aeGIS

ANYTIME EVERYWHERE GIS

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***Abstract*—**Anytime everywhere geographical information system helps cities get a bird's eye view of their situation and their needs, using Geographical Information Systems (GIS) technology. Photograph a city from a space, magnify it, look at a few streets in any area, and then send in a survey teams to fill in the blanks from the streets up-how many people live there? How many have access to water and sanitation? Are the roads in need of repair? How many people keeps livestock? Which junctions are the most overcrowded? Armed with answers to such questions it is far easier and cheaper to bring improvements at the grass-roots level. The information gathered and researched provides a database of statistics and indicators on the state of urban development around the world. The information provides a database of statistics and indicators on the state of urban development around the world. The information provided enables policymakers as well as administrators to monitor implementation of Local Area Development goals to significantly improve the lives of citizens, in this case, 10,000 citizens of Sreekariyam Ward in Thiruvananthapuram. As a computerized system for the storage, retrieval, visualization, analysis and modelling of spatial information, aeGIS greatly facilitates different stages of the urban planning process. The growing user friendliness, affordability and performance of GIS in recent times, has further enhanced its utility as an effective planning support system. If constraints in the use of GIS such as data availability and skill limitations can overcome, open source GIS can provide excellent support for the planning of harmonious cities.

Keywords-

I. INTRODUCTION

Decentralization and participation are indispensable for achieving sustainable development. Towards this the Government of India has divided the corporation into different wards to promote decentralized Governance. Accordingly it is the constitutional responsibility of the local self-government to plan and implement projects for social and economic development in a participatory manner. In this context building reliable and accurate database enabling information flow is indispensable for planning and monitoring of schemes. In addition, creation of reliable interactive database can also help in revenue collection (house tax, property tax etc.) which in turn will lead to better service delivery and efficient management of local self-Governments. The present study looks at the creation of an interactive Geographic Information System (GIS) which is cost effective and people friendly for effective planning and management at the Grass root level. The Wards are the lowest unit of the urban local self-government system covering a population of approximately 10,000-12,000. Even though it is widely recognized that the Geographic Information System (GIS) has the capacity to analyze both spatial and temporal data on a cost effective manner for effective planning and management, its application at the micro level for participatory planning and management is limited as of now. In this context a project team was set up to integrate data from various organizations and efforts were made to develop an interactive package for participatory management at the grass root level.

II. OBJECTIVES OF STUDY

To develop an interactive GIS package for Sreekaryam ward in Sreekaryam panchayat, to be used by panchayat and also by the people at grass root level.

- To analyse spatial spread of infrastructure and link it up with resources and optimum utilisation.
- To formulate an action plan for the gram panchayat level on an interactive mode using a GIS platform.
- To develop interactive GIS gram panchayat level plan.
- Maximizing the efficiency of planning and decision making
- Integrating information from multiple sources
- Facilitating complex querying and analysis
- Eliminating redundant data and minimizing duplication

III. THE STUDY AREA

The study area was Sreekaryam Ward coming under Kariyam zonal office of Thiruvananthapuram District, Kerala State in India. The Sreekaryam ward has a population of approximately 10,000 and an area of 4.64 square km. The Sreekaryam ward is one of the five wards coming under the Kariyam zonal office. The reasons behind taking Sreekariyam ward is because it hasn't between mapped yet. This area is bounded by NH on one side and ODR on the other sides and it

depicts a ring road. This area is developing and lots of constructions are being undertaken at the moment. It's a conglomeration of all kinds of roads with overcrowded junctions to remote areas.

IV. METHOD AND TYPE OF DATA COLLECTED

The data collection was done on an interactive mode. The data was collected from different departmental organizations. The ward boundary has been clearly demarcated with the help of Assistant engineer, Kariyam zonal office and the counsellor, Sreekariyam ward, using cadastral maps in 1:5000 scale. The mapping was done with suggestions from the AE and the counsellor. Participatory local appraisal was conducted to validate the data collected. Data relating to following areas were collected.

1. Topo sheet.
2. Road network maps. (From Kerala Land Use Board)
3. Surveys relating to basic infrastructure of the roads, drinking water resources, schools etc.
4. Transformer locations
5. Open drain surveys.
6. Resource surveys using cadastral map in the scale of 1: 5000.
7. Surveys of governmental assets.
8. Location of waste disposal sites.

V. PROCESS METHODOLOGY

The base data forms the attribute database, the spatial database and the maps. These databases are integrated in a GIS platform and an information system was developed.

The presentation was made by QGIS 2.2 Software and the integrated plugins like GDAL, Geo search and open street maps were used. GDAL plugin was used to georeference the cadastral map. Open street map served as a base map to digitize various features.

The Interactive GIS developed is flexible to adapt to new situations and environments.

The pilot software was provided to the staffs working in the counsellor's office and were trained to use the same. Furthermore the documentation of the work has been done for an easy guidance.

The Software's used are QGIS 2.2.0 Valmiera, GDAL 1.2.29, Open Layers plugin 1.1.4 and geosearch 1.3.0 for developing the Interactive GIS for the ward.

The latitude and longitude of locations were found using Etrax GPS tracker and Android app GPS STATUS installed in our smartphones.

The outputs are of vector shape file form on the Window Screen are placed for visualizing the Software capabilities and outcomes. The Software has the capabilities to update database and the files are saved in new databases, which facilitates comparison of data over time period, for studying the impact of schemes or programs or development initiatives and detection of changes.

All formats are placed in window format for ease in use and understanding at the local level with QGIS Software. With training of one day, a person with high school qualification can operate the software and maintain the same. Any new parameters can be added and the software can be upgraded from time to time based on the need of the time, without losing any data.

Two kinds of modelling are generally adopted in aeGIS

1. arc-node topology model
2. relation database model

The road networks, boundary, open drains etc. are digitized using arc-node topology modelling. The data was inputted in vector format (point, line, and polygon). The arc-node topology data model is central to many QGIS vector operations. Arcs are represented with starting and ending nodes, which imparts directionality to the arcs. Each of the nodes and vertices is stored with coordinate values representing real-world locations in a real-world coordinate system. The storage of real-world coordinate values for features stored in the GIS is known as georeferencing. If features stored in the GIS are referenced to real world locations, the features are said to be geoferenced

Almost all of the tabular data used in a GIS are stored in relational database tables. Outside of a GIS, tabular data are commonly held and manipulated in relational databases such as dBASE, rBase, ACCESS, Oracle, SQL Server, INFORMIX, or other high-end relational database management systems (RDBMS). The tables in these databases are often linked with inter-tabular relationships, hence the name "relational" database. Tables are composed of columns or fields, and rows or records. These terms can be interchanged.

VI. APPLICATION

aeGIS has a wide variety of application which can enable us to achieve Local Area development Goals. Some of them are as follows :

1. Roads are the foremost component that is concerned with the development of an area. aeGIS provides attribute data which include the length and condition i.e. whether the road is in good condition or not. This can thus aid in improving the condition of the roads.

2. It also contains the areal extend of government buildings thus helping the local governing in future expansion.

3. Waste disposal near road side are a nuisance and it tells us the absence of proper waste management system in the area. aeGIS provides the location of these site's in order to eradicate the nuisance and thus enhancing the condition of the society.

VII. CHALLENGES FACED

The data like road network mapping, cadastral maps etc. were scattered in different governmental organizations. These organizations were reluctant to hand these data and even they did these data came at a price.

VIII. REPLICABILITY

The Interactive GIS developed at the Ward can be replicated. There are also possibilities and potential available for adding additional features and making it a wide spectrum software. The database required may vary depending on the type of problem faced in a particular area. The level of social mobilization needed to ensure participation in data collection and analysis can also vary from place to place.

IX. CONCLUSION

The user friendly interactive GIS for a micro administrative unit has helped in ensuring better participation of the stakeholders in decision making. The variation in the level of education of the community was bridged by pictorial representation of data. The project helped in empowerment of the community and generated land literacy. User friendly interactive GIS data base generated at a micro administrative unit (ward) can improve the efficiency of administration, improve resource mobilization and help in informed decision making. The software being simple and customized and open for modifications hold lot of promise for local level applications. The strong aspect of this software is the capabilities of liking wide graphic aspects, like photographs, audios, videos, imageries and analyzed maps etc. , which project field realities and help taking appropriate decision making, by people themselves.

The grass-root level thematic maps would provide a clear picture of any attribute, as it would help the planners associate various parameters together to gauge the effects of any plan and to effectively utilize the funds. It would be a refreshing approach for individuals and the village community, who till now are totally dependent on government agencies for all kinds of information. Due to the limited resources in the Government departments, potential of GIS has not been explored yet, though it can help in better planning and decision making. It is also observed that many a time, lot of money, time and effort is put by various departments for generating similar kind of spatial data, while this could be avoided by putting the data at a common place. There is need of some methods for updating such kind of spatial data by various departments and some mechanism for sharing of data so that latest maps can be timely obtained for decision making.

'aeGIS' a GIS framework fulfills all above requirements and helps in the integration of spatial and non-spatial data for various departments.

A. DESIGN OF WEB BASED GIS ON SREEKARYAM PANCHAYAT

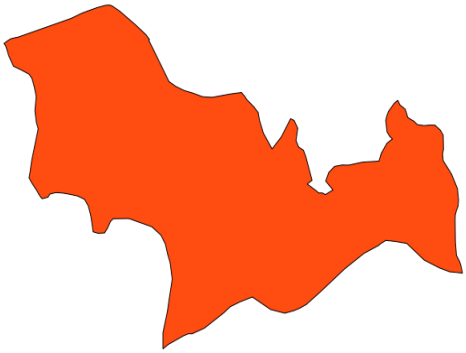

Fig 1. Boundary

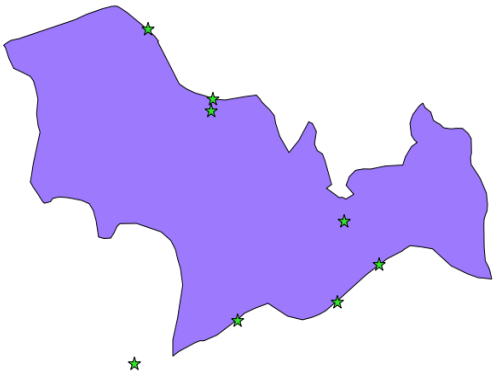

Fig 2. transformers

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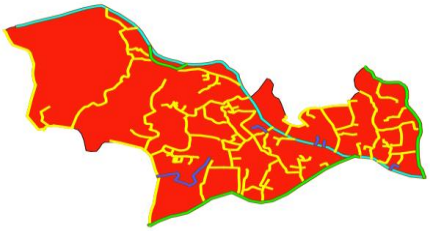


Fig3.Roads

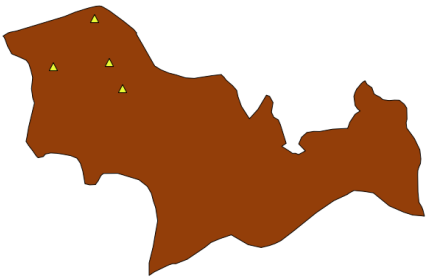


Fig 4. ponds

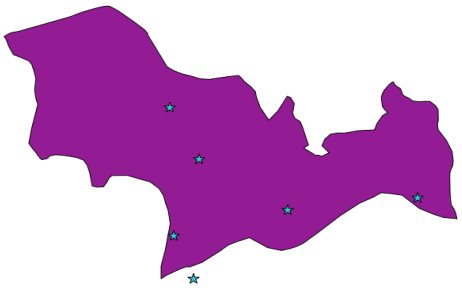


Fig 5. Anganvadis

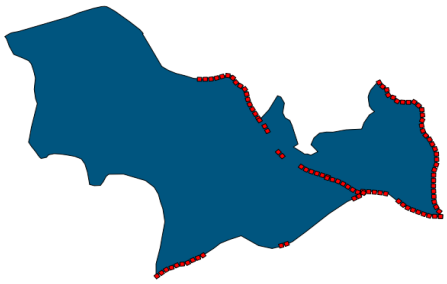


Fig 6. Open drains

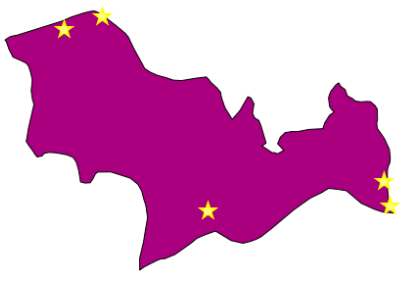


Fig 7. Assets

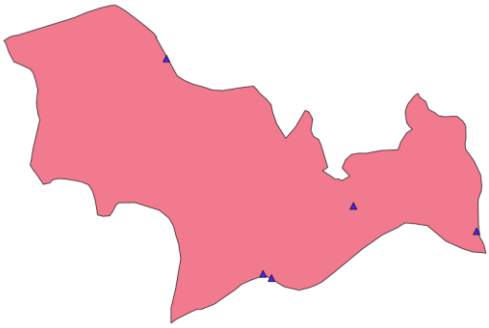
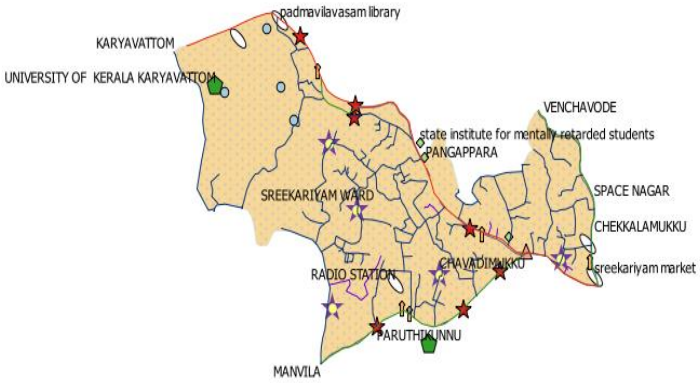


Fig 8. Waste disposal site's



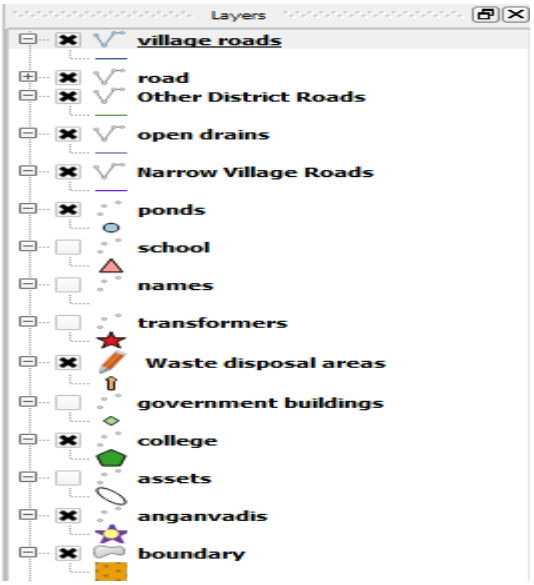


Fig 9. Final output

B. *ATTRIBUTES OF VARIOUS GEOSPATIAL DATA TYPE IN aeGIS*

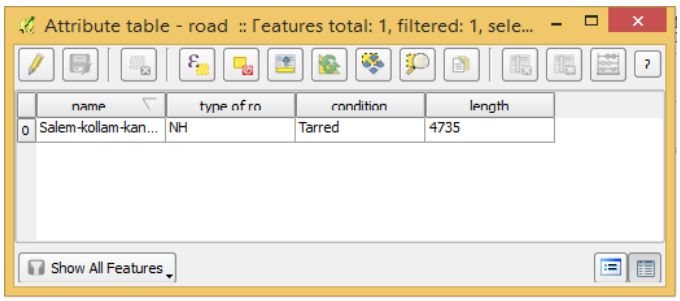


Fig 10. Attribute of national highway

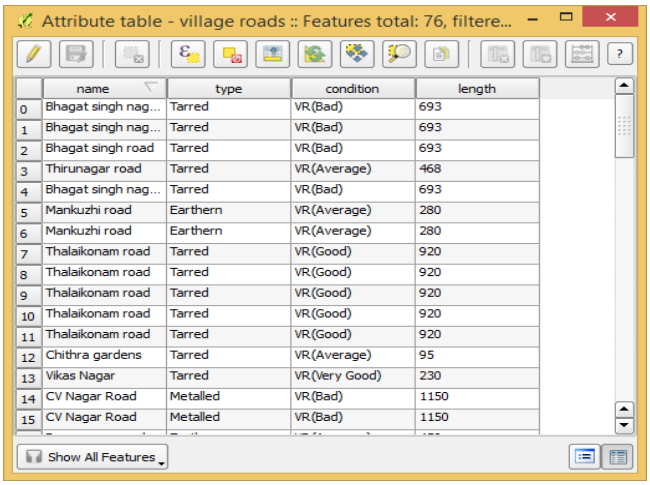


Fig 11. Attribute of VR

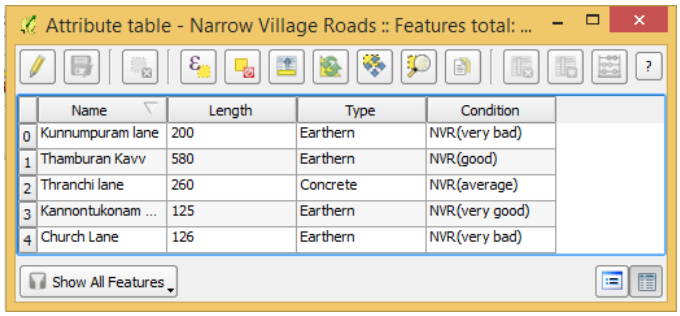


Fig 12. Attribute of NVR

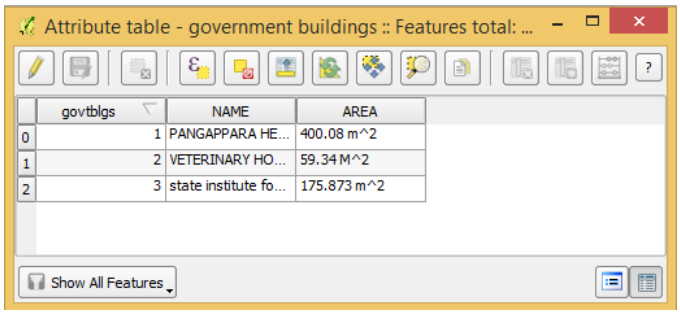


Fig 13. Attribute of government buildings

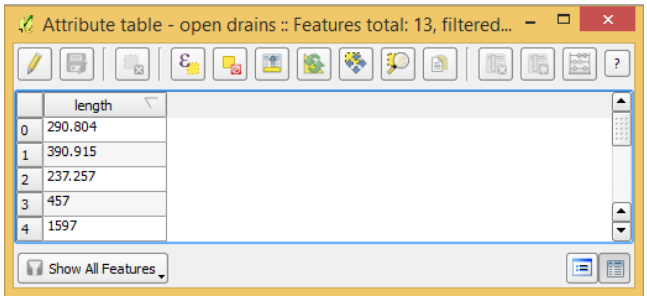


Fig 14. Attributes of open drains.

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