



DISASTER RISK REDUCTION STRATEGY

DRR Strategy includes:

- Reducing exposure to hazards by educating masses, early warning system
- Lessening vulnerability of people and property by building resilient society and infrastructure
- Improving preparedness for emergency situations by Integration of response systems & Building Back Better

NDEM IS DATABASE+ & A SUBSET OF THE WIDER DRR STRATEGY



ESSENTIAL DATA ELEMENTS FOR DRR

| Type | Contents | Format |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Core | | |
| Base data | Administrative (international to village boundary), Transport (road, rail), Drainage, Canal, Coastline | Vector |
| Thematic data | Land use land cover, Settlement (area/point), Mining area, Surface water body, Forest boundary, Slope, Geomorphology, Lithology, Lineament, Meteorological data | Vector/ Raster |
| Infrastructure data | Hospitals, airports, helipads, ports, jetties, river gauge stations, ponds & tanks, reservoir, dams, embankments, power plants, major communication networks, point of Interests, vital installations | Vector/ Point Info |
| Disaster specific data | | |
| Disaster data | Risk maps, hazard zonation database, Disaster specific products of flood, cyclone, Tsunami, landslide, earthquake, wild fire, epidemics, drought. | Raster |
| Non-spatial | | |
| MIS Data | Census data, health information, contact directory of various disaster equipment, inventory of essential resources & man power, relief materials etc. | DBMS |
| Image data | | |
| Space data | Satellite imagery, Aerial Photographs. | Raster |



NATIONAL DATABASE FOR EMERGENCY MANAGEMENT (1)

In 2013, NDEM was conceived as a GIS based repository of data to support disaster and emergency management in the country.

It is a holistic, government public interface driven by multiple technology and cross-cutting strategy.

The database enables development of decision support system in the form of customized user interfaces with necessary security mechanism.

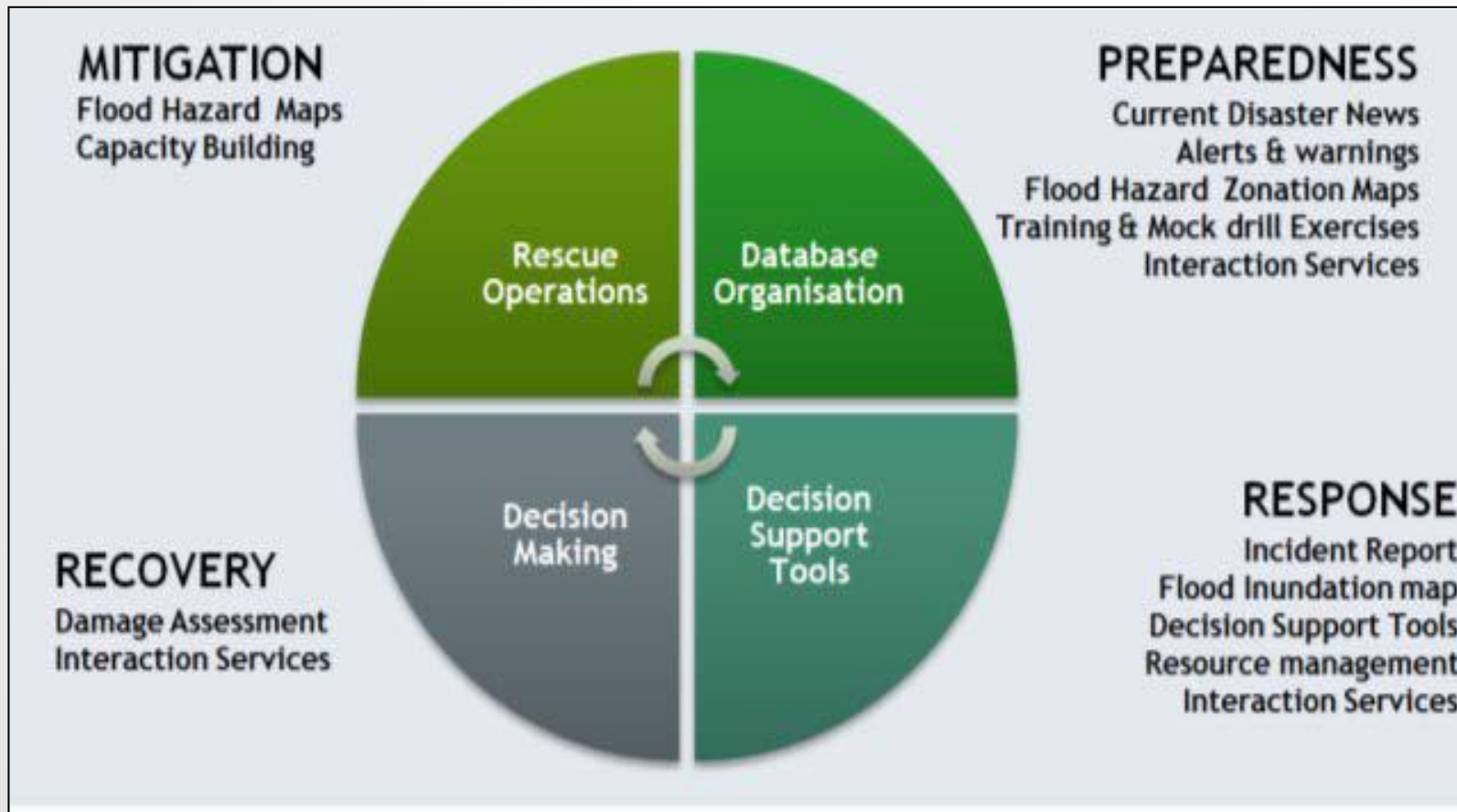
ISRO is designated as the nodal authority for this project

Web portal: <https://ndem.nrsc.gov.in>



NATIONAL DATABASE FOR EMERGENCY MANAGEMENT (3)

NDEM CONCEPT





NATIONAL DATABASE FOR EMERGENCY MANAGEMENT (2)

NDEM IS AN NATIONAL PLATFORM OF DATA INTEGRATION.

Primary objectives are:

- a. Pooling and Spatial Integration of Database drawn from various nodal agencies and Development of Decision Support Tools.
- b. Hosting of services for real-time situation assessment, preparedness, response recovery and mitigation



NATIONAL DATABASE FOR EMERGENCY MANAGEMENT (4)

NDEM OBJECTIVES

Organization of multi-scale geospatial database for entire country at 1:50,000 scale; for 350 multi-hazard prone districts at 1:10,000 scale; for 5 mega-cities at 1:2,000 scale (Delhi, Mumbai, Kolkata, Bangalore and Hyderabad)

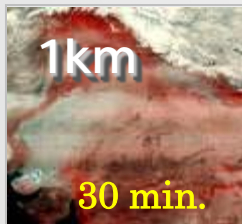
Development of Decision Support System (DSS) tools for addressing disaster / emergency management.

Establishing computer infrastructure to facilitate network connectivity, data ingest, validation, GIS databases organization, data dissemination and services hosting.

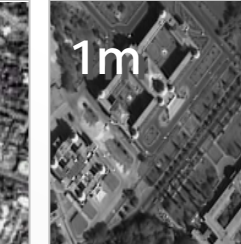
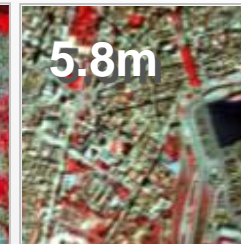
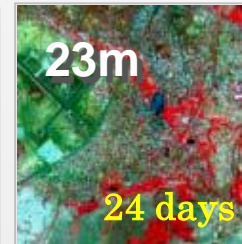
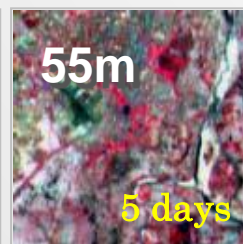
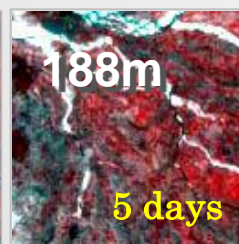
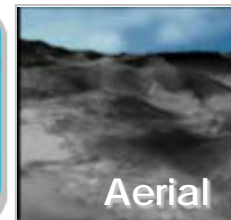


SPACE INFRASTRUCTURE FOR NDEM

Remote sensing provides satellite imagery with varying active and passive sensors for disaster management



Aerial Laser Terrain Mapper
Digital Camera
Synthetic Aperture Radar (SAR)

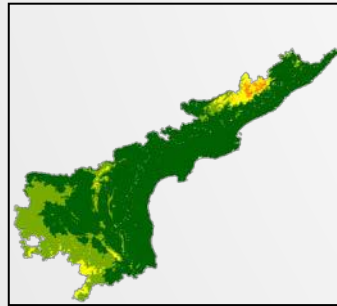




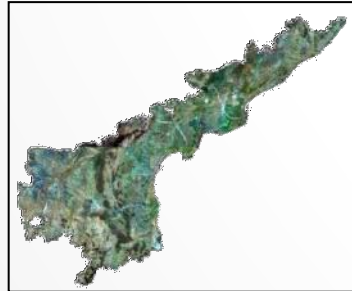
USE OF SPACE TECHNOLOGY FOR RASTER SERVICES

Satellite imageries with resolution ranging from 5.8 m to less than a meter are integrated for complementing with vector data.

Very High Resolution Satellite data i.e., Cartosat-2 of 1m resolution and sub meter resolution data are used for web map services.



CARTO2DEM - 30M



IRS LISS IV - 5.8M



CARTOSAT 1 - 2.5M



CARTOSAT 1 + LISS IV
- 2.5M



CARTOSAT 2 + LISS IV -
1M

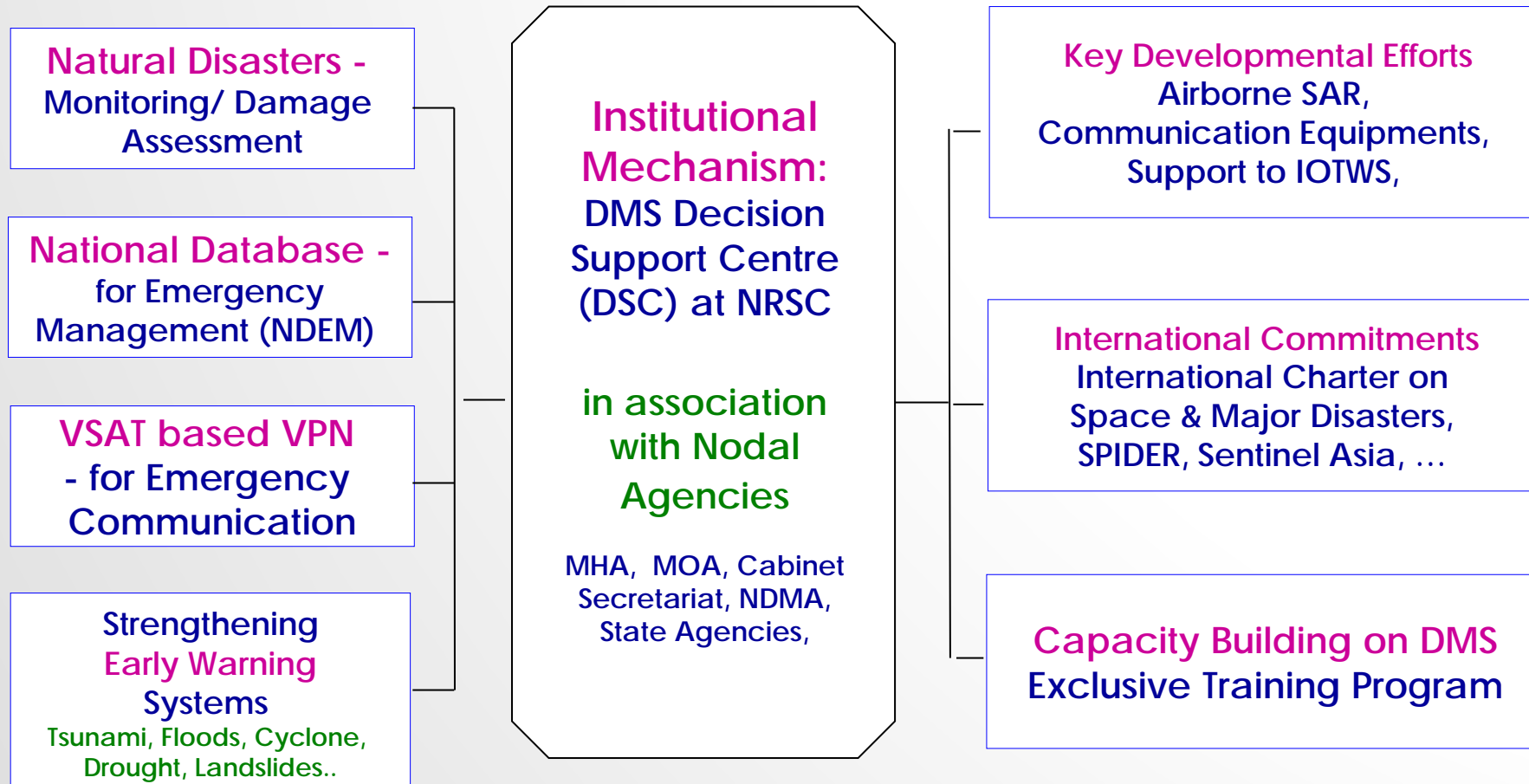


Very High resolution
data < 1M



DATA INTEGRATION & MANAGEMENT SYSTEM

A special software platform of ISRO integrates spatial data with in-situ data from ground segments which eventually helps the interveners and senior managers.

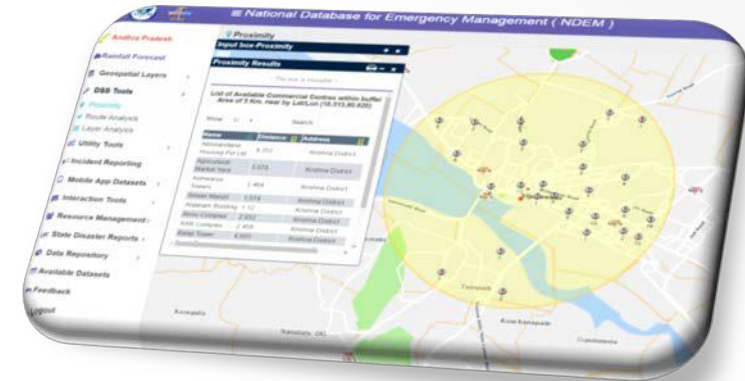


MHA: Ministry of Home Affairs
MOA: Ministry Agriculture
NGO: Non-Governmental Organizations
NDMA: National Disaster Management Authority



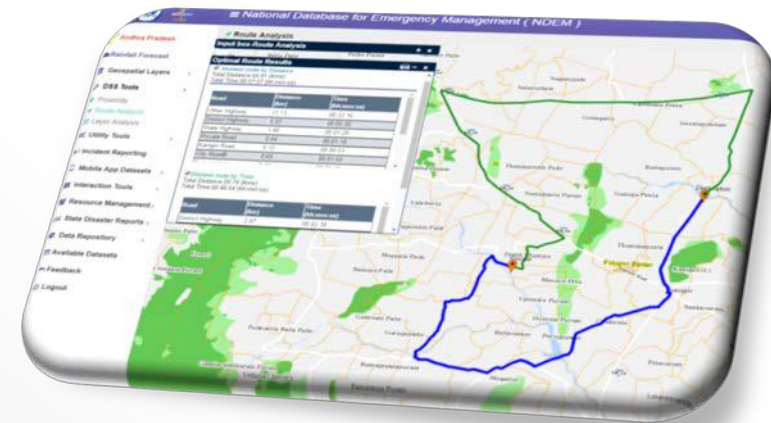
USE OF APPROPRIATION INTEGRATION TOOLS FOR END USE AND RESPONSE

Proximity tool is used for identifying emergency facilities. It provides optimal search for emergency facilities such as hospitals, shelters, rail/bus stations etc. within the user defined range.



Proximity Analysis

Route analysis tool facilitates the user to find out the shortest route between emergency facility and user interested location/disaster site with details of the route.



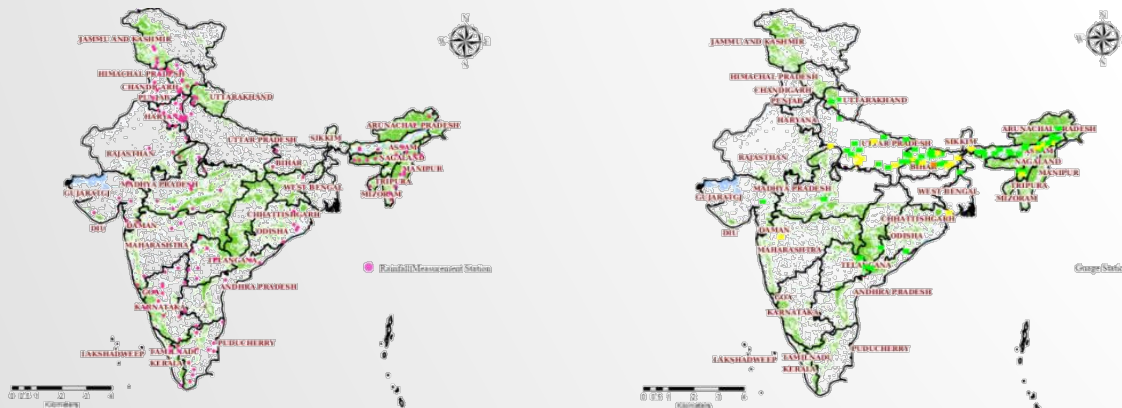
Network Analysis



DISASTER DASHBOARD

NDEM web portal provides disaster related alerts/warnings obtained from the authorised sources.

Information about daily rainfall, river water levels, city weather etc., are integrated into dash board as a service open to the public.

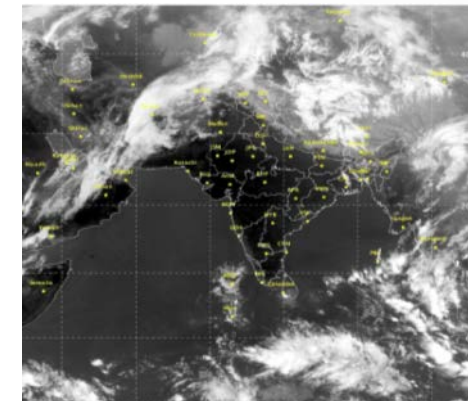


| | |
|-------------|-------------|
| Date | 28-Mar 2017 |
| Rain Fall | 3mm |
| Temperature | 39 c |
| Wind Speed | 15 Km/hrs. |
| Sunshine | 158 |

Daily Met Data from IMD

| | |
|------------------|---------------------|
| Name_of_river | Sone |
| Forecasting site | Koelwar |
| District | Patna |
| State | Bihar |
| Date | Aug 14, 2016 12:00 |
| Sub_division | Bihar |
| Warning_level | 54.52 |
| Danger_level | 55.52 |
| Highest_flood | 58.88 |
| Phfl_date | 1971-07-20 |
| Actual_level | 54.85 |
| Al_time | 12:00 |
| Al_trend | Falling |
| Normal_level | 52.22 |
| Forecast_level | 54.7 |
| Forecast_trend | Falling |
| Forecast_date | 14/8/2016 |
| Forecast_time | 16:00:00 |
| Situation | Low Flood Situation |

River Water Levels from CWC



Cloud Movement



CITIZEN INTERFACE: MOBILE APPS

Mobile Apps that can provide real-time field information are integrated into NDEM portal.

Incident Reporting, Relief Management and geo-tagging are enabled through mobile app.

