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Country presentation

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

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Deputy Director Emergency Operation
Disaster Management Center

J.M.A.R. Jayrathne
Visiting Researcher (Sri Lanka)
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 distracts 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

Sri Lanka

Area – 65,610 km²
Population -20,560,00
Profile of Sri Lanka

**Profile of Sri Lanka**

**Sri Lanka**

- **Capital**: Colombo
- **Official language(s)**: Sinhala, Tamil
- **Currency**: Sri Lankan Rupee (LKR)

**Profile**

- **Area**:
  - Total: 65,610 km²
  - Water: 4,4
- **Population**:
  - 2010 estimate: 20,238,000
  - Mid-2010 census: 20,653,000
  - Density: 304.4/km²
- **Gross Domestic Product**
  - Total: $116.5 billion
  - Per capita: 15,220

**Percentage distribution of population by ethnicity, 2001**

- Sinhalese: 82%
- Tamil: 7.9%
- Indian Tamil: 4.30%
- SL Moor: 5.10%
- Other: 0.70%

**Map of Sri Lanka**

- Agro-Ecological Zones: Mainly 02
- Provincial Map: 09
- District Map: 25
- Road Network Map of Sri Lanka
- Rail Network Map of Sri Lanka
- Population Density
Overview of Climatology

<table>
<thead>
<tr>
<th>Monsoon Season</th>
<th>From</th>
<th>To</th>
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<tbody>
<tr>
<td>First Inter Monsoon</td>
<td>March</td>
<td>April</td>
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<tr>
<td>South West Monsoon</td>
<td>May</td>
<td>September</td>
</tr>
<tr>
<td>Second Inter Monsoon</td>
<td>October</td>
<td>November</td>
</tr>
<tr>
<td>North East Monsoon</td>
<td>December</td>
<td>February</td>
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</table>

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

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

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

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

THE SEA AREA

- Coastline of around 1,382 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.

EEZ: (Area 8 x Land Area of SL)

Continental Margin: outer limit of the claim (Area 25 x Land Area of SL)
ANCHORAGES

1. Kankasanthurei
2. PPD
3. Kokilai
4. Muttur
5. Batticoloa
6. Kaththankudi
7. Kalumunai
8. Pottuvil
9. Panama
10. Patanagala
11. Hambanthota
12. Kalmatiya
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. Thotamuna
32. Kandakkudawa
33. Kandakkuliya
34. Puththalama
35. Serakkuliya
36. Palliyawaththa
37. Arnold Canal

THE GLORY OF SRI LANKA
# Multi Hazards in Sri Lanka

In 1974 to 2016 from desinventer

## Disaster Event & Impacts

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<th>DISASTER/INCIDENT</th>
<th>DEATHS</th>
<th>INJURED</th>
<th>MISSING</th>
<th>HOUSES DESTROYED</th>
<th>HOUSES DAMAGED</th>
<th>AFFECTED</th>
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In 1974 to 2016 from desinventer
## Major Hazard Prediction Calendar in Sri Lanka

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<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
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<td><strong>Rain Fall</strong>&lt;sup&gt;[1]&lt;/sup&gt;</td>
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<td><strong>Temperature</strong>&lt;sup&gt;[1]&lt;/sup&gt;</td>
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<td><strong>Flood Risk</strong>&lt;sup&gt;[1]&lt;/sup&gt;</td>
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<td><strong>Monsoon Cyclone</strong>&lt;sup&gt;[1]&lt;/sup&gt;</td>
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**Cyclone Track**

![Image of Cyclone Track](image241)
Human Elephant Conflict
Establishment of Electric Fences and Live Fences

But we care them

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

Spent more than 300 Mn Rupees
Crocodile Cages project at Matara

More than 3000 families are benefitted

Immediate After Occurrence of the Earthquake in Sumatra on 26th 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 26th 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

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

Note: Earthquake occurred at 06:58 am

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

Chair Person: H.E. President
Vice Chairman: Hon. Prime Minister
Leader of Opposition
Nine Provincial Chief Ministers
Five MPs from Opposition

Ministry of Disaster Management

Ministers in charge of:
- Social Services
- Rehabilitation & Reconstruction
- Home Affairs
- Health
- Science & Technology
- Housing
- Coast Conservation
- Irrigation
- Power
- Defence

Ministers in charge of:
- Police
- Finance
- Land
- Fisheries & Aquatic Resources
- Foreign Affairs
- Water Supply
- Highways
- Urban Development
- Education
- Environment
- Economic Development

Departments:
- Department of Meteorology
- Disaster Management Center
- National Building Research Organization
- National Disaster Relief Service Center
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, Lightening Strikes and Severe Thunder Storms
   - Animal Attacks
   - Dam Breach
   - Drowning
   - Road accidents
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

National
- National Disaster Management Coordinating Committee
- Emergency Response Committee

District
- District Disaster Management Committees

Divisional
- Divisional Disaster Management Committees

GN
- Village Disaster Management Committee
- Sub Committees at GN 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.

**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).

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

Early Warning Dissemination System

- Receive data and information
- Generate warning messages for the community
- Dissemination of Warning Messages
- Last Mile Dissemination
- Awareness & Training Conducting Mock drills

Technical Agencies
- Disaster Management Centre
- District Level
- Divisional Level
- GN Level

Police & Military
- Communication & Media Centre
- Police & Military
- Vulnerable Community
Receiving Technical Information from Various Agencies

International and Regional Agencies
- PTWC (Pacific Tsunami Warning Center)
- United States Geological Survey
- Global Disaster Alert and Coordination Service
- INCOIS (Indian National Centre for Ocean Information Services)
- Indonesian Meteorological Services
- Regional Integrated Multi-Hazard Early Warning Service
- Australian Meteorological Services
- Japanese Meteorological Services

Local Agencies
- DOM
- DOI
- GSMB
- MEPA
- NARA
- CCD

Emergency Operation Center

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

- **Provincial / District Level**
  - Radio Communication
  - Telephones / CDMA / GSM

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

Emergency Operations Centre
- Police & Military Communication

Early Warning Sub Committees / Teams
- NGOs and CBOs
- Vulaters
“Last Mile” Dissemination

Communication Tools
- Multi hazard EW tower
- Temple Bell
- Loudspeaker car
- SMS
- Rider/Mega phone
- Military Rider/Messenger

Tsunami Warning
Flood Warning
Evacuation Instruction
in collaboration with CBDM

District Divisional GN
Police
DMC

I am in here

Director EOC

Dy. Director (Emergency Operations)
Asst. Director EO
Asst. Director EO
EOC Supervisor

Dy. Director (Early warning)
Asst. Director (Call Centre)

Dy. Director (Communication)
Asst. Director (Communication)
Military Coordinator

IT Assistants 02 Nos.
Radio Operator 01 Nos.
Communication Assistants 03 Nos.

Three forces officers
Police Officers

Operation Assistants/Management Assistants 13 Nos. (24 x 7)
Management Assistants 03 Nos.
Management Assistants 21 Nos. (24 x 7)
24 x 7 National Emergency Operations Centre

EOC Operations

VHF/HF

SMS/ Cell Broadcast

EW Towers

Satellite
Multi-Hazard Early Warning Dissemination System

Technical Information from International and National Agencies

Multi-Hazards Early Warning Dissemination Unit of the DMC

24 Emergency Operation Center

Out Puts

Radio Comm
- SLT/Dialog, SMS
- Fax
- Internet
- Satellite com
- Cell Broad.
- Police Com
- Military Com
- Warning Towers
- DEWN
- Media

Dissemination of Warning

Government Agencies, Critical Agencies & Stakeholders
- Police
- Media & General Public
- Military
- Regional & International Organizations
- UN System, INGOs, NGOs

Provincial Councils
- District Secretariats
- Divisional Secretariats
- Local Authorities
- Police Stations
- Hospitals
- Government Dpt.
- NGOs, CBOs

Hospitals

Dissemination of Warning

24 Emergency Operation Center

District Disaster Management Committees
Divisional Disaster Management Committees

Village level DM Committees

Speakers
- Bells / Sirens
- Messengers
- Riders / Cyclers

Early Warning Towers

77 Early Warning towers

Repeater Stations

EW Towers

Activated through
- Satellite
- VHF Radio
Life at sea during Deployments & Retrievals

27 March 2011
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 SYSTEM

SMS (5000 SELECTED KEY CONTACTS)

DEWN TEXT Message

DEWN SERVER

CELL BROADCAST (12,500,000 PEOPLE)

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**: 100 mm/day level
- **Evacuation, Off limit**: 75 mm/hour or 150 mm/day

Community Based Early Warning System 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 (ADRC).

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

EOC-DMC
↓
119 Mirihana
↓
All Police Stations

Warning given to Vulnerable Community through all Police Stations

Early Warning System with Military

DMC
↓
OCDS

ARMY HQ
NAVY HQ
AIR FORCE HQ
COAST GUARD HQ

Vulnerable Community
Deployment of Army SAR Teams

Deployment of Sri Lanka Coast Guard

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

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Hidden killers

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

More information please visit: www.dmc.gov.lk