

GIS Based Land Records Management System

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Abstract—Land is the habitat of men. As land holds importance in many spheres, it is required to have a system to gather, distribute and update information of land records. Nowadays; everybody needs more detailed land information than it has been traditionally available. But Since last decade, it has been realized that the existing village maps are not geo-referenced. On the other hand, policy makers, planners, land administrators and individual citizens all have a dire need for right information in timely manner. Lack of proper land records, poor records keeping and inefficient judiciary makes concerning system vulnerable to high loss and its demands a system that keeps the accurate record of lands and makes it available in time. GIS technology is having capability of capturing, storing, analysing and displaying geographically referenced information which is needed for present scenario. In GIS map of village is mapped and attribute data is entered in data sheet which will helpful to policy makers, planners, land administrators and individual citizens to find out Land Records within in minute. This paper brings out GIS is a tool that can be effectively used in Land records management system. It integrates non-spatial and spatial datasets for query and better display. Such Geo-referenced Maps can be used on a day-to-day basis by decision-makers at grass root level

Keywords- GIS, GPS, Land Records Management, Gram++.

I. INTRODUCTION

Land records are maintained by district administration for deciding ownership and boundaries of land. We do not have an efficient Land Management System which covers detailed information of each aspect. We are still dependent on the age-old methods of creating and maintaining the Land records. This system of manual surveys, cloth bound cadastral maps, non-uniform structures of record of rights, each state maintaining this database as a hard copy register created in their individual languages, lack of dedicated and qualified people who can maintain and update these records both in the record of rights as well as the cadastral maps, cannot meet the objective of being an efficient one. Computerization is natural solution for all these problems. The government of India has already taken initiatives to computerize land records in the country. At present the scheme is being implemented in many districts excluding only those districts where there are no appropriate land records. Since last decade, it has been realized that the existing village maps are not geo-referred. On the other hand, policy makers, planners, land administrators and individual citizens all have a dire need for right information. Due to Lack of proper land records management, poor records keeping and inefficient judiciary has resulted in a high demand of a system that keeps the accurate record of lands, Records of right ownership and makes it available in time. Any project that is to be executed requires a basic planning at both macro and micro levels. To carry out this task one first requirement is basic land information, which is correct and available in time. For this, Re-survey of lands with the help of GPS and linking of its attribute data with the cadastral maps/village maps through GIS should be taken up.

II. LAND ADMINISTRATION SYSTEMS

Land is defined as the solid surface of the earth that is not covered by water. Any developmental activity is nearly impossible to conceive without taking land into consideration. Land administration is about registering land rights not only to secure these rights for the well-being of individual owners but also to support good governance and sustainable development. [19]How to register relationships between land and people? What is the value of land and what is its use? These are some of the questions related to land administration and to maintain land administration systems. Land administration systems are about addressing these problems by providing a basic infrastructure for implementing land related policies and land management strategies to ensure social equity, economic growth and environmental safety. [19]

A. Land Administration Functions

The four land administration functions are different in their professional attention, and are normally undertaken by a mix of professions, including surveyors, engineers, lawyers, land economists, planners, and developers.

- Land Tenure: The processes and bodies related to safeguarding access to land and formulating supplies in land, and their allocation, recording and security, cadastral mapping and legal surveys to determine parcel boundaries, creating new properties, the transfer of property or use from one party to another through sale, lease or credit security; and the management and adjudication of doubts and disputes regarding land rights and parcel boundaries. [2]
- Land Value: The processes and institutions related to assessment of the value of land and properties, the calculation and gathering of revenues concluded taxation, management and resolution of land valuation and taxation disputes. [13]
- Land Use: The processes and institutions related to control of land use through adoption of planning policies and land use regulations at national, regional and local levels and the management of land use conflicts. [13]
- Land Development: The processes and bodies related to building of new physical infrastructure and utilities, the implementation of construction planning, public acquirement of land, expropriation, change of land use through granting of planning authorizations, and building and land use permits, and the distribution of development costs. [13]

III. LAND RECORDS MANAGEMENT

Land Records needs to be carefully managed to maximize its potential benefits. Recently, new capabilities for data collection and processing, together with expanding requirements of users, have directed attention to the need for improved land Records management strategies. Such strategies are concerned with the effective organization of resources in order to achieve a set of objectives. These objectives may include improvements to the coverage, content, compatibility, and reliability of information of access to it, and the possibility of integrating it with other data. The ultimate goal is to meet the needs of users more efficiently, effectively and equitably. [6]



Figure 1: Life Cycle of Land Record Management [Pitney Bowes, 2012]

IV. STUDY AREA AND DATA COLLECTION

Wada is a one of 15 Taluka of the Thane district in Maharashtra State. Wada is the most industrialized Taluka in Thane district. Wada is located at 19.65⁰N 73.13⁰E and it has an average elevation of 38 meters. The main river flowing through Wada is Vaitarna. As of 2011 India census, Wada had a population of 142,753, with 52.33% males and 47.66% females. Of the total population, 26,566 live in rural areas.

A. Taluka Circle Inspector Office, Wada

Circle Inspector is village level Revenue Officer working under Tahasildar and Naib Tahasildar. The Circle Officer and the Circle Inspector in charge of a circle shall exercise such powers over the Talathi in his circle and perform such duties and functions as may from time to time be prescribed.

Administration of Land Records: Land Records are maintained under the various 'Village Forms' and following are the various 'Village Forms' maintained by the Taluka Inspector

- i. Village Form VI: revenue accounts relating to area and land revenue.
- ii. Village Form VII-XII: accounts relating to persons from who land revenue are realizable.
- iii. Village Form VIII-A: Revenue Accounts of recoveries, with the balance sheet.
- iv. Village Form VII-B: Revenue accounts relating to statistics for sound general administration.
- v. Village Forms VI-C: accounts of dues other than land revenue and forms and registers in respect of administration and other matters.

B. Taluka Inspector of Land Records, Wada

This department is commonly known as Survey Department. This department is measuring land, fixing boundaries of holdings, settling assessment of the agricultural land. They determine boundaries of villages, cities and towns and fixes boundary marks. They also keep land records.

Administration of Land Records: At the Taluka level the work is done by the District Inspector of Land Records and Taluka Inspector of Land Records respectively. Functions of the Land Records department are as follows:-

- i. Maintain all survey, classification and settlement records up-to-date by keeping a careful note of all changes by conducting field operations preliminary to incorporation of the changes in survey records.
- ii. Collect and provide statistical information necessary for the sound administration of all matters connected with land.
- iii. Supervise the preparation and maintenance of Record of Rights by periodical inspection and maintenance and repairs of the boundary marks of individual fields.
- iv. Conduct periodical revision settlement operations.
- v. Organize and carry out surveys of village sites on an extensive scale and arrange for their proper maintenance.
- vi. Maintain all tehsil maps up-to-date, to reprint them and to arrange for their distribution to various departments for administrative purposes and for sale to public.
- vii. Maintain up-to-date all village maps by incorporating necessary changes as and when they occur.

In Taluka Inspector Land Records Department, with the help of survey instruments like Plane Table Survey, Electronic Total Station (ETS), Theodolite Instrument surveys are done currently. In Maharashtra some pilot project studies are conducted in some villages with GPS and ETS technologies for Surveying.

V. GIS role Land Records Management

GIS is a tool that can be effectively used for better visualization and spatial analysis applications. Maps are a powerful medium for planning, analysis and monitoring. It integrates non-spatial and spatial datasets for query and better display. Cadastral Maps can be used on a day-to-day basis by decision-makers at grass root level. The data of cadastral survey forms the basis for generation of any accurate high-level map. [6] Since last decade, it has been realized that the existing village maps are not geo-referred. On the other hand, policy makers, planners, land administrators and individual citizens all have a dire need for right information. Today's needs are using GIS technology which is having capability of capturing, storing and analyzing and displaying geographically referenced information. As today every peoples are using computer and its minutes click to get the any information regarding their subject. In GIS map of village is mapped and Attribute data is entered in data sheet which will helpful to policy makers, planners, land administrators and individual citizens to find out Land Records within in minute. [6]

A. Geographical Information system

Geographical Information Systems (GIS) are computer-based systems that enable users to collect, store, and process, analyses and present spatial data. GIS provides an electronic representation of information, called spatial data, about the Earth's natural and man-made features. A GIS references these real-world spatial data elements to a coordinate system. These features can be separated into different layers. A GIS system stores each category of information in a separate "layer" for ease of maintenance, analysis, and visualization. [20] For example, layers can represent terrain characteristics, census data, demographics information, environmental and ecological data, roads, land use, river drainage and flood plains, and rare wildlife habitats. Different applications create and use different layers. GIS can be defined as a computer system capable of assembling, storing, manipulating, and displaying geographically referenced information. [20]

VI. METHOD

To collect Cadastral maps and Attribute data for a Case study to developing a Land records management system using GIS Technology.

- Deciding Case study area.
- Collection of data regarding land records. (Spatial data & Attribute data)
- The attribute data, generated through data entry process has to be linked with the village map/cadastral map using GRAM++.
- Develop GIS based Land records management model for Case study area using GRAM++.
- Run Queries on the developed model.
- Conclusions based on the Model.

VII. CONCLUSIONS

This study will bring out the importance of land records and management system in India. It would serve the correct and timely information of land records. GIS tools for land records management would be highly effective in India where land issues are predominant. It will benefit the land owners, Planners, Decision makers and land administrators by improving the effectiveness and efficiency of land records management. It is desirable to have properly geo referenced land records data and its integration with other land parameters for planning and decision-making. It is important that cadastral survey using latest technology may be done for the entire country. Disputed cases in land titles should also be decided at the earliest. Computerisation process should integrate registration of land titles. Land laws/mutation process should be simplified for easy and fast implement.

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