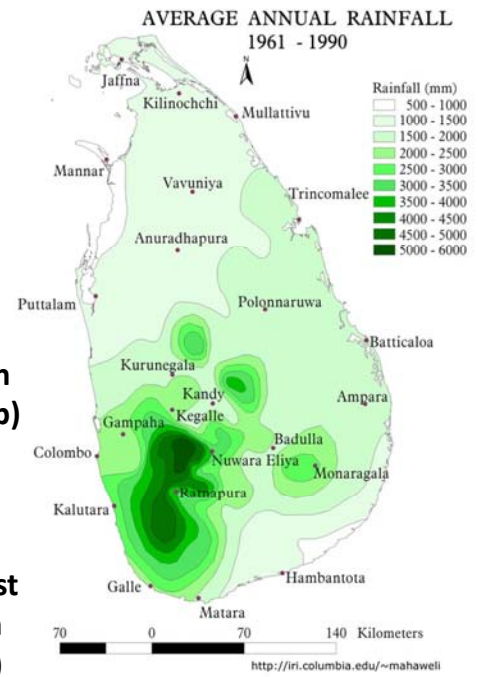
**South-West Monsoon (May-Sep)**  
556 mm  
30%



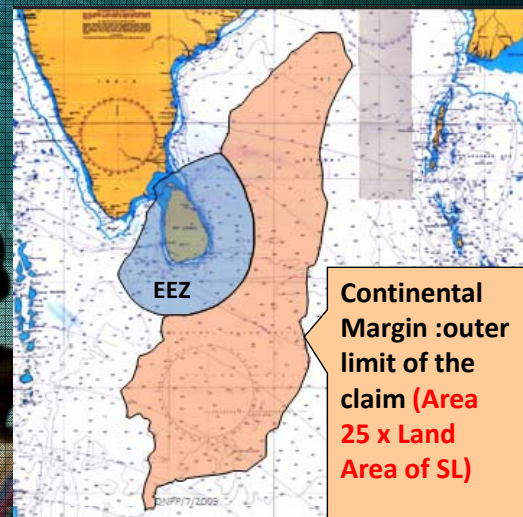
**Second Inter-Monsoon (Oct-Nov)**  
558 mm  
30%



**North-East Monsoon (Dec-Feb)**  
479 mm  
26%



## THE SEA AREA



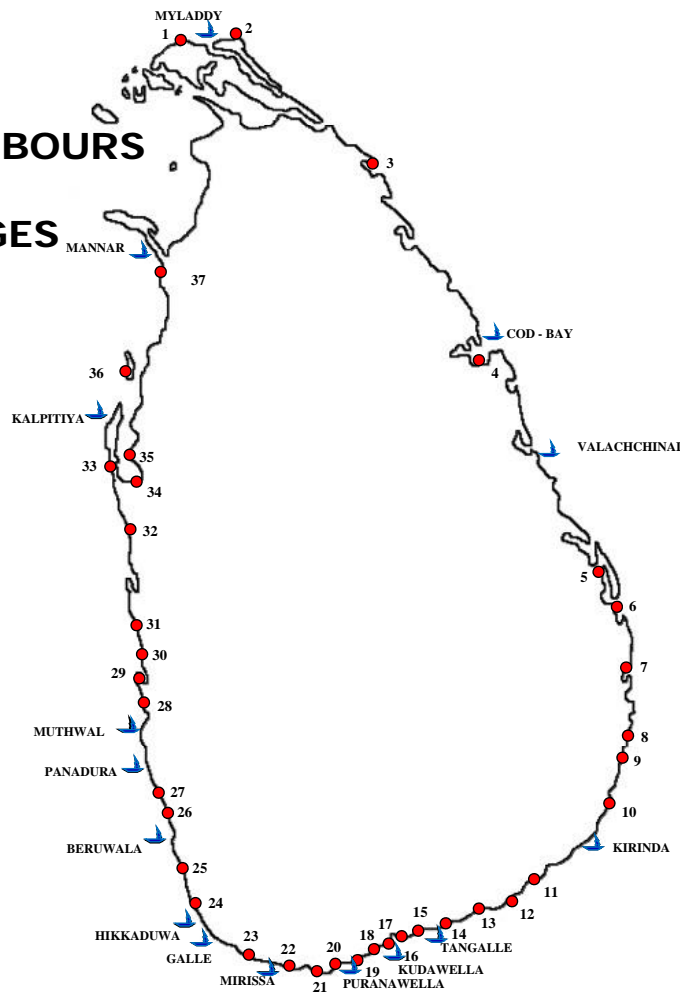
- ❖ Coastline of around **1,340 Km**
- ❖ Territorial sea of **21,500 sq. Km.**
- ❖ Exclusive Economic Zone (EEZ) of **517,000 sq. km.**
- ❖ Area of extent of Continental Margin **1,672,396 sq. km**



# FISHERIES HARBOURS AND ANCHORAGES

## FISHERIES HARBOURS

1. MYLADDEY
2. COD - BAY
3. VALACHCHENAI
4. KIRINDA
5. TANGALLE
6. KUDAWELLA
7. PURANAWELLA
8. MIRISSA
9. GALLE
10. HIKKADUWA
11. BERUWALA
12. PANADURA
13. MUTHWAL
14. KALPITIYA
15. MANNAR



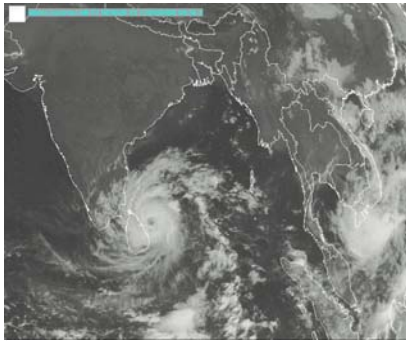
## ANCHORAGES

1. Kankasanthurei
2. PPD
3. Kokilai
4. Muttur
5. Batticoloa
6. Kaththankudi
7. Kalmunai
8. Pottuvil
9. Panama
10. Patanagala
11. Hambanthota
12. Kalamatiya
13. Rakawa
14. Unakurawa
15. Mawella
16. Nilwella
17. Kottegoda
18. Gandara
19. Thotamuna
20. Pollathumodara
21. Kapparathota
22. Kathaluwa
23. Dodanduwa
24. Haranpola
25. Maradana
26. Payagala
27. Kaluthara
28. Dikowita
29. Pitipana
30. Kammalmodara
31. Thoduwawa
32. Kandakkudawa
33. Kandakkuliya
34. Puththalama
35. Serakkuliya
36. Palliyawaththa
37. Amold Canal

# THE GLORY OF SRILANKA



# Multi Hazards in Sri Lanka



## Disaster Event & Impacts

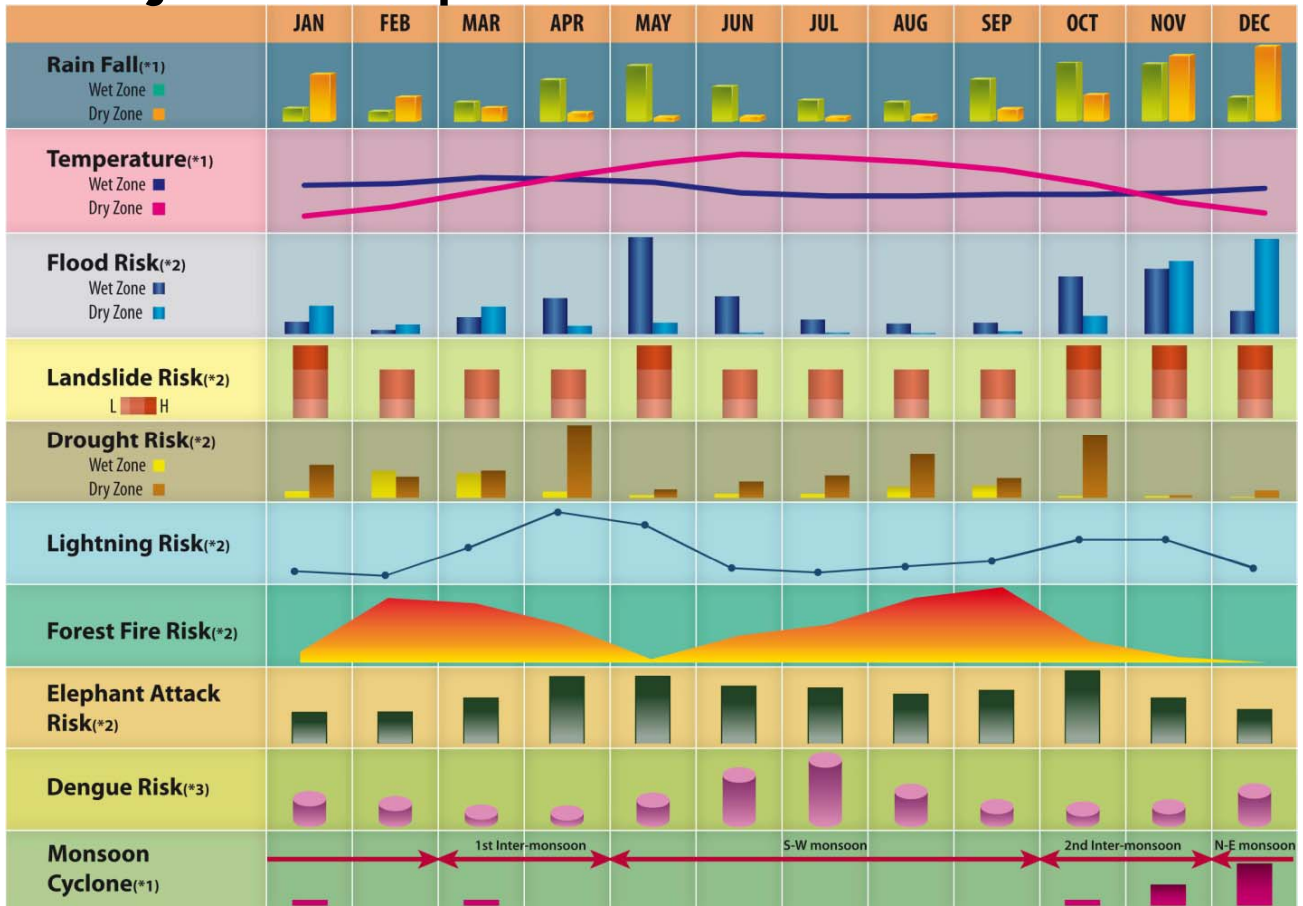


DISASTER/INCIDENT	DEATHS	INJURED	MISSING	HOUSES DESTROYED	HOUSES DAMAGED	AFFECTED
TSUNAMI	30,959	19,611	1,908	57,085	48,208	1,076,240
LANDSLIDE	980	311	187	2589	10563	158959
ANIMAL ATTACK	967	605	2	195	7698	80062
CYCLONE	846	588	21	18,147	111,070	1371943
FLOOD	559	333	21	52,763	160,127	13,821,096
LIGHTNING	494	437	3	28	255	2072
EPIDEMIC	368	0	0	0	0	572635
STRONG WIND	148	375	44	5669	41803	420553
FIRE	101	356	0	1902	934	15058
DROWNING	75	8	13	0	0	50
RAINS	26	185	1	418	4400	745645
GALE	24	121	1	958	12675	115767
CUTTING FAILURE	23	34	0	82	769	16155
LAND SUBSIDENCE	17	8	0	69	1742	10403
EARTH SLIP	10	10	7	56	168	3043
CYCLONE & FLOOD	9	12	0	13178	37371	319128
CHEMICAL	5	2	0	1	0	424
ROCK FALL	3	4	0	10	41	576
FOREST FIRE	1	0	0	16	19	198
RETAINING WF	1	0	0	0	4	24
DROUGHT	0	0	0	0	0	16,675,914
LEAK OR SPILL	0	0	2	1	0	30690
STORM	0	0	0	2	33	7
TORNADO	0	0	0	25	166	430
URBAN FLOOD	0	0	0	0	0	155
TOTAL	35616	23000	2,210	153,194	438,046	35,437,227

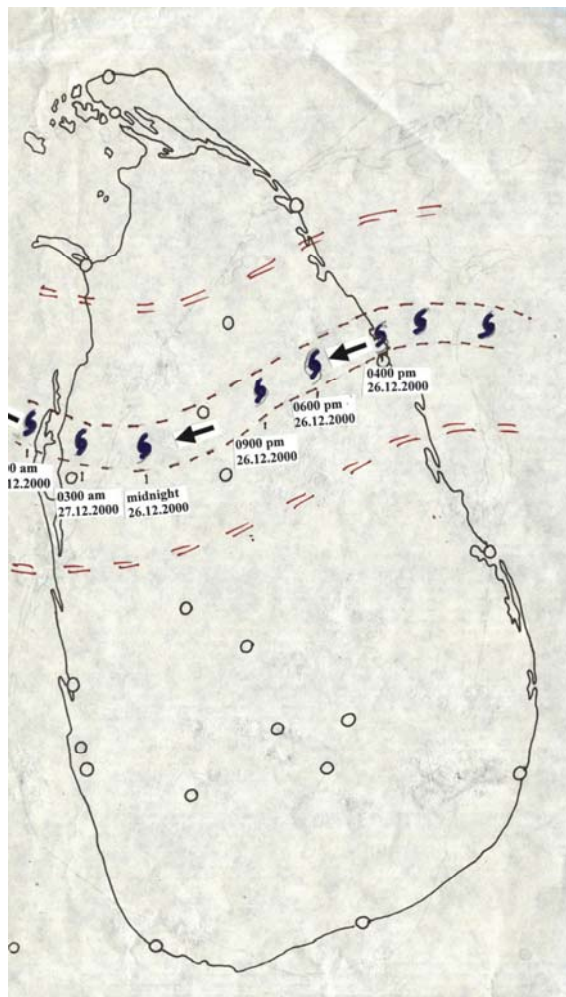
In 1974 to 2016 from desinventer



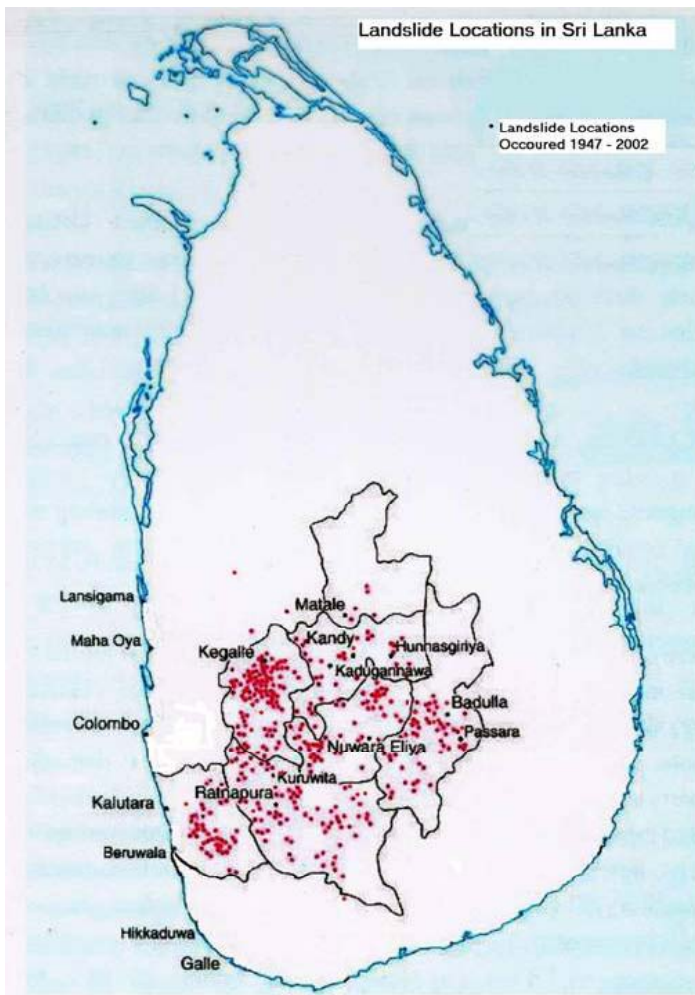
# Major Hazard prediction calendar in Sri Lanka



Cyclone track







## Human Elephant Conflict







But we care them

## Establishment of Electric Fences and Live Fences



Spent more than 300 Mn  
Rupees



- **Bio-fences** are traditionally used as a barrier for Elephants.

# Crocodile Cages project at Matara

More than 3000 families are benefitted



## Immediate After Occurrence of the Earthquake in Sumatra on 26<sup>th</sup> December 2004

- People were deceived due to un awareness.
- 35,000 People died due to unpreparedness
- 5000 missing
- No any Early warning System had been established before 26<sup>th</sup> December 2004
- No any trainings for the vulnerable communities.
- No any preparedness for Tsunami.
- No mitigation work.
- They don't know the word "Tsunami"
- People try to collect things from the beach.



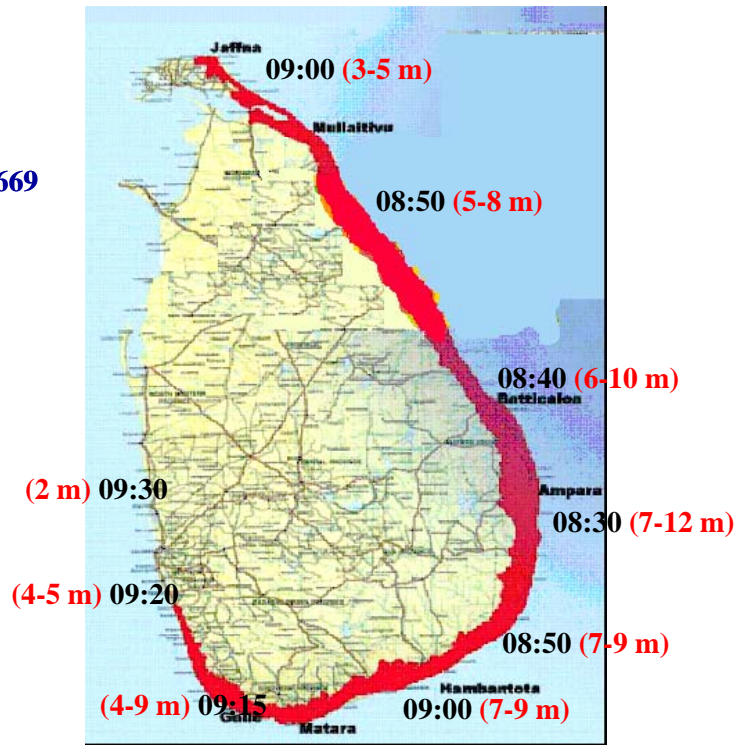


## Indian Ocean Tsunami of 26-12-2004

No of Deaths – 30, 959

No of Missing – 5, 644

No of Displaced – 500, 669



**Note:**  
Earthquake  
occurred at  
06:58 am

**Time of arrival of first wave and estimated max. wave height**

## **Some of the devastations .....**

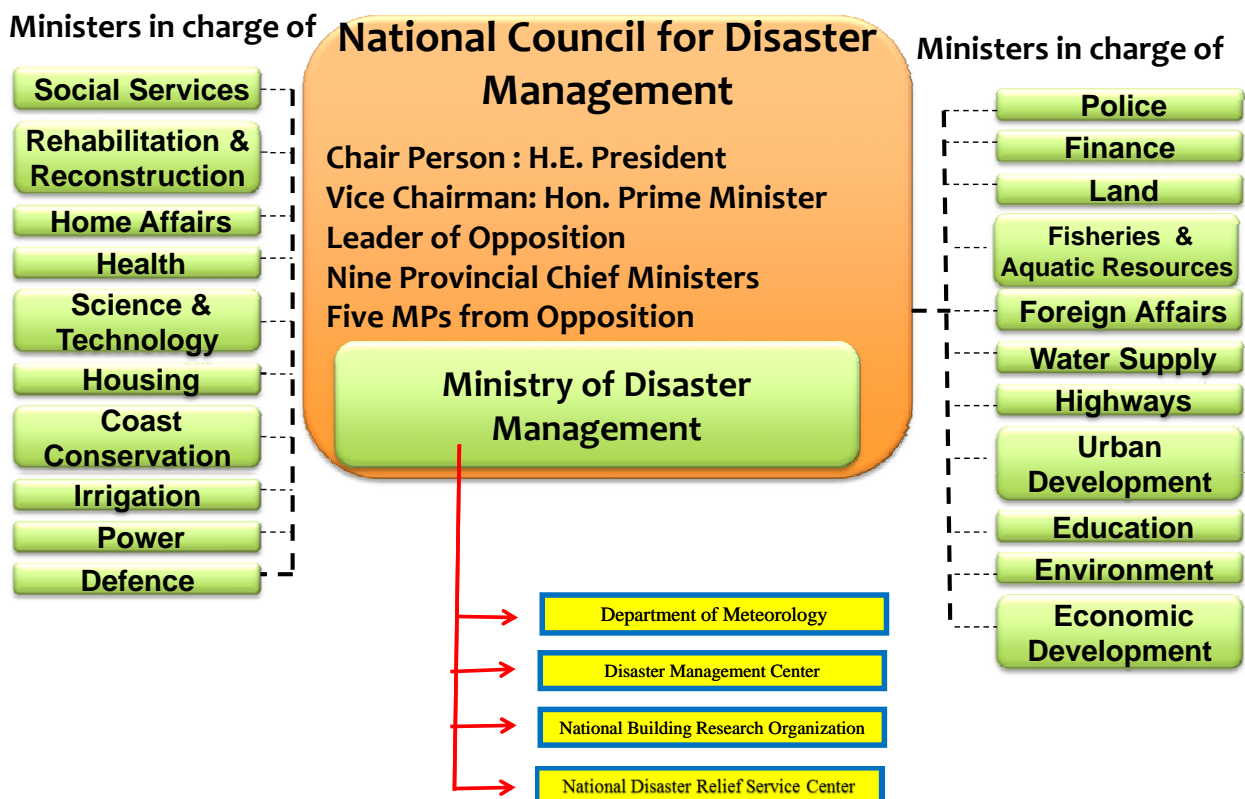




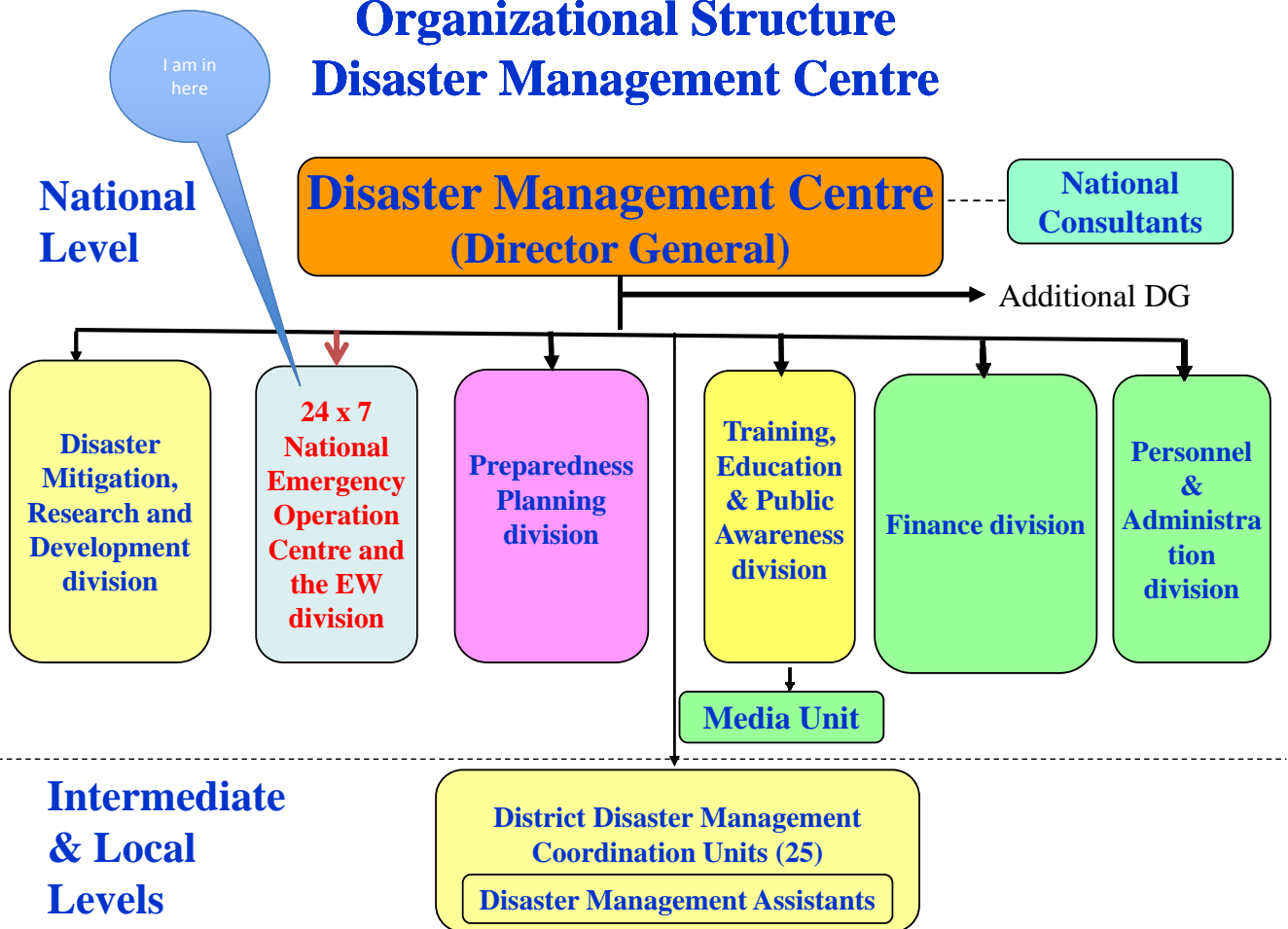
# Sri Lanka Disaster Management Act; No.13 of 2005

- ✓ Provides a legal and institutional framework for Disaster Risk Management (DRM) in Sri Lanka
- ✓ Addresses Disaster Management (DM) holistically, leading to a policy shift from response based mechanisms to a proactive approach

## National council for disaster Management

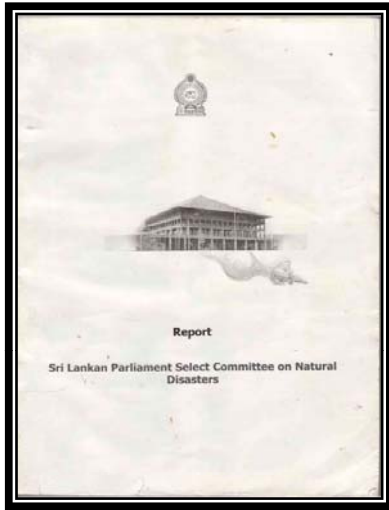


# Organizational Structure Disaster Management Centre



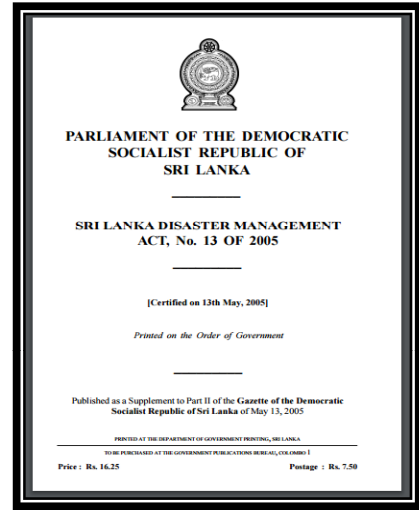
## TYPES OF DISASTERS (As per the Act)

- 1.Landslides
  - 2.Cyclones
  - 3.Floods
  - 4.Droughts
  - 5.Industrial Hazards
  - 6.Tsunami (Seismic Wave)
  - 7.Earthquakes
  - 8.Air Hazards
  - 9.Marine Hazards
  - 10.Fire
  - 11.Epidemics
  - 12.Explosions
  - 13.Air Raids
  - 14.Civil or Internal Strife
  - 15.Chemical Accidents
  - 16.Radiological Emergency
  - 17.Oil Spills (Inland & Marine)
  - 18.Nuclear Disaster
  - 19.Urban and Forest Fire
  - 20.Coastal Erosion
  - 21.Tornadoes, Lightning Strikes and Severe Thunder Storms
- ❖ Animal Attacks
  - ❖ Dam Breach
  - ❖ Drowning
  - ❖ Road accidents

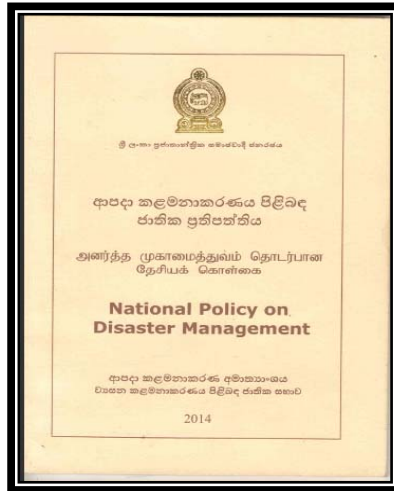


Sri Lankan Parliament Select Committee on Natural Disasters

**DISASTER MANAGEMENT ACT, POLICIES & PLANS**

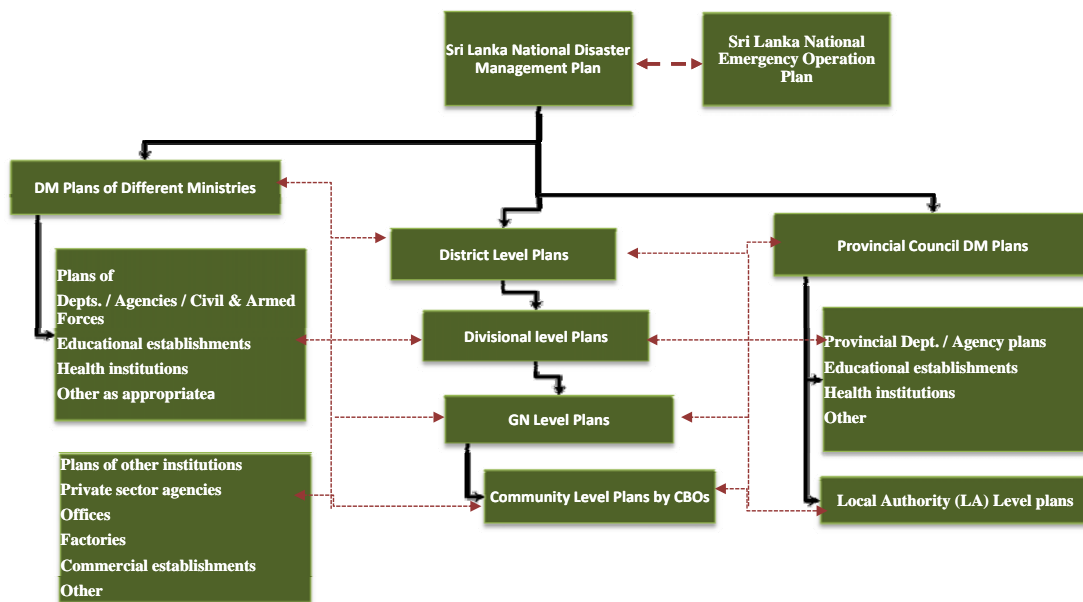


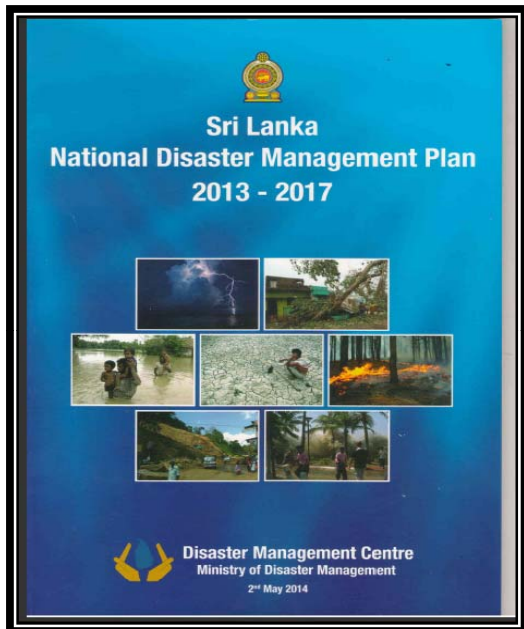
DM ACT on Disaster Management



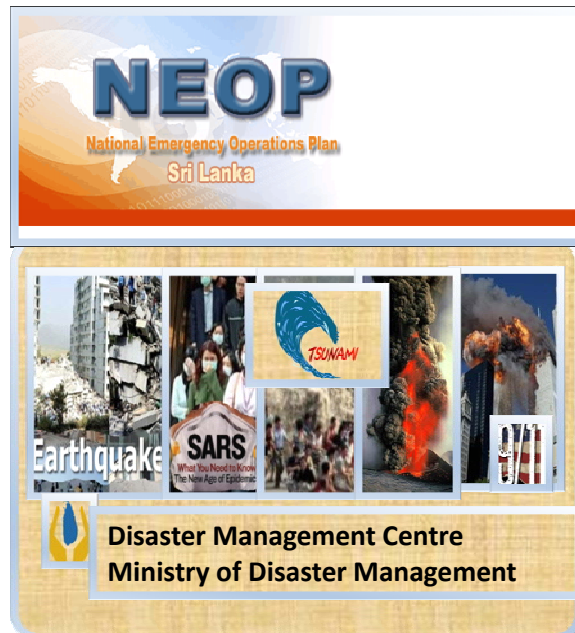
DM Policy

**Disaster Management Plans at all levels and in all sectors**





1. Sri Lanka National Disaster Management Plan



2.NEOP

3. Institutional Disaster Management Plan with BCP

1. National Disaster Management coordination Committee CNDMCC)

- ERC Organizations
- Government /Privet sector
- Technical Organizations
- NGO/INGO
- UN org
- Red cross mission
- Academia
- Etc.

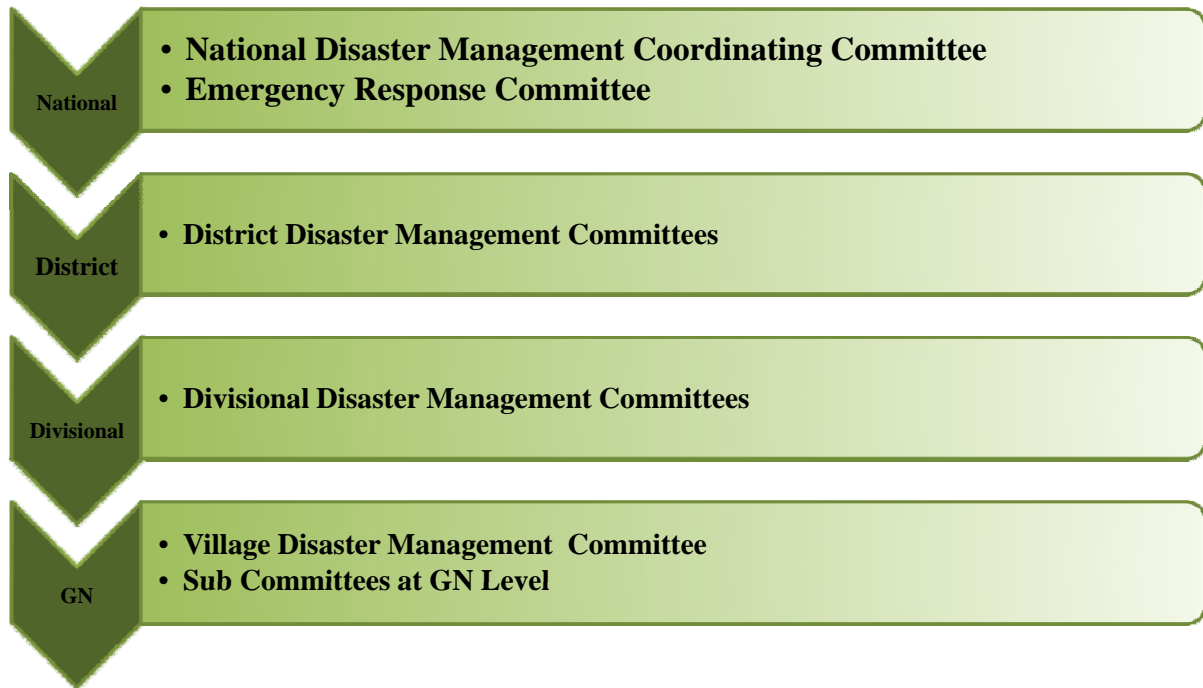


2. Emergency Response Committee (ERC)

- Disaster Management Centre
- Office of the Chief of the Defence Staff
- Sri Lanka Army
- Sri Lanka Navy
- Sri Lanka Air Force
- Sri Lanka Police
- Fire Department
- National Hospital
- Ceylon Electricity Board
- Sri Lanka Telecom Ltd
- Road Development Authority
- Sri Lanka Ports Authority
- Colombo Municipal Council
- Department of Government Information
- Central Environmental Authority
- National Water Supply & Drainage Board
- District Secretariat, Colombo
- Ceylon Petroleum Corporation
- Marine Pollution Prevention Authority



# Disaster Management Framework National to Local Level



## Sub Committees at GN Level



Early Warning



Evacuation /S & R



Medical / Health & first aids



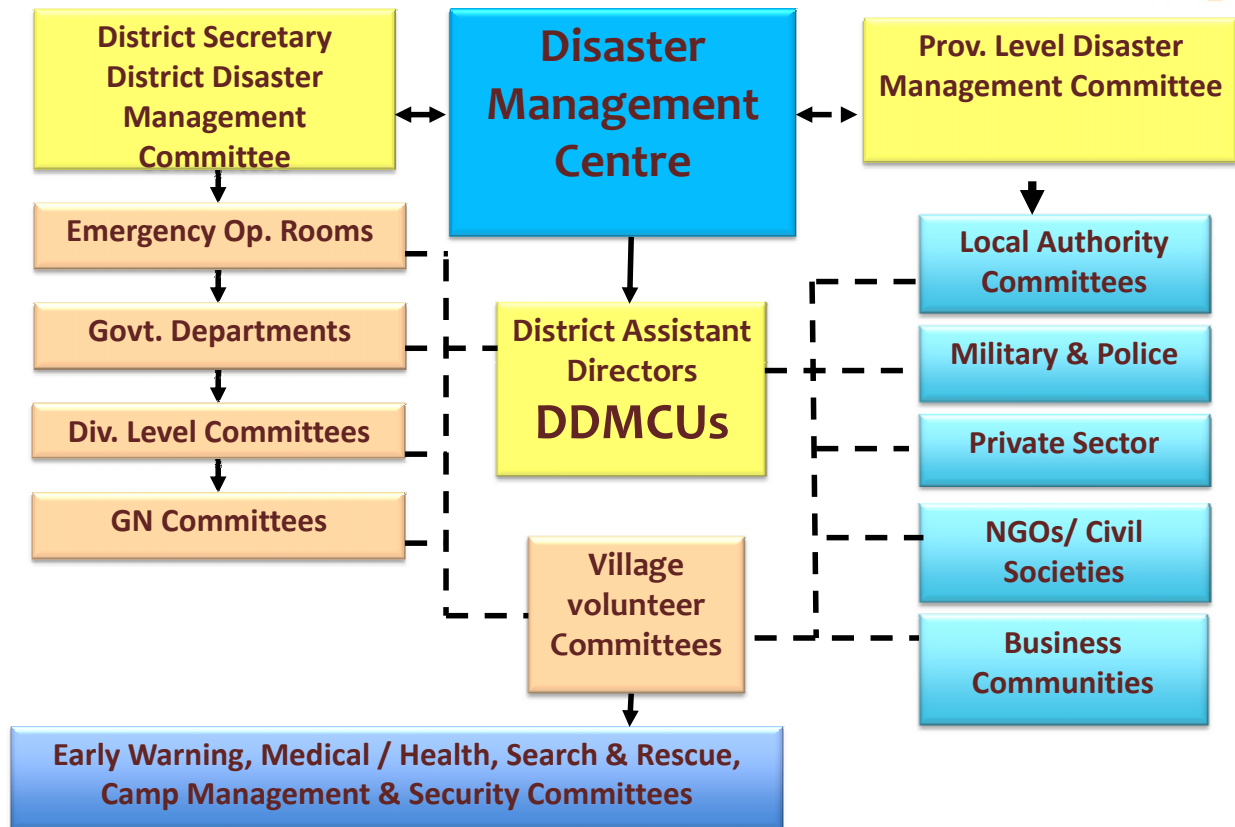
Camp Management



Village Security



## DRM Mechanism at Sub-National level



## Key DRR Activities

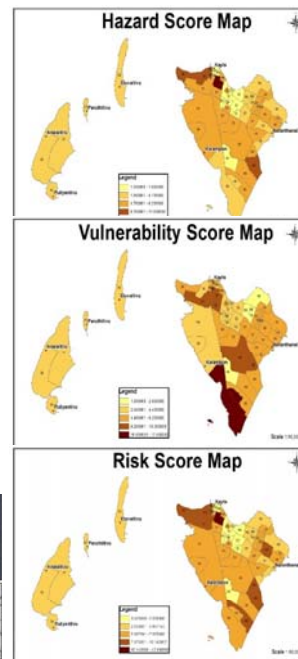


- Forecasting and Analysis of Disaster Risks
- Disaster Mitigation
- Strengthen of Response Capacity.
- Training and Awareness
- Preparedness
- Simulation Exercises
- Early Warning & Emergency Response

# Hazard Vulnerability and Risk Analysis



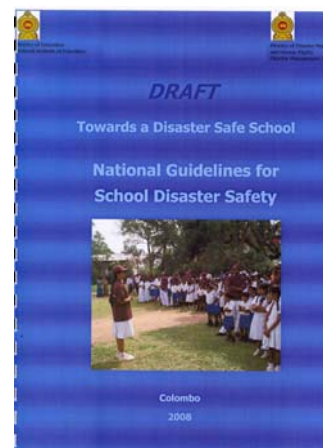
- It shows potential hazards prevailing in the districts, divisions and Grama Niladari Levels and probable time of occurrence, which would be extremely important in terms of Preparedness and Response.
  - Hazardous months, indicating Potential Hazards; Probable time of occurrence;
  - Potential impacts.
  - Seasonality of hazards.
  - History of disasters
  - Frequency of disaster occurrence.
  - Prediction of probable disasters in relation to time, for precautionary measures, early warning and safe rescue operations.
  - Estimation of Population at risk



Hazard profile of Sri Lanka  
[www.hazard.gov.lk](http://www.hazard.gov.lk)

## Awareness and Education on Disasters

- Books (Cartoon, Story, Education, School)
- Leaflets/ Handouts
- Sign boards
- Posters / Calendars
- Teaching Materials (guidelines)
- Videos
- Dramas
- Presentations, Games and Computer Quiz program
- Mobile Training Vehicle
- Tsunami Malla (Bag).







## Knowledge and Awareness Creation sessions on Disasters

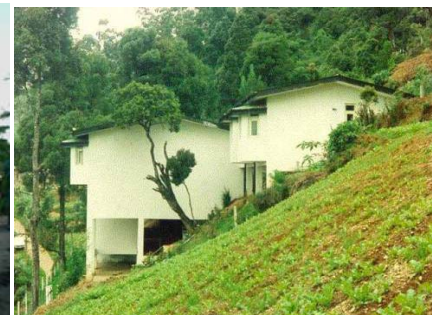


## Disaster Mitigation



### Structural Mitigation

- Engineering measures to modify hazard environment
- Land use plan implementation and management
- Control and protection works
- Preparedness measures (retrofitting, strengthening through structural modifications etc)
- Reconstruction and rehabilitation work after a disaster
- Infrastructure projects through Management and Institutionalization of disaster mitigation as a component

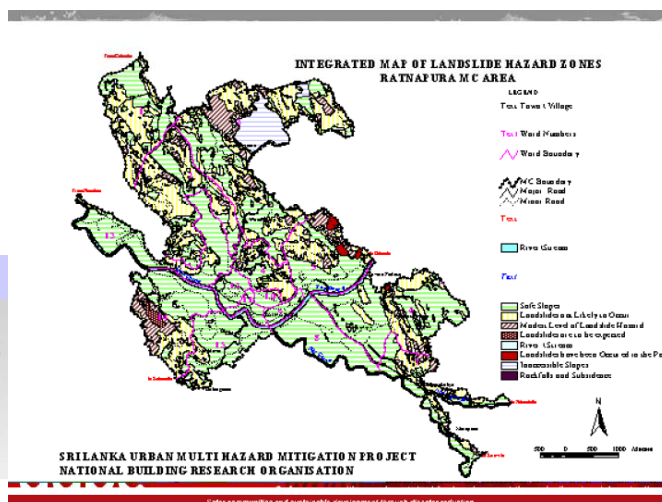
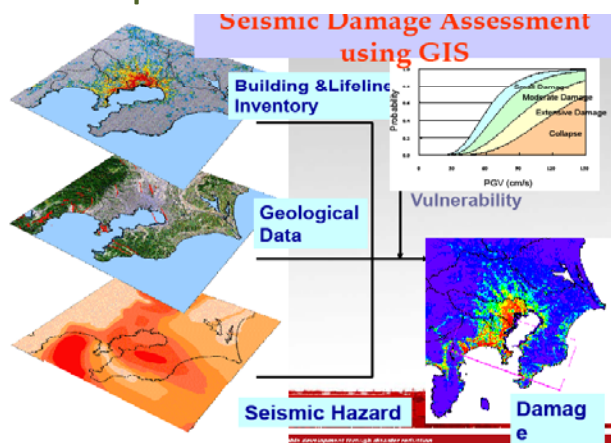




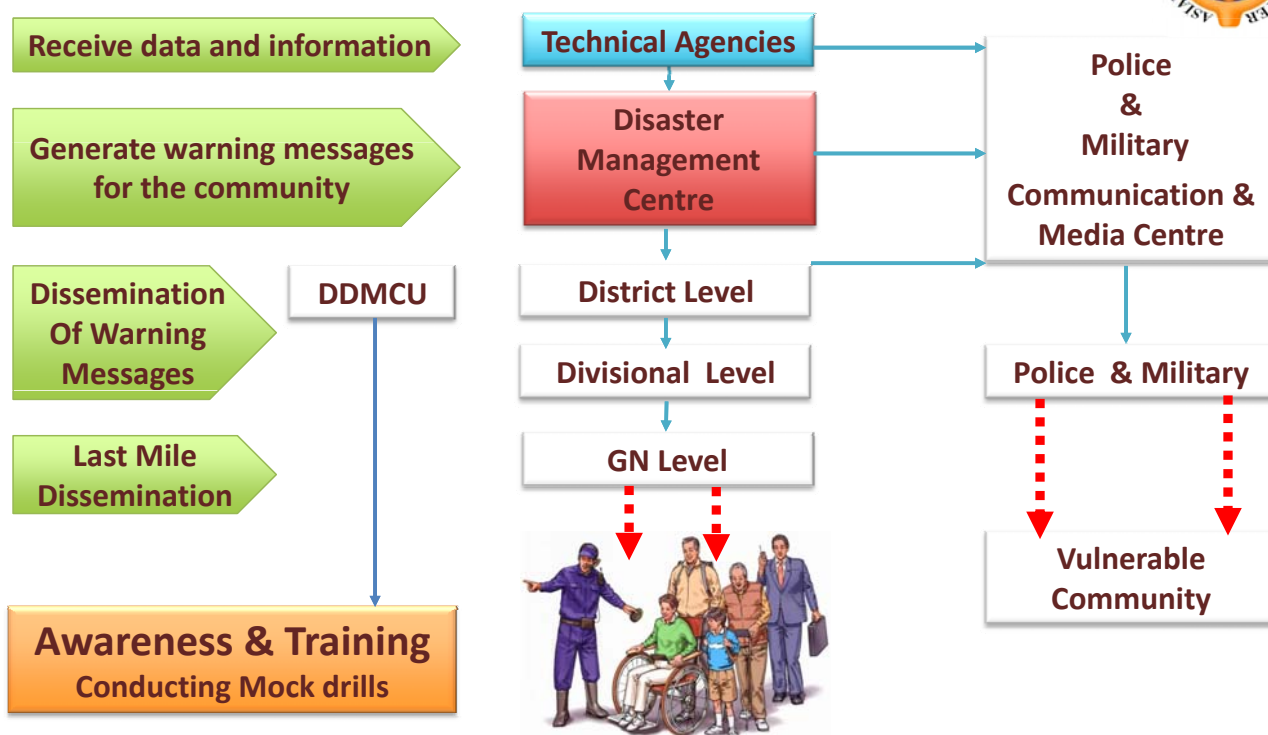
# Disaster Mitigation

## Non- Structural Mitigation

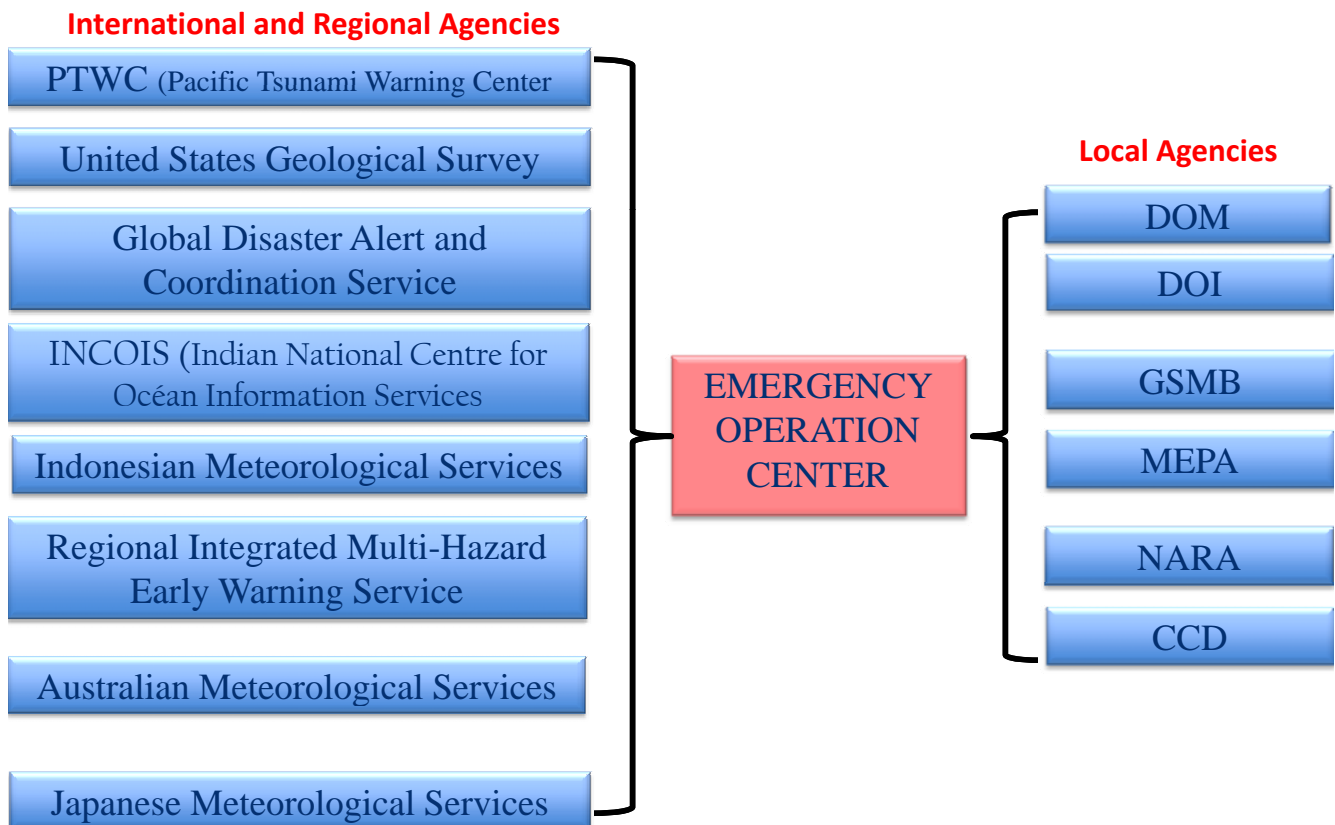
- Legislative, Land Use and Risk Management Measures
- Economic Measures
- Institutional Strengthening
- Mainstreaming Disaster in to Development



## Early Warning Dissemination System



# Receiving Technical Information from Various Agencies



## Modes of communications



### ▪ National Level

- TV Stations
- Radio Station
- Early Warning Towers
- Police & Military Communication
- Cell Broadcast/ SMS
- Technical Devices
- Satellite & Radio Communication (HF & VHF)
- Telephones / CDMA/ GSM

Early Warning Unit

24 x 7 Emergency Operations Centre  
117 Call center/119/1919 call centers

### ▪ Provincial / District Level

- Radio Communication
- Telephones / CDMA/ GSM

Emergency Operations Centre  
Police & Military Communication

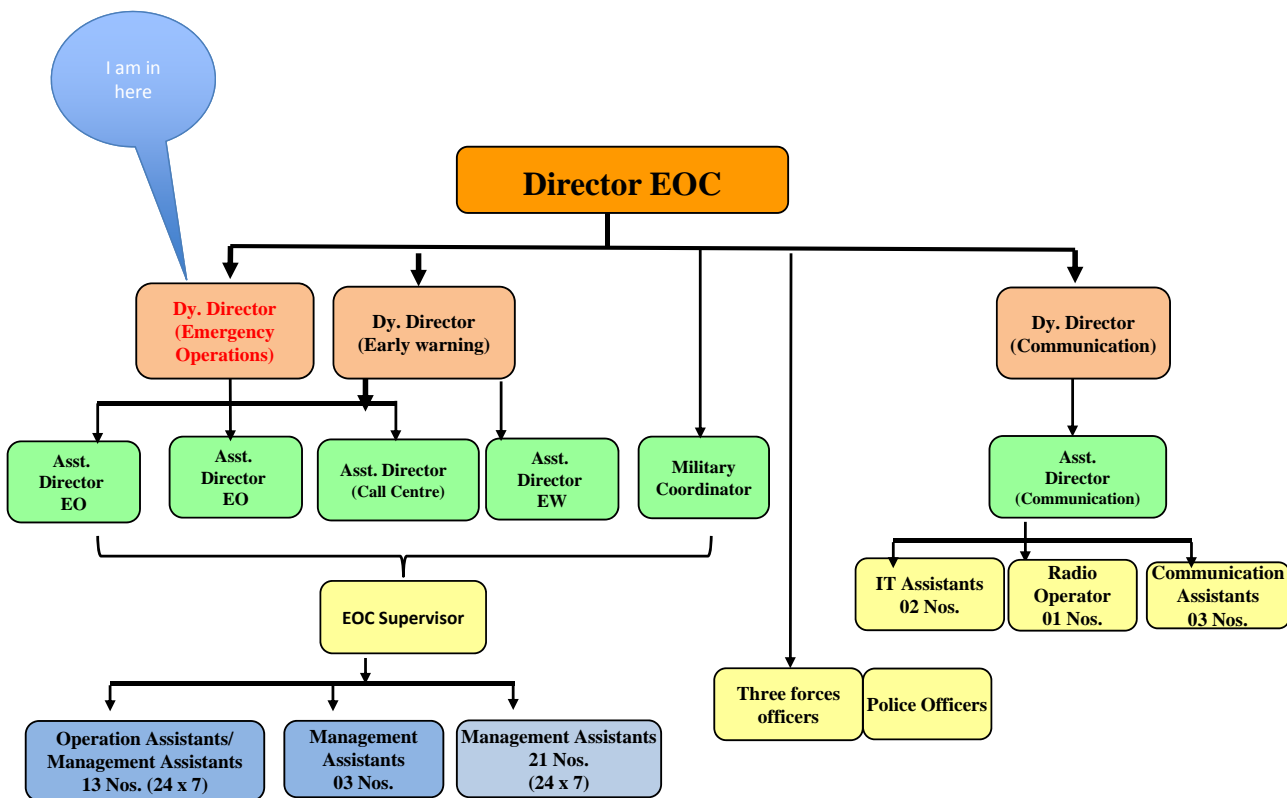
### ▪ Divisional level / Village Level

- Telephones / CDMA/ GSM
- Police Vehicles – Announcements
- PA Systems
- Sirens
- Temple and church bells
- Riders/ Push Bicycle & Motor Cycles/Messengers

Early Warning Sub Committees/Teams  
NGOs and CBOs  
Vulaters



# “Last Mile” Dissemination



# 24 x 7 National Emergency Operations Centre



VHF/HF

## EOC Operations



SMS/ Cell Broadcast



EW Towers

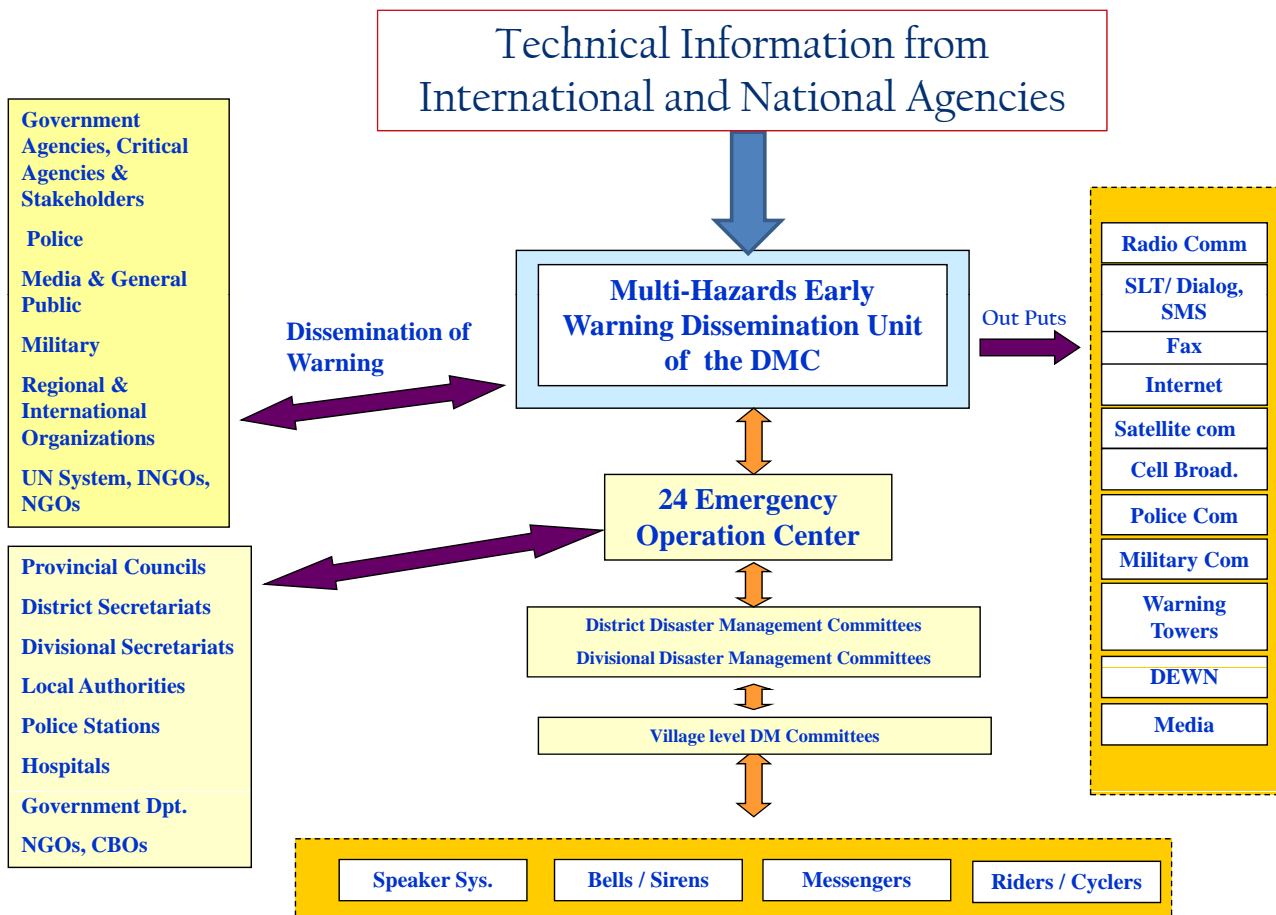


Satellite

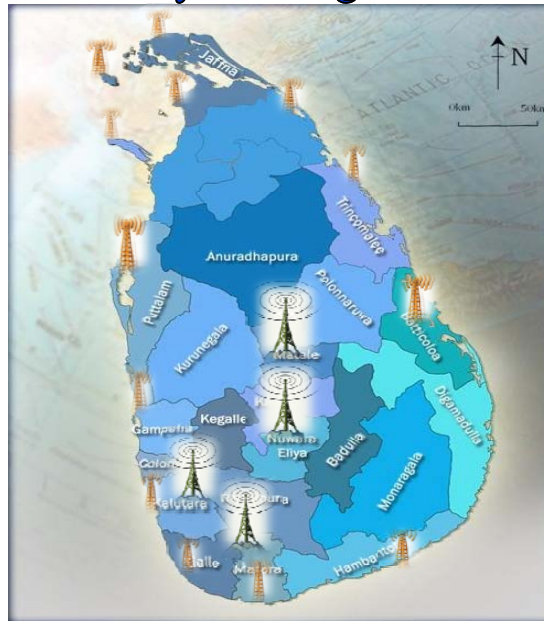




# Multi-Hazard Early Warning Dissemination System



## Early Warning Towers



**77 Early Warning towers**



Repeater Stations

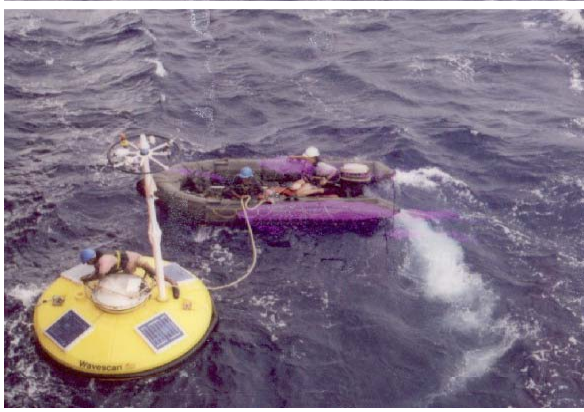


EW Towers

Activated through

- Satellite
- VHF Radio







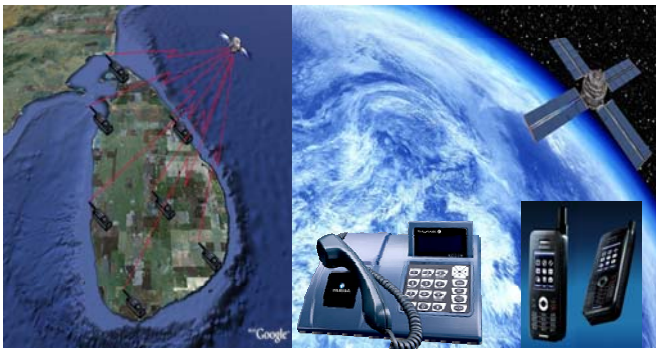
# Telephones



# VIRTUAL PRIVET NETWORK (VPN)



## Thuraya Satellite phones



Satellite communication covering 25 Districts



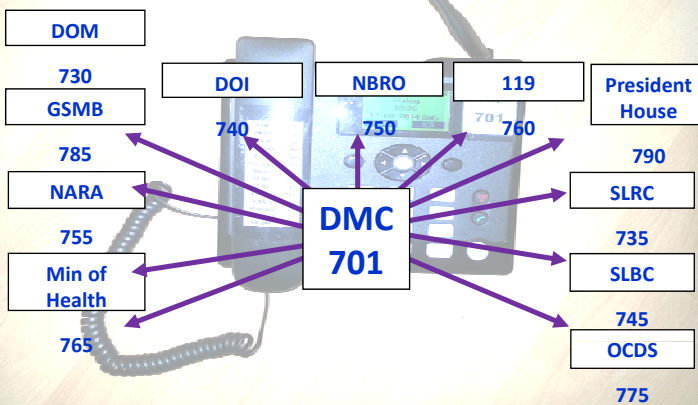
## Disaster Management Center with Media Agencies



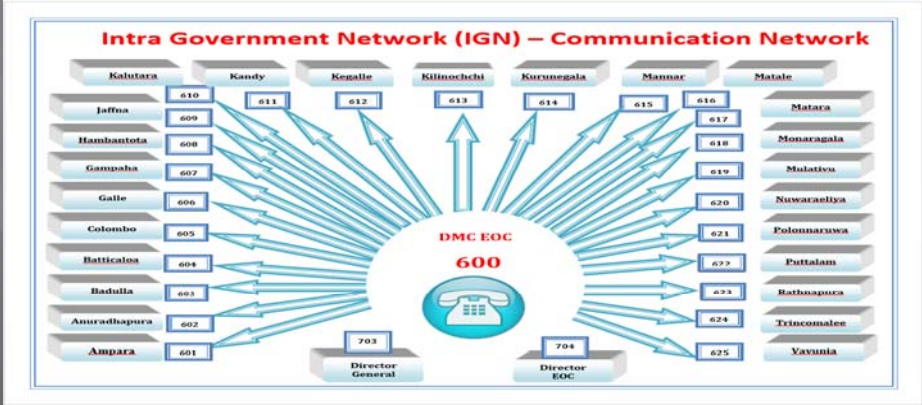
## Early warning through Media 24 x 7



**IGN Net Work (Intra Government Network) in between DMC and most important agencies)**



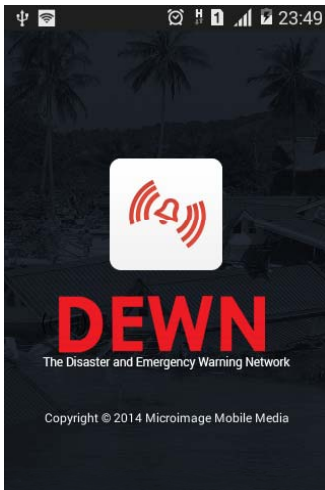
**IGN Net Work (Intra Government Network) in between DMC and 25 Districts)**



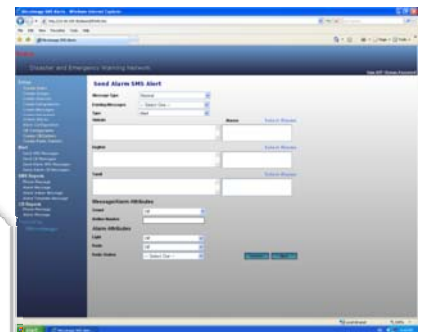
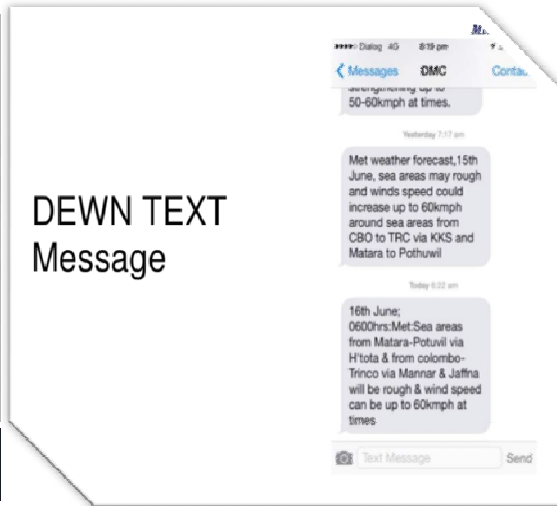


# Disaster Early Warning Network

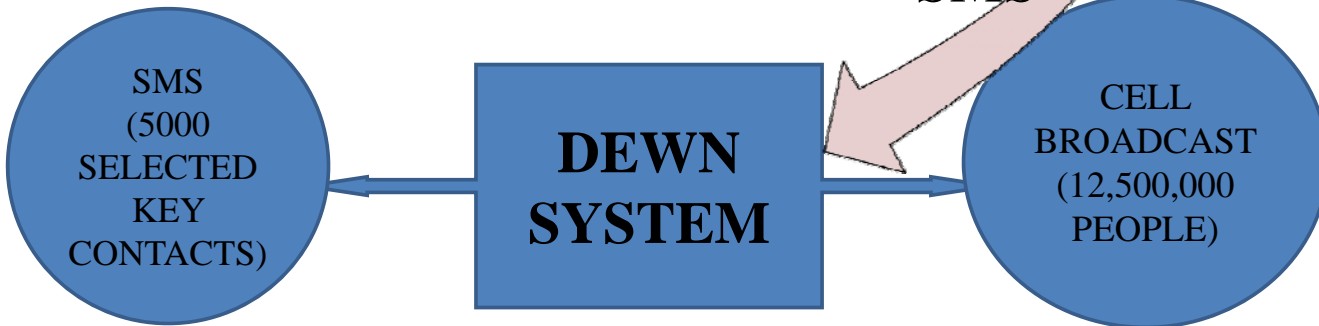
**(DEWN)** (download software through play store)



DEWN TEXT Message



DEWN SERVER



# Emergency Call Centre 117



# Self evacuation system as a local system for the Landslides

Standard threshold limits of the Rainfall

**Alert 75 mm/day**

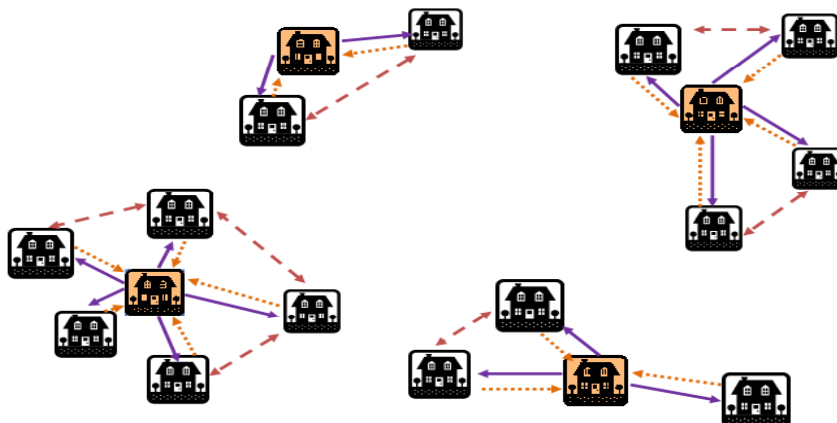
**Warning 100mm/day level**

**Evacuation, Off limit 75 mm/hour or 150mm/day**



## Community Based Early Warning Sysytem with Simple Rain Gauge in vulnerable areas of the Community

- ❖ Information from Key House to neighboring house
- ❖ Checking with the Key House by neighboring house
- ❖ Information sharing paths between neighboring houses

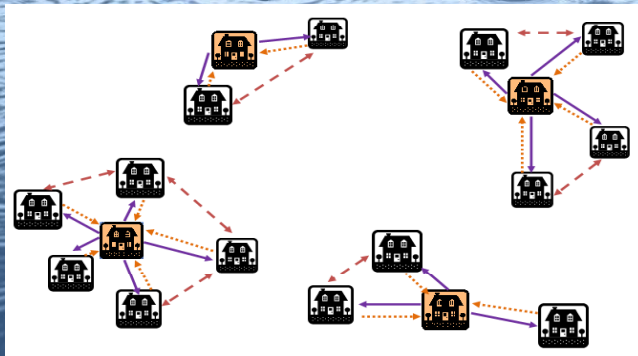




# ADRC

conducted a Local Level Early Warning Program in Ratnapura area

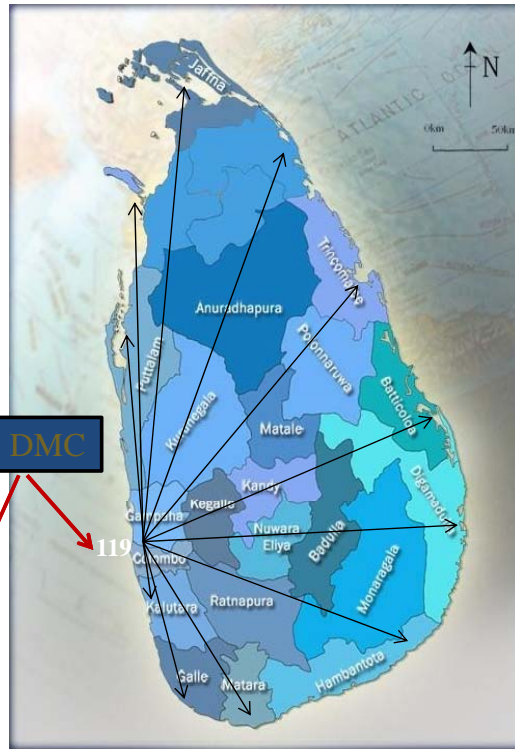
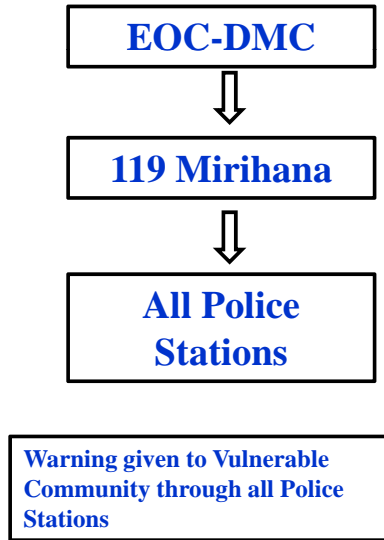
**Project for Community Centered Early Warning Capability for Landslides and flood  
(financially supported by ADRC)**



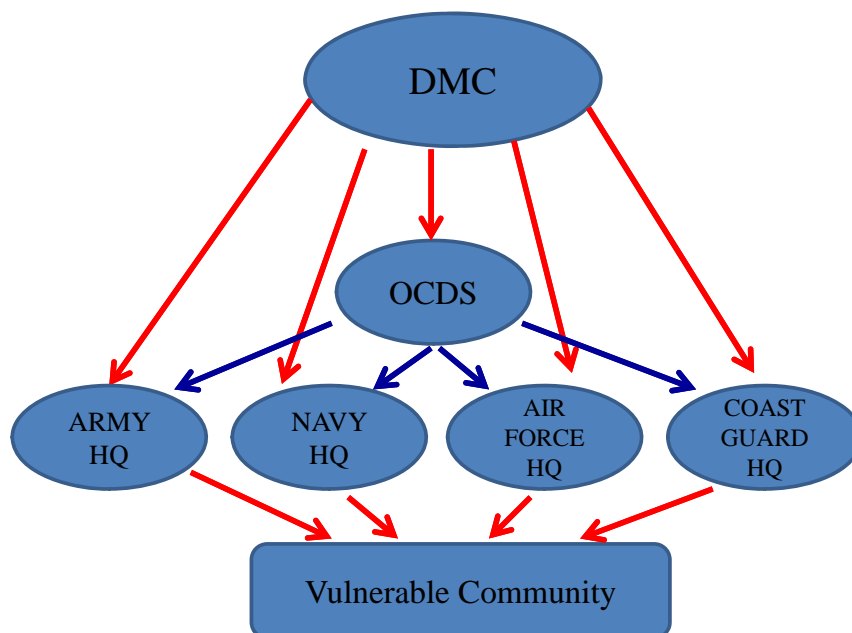
Rain Gauges were given to the local community in the flood prone areas and trained the responsible persons levels for the Alert and The Evacuation at the rainy seasons.

## Use of Military and Police for Warning and Evacuation and Respond

## Use of Police Communication during Disaster Warning and Evacuation



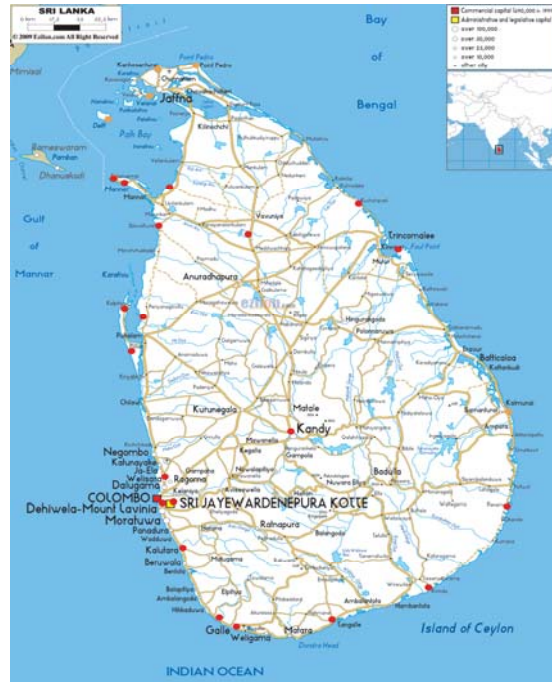
## Early Warning System with Military



## Deployment of Army SAR Teams



## Rapid Response Rescue & Relief Squadron (4RS) Teams by NAVY



## Deployment of Sri Lanka Coast Guard







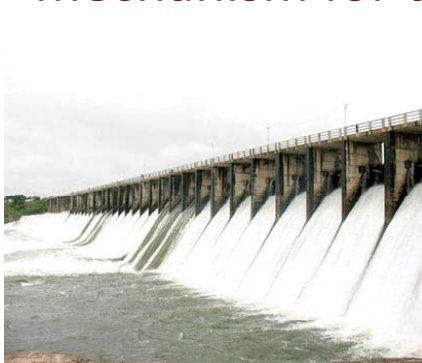
## Air Support for Disaster Response





# Future Plans for EW

- SLT Warning rings to Coastal Populations
- To provide VHF communication to Divisional and most vulnerable GN Divisions.
- Enhance the EW systems and dissemination mechanism for the DAM safety





## International Cooperation

All activities of DRR a line with

- Sendai Framework for DRR
- Sustainable Development Goals
- Legally binding universal agreement on climate change
- Sphere guidelines
- Incident Command System

## International Assistant

-Good and Services

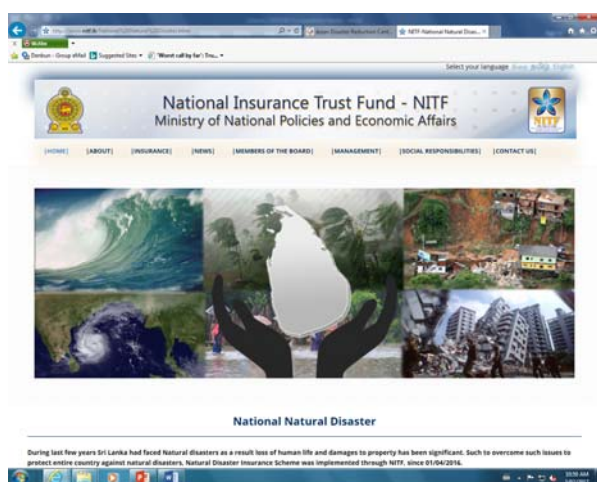
Nepal –Earthquake in 2015

Philippine – Cyclone Haiyan in 2013

Haiti –Earthquake in 2010



## Disaster Insurance



### Coverage

Covers lives and properties, specifically all households and small business establishments (any business of which annual turnover does not exceed LKR 10 M) covered up to 2.5 million rupees each in respect of damages(per event) caused to their property and contents due to Cyclones, Storm, Tempest, Flood, Land slide, Hurricane, Earthquake, Tsunami and any other similar natural perils, excluding Drought.

All Fishermen registered under Department of Fisheries will be covered to the value of Rs.1 Million each.

## Limitations

- Death compensation other than fisherman death - Rs.100,000.00
- Property damage (House and SME) - Max Rs.2.5 Mn
- Fisherman death - Rs.1,000,000.00 (1 Mn)

# Challenges/Gaps



- Lack of available data and data sharing mechanisms (Exposure data, Baseline data and real time data).
- Insufficient Vulnerability and Risk Analysis in the country.
- Different mandates, priorities and attitudes of Stakeholder agencies.
- Political intervention for disaster management at every time.
- Insufficient financial allocation for DM. Specially the supply of equipment.
- Less active volunteer participation.
- Night time evacuation.
- No dedicated traffic plan.
- limited human resources in the DMC.
- EW equipment maintenance. (Cost / Monopoly Market)
- Poor recording of disasters.
- Lack of knowledge transferring system.
- Less adaptation of DM practices and Rules and regulation also DM frameworks.
- No master Plan to the country



## Research Topic

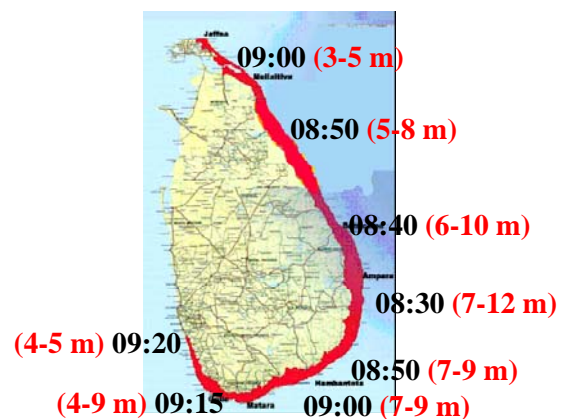
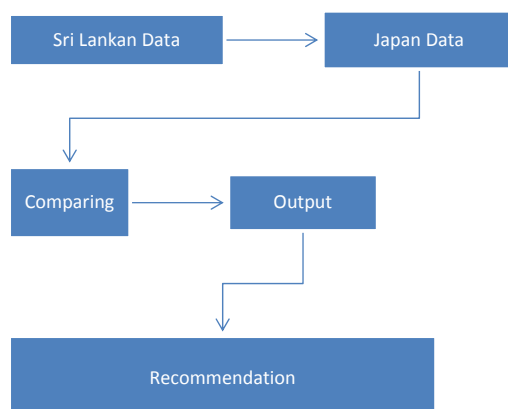
### Main Objective

Analysis of the Effectiveness of Early Warning to Face future tsunamis in Sri Lanka ,comparison with Japanese system,

### Other Objectives

- To measure the most effective early warning system for Tsunami.
- Identify GAPS in early warning system and remedial measures for further improvements.

### Analytical Method





# Hidden killers

- Road accidents = 2300 deaths per/ year
- Drowning = 800
- Lightning = 50
- Dengue = 100
- Also Cancer, Heart attack are prominent deaths.



*Thank you* »»

More information please visit: [www.dmc.gov.lk](http://www.dmc.gov.lk)