

Web-enabled GIS System for Disaster Management

Business Context

Karnataka State Natural Disaster Monitoring Centre (KSNDMC) is an autonomous body affiliated to the Department of Science and Technology (S&T), the Government of Karnataka. KSNDMC provides regular weather and natural hazards-related updates to the farming community, agriculture and horticulture sector, fishermen, transport sector, power and electricity sector and state and district level disaster management authorities in Karnataka. The centre provides a common S&T-based platform to synergise the 'Early Warning and Preparedness' activities related to management of natural hazards in Karnataka. 'Early Warning and Preparedness' heavily depends on S&T inputs like reliable, accurate real/near real data on the hazard causing parameter, forecasting, data analyses, alert recognition and dissemination of alerts. KSNDMC with an objective to develop a geospatial database for the decision making and management in an event of natural hazards, envisaged a system to capture the data in a near real-time manner (at an interval of 15 min, 24X7) and automate the generation of reports, alerts and early warnings to government bodies and communities. To capture the data, 1600 Telemetric Rain Gauges (TRG),

200 weather stations (TWS) and 13 VSAT-enabled earthquake monitoring stations are installed and maintained by KSNDMC.

Challenges

The key challenges were:

- Generating auto-mode customised alerts/early warnings/advisories based on the high density and high resolution near real-time data collected from telemetric systems of KSNDMC instead of current semi-auto mode
- Issue timely auto alerts/early warnings, advisories related to natural disasters to government bodies and community via SMS/help desk/email/social media/web portal
- Ensuring data integrity for delayed/no response TRG and TWS
- Building an interactive system to conveniently manage TRG and TWS stations, perform analysis, search, compare current and forecasted data
- Integrating historical data with data from newly installed TRG and TWS stations

The KSNDMC GIS is currently in operation and has been a success story where for the first time GIS-enabled early warning and spatial decision support system for disaster management has been developed and made operational in the government.

V S Prakash, Director
Karnataka State Natural Disaster Monitoring Centre

Solution

KSNDMC hired the services of Esri India in 2010-11 for three years, with scope for extension, to develop an interactive web-based GIS solution that enabled:

- Viewing weather information (temperature, humidity, wind speed and direction) and forecast data for weather and rainfall for periodical reports, e.g. actual rainfall vs. weighted average rainfall information and sending alerts if advised
- Managing TRG and TWS stations online
- Viewing and generating reports online at District/ Taluk/Hobli/Gram Panchayat levels

A KSNDMC steering committee guided Esri India Team in the programme. A comprehensive geospatial and

Web enabled Geo-spatial early warning and decision support system for disaster management enables timely insights, better communication thus making the information rapidly available for better preparedness and action.

Benefits

- The system now acts as a spatial decision support system for KSNDMC for planning purposes
- Application development module for the helpdesk has facilitated KSNDMC to answer queries raised by the community 24X7. Currently, this application is used by KSNDMC helpdesk to provide weather advisories to approximately 500-1,000 farmers/day across Karnataka
- Automated daily, weekly, monthly, seasonal and annual reports generated by the applications are later validated by KSNDMC personnel to issue automated alerts to the registered users e.g. in case sudden rainfall exceeds the threshold

asset database was also created which maps TRG and TWS locations, near real-time data received and historical data as well. The data model also integrates various proximity interpolation models and forecasting models as one of the tool in management of natural hazards in Karnataka. The solution is based on Esri technology – ArcGIS Server 9.3.1, ArcGIS Desktop, ArcSDE, along with Oracle 10g as RDBMS and Visual Studio 2008 as a development environment.

About Esri India

Esri India (NIIT GIS Limited) is an end-to-end Geospatial Information Systems (GIS) based solutions provider and enjoys a leadership position in India with a large customer base of Esri suite of software. Esri India also provides ArcFM Utilities solutions from Schneider Electric (Telvent), Network Engineer Telecom solutions from Ericsson (Telcordia), Cellular Expert from HMIT-Baltic, Cityworks from Azteca Systems and ENVI Image Analysis and Processing solutions from Exelis VIS to its customers.

Established in 1996, Esri India is a strategic joint venture between Esri Inc., USA and NIIT Technologies Ltd., India.

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