Virtual Training Program on
Geo-Spatial Approach for Hazard Mapping, Monitoring, Analysis, Report and Map Generation through Bhuvan Portal

Organized by
Gujarat Institute of Disaster Management
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Concept Note:

Disasters Risk Management is the key area of intervention that may ensure sustainable development. Disasters are spatial in nature as they strike at a specific location and influence a particular area so the location intelligence plays a critical role in disaster risk management.

GIS coupled with remote sensing provides a basic framework that helps in all the stages of disaster risk management starting from preparedness, to response and recovery. Governments and other agencies are being revolutionized by adapting advanced wireless technologies and web-based GIS applications.

GIS decision support systems for disaster have been applied in several parts of the world for effective DRM. For assessing disaster risks, one needs an understanding of key disaster event characteristics such as location of impact (for example, earthquake epicenter, cyclone landfall), physical characteristics (magnitude in case of earthquakes, central pressure in case of cyclones), local conditions like land use and type and height of structures. Earlier these were a cumbersome task but now a days Web-GIS and many Web Map Services have made this task browser and App accesible.

Bhuvan, an initiative of Indian Space Research Organization (ISRO), is a satellite product mapping tool (launched in 2009, quite similar to Google Earth or Wikimapia) which allows users to zoom far closer than the aerial view from a chopper. The browser is specifically tailored to view India, offering the highest resolution in this region and providing content in four local languages. This web based software application allows seeing surface of the Earth in 2D/3D representation. This interactive versatile visualization system is for navigation, scanning satellite imagery with overlays of rich information like natural resources, roads, geographic features, and numerous other location-specific features.

Bhuvan is using a crowd sourcing approach to enrich its maps and collect point of interest data. It also acts as a platform for hosting government data (example - Karnataka Forest Department datasets).

Bhuvan portal gives users (from any section of the society) an easy way to experience, explore and visualize satellite images from Indian Remote Sensing Satellites (IRS). This datasets have also integration capabilities with many open source GIS software viz., Q-GIS which offers researchers and planners to develop and orient spatial data to meet their specific requirements and objectives. *It has an important role in mapping urbanization and growth of cities particularly in the face of climate change and disaster*. *Bhuvan has been upgraded with high focus on management services for disasters (cyclone, drought, earthquake, flood, forest fire, landslide etc.),* tourism and with high resolution databases. The recent version of Bhuvan is now featured with more disaster services which are now integrated with agricultural drought and landslide hazard zonation. This portal also offers Flood and Forest Fire Alerts, online data of significant use will be of great help for the government to plan the reconstruction and rehabilitation activities in the country.

This portal has many spatial tools generally available in commercial GIS software. Any user having an internet connection is capable to use online resources and to view earth features in 3-dimensional format.

A GIS layer can be created by adding their point of interest and may be shared with others. Other facilities include chart routes, plot areas, calculate distances, and overlay separate images. Various layers can be shown or hide in any combination for required display. Using the scale and the robust measurement and terrain analysis tools, users can plot mileages, calculate elevation differences and measure slope angles between desired points. Further 3D view allows for terrain elevation profile along a path, and find places of interest along the way. Links may be developed for other web-sites to contact those points of interest and establishments.

The following services are available on Bhuvan Geoportal:

• Thematic services • Web map services (WMS) • Add different Imagery and Elevation layers onto the databases • Load OGC Web Feature services data •

Perform attribute query on the map • Load WMS and WFS data on Bhuvan • Tourism GIS • Municipal GIS • Terrain Profile tool • Threat Dome tool • Video on terrain • Community tool • Public layers • Add content • Weather services • Ocean services •

Disaster services • My maps • Rediff maps • Mobile application

The mapping tool allows users to visualize drought, flood, forest fire and landslide affected regions or any other theme which are available in the existing database. Some of the features/tools are listed below:

• **Drawing 2D objects** (Text labels, polylines, polygons, rectangles, 2D arrows, circles, ellipse) • **Drawing 3D objects** (Placing of expressive 3D models, 3D polygons, boxes) • **Online shape file** creation and download for use at other places. • **Draw tools** (creates simple markers, free hand lines and urban designs) • **Terrain profile** (displays the terrain elevation profile along a path) • Contour maps (displays a colourized terrain, maps and contour lines) • **Navigation map** (to jump to and view locations in 3D) and fly to locations • Heads –up display (HUD) navigation controls • Urban Design Tools (to build roads, junctions and traffic lights in an urban setting) • Superimpose administrative boundaries of choice on images as required.

Bhuvan is a web-platform services a comprehensive Geo-spatial service is Disaster Risk Reduction like it offers various spatial services that are helpful for contingency planning, in disaster services it offers near real time flood, drought, cyclone monitoring, Early Warning, damage assessment, and alerts.

The second face of the Disaster is the emergency services that is handling by the NDEM (National Database for Emergency Management) is GIS based repository of data to support disaster/emergency management in country coupled with set of DSS (Decision Support System tools to assist the disaster managers in emergency situation).

This Training will be focused on Geo-spatial contingency services and acquaint the participants about how they can use these services in the Disaster Risk Management.

Objectives:

1. Understanding Basic Concept of Remote Sensing & GIS
2. Understanding Mapping & Monitoring through Bhuvan Portal
3. Understanding Geo-spatial services in Disaster Risk Reduction

Target Participants:

Dy. Director Agriculture (Training), A.O., Agriculture Extension Officer, Agriculture & Horticulture Supervisor, and Statistics Assistants.Range Forest Officer, Asst. Conservator of Forest.

Methodology:

The training has been designed to be in online lecture and practical demonstration sessions followed by a questionnaire. It will be a fully virtual classroom training program.

Resource Person:

Dr. Harish Karnatak, ISRO, Dehradun Dr. Kamal Pandey, IIRS (ISRO), Dehradun,

Expected Outcome:

The participant will be aware of the Geospatial services provided by BHUVAN Portal and how they can be useful in Disaster Risk Management.