

## Land Record Management Using GIS

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**Abstract:** Land is measure of wealth, status and power. India is a predominantly an agricultural economy and now it is rapidly transforming into an industrialized economy because of which it is suffering from urban overcrowding, unlimited exploitation of precious natural resources like land are being put to enormous strain, screaming for proper management. But India do not have an efficient Land Management System which covers detailed information of each aspect. Land records maintained manually have different formats and use different terms to convey same information. Therefore, there is need to develop a uniform terminology and generalized database scheme for land records. Efficiency in land management gives the overall idea of a nation's developmental status. GIS deals with spatial data collection, storage, management, retrieval, conversion/changing, analysis, modeling, and display information about the features that make up the Earth's surface. It can decrease the cost and time of the decision makers and planners in arranging the data in reaching the accurate conclusion. GIS is a tool that can be effectively used for better visualization and spatial analysis applications.

**Keywords:** Land record, spatial data, GIS, analysis, query..

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### 1. Introduction

Land is measure of wealth, status and power. Any developmental activity is almost can't take place without taking land into consideration. Therefore, efficiency in land management gives the overall idea of a nation's developmental status. India having 29 States and 7 Union Territories and each state has been divided into Districts and then to Villages and so on. There is Land, which belongs to Government, land which is Private Property, land which is totally unused. As population grows, infrastructure tends to grow and property value starts increasing. The family disputes in villages make more and more divisions on the land. So keeping Land Records has become a necessity. Also India is a predominantly an agricultural economy and now it is rapidly transforming into an industrialized economy because of which it is suffering from urban overcrowding, unlimited exploitation of precious natural resources like land are being put to enormous strain, screaming for proper management. But India do not have an efficient Land Management System which covers detailed information of each aspect. 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. Land records maintained on paper or cloth has preservation, updating and retrieval problems. Computerization is natural solution for all these problems. And Geographical Information System (GIS) technology provides municipal governments with extraordinary quantitative and qualitative benefits. The technology can be the basis for revolutionizing how government processes work. GIS solution is the need of the hour taking into consideration the voluminous information that needs to be made available to various decision makers in various departments.

### 2. Objectives of land record management:

During the recent past, the demand for this information has expanded. This has extended the applications of existing parcel-based information systems and created the need for new ones. Some of these changes have arisen because of :

- a) A need for more efficient handling of land title documents to provide greater security of tenure for those in occupation of land and to keep pace with the greater demand for reconvening .
- b) A rise in property values, and a need for better support for mortgaging and investment.
- c) A steady increase in the number of private and public users who make routine enquiries about land ownership.
- d) Growing concern about the quality of the environment
- e) Greater attention which has been paid to physical planning and to land development programmes, which in turn has resulted in a growth in the number of users and the variety of uses of cadastral information.
- f) Specific land planning and management problems which have arisen in certain areas, such as the need to protect agricultural land around the edges of cities. In many third world countries the greatest pressure on the land is the urban fringe [4].

- g) Cadastral maps and record of rights are not up-to-date and do not confirm to the ground realities.
- h) The upkeep of the records and the maps is a tedious task due to lack of will, qualified people and complexity of the problem.
- i) The non uniformity of Record of rights and this being in different regional languages results in a database which can not be used for planning and analysis.
- j) Lack of will to adopt newer technology [5].

### 3. Present scenario of land record

Land records books like Khasra Girdavari, Khatauni, and Jamabandi etc. maintained by Patwari, the revenue official at village level, need updating from time to time. These books are being used extensively along with land acquisition and litigation generating voluminous paper to serve the farmers. The storage of these documents is prone to natural disaster like fire, flood, earthquake, loss or damages due to white ants etc. Therefore, land records and related documents need to be electronically documented [11]. Preparation and use of large-scale maps, especially for rural areas, is not as good as in developed and other developing countries. Maps are required by many department, NGOs, agencies, companies to carry out developmental activities in the area. Local authorities, public undertakings, service organization require maps. However, the requirement of maps in terms of quantity, quality and accuracy vary from organization to organization. It is important to note that all the agencies aforementioned and others do not need comprehensive map, i.e. all the information in map [6].

In any land records a number of records are prescribed to be, maintained at the village, tehsil and district levels and statements of land holdings, land revenue and rental cropped areas, land use pattern. The principal records being maintained are as follows:

1. Village map: A pictorial form showing the village and field boundaries.
2. Field books or khasra which is an index to the map, in which changes in the field boundaries, their area, particulars of tenure-holders, methods of Irrigation, cropped area, other uses of land etc. are shown.
3. Records of Right also known as khatauni, in which the names and classes of tenure of all occupants of land are recorded [4].

### 4. Study Area for land record management

Khochivade village is located in Vasai Tehsil of Palghar district in Maharashtra, India. It is situated 3km away from sub-district headquarter Vasai. As per 2009 stats, Khochivade village is also a gram panchayat. The total geographical area of village is 149.99 hectares. Khochivade has a total population of 2,219 peoples with 50.83% males and 49.17% females. There are about 476 houses in Khochivade village.

### 5. Land record department consist of:

**a) Talati:** Duties of a Talati include maintaining crop and land records (record of rights) of the village, collection of tax revenue, collection of irrigation dues. Amongst the administration, the talati has the closest connection with the village people. The talati was supposed to live anywhere within these villages and was supposed to visit each village every month to understand people's needs. The talati then reported these needs to the sub-divisional manager in the sub-divisional office. Additionally, the Talati was also required to give each landholder an account showing the landholders dues.

**b) Patwari:** He is a land record officer at sub-division or [Tehsil](#) level. As the lowest state functionary in the Revenue Collection system, his job encompasses visiting agricultural lands and maintaining a record of ownership and tilling ([girdawary](#)). A patwari has three chief duties: The maintenance of record of the crop grown at every harvest, he keeping of the record of rights up to date by the punctual record of mutations and The account of preparation of statistical returns embodying the information derived from the harvest inspections, register of mutation and record of rights.

**c) Girdawary:** Girdawary is the record of land cultivation. It records the crop and ownership of the crop. Local landlords must ensure that Girdawary stays in their name, otherwise; if someone else is shown as cultivating the land for an extended period of time, they can claim possession of the land, resulting in a dispute of land ownership.

**d) Jamabandi :** A *jamabandi* meaning "rights of records" and refers to land records. These records are documents which are maintained for each village within its [Tehsil](#). It contains the name of the owners, an area of cultivation/land, shares of owners and other Rights. It is revised after a certain period of time. After it is prepared by [Patwari](#). It is attested by Revenue Officer of that division. Two copies of jamabandi are made, one is kept in Government's Record room and other is kept with Patwari.

## 6. Role of GIS in land record management

Geographic information system (GIS) is a computer based system that deals with spatial data collection, storage, management, retrieval, conversion/changing, analysis, modeling, and display information about the features that make up the Earth's surface. It provided the potential for mapping and monitoring the spatial extent of the built environment and the associated land use/ land cover changes[3]. Gathering of basic information is the primary step in taking the proper decision in developmental activities of the study areas. The basic information can be obtained by different methods like field surveys, aerial surveys, Census of India. The information necessary to make available all kinds of data related to the village, easily and concisely for planning at micro- level. This information system will be helpful for planners, academicians, geographers, decision makers and government officers. The emergence of Remote Sensing and Geographic Information System as a powerful tool for spatial analysis and storage has in effect alleviated the problem by computerization of the spatial data. The GIS technology can decrease the cost and time of the decision makers and planners in arranging the data in reaching the accurate conclusion [1]. GIS is a tool that can be effectively used for better visualization and spatial analysis applications.

## 7. Methodology

The methodology adopted in the study can be described in the following steps.

- a) Collection of spatial and attribute data of khochivade village.
- b) Plot-wise land use map is prepared and attributes were assigned for every plot with full ownership and built-up information using grass GIS
- c) For case study area develop land record management model using grass GIS.
- d) Run queries on the model for immediate and ready extraction of information through Web.

## 8. Conclusion

Land Administration Systems are the basis for conceptualizing rights, restrictions and responsibilities related to people, policies and places. This study will bring out an overall understanding of the concept of land administration systems for dealing with rights, restrictions and responsibilities in future spatially enabled government. No nation can build land management institutions without thinking about integration of activities, policies, and approaches. The GIS based Land Information System (LIS) provides important tools for the developers and planners to extract information of the infrastructure facilities. GIS methodology is found to be very useful in monitoring the urban growth of a thickly populated and rapidly increasing city.

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