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Brochure

# Streamlining Forest Management with Web-Based Geoportals

Forests cover nearly one third of the Earth's land surface, providing timber, food, fuel, storage and recycling of water, habitat for a variety of plants and animals, and recreational benefits.

But threats to the world's forests are growing. Expanding agriculture methods, illegal and unsustainable logging, wildfires, and development pressures are some of the major threats impacting forests globally.

Forest agencies, both local and regional, are tasked with:

- Oversight of forest health issues
- Maintaining and protecting vegetation and wildlife habitats
- Managing lands for recreational use
- Firefighting
- Managing timber, food, and fuel resources

In order to provide these services and protect forest ecosystems, forest agencies are working to monitor, react, and preserve rich and diverse natural resources.

Owing to the economic importance of forest wealth, forest agencies 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.

## Fire and Theft Reporting, Watershed and Mining Area Mapping

Situated in eastern India, forests and woodlands cover about 30% of the state of Jharkhand, whose name denotes 'area of land covered with forests'. Jharkhand Forest Department is entrusted with all matters pertaining to forests and forestry; including protecting and conserving forest and wildlife resources of the state through scientific forest management practices.

Jharkhand Forest Geoportal consists of numerous modules, including:

- Forest Fire
- Citizen Forest Incident Reporting
- Micro Level Watershed
- Plantation Monitoring
- Mining Area Mapping
- Wildlife Reporting

Forest managers and citizens can use the web-based geoportal to submit reports that include the geographic location of the incident, what type of damage is evident, reporting date and time, and upload photos.

In this solution, data modeling, watershed extraction, slope generation, vector and other data management are carried out using ERDAS IMAGINE®, GeoMedia®, and ERDAS APOLLO from Hexagon's Geospatial division.

Number and location of forest fires in the state of Jharkhand

Foresters begin by processing satellite images using ERDAS IMAGINE to prepare them for analysis. Next, foresters create complex spatial models using Spatial Modeler in ERDAS IMAGINE. These models are used to perform Forest Cover Change, Forest Encroachment Change, Forest Fire Burnt Area Identification, Forest Density Change, and Water Index studies in their area of interest.

Their spatial and non-spatial data is organized into a centralized library and distributed through ERDAS APOLLO. In this solution, the spatial and non-spatial data can be searched and efficiently rendered in the portal. In addition, the complex spatial models can be published, and users can run and reuse these models, and generate PDF reports.

## Forest Monitoring

Madhya Pradesh is the second-largest state in India, by geographic area. 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.

Total forest fire count in a southern district of Jharkhand

Madhya Pradesh Forest Department portal provides maps to the public. Registered and domain users have access to advanced processing and GIS functionality.

Madhya Pradesh Forestry Department has formed 15,228 Joint Forest Management Committees that protect and manage about 70% of the state's forest areas.

Madhya Pradesh Forestry Department uses a web-based forest monitoring time series module to identify trends and changes over a period of time to measure occurrences such as disturbances in vegetation or expansion of agricultural land usage. ERDAS IMAGINE provides the time series analysis through change detection technology. 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.

## Wildlife Reporting

Based in Dehradun, Uttarakhand, India, situated near the Himalayan foothills, Wildlife Institute of India trains biologists, wildlife ecologists, socio-economists, and managers to build up scientific knowledge, carry out research, and provide information on conservation and wildlife resources. Using their web-based WWI module for wildlife monitoring, managers and researchers can upload photographs and report information, as well as perform damage assessment and man-animal conflict zonation management.

Video feed of wildlife sightings inset on a map of marked sightings, provided in Wildlife Institute of India portal.

## Plantation Monitoring

Situated in the middle western part of India, Maharashtra state is one of India's biggest commercial and industrial centers, earning the name gateway of India. Comprised of Mumbai, its capital city, and other cosmopolitan cities, the state's varied landscapes range from beaches to mountains, including wildlife sanctuaries and national parks.

Maharashtra Forest Department, custodian of Maharashtra state's rich bio-diversity, aims to augment green cover on non-forest areas to achieve national targets of 33% of land area to be under green cover.

Plantation seedling statistics, maps, and images in Maharashtra Forest Geoportal

Using Maharashtra Forest Geoportal, plantations throughout the state can be superimposed on a satellite base map and combined on an interactive dashboard that includes live video feeds via a mobile app and other dynamic plantation status information. One example is plant nursery seedlings utilization analysis, available to users per individual plantation sites.

Hexagon's solutions and component-based Spatial Modeler technology employ a modular design. With these, users can build their own desktop, server, or cloud solutions that incorporate only the geoprocessing that they need. The 450+ geoprocessing services use multi-source data to perform operations such as georeferencing, orthorectification, and change detection. By extracting and repurposing proven geospatial technology into stand-alone functional elements, Hexagon has enabled users and partners to create streamlined, targeted applications that solve their specific problems.

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Hexagon's Safety, Infrastructure & Geospatial division improves the resilience and sustainability of the world's critical services and infrastructure. Our solutions turn complex data about people, places and assets into meaningful information and capabilities for better, faster decision-making in public safety, utilities, defense, transportation and government.

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