# Emitech Collaborates With Esri India to Develop Forest Management Solution

The application of Geographical Information Systems (GIS) has transformed almost every field in the engineering, natural and social sciences, offering accurate, efficient, reproducible methods for collecting, viewing, and analyzing spatial data. Forests are important renewable natural resources and have a significant role in preserving an environment suitable for human life. Forestry involves the management of a broad range of natural resources within a forested area. However, forest resource management in today's ever-changing world is becoming more complex and demanding to forest managers. Geographic Information Systems (GIS) and related technologies provide forest managers and resource planners with powerful tools for planning, management, and decision making.

Emitech Infosystems Private Limited (EIPL), a Kolkata-based Geospatial Products and Services company has been working with Esri India in providing GIS-based solutions including remote sensing and image processing, digitization, thematic mapping, digital image processing, contour mapping, and spatial analysis across India. Emitech Infosystems Private Limited (EIPL) collaborated with Esri India to develop a Web GIS-based Forest Management solution for Tripura Forest Development Corporation (TFDC) under the supervision of Tripura Space Application Centre (TSAC). The solution uses Esri ArcGIS API for JavaScript 3.x, ArcGIS Server 10.x along with ArcGIS Desktop 10.x and underlying SQL, Oracle, or Postgres database servers which enables forest department in resource management, harvest planning, fire management, among others. The application enabled the forest department in:

- Managing plantation and nursery data
- Easy tracking of budget allocation and expenditure
- Uploading and retrieving field data
- Zonal officers (Admin) for different locations of data centers
- Providing specific access to zonal admin
- Zonal admin can see of update only of his respective zonal data
- One final report to check uploaded data with various filter and query builder options

The below diagram shows the workflow of the application:
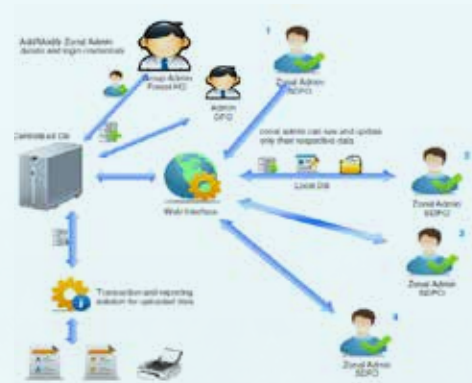
Features

1. Security management: The tool enables the admin to manage different levels of users and their access rights in the application.

2. Standard GIS functionalities:

- The full extent tool shows the initial view of the map i.e., the extent of Tripura state.
- Zoom In tool helps zoom a particular area of the map. A user can click on this tool and draw a rectangle around their subject site to zoom to the site.
- Zoom out tool enables the user to zoom out by drawing a rectangle on a map.
- The next extent helps users to go to the next extent, where they can browse different locations on the map.
- The previous extent allows users to go to the previous extent if the user has browsed different locations on the map.
- Pan tool helps the user in panning through the map. The user can use this tool to see the adjacent areas on the map.
- The Measurement tool enables a user to measure distance, area, and coordinates by drawing graphics on the map. Measurement units can be changed as per user preference.
- Identify tool is used to see detailed information and related images of layers at the clicked point by the user.
- Graphics clear tool helps clear all the graphics drawn by the user on the map.
- Show current location tool can be used to show a user's current location on the map. In browser, the application will ask to use the user location, which should be allowed by the user.

3. Option to choose different base maps (like Imagery, topographic, street, etc.) layer.

4. Layer control tool, with which user can switch on and off the layers on the map.

5. Legends tool dynamically displays symbology of visible layer on the map.

6. The drawing tool helps the user to draw the area of interest and get the area of the drawn polygon and mark the coordinates.


7. Printing of maps in different format and size.

8. Attribute information display on map: This tool displays attribute info from spatial and non-spatial database filtered through a query or on the selection of map

9. Spatial query tool: This tool facilitates users to select features based on graphics drawn on the map. E.g., finding habitations/waterbodies under a forest area.
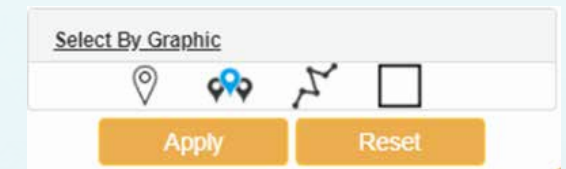
10. Buffer tool: This tool helps in doing proximity analysis. E.g., finding habitations under 5 km area from a national park.

11. Facility to upload the data directly through excel sheet for different zones.

12. Report generation tool: Reports can be generated based on a combination of spatial or non-spatial information.

Benefits

1. A comprehensive GIS-based analytics and reporting solution to visualize, locate forest assets, and track changes.

2. Exporting single-page and multi-page PDF reports based on customized advanced queries to GIS data.

3. Easy interface to upload department-related data in a prescribed format.

4. Smooth coordination between different zones for production, complaint redressal, and management.

5. Reduced cost of managing the forest asset monitoring and field operations.

6. Easy user creation and assignment of roles.