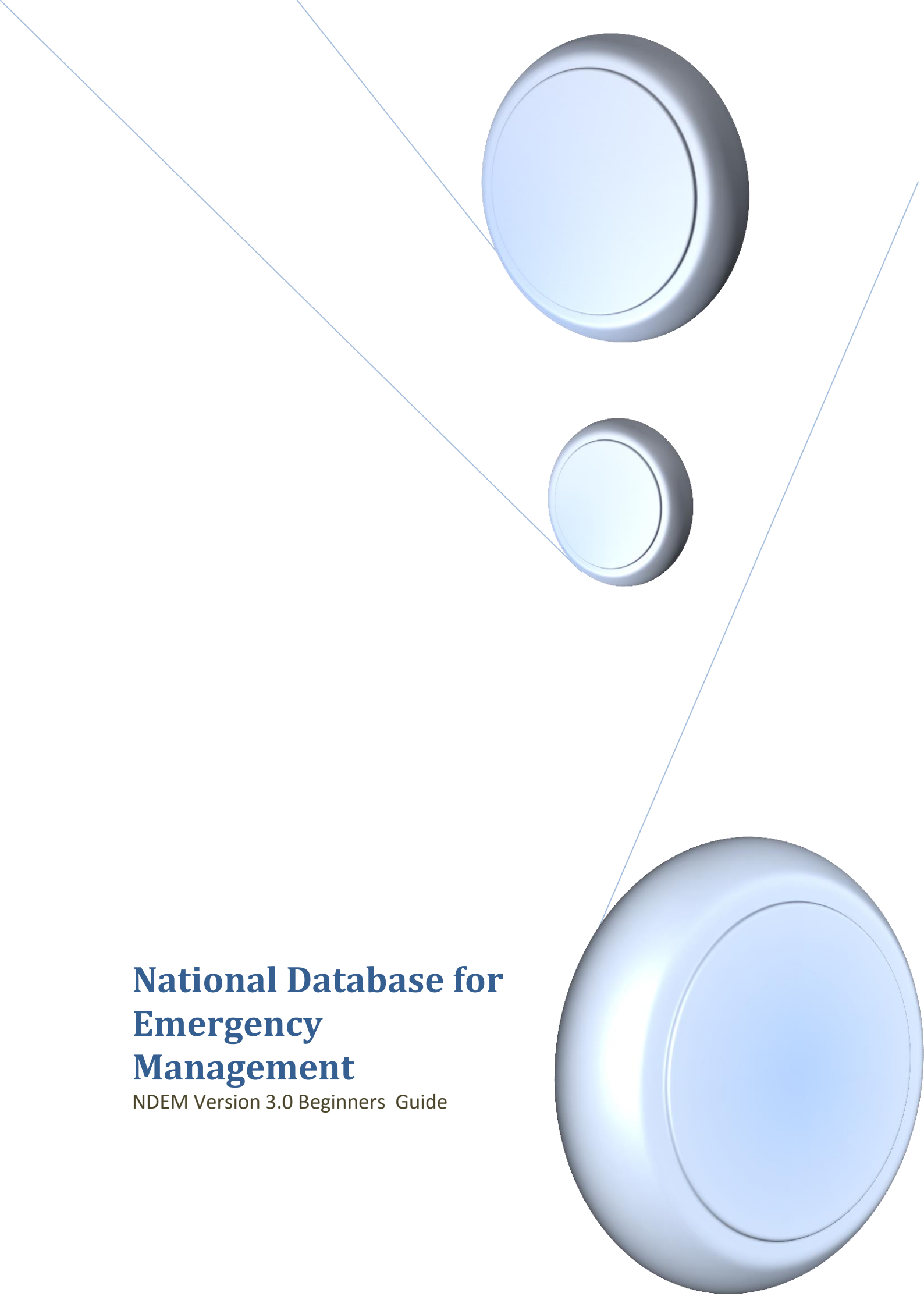

National Database for Emergency Management

NDEM Version 3.0 Beginners Guide

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Chapter 1

Welcome to NDEM

1.1 What is NDEM?

Government of India has envisaged a policy to build a safer and disaster resilient India by developing a holistic, integrated proactive multi disaster and technology driven strategy for disaster management. Accordingly, Ministry of Home Affairs (MHA) has translated this approach into National Database for Emergency management (NDEM) for taking up ameliorative measures for providing timely information and decision making in the event of disasters. National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO) is the lead agency to implement and operationalize NDEM project. NDEM essentially serves as national repository of GIS based data for entire country coupled with set of Decision Support System tools to assist the disaster managers in decision making during emergency situations.

NDEM Portal Version 1.0 was made operational in June 2013 and provided various disaster products and services for 2013 - 2014 disaster events to the respective State Governments. To have high availability and consistency of NDEM portal products and services, NDEM version – 2.0 was operationalized in May 2015. Currently, NDEM version – 2.0 has been deployed for all 36 States/Union Territories in the country on internet domain. It includes disaster dashboard, comprehensive multi-scale geospatial database, historical disaster database, customized Decision Support System (DSS) tools, incident reporting, interaction tools, mobile applications, Indian Disaster Resource Network (IDRN)/ health database etc. In order to enhance the capabilities of NDEM services, NDEM Version 3.0 is developed with emerging technologies and additional features like real time communication from the field (Audio Video chat), Resource management, Attribute updation of emergency facilities etc. are incorporated.

1.2 Objective

The objective is to introduce NDEM Version 3.0 geoportal and its features for effective disaster management. It specifically explains the user interfaces and various modules involved in the disaster management.

1.3 System Overview

It is important to define standards for systematic design and development and also to maintain the harmony among various module developed by multiple individuals. The standards followed for NDEM version 3.0 Software development are:

SNo.	Tools	Software Used
1.	Web Server	IIS / Apache
2.	Database	PostgreSQL,
3.	Application Servers	Map Server, GeoServer (Cache Enabled)
4.	Development Tools	HTML5, CSS, JavaScript, jQuery, Bootstrap, PHP, Python
5.	Spatially Enabled Databases	PostGIS
6.	Utilities & APIs	Standard tools for Geospatial applications, Open layers APIs
7.	Web Mapping Framework	Open Layers 3.0, HTML/CSS
8.	Transformation and Coordinate System	WGS84 / GCS
9.	Mobile Mapping Standard	Mobile Apps (Android & Browser based)

1.4 Tasks you perform with NDEM Version 3.0

National Database for Emergency Management (NDEM) is a GIS database consisting of core, hazard specific and non-spatial data for addressing emergency management in the country. The NDEM Version 3.0 consists of multi-scale database of geospatial database for entire India at 1:50,000 scale, multi-hazard prone districts at 1:10,000 scale, and mega cities at 1:2,000 scale. The database is integrated into a uniform framework with set of customised Decision Support Tools. Further, set of Mobile Apps are customised for relief management using NDEM Version 3.0. The salient features of NDEM Version 3.0 are:

1. Disaster dashboard –Disaster related alerts, warnings, current/historical news from authorized sources
2. Data Visualization - Detailed multi-scale Geospatial Data Services with Satellite imagery
3. Decision Support Tools – Customized GUI based tools for decision making
4. Utility Tools – Standard GIS tools like Distance and Area measurement, Search etc
5. Incident Reporting – Disaster event reporting through Mobile Apps, SMS, Portal
6. Interaction Portal – Communication and data exchange, Audio/Video live chat amongst users
7. IDRN Database – India Disaster Resource Network (IDRN) database for rescue equipment
8. Mobile Apps – Apps for Relief Management, Attribute Collection and Geo-tagging of Facility
9. Data Inventory – Statistics of Geospatial data and downloadable products

1.5 Tips on learning NDEM Version 3.0

i. How to the access NDEM portal?

NDEM Version3.0 portal is accessible through web browser.

User has to type URL ***http://ndem.nrsc.gov.in*** to access the portal as shown in figure 1.1.

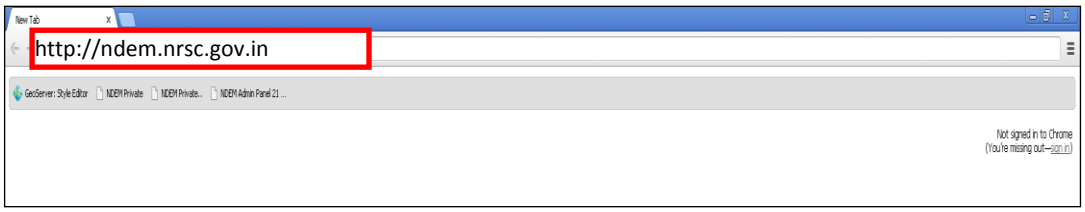


Figure 1.1 Accessing NDEM portal

After entering the above mentioned URL, the home page will appear as shown in figure 1.1.

ii. What are the browser requirements for accessing the site?

The site can be best viewed in all modern browsers.

iii. Any specific software required for working with the portal?

No specific software is required.

iv. Who can access this portal and how to get authorization?

This portal is accessible to all Central/State disaster management officials. Secretary, DM / Relief Commissioners of all States, besides MHA can access the site. As it is protected site, user name and password are required for accessing the data. The State Government has to send details of authorized official, duly signed by the competent authority for obtaining user name and password.

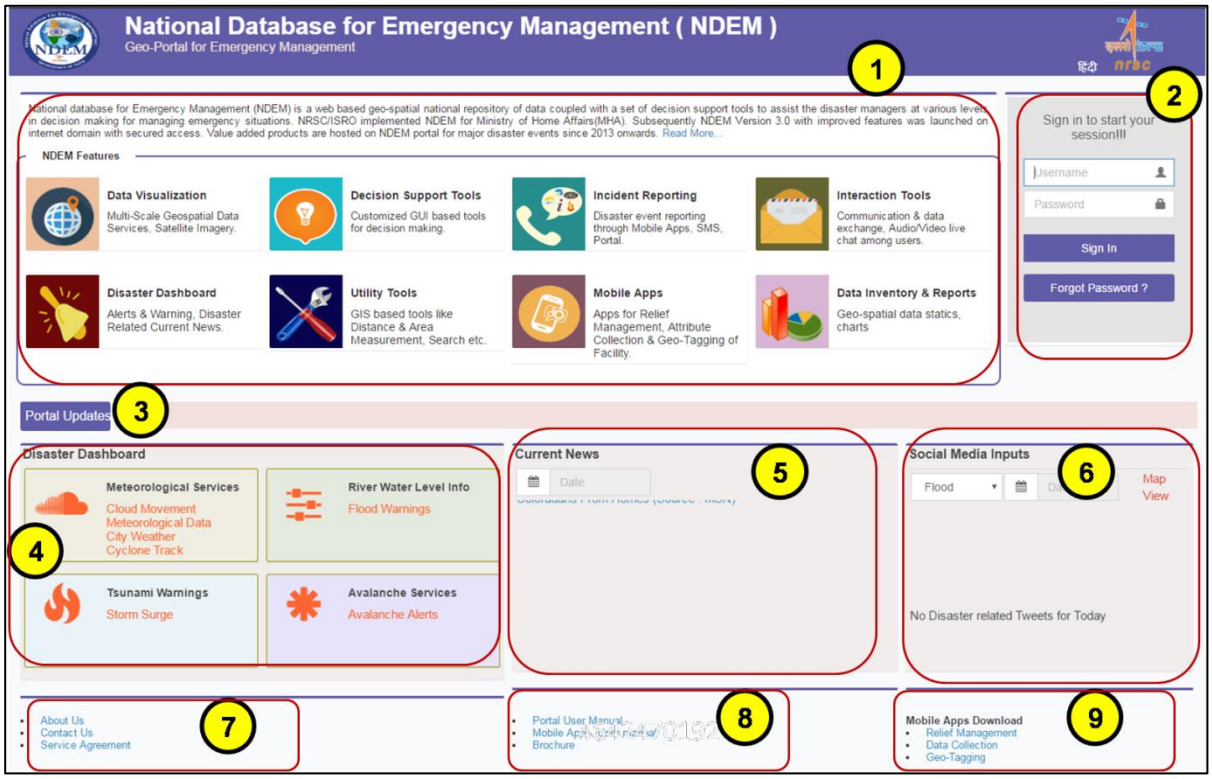
Exploring NDEM Geoportal

2.1 Objective

NDEM Version 3.0 geo-portal has been designed and developed using Free and Open Source Software technologies with multilevel authentication for accessing the services by the authorized officials. This chapter is intended to illustrate salient features of NDEM home page and disaster dashboard.

☞

- NDEM V3.0 can be accessed on all modern browsers with active Internet Connectivity.
- To access the portal, open any Web Browser and type the following URL : *http://ndem.nrsc.gov.in*
- Figure 2.1 shows the home page of NDEM Version 3.0.



1. NDEM Features
2. Login
3. Portal updates
4. Disaster Dashboard
5. Live news
6. Social Media Integration-Tweets
7. Useful Links
8. Mobile Apps Download
9. User Manual Download links

Figure 2.1 Home Page

! In case, you are not able to open the home page of NDEM V3.0 portal as mentioned in figure 2.1, check for internet connectivity or contact your system administrator.

2.2 Disaster Dashboard -

Disaster dashboard provides daily meteorological services, river water level information, tsunami warnings and avalanche warnings. Updated Cloud movement, cyclone track, rainfall and river level details from various forecasting departments are incorporated in Disaster Dashboard. Dashboard also has disaster related news feed from different authorized national news channels, web sites and tweets regarding disasters. The salient features of NDEM V3.0 dashboard are discussed briefly in successive sections.

2.2.1 Meteorological Services

Meteorological services show updated near-real time information about cloud movement, daily meteorological data, city weather information, and cyclone tracks.

Hourly cloud movement information derived from InSAT 3D IMG is captured, which is obtained as service to NDEM from IMD/MOSDAC. Meteorological information such as Rainfall, temperature and wind information is obtained from Indian Meteorological Department. City weather forecast for the next 7 days is taken as service from Indian Meteorological Department.

☞

- Click on *Cloud Movement* in Meteorological Services to get Cloud Movement (figure 2.2 (a)).
- Click on *Meteorological Data* to get Daily rainfall, wind speed and temperature information (figure 2.2 (b)).
- Click on *City Weather* to get weather prediction for next 7 days (figure 2.2 (c)).
- Click on *Cyclone Track* icon in that particular city to get local weather forecast (figure 2.2 (d)).

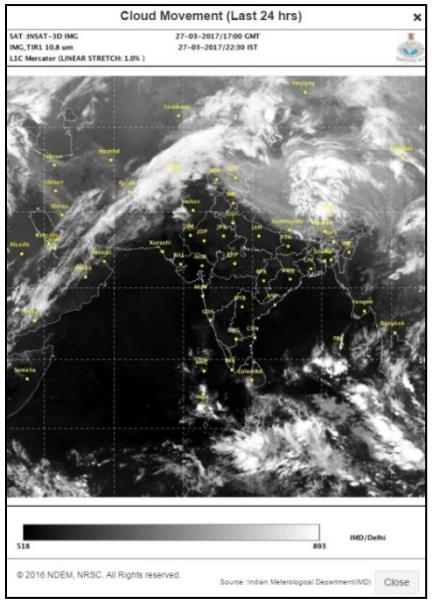


Figure 2.2 (a) Cloud Movement

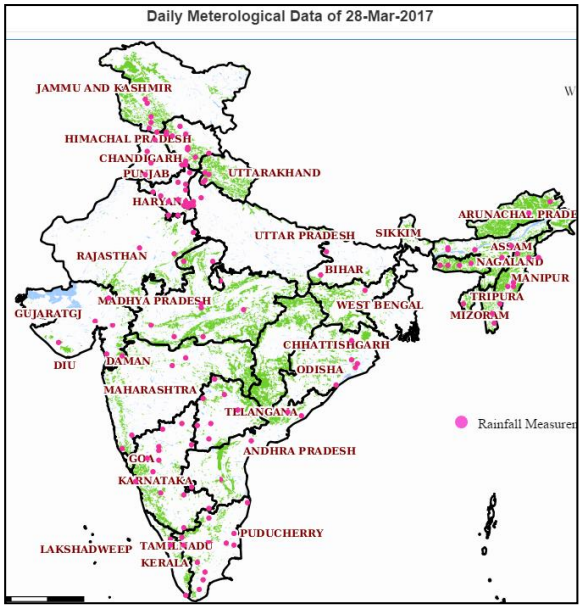


Figure 2.2 (b) Daily Meteorological Data

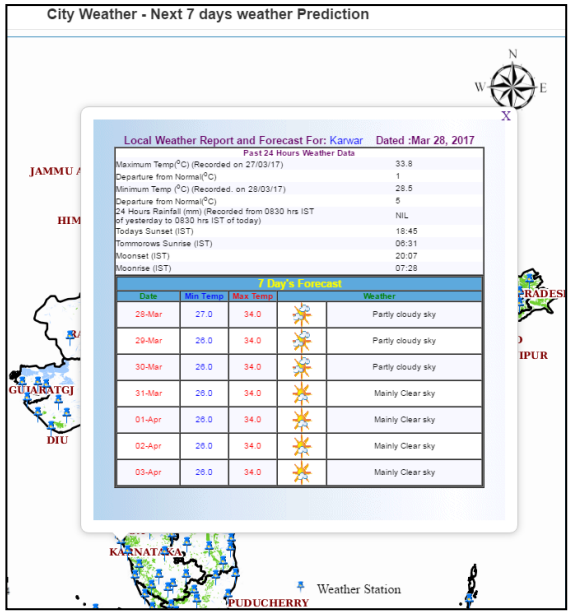


Figure 2.2 (c) City Weather - Next 7 days weather Prediction

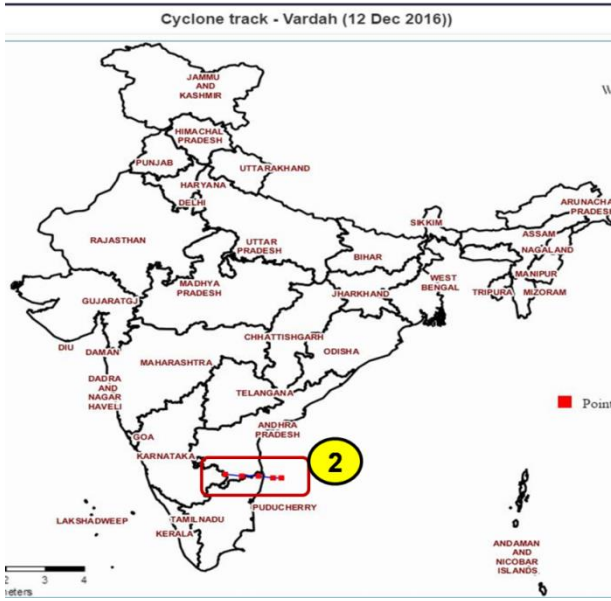


Figure 2.2 (d) Cyclone Track - Vardhah

☞

- Click on *Flood Warnings* to get river water levels and its forecast (figure 2.3 (a)).
- Click on *Storm Surge* to get Storm Surge Bulletin (figure 2.3 (b)).
- Click on *Avalanche Alerts* to display Avalanche Alerts report (figure 2.3 (c)).

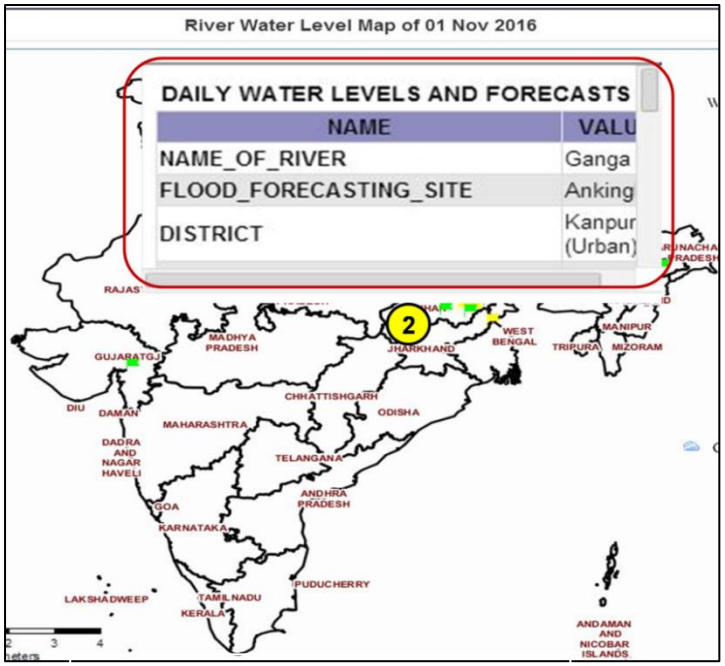


Figure 2.3 (a) River Water Levels

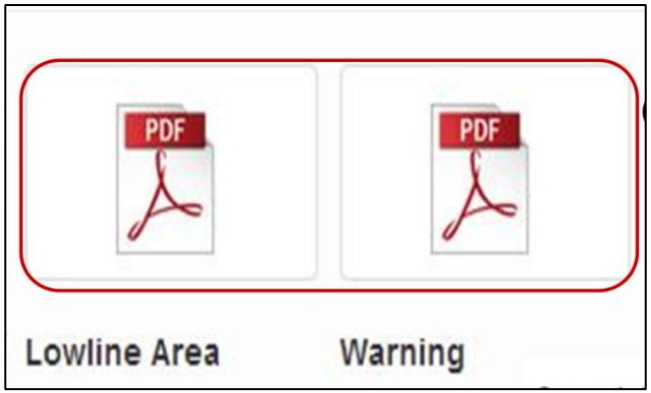


Figure 2.3 (b) Tsunami Warnings

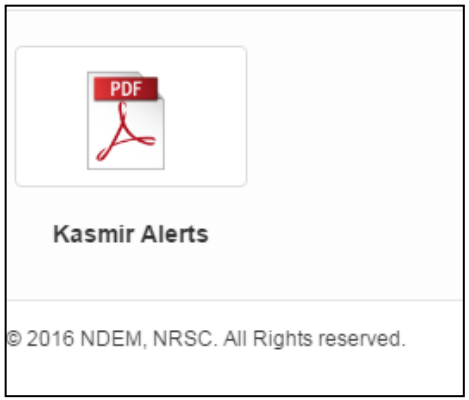


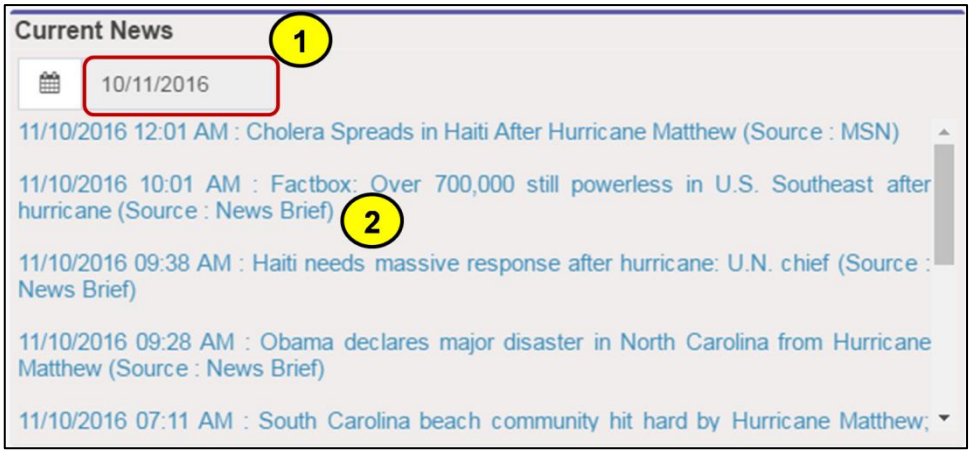
Figure 2.3 (c) Avalanche Services

! River water levels are issued by Central Water Commission upon crossing warning levels. Tsunami alerts/warnings from INCOIS/IMD are integrated as part of Storm Surge Data.

2.3 Current News : This displays disaster related news feed from different authorized national news websites and channels.

☞

- Click on icon to retrieve news for particular date.
- For example, Choose 10/11/2016 from date picker. Disaster related news gets displayed (figure 2.4).



1. Select required date to view Historic data
2. News of corresponding date

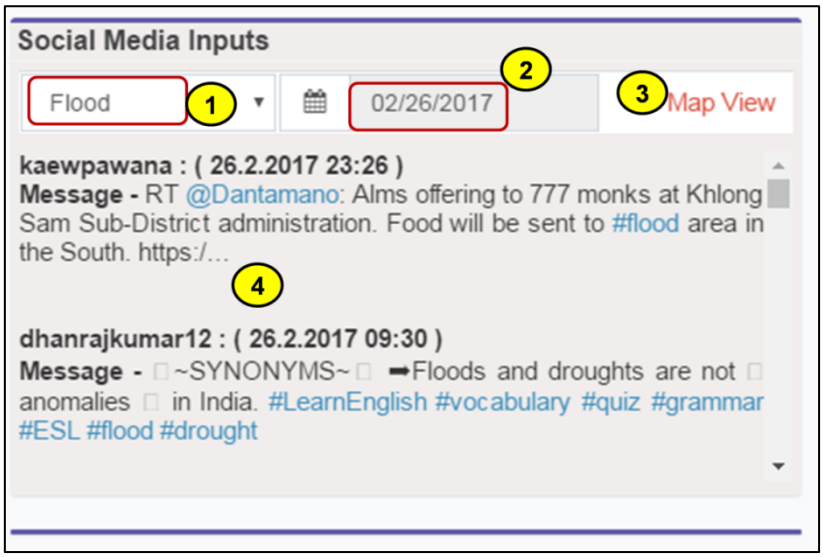
Figure 2.4 Live News Module

! Disaster related news for that particular day gets displayed in the panel as shown in figure 2.4.

2.4 Social media inputs: Social media is a new technology which allows for channel of broadcasting disaster related messages to the public. This module displays tweets related to disasters.

☞

- User can filter tweets based on disaster type and date.
- Click on icon to retrieve tweets for particular date.
- Select Disaster type to filter disaster related tweets (figure 2.5).
- Click on MapView to get tweet locations. User can get details by clicking on tweet icon on map (figure 2.6).



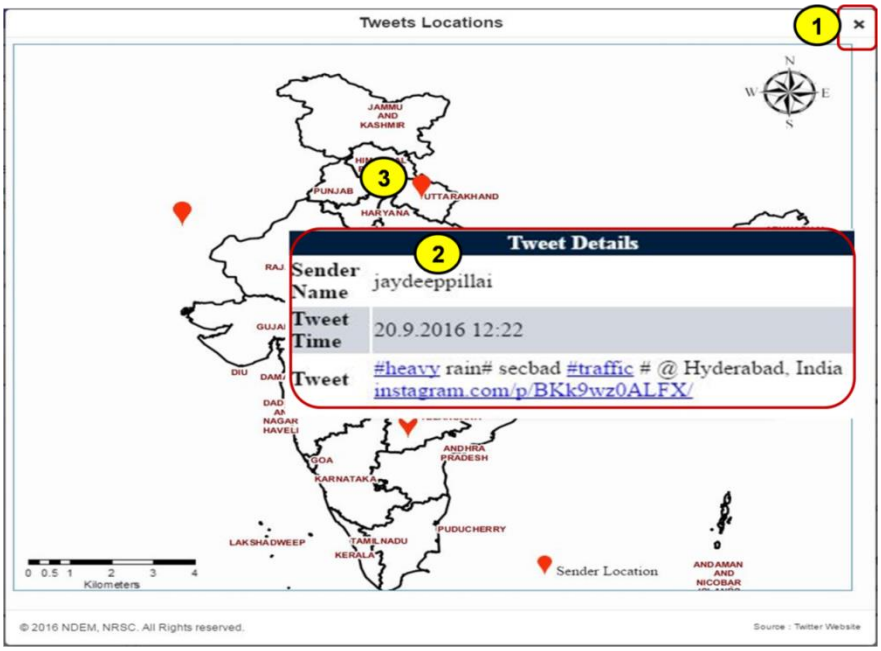
1.Search Tweets Based on disaster specific keywords

2. Search Tweets Based on date

3. Click to view the corresponding Tweets Location on map

4.Tweets on selected keyword/date

Figure 2.5 Social Media Integration



1. Close window
2. Tweet details
3. Tweets locations

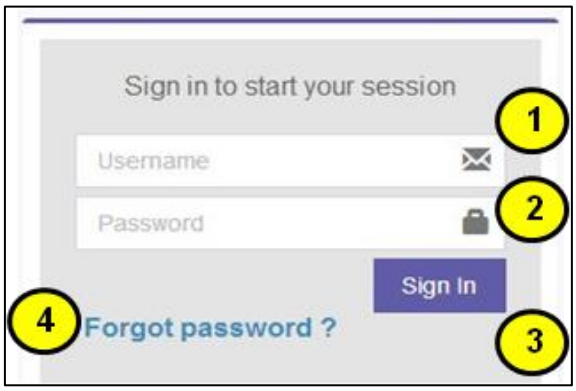
Figure 2.6 Tweets location Window

! Filtering Disaster related tweets for that particular day gets displayed in the panel as shown in figure 2.5 and 2.6.

2.5 Login Panel- Panel to enter the user credentials to access NDEM portal.

☞

- To login to the portal, please enter valid user credentials.
- Authorized officials are provided with user credentials for login.



1. Username text box
2. Password text box
3. Sign In button
4.Forgot password

Figure 2.7 Sign In panel for users

! In case, you are not able to login, kindly check your credentials or contact NDEM admin for help for password recovery!

2.6 Useful Links -Link to the Service agreement and contact details are incorporated in this panel (figure 2.1).

2.7 Mobile Applications Download: Mobile applications can be downloaded by clicking on respective app links as shown in figure 2.1.

2.7 User Manual Download Links: Link to user manual, mobile application manual and brochure are provided in this panel (figure 2.1).

Operational Procedure for NDEM Geoportal

3.1 Objective

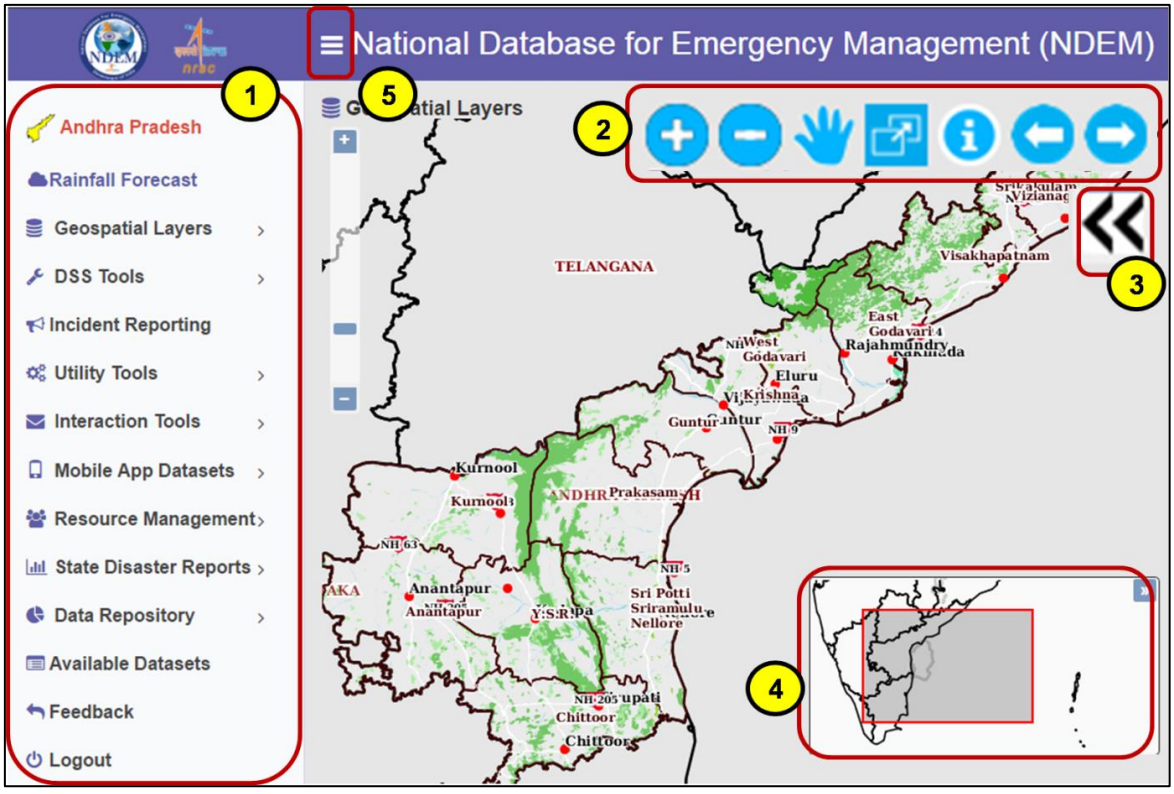
NDEM Version 3.0 web portal is developed to visualize, search and analyze on the geospatial database. This chapter is intended to provide understanding of User interface and step wise procedure to operate Geospatial layers.

3.2 State User Home Page

After validating state user credentials, a customized map viewer of respective state gets zoomed. Map gets zoomed to selected state and current disaster layers(if any) are overlaid by default.

☞

- Enter valid user credentials in login panel (as described in previous chapter)
- Customized map of respective State/UT gets displayed(as in figure 3.1)



1.Table Of Contents
2.Basic GIS Tools (Zoom In, Zoom Out, Pan, Identification, Previous extent, Next extent, Swipe tool)
3.Layer Switcher
4.Interactive Overview map
5.Left menu collapse and expand

Figure 3.1 GIS Viewer (Andhra Pradesh Login)

! In case, you are not able to view map or problems with login, kindly check your credentials or contact NDEM (ndem_admin@nrsc.gov.in) for help for password recovery!

The table of contents shows the main modules of the portal as follows:

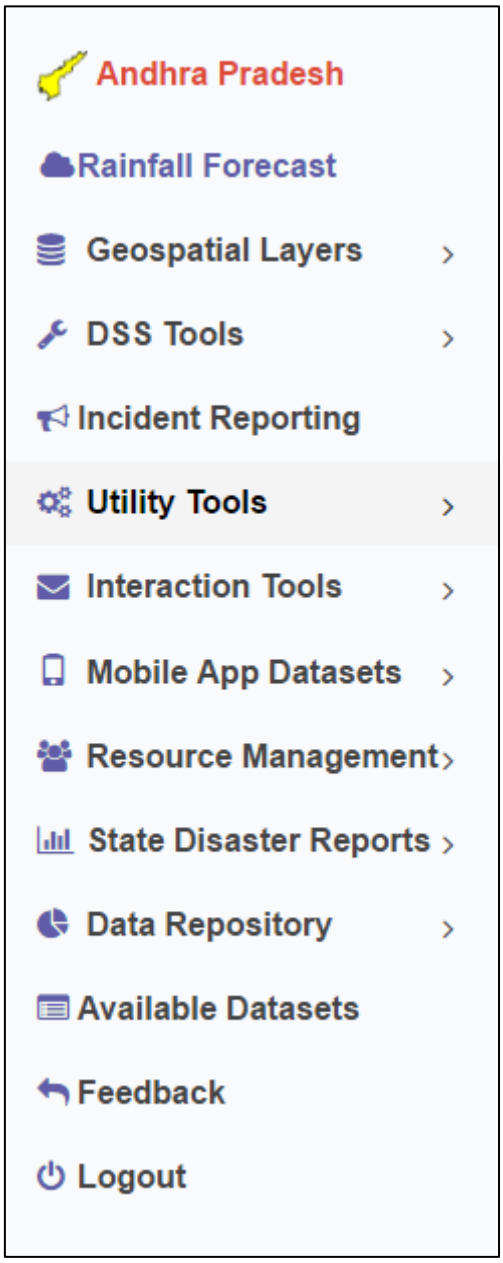


Figure 3.2 Table of Contents

1. GIS data visualization and analysis - Information on disaster products highlighting the current disaster occurred in respective States appears on a single viewer

2. Decision Support Tools – Customized GUI based decision support tools for decision making
3. Incident Reporting-To raise, visualize incidents raised by NDRF officials
4. Utility Tools – GIS based utility tools for data visualization
5. Interaction portal - Dynamic communication & data exchange amongst relief/disaster managers for better co-ordination, live audio/video chat
6. Mobile apps and data visualization - A suite for collecting field data for relief management activities, incident reporting etc
7. Resource Management -Allocation and reallocation of resources among godowns are carried out as part of resource management module
8. Available datasets -Overall description of layer information for a particular state.
9. State Reports - Providing upload/access to disaster damage statistics to disaster manager for response activities
10. Data Repository - Comprehensive outputs of the disaster event in the form of reports and maps for utilization by disaster managers. Also consists of database from India Disaster Resource Network and Health Databases.

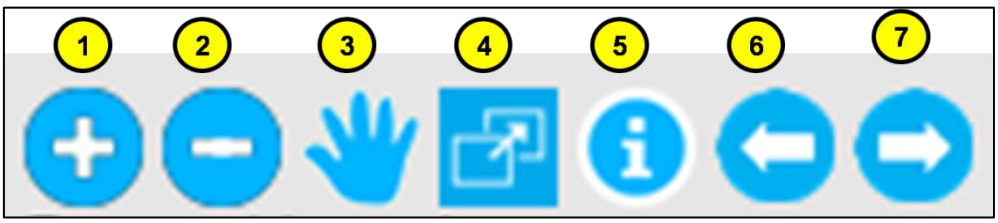
Each of the above mentioned module is explained in consecutive chapters.

3.3 Basic GIS Tools Description

GIS tools such as Zoom-in, Zoom-out, Pan, Identification, zoom to full extent, swipe tool, previous and next extent are available on map viewer (Figure 3.2).

☞

- GIS Tool bar is present on top right corner of the map (figure 3.3). Each tool is explained in brief in consecutive sections.



1. Zoom in
2. Zoom out
3. Pan tool
4. Zoom to Map Extent
5. Identification tool
6. Zoom to Previous Extent
7. Zoom to Next Extent

Figure 3.3 Basic GIS tool bar overview

3.3.1 Zoom-in and Zoom-out tool

If you want to see an area of the map in greater detail, you can zoom in to the map.

Use zoom-out to decrease the zoom level of a map.

☞

- Click on  icon from GIS tool bar.
- Drag a box on map to zoom in to it. When you drag a box on the map after clicking the Zoom In button, the map zooms to the new area.
- Click on  icon from GIS tool bar.
- Select the portion on map which is to be zoomed out (Figure 3.4(a)).

3.3.2 Identification tool

☞

- Click on  icon from GIS tool bar.
- Click the Identify Features button and click on map. When you click a feature with the Identify Features tool, the Identify Results window appears. You can inspect the attributes of the feature from this window.

3.3.3 Zoom to Map Extent Tool

☞

- If you have zoomed in to the map and want to see all of it, you can quickly zoom out to the map to full extent.
- Click on  icon from GIS tool bar.
- Now you can see the full extent of the map.

3.3.5 Pan Tool

☞

- Click on  icon from GIS tool bar.
- Use the pan tool to move the map up, down, to the left, or to the right

3.3.5 Previous Extent

☞

- Click on  icon from GIS tool bar.
- Previous Extent tool takes users to previous map extent

3.3.6 Next Extent

☞

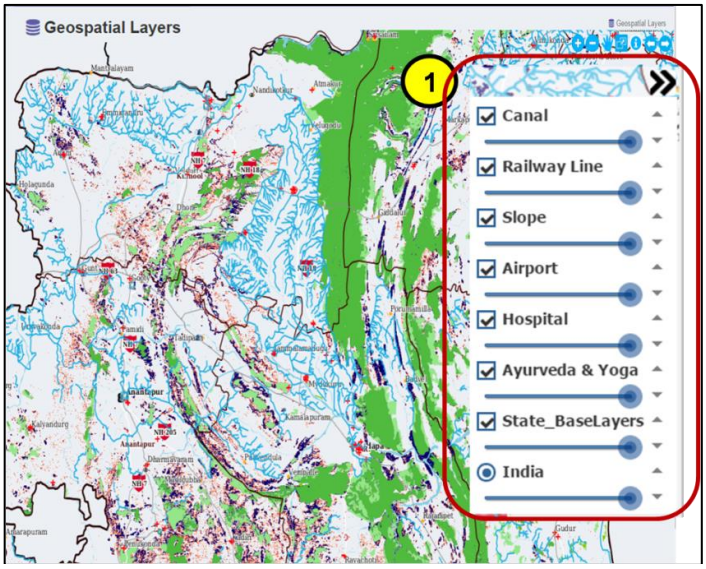
- Click on  icon from GIS tool bar.
- Next Extent tool takes users to Next map extent

3.3.7 Active Layers Tab

Active layers tab displays a table of contents for the map. This allows the user interface to switch between Base Layers and to show or hide Overlays. By default the switcher is shown minimized on the right edge of the map, the user may expand it by clicking on the handle.

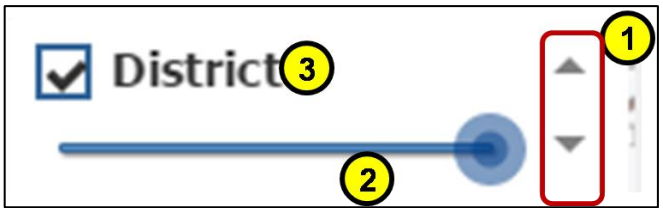
☞

- Click on  icon from GIS tool bar.
- List of layer names that are overlaid on the map is displayed (Figure 3.10).



1. Active Layer Tab with layer toolbar

Figure 3.4 Active Layer Tab with layer toolbar



1. For Moving the Layer Up and Down
2. Opacity Tool
3. Layer Name

Figure 3.5 Layer Toolbar

3.3.7.1 Layer Toolbar:

☞

- Drag the ▾ icon from Layer Toolbar(shown in figure 3.5) in Layer switcher to move the layer up or down.
- User can adjust the opacity of layer by dragging opacity icon(Figure 3.6 (a) and Figure 3.6(b))

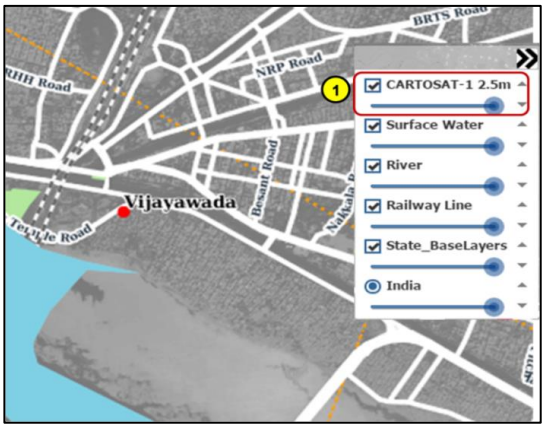


Figure 3.6 (a) Actual Image

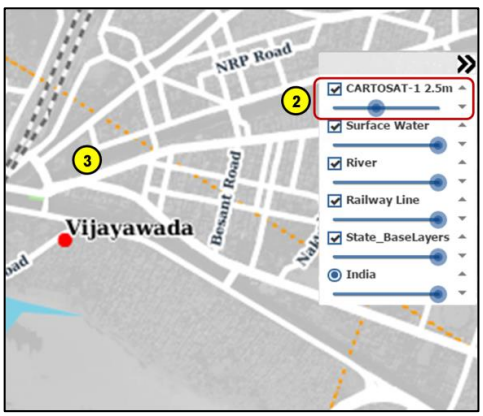
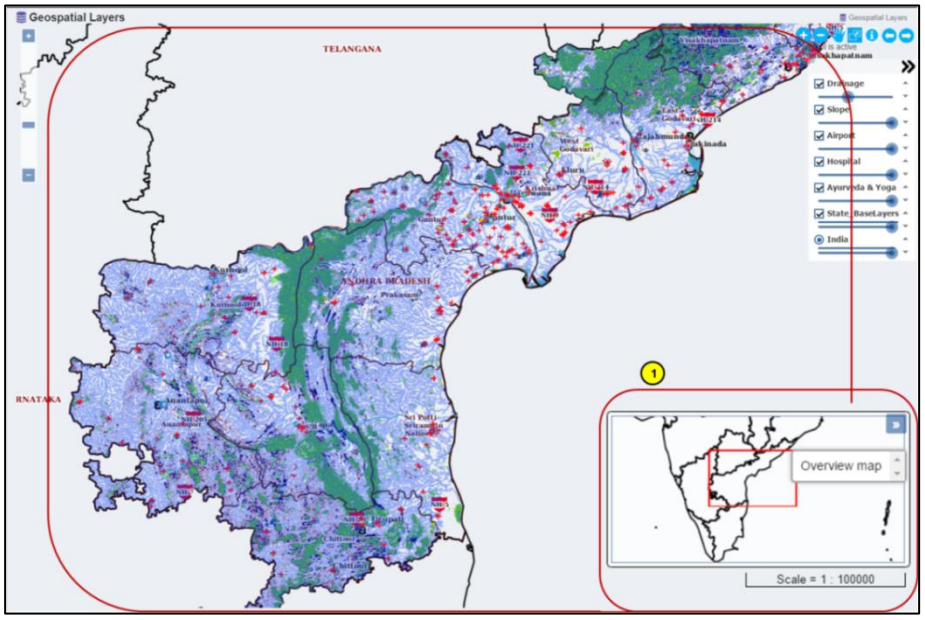


Figure 3.6(b) Image with reduced opacity

3.3.8 Overview map

☞

- Click on the » icon to get current extent of the map within the context of a larger area.(Figure 3.7)



1. Overview map

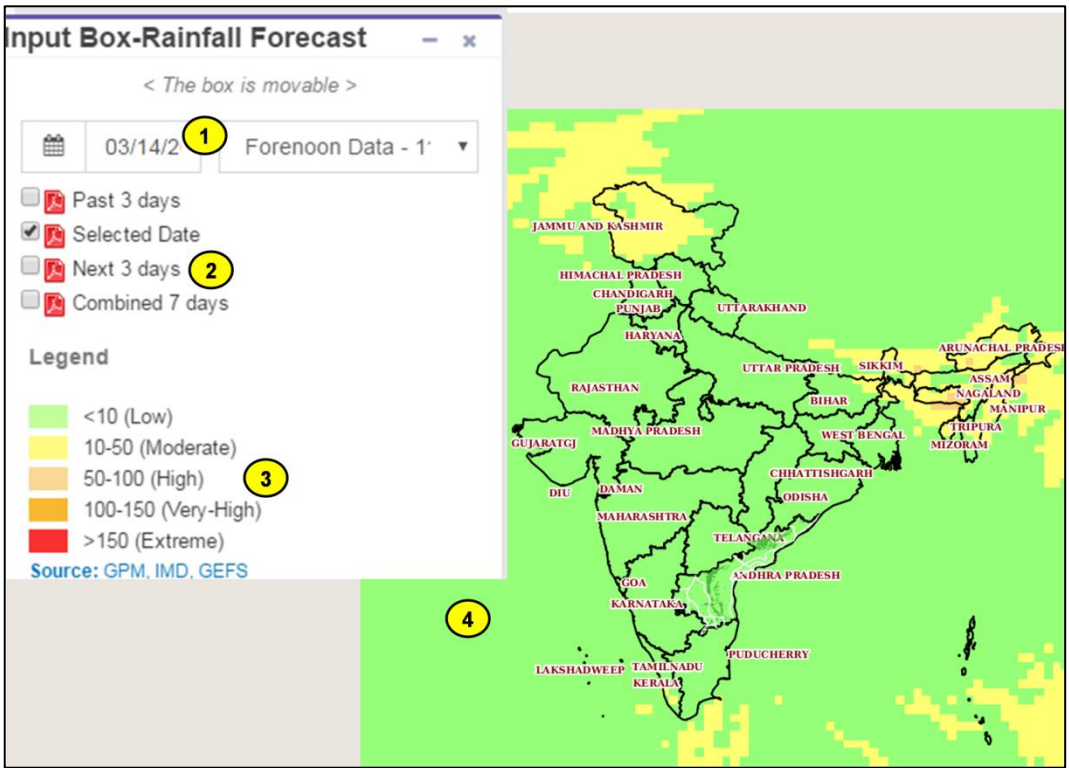
Figure 3.7 Overview map

3.4 Rainfall Forecast

Modeling and simulation procedure might help to facilitate management and limit the impact of disasters. Rainfall forecasting is one of the most effective and important methods of flood damage mitigation methods. This module consists Rainfall forecasting system available for next seven days.

☞

- Click on "Rainfall Forecast" from Left Panel.
- Input box of Rainfall Forecast gets displayed as shown in figure 3.8.
- Select Date and Session (Forenoon, Afternoon, Evening).
- Layer for respective date and session is overlaid on map.
- Click on PDF icon to visualize Rainfall forecast for past 3 days, next 3 days etc.



1. Select Required Date and Timespan
2. Click on pdf icon to view Rainfall Forecast pdf
3. Rainfall Forecast - Legend
4. Forecast Visualization on map

Figure 3.8 Rainfall forecast Module

! Rainfall Forecast data is generated using GEFS (Rainfall Forecast) data given by TRMM &FEFS.

Exploring Geospatial data

4.1 Objective :

NDEM consists of comprehensive multi-scale geospatial database for entire country. NDEM Version 3.0 Geospatial layers are explained in detail as part of this chapter.

4.2 Geospatial Layers

Geospatial data in NDEM are categorized in different categories like Base layers, Thematic layers, Infrastructure layers, Meteorological data, 10K Data, 2K data and Raster data, High Resolution Data etc.

☞

- Click on "Geospatial Layers" from Table of Contents (figure 4.1) .

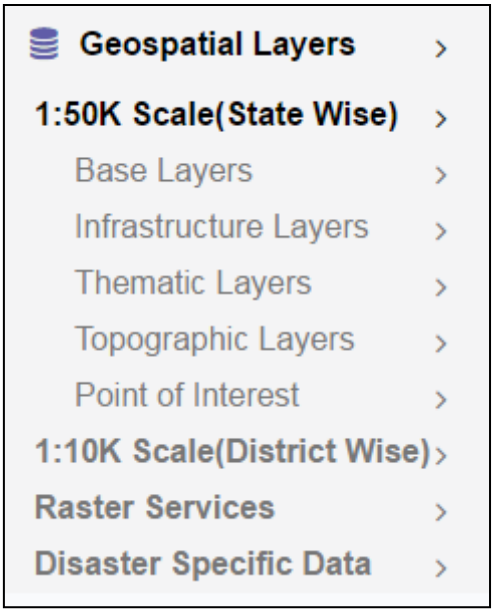
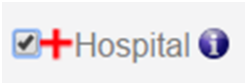


Figure 4.1 Geospatial Layers in Table Of Contents

4.2.1 1:50,000 (State wise)

At 1: 50000 scale, data is organized at State level and is further subdivided into Base layers, Thematic layers, Infrastructure layers, Topographic layers and Point of Interests.

☞

- Click on "1: 50,000 Scale" in "Geospatial Layers" from Table of Contents.
- Go to full extent of map (figure 4.2 (a)), add Railway line from Base Layers tab, Hydrology from Thematic layers tab, hospitals from Infrastructure tab (Figure 4.2 (b)).
- The icon beside Hospital from Infrastructure layers tab 

(figure 4.3(a)) is the icon for showing legend and meta data of the hospital (figure 4.3 (b)).

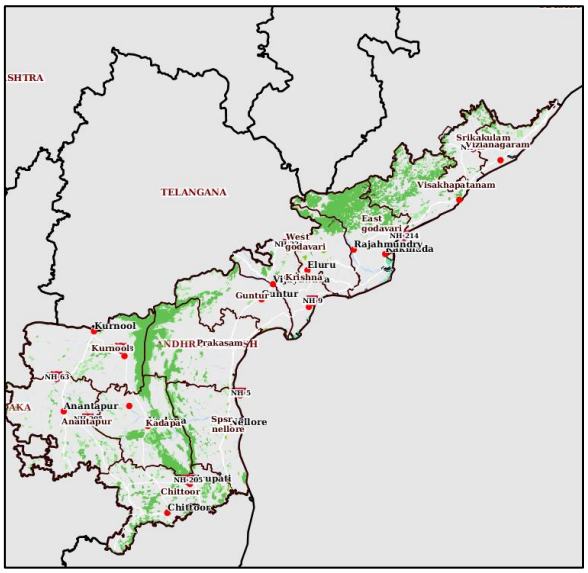


Figure 4.2 (a) 1:50000 Scale Visualization

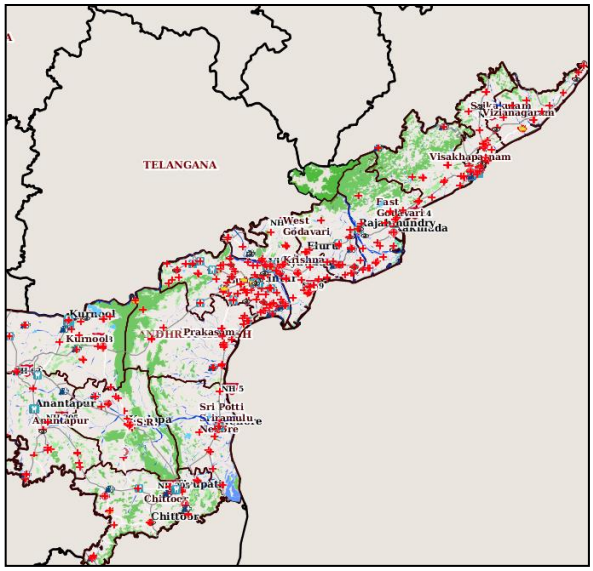


Figure 4.2 (b) Visualization of layers at 1:50000 Scale after adding facilities

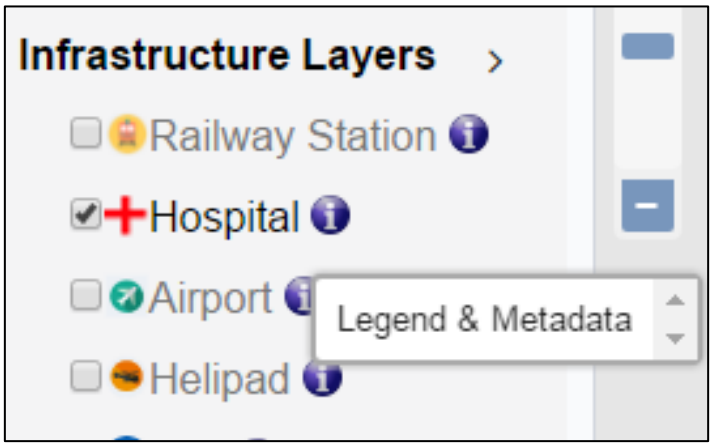


Figure 4.3 (a) Legend and Meta data Icon

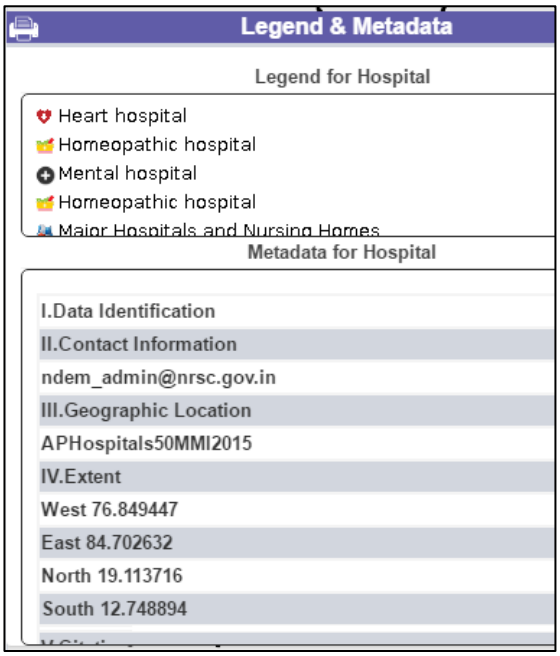


Figure 4.3 (b) Legend and Meta data for Hospital

☞

- Now, zoom the map to focus Krishna District, then goto Vijayawada add Hospitals from "Health Services" subcategory from Point of Interest.

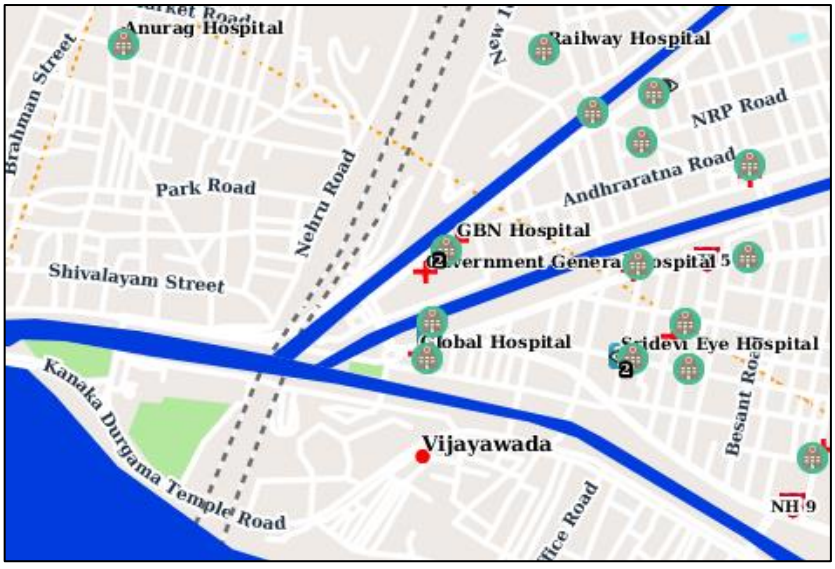


Figure 4.4 Adding Point of Interest to Map

4.2.2 1:10000 Scale Data

At 1: 10000 scale, data is organized at district level and is further subdivided into respective districts in the state.

☞

- Click on "1: 10000 Scale" in "Geospatial Layers" from Table of Contents.
- User can see that 1:10000 Scale data is segregated District wise. Select Guntur district and overlay Infrastructure, Land Use and Settlement area (figure 4.5)

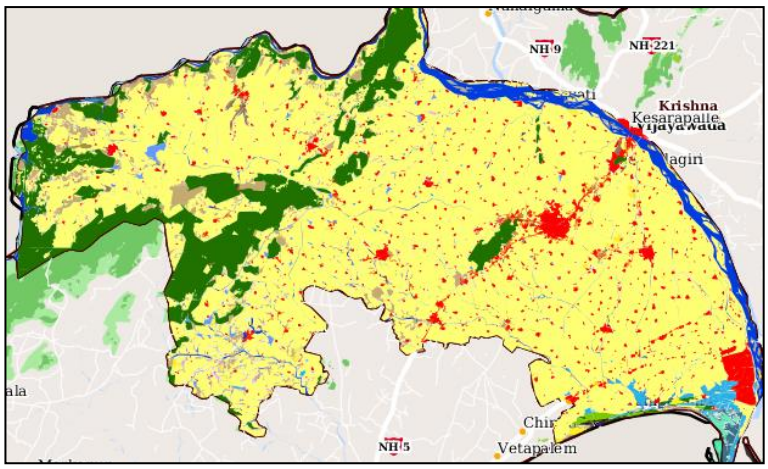


Figure 4.5 1:10000 Scale Data Visualization

4.2.3 Raster Services

☞

- Click on "Raster Services" in "Geospatial Layers" from Table of Contents.
- Select LISS IV & C-1 2.5 m from Raster Services (figure 4.6).
- Click on  (swipe tool) to active swipe tool. Swipe tool functionality is explained in detail in next section.

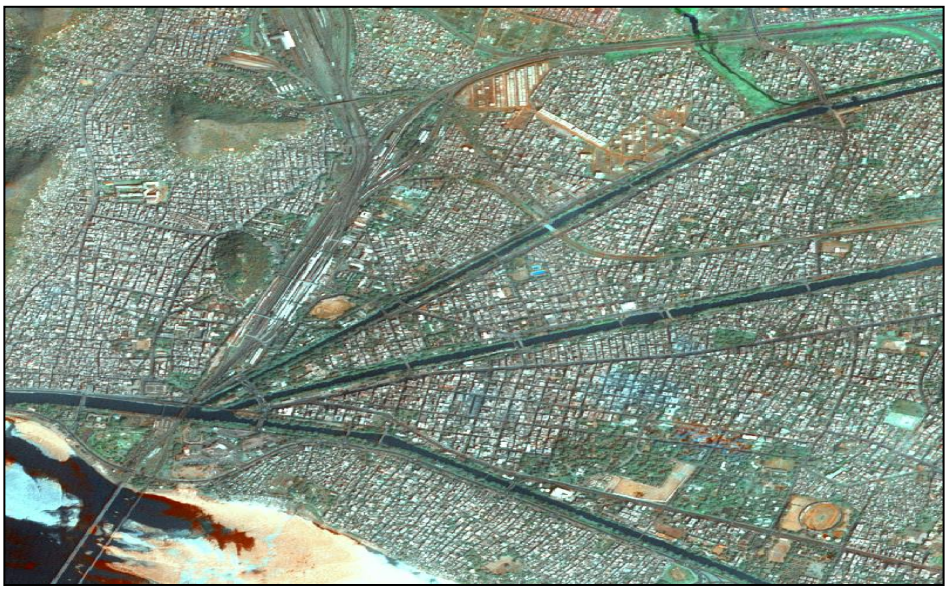
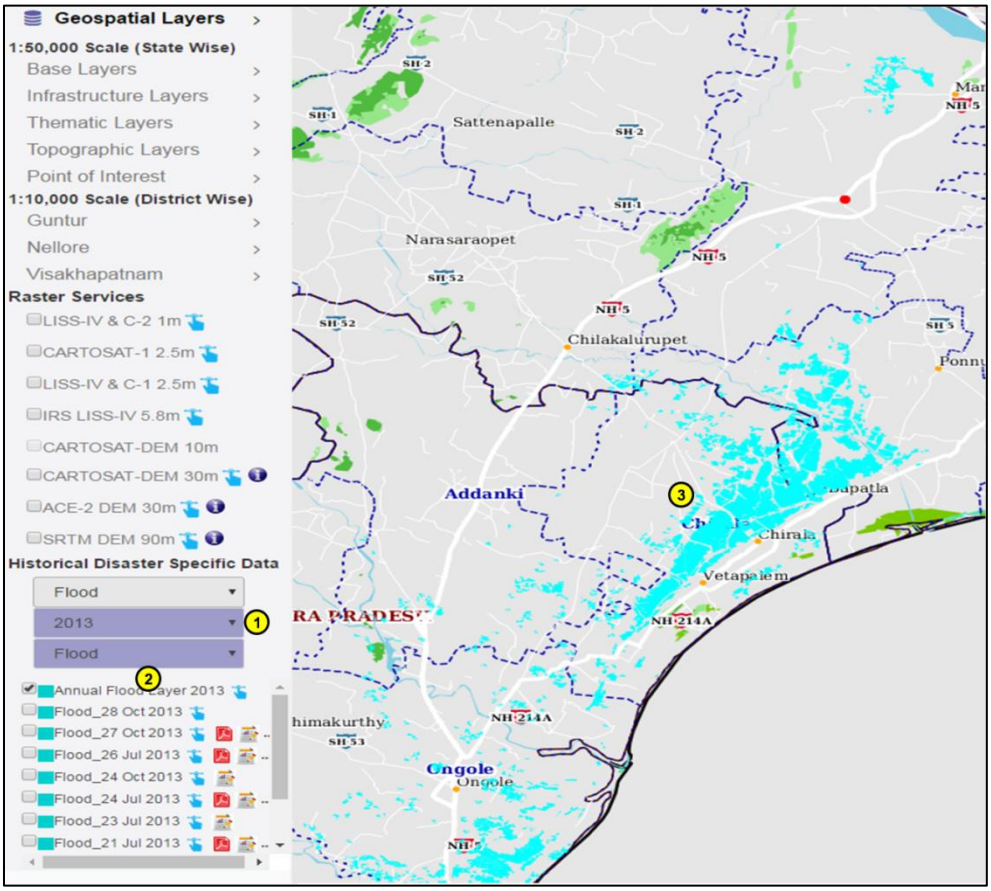


Figure 4.6 Geospatial Raster Layer Details

4.2.4 Disaster specific services

☞

- Click on "Disaster Specific Data" in "Geospatial Layers" from Left Panel.
- User has to select disaster type, year and event to get respective disaster specific data (Figure 4.7).
- Click on (swipe tool) to active swipe tool. Swipe tool bar is visualized on map as seen in figure 4.8.
- Drag the swipe tool to perform pre and post disaster analysis.

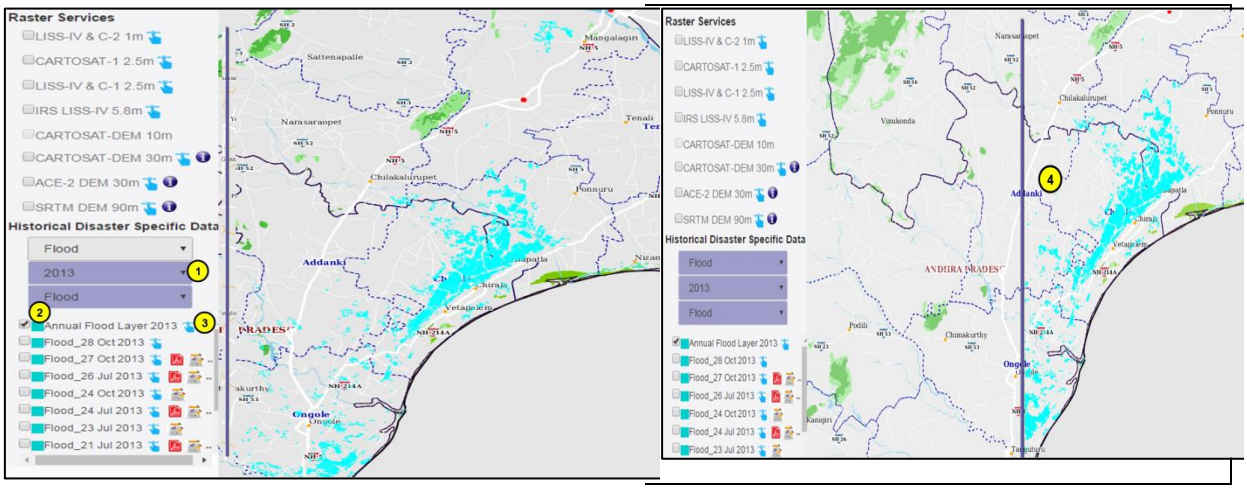


1.Select Disaster type/ Year / Event

2. Select require Disaster specific layer

3.Selected Flood layer on map

Figure 4.7 Disaster Specific Layer Query Builder



1. Select Disaster/ Year / Event
2. Select require Disaster specific layer
3.Activate Swipe tool to swipe the selected layer on map
4.Remaining part of layer after swiping the Selected Flood layer on map

Figure 4.8 Disaster Specific Layer -Swipe tool functionality

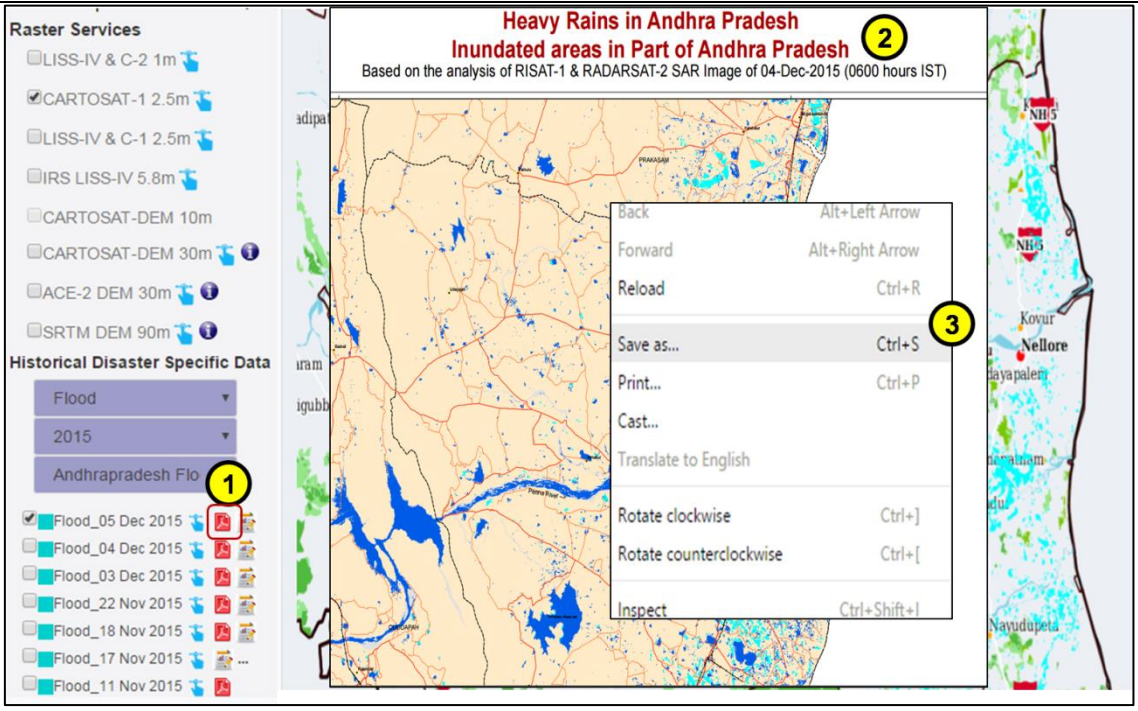
4.2.4.1 Downloadable Products:

User can also download disaster specific map and report for particular disaster.

4.2.4.1.1 Download Map:

☞

- To get downloadable map product of disaster, user has to click on map icon beside particular disaster. Map gets visualized as PDF in a separate window (figure 4.9)

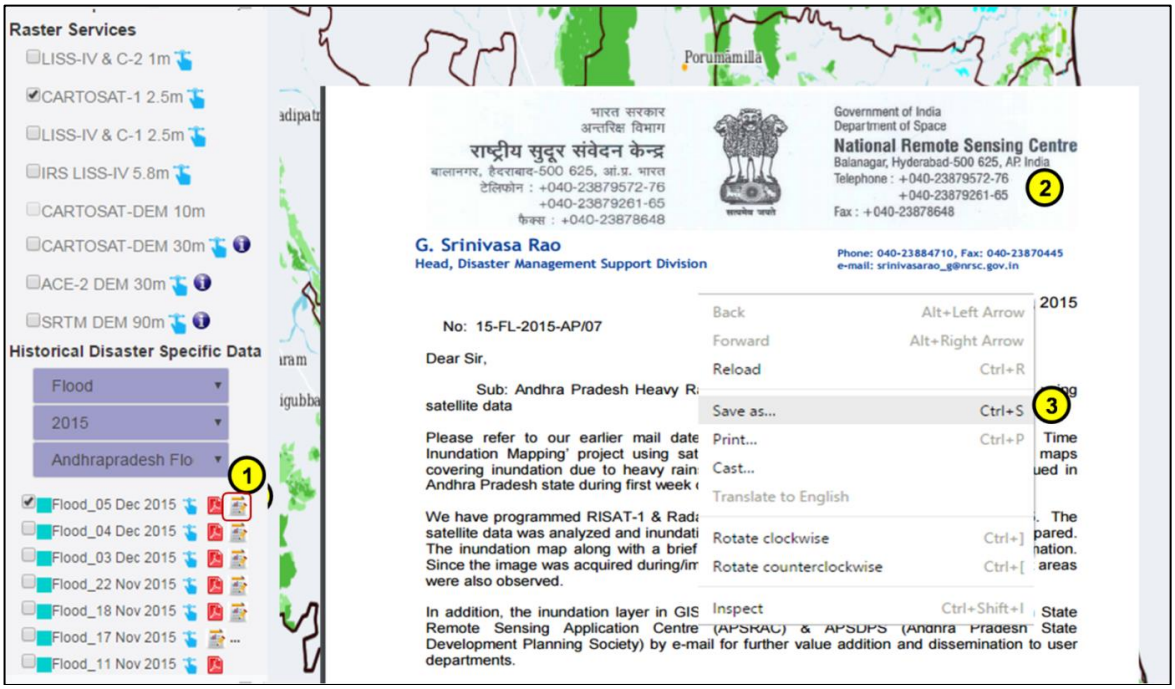


1. Click on Download Map Icon.

2. Map will be opened in New window
3. Right Click and save the file to the required location
Figure 4.9 Download Map

! User can download the map by right click and saving it!

4.2.4.1.2 Download Report: User can download the report with disaster specific geospatial data which are hosted on NDEM geo portal. User can click on the download Report icon (figure 4.10).



1. Click on Download Report Icon.
2. Report will be opened in a new window
3. Right Click and save the file to the required location

Figure 4.10 Download Report

☞

- To get downloadable report of disaster, user has to click on icon beside respective disaster. Report gets visualized as PDF in a separate window (Figure 4.10)

! User can download the report by right click and saving it!

Chapter 5

Performing spatial analysis

5.1 Objective

During disaster response phase, latest information from the field plays an important role. Using the static data sets coupled with the current field information disaster managers can visualize the incident over time; track the activities of responders using various utility and decision support tools. This chapter focuses on giving clear functionality and usage of various utility and decision support tools.

5.2 Decision Support Tools

Decision Support Services (DSS) are designed and developed into a graphical user interfaces with the integrated data services as the input. The portal provides four DSS tools i.e., Proximity tool, Network Analysis tool, Add Layer Tool, Layer Analysis tool.

☞

- DSS Tools can be accessed by selecting "DSS Tools" module from Table Of Contents (figure 5.1)

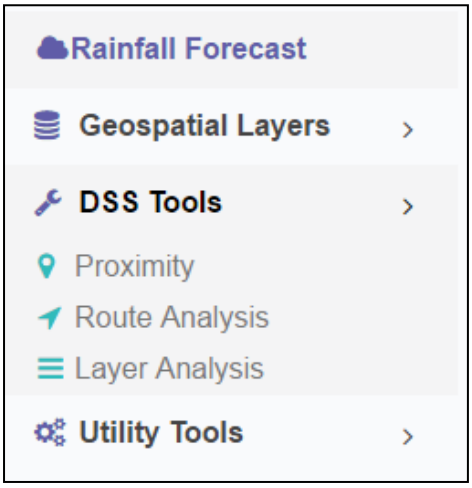


Figure 5.1 Decision Support Tools in Table of Contents

5.2.1 Proximity

Proximity Tool provides optimal search for emergency facilities such as hospitals, shelters, rail/bus stations etc. within the user defined buffer distance.

☞

- Select "Proximity Tool" from DSS Tools Module.
- Center location can be selected either by entering location coordinates or by pointing location on map.
- Zoom to Vijayawada and select center location.
- Enter buffer distance (say 1km) and select Automotive Stores from Commercial Centers (figure 5.2).

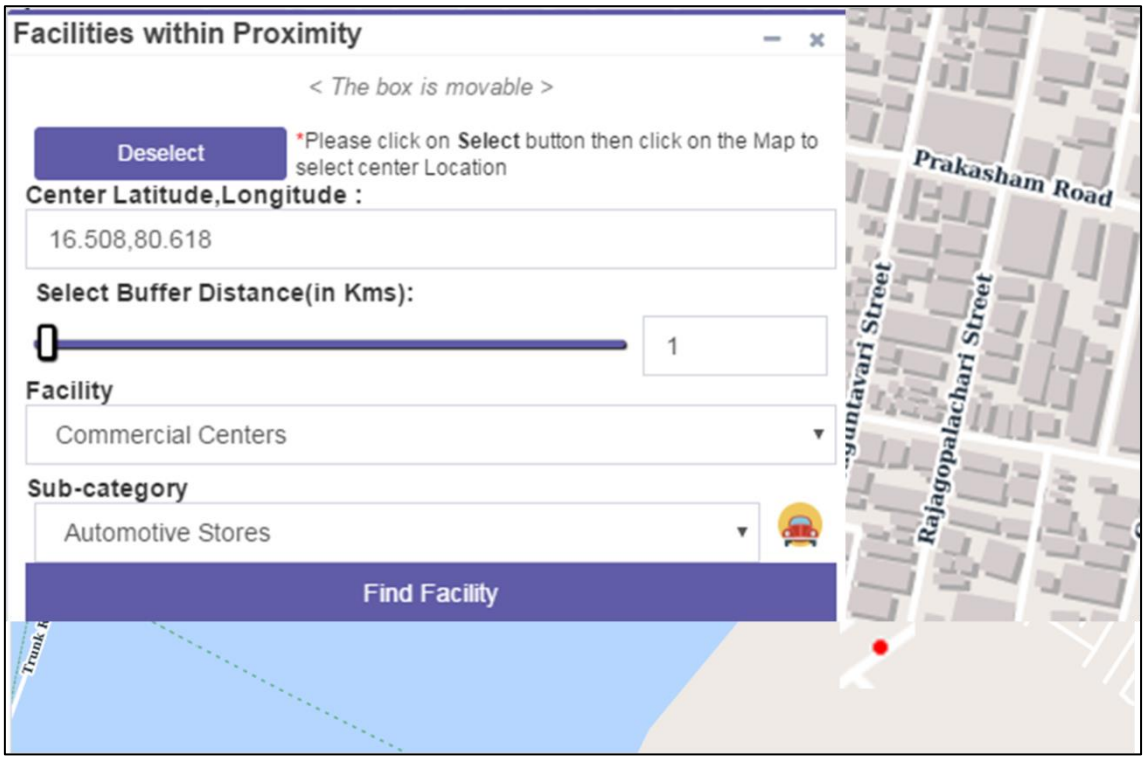


Figure 5.2 Proximity Tool Input box

- Click Find Facility after selecting required Facility and sub-category.
- User can visualize the available list of emergency facilities in user selected buffer area (figure5.3).

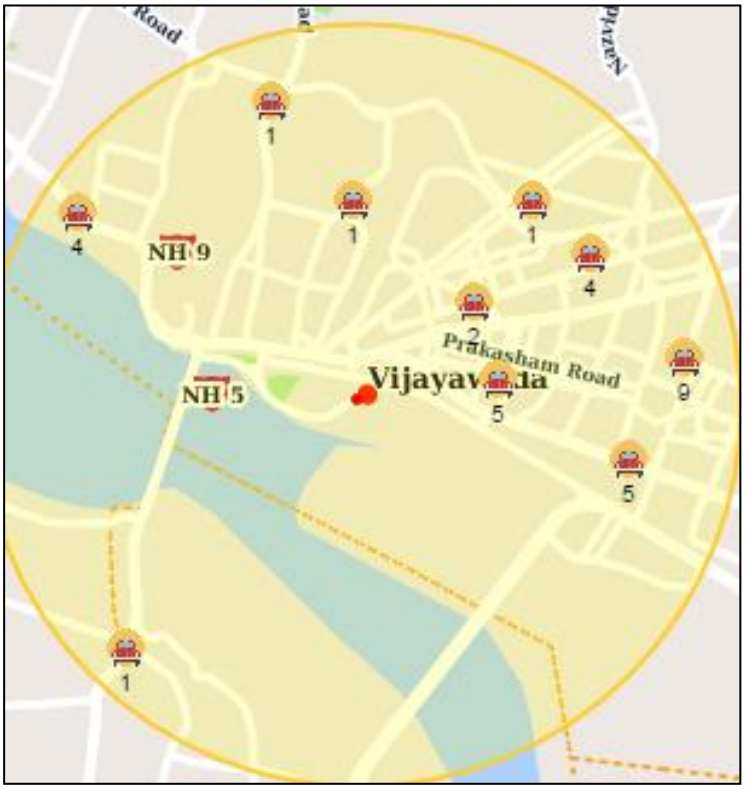


Figure 5.3 Proximity Buffer Distance and Visualization of Emergency Facilities

☞

- Proximity tool displays Available automotive stores in the form of printable list (figure 5.4).
- By Clicking on specific emergency facility name, details of respective facility get displayed.

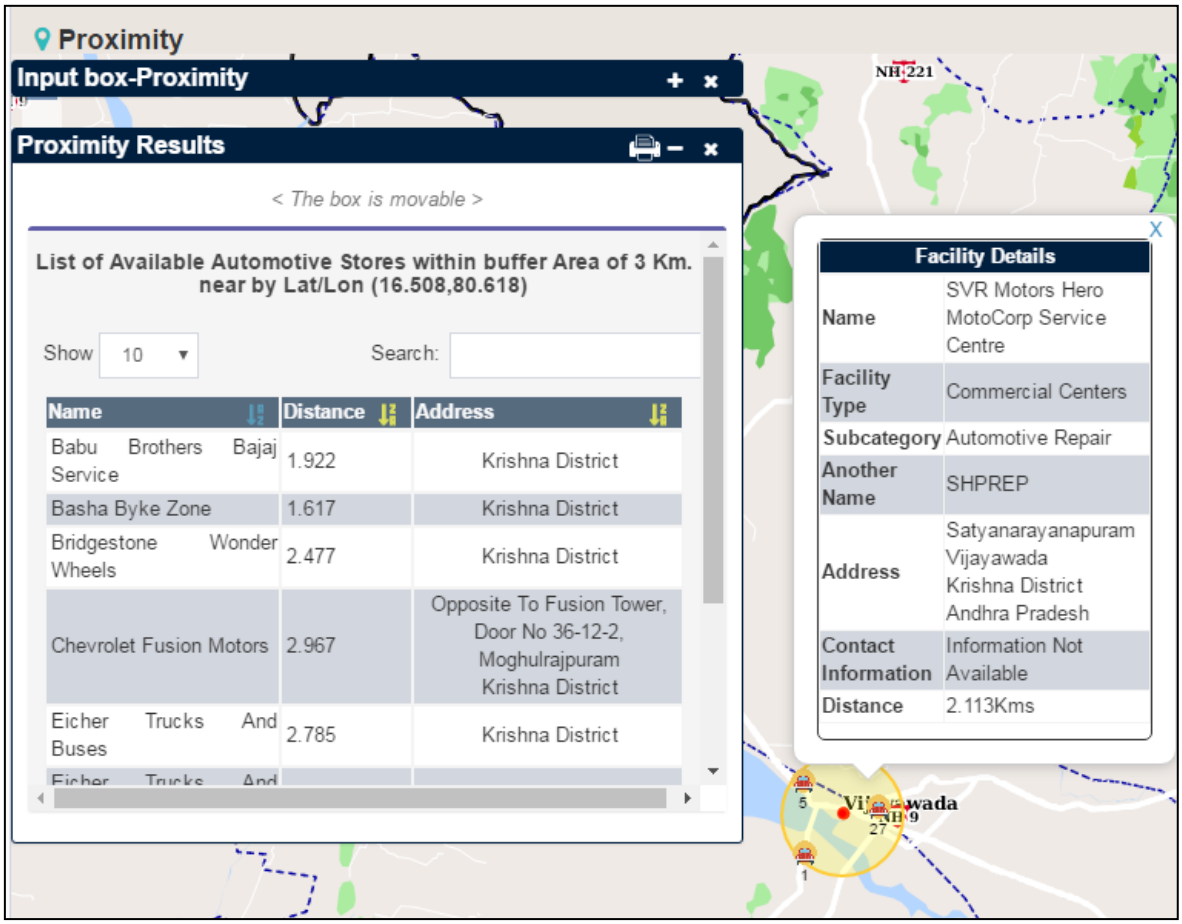


Figure 5.4 List of available Emergency Facilities within Buffer area

5.2.2 Network Analysis Tool

Network analysis tool facilitates the user to find out the optimal route between emergency facility and user interested location/disaster site with road network data.

☞

- Select "Network Analysis Tool" from DSS Tools Module.
- Source and Destination location can be selected either by entering location coordinates or by pointing location on map (figure 5.5).
- User can add obstacle (Line/ Polygon) in between source and destination location.

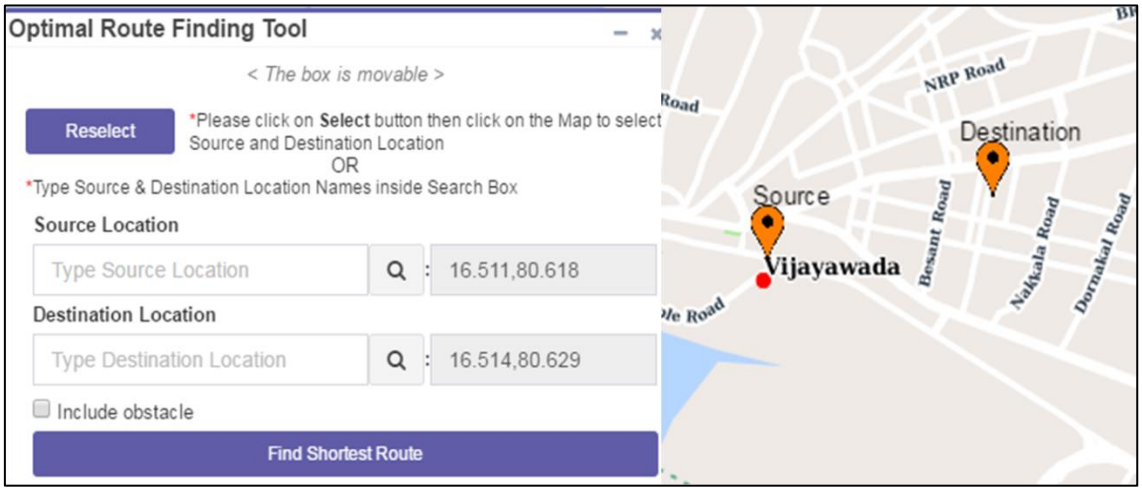


Figure 5.5 Optimal Route Analysis - Input Box

☞

- By clicking on "Find Shortest Route", user can visualize minimum distance as well as minimum time taking route from source to destination (figure 5.6).
- User can get printable report of optimal route

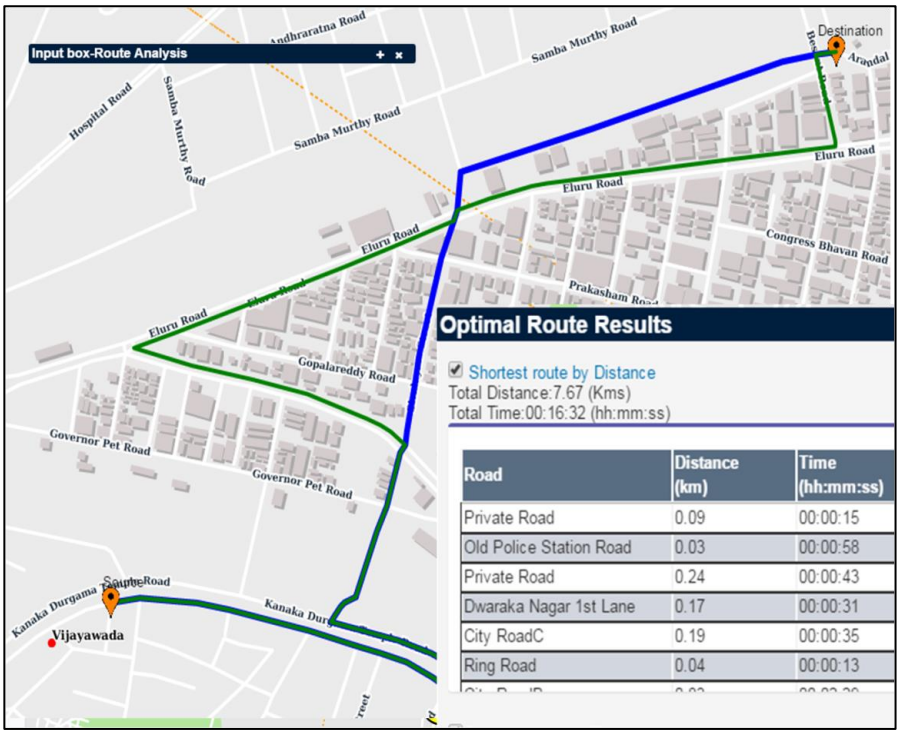


Figure 5.6 Route analysis Tool output without obstacle

☞

- User can include obstacle by clicking on "Include Obstacle" check box in input box (figure 5.5). Optimal route by excluding the obstacle path is displayed (figure 5.7).

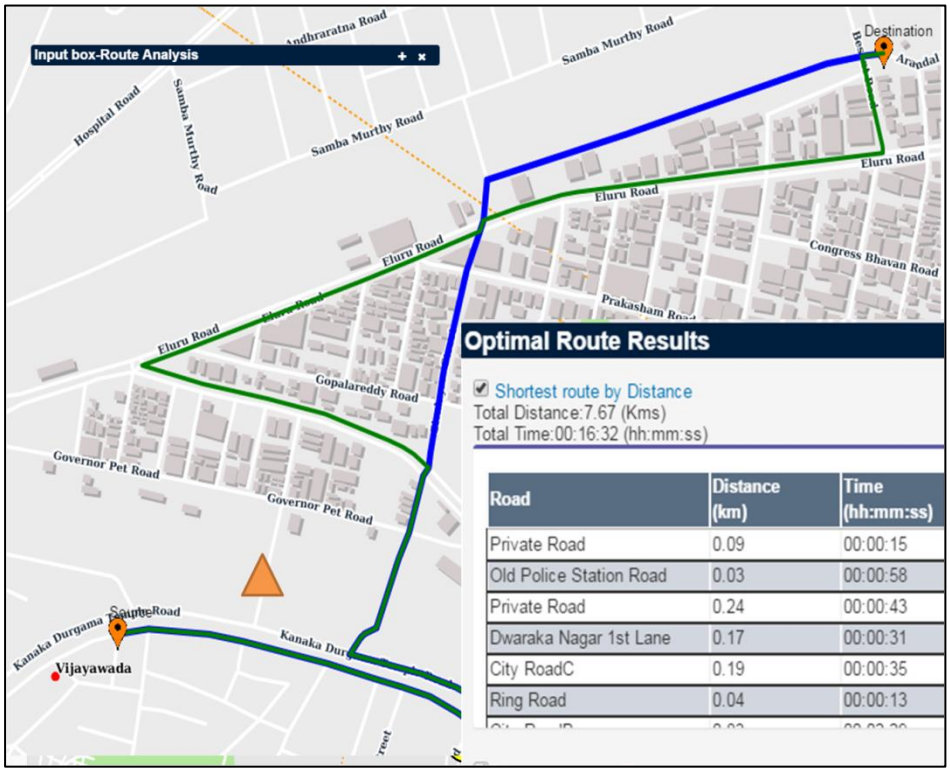


Figure 5.7 Route analysis Tool output with obstacle

5.2.3 Layer Analysis Tool

Layer Analysis tool is another DSS tool that has been developed and implemented for multilayer analysis. User can select a vector layer for which taluk/district wise area coverage statistics needs to be generated. Statistics can be generated for full vector layer as well as for the layer area inside a user drawn polygon (AOI).

☞

- Select "Layer Analysis Tool" from DSS Tools Module.
- Select admin boundaries, disaster type, year for analysis (Figure 5.8). Say select admin boundaries as Taluk, Disaster type as Flood, Year as 2015 and Flood type as Fllod_03_Dec_2015 (figure 5.8).

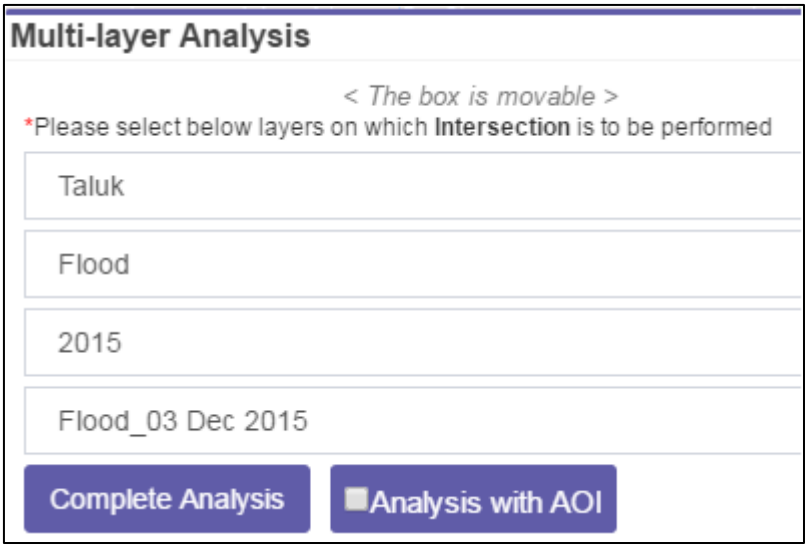


Figure 5.8 Multi-layer analysis Input

☞

- Complete Analysis by performing intersection of user selected layers gets displayed (Figure 5.9).

☞

- Complete Analysis can also be performed on Area of Intersection drawn by user (Figure 5.10).

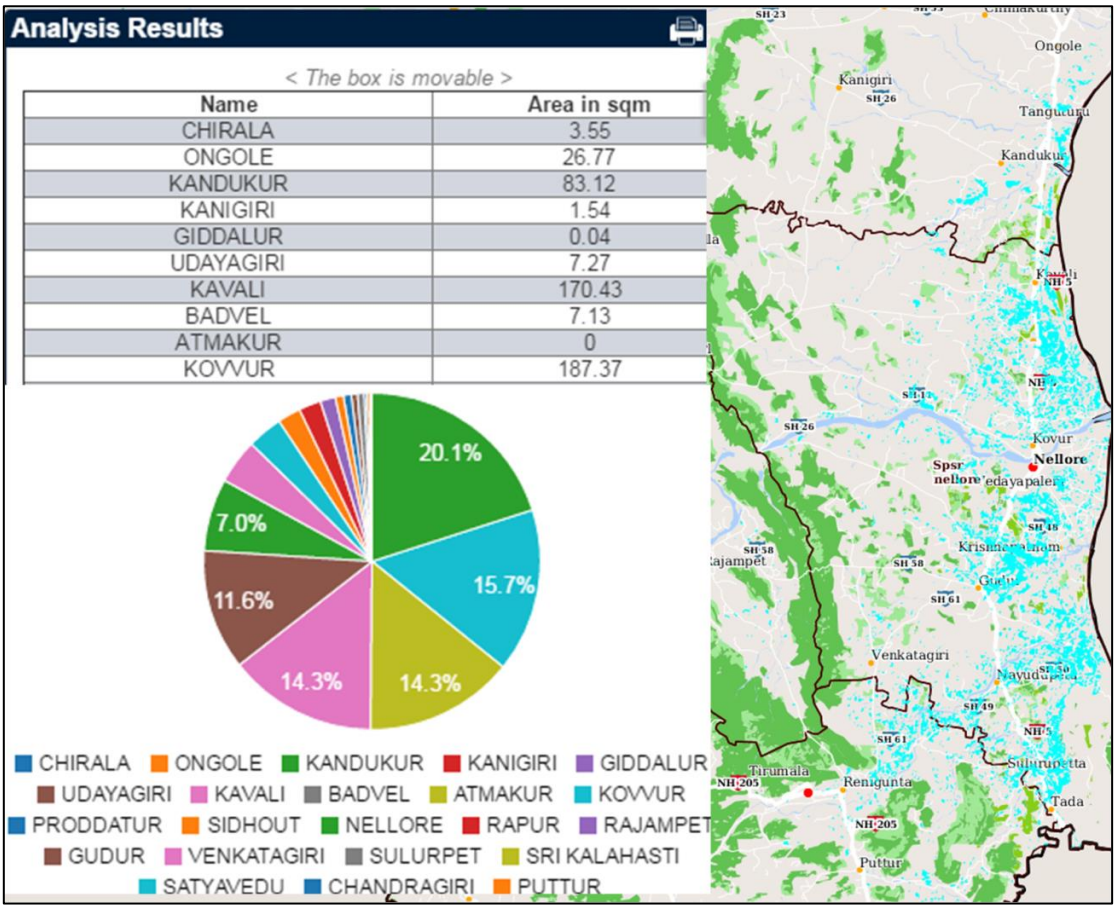


Figure 5.9 Layer Analysis without obstacle

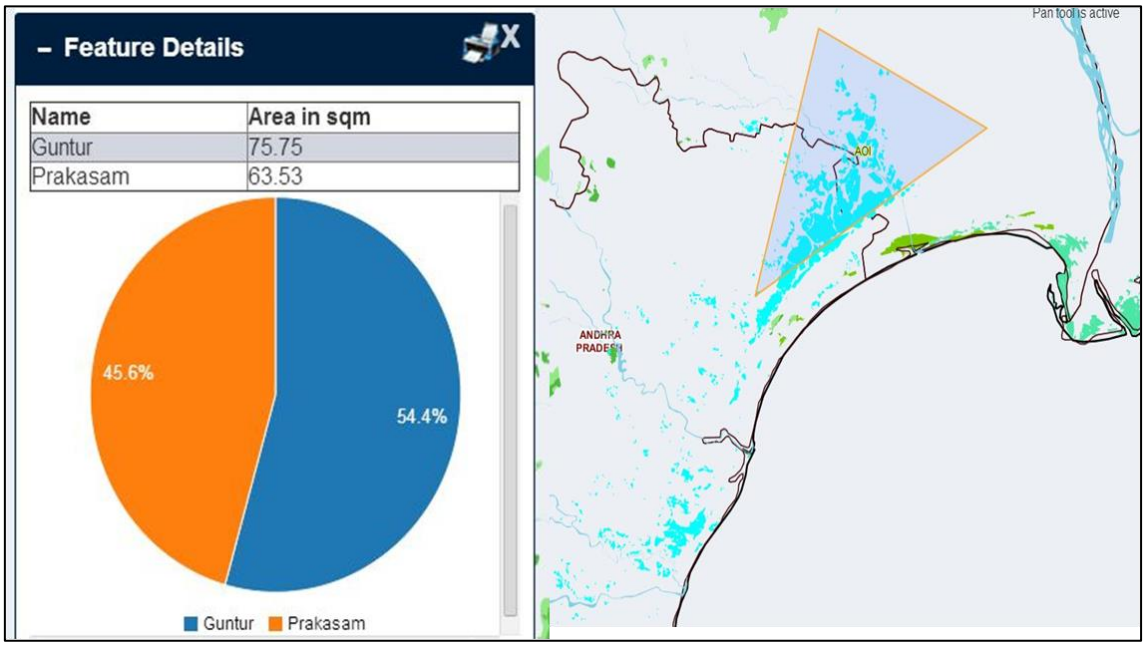


Figure 5.10 Layer analysis output with Area of Interaction

5.3 Utility Tools

NDEM Portal provides four utility tools namely, Distance measurement, Area measurement, Geospatial search and add layer tool.

☞

- Select "Utility Tools" from Table of Contents (figure 5.11).

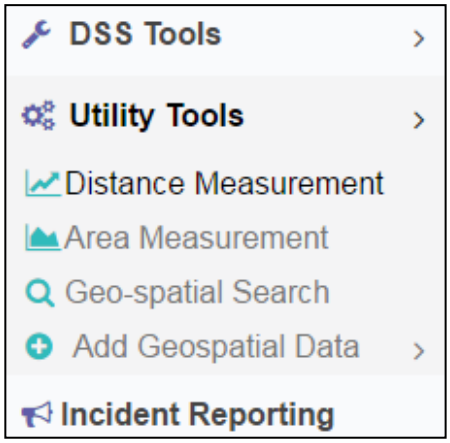


Figure 5.11 Utility Tools from Table of Contents

5.3.1 Distance Measurement tool

Using this tool, the shortest/optimal distance between disaster event and facility location has to be analyzed at near real time.

☞

- Select "Distance Measurement" from Utility Tools.
- Click on source destination and drag on map layer up to required length and double click to mark the end of line.
- Distance/length of user drawn line is displayed (Figure 5.12).

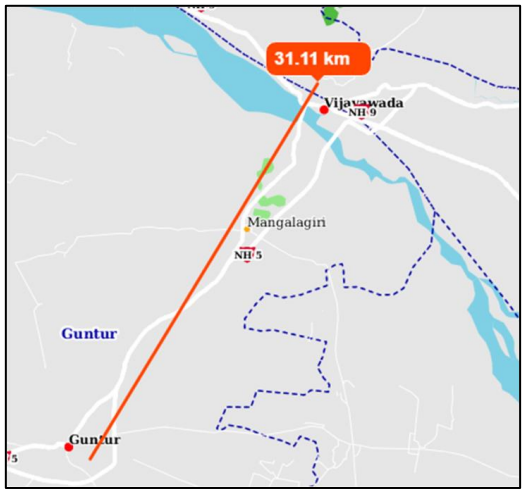


Figure 5.12 Distance Measurement

5.3.2 Area Measurement tool

☞

- Select "Area Measurement" from Utility Tools.
- Drag the mouse on map and draw a polygon(as shown in figure 5.13)
- Area of user drawn polygon gets displayed.

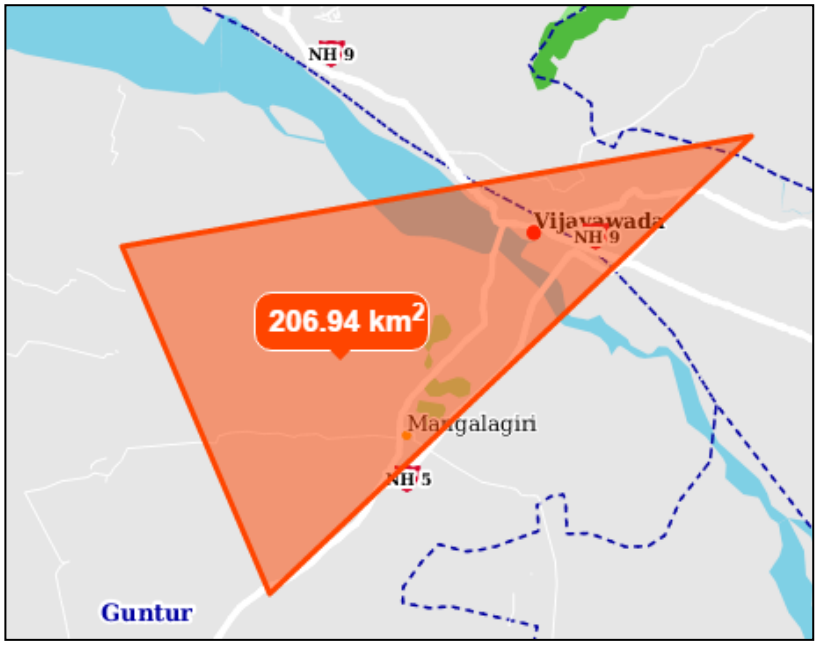


Figure 5.13 Area Measurement

5.3.3 Geospatial Search Tool

Search tool is used to search any place, district, taluk, village, any point of interest etc. on map.

☞

- Select "Geospatial Search Tool" from Utility Tools.
- Enter required place of interest in search field.
- Lookup auto-completion is enabled so that users can select items from a dynamic list.
- Map gets zoomed to user selected place (figure 5.14).

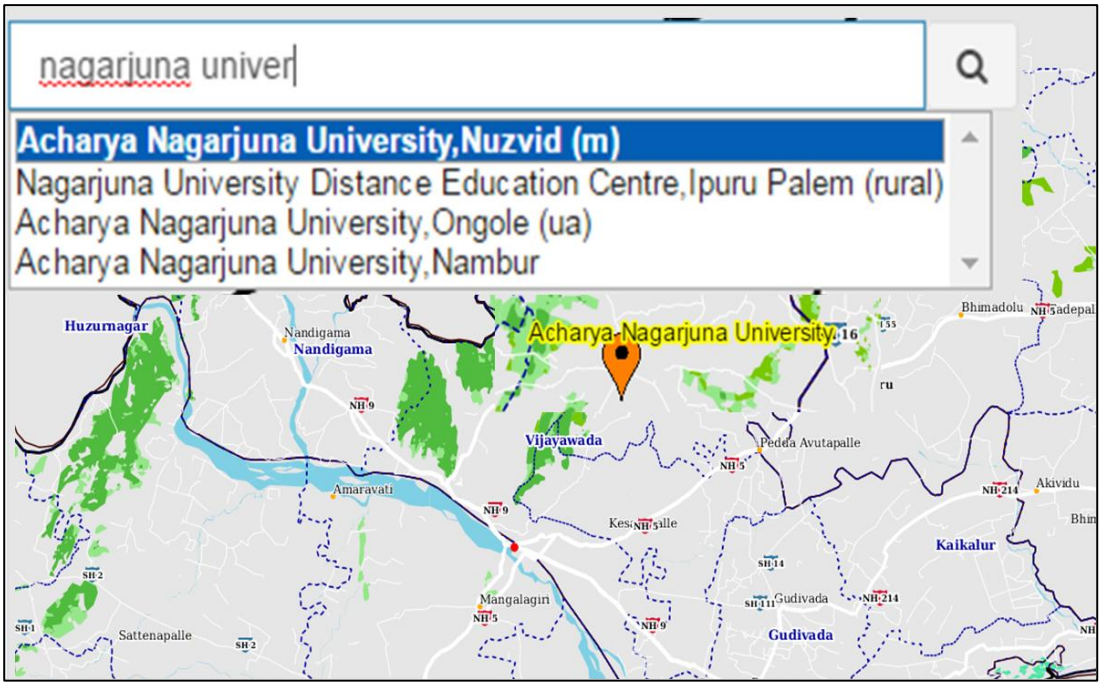


Figure 5.14 Utility Tool – Geospatial Search

5.3.4Add Layer Tool

Add layer tool is a utility tool which can be used to overlay a user's shape file on the map. Users can select their own shape-file and upload to overlay the file on the map for temporally visualization purpose.

☞

- Select "Add Geospatial Data" from Utility Tools.

5.3.4.1 Add Vector Data

☞

- Select "Vector" from Add Geospatial Data.
- User has to upload Vector layer in the form of Shape File, KML, GML or Geo-Json to visualize it on map (figure 5.14 and figure 5.15).

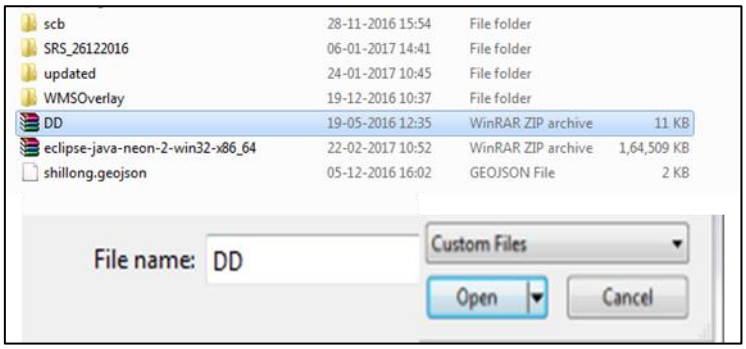


Figure 5.15 (a) Add Geospatial Data – Vector Upload data Screen

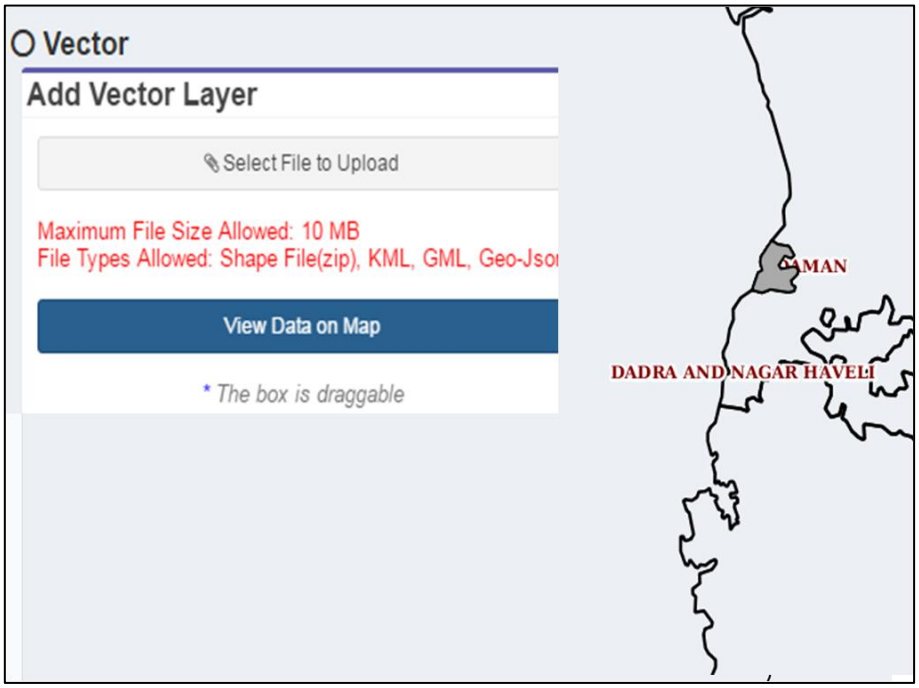


Figure 5.15 (b) Add Geospatial Data - Vector

5.8.4.2 Add Raster Data

☞

- Select "Raster" from Add Geospatial Data.
- User has to upload Raster layer in the form of IMG, TIFF to visualize it on map (Figure 5.16).

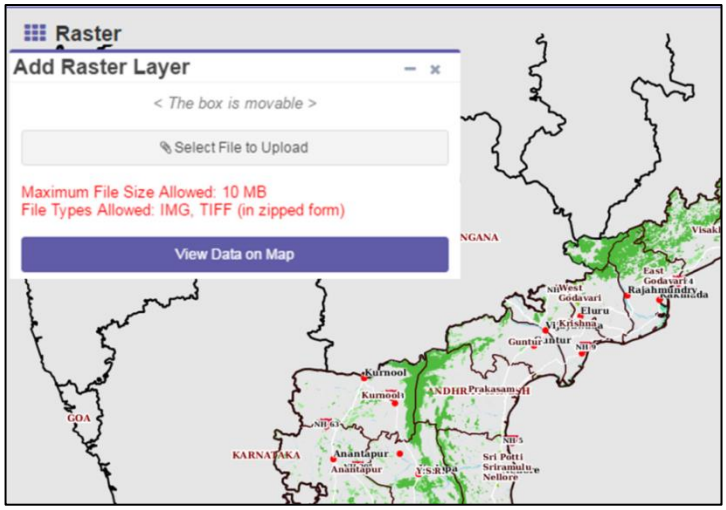


Figure 5.16 Add Geospatial Data - Raster

5.8.4.3 Add WMS layer

☞

- Select "WMS" from Add Geospatial Data.
- User has to specify WMS URL and Layer name to overlay it on map (figure 5.18). Say, WMS URL be http://ndem.nrsc.gov.in/geoserver_heavy/ndem50k/wms and layer name as ndem50k:apdrainage50wris2011
- User specified layer gets overlaid on map (figure 5.19).

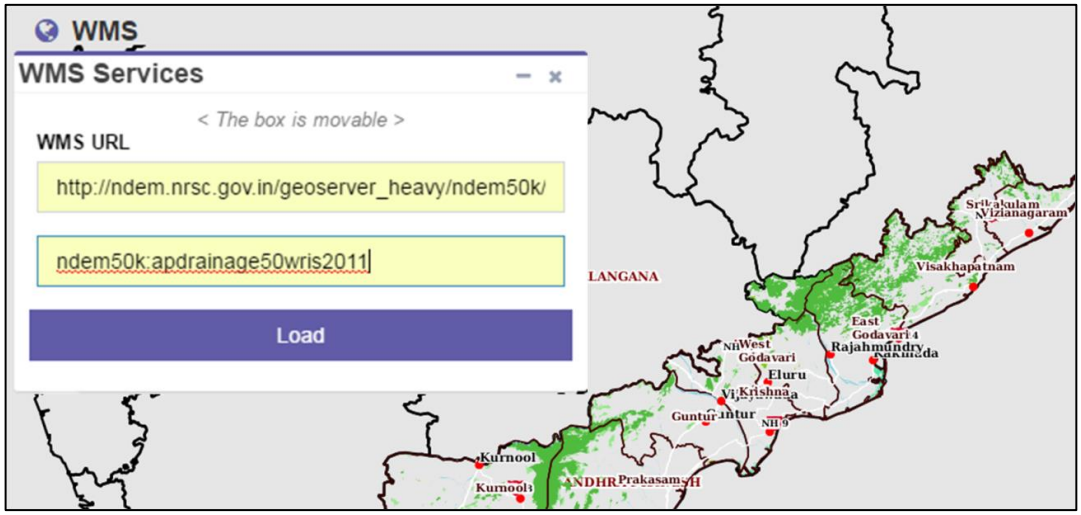


Figure 5.17 Add WMS Layer - Input box

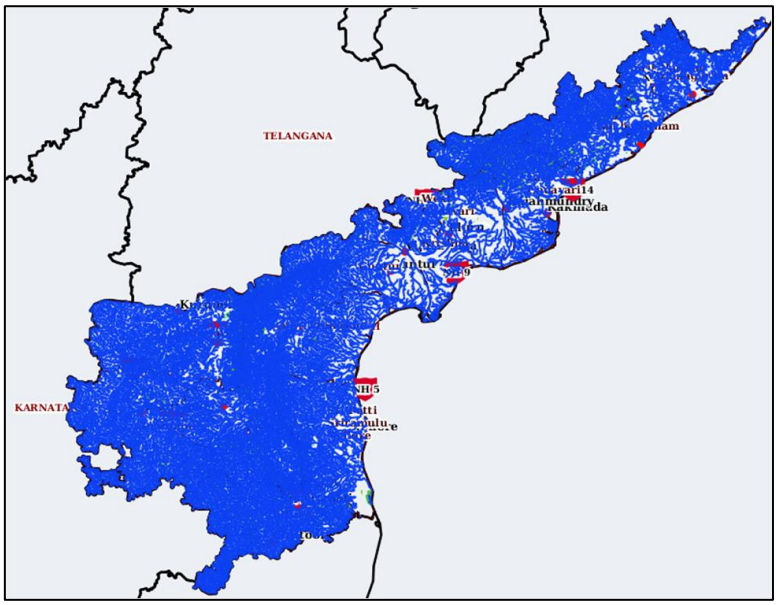


Figure 5.18 Add WMS Layer output

Exploring Mobile App DataSets

6.1 Objective

Any relief and rescue operations start from the incident reporting followed by the communication to the respective authorities, analysis of the magnitude of the event etc. NDEM geo-portal has improvised incident reporting mechanism and various mobile applications. This chapter aimed at describing various modules customized for incident reporting, visualization of mobile app datasets, resource management, communication mechanisms and data repository.

6.2 Incident Reporting

The purpose of the incident report is to intimate the geo-location of the incident along with other incident details such as time, place of occurrence, etc., to the authorized officials for taking immediate actions.

☞

- Select "Incident Reporting" from Table of Contents.

6.2.1 Report Incident:

User can report incident from mobile applications, or via SMS or through portal. In this section, we will learn, how to report incident through portal.

☞

- Incident can be reported by entering details of incident (location coordinates, date, time, details of reporter etc.) and clicking "Report Incident" button (figure 6.1)
- Location coordinates can either be entered manually or can be captured by selecting a point on map.
- Reported incident appears in Blue color. When NDRF officials forward the incident, the color turns to Green. Once, the incident has been approved by NDRF Headquarters, incident bubble turns to Red color.

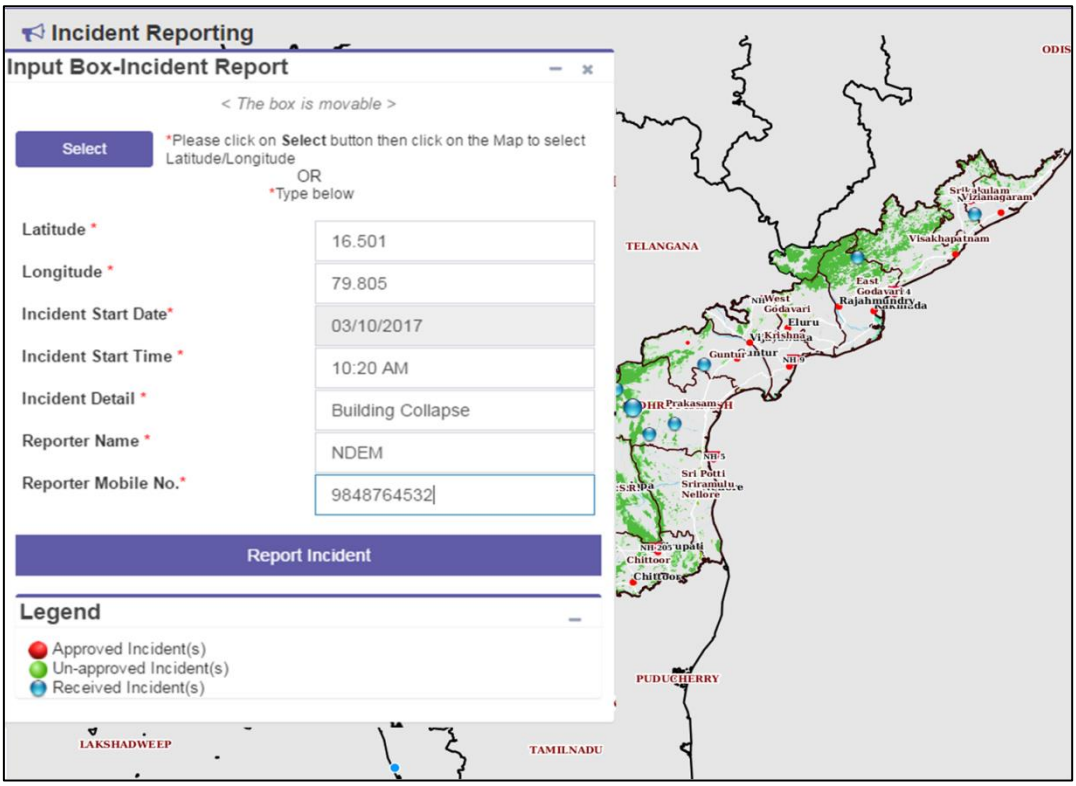


Figure 6.1 Incident Reporting - Input Box

Color coding of various stages of Incident on Map:

- Received Incident
- Forwarded Incident
- Approved Incident

☞

- Size of recently reported incident is bigger than all other incidents.
- Details of reported incident can be obtained by clicking on the incident icon on map (Figure 6.2)
- User can update the reported incident's location coordinates.

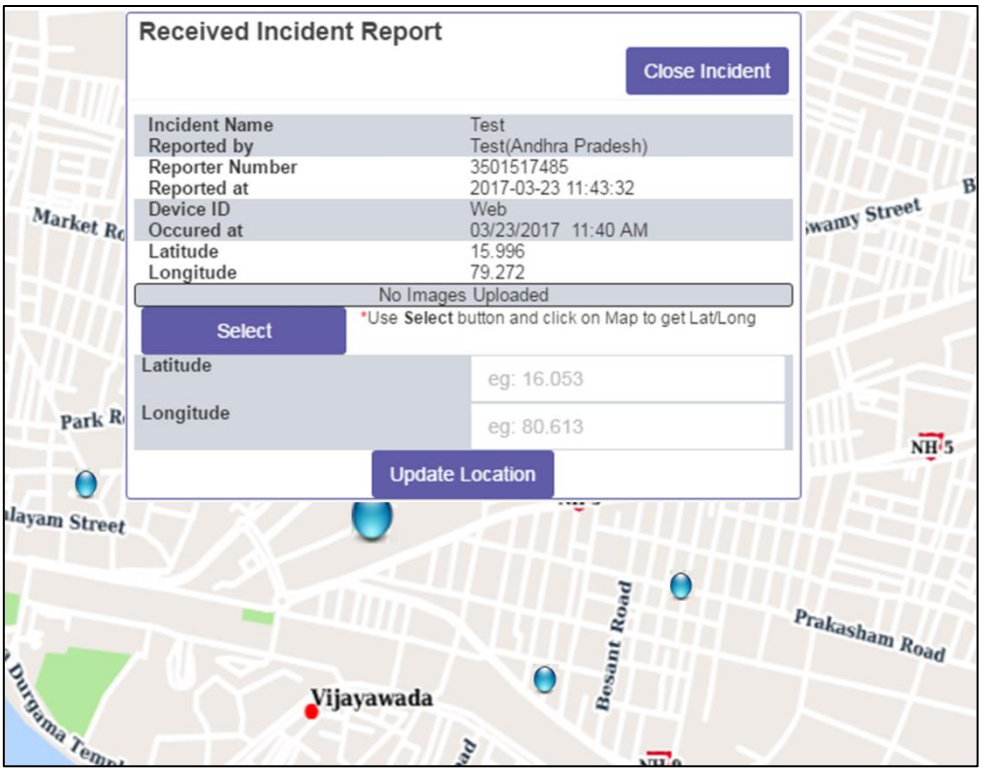


Figure 6.2 Received Incidents

6.3 Mobile App Datasets

The use of mobile applications in disaster management and emergencies has improved due to emerging advances in telecommunication and remote sensing technologies. Three mobile applications have been developed under NDEM namely, Relief Management, Geospatial Data Collection and Geo-tagging of facilities. Visualization of the data received from these mobile apps is explained in this section.

☞

- Select "Mobile App DataSets" from Table of Contents (figure 6.3).

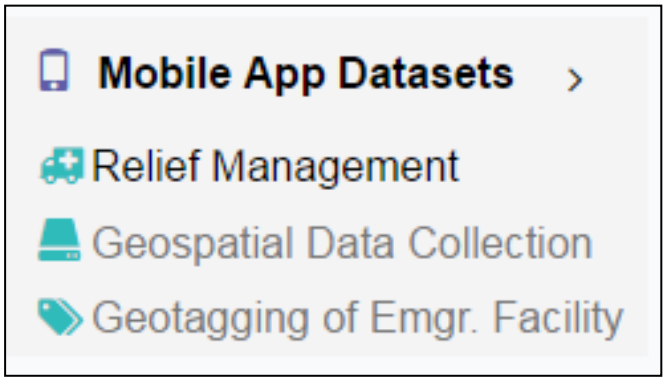


Figure 6.3 Mobile App Datasets in Left Panel

! Mobile applications can be downloaded from NDEM geo-portal Homepage.

6.3.1 Relief Management

☞

- Select "Relief Management" from Mobile App DataSets.
- Select one of the four modules from Relief Management (Say Distress Call).
- All unattended distress calls are listed and visualized on map (figure 6.4).

Relief Management application is used by field officials to send calls or quick information about the disaster during disaster response activities. The information that can be sent from the mobile device is organized into the following four modules.

- **Distress Call:** It is like a SOS (Short Information System) message. The module sends a pre-defined short message along with location coordinates and mobile ID with time stamp.

- **Emergency Call:** It is used for sending a short message from the site requesting specific help / support such as “send water bottles”, “send medical kits” etc.

- **First Info Report:** For sending a qualitative report of the disaster situation along with field photographs and location coordinates in a specified format.

- **Summary Report:** To send quantitative report of the disaster situation along with field photographs and location coordinates in a specified format.

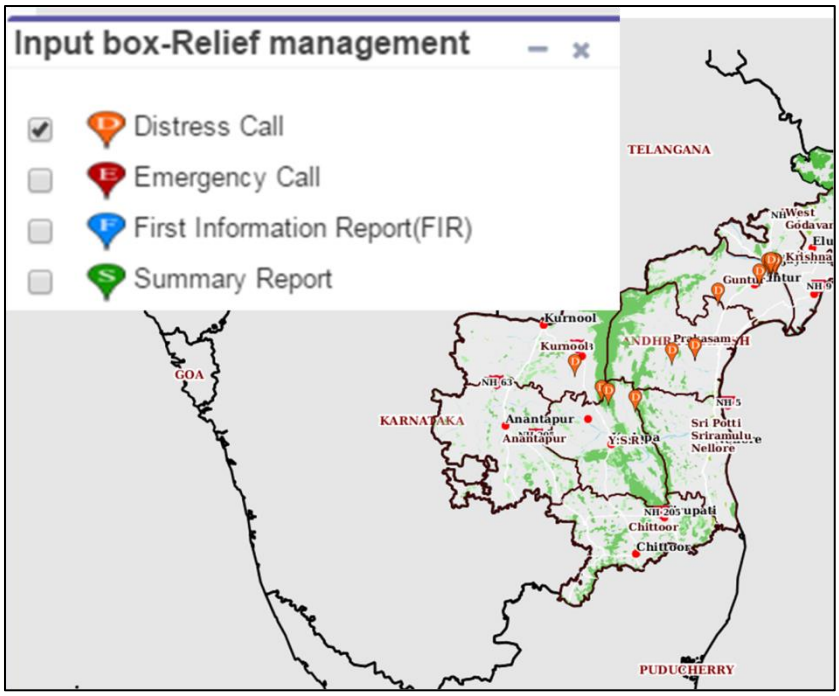


Figure 6.4 Mobile App Datasets-Relief Management-Distress Call

☞

- Details of distress call can be obtained by clicking icon on map or by clicking unattended calls list.
- Officials can respond to distress calls by clicking "Take Action" button and giving required details(figure 6.5)
- SMS will be sent to concerned official updating the status.

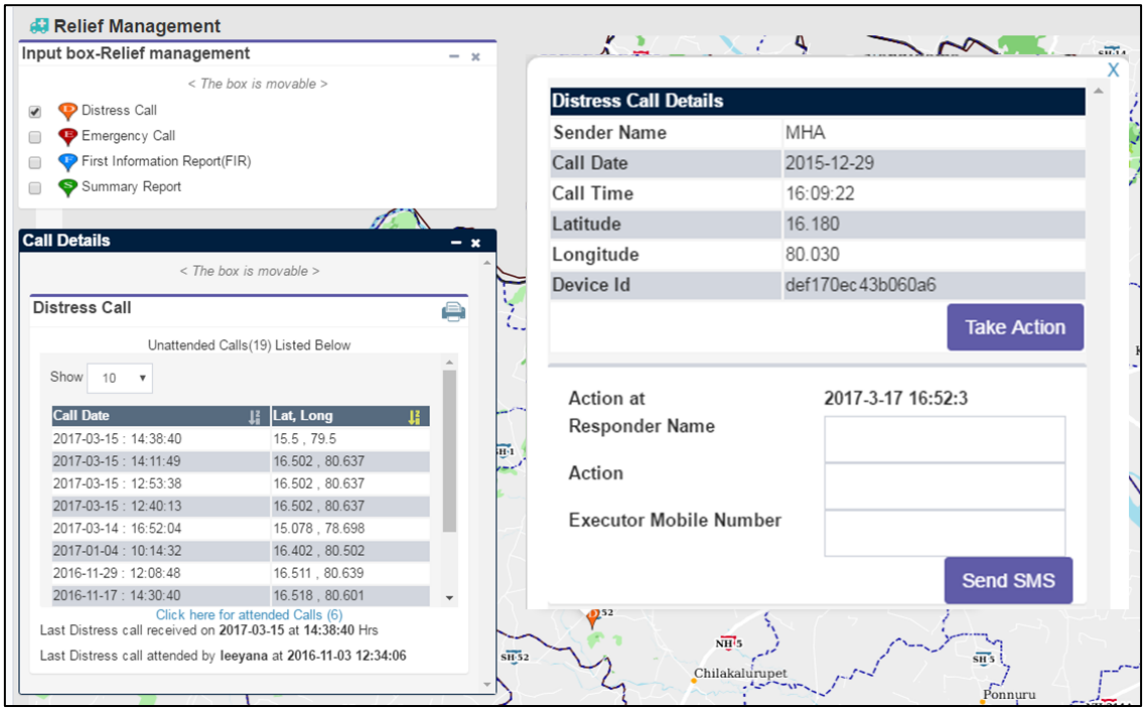


Figure 6.5 Details of Distress Calls

Design for Emergency call is same as Distress Call. During Rescue operation, personnel on the ground can give periodic updates to the official in control room as more detailed report through First Information Report. Images that were sent along with the report also can be visualized on the map. Similarly, Summary report can be send at closer of the event with the complete event report.

☞

- Select "First Information Report" from Relief Management.
- First Information Reports are listed and visualized on map (figure 6.6).
- Details of FIR can be obtained by clicking icon on map or by clicking unattended calls list.
- Multiple images can be sent to control room via First Information Report.

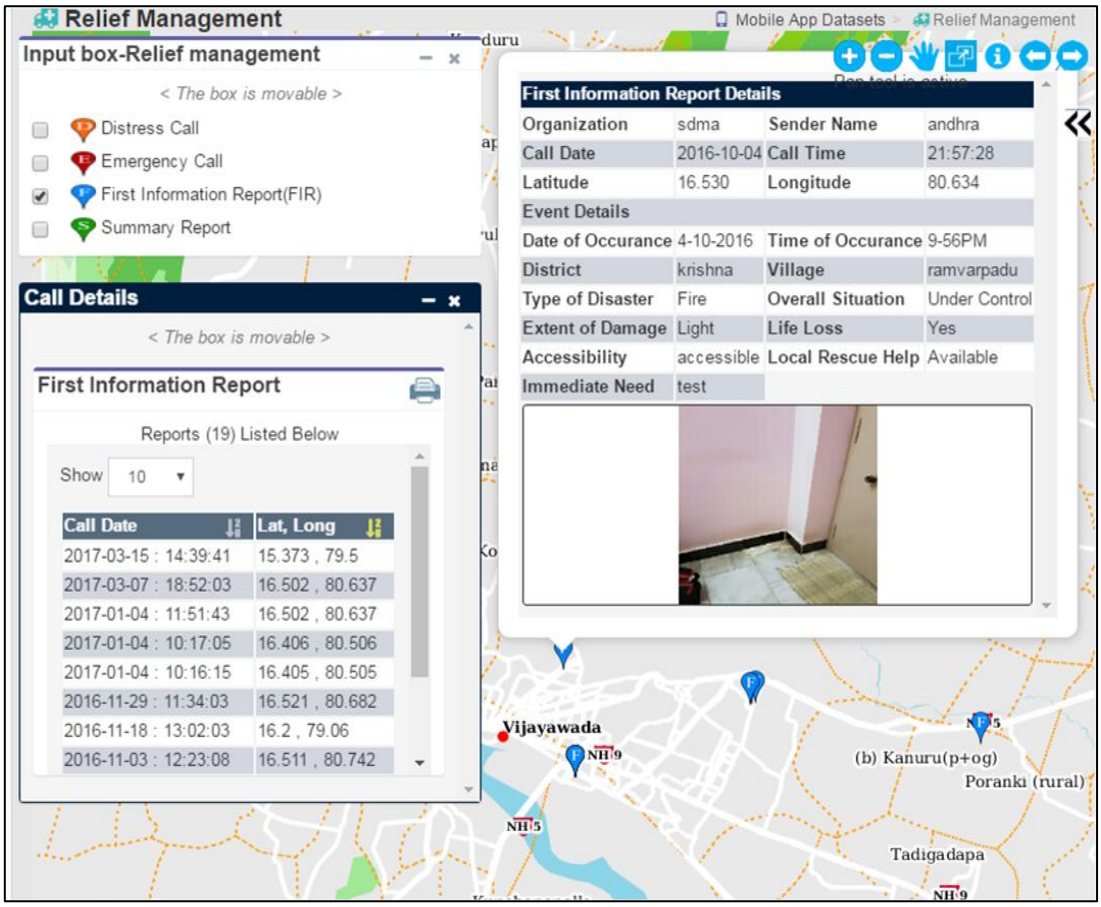


Figure 6.6 Mobile App Datasets-Relief Management-First Information Report(FIR)

Design for Summary Report page will be same as FIR page.

6.3.2 Geospatial Data Collection of Emergency Facilities (GDC)

Using this application, one can collect the field level geo spatial data of emergency facilities in real/near-real time with photographs and send to server. Information on the following four category facilities can be sent from the mobile devices.

- Medical facilities: Type of hospital, facilities available, services available etc.
- **Relief Shelters:** Type of shelter, capacity, facilities available etc.
- **Police Station:** Zone, Area name, Contact number etc.
- **Civil Supply Godown:** Type of godown, capacity etc.

☞

- Select "Geospatial Data Collection" from Mobile App DataSets.
- Select Hospital Facility from Geospatial Data input box.
- Hospital Details can be visualized and related points are overlaid on map (figure 6.7)

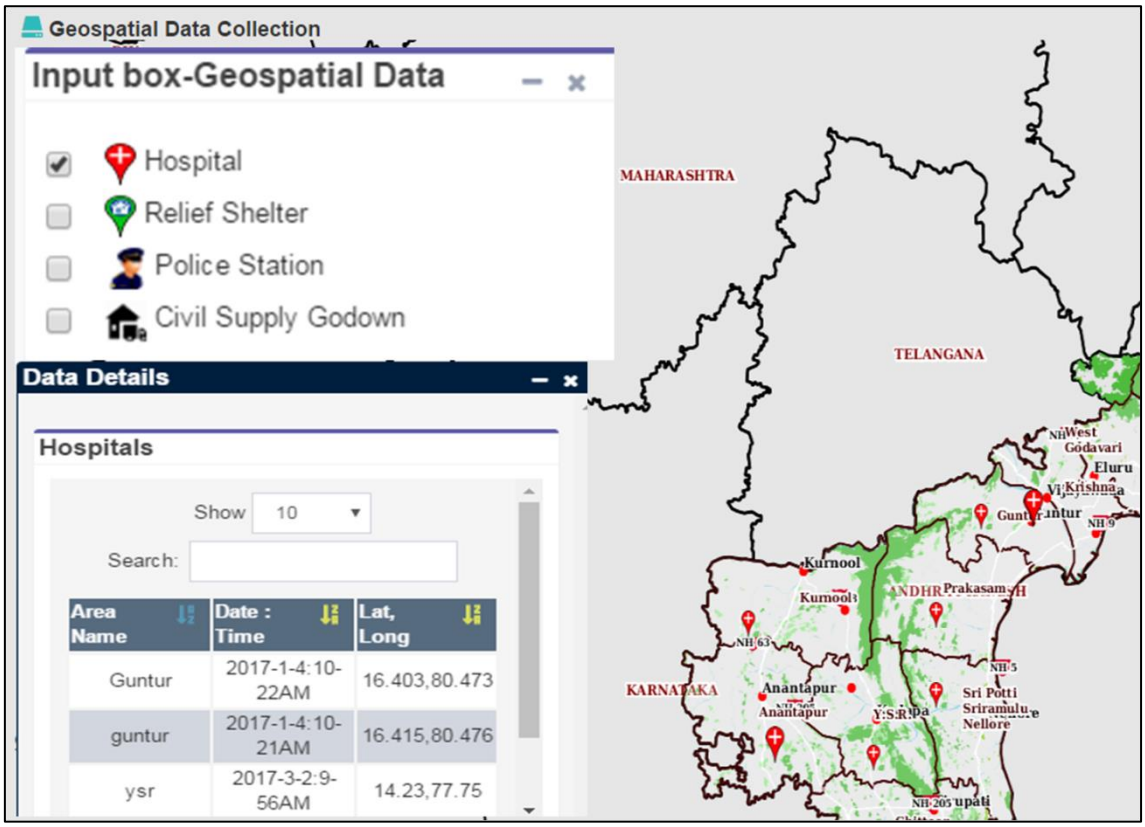


Figure 6.7 Mobile App Datasets-Geo-spatial Data Collection-Hospital Detail

☞

- Details of hospitals can be obtained by clicking icon on map or by clicking respective hospital list (figure 6.8).
- Attributes of various facilities can be added from portal by clicking on "Edit Data" button (figure 6.9).

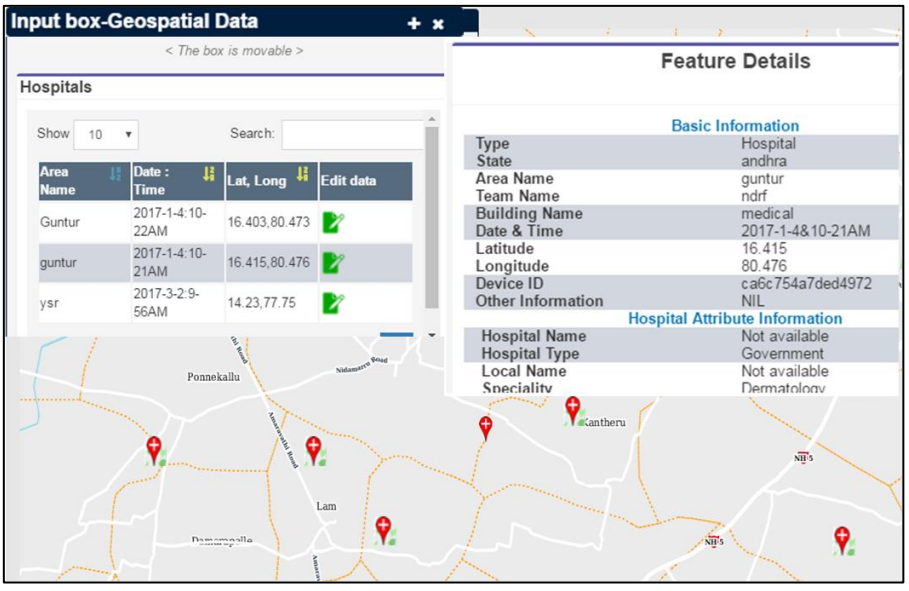


Figure 6.8 Mobile App Datasets-Geo-spatial Data Collection-Hospital Detail

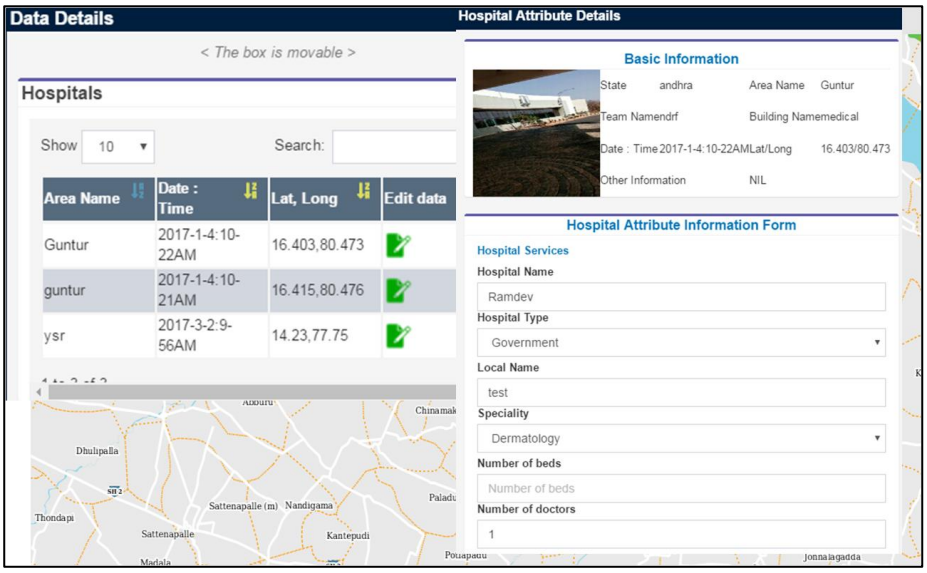


Figure 6.9 Mobile App Datasets-Geo-spatial Data Collection-Attribute Form

6.3.3 Geo tagging of Emergency Facilities

Geo tagging of emergency facilities using online maps is a mobile application developed on android platform to collect emergency facilities on mobile device.

☞

- Select "Geotagging of Emgr. Facility" from Mobile App DataSets.
- Select Hospital Facility from Geotagging input box.
- Hospital Details can be visualized as list and related points are overlaid on map (figure 6.10).

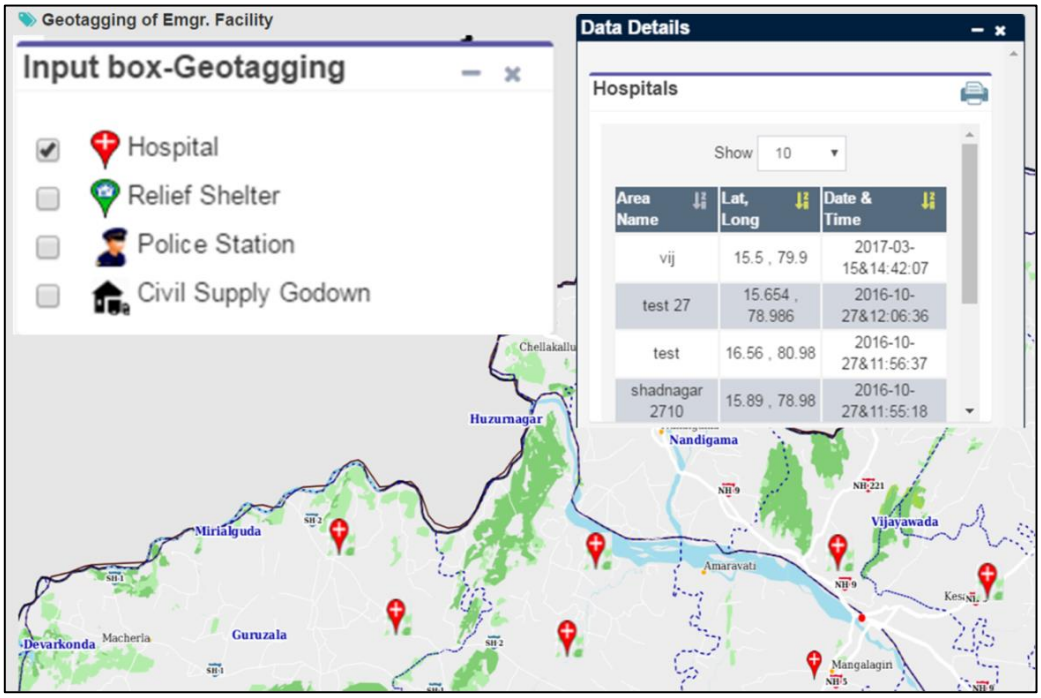


Figure 6.10 Mobile App Datasets-Geo-tagging Emgr.Facility-Hospital Detail

☞

- Details of hospitals can be obtained by clicking icon on map or by clicking respective hospital list (figure 6.11)

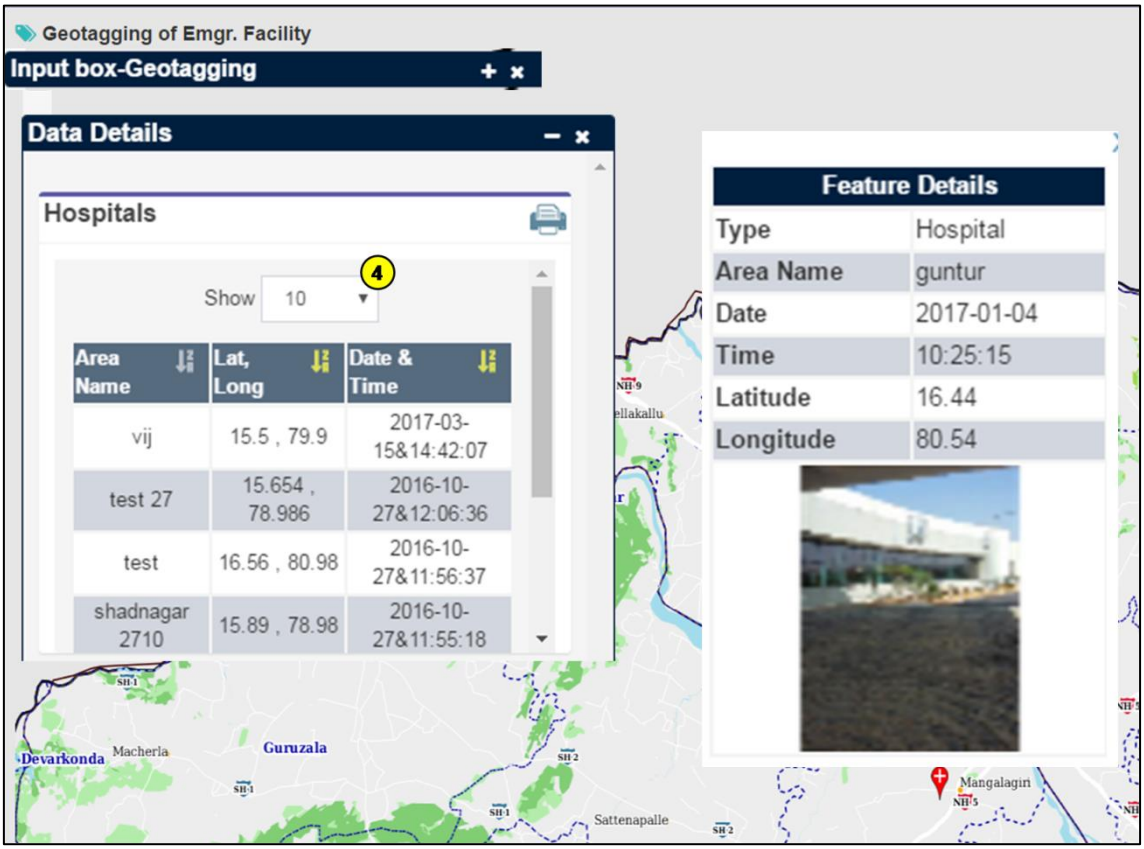


Figure 6.11 Details of Hospitals - Geotagging Application Datasets

6.4 Interaction Tools

Interaction services provide the single point communication system for all users. Through this portal, user can closely interact to each other in different mode. This communication does not use any mail server for interaction among users but use the internally developed portal for secure communication.

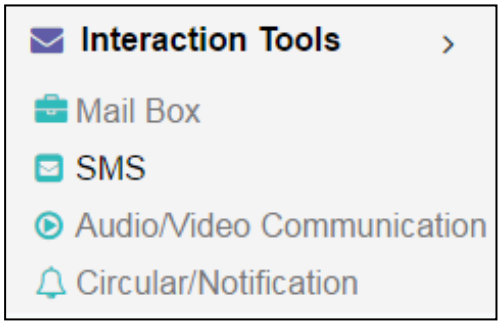


Figure 6.12 Interaction Portal in Table of Contents

6.4.1 SMS

☞

- Select "SMS" from Interaction Portal.
- User can send, visualize received SMS (figure 6.13).

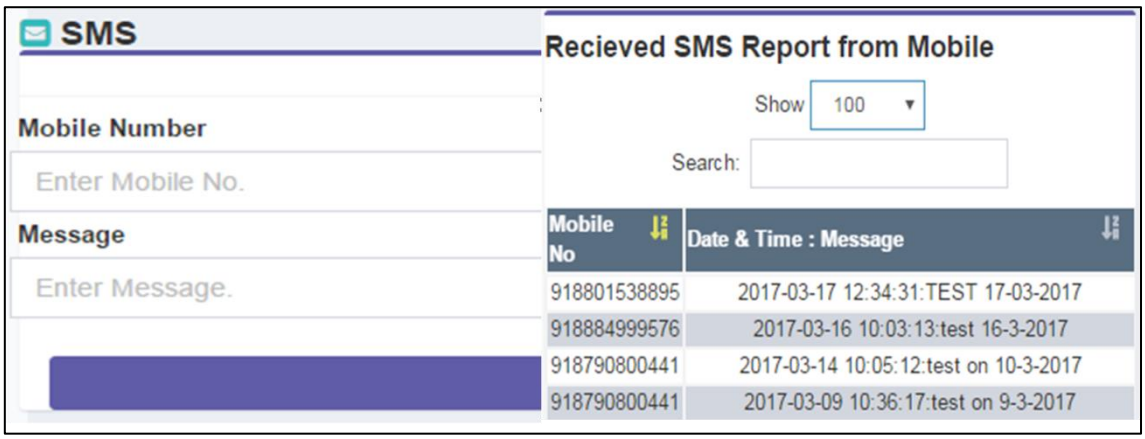


Figure 6.13 Interaction Portal - SMS

! User can send SMS to the portal in the following format: NRSC NDEM XXXXX to 51969.

6.4.2 Circular/ Notification

One to many communication can be done via public notice. Using circular/notification option, data is sharable to all the users. A public notice needs to be approved by an Administrator.

☞

- Select "Circular/Notification" from Interaction Portal.
- User can send public notice by prior approval by Administrator. SMS would be sent to authorized officials after publishing the Circular.
- Published Circulars can also be viewed (figure 6.14).

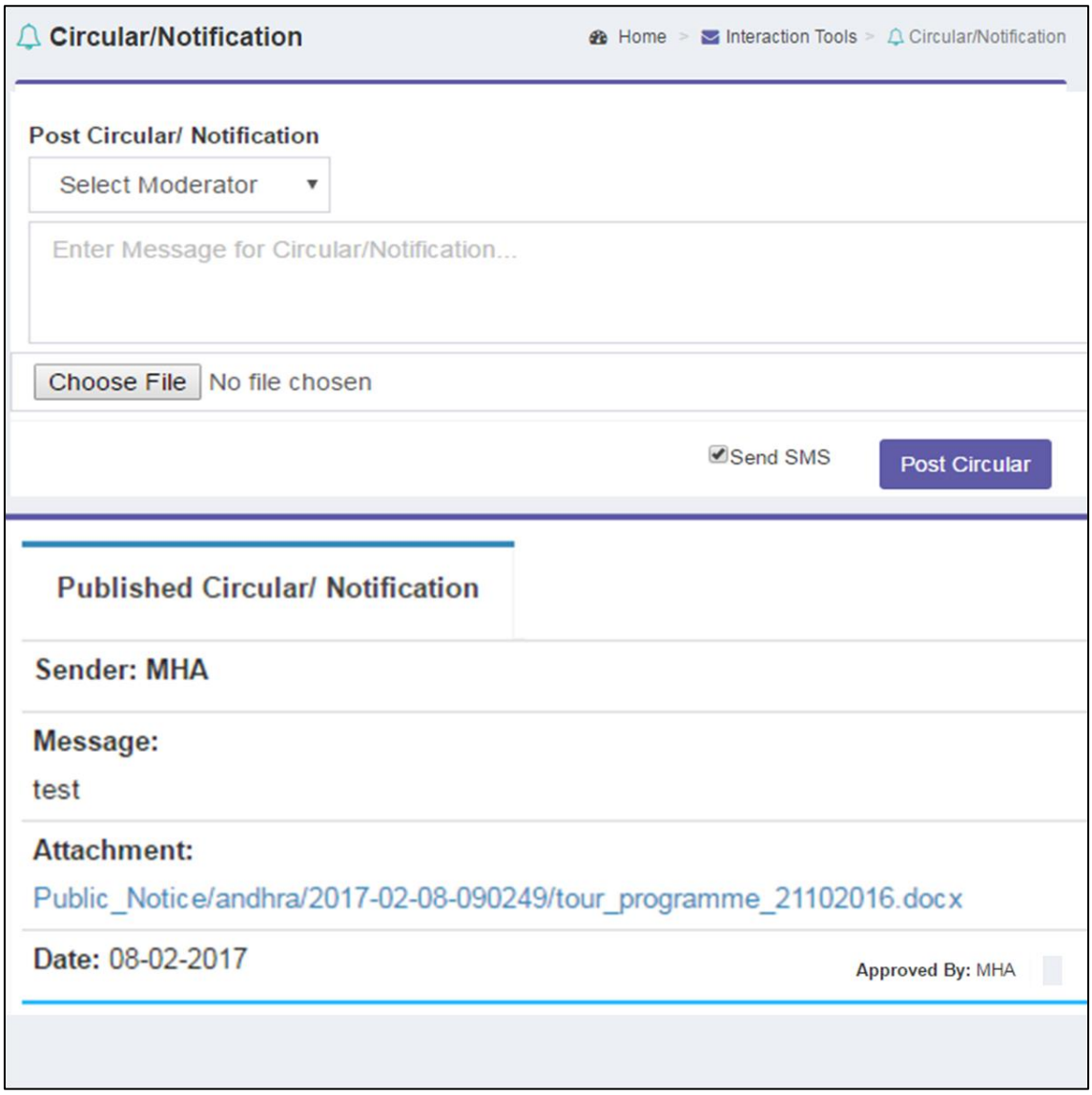


Figure 6.14 Interaction Portal - Circular/Notification

6.2.3 Audio/Video Chat:

Delivering video feed from an incident site has positive contributions to the disaster response team. NDEM portal has a feature to make a live audio video communication amongst State/Central departments helping in effective decision making during disasters and also for monitoring the disaster response activities.

☞

- Select "Audio Video Communication" from Interaction Portal.
- Audio Video communication delivery can be seen (figure 6.15)

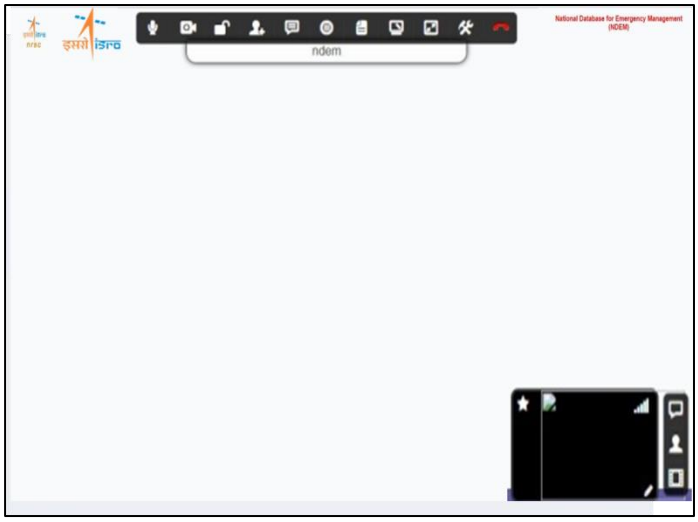


Figure 6.15 Interaction Portal – Audio/Video Communication

6.4.4 Mail box

Interaction portal also provides an option to compose, visualize received and sent mails. Inbox contains received mails. User can read, forward and delete these mails.

☞

- Select "Mail Box" from Interaction Portal.
- User can compose, read sent mails, read received mails as part of this module (figure 6.16).

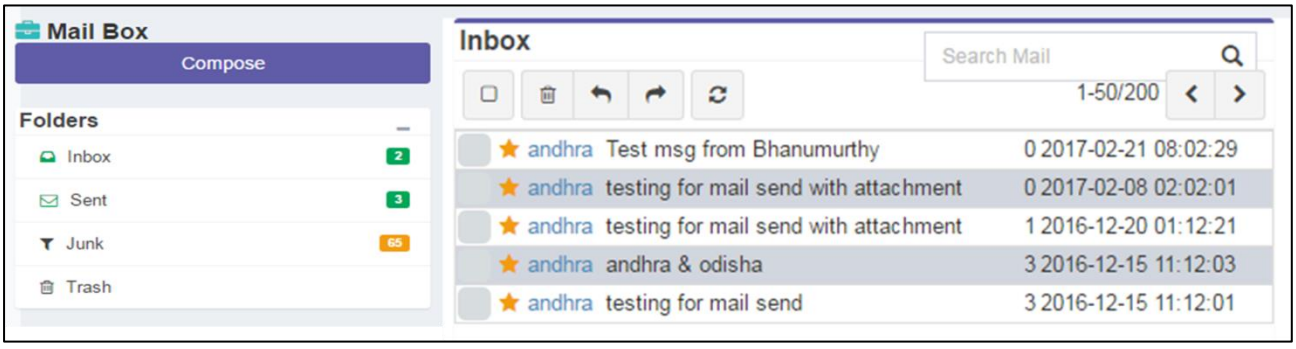


Figure 6.16 Interaction Portal – Mail box

6.5 Resource Management

This module is broadly categorized into three sub-modules namely, Inventory, Allocation & Reallocation and Reports. Each of them are explained as follows..

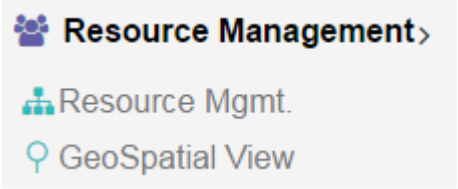


Figure 6.17 Resource Management in Table of Contents

6.5.1 Inventory

Resource management inventory sub module can be used to add Godown, add category details and team details.

☞

- Select "Resource Mgmt" from Resource Management.
- Users can add Category/Team/Godown by clicking on respective buttons.
- For example, by clicking on Add Category and entering required details, user can add category (figure 6.18)

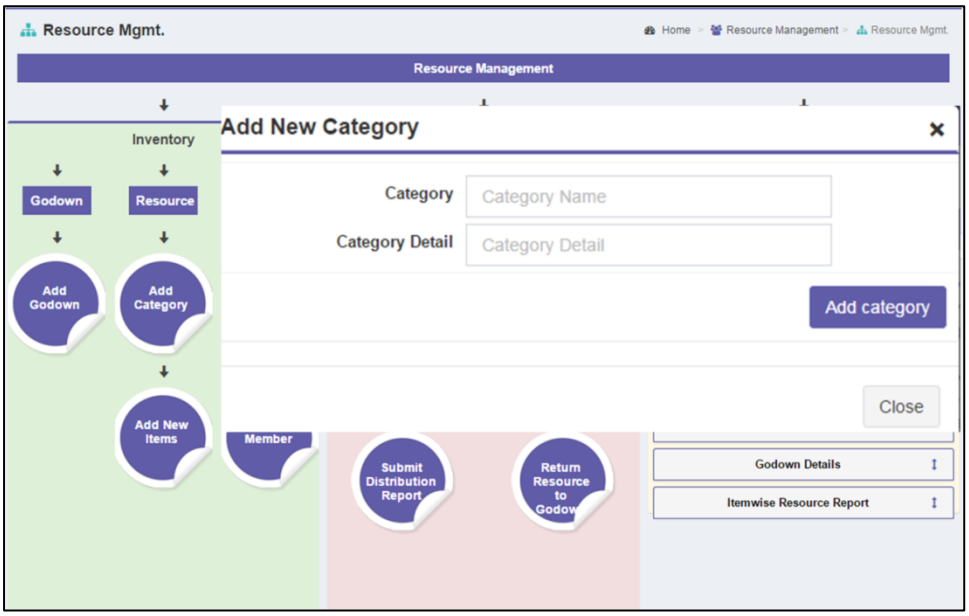


Figure 6.18 Resource Management-Add Category Details

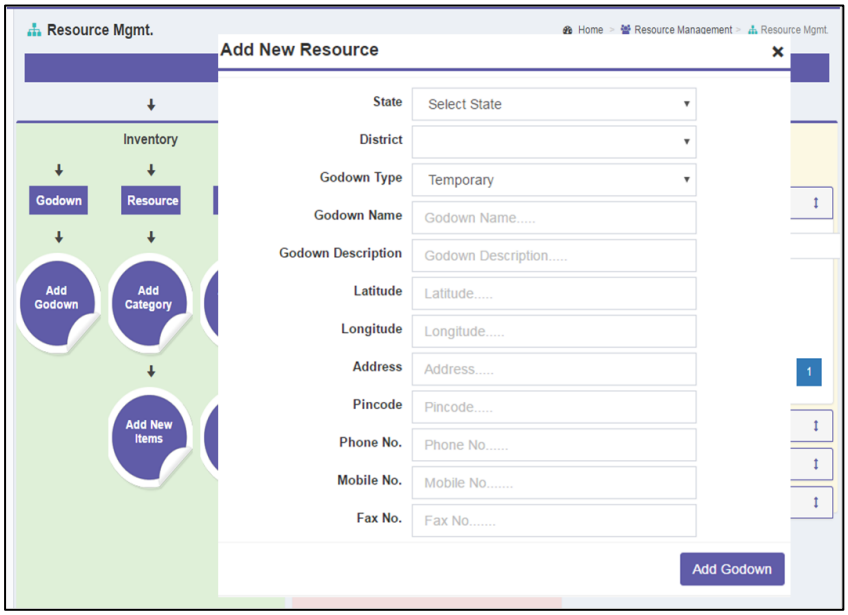


Figure 6.19 Resource Management - Add New Resource

6.5.2 Allocation & Reallocation

Users allocate resources to any Godown as per the need or relocate the resources from one Godown to another or distribute the resources among different teams.

- Select "Resource Mgmt" from Resource Management.
- From Allocation & Reallocation Module, users can allocate, reallocate, distribute, return or submit report.
- By entering required fields (For example, here Allocation) users can allocate the resources (figure 6.20).

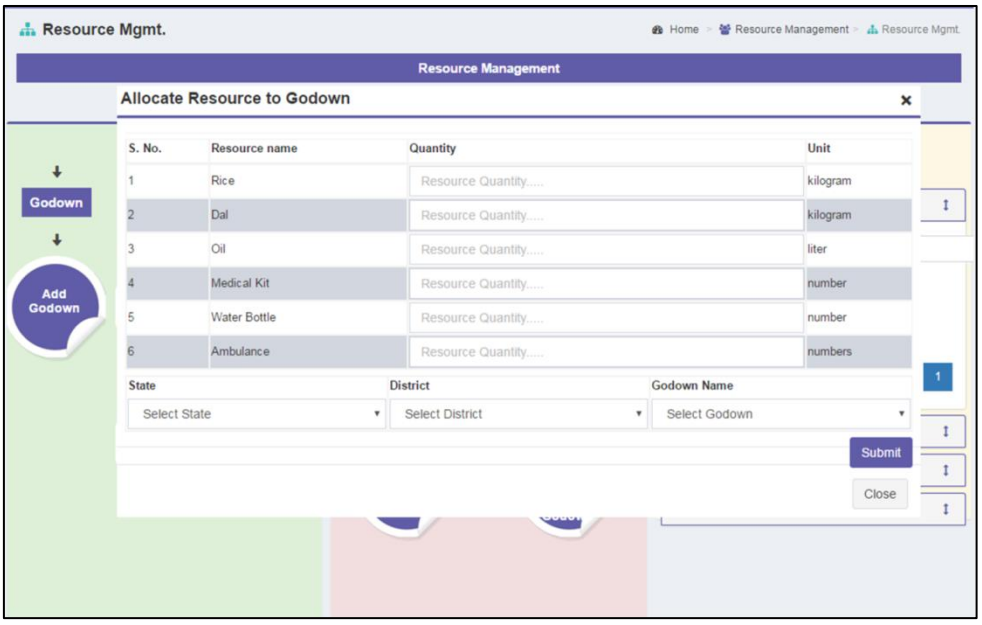


Figure 6.20 Resource Management-Allocate Resource form

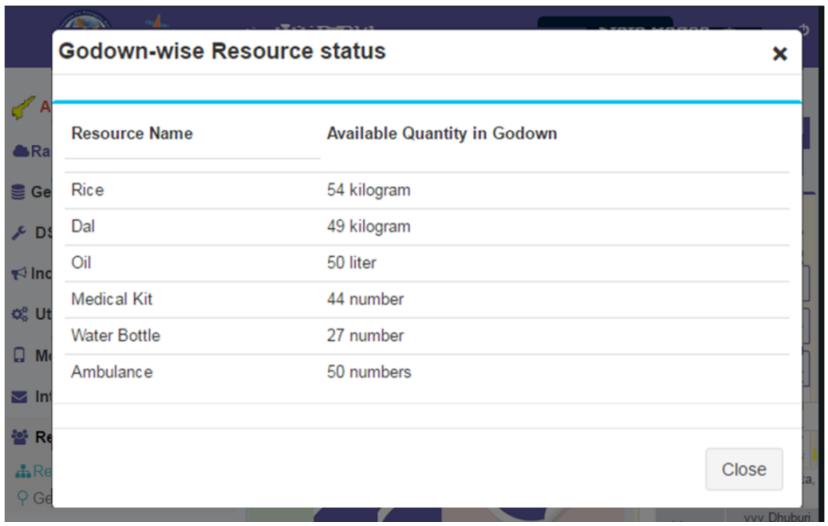


Figure 6.21 Resource Management-Godown-wise Resource status

6.5.3 Reports

Users can view details of resources, teams, team members, Godown details and Itemwise go down details in this sub module.

6.5.4 Geospatial View

In this section, user can visualize details of Godowns on map viewer.

☞

- Select "Geospatial View" from Resource Management.
- By selecting various resources, geo-location of those godown can be visualized on map (figure 6.22)
- Godown details can be obtained by clicking on respective icons.

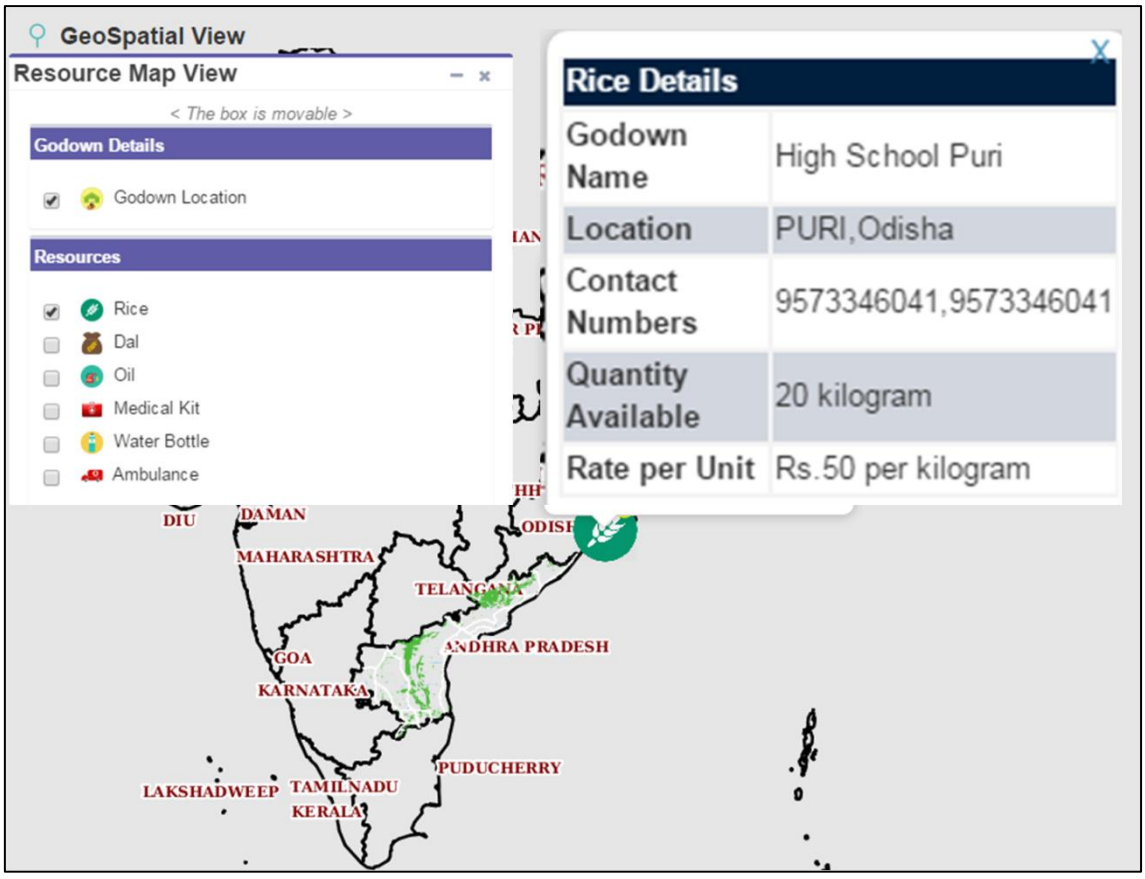


Figure 6.22 Resource Management-Map View

6.6 State Disaster Reports

Provides upload/access to disaster damage statistics to disaster manager for response activities. It is subcategorized as State Rainfall Statistics and Disaster Damage Statistics.

6.6.1 State Rainfall Statistics

☞

- Select "Rainfall Data" from State Disaster Reports.
- Users enter Flood/Rainfall data by providing required details through this module. Users can save/submit the data. Privilege to edit the saved data is also provided. A printable report can be generated from submitted data (figure 6.23)

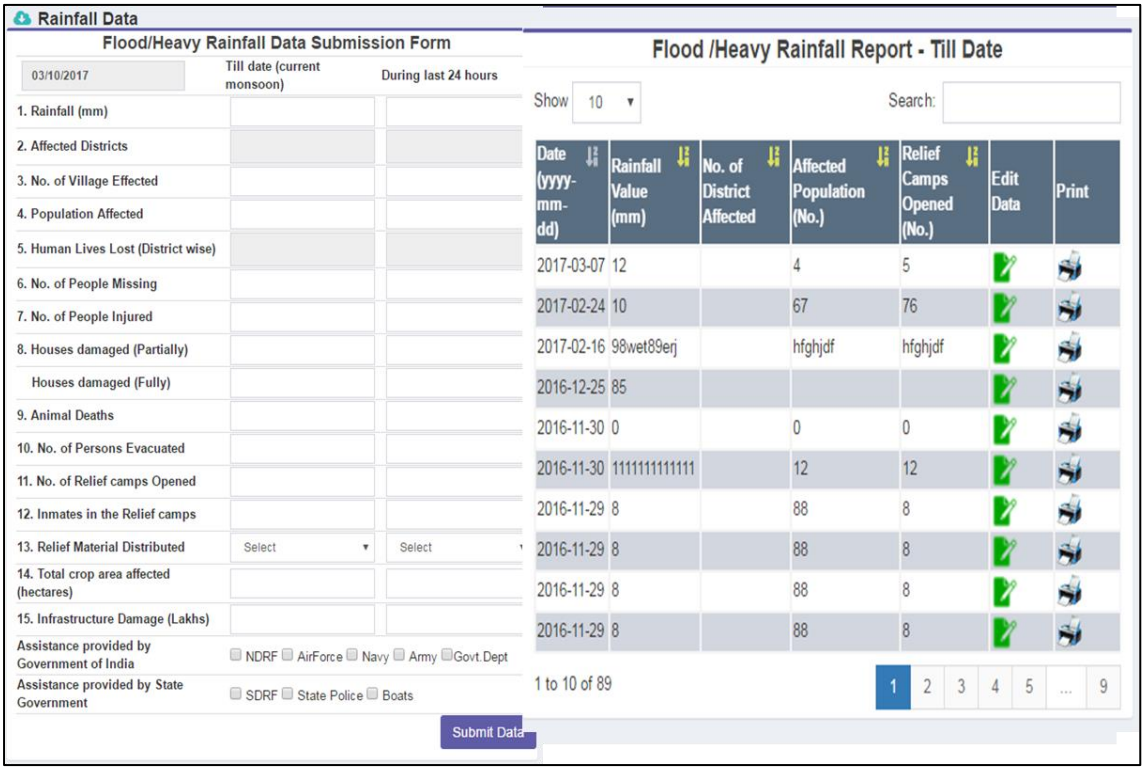


Figure 6.23 State Reports-State Rainfall Statistics

6.6.2 District Damage Statistics

In “District Damage Statistics” module, two lists will appear; one for submitted data and second for saved data in which user will have the facility to update the saved data and submit it. Print facility will be there to print each record.

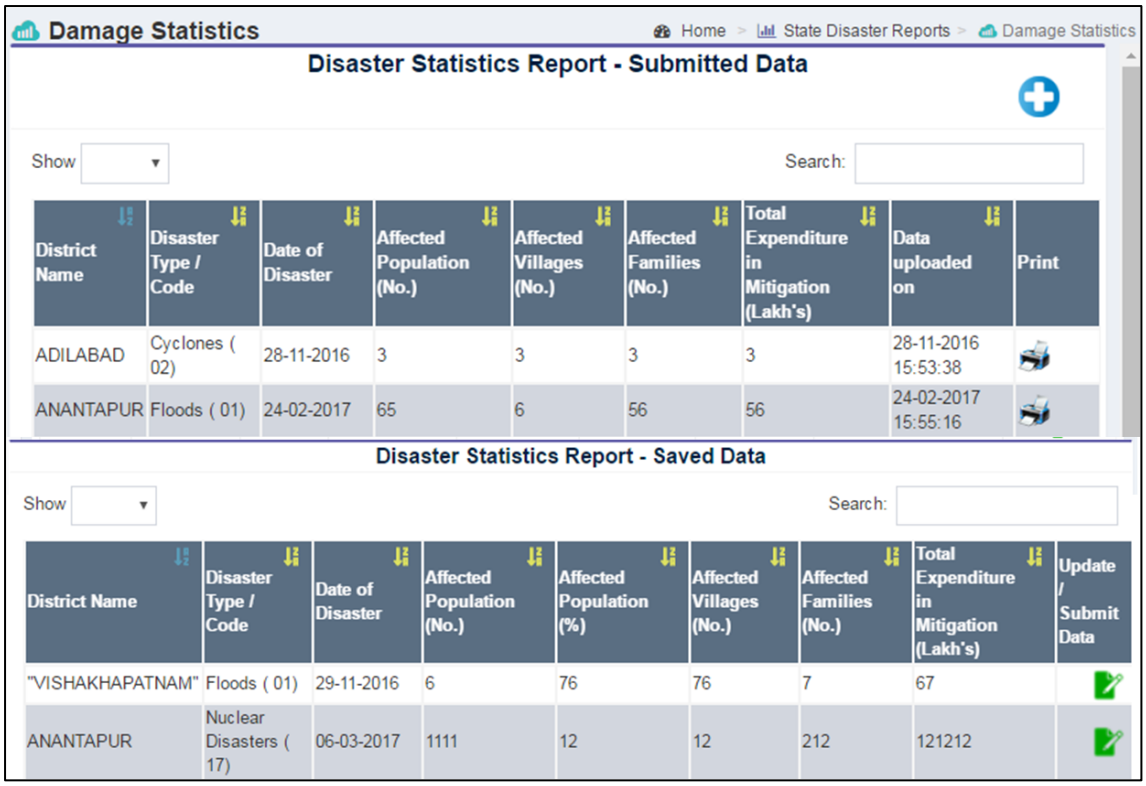


Figure 6.24 State Reports -Disaster Damage Statistics

☞

- Select "Damage Statistics" from State Disaster Reports.
- District wise disaster damage statistics are available in this module. Users can enter/save/submit the statistics. Printable report can be generated (figure 6.23)

☞

- Select "+" icon from Disaster Damage Statistics Report Module.
- User has to provide required details to add disaster statistics (figure 6.25)

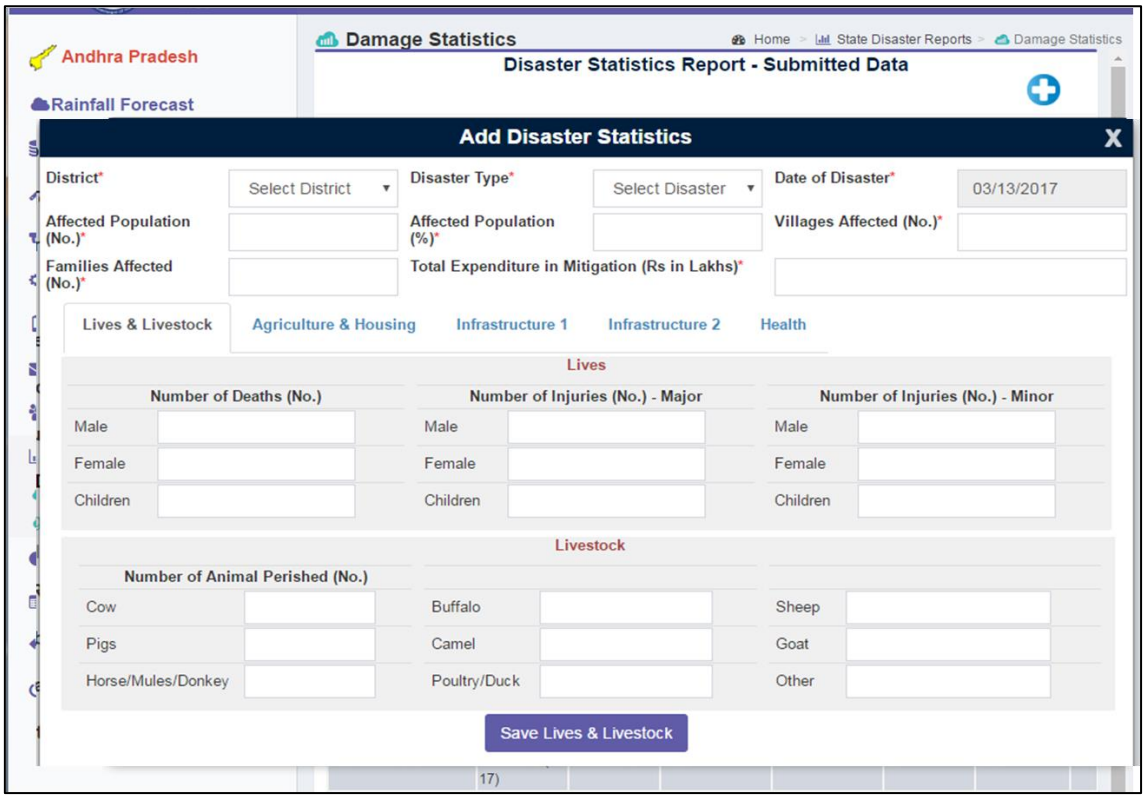


Figure 6.25 State Reports -Add Disaster Statistics

6.7 Data repository

Comprehensive outputs of the disaster event in the form of reports and maps are present in this module. In addition to this, it also consists of database from India Disaster Resource Network and Health Databases.

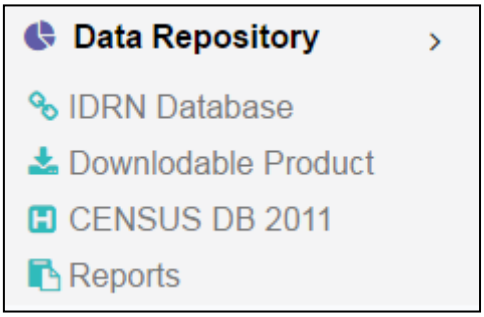


Figure 6.26 Data Repository - Table of Contents

6.7.1 IDRN (Indian Disaster Resource Network)

☞

- Select "IDRN Database" from Data Repository.
- Select District, Activity, Category and Item (figure 6.27)
- Respective items are overlaid on map and their legend is displayed.

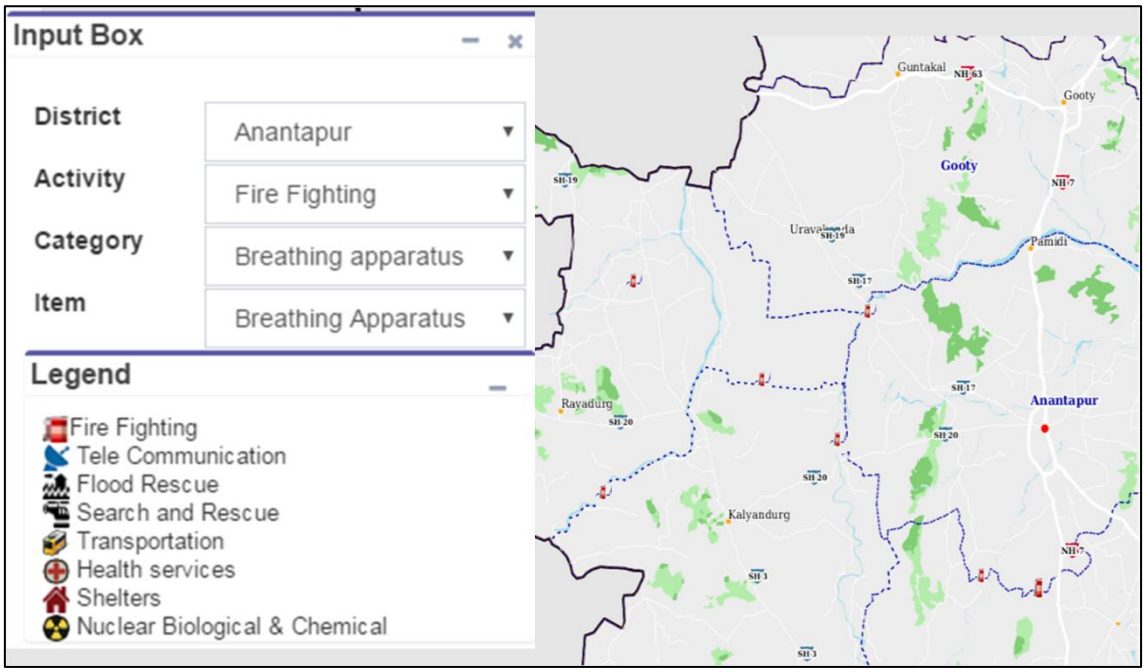


Figure 6.27 Data repository – IDRN Module

☞

- Disaster equipment details for respective user inputs is displayed in the form of list (figure 6.28)

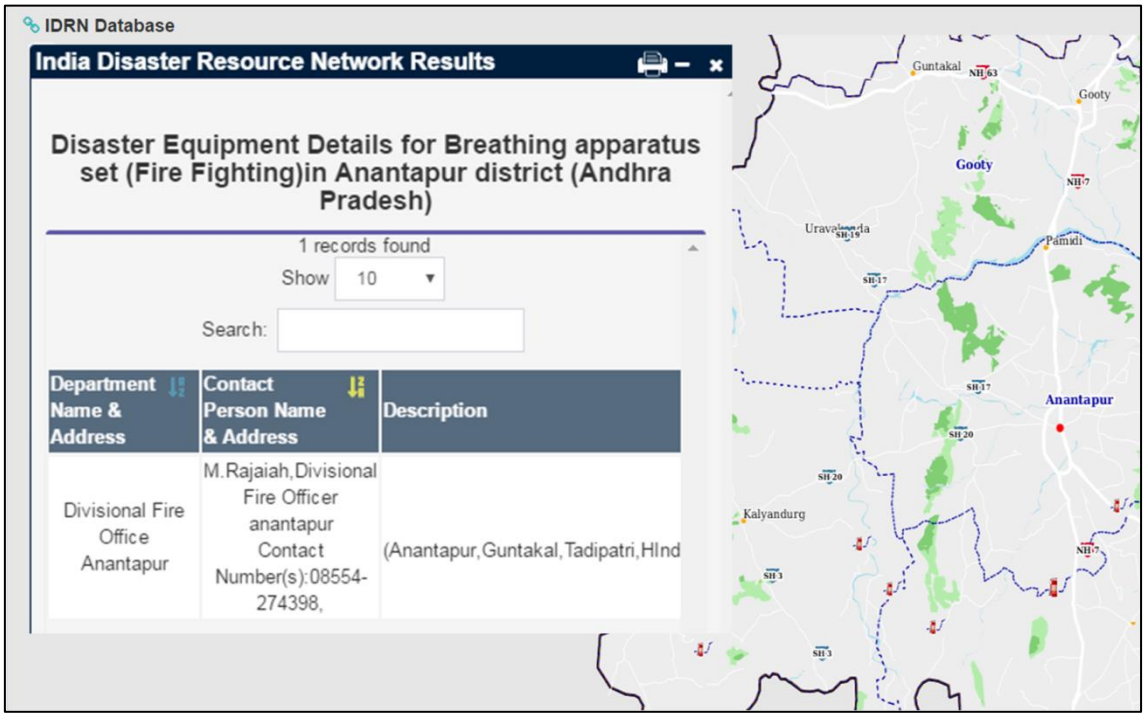


Figure 6.28 IDRN Module - Disaster Equipment List

☞

- By clicking on item/activity/equipment icon on map, details of respective facility can be obtained (figure 6.29)

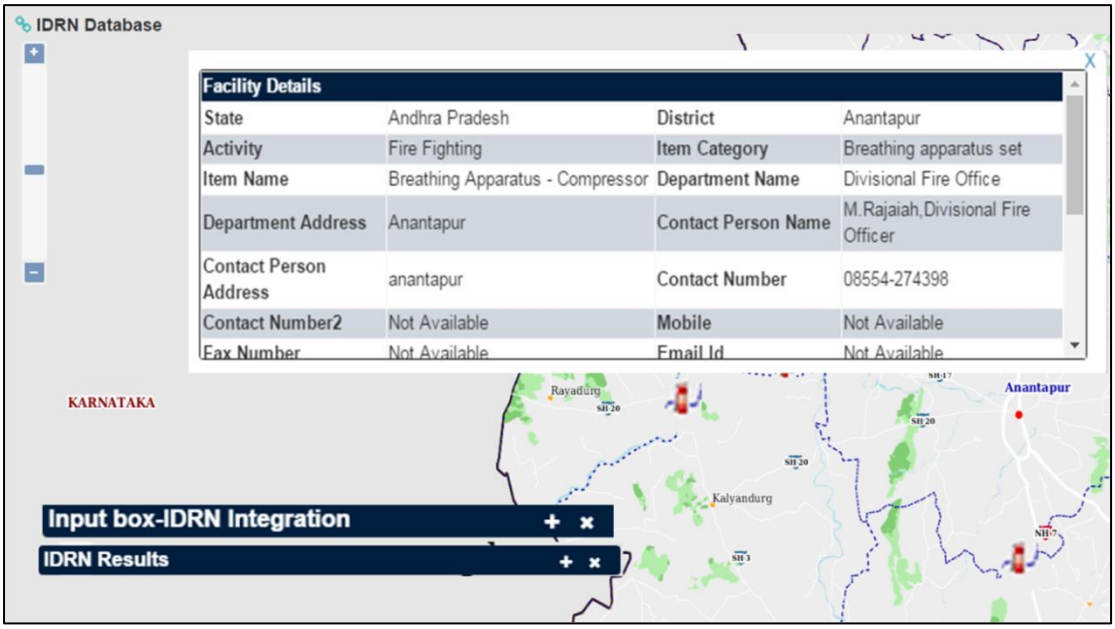


Figure 6.28 IDRN Module - Disaster Equipment Details

6.7.2 Downloadable products

6.7.2.1 Downloadable Products for Disaster Event:

Contains the complete catalog of disaster products.

☞

- Select "Downloadable Products" from Data Repository.
- Select required Disaster type and Year.
- Available downloadable products can be visualized in list format. User can click on Map/report to view/save them.

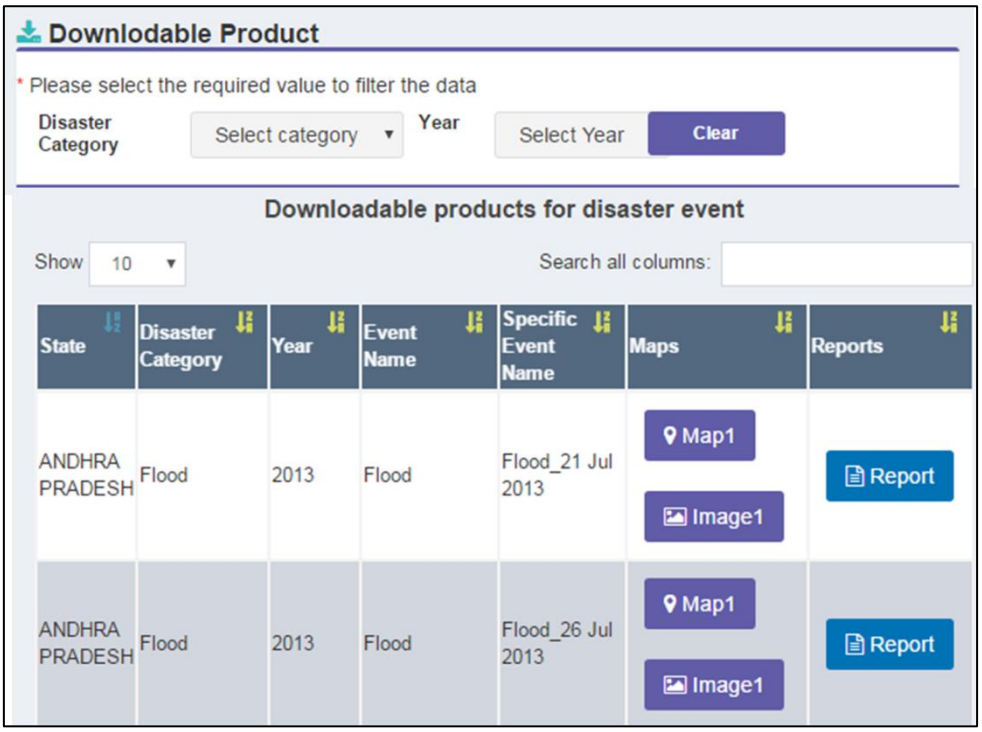


Figure 6.30 Downloadable Products

6.7.3 Census DB 2011

The health database provided by Ministry of Health for entire India is integrated into the portal. User can Query to retrieve the information district-wise / State-wise.

6.7.3.1 Population Detail:

☞

- Select Population Details icon from CENSUS DB Module.
- Select district and click on submit (figure 6.31)
- Population details of respective district get displayed.

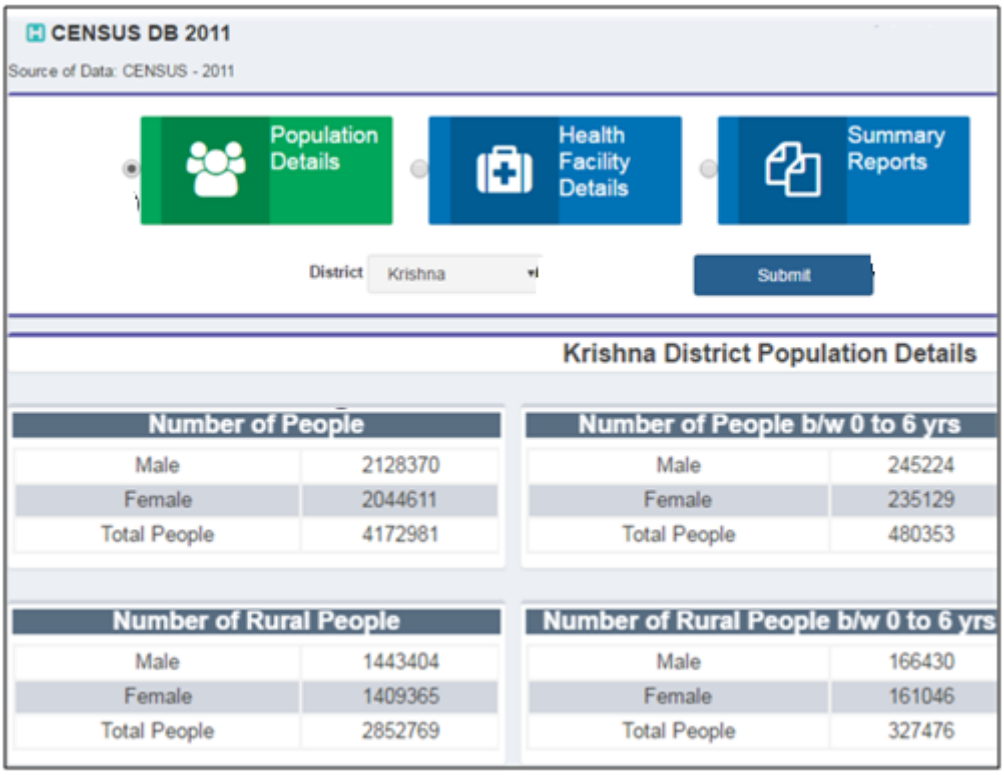


Figure 6.31 State Reports -Add Disaster Statistics

6.7.3.2 Health Facility Contact Details:

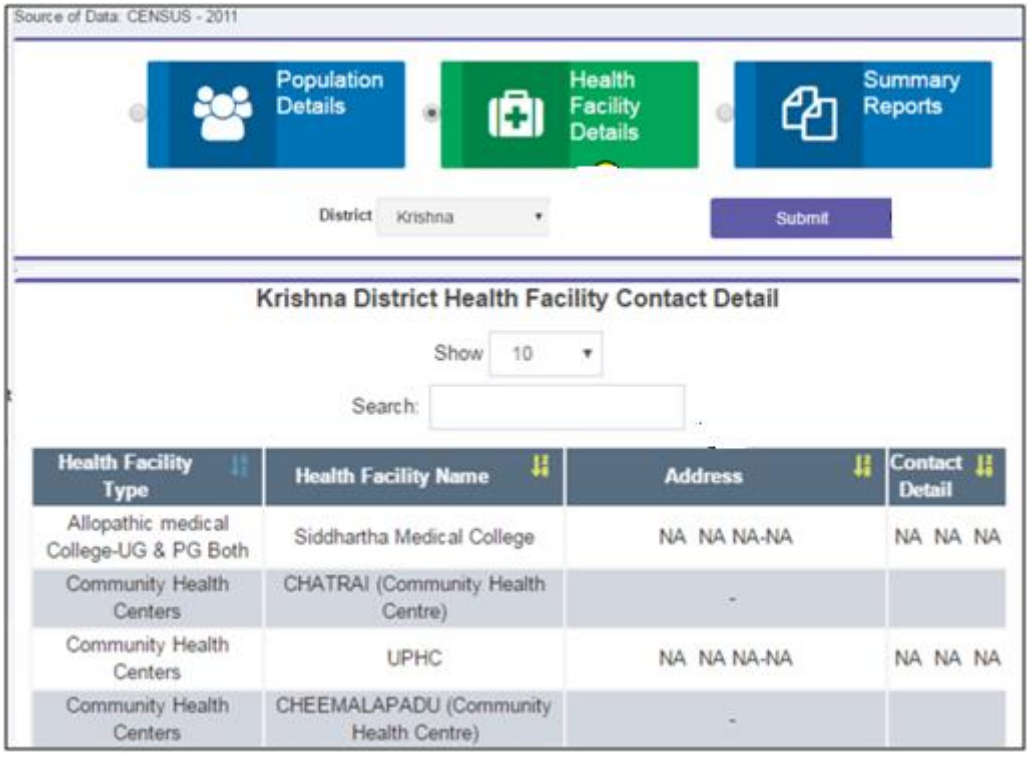


Figure 6.32 State Reports -Add Disaster Statistics

☞

- Select Health Facility Details icon from CENSUS DB Module.
- Select district and click on submit (figure 6.32)
- Health Facility details of respective district gets displayed.

6.7.3.3 Summary Report Details:

☞

- Select Summary Reports icon from CENSUS DB Module.
- Select district and click on submit (figure 6.33)
- Health Facility summary of respective district gets displayed.

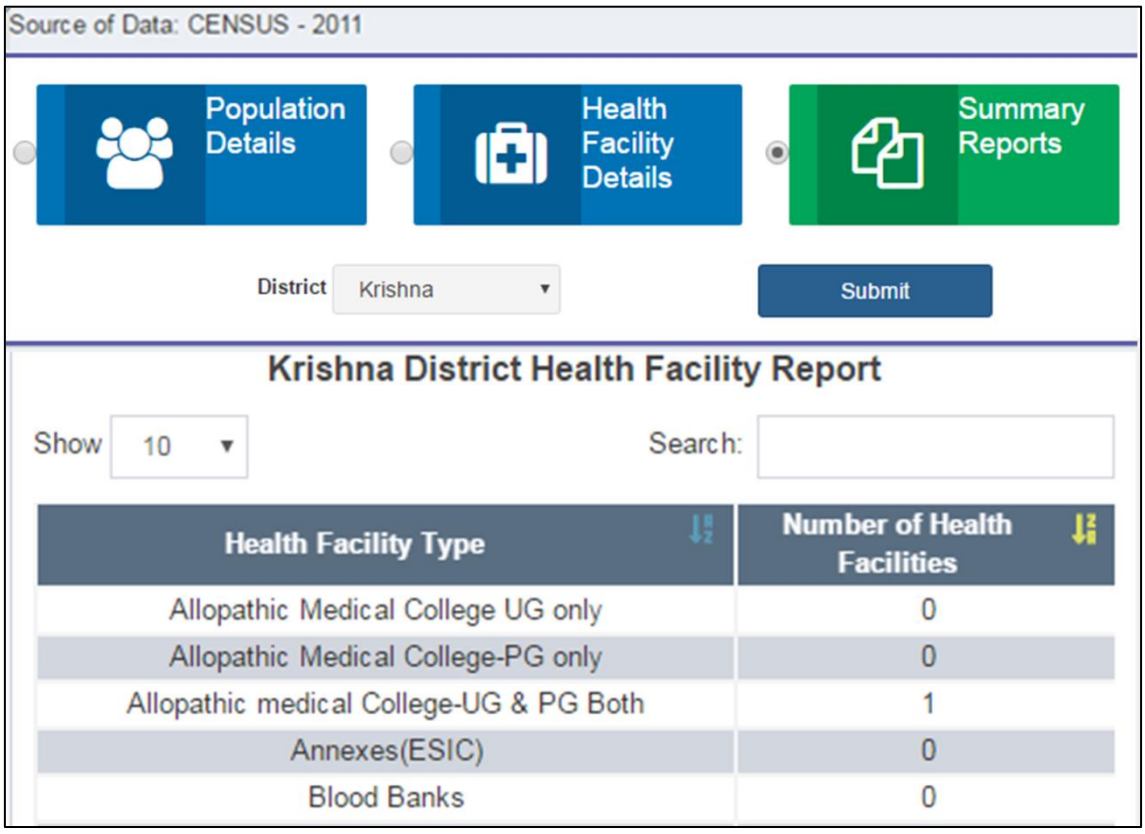


Figure 6.33 Data Repository- Census DB 2011-health report Module

6.8.4 Reports

☞

- Select "Reports" from Data Repository.
- Datasets information is graphically represented in this module(figure 6.34)

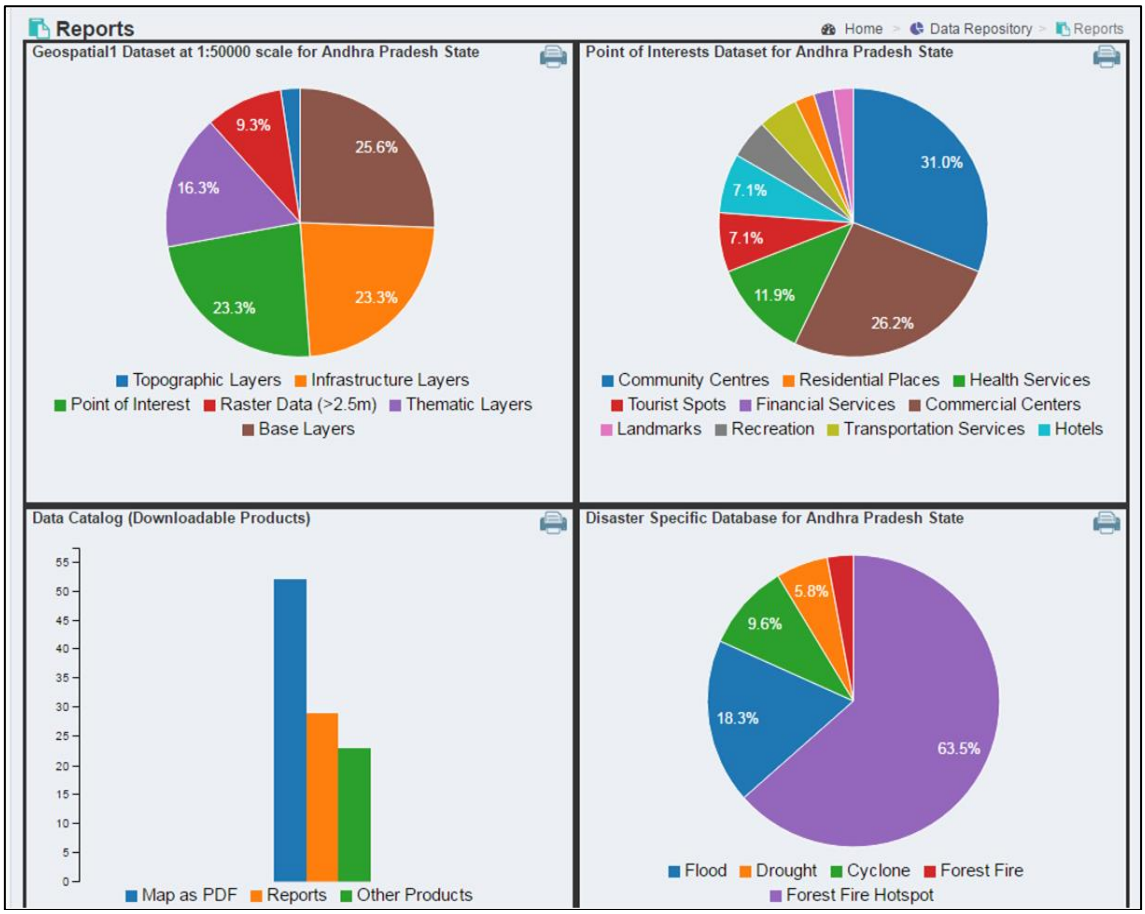


Figure 6.34 Data repository – Reports

6.6 Available DataSets:

Overall description of layer information for a particular state.

☞

- Select "Available Datasets" from Left Panel.
- Overall layer information of particular state can be visualized in this module. A printable report can be generated by clicking on print icon (figure 6.35).

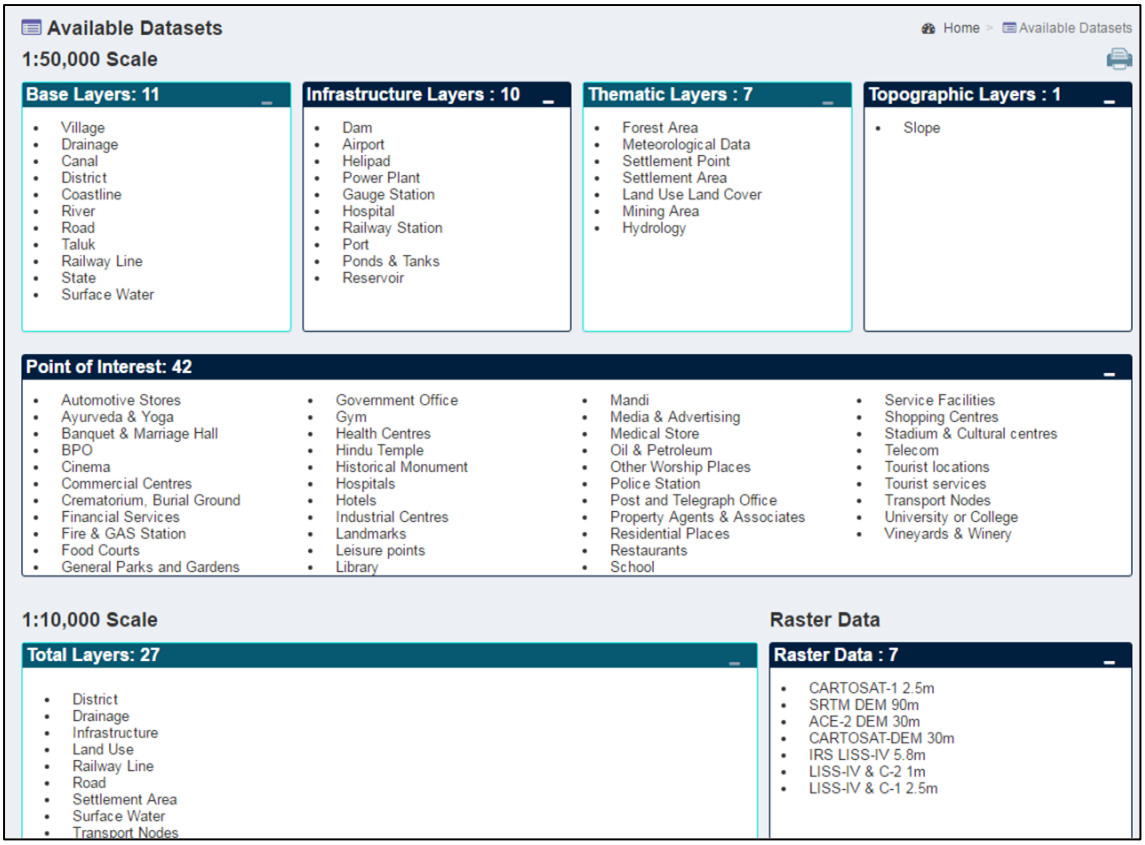


Figure 6.35 Available Datasets inventory Module

6.9 Feedback

User can provide feedback using the "Feedback" link on the bottom menu.

☞

- Select Feedback from Left panel.
- Enter required fields like name, email, answers to feedback questions and other suggestions and click on submit button (figure 6.36).
- Feedback statistics can be obtained by clicking on "Feedback Statistics" (figure 6.37).

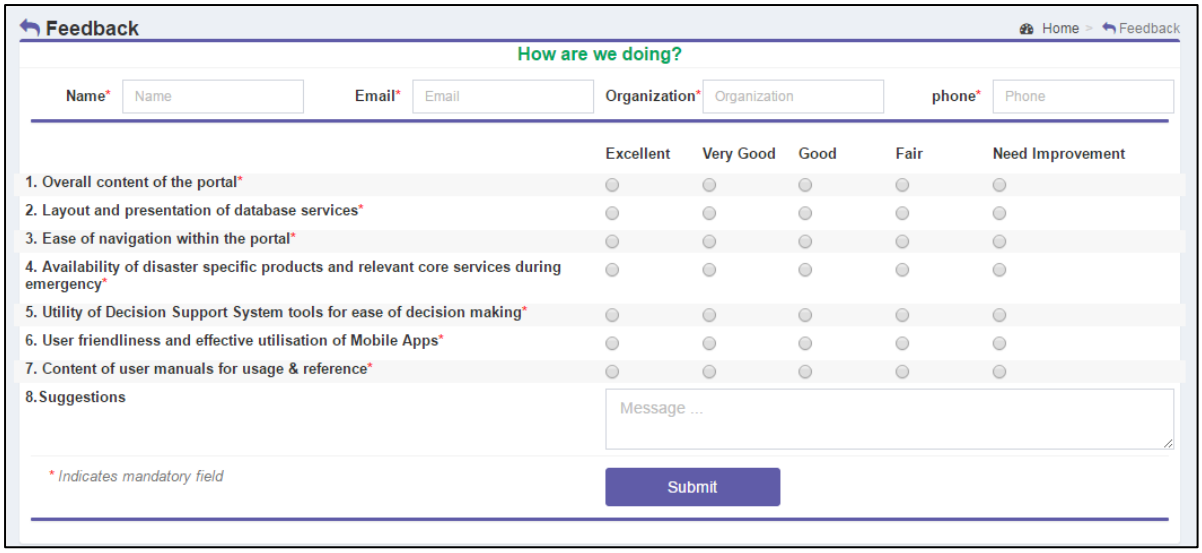


Figure 6.36 Feedback Form

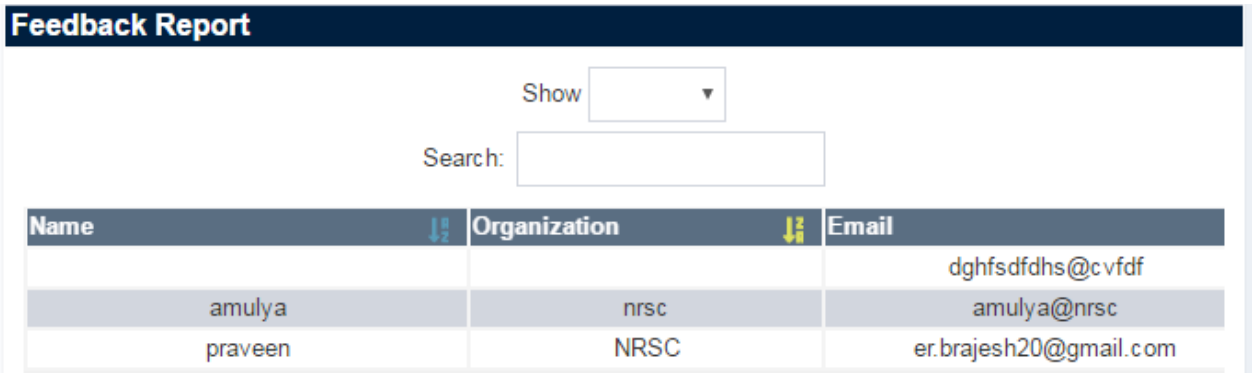


Figure 6.37 Feedback Report

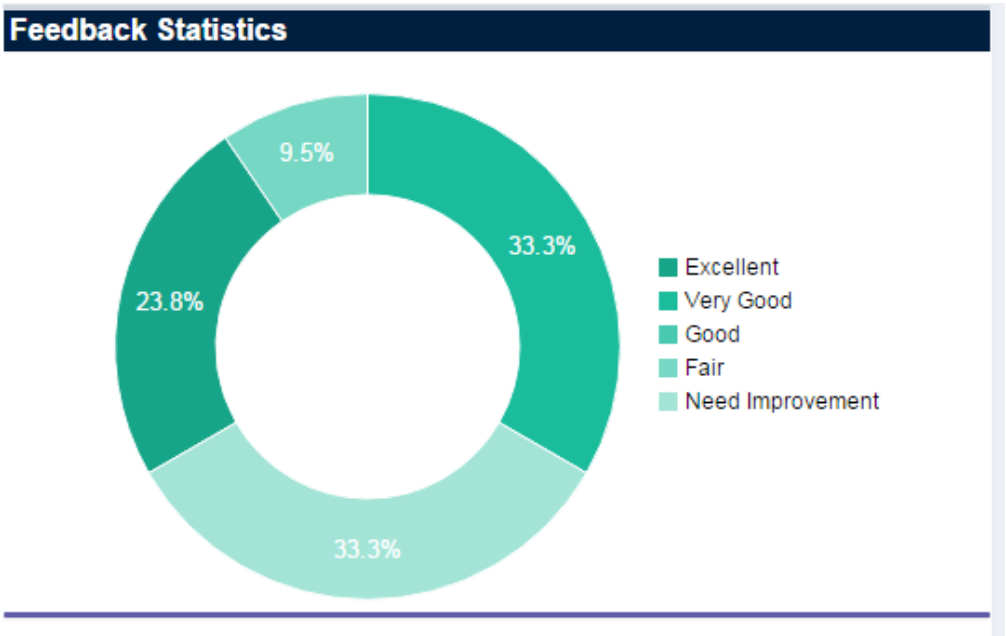


Figure 6.38 Feedback Statistics

Conclusion

Using this manual you have learnt about,

a. Visualization of Geospatial layers on map
b. Reporting an incident
c. Finding nearest emergency facilities around Incident location using various Decision support and utility tools.
d. Mobile app datasets visualization on map viewer.
e. Many/One-to-Many/One Communication mechanisms
f. Finding nearest rescue equipment using IDRN database

Sometimes the best response to natural or man-made disasters can be effective planning before tragedy happens. Using this geo-portal, disaster management officials would be able to carry out the relief and rescue operations with much ease and effectively with technological support from the portal. The satellite images of different resolutions, geospatial services derived from remote sensing data, decision support tools developed with data inputs from multi-scale geospatial services, live news feed, alerts/warnings from disaster dashboard services, mobile applications for real-time field information etc., are highly helpful in combating disasters.

In case of any queries, direct all your technical questions to ndem_admin@nrsc.gov.in