Use of Open Source Geospatial Tools in Conservation: A case study of Wetlands of Kerala

Santosh Gaikwad and S Narendra Prasad

Salim Ali centre for Ornithology and Natural History
Deccan Regional station, Hyderabad
What are Open source geospatial tools?

- Software suite for processing spatial data such as maps, satellite data and other georeferenced data and info
- Code is under GNU/GPL licence
- Freedom to use, modify, distribute the software
- Open Source Geospatial Foundation (OSGEO)
Why Open source?

- Cost
- Freedom
- Community
- Robust and Stable
- Faster Development Cycle
- Long History of Science/Academic Involvement
Plan of the Presentation

- Background and Introduction
- Relevance and use of Open source Geospatial tools
- A Desktop GIS for wetlands
- A Web Based wetland Information system
- Way forward
Inventory of wetlands

MOEnF, 1981
SAC, 1998
SACON, 2004
CED 2005
KSLUB, LU/LC, 2008
SAC, Ongoing
Relevance of use of Free and Open source Geospatial tools

- Freedom to change, copy, distribute (GNU, GPL) software
- Localisation
- Multiple stakeholder involvement
- Often inexpensive
- In tune with Kerala state policy on use of ICT
Desk top GIS

Open Jump

ILWIS
Administrative boundaries of Panchayats, Municipalities and corporations of Kerala
A Zoomed view Administrative units.
Colour Coded Administrative units
A Zoomed view of Administrative units.
Zoom of wetland layer on Panchayat
An overlay of Wetland layer on Panchayat layer. Inset table illustrates info on wetlands.
An overlay of Wetland layer on Panchayat layer. Inset table illustrates detailed info on wetlands.
Thematic layers

1. Land use and land cover
2. Roads
3. Place Names
4. Drainage
5. Kerala State Boundary
6. Kerala Panchayats
7. Other administrative units like blocks or districts. (These were obtained through union function available in PostGIS on the fly)
Wetlands of North Kerala-Parts of Kasargod district
Location of wetlands
WEB GIS Tools used

- Google Map API
- HTML
- CSS
- PHP
- Post GRE Sql
- Post GIS
- Azax/XML
- OGR Library
- Open Jump
**Data Processing**

- Data Uploading using OpenJUMP
- Database Design
- Re/Projecting Data using GDAL library
- Data Cleaning using OpenJUMP
- Thematic Vector Data Collection on Land Use Land Cover including wetlands

**PostgreSQL PostGIS Database**

Conversion of data to XML

**Google Server**

Provides services for use in Map (imagery, streets, geocoding...)

API key = "XYZ"

**Web Page**

Web Page reads in XML or KML and displays as data on the map

```xml
<markers>
  <marker lat="X" long="Y" id="1" />
  <marker lat="X" long="Y" id="2" />
  ...
</markers>
```
The Google Map API with menu on the left for wetland query.
The Google Map API with satellite data and wetland Query system
Wetlands of Kannur with Fallow lands
Wetlands of Perumbadappu Block of Malappuram District
The Panchayat Fisheries Resource Databook is called Panfish book. The data pertains to water resources, fishes & others. The data in this site contains 14 types & aerial extent of wetlands. The data on these wetlands were collected in 2002 by Dept. of fisheries, Govt. of Kerala.

Panchayat: Alangode Number Of Ponds: 30 Area Of Ponds: 0.94 ha
Panchayat: Marancherry Number Of Ponds: 36 Area Of Ponds: 1.81 ha
Panchayat: Nannamukku Number Of Ponds: 5 Area Of Ponds: 0.42 ha
Panchayat: Perumbadappu Number Of Ponds: 38 Area Of Ponds: 0.72 ha
Panchayat: Veliyancode Number Of Ponds: 36 Area Of Ponds: 1.86 ha
Wetlands in Nemmara Block of Palakkad district
Wetlands Of Kerala

Results Fetched Successfully!

No: 22072
Name: Viruppu (single Crop)
Area: 1.4358088508606 Hectare
Perimeter: 719.382683647806 Meters
No: 3851
Name: Water Bodies
Area: 0.234967160975933 Hectare
Perimeter: 180.184247741278 Meters
Maranchery Fallow lands for Sustainable Development by KSBB
Wetlands of Patancherry in a radius of 2500M. Only 40 out of 110 total number is found within this radius.
Wetlands of Nemmara panchyat of Nemmara Block, Palakkad district.
Wetlands of Chittor_Tahtamangar
Municipality of Palakkad district
Wetlands of Chittor
Municipality of Palakkad district

Wetlands of Chittor-Tahtamangar
Municipality of Palakkad district
Wetlands Of Kerala

Results Fetched Successfully!

Wetlands of Chittor_Tahtamangar
Municipality of Palakkad district-Zoom

Search Add Overlay Geo Tools

Palakkad

Municipality Panchayat
Chittoor-Thathamang

Select Wetland Size (Radius in Meters)

Panfish Data
Select Wetland Type

OK Reset

Total 35 Wetlands found

Done
Wetlands of Ernakulam district with fallow lands on satellite image backdrop.
Wetlands of Thrissur district with overlay of Fallow lands.
Wetlands of Alappuzha with overlay of Fallow lands
Wetlands of Palakkad district

Total 2194 Wetlands found
Wetlands of Wayanad district

Total 10 Wetlands found
**Advantages:**

- Free (except for developer time)
- Quick development time - depending on complexity of application
- End product is light weight application, client side scripting
- Intuitive user interface - general public already familiar with Google Maps interface and basic navigation
- Fast, good response time
- Google provides solid background services (satellite data, roads, traffic data, street view, geocoding)
- Effective for displaying selected GIS data - not every mapping application requires multiple, complex map layers
- Great on-line resources for learning, multitude of samples and tutorials
- Best for focused applications
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A Way forward

- Biodiversity Information Management can effectively benefit from use of Open source geospatial tools, e.g., PRM
- Peoples Participatory process with real-time monitoring and updation of information and data
- OSGEO-India in partnership can do capacity building
- A highly cost effective and sustainable model for effective ICT use in NRM for all stakeholders
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