REMOTE SENSING AND GIS BASED INFORMATION

ON THE STUDIES NILGIRI DISTRICT, TAMIL NADU, INDIA

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ABSTRACT

This information helps people to get acquainted with the district if they are thinking of moving, have just moved to, or are native to the district. Unfortunately the district of Nilgiris does not have such information available in one location for the general public to view. I hope to provide citizens with a thorough description of their district and its workings, as well as the geology that the city is located atop of the major objectives are to identify the various path. To bring out the infrastructural facilities available in various Tourist centers and finally. To identify all the location and water bodies. Finally creating Nilgiris District information for the public use. The prepared thematic and analysis maps are scanned. The Autocad software was used to digitize the thematic maps. Topology was created and exported to software ARCGIS 9.3.Polygon cleanup was done using Global maper software. After the exportation of map from Autocad, the digitized maps are analyzed using Arc GIS and Global Maper tools. Particular data are entered for every thematic map, finally the maps have been prepared with reasonable data. Integration of thematic maps is done using the Geoprocessing Wizard extension. In this integration dissolve and intersect options are used. The final map was prepared, which shows the suitable sites for the artificial recharge. Using layout tools, the final output maps are prepared. This study gives an outstanding model for the users. This attempt concludes with user friendly criteria about the study area. And it helps the user to assess and identify various characteristic features of the entire study area with its essential features.

KEYWORDS: Geology, Geomorphology, Soils, Digital Elevation Model, Land Use/Land Cover

INTRODUCTION

A website for the district of Nilgiris, Tamil Nadu has a community GIS link which allows residents of the district to view information regarding the workings of their district. Some of this information includes tourism, schools, watershed and land use, etc. This information helps people to get acquainted with the district if they are thinking of moving, have just moved to, or are native to the district. Unfortunately the district of Nilgiris does not have such information available in one location for the general public to view. A GIS information database is needed for the district of Nilgiris to aide in future land use, to determine possibilities for population growth, for people who are simply interested in the workings of the district (those who are thinking of moving here, or those who already live here).

AIM AND OBJECTIVES

The useful information that our GIS database will contain regarding the district of Nilgiris will be underlying geology of the district of Nilgiris and the area east of the road and railway tracks, path of irrigation canal, location of

wellheads and wellhead protection areas, streets, location of the hospital, police station, fire station, post office, location of parks, location of schools and school zoning, tourist locations days.

I hope to provide citizens with a thorough description of their district and its workings, as well as the geology that the city is located atop of.

The major objectives are

- To identify the various path

- To bring out the infrastructural facilities available in various Tourist centers and finally,

- To identify all the location and water bodies,

- Finally creating Nilgiris District information for the public use.

STUDY AREA

The Name 'Nilgiris' means Blue hills (Neelam – Blue and giri – Hill or Mountain) the first mention of this name has been found in the Silappadikaram. There is a belief that the people living in the plains at the foot of the hills, should have given the name, the Nilgiris, in view of the violet blossoms of 'kurinji' flower enveloping the hill ranges periodically. The Nilgiris is situated on the Western ghats of Tamil Nadu. It is located between 10^0 38' N and 11^0 48' N latitude and 76^0 0'E and 77^0 15'E longitudes. The Nilgiris is bounded on North by Karnataka State, on the east by Coimbatore and Erode District. South by Coimbatore and Kerala State and West by Kerala State.
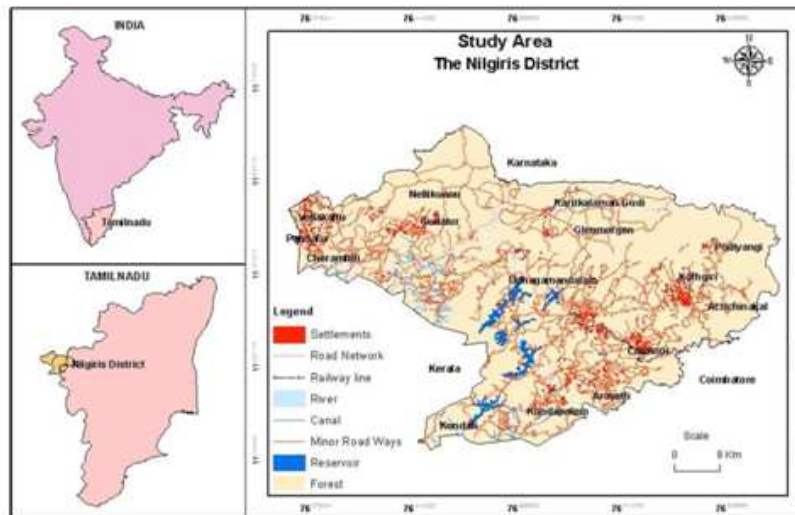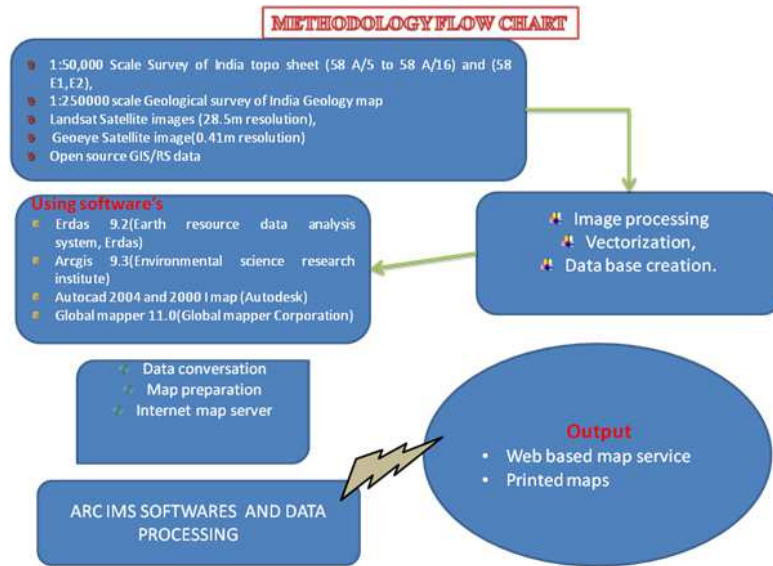

Figure 1

METHODOLOGY

Figure 2

GEOLOGY

The Nilgiris district exposes charnockite group of rocks with associated migmatites and bhavani group along with the enclaves of satyamangalam schist complex. The charnockite group is represented by charnockite and pyroxene granulite and covers a major part of the district in the southern port, which is popularly known as "Nilgiris massif". The bhavani group comprises fissile hornblende biotitic gneiss and occurs in in the northern port of the district. The satyamangalam schist complex is represented by quartz-sericite/mica. Schist, ultramafic and banded magnetite quartzite. The Nilgiris massif is capped by aluminous laterite at a number of places including the deep zone of weathering. Rocks of the greater part of the district weatherd and the development of a thick soil profile attaining a thickness up to 40m.with lithomarge is a common feature. The low gradient of slope in ooty, promotes stagnation of surface water as bogs and swamps.
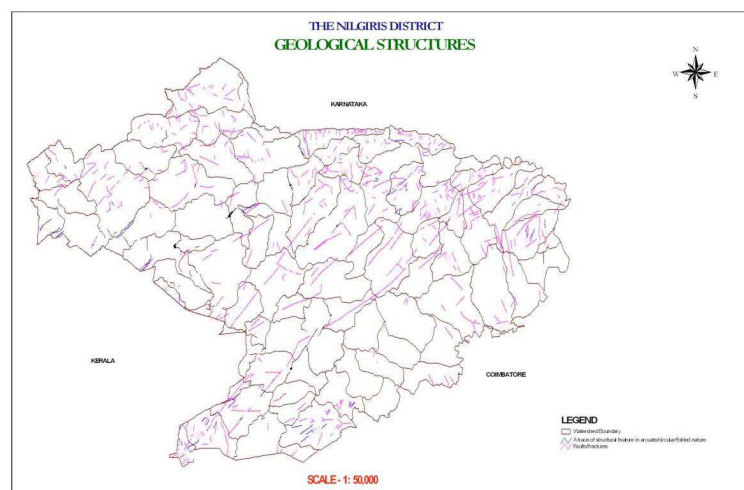

Figure 3

SOILS

Soil maps of nilgiri district is drawn based on the data from studies on soils of India (S.V. Govindaraja and H.G. Gopala Rao) and Soils of nilgiri district, Tamil Nadu (geological survey of India, Hyderabad)(hydrological atlas of Tamil Nadu(c.g.w.b 1987)

Based on chemical composition alkalinity, porosity and permeability of the soil they are classified into,

- Rock out crops with loamy sand/sandy loam brown/red soils

- Black clary soil (with calcium carbonate in matured soils)
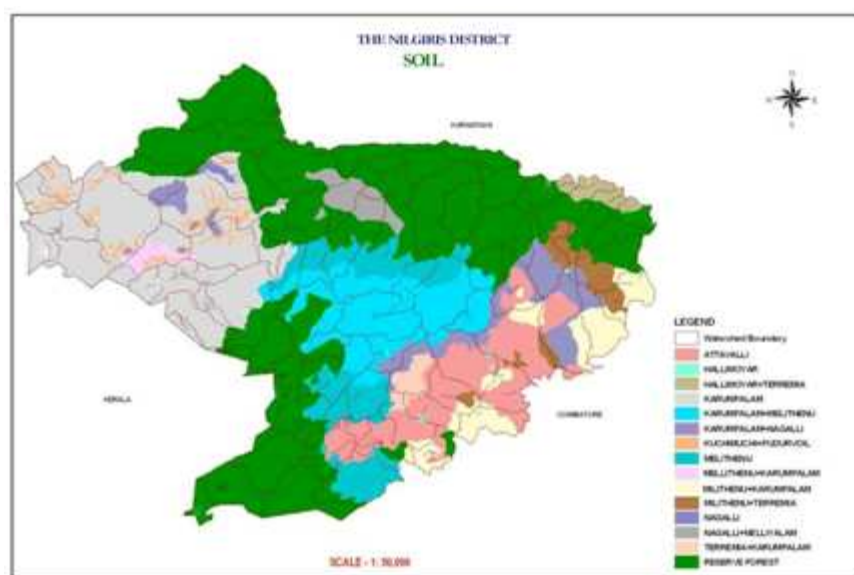
- Brown clay loam

Figure 4

SLOPE

Slope is an important attribute which influences potential zone, soil development and ground water flow and velocity. Slope is one of the indirect attribute of potential zone. The slope has the control over the amount of water passing through the unsaturated zone and into the aquifer during a specified period of time. Slope map is prepared by adopting a method developed by Wentworth (1930). The toposheet 58 A/15 have been used in 1:250000 scale for the preparation of base map. A 1cm square grid was prepared for the study area. The total number of contour cutting value is converted into degrees and minutes, for obtaining this the following formula is used.

Slope in Degree: (Total number of x contour interval contour Cutting /Km)

636.553

The Nilgiris distract slop map showing 90% high elevation area, 3% low elevation area remaining 7 % area only plain and settlement suitability area.
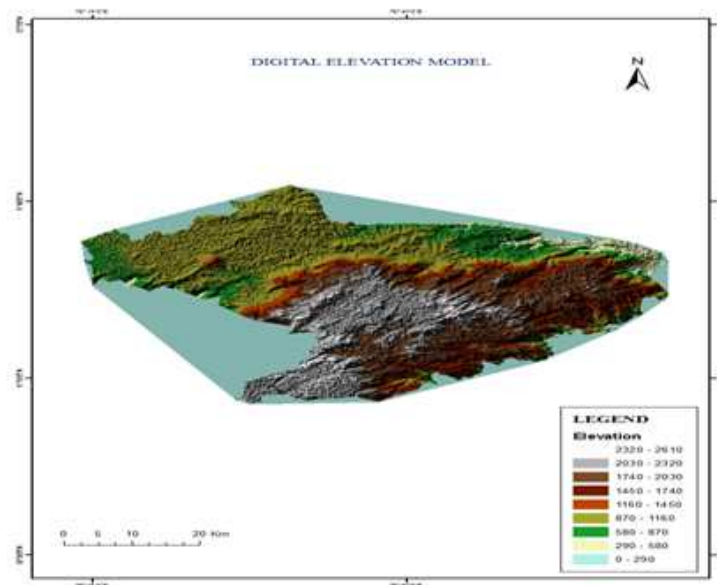
Figure 5

GEOMORPHOLOGY

The nilgiri hills rise abruptly from the surrounding plains to an elevation of 170m, above.m.s.l.they are surrounded by the coimbatore plains in the southeast, bhavani plains in the northeast, moyar valley in the north and gudalur plateau in the North West. The prominent hills are ooty hills, dodabetta, kodaibetta, bhavani betta and devabetta. dodabetta is the highest peck in Tamil Nadu. moyar is a prominent river in the district and flows in an easterly direction, along the northern boundary of the district. The drainage is dendritic to radial at places with prominent rapids, cascades and water falls. The erosional surfaces such as dodabetta, ooty, coonoor and moyar are recorded in the district. All these erosional surfaces are capped by residual laterite. The dodabetta surface includes landform such as high peaks, structural hills, and rocky escarpments with or without soil cover around which prominent radial drainage is developed. The ooty and coonoor surfaces include gentle mounds, with soil cover, stream meanderings and gentle smoothing of the hills. The latter aboutts against the former at many places, with break in slope.
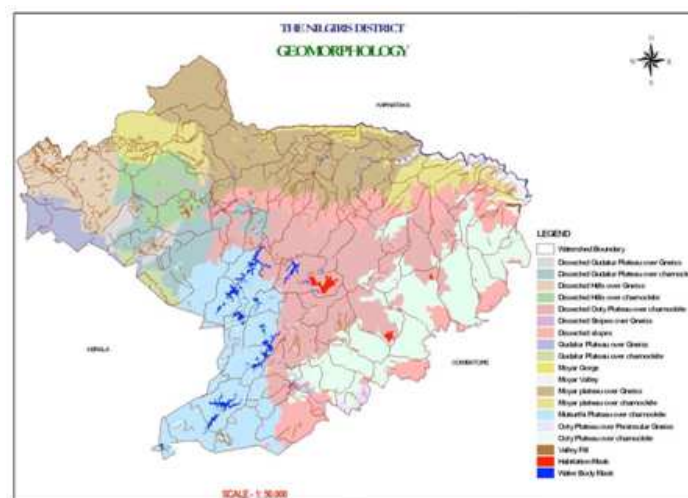

Figure 6

LANDUSE / LAND COVER

The Land use / Land cover of the area is yet another important parameter controlling the landslides as it provides varied degrees of protection and vulnerability to landslides. For example the natural vegetation and the thick forests anchor the soils and protect the slopes from slope failures. Whereas, the plantations, settlements, highly developed areas with net work of roads etc., increase the probability of Landslides occurrence. By duly interpreting the raw and digitally processed IRS P6 LISS –IV data, land use and land cover features were interpreted. The features so interpreted viz: dense forests, forest blanks, open forests, plantations, reserve forests, scrub forests, settlements, water bodies, water logged areas etc., were digitized and vector GIS layer was generated showing all the features as different polygon classes.
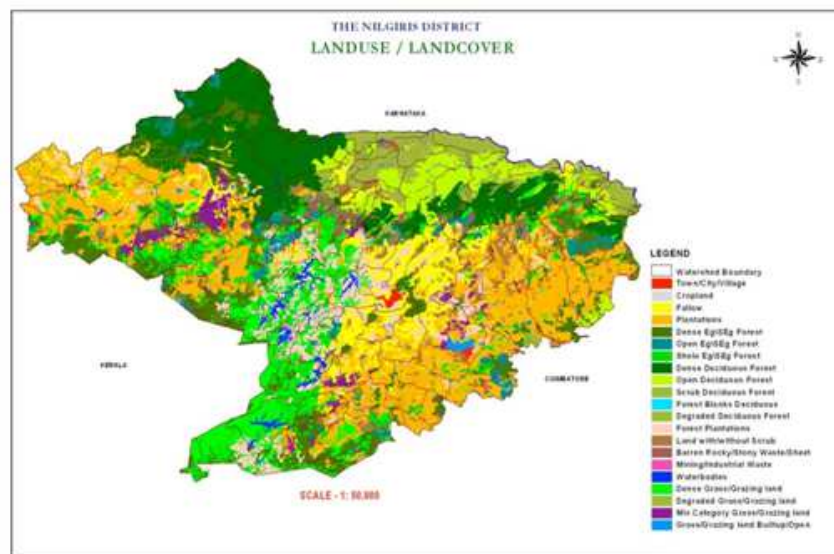

Figure 7

INTERNET MAP SERVICE

Internet is daily becoming a more important channel of communication and offers greater possibilities for transmitting and receiving all kinds of information. Thus, geographical information systems (GIS) are being complemented with this development, and consequently, replacing interactive means of communication through the network.

INTERNET MAP SERVER (IMS) TECHNOLOGY

With IMS technology, the spatial information published on the Net is dynamic. The distribution of geographical information via Internet allows the integration in real time of data originating in any part of the world. The user has access to WWW resources, moves freely through all the information with functional tools, changes graphic representation online, links graphic elements with information from databases, and works in real time with analysis functions. The options of exchanging, integrating, or analyzing data in a new form through the network facilitate, expedite, and favor the process of decision taking. Users can combine data and information accessible via Internet with local data, see them, and make consultations and the pertinent analysis. This distributive system of information, compared with tools that are "stand-alone" or installed in a personal computer, offers the following advantages, among others:

- Sharing and exchange of data.

- Access to applications and tools for analysis and decision taking for a much more extensive public.

- Facilitates continued updating of information, helping to reduce redundancies (duplications) and improving access to databases.

- Facilitates the updating of applications and disclosed information.

THE IMS ARCHITECTURE COMPRISES THREE LEVELS

Client Applications: Work environment of the user. Any navigator that supports standard HTML can act as client. It will also need to support Applet (Plugin) of Java or ActiveX technology if the services being accessed contain these components. Through Internet, and with the navigator as interface, the Client sends requests to the Server Application to obtain the information that the Client wants to see, consult, or analyze.

SERVER APPLICATION

These are responsible for channeling and attending the operations that the user requests on the data: ArcView IMS, Map Objects IMS, Arc IMS, Map Guide, TITAN, MMS, etc.

DATA BASE

The server applications access the data that can be stored in files or in spatial databases (Spatial data engine, SDE).

The Land Use Project has researched the advantages and disadvantages of the most important map server systems available on the market: ArcView IMS (Environmental Systems Research Institute, ESRI), ArcIMS (ESRI), Map Objects IMS (ESRI), TITAN (ERDAS) and MapGuide (AUTODESK). Other available systems for the spatial distribution of data on Internet are GeoMedia Web (INTERGRAPH), MapXTreme (MapInfo), MMS (Mapserver), Multiviewer (OpenGIS Consortium) and GIS Viewer (University of California, Berkeley).

TYPES OF WEB MAP

Static map, dynamically created web maps, Distributed web maps, animated web maps

Real time web maps, Personalized web maps, Customizable web maps, Interactive web maps, Analytic web maps, Online atlases, Collaborative web maps

HISTORY OF WEB MAPPING

- 1989-09: Birth of the www, www invented at CERN for the exchange of research documents.

- 1990-12: First Web Browser and Web Server, Tim Berners-Lee wrote first web browser and web server.

- 1991-04: HTTP 0.9 protocol, Initial design of the HTTP protocol for communication between browser and server.

- 1991-06: Viola WWW 0.8 Browser, The first popular web browser. Written for X11 on UNIX.

- 1991-08: WWW project announced in public newsgroup, this is regarded as the debut date of the Web. Announced in newsgroup alt. hyper text.

- 1992-06: HTTP 1.0[8] protocol, Version 1.0 of the HTTP protocol. Introduces the POST method and persistent connections.

- 2005-04: UMN Map Server 4.6, Ads support for SVG.

- 2005-06: Google Earth, The first version of Google Earth was released building on the virtual globe metaphor. Terrain and buildings can be viewed 3 dimensionally. The KML (XML based) markup language allows users to integrate their own personal content. This virtual globe needs special software and doesn't run in a web browser.

- 2005-11: *Firefox 1.5*, First Firefox release with native SVG support. Supports Scripting but no animation.

- 2006-05: Wikimapia Launched

- 2006-06: *Opera 9*, Opera releases version 9 with extensive SVG support (including scripting and animation).

- 2006-08: SVG 1.2[13] Mobile Candidate Recommendation, This SVG Mobile Profile introduces improved multimedia support and many features required to build online Rich Internet Applications.

OPEN SOURCE GIS SERVER BASED SOFTWARES

- Mapnik - C++/Python library for rendering - used by Open Street Map

- GeoServer, Map Guide Open Source – Web-based mapping server.

- Map Server – Web-based mapping server, developed by the University of Minnesota.

LICENSES WARE GIS SERVER BASED SOFTWARE

- ARC IMS AUTODESK IMS, MANIFOLD IMS, ERDAS TITAN

WEB SERVICE SOFTWARE CONFIGURATION

- Windows server 2000,2003,2008, Network load balancing, IIS, JRF, Arc IMS application

IMS FUNCTIONALITY MATRIX

The ATERAS conversion includes the generation of a new relational database to replace the functionality and Content of any IMS database. The new target relational database can reside on or off the mainframe and can use any of the standard relational database management systems, Microsoft SQL Server, Oracle or IBM DB2. The ATERAS solution includes the conversion and migration of the IMS database design and of the IMS data within the databases. The resulting databases are fully relational and native to the target database Management system and environment.

DATA BASE FUNCTIONALITY

The ATERAS solution provides a complete replacement for all IMS database functionality: IMS record layouts, Multi-View record types, Parent and Child relationships, Group-level elements, Re-defined data within records, Occurring data, Indexes Relational Results. The resulting relational database is fully relational. Primary keys, foreign keys and index definitions are automatically created. All constraints are generated into the resulting DDL. Table spaces, indexes, table names and column names are all generated according to your naming standards. The new relational database provides the

same business capabilities as the existing IMS database, but also provides full access to the data using standard SQL.

DELIVERED COMPONENTS

As part of the delivery process, ATERAS uses DB-Shuttle to generate and deliver the following component types for installation in the new relational database processing environment:

- Data Definition Language (DDL) Syntax for the new database

- IMS Data Extract programs, generated in COBOL, to unload all IMS data to the correct format for the relational database load utility

- IMS Data Extract JCL, customized to your environment, to execute the extracts and other key processing utilities

- Load Syntax (optional) for use by relational database load utility

- RI Check Syntax (optional) for use by relational database utility package

- RUNSTATS Syntax (optional) for use by relational database utility package

- DCLGEN syntax (optional) to define COBOL layouts of the tables for replacement applications

IMS DATA CONVERSION

The IMS data extract and relational load process is simple and straightforward. During the extract process, all IMS data is extracted and written to a set of sequential files that are ready to load to the new relational database target. The IMS data extracts are fast and can be executed simultaneously. ATERAS can provide a number of extract variations for sites that have special requirements for a short IMS data conversion window. Data conversion during the cut-over weekend or evening is always fast and complete.

CUSTOMIZATION WORKBENCHES

Special workbenches within DB-Shuttle provide additional capabilities for tailoring your IMS migration so that it better meets your needs and requirements:

- Re-name Workbenches to allow full naming of all tables, columns, table spaces and indexes using a rules basis or a full-name basis

- Multi-view workbench processing to allow the specification of multiple data layouts for a single IMS record so that the conversion can include multiple tables to replace the multi-function IMS record

- Data Cleansing Workbench to provide rule-based data cleansing during the IMS data extract process

- Date Conversion Workbench to allow DATE type columns in the new relational databases (all data formats are supported)

- Element Re-name Workbench that allows selection of group-level or elementary IMS fields for use as columns in the relational database

- Record Re-Definition Workbench to allow changes to field types and lengths during the conversion

- Segment workbench where copybook or hard-code record layouts are associated to the IMS database segments Visibility and Knowledge-Building ATERAS ensures that the customer teams (and the ATERAS teams) have a full understanding of the existing IMS database, as well as a full understanding of the post-conversion relational database. DB-Shuttle generates many reports and diagrams to assist with this knowledge-building process:

- Complete Entity Relationship Model (ERM) diagrams for the new relational databases

- Summary reports of the IMS file sizes and usage

- Matrix reports that relate files to tables, fields to columns, IMS records to extract programs, and more

- Date Finder reports that allow team members to define selected fields and columns to ensure that he migration addresses all requirements for date conversion

- Additional ad hoc reports that assist in further detailed identification of the unique characteristics of your IMS database and its conversion Related Applications ATERAS also provides automated conversion of the applications that use the IMS database. Visit our website at www.ateras.com to see how ATERAS converts COBOL, PL/1, Assembler, Easy trieve, JCL and Process for IMS applications.

INSTALLATION PROCESSING

Install iis from xp cd,

Install Mirco soft visual studio 2008, java jre, Apache_tomcat_5.5.28,

Geoserver → Geoserver 1.7.7_war → copy → C folder → program → apache software foundation → tomcat 5.5 → paste → back → Tomcat 5.5 → bin → tomcat5(service runner),.

Arc IMS_ 9.3 → Arc IMS_Incius →Arc IMS_web_ADF_dotNer → setup → portal id 80 → next → updating → finish.

Micro soft 2008 open→ run command → devenv → file → new → website → web map application → Browse (any folder) → ok → ok → default. aspx

WORKING PROCESS MANUAL

Start → all programs → Apache Tomcat 5.5 → tomcat manager → User Name: (admin) → passward: (Not required) → ok → geoserver → my geoserver → login → Username: admin → passward: Geoserver
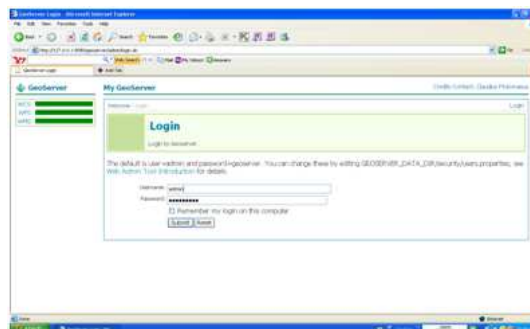

Figure 8

→ submit → configrication → data → Datastores → new → feature data set description: (shape file) → Feature data set id: alagu (any name) → new →url → ([Copy all the shape files only]→ start → my computer → C → program file → apache software foundation → tomcat 5.5 → web apps → geoserver → data → data → shape files → copy → select the shape file → press F2 → copy) → url: file:data/shape files/(name.shp) → submit → style : green(any) → Additional styles : (all select) → SRS: 4326 → Generate → submit → apply(left top button) →save
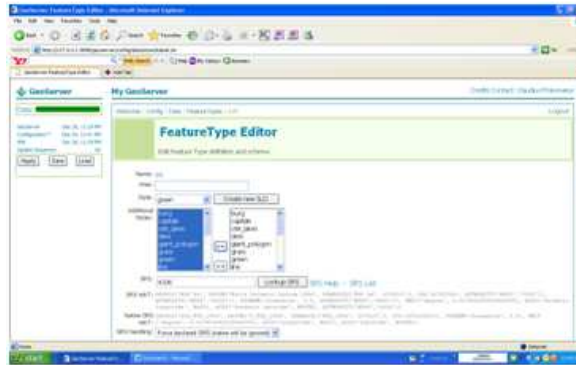

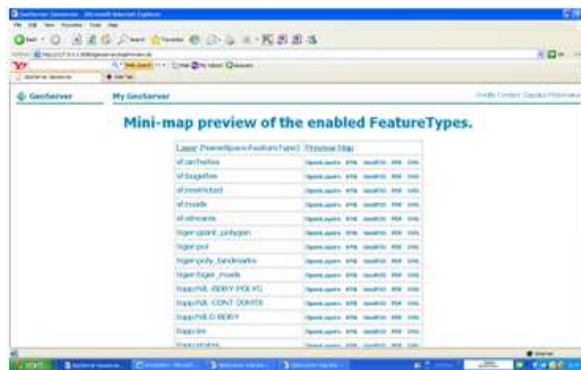
Figure 9:

Figure 10

→ Welcome → Demo → Map preview → (click any layer) → (it will open map preview in internet explore.) → ** (copy in address bar) http://127.0.0.1:8080/geoserver/ wms

FINAL OUT PUT GEOSERVER MAP
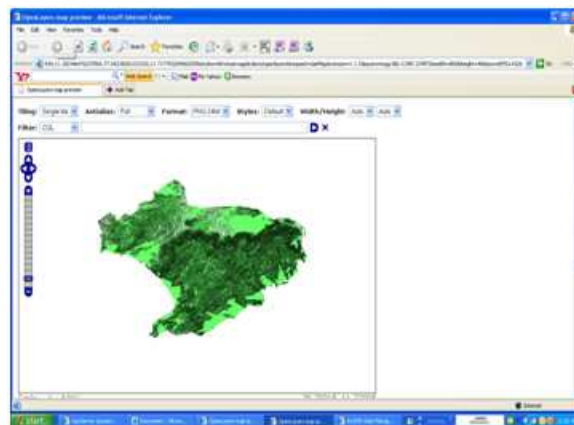
Figure 11

1. Start →all programs → arc gis → arc gis → arcIMS web manager for the Microsoft.NET frame work → user name: alagurajap\project → user name: administrater/project → ok → web Application →create application → name: project name → next → add layer → Catalog →Add Gis Server → type: WMS → url: ** paste → (click the name) → add → next → next → finish.
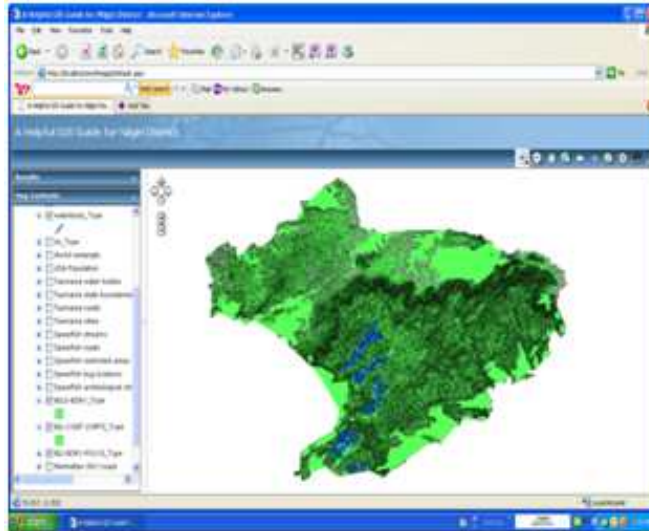
ARC IMS OUT PUT

Figure 12

ATTRIBUTE INFORMATION

Figure 13:

AREA CALCULATION

Figure 14

MAP ZOOM IN, ZOOM OUT AND INSERT MAP

Figure 15

CONCLUSIONS

This study finds a feasible solution for the users and to the society in a remarkable way. And it will also lay a front foot for the future inventions in the field of GIS applications. This study attempts an intense step and be an appropriate model for the future.

This study gives an outstanding model for the users. This attempt concludes with user friendly criteria about the study area and it helps the user to assess and identify various characteristic features of the entire study area with its essential features.

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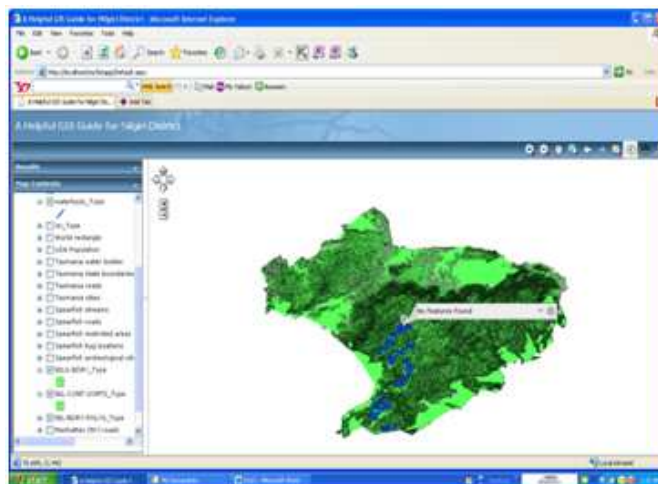
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