



WEB APPLICATION IN LAND INFORMATION SYSTEM – A CASE STUDY OF IBRAHIMPATNAM MANDAL, RANGAREDDY DISTRICT, TELANGANA, INDIA

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Article DOI: <https://doi.org/10.36713/epra31037>

DOI No: 10.36713/epra31037

ABSTRACT

Web application in land information system aimed to modernize management of land records, minimize scope of land/property disputes, enhance transparency in the land records maintenance system, and facilitate moving eventually towards guaranteed conclusive titles to immovable properties. The web-based technology has given great scope for integration and dissemination of map and multi-lingual attribute data. Any one on the Internet can access the information. The data updation, authentication has to be done at server with proper password protections. The web technology has given tremendous scope to LIS. The huge database of LIS including both map as well as alphanumeric data can be safely stored in a centralized server in the main land record department of each state. This information will be accessed through internet from different sub-divisions. Various levels of information will be available to different departments and they can be password protected to prevent illegal accessing of data. Open source Map server web application is used in this work. Map Server web application is a popular open source domain whose purpose is to display dynamic spatial maps over internet. Map server is a user friendly interface which is independent of GIS software with sufficient functionality to Land Information system.

KEY WORDS: Web Technology, Map Server, Land Information system (LIS), Property

1. INTRODUCTION

Land Information System is a detailed repository of land related details which can be handled with precision with GIS. GIS is a powerful computer based tool for mapping and a Decision Support System (DSS). Geographical Information System can integrate various type of data base along with statistical analysis, visualization and spatial analysis offered by the map. GIS facilitate integration of large volume of database and is an excellent and powerful tool for handling spatial as well as non-spatial data. GIS offers operations such as query, buffering, networking, overlay and statistical analysis. The World Wide Web (WWW) in its present level of development makes it possible to process and disseminate all the land record on the GIS platform along with the attached data. It is so structured that anyone and everyone can interact on the website in a query-based structuring. Even all applications and requests for mutations can be accepted online. The web technology has given tremendous scope to land information system. The huge data base of land-Information system can be stored in centralized server. This information can be accessed through Internet.

The web based land parcel-wise information provides the facility for ready and instant extraction of information regarding land ownership and other land details. Data mining and warehousing is the buzzword in the recent time. Data mining helps the end user extract useful information from large database. The huge volume of information created for LIS can be retrieved and visualized. Land is a finite resource and it is undergoing degradation. Action plan, based on land management strategies is required for the efficient and optimal use of land.

2. OBJECTIVE OF THE STUDY

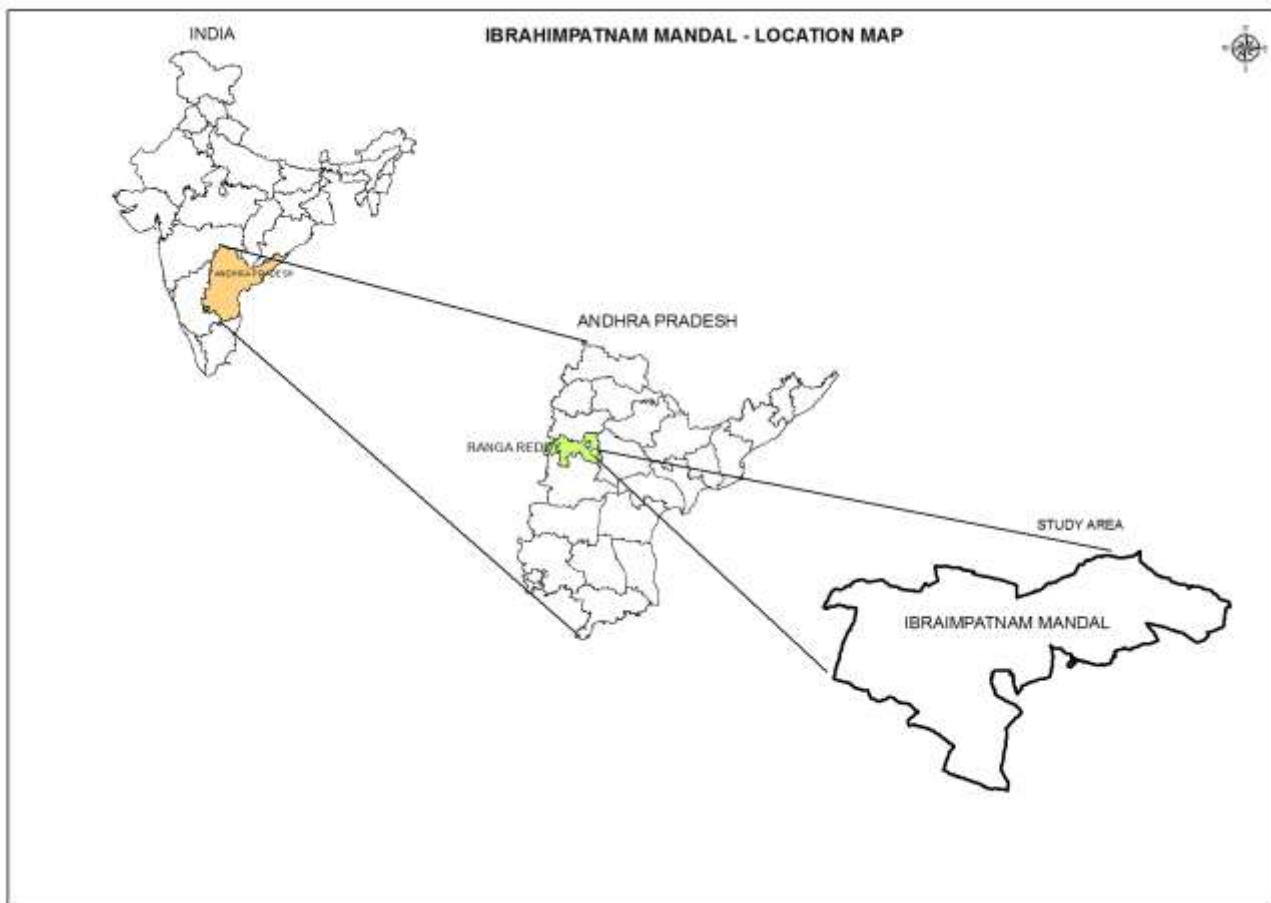
The main objective of the study is to develop a web based Land Information System for Ibrahimpatnam mandal of Rangareddy district

3. STUDY AREA

The study area falls in Ibrahimpatnam mandal which is situated in south eastern part of Rangareddy District (Fig 1). Rangareddy district was formed in 1978 by carving out some portion of Hyderabad urban taluk and rural and urban areas of remaining mandals of erstwhile Hyderabad district. Ibrahimpatnam is located in the southeastern part of Greater Hyderabad Municipal Corporation (GHMC) Ibrahimpatnam lies between 17° 06' and 17° 15' North Latitude and 78° 32' and 78° 48' East longitude. Ibrahimpatnam mandal covers an area of 284.0 sq.kms. In the north, it is bordered by Hayatnagar Mandal, Maheswaram mandal in the west. Kandukur mandal in the south-west, Yacharam mandal in extreme south, Manchal mandal in the south-east



and Nalgonda district in north-east. The study area is covered by toposheet no. 56K/12 North-west, 56K/12 South-east, 56K/12 South-west and 56K/16 North-west. Out 27 villages, 6 are uninhabited villages, which include Ismailpampu, Rainguda, Tattikana, Firozguda, Tadlakalva and Alimiyakunta. Excepting Firozguda, all other uninhabited villages covered very insignificant area.

Fig. 1

Ibrahimpatnam Mandal is in the immediate periphery of Greater Hyderabad Municipal Corporation (GHMC). The Outer Ring Road (ORR) passes through the study area in the north-western periphery of the mandal touching Adibatla and Bongaluru villages covering a distance of about 10 kms. Due to nearness to the outer ring road, Adibatla village has registered the growth impulses and drastic land transformation. A lot of software related ventures like TCS, Cognizant, and Tata Aerospace are located in this area. Outer Ring Road (ORR) connects the Rajiv Gandhi International Airport at Shamshabad. Hyderabad Airport at Begumpet is shifted to Shamshabad, located in the south-western periphery of Hyderabad along N.H 7. Due to spillover effect and growth impulses triggered by nearness to megacity of Hyderabad, Outer Ring Road (ORR), Information Technology (IT) centers and International Airport, the study area witnessed large scale land transformation. Therefore, the study area provided ample scope in understanding the land dynamics in the sprawling urban peripheral area of Greater Hyderabad.

4. METHODOLOGY AND DATABASE

Land information system is a multi-layered information system which is an outcome of inter-play of natural and human intervention. Therefore, it requires a variety of database obtained through traditional/ conventional source, which is to be complemented and supplemented by technology based surveys. Both primary and secondary data is used in this work. Primary data is collected through field visit, questionnaire survey and interview method. GPS data is obtained to collect the co-ordinates, GCPs and other location details. Secondary data is collected through various government departments like Mandal Office, Panchayat office, Survey Settlement and Land Record office, Indian Metrological Department, Geological Survey of India, and Census of India etc. Toposheets prepared by Survey of India is used for the generation of baseline and attribute information.

Earlier, the land cadastre information was updated with the help of aerial photographs. With the availability of very high resolution satellite data, it is now possible to use it in very large scale mapping at land parcel/cadastre level. High resolution satellite



image of IRS P6 with PAN merged LISS-IV data for the year 2011 is used in this study. To bring Land information system in public domain, Map Server based Web application is used. To bring Land Information in public domain, Open source Map server web application is used in this work. Map Server web application is a popular open source domain whose purpose is to display dynamic spatial maps over internet. Map server support display and querying on raster as well as vector data formats. It is fully customizable output. Although land information system is generally GIS software driven, Map server is used in this research work because, it is user friendly interface in which user can query or search information on spatial and non-spatial data. Map server is a user friendly interface which is independent of GIS software with sufficient functionality to Land Information system (fig 2)

Fig 2
ARCHITECTURE OF MAP SERVER BASED LAND INFORMATION SYSTEM

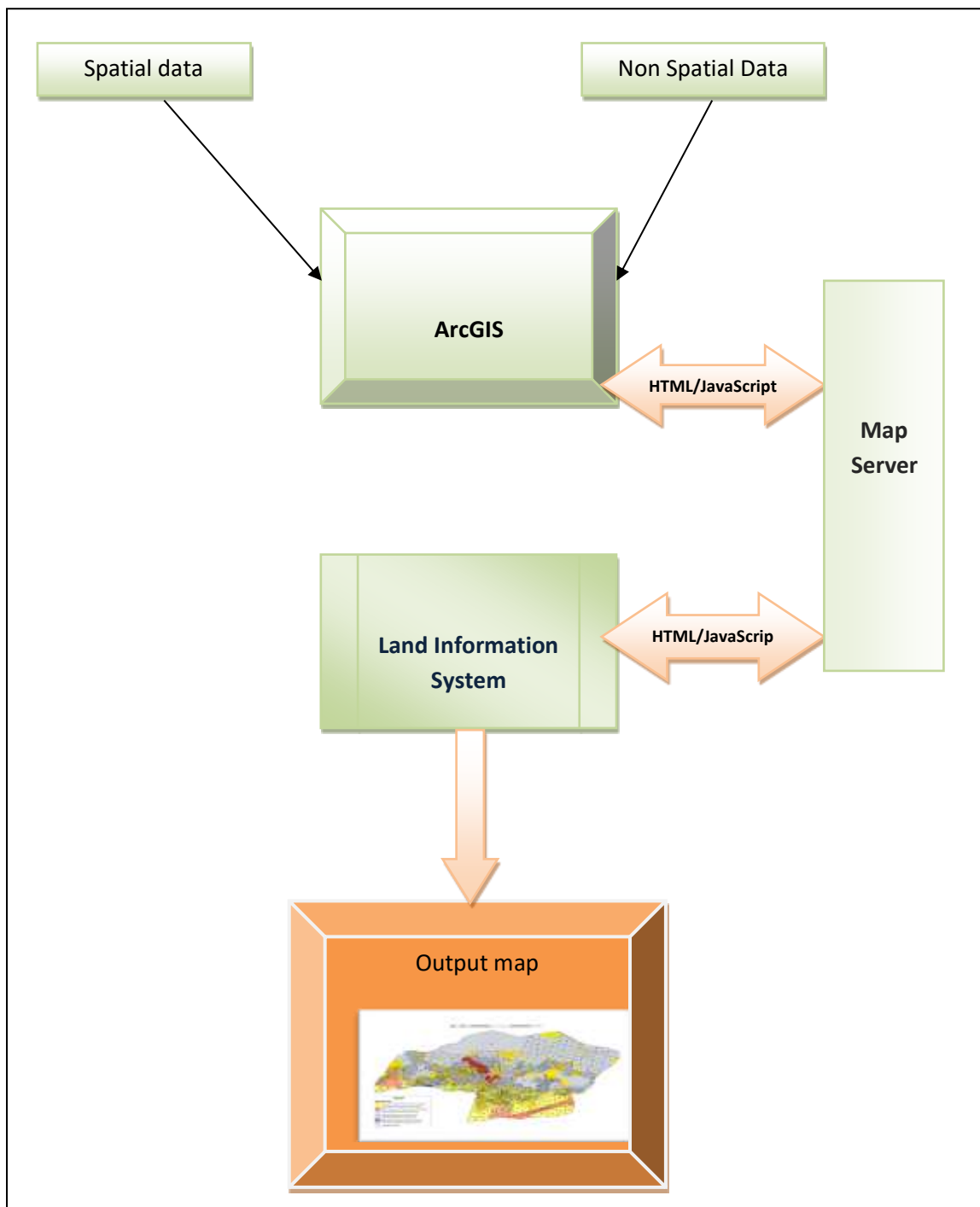
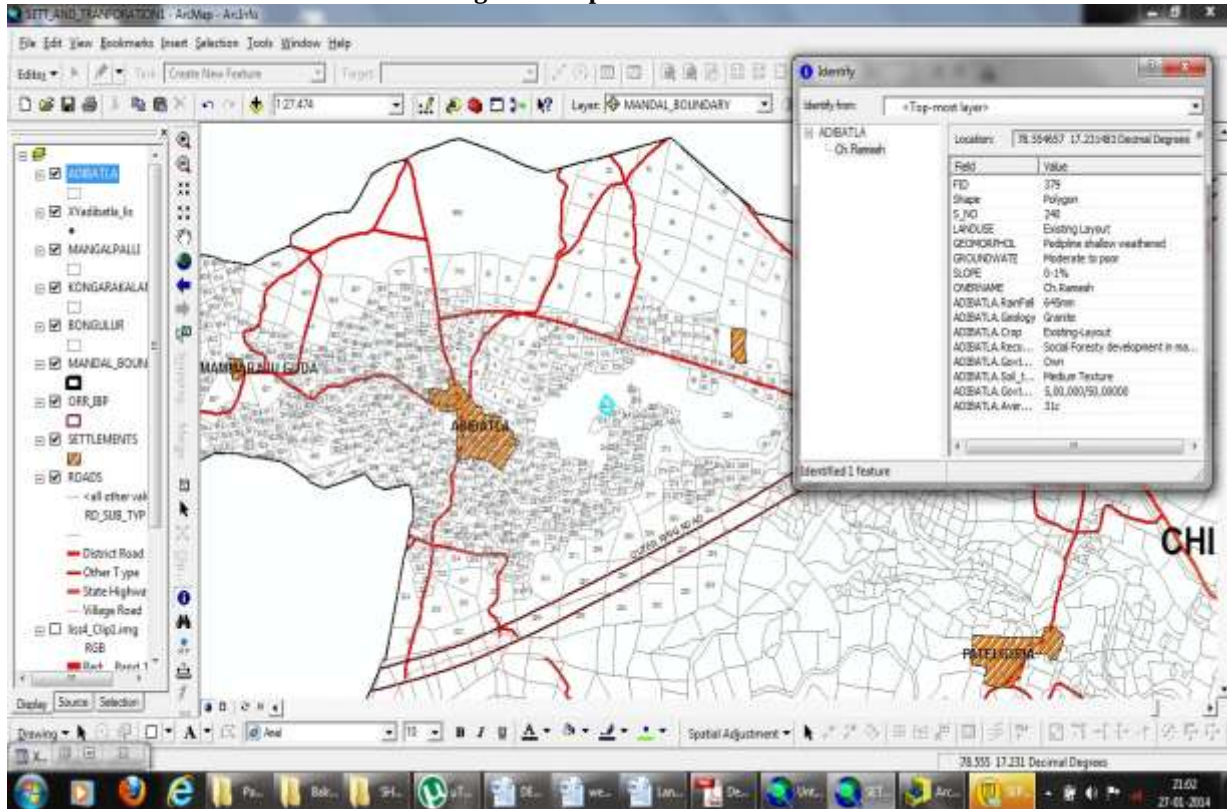




Fig 3
Window Showing Ibrahimpatnam Cadastral Details In Arc GIS



ArcCatalog was used for viewing the metadata, for creating new shape files and managing the spatial data assets. Arc Map was used for the actual editing purpose. It is meant for the design and interaction by viewing, editing or analyzing the geographical data in a visual context. New layers were also compiled and added according to the Information of Cadastral parcel (Figure-5.2). The new layers were created in the form of shape files and each Survey number was represented as a polygon feature. The feature's attribute table was then updated with details like its ID, Owner name, Extent, Landuse and Geology if any. The features in each layer were also categorized according to the different types available and given a category name. On the basis of the categories the symbology was also defined in the layers. Arc GIS data kept on Map Server using some coding languages. Coding part is done with programming languages includes: HTML, CSS, JavaScript, and C#.Net

By taking the advantage of Remote Sensing, GIS and Web technology Land Information System for cadastral mapping is developed by integrating digital cadastral map and land record database. By putting cadastral map and other kind of information into the digital form, it allows the user to retrieve the information. Map Server is the platform for publishing spatial data and interactive mapping applications to the web. HTML, CSS, JavaScript, and C#.Net are the powerful programming language, which is used to design excellent front-end tool. Web base LIS is primarily concerned with the storage and integration of land data. In such system digital map provide the foundation to build real estate information using land parcels as basic building blocks. This web based LIS can be utilized by any organization to store and analyze the land records.

5. RESULTS

Web based LIS of Ibrahimpatnam Mandal :

In the web based LIS page, only authenticated users can enter. Login users are of two types 1) administrator 2) users. The main difference between the two users is that only administrator can update the data, the save button is visible to the users who is having admin privileges and also only the users having admin privileges can create a new user account. All the remaining features are the same to all type of users

Main page: From home page all the operations of the application can be performed like viewing the maps, updating the data, generating reports. Create new user accounts, etc.

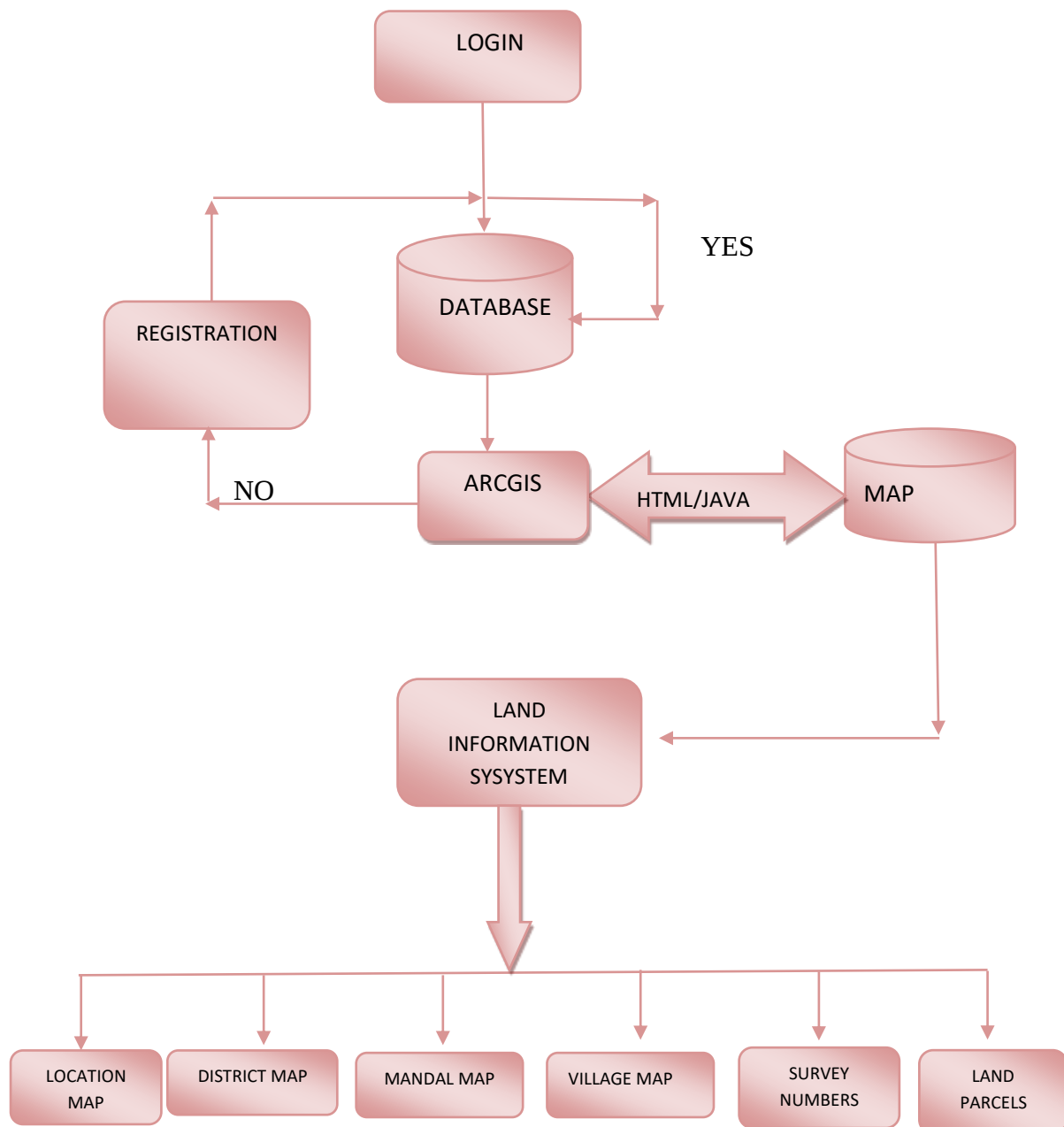
In this home page the following tab pages are included to perform actions.

1. Location Map
2. District Map
3. Mandal Map



4. Village Map
5. Land use/Land cover Map
6. Land irrigability Map
7. Land Capability Map
8. Soil Map
9. Slope Map
10. Geology Map
11. Hydro-Geomorphology Map
12. Cadastral Map
13. Survey number
14. Land details
15. For each main menu we have submenus.

Fig 4
LAND INFORMATION SYSTEM-FLOWCHART





16. In the login window we can login, if new user cannot login he must be register first. Security is maintained.
17. In the registration window user name and password will appear.
18. After register you have to login with same username and password the corresponding window will appear.
19. In the main page LIS displays Location Map, District Map, Mandal Map like other theme maps and parcel map Click survey number it will displays information about land parcel details .

Fig 5
Window Showing Login Page



Fig 6
Window Displaying Location Map of Ibrahimpatnam Mandal

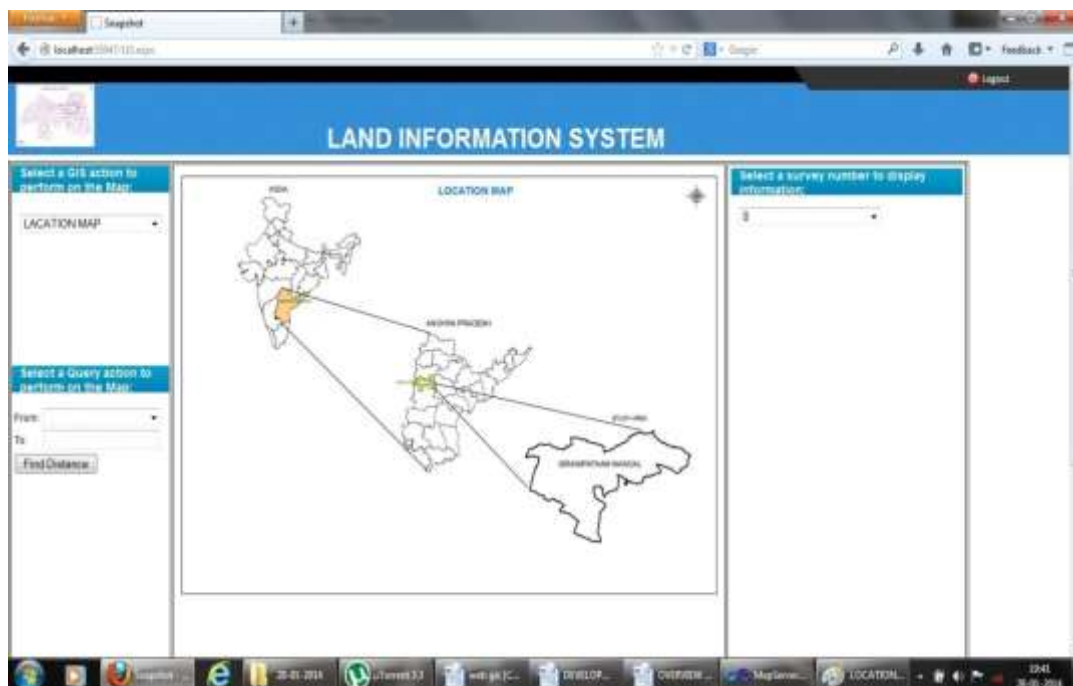




Fig 7
Visualization of Cadastral Map Superimposed On IRS P6 Liss-Iv Image

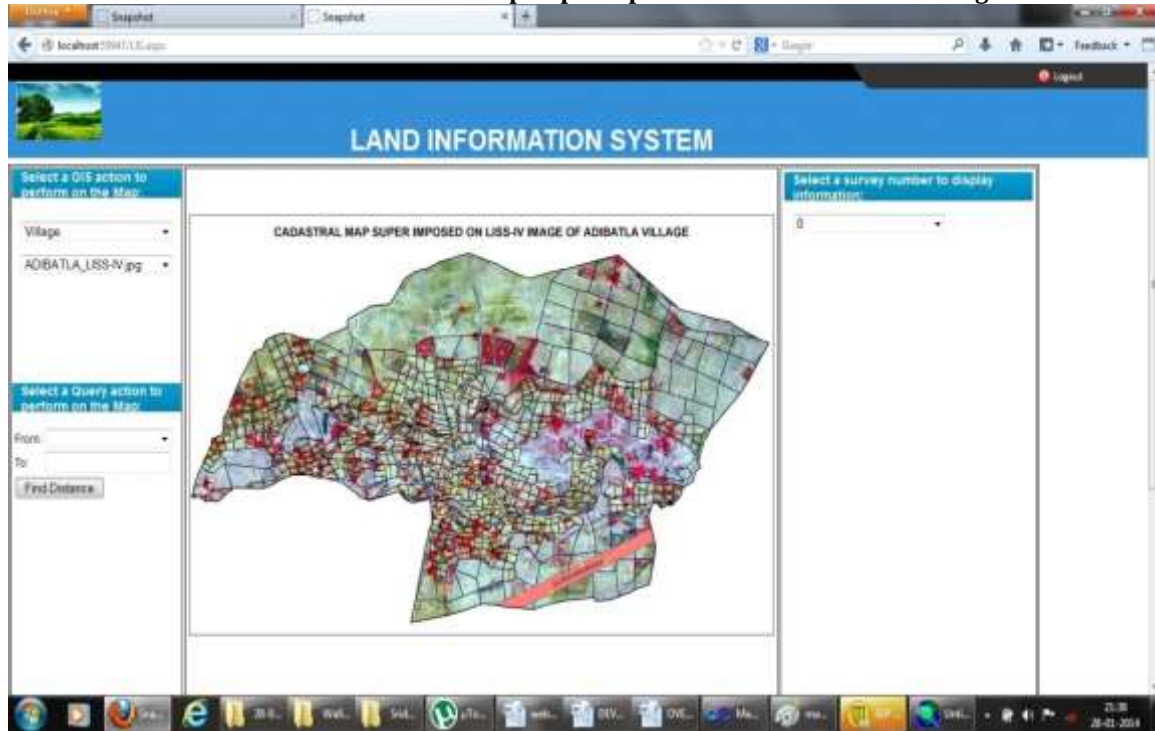


Fig 8
Window Displaying Land Use/Land Cover

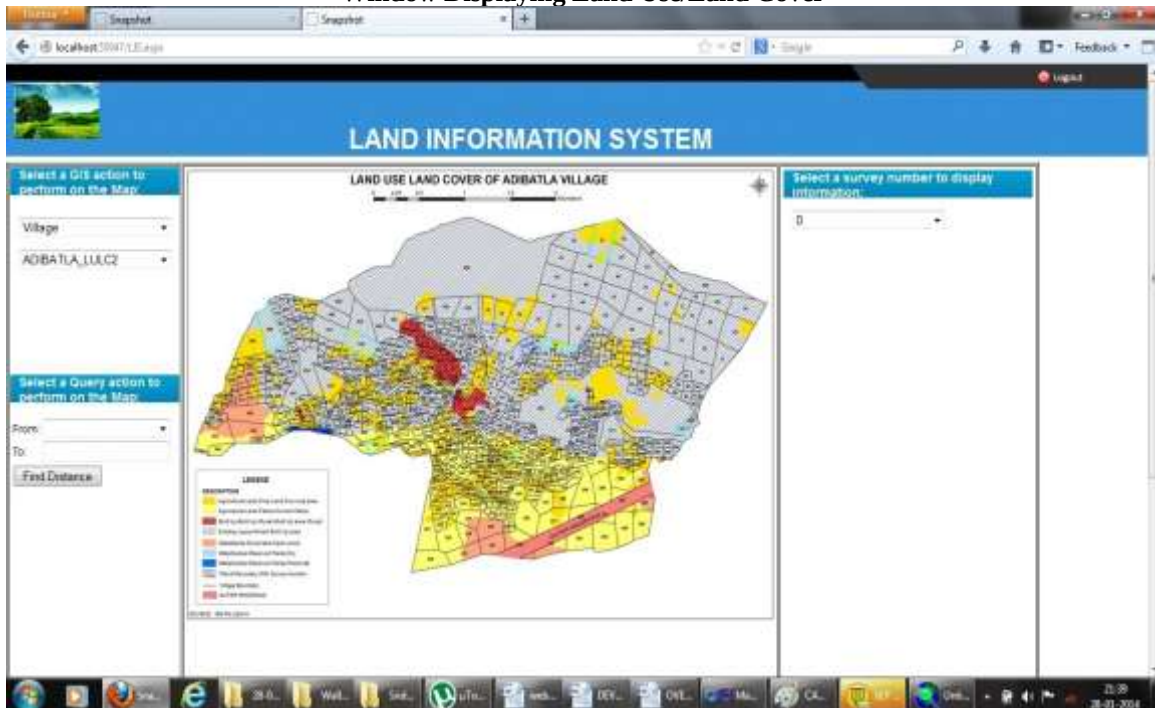




Fig. 9
Window Displaying Land Parcel/ Survey Numbers

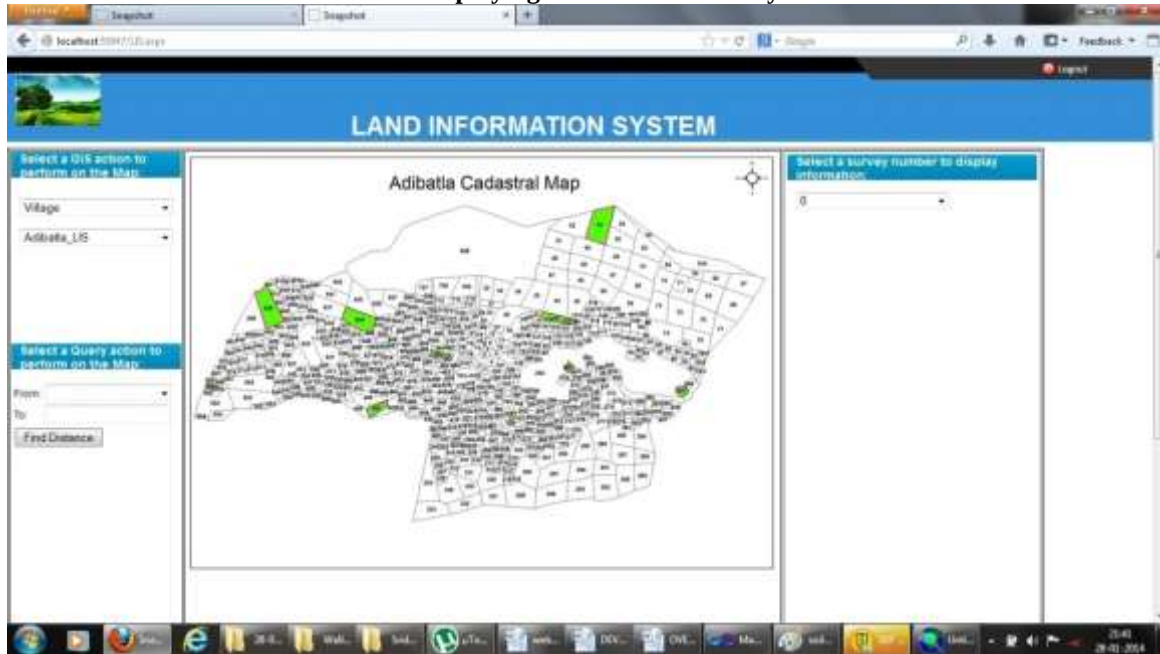


Fig.10
Window Displaying Land Parcel Details of Survey Number 240

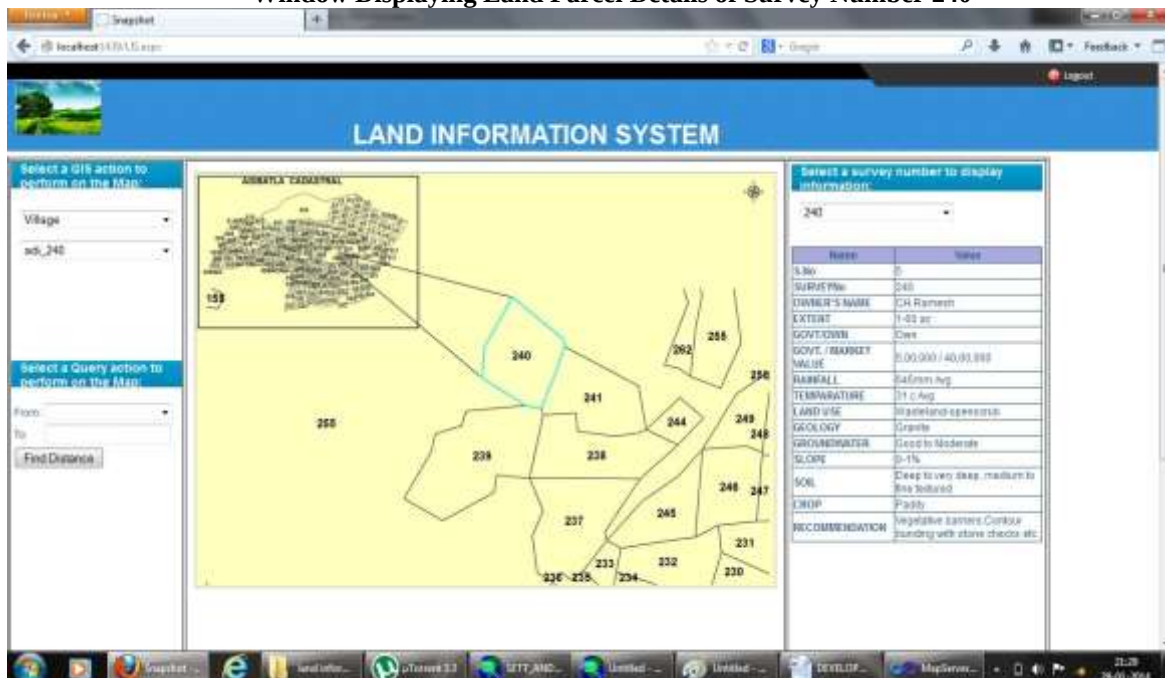
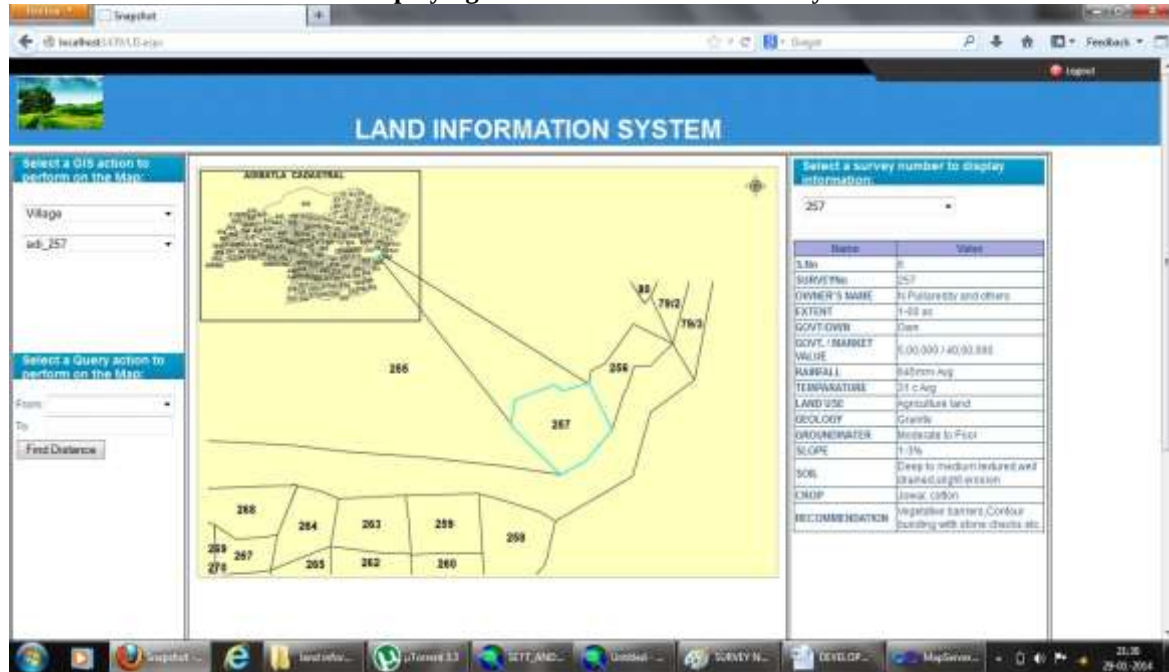




Fig 11
Window Displaying Land Parcel Details of Survey Number 257



6. CONCLUSION

The developed Web based LIS with the functionality of Add layer, Remove layer, Zoom In, Zoom Out, Map view and tabular view etc is sufficient to effectively store, display, manage and analyze land data. Application was designed for those, who were not specialized in the remote sensing and GIS, little knowledge to operate computer is sufficient to use the designed LIS. More tools can be designed for the better functionalities.

This integrated online Land Information system can help the planners, and realtor, common man decide and buy a plot in desired location and enquire about information of plots. This application can also assist the land information details and increase taxes/revenues in the State. This application will enable even naive users who are not familiar with GIS to browse the Land Information System (LIS) content through Web over the Internet. Enable users to spend quality time by directly providing them the required detail without wasting time. This application will help the potential buyer original land details before buying a plot. This application will improve the quality and level of web information presentation.

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