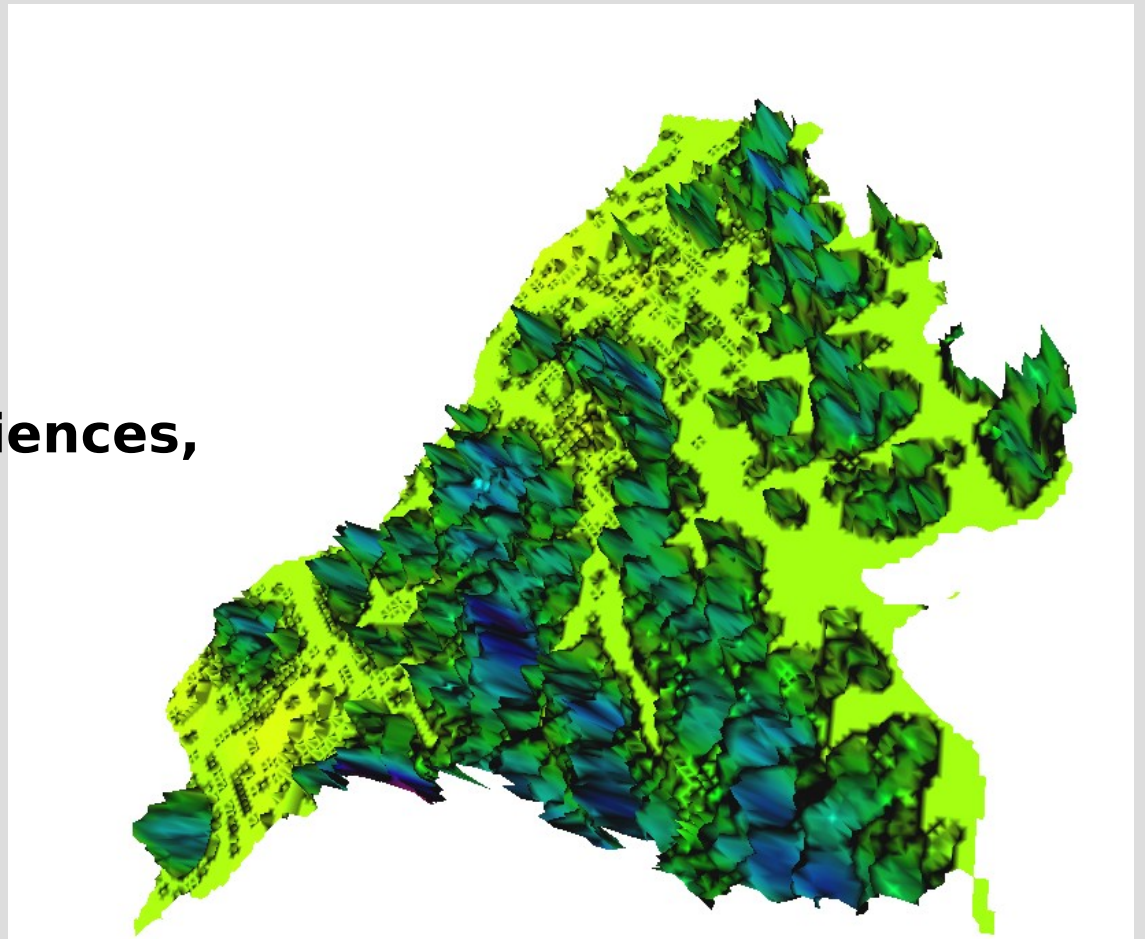


Application of GIS in decentralised planning - A free software approach.

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IISc, Bangalore.**



Decentralised planning in India

★ **Dispersal of decision making and administration process.**

- Planning and developmental activities carried out through a decentralised manner, is referred as decentralised planning.
 - *It implies the hope of **opening the blockages** of an inert bureaucracy,*
 - *giving more **direct access** for the people to the government and the government to the people,*
 - *which essentially **stimulate the entire nation** to participate in national development plans (Mahwood,1993).*

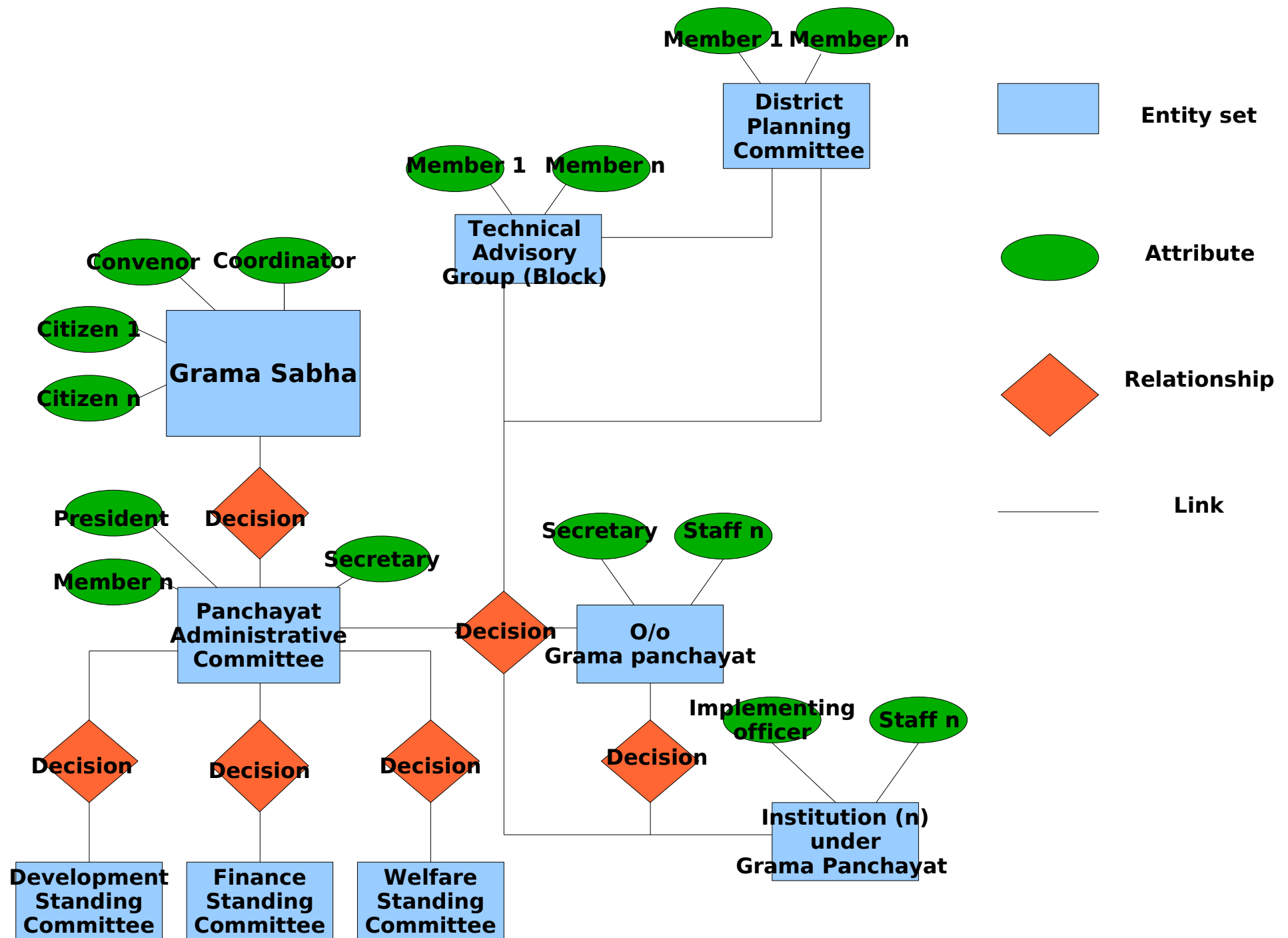
★ **Bound with the Panchayat Raj and Nagar Palika systems.**

Panchayat Raj - Rural local self government system in India.

- ☆ 3rd stratum of Administration in India along with Nagar palikas.
- ☆ 73rd constitutional amendment institutionalised the Panchayat Raj system and Grama sabha.
- ☆ Kerala - 3 tier Panchayat Raj system - Village (Grama), Block, and District (Zilla) – Act as local governments.
- ☆ Grama Panchayats - More financial and quasi-judicial powers than Block and District levels.
- ☆ Powers to impose and collect taxes, to raise its own fund, and administrative powers.

Developmental Planning in Grama Panchayats- Kerala scenario

- Start from the **Grama sabha** and development seminar.
- Grama sabha is a **permanent ward level committee** of electors - Meet **4 times a year**, interval between two grama sabhas will not exceed 6 months.
- Grama sabha take **decisions on the development activities** usually for the current financial year.
- Grama sabha decisions are compiled to prepare Panchayat level development plan document, and copies are duly sent to TAG and DPC for approval.



E-R Diagram depicts the decision making process related to the plan and development activities in a Grama Panchayat.

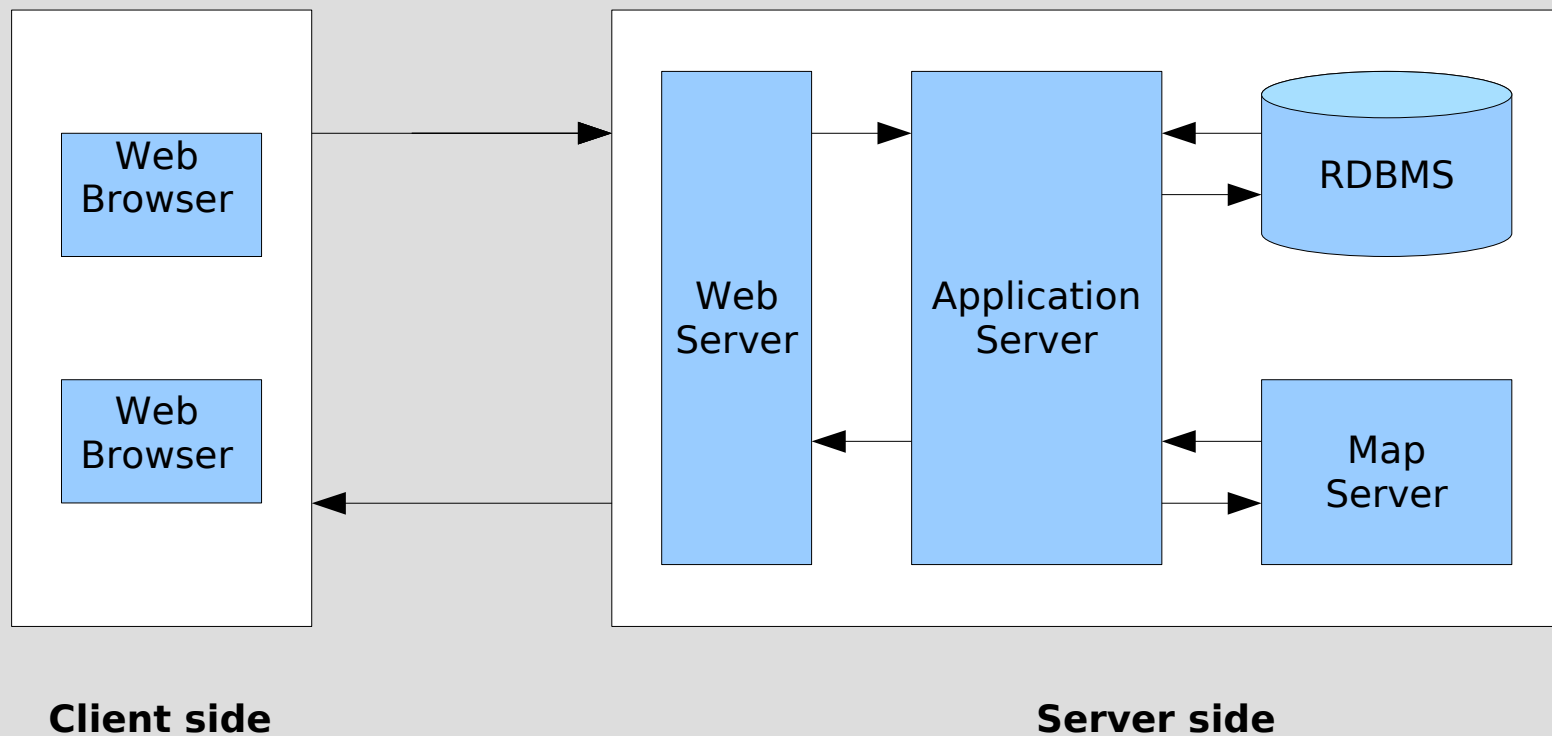
Difficulties in local resource planning

- For planning, information from **resource maps** and data from various **asset documents** are needed, and used. - Large sheets of hard copy resource maps and volumes of asset documents are **difficult to handle** in discussion sessions.
- A **new entrant** to this process will take time to understand the general physiography, land use, location of assets etc.
- Project beneficiaries and decision makers **usually think only about benefits** of the proposed work.
- Practice of **implementation of projects anyway** within time-limit, without considering bad implications, in order to avoid both lapse of funds and political failure.

A Simple solution for better decisions

- Hard copy resource maps and details in asset documents can be **converted to digital data** form which can be handled more easily.
- **FOSS GIS** (Free / Open Source GIS) is used for preparing digitised base data to develop geo-visualisation.
- A **geo-visualisation** connected with a geo-database, commonly accessible through a **web browser - A WebGIS** - will enable the decision makers to formulate better solutions for problems related with planning.

Design of a web based Geo-database.



Geo-visualisation - Visual geo-spatial display

- *The interface between cartography and scientific visualisation, and between technology for mapping and ways in which mapping can facilitate geographic thinking has been labelled Geographic visualisation (Geo-visualisation) (MacEachren and Monmonier, 1992).*
- In practice: A set of hardware and software tools and techniques which support geo-spatial data analysis through the use of interactive visualisation. - A subset of GIS.

Geo-visualisations are used in:

- Data storage and distribution alternatives.
- Environmental studies.
- Military / Intelligence applications.
- Multimedia development.
- Reconstruction of historical events and settings.
- Information systems and **planning**.

How it help to the planning process in a grama panchayat

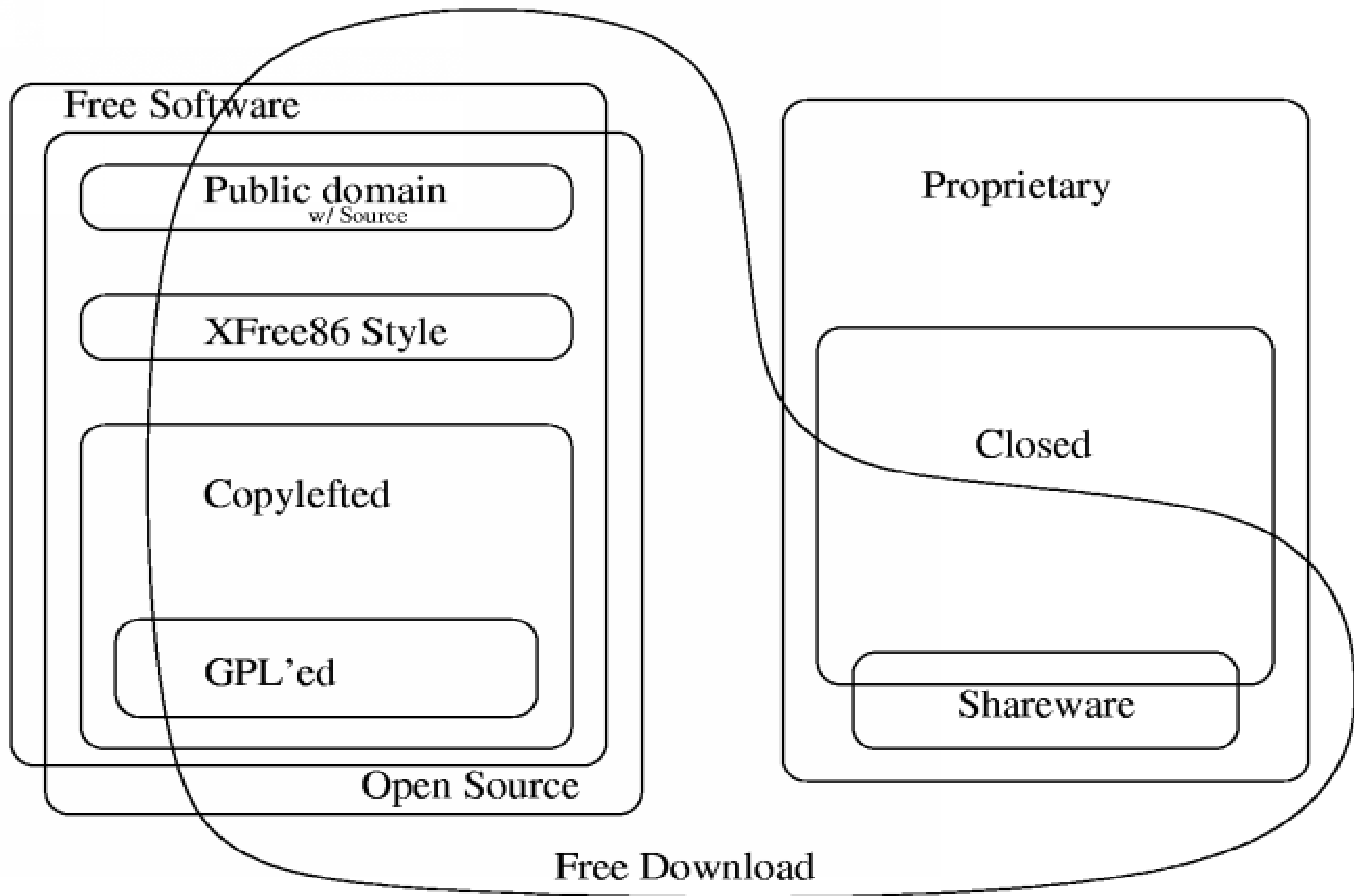
- ★ Serve as a single access point to get information about important resources in grama panchayat, for plan purposes.
- ★ Information on natural and built-up resources can be accessed interactively, which help to make environment-friendly decisions through holistic approach.
- ★ It provide the stakeholders spanning through different levels, with the ability to make balanced and economically feasible decisions.

Choosing right software tools for grama panchayat - Why Free / Open source

- **Ensure 4 freedoms on software** - No need to be dependent on corporates who may have vested or predatory interests.
- **Support** - Free technical support available through user groups, web forums, mailing lists, and IRC channels.
- **Reliable** - Standard free operating systems are more stable than proprietary counterparts (Wheeler, D.A.).
- **Data security** - Standard GNU/Linux systems have inherent protection against viruses, worms and malwares, and less vulnerable than proprietary softwares (Redners tryckeri, 2003).
- **Financially affordable technology** - Considering plan outlay of Panchayats. Availability of a wider range of tools in public domain and in official repositories of Free OSs.

Choosing right software tools - Why Free / Open source

- **Community culture** - Community driven software development model - sharing of ideas - joint efforts to solve problems.
- **Government policy and support** - Governments clearly supports Free software.
 - ★ *“Free and Open Source Software will be used in all government funded ICT e-Governance projects to the maximum extent possible... Considering the growing economic opportunities happening around FOSS, the Government intends to develop the State as the FOSS destination in the country.” - Information Technology Policy Document - 2007, Govt. of Kerala.*



Different categories of softwares (www.fsf.org)

Objectives

- ▶ Create a geo-spatial database for a grama panchayat compiled from locally available data sources.
- ▶ Develop geo-visualisation of basic themes in pre-defined scales, based on the geo-database, using open source spatial information systems, suitable for decision making and planning at disaggregated levels.

Study area

▶ **Cheruvannur Grama Panchayat**

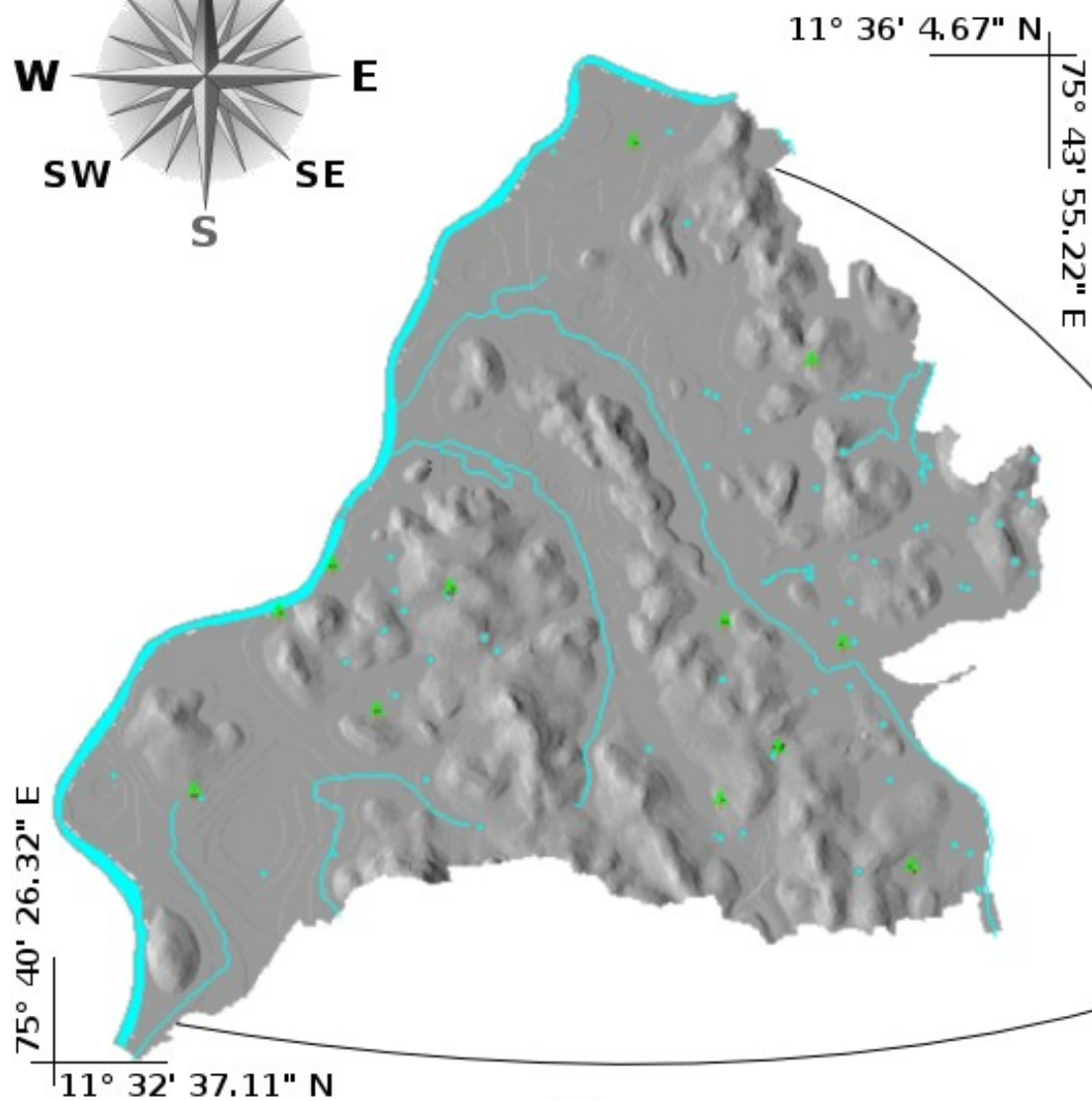
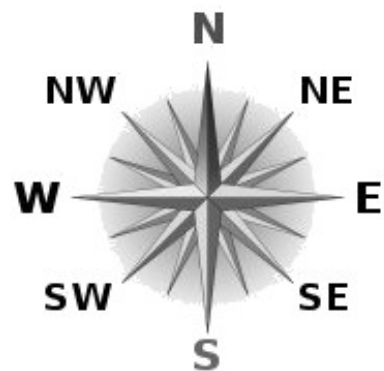
- Perambra Block
 - Koyilandi Taluk
 - Kozhikode District

▶ Area: 21.61 Km².

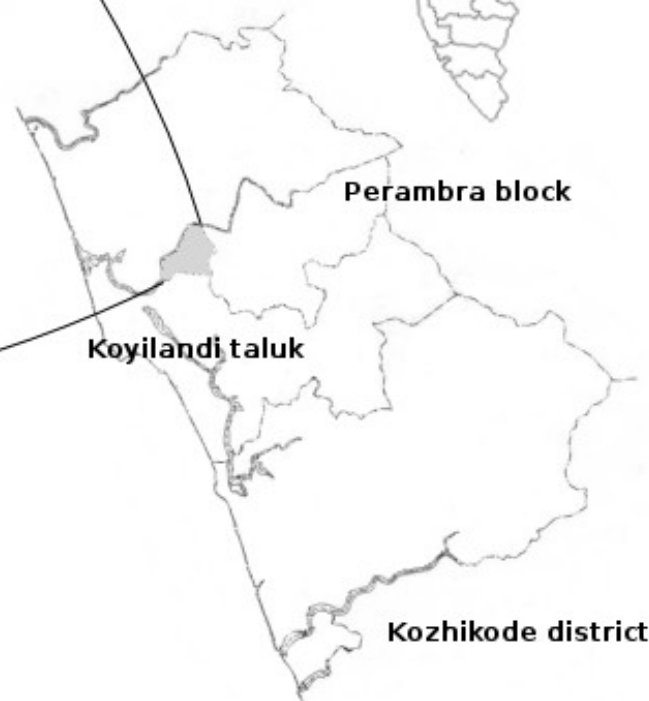
▶ Population: 22150 (2001 Census).

▶ Location:

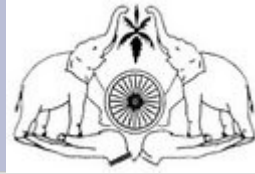
- Between 11° 36' 4.67" and 11° 32' 37.11" North Latitudes
and
→ 75° 40' 26.32" and 75° 43' 55.22" East Longitudes.



**Cheruvannur Grama Panchayat
Shaded relief and Location**



Cheruvannur Grama Panchayat



Materials

- Toposheets - 49M (1:250,000) and 49M/10/SE (1:25000),
- Panchayat resource maps (1:4000),
- Panchayat asset registers (roads, lanes, culverts, bridges and other constructions),
- LSGI election - Ward de-limitation documents,
- District census handbook – Taluk map with village boundaries,
- Watershed atlas and
- Watershed based development master plan - Perambra Block Panchayat.

Methodology

- Set-up the hardware, installed and configured the softwares.
- Scanned the maps (resolution: at least 200x200 pixels).
- Geo-referenced the maps:
 - ➔ Toposheets & Taluk map → Linear affine (1st order transformation).
 - ➔ Resource maps → Polynomial transformation matrix (3rd order).
- Digitised vector layers.
- Designed and created attribute database and tables → National(Natural) Resources Information System – Node design and standards (NNRMS, ISRO).
- Created raster layers and
- Set-up visualisation.

Layers

- **Raster Layers:**

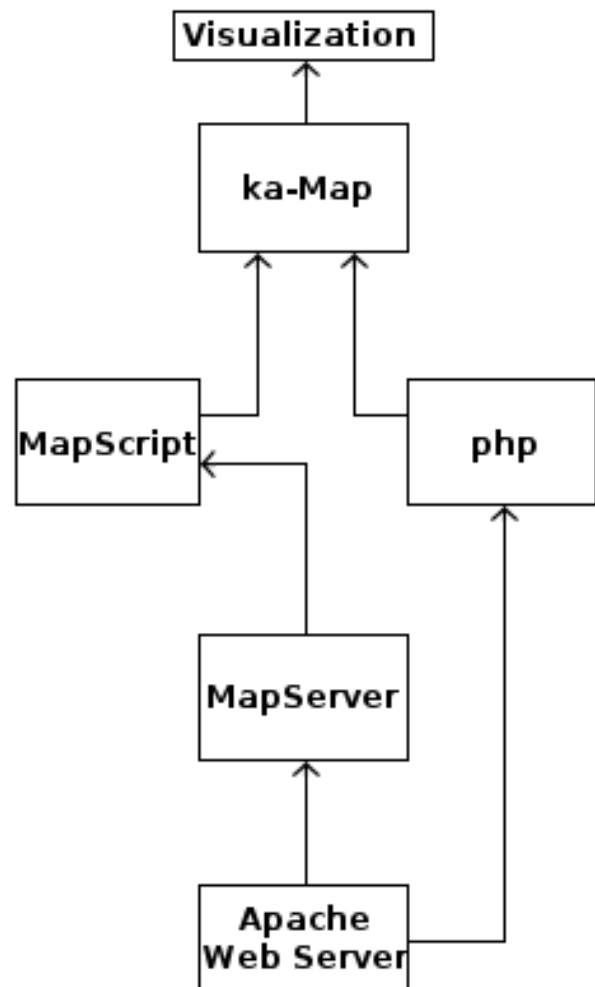
- **Elevation** - Show undulations of the area - useful for watershed based development programmes.
- **Land use/Land cover** - Provide an idea of current and better agriculture practices.

● **Vector Layers**

- **Place names**
- **Roads**
- **Energy** - Installed transformers.
- **Communication Facilities** - Post offices, Telephone exchanges and public telephone booths.
- **Anganwadi Centres**
- **Educational Facilities** - Schools and Public libraries.
- **Medical Facilities** - PHC, FWCs, Ayurveda hospital, Homeo dispensary and Medical shops.

- **General Facilities** - Government offices, Ration shops, Veterinary hospital, cemetery, river sand mining sites, Public computer kiosks etc.
- **Watershed Boundaries** - For watershed based development programmes.
- **Water-flow structures** - Aqueduct, Siphon, Regulator and Weir.
- **Sacred Groves**
- **Canals** - 3 distributory canals.
- **River and ponds**
- **Streams**
- **Admin boundary 2000 - 2005**
- **Admin boundary 2005 - 2010**

Visualisation front end



Ka-Map from maptools.org

- An open source javascript API - to develop an interactive web-map interface, which use the features available in modern web browsers.
- Works on Apache, with UMN Mapserver, PHP, and PHP-Mapscript.

Softwares and tools:



→ **Debian GNU/Linux 'Etch' 4.0** - Server operating system.



→ **GRASS 6.2.3** - Leading open source GIS for both raster and vector operations.



→ **GDAL 1.3.2** - Geo-spatial Data Abstraction Library
- The translation library for various file formats.



→ **PostgreSQL 8.1** - Object Relational Database Management System.



→ **PostGIS 1.1.2** - Spatial database extension for PostgreSQL.

Softwares and tools:



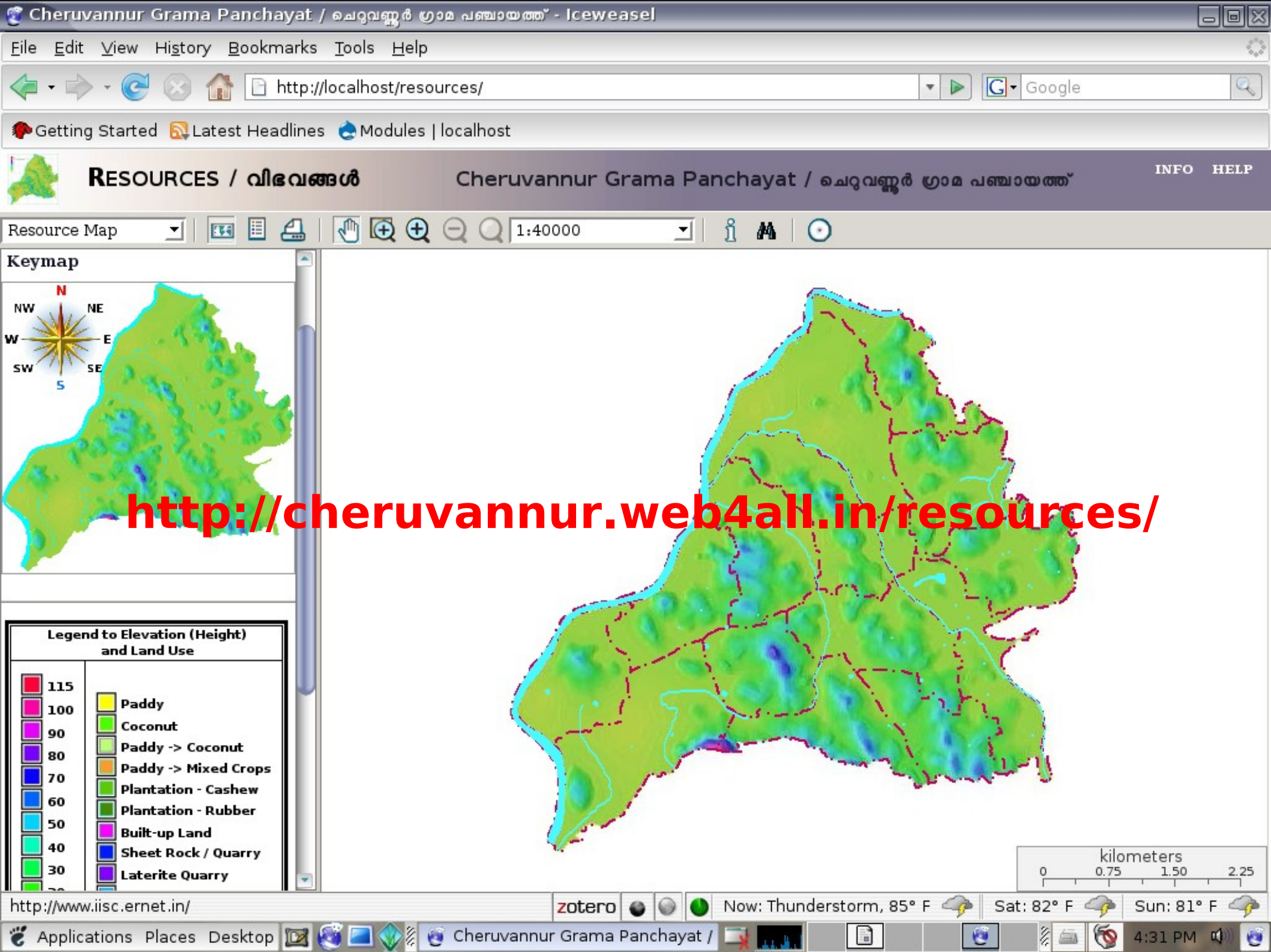
→ **Apache** - an open source web server.



→ **UMN Map Server** - an open source development environment for building spatially - enabled internet applications.



→ **PHP** with **PHP-Mapscript** - a scripting language, designed for producing dynamic web pages and a dynamically loadable module that makes MapServer's MapScript functions and classes available in a PHP environment.



Thank you..