

Geospatial Information as Decision Making Tool for Disaster Management in Sri Lanka

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Overview of Geospatial Data

1. Emergency Activations
2. Hazard / Risk Data
3. Volunteered GIS
4. National Loss Database
5. Data sharing

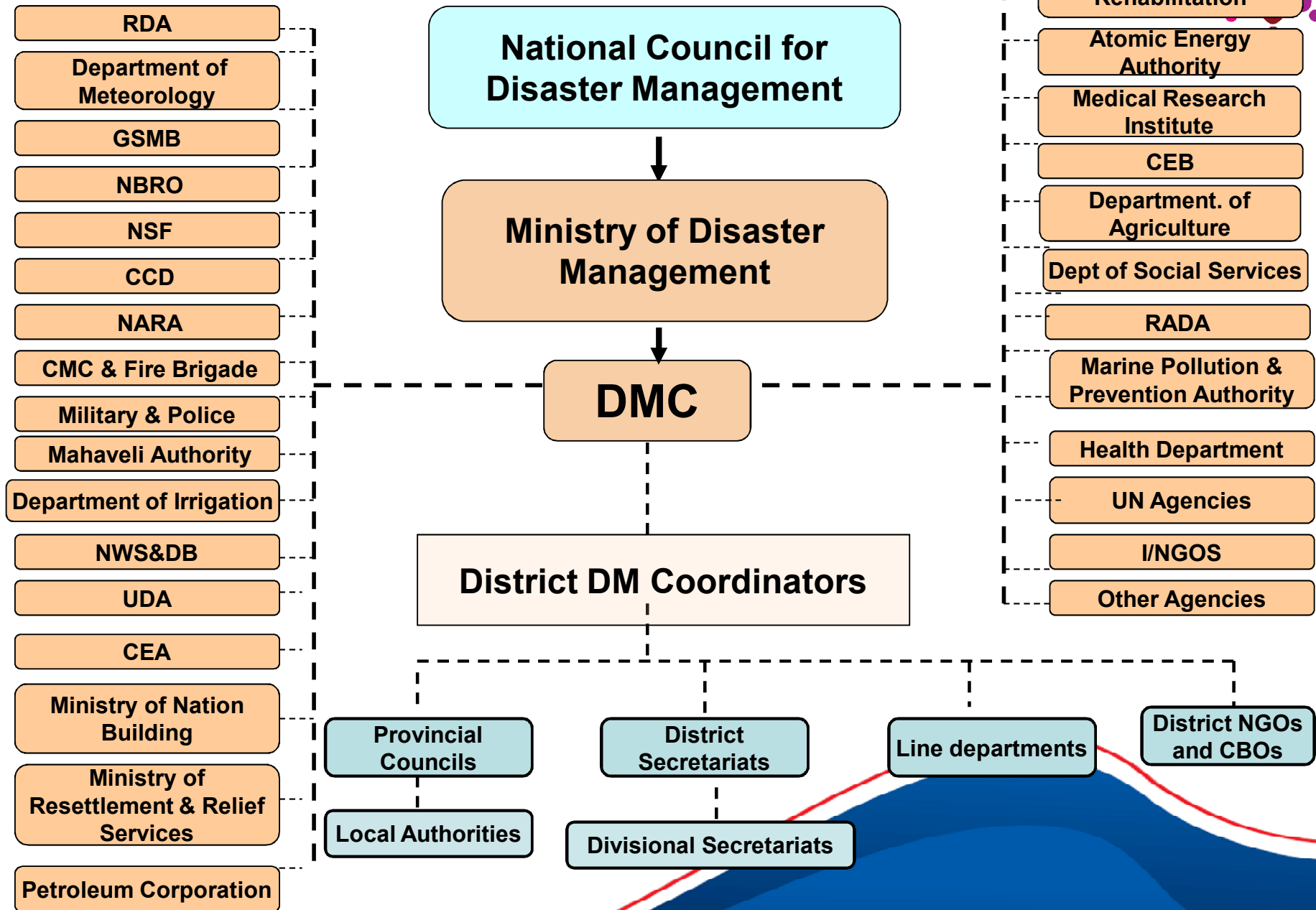


Disaster Management Centre

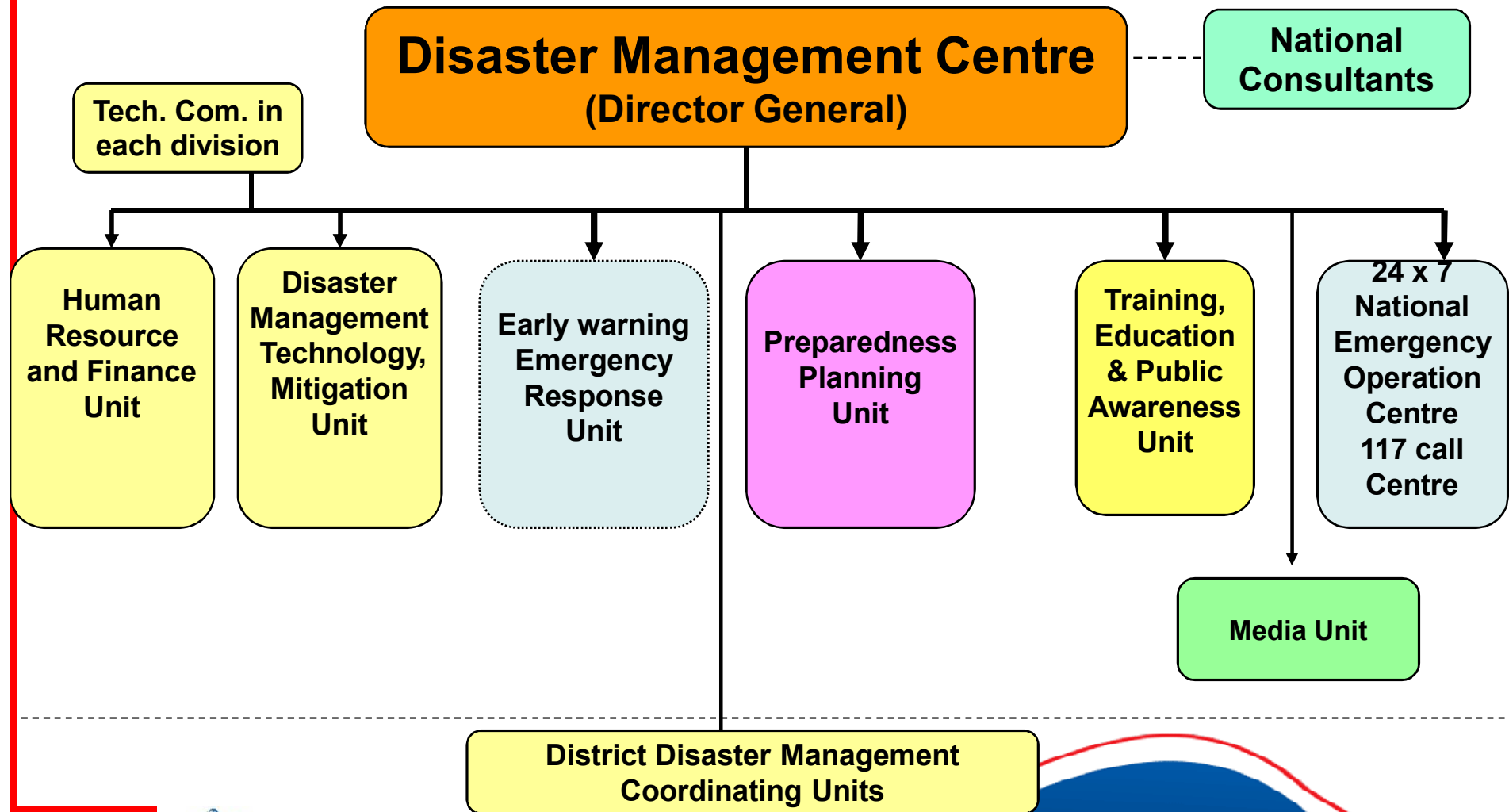
- Established under Disaster Management Act No. 13 of 2005, implementation arm of Disaster Management Council chaired by His Excellency President
- Coordination and implementation arm of Risk Assessment, Risk Reduction, Mitigation, Preparedness, Awareness, Early Warning Dissemination, Emergency Response, Relief and Re-Construction
- Coordinating above activities with various Technical, Administrative, Scientific and Research Agencies of Government and Non Government
- Also closely working with General Public, especially up to village level



Coordination Mechanism in Disaster Management



Organizational Structure Disaster Management Centre



DMC

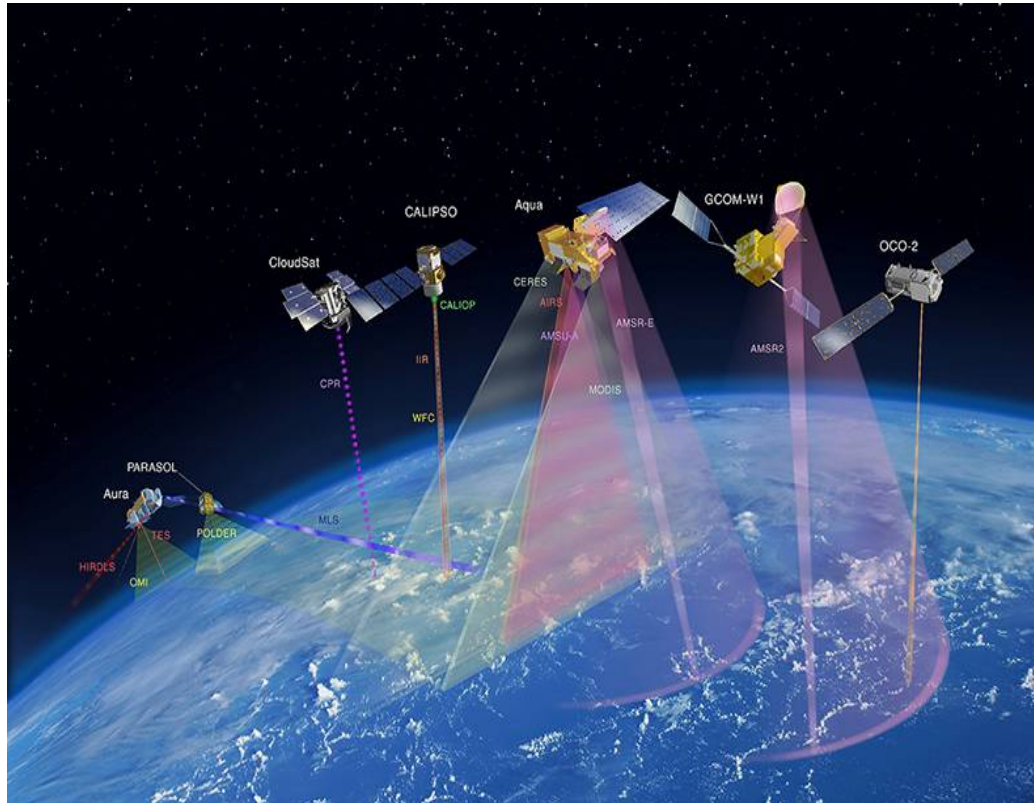




24 x 7 National Emergency Operations Centre



Space Technology for Disaster Management



“Ensure that all countries, international and regional organizations have access to all types of space-based information and services to support the full disaster management cycle”

UN GA Resolution
61/110, 14 Dec 2006

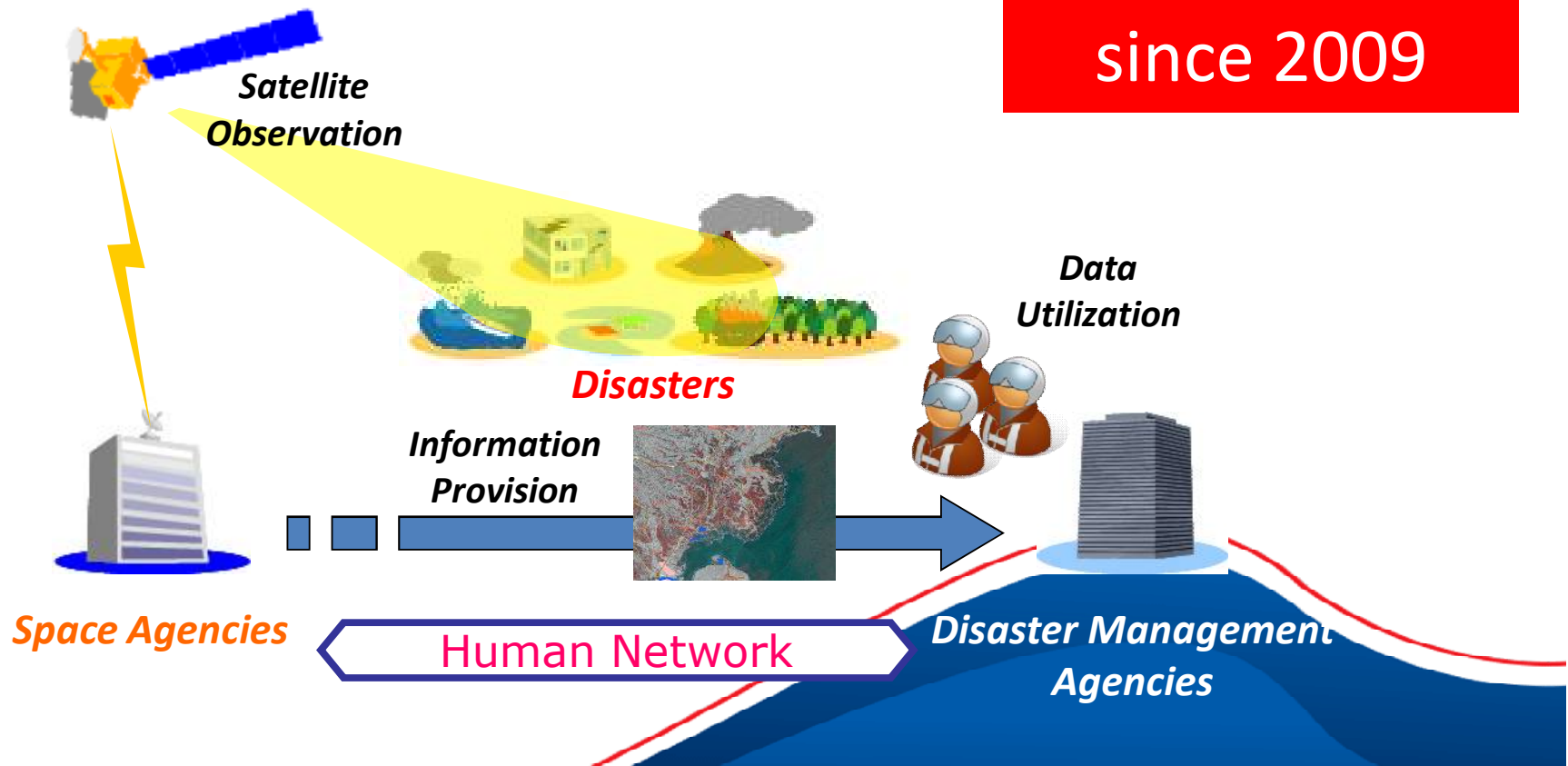


Concept of Sentinel Asia System (SAS)

Facility to receive near real time satellite imageries to countries like Sri Lanka, is limited. Overcome this, an regional initiative were initiated called “Sentinel Asia”.



DMC with Sentinel Asia since 2009



Emergency Observations by JAXA (Sentinel Asia)

	Disaster Type	Activation Requested	Observation Conducted	Map Disseminated	Peak Time of Disaster	Data	Result
1	Floods	17th Dec 2009	18 Dec 2009	No map generated	16 Dec 2009	ALOS Prism	Un successful due to cloud
2	Floods	17 May 2010	19 May 2010	20 May 2010	18 May 2010	ALOS Palsar	Successful
3	Floods	08 Dec 2010	09 Dec 2010	10 Dec 2010	8-10 Dec 2010	ALOS Palsar	Successful
4	Floods	11 Jan 2011	13 Jan 2011	14 Jan 2011	10-12 Jan 2011	ALOS Palsar	Successful
5	Floods	04 Feb 2011	06 Feb 2011	07 Feb 2011	03-05 Feb 2011	ALOS Palsar	Successful
6	Landslide	30 Oct 2014	01 Nov 2014			ALOS Palsar	Successful

No major disaster occurred in order to obtain satellite images after 2011 ebruary

***2011 November floods in Colombo – no adequate time to capture imageries*



Timing of data reception / Map Publish

Less than 60 Hours



Date	Time	Action
2010.05.17	-	Third consecutive day received heavy rain to Western province.
2010.05.17	14.00	Consultation with stakeholders
2010.05.17	18.00	Request image activation via SMS to JAXA Satellite tracking Centre @Tsukuba
2010.05.18	8.30	Received satellite observation plan, to be utilize ALOS PALSAR
2010.05.19	17.30	Emergency observation over Western Province
2010.05.20	8.30	Received ALOS Palsar raw data from JAXA
2010.05.20	16.30	Produced draft inundation maps and uploaded to the web

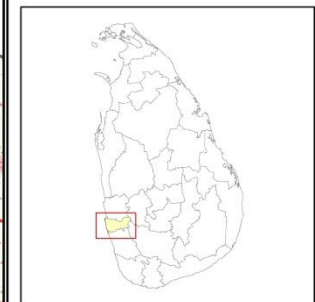
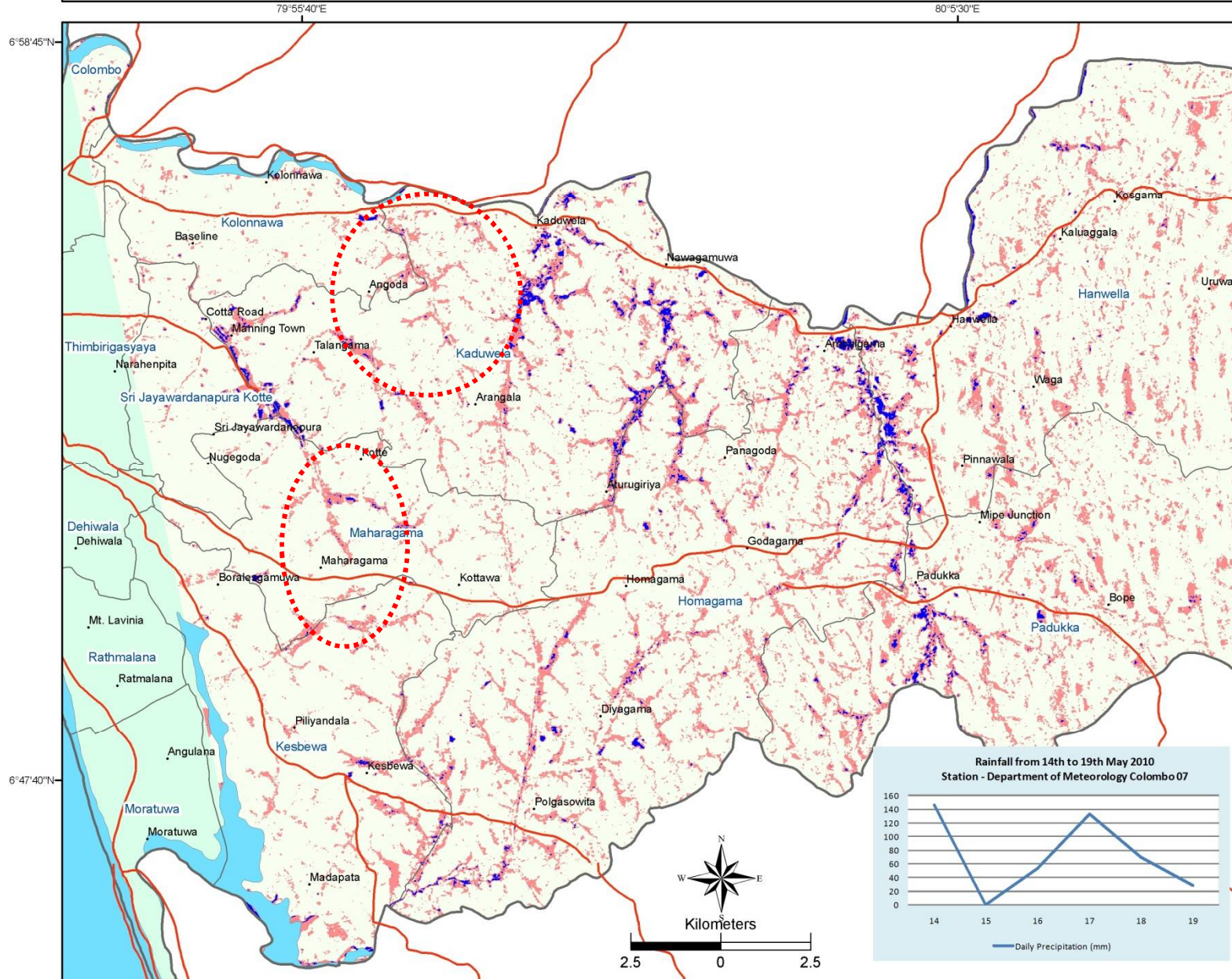
8 Hours

Flood Western Province – 15 – 18 May 2010



Flood Inundation Mapping, Colombo District, Sri Lanka

Flood Inundation as at 19th May 2010



Legend

- Main Roads
- DS Boundary
- Paddy Fields

Inundation

- Pre Flood Standing Water
- Flood Inundation
- No data

Data Source:
ALOS Palsar 1.5 data products, by Japanese Aerospace Exploration Agency (JAXA) and Ministry of Economic, Trade & Industry (METI), Japan.

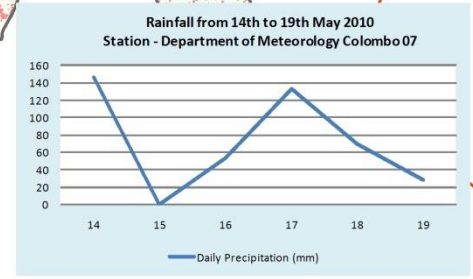
Resolution:
6.3 m ground resolution

Observation Dates:
Flood Event - 19th May 2010
Pre Flood - 09th March 2010

Satellite Activation by:
Sentinel Asia Secretariat with cooperation of Asian Disaster Reduction Centre (ADRC)

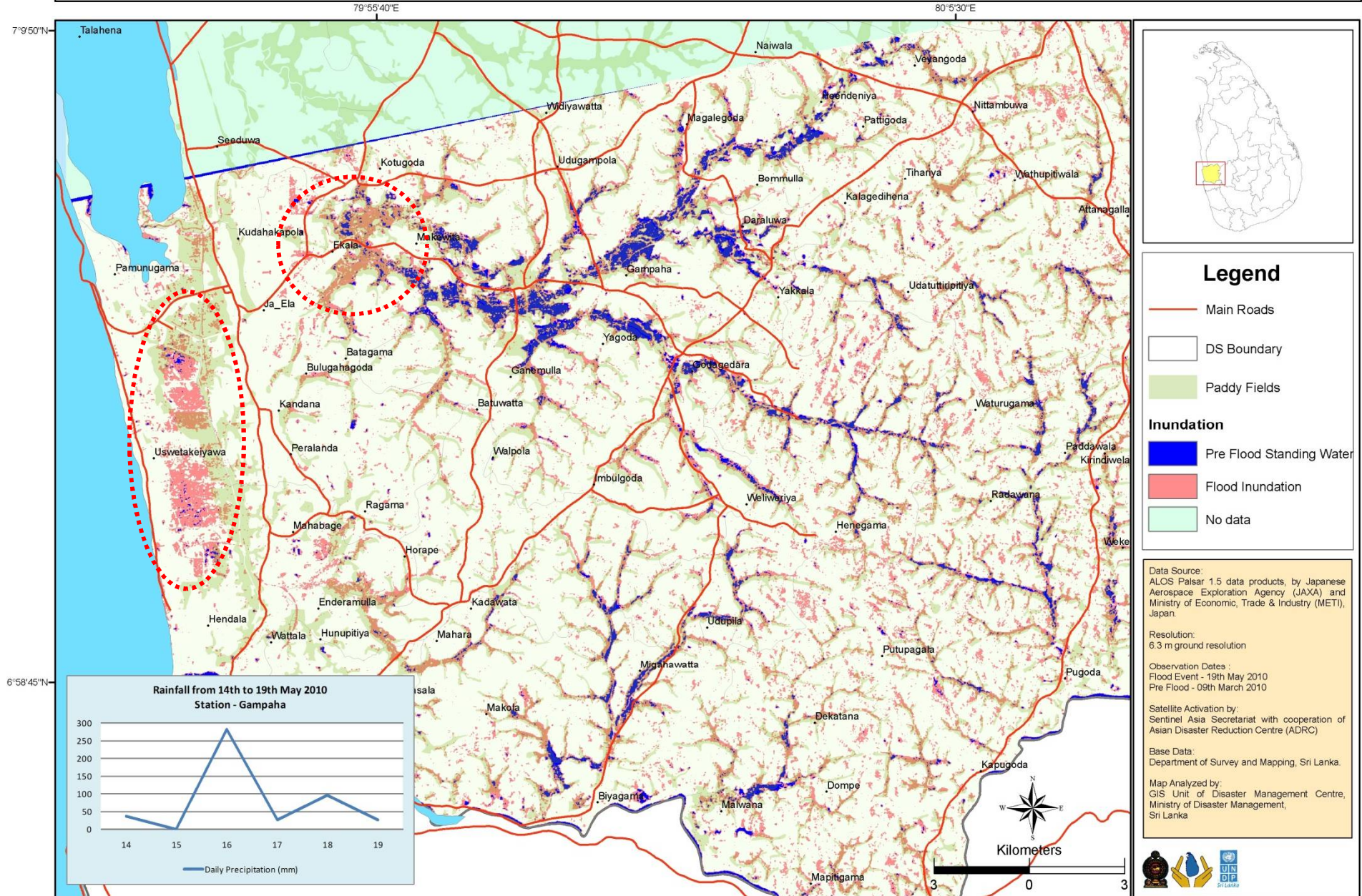
Base Data:
Department of Survey and Mapping, Sri Lanka.

Map Analyzed by:
GIS Unit of Disaster Management Centre, Ministry of Disaster Management, Sri Lanka



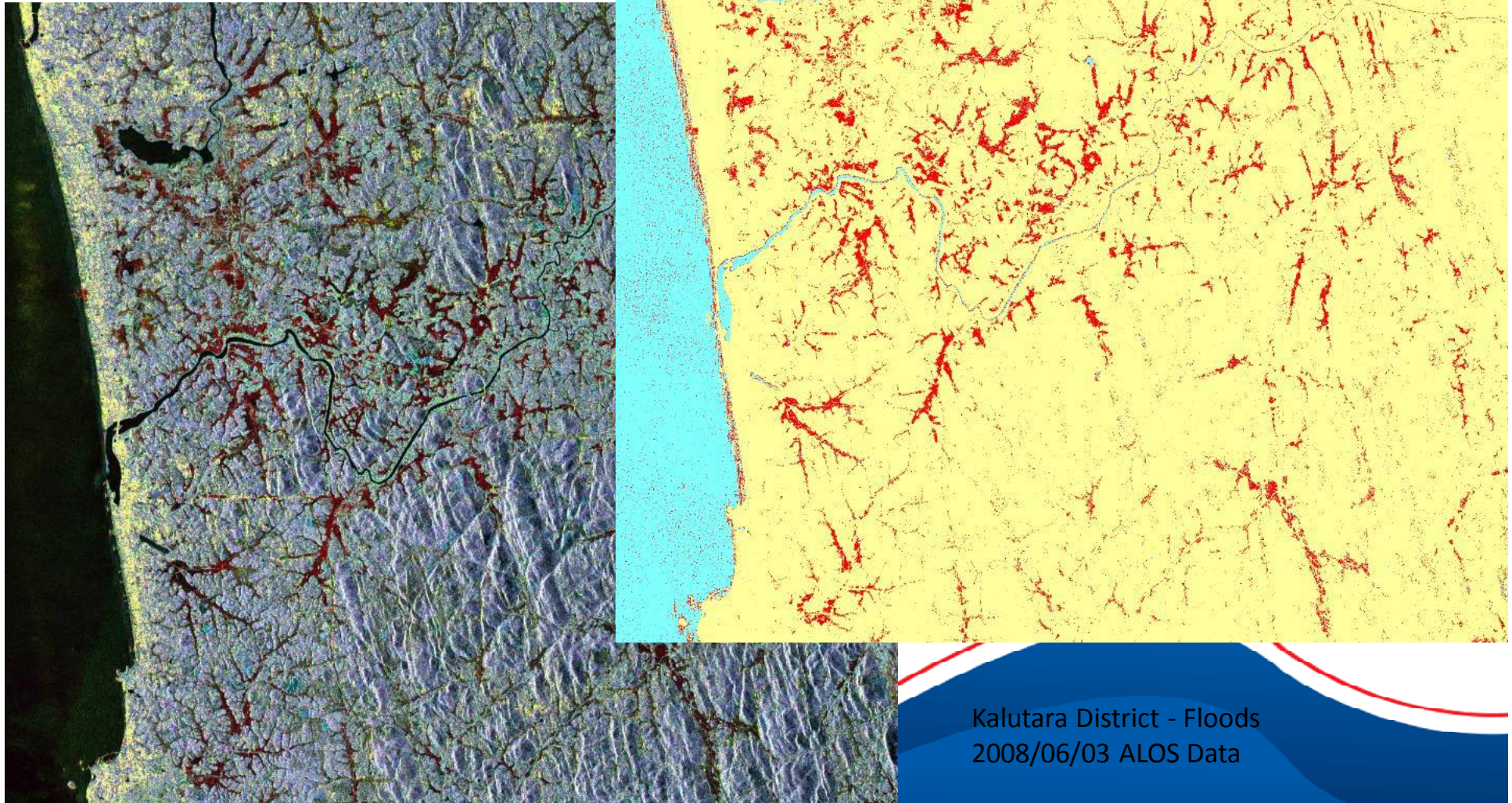
Flood Inundation Mapping, Gampaha District, Sri Lanka

Flood Inundation as at 19th May 2010



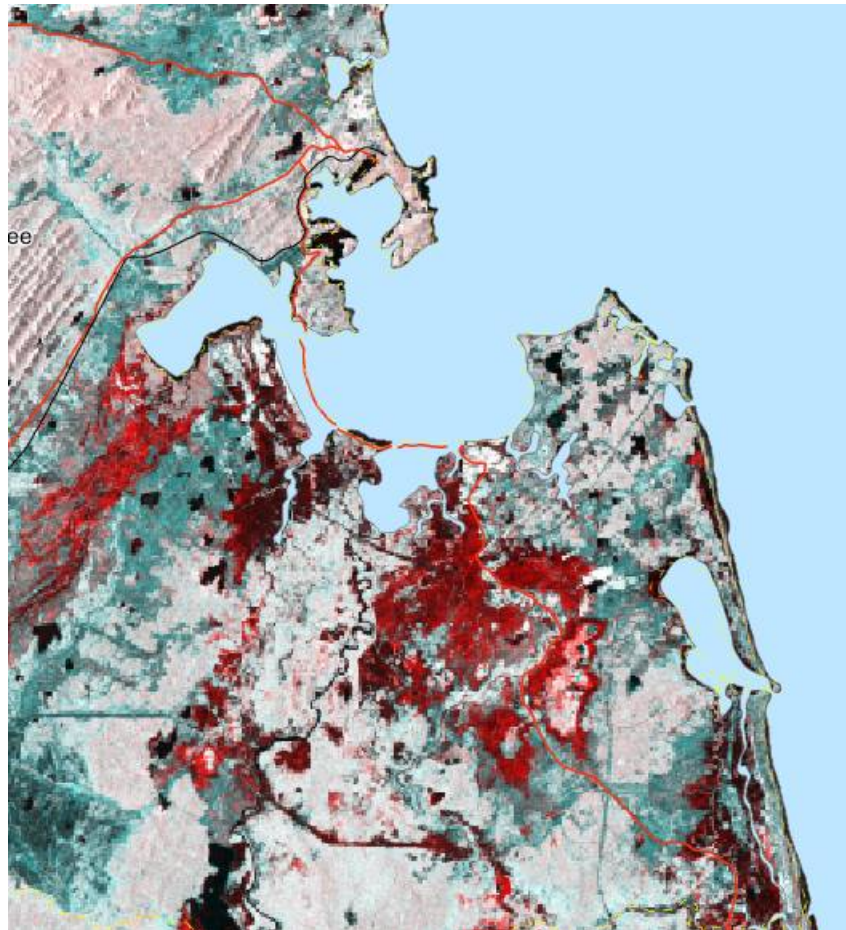
Emergency Earth Observation

Use of Near Real Time Earth
Observation for Emergencies
Maps are available www.dmc.gov.lk

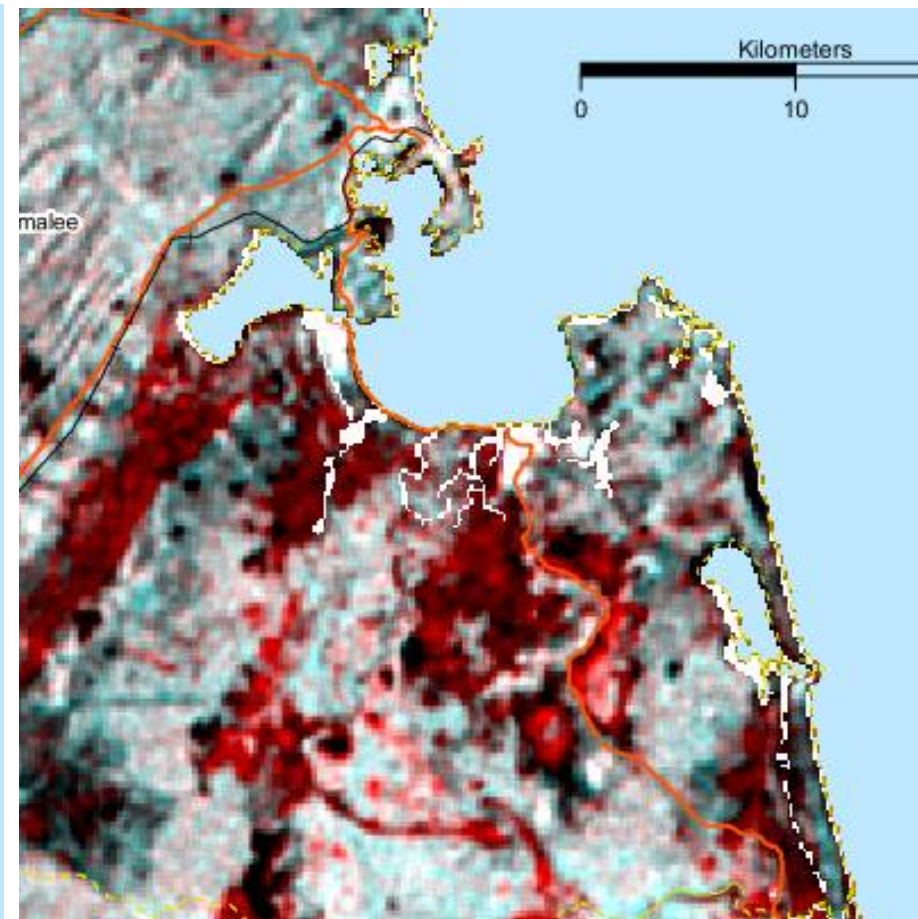


Kalutara District - Floods
2008/06/03 ALOS Data

Flood February 2011 Eastern Province Sri Lanka



10.30 am 06th Feb. 2011 PALSAR 6m



11.45 pm 06th Feb. 2011 PALSAR 100m

Near Real Time Rainfall Monitoring

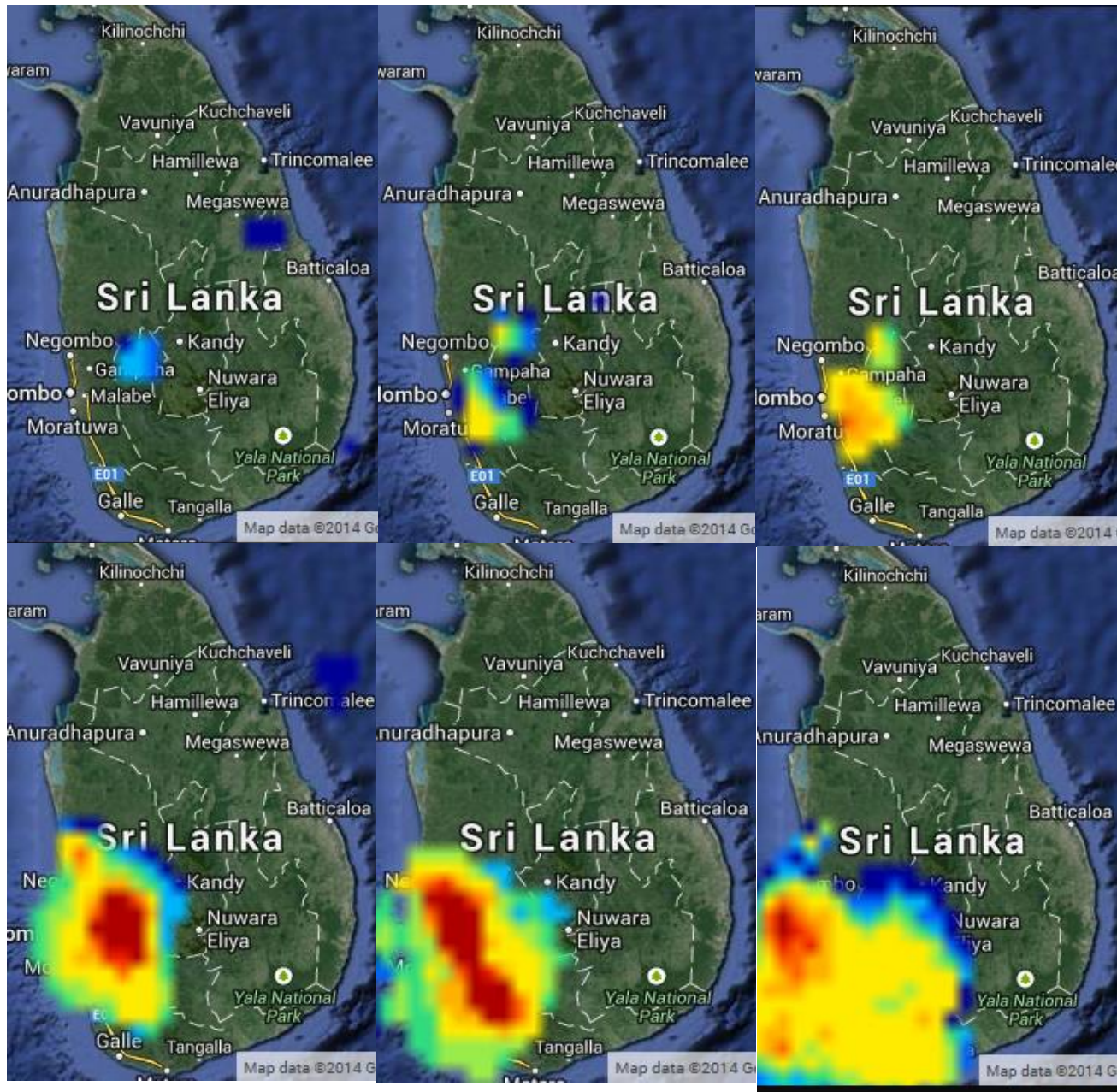
**RAINFALL COVERAGE &
INTENSITY**

01/02 June 2014

Rain 0.1 0.5 1.0 2.0 3.0 5.0 10.0 15.0 20.0 25.0 30.0 [mm/hr]

Rainfall Intensity

Data Source:



2. Hazard / Risk Data



Components of Hazard Profile



Disaster Management Centre



United Nations Development Program

Floods

Department of Irrigation

Landslides

Research Organization

Drought

Agriculture

Cyclone

Department of Meteorology

Lightning

Tsunami

Sea Level Rise

Coast Conservation Department

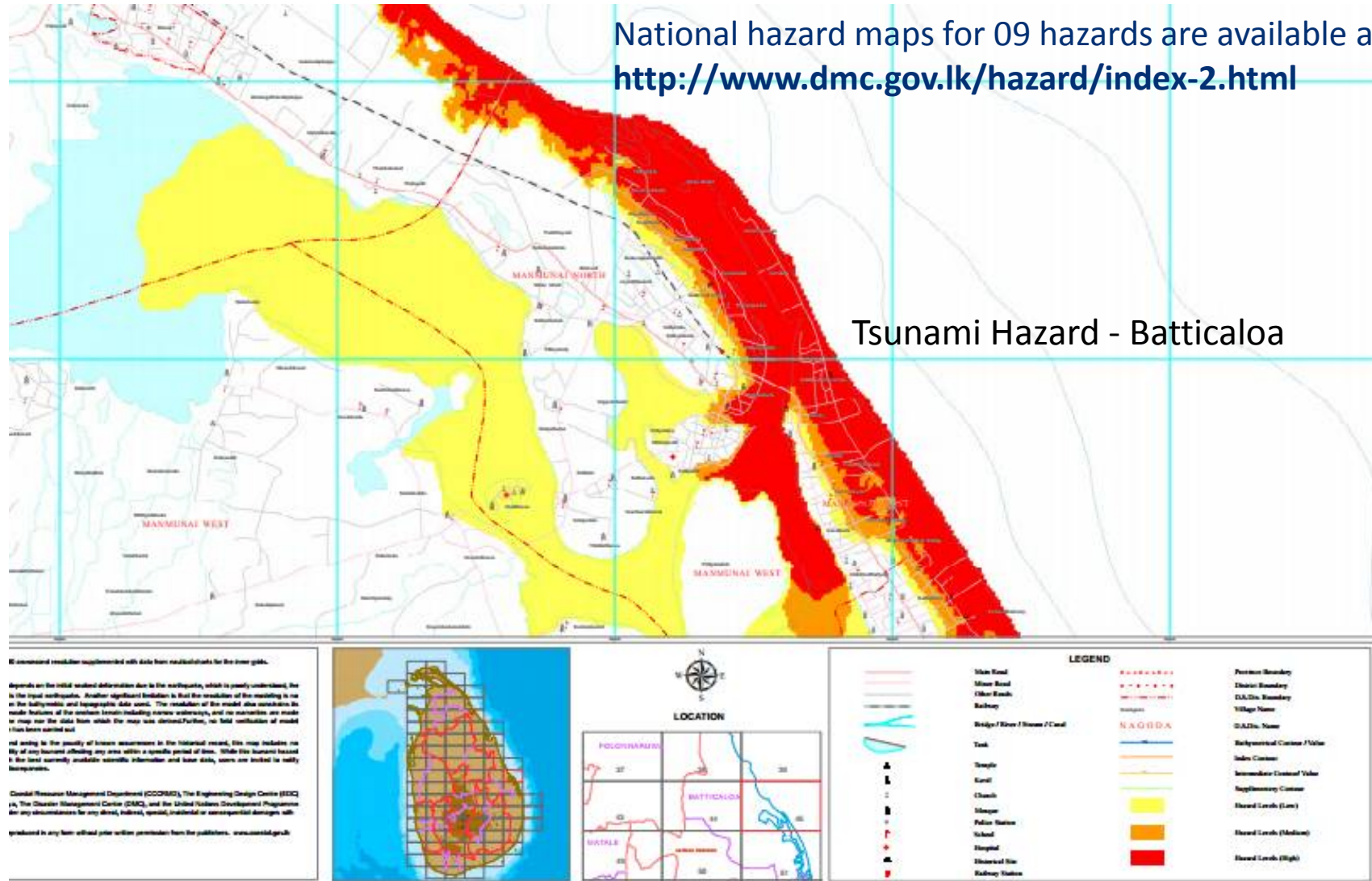
Storm Surge

Coastal Erosion

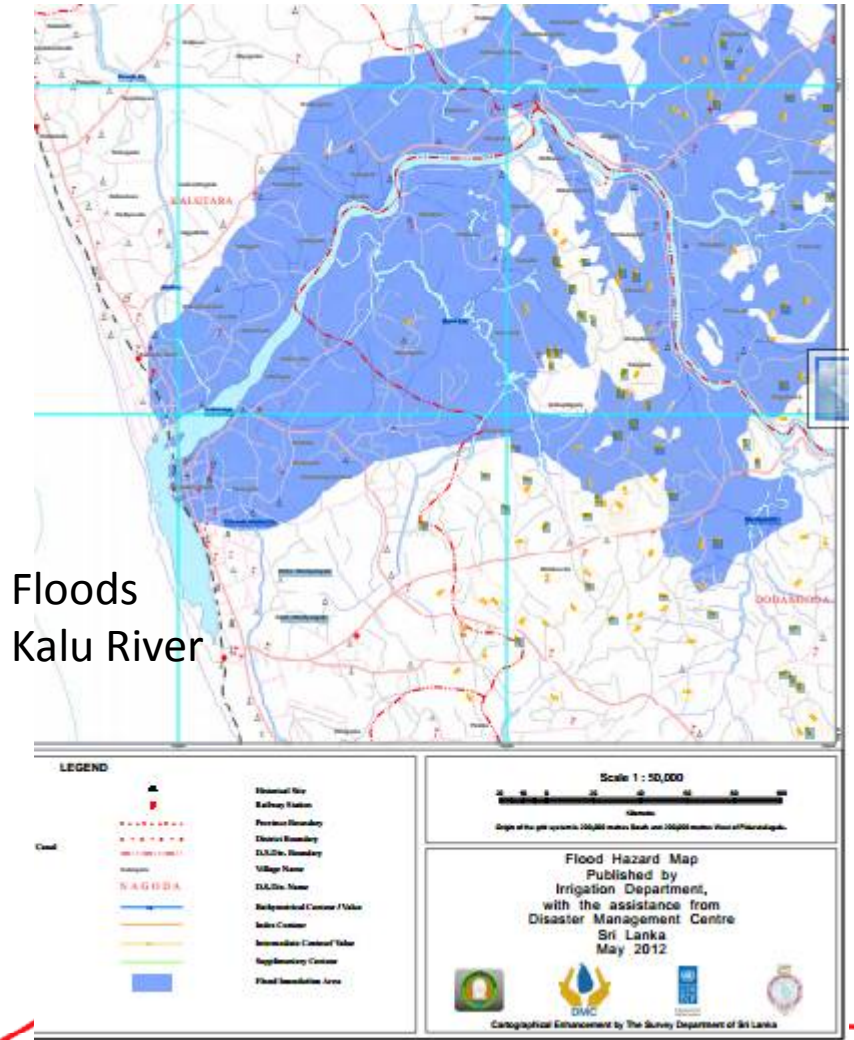
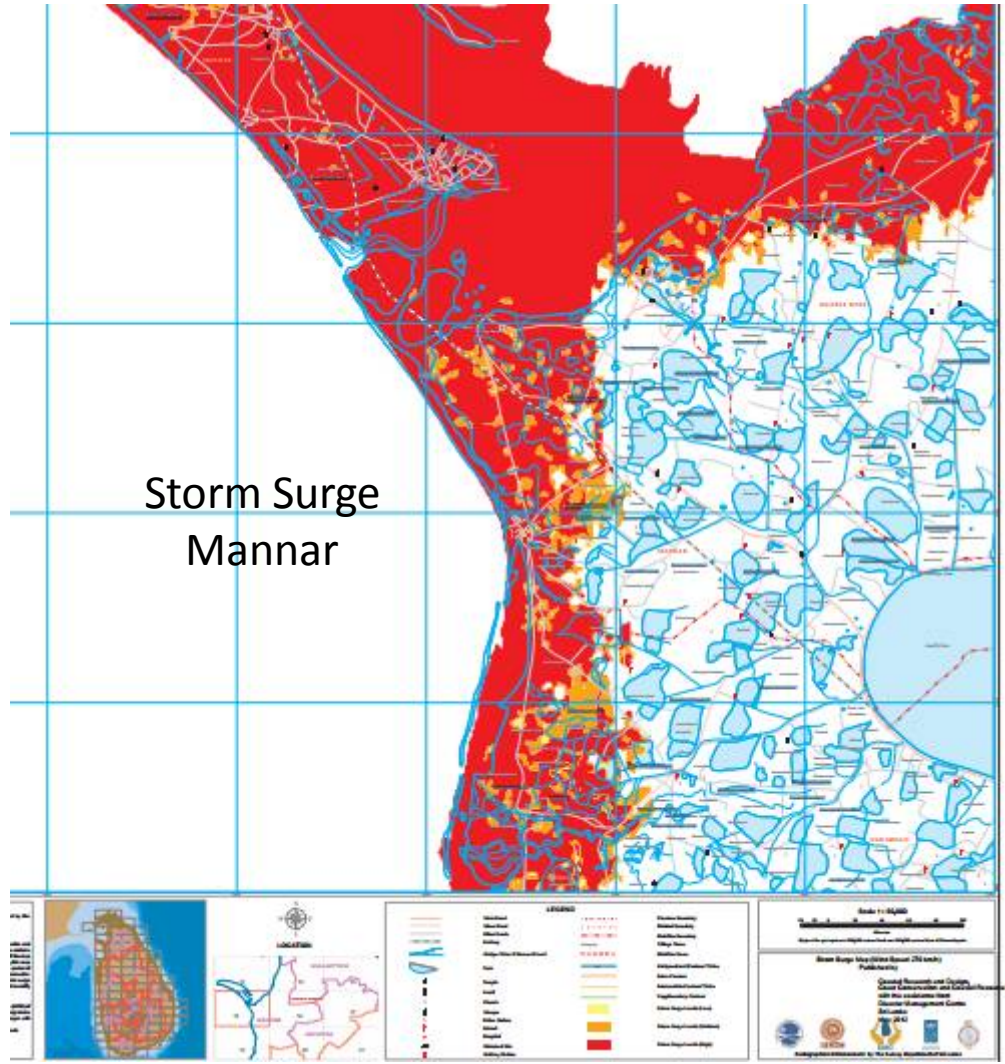
Best Practices – Hazard Maps

National hazard maps for 09 hazards are available at <http://www.dmc.gov.lk/hazard/index-2.html>

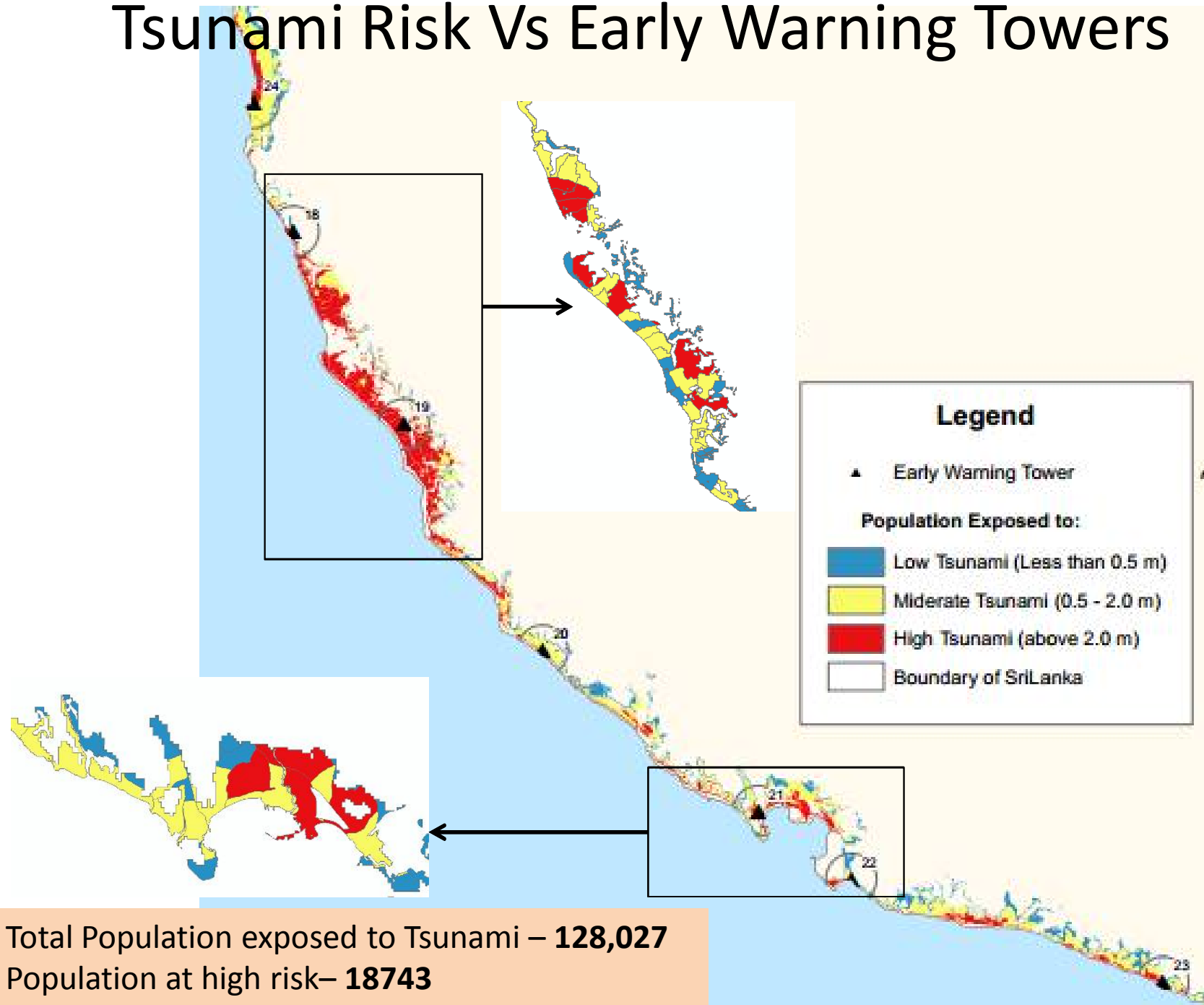
Tsunami Hazard - Batticaloa



Best Practices – Hazard Maps



Tsunami Risk Vs Early Warning Towers



Project Components

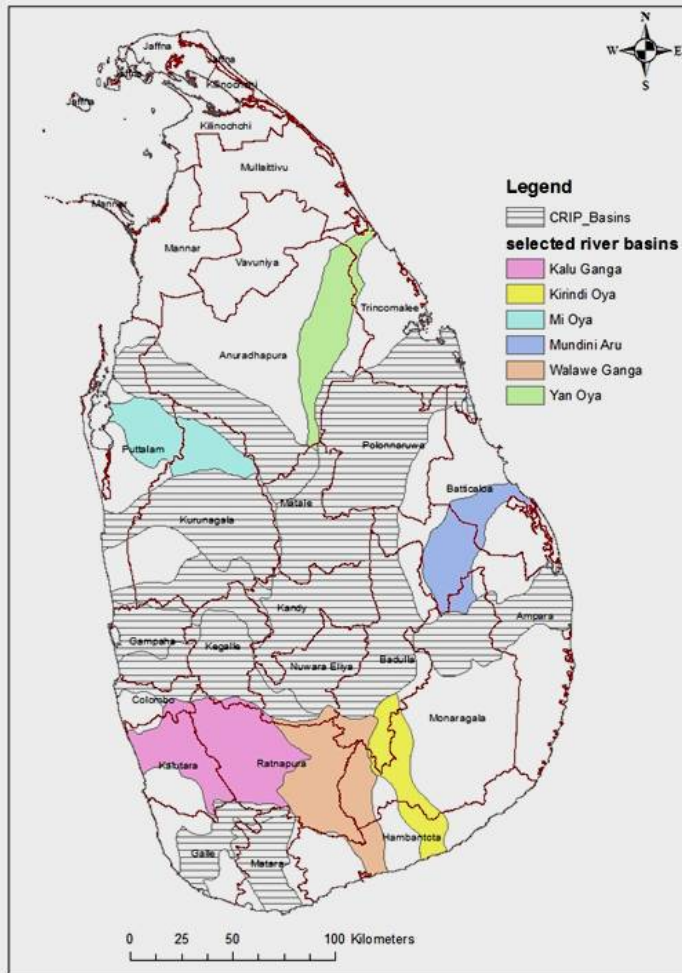
Risk Map Development for

- Riverine Flood 7 River basins
- Urban Flood 23 Urban Cities
- Tsunami (entire coast)
- Storm Surge (entire coast)
- Drought
- Strong Winds / Cyclone
- Value – 1.5 US\$ Million
- Duration 2016 – 2019 : 48 Months

**Project
Inception
Report
Developmen
t of Multi-
Hazard Risk
Profile for
Sri Lanka**



07 River Basins



Mundeni Aru Basin (1475 sqkm)

Kirindi (1230 sqkm)

Mi Oya (113 sqkm)

Yan Oya Basin (1782 sqkm)

Walawe Ganga Basin (2596 sqkm)

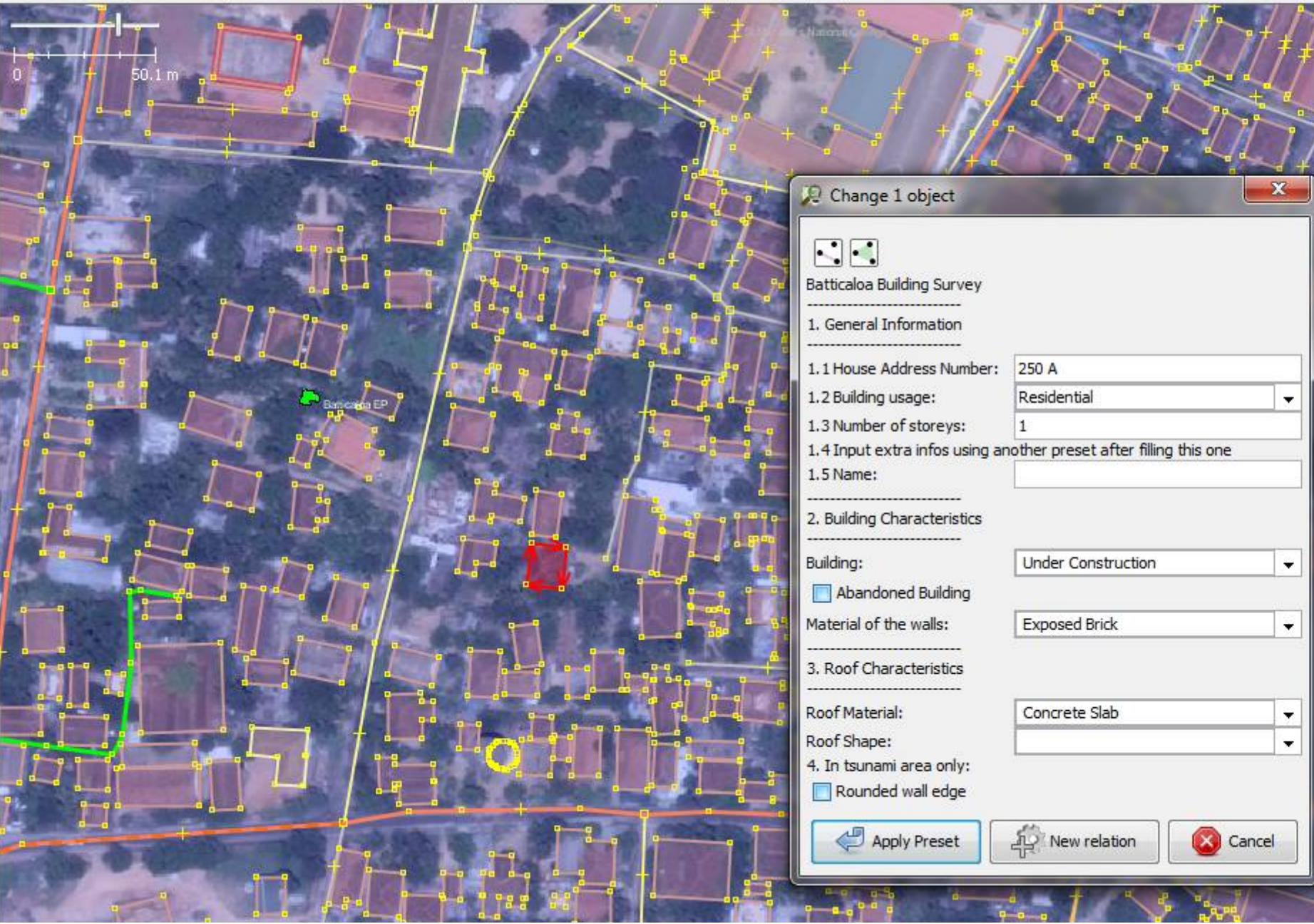
Kalu Ganga (2976 sqkm)

Bolgoda Oya (366 sqkm)



3. Volunteered GIS (VGIS) with OSM





Change 1 object ✕

Batticaloa Building Survey

1. General Information

1.1 House Address Number:

1.2 Building usage:

1.3 Number of storeys:

1.4 Input extra infos using another preset after filling this one

1.5 Name:

2. Building Characteristics

Building:

Abandoned Building

Material of the walls:

3. Roof Characteristics

Roof Material:

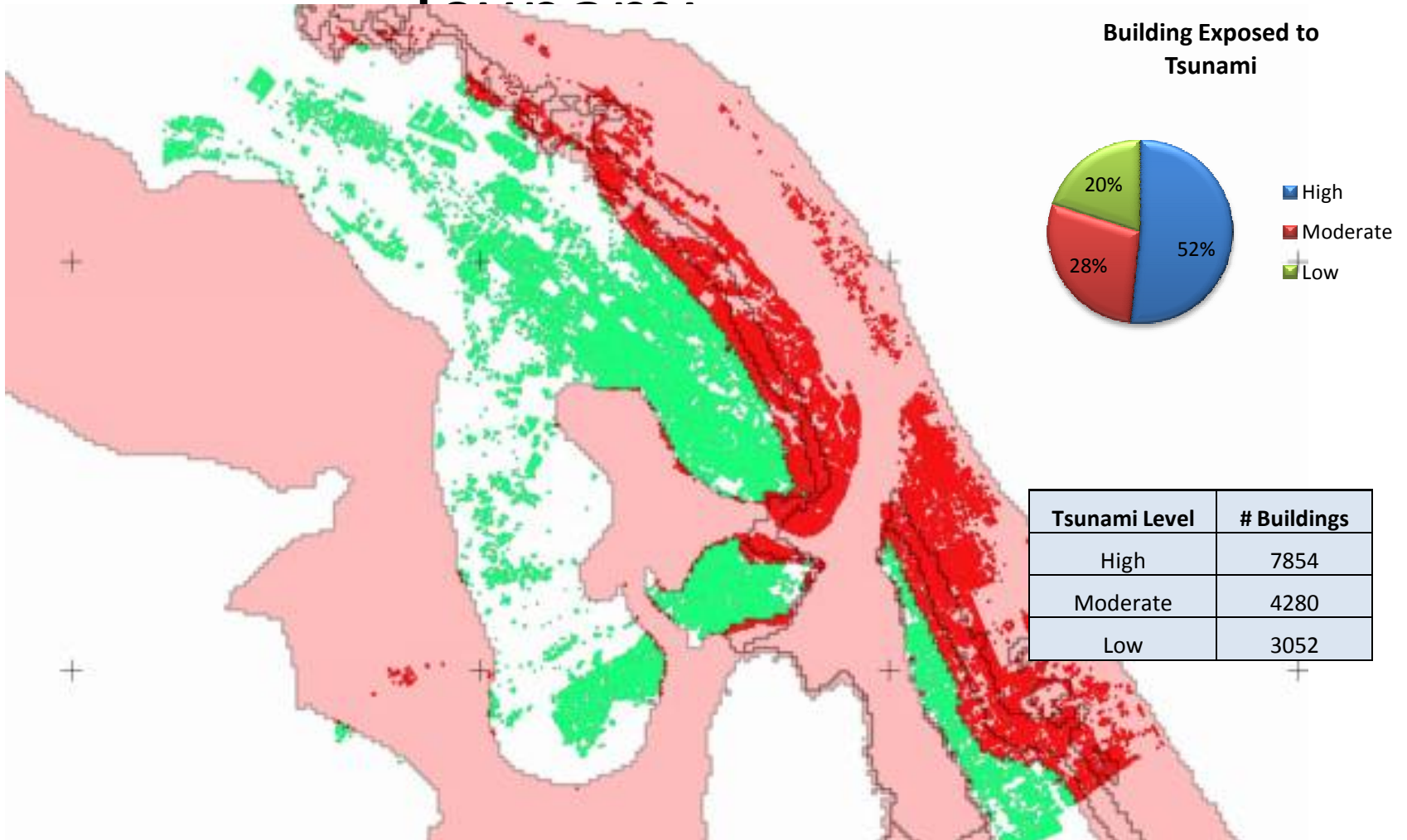
Roof Shape:

4. In tsunami area only:

Rounded wall edge

Buildings might affected by

Tsunami:



Total buildings – 32,000

Total tsunami affected buildings – 15,000

RISK PROFILE

Buildings – Manmunai North

Risk Level	Number of Buildings
High Risk	4569
Moderate Risk	5563
Low Risk	5054



4. National Loss Database





HISTORICAL DISASTER INFORMATION SYSTEM IN SRI LANKA

www.desinventar.lk





Disaster Information Management System - SRI LANKA



WELCOME to Disaster Information Management System in Sri Lanka

Search **GO**

ABOUT US

What is Disaster Information Management System

Data Sources

Data Collection Process


Data Validation

Disaster Definitions

Incident Reporting Formats

User Manual

Training and Awareness



Droughts

Major droughts occurred in 1992 and 2001. A look at the seasonal distribution shows that droughts occur largely in the month of August. With respect to the spatial distribution, areas most affected appear to be the districts of Kurunegala, Puttalam, Hambantota, Moneragala and Ampara. People were most affected by severe droughts that occurred in the years of 2001 and 2004...

1 2 3 4 5 < >

LATEST DISASTER INCIDENT IN SRI LANKA



Colombo, 11 January, Sri Lanka recent flooding causes Rs. 30 billion loss:

The most devastating floods that had battered the Eastern coast of Sri Lanka and wreaked havoc in most part of the island had cost the emerging economy a staggering Rs. 30bn...

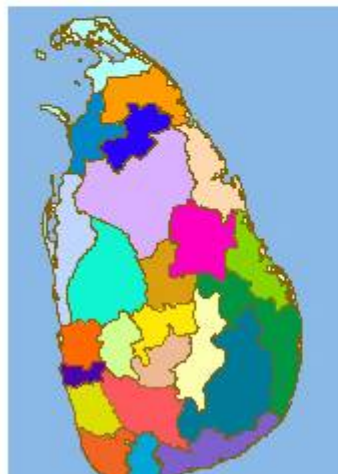
11 Over 200,000 acres of paddy land destroyed by floods in Sri Lanka

JAN 2011 Heavy rains, landslides, and strong gusty winds continue to devastate several.....

11 Unfavorable weather to continue in Sri Lanka

JAN 2011 From yesterday onwards, due to the influence of the atmospheric disturbances, the showery weather with strong winds at times will continue over most parts of the co...

DISTRICTS PROFILES



Welcome to

The Disaster Management Centre (DMC) of the Ministry of Disaster Management with technical and financial support from the Disaster Risk Management (DRM) programme of the United Nations Development Programme (UNDP) and the UNDP Regional Centre in Bangkok (RCB) has initiated the development of a database on the past disaster incidents from 1974 to date.

The Disaster Information Management System is a sustainable arrangement within an institution for the systematic collection, documentation and analysis of data about losses caused by natural and man made disasters

[Read More](#)

Please click on Following Link to Enter in to the Database:
This querying system will provide you with basic data about the effects of many types of natural disasters occurred in the country.

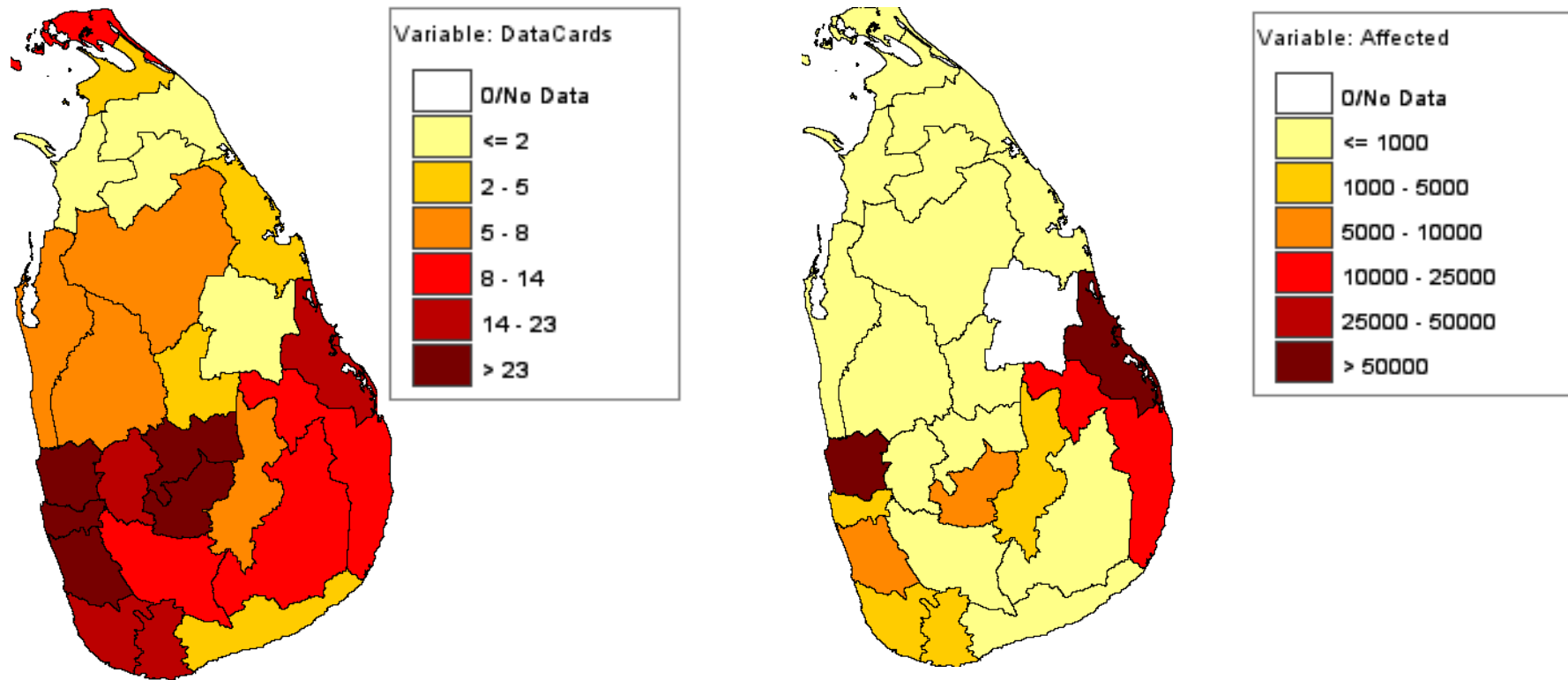
DIFFERENT DISASTERS & THEIR IMPACTS



Drought
People Affected, Losses to Agricultural Crops

It is also important to note that major droughts occurred in 1992 and 2001....

Spatial Distribution



Gampaha and Batticaloa ranks the highest in number of population affected during 2013. Ampara, Nuwaraeliya and Kalutara are the other districts in which significant number of population were affected.

Overall, Colombo, Gampaha, Kalutara, Kandy, Nuwaraeliya, Batticaloa, Galle and Matara districts shows higher frequency of occurrence of multiple disasters in 2013.

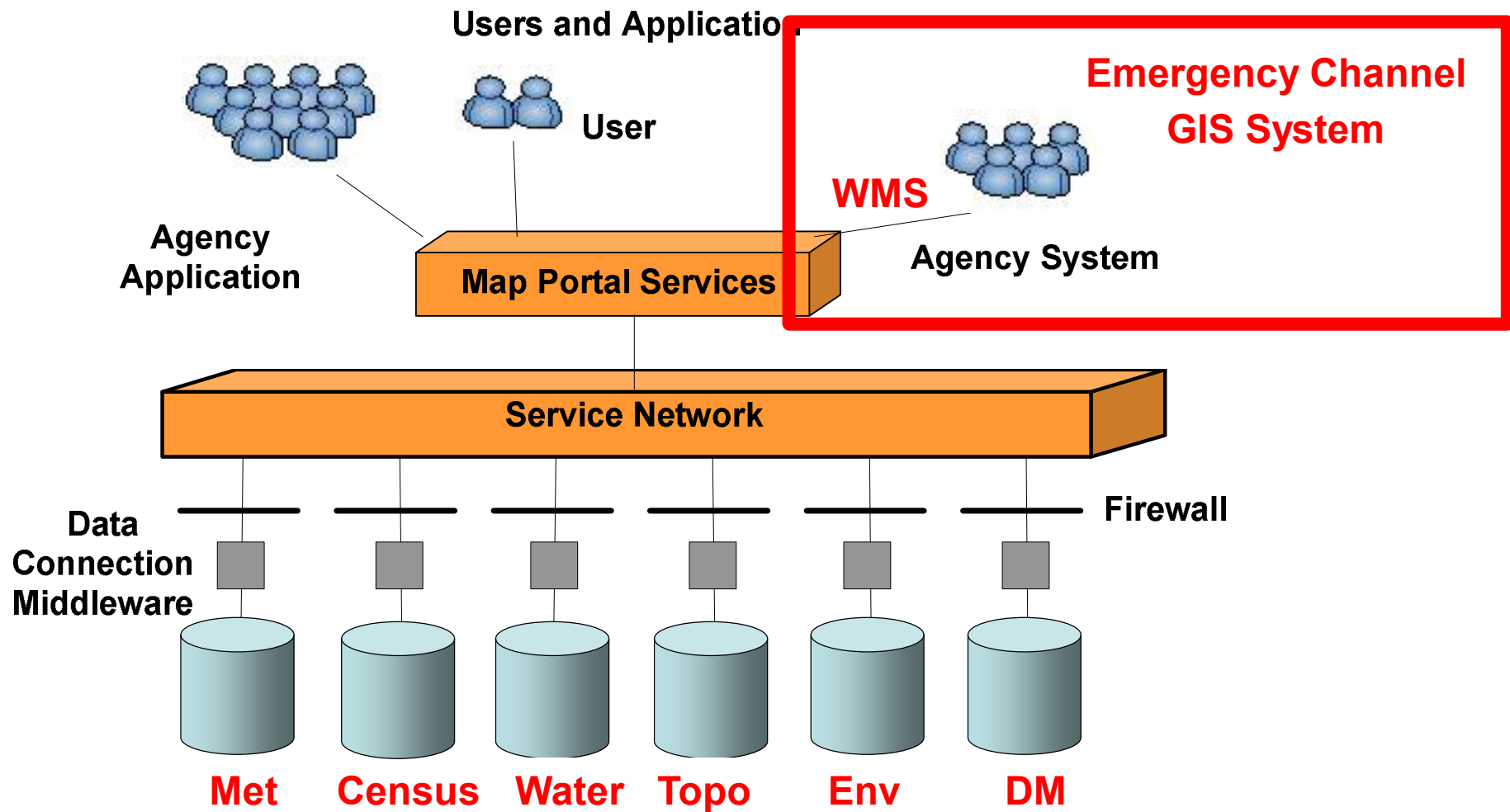
5. Data Sharing / Collaboration



Data Sharing is Important !!!

Organization	Role in Disaster Management Information	Primary Information Collected	Data Source
Disaster Management Centre	Warning / Information Dissemination up to local level	Feedback from citizen on "117" Disaster occurrences (www.desinventar.lk)	Crowed sourcing Manual observation
Department of Meteorology	Weather forecast Tsunami Warning Cyclone Warning	Rain, temperature and wind speed measurement	Rain gauges Weather stations
National Building Research Organization	Landslide Warning	Rain fall	Rain gauges
Irrigation Department	River Flood Warning	River flaw Rain fall	River gauges Rain gauges
Mahaweli Authority	Reservoir Water Level Information / Spill Gate Opening	Reservoir water level	Water level sensors

National Map Portal



Geo-Portal for Risk Data Sharing

The screenshot shows the RiskInfo Disaster Risk Information Platform interface. At the top, the logo reads "RISKINFO Disaster Risk Information Platform" with the tagline "Risk Information for all...". A "Sign in for extra features" link is visible in the top right. The main content area is divided into three primary sections: "Welcome", "MAPS", and "DATA".

- Welcome:** Features a map of Sri Lanka with a color-coded risk overlay. Below the map, a text block explains the platform's purpose: "Welcome to the Sri Lanka Disaster Risk Information Platform (RiskInfo). The purpose of RiskInfo is to make disaster risk information available to all the stakeholders and the public in order to facilitate disaster risk reduction and recovery efforts. The initiative is led by the Disaster Management Center (DMC) in partnership with UNDP, NGOs and GDFRR Labs. The data sharing platform is built using the open source software GeoNode that is designed to enable collaborative use of geospatial data and maps. To get in touch and get in account to upload data: riskinfo@dmc.gov.lk".
- MAPS:** An orange section with a search bar and a "Search" button. Below the search bar are four buttons: "Hazard profile maps", "Administrative boundaries", "Explore maps", and "Create a new map" (with a "Create map" sub-button).
- DATA:** A blue section with a search bar and a "Search" button. Below the search bar are four buttons: "Hazard data", "Exposure data", "Base data", and "View all data".

At the bottom of the interface, there are links for "Powered by GeoNode 1.2", "Need Help? Help", and "For Developers". A "Partners" section displays logos for GDFRR, UNDP, and the Sri Lanka Disaster Management Center.

www.riskinfo.lk

Under Construction....



Conclusion and Recommendations

National

- DMC made considerable effort to utilize Geo-informatics in all phases of Disaster Management in Sri Lanka. However, improvements are needed
 - Capacity building of end-user agencies
 - Develop proper data sharing policy and platform
- Risk information is under development for main hazards during 2016-19 period
- Emergency activation should be coordinated approach . DMC will continue as focal point– should not duplicate activations

Regional / Sentinel Asia

- SAS Activations – I would Propose DM Agency in country to coordinate the activation
- DAN – Recommended to have web based coordinated mechanism – A Task Manager to eliminate duplication
- Reginal Server – Develop the entire portal / change architecture with consultation with user requirement and improve server functionality / response time

