Monitoring Forest Cover Changes in Madhya Pradesh

Madhya Pradesh is the second-largest state in India, by geographic area. Known as the Heart of India, it is endowed with rich and diverse natural resources. Fully one-third of the state is dense forestland, consisting of 18 unique forest types, ranging from thorn-forests to subtropical hill forests. In addition to providing catchment areas for the Narmada, Chambal, Betwa and Sone rivers, the jungles are home to tigers, buffalo, and a wide variety of deer, antelope, and birds.

These forests represent a significant resource for the state, with both forestry (primarily teak) and non-timber forest products such as medicinal herb collection contributing to the welfare of the citizens.

About the Department

The Madhya Pradesh Forestry Department's large and geographically dispersed workforce works to be responsive, transparent, accountable, and service-oriented. This is not easy when your team is responsible for maintaining the ecological balance an area of over 77,000 square kilometers. To meet this challenge, the department has been a pioneer in forming 15,228 Joint Forest Management Committees (JFMCs). These committees protect and manage about 70% of the forest area.

Owing to the economic importance of forest wealth, they need to systematically organize the planning, implementation, and monitoring of all forestry-related operations. They keep track of changes in both the amount of area that is forested as well as how that land is being used. They collect and store a variety of GIS and geospatial data. This data must then be made available to all stakeholders, including the remote and rural tribes who depend on the forest for their livelihood.

Unregistered users can use the portal to view the maps and perform basic map reading tasks.

About the Project

Tracking all of these changes requires access to a large repository of geospatial data, including satellite imagery and vectors defining the forest boundaries. This data must be efficiently managed, stored, and cataloged with quality metadata. In order to facilitate an effective decision system, the data must be made available instantly and easily over the internet to the decision makers within the department.

This project allows the forestry department to use satellite imagery to map the forest, quantify tree growth and calculate forested area, all processed on the central data server. In addition to mapping remote areas, the department had to identify illegal encroachments onto forest land and illegal mining activities within the forest boundaries. They also needed automated ways to monitor forest change analysis (afforestation and deforestation) and the forest density.

Setting Goals

- Manage large repository of satellite imagery covering entire state from multiple years

- Automatically catalog and harvest metadata from newly acquired data

- Serve data as OGC services for decision-makers

- Quantify changes in forest cover and changes in vegetation

- Analyze the illegal mining activities with in the forest area

- Generate reports for stakeholders to monitor the changes in land use.

Realizing Results

Madhya Pradesh Forestry Department chose ERDAS IMAGINE Professional and ERDAS APOLLO from Hexagon Geospatial. ERDAS IMAGINE provides the capability to efficiently exploit satellite imagery. ERDAS APOLLO facilitates the cataloguing and discovery of datasets. It searches through the watched directories to automatically catalog the data, harvest the required metadata, and serve the data as OGC Services. It also provides granular, role-based user management, custom queries, and fast download of the data.

ERDAS IMAGINE Professional is being used to process LISS III, LISS IV and WorldView satellite imagery that aids the forest department for image geo-referencing, image subset, image mosaics classification etc. To set up the server-side, on-demand geoprocessing tasks, the department uses the Spatial Modeler in ERDAS IMAGINE. This tool provides an ever-growing toolbox of geoprocessing operators that allow the Forestry Department to build their own models and publish them to ERDAS APOLLO as Web Processing Services (WPS). This enables the forest officials to perform server-side, on-demand change-detection of forest using temporal imagery directly in the ERDAS APOLLO catalog with no software requirement at the client side.

The forestry department was able to conduct:

*   Time series analysis by visualising the imagery across time
*   Change analysis by creating Normalized Difference Vegetation Index (NDVI) maps in the region to analyze the change in vegetation
*   Land use surveillance by identifying forest land encroachment of and illegal mining activities
*   Effective communication by presenting the results through easy-to-interpret reports.

Registered and domain users have access to advanced processing and GIS functionality.

Key Benefits

*   Detect changes over the years using multiple tools on an integrated platform
*   Organize file-based, database and web-enabled geospatial and business data into one human-readable library
*   Optimize efforts by dynamically creating information and enabling fast image delivery and GIS Integration
*   Analyze the measures to control deforestation, illegal mining activities and encroachment of forest cover.

Contact us

🌐   https://go.hexagongeospatial.com/contact-us-today

HEXAGON

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous - ensuring a scalable, sustainable future.

Hexagon's Geospatial division creates solutions that deliver a 5D smart digital reality with insight into what was, what is, what could be, what should be, and ultimately, what will be.

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 20,000 employees in 50 countries and net sales of approximately 4.3bn USD. Learn more at **hexagon.com** and follow us @HexagonAB.