

# **Spatial concept matters for Land Administration**

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## **Abstract**

Land being an essential element has got great value and is regarded as the prime wealth of prestige. Ownership of land has always been a matter of concern to individual and a country as a whole. Proper management of land-related information is expected to be carried out by Land Administration Authority. This authority is not just responsible for collecting and disseminating information on land but is also responsible to manage them in following the standardization. Geographic Information Science is considered as a reliable method for the collection of this information, following specified standards and management process at reasonable cost and time. Cadastre is considered a GI based land information system that is promoted over time to assist the authority in collecting, maintaining and disseminating information of land in a trustworthy manner. This information system performs tasks related to maintaining tax records, ownership of land, transferring of land rights, etc.

## **Introduction**

Land administration is considered an essential part in public administration. This authority is responsible for collecting and disseminating information of land and its associated resources (Acharya 2008). Several tasks including transfer of rights in land from one owner to another through different ways; use and conservation of the land; gathering of revenues from the land; and resolving of conflicts concerning the ownership and the use of land. It is considered as a basis for conceptual rights, responsibilities and restrictions related to people, land and land policies (Navratil 2020). Geographic Information Science (GIScience) deals with the concepts, principles, and models of geographic information. GIScience with the knowledge of space using new technology is considered to be useful for the improvement of land administration (ibid.). Spatial Data Infrastructure (SDI) helps in linking people with land information where ownership registration and spatial location are linked through a unique code which is the basis for all kinds of land administration system (Williamson et al. 2009). The major criterion to evaluate the land administration process of a particular country can be the speed of registration process, transparency, land law and regulations and provision of a public hearing authority (Subedi 2009).

## **Land Administration**

The land has always been recognized as a prime indicator of social prestige. It is a well-known fact that the land is limited and thus with the increasing population and unmanaged settle, problems and conflicts are likely to occur (Navratil, 2020). This suggests the need of implementing powerful and pragmatic land laws for maintaining peace and harmony among land users (Cobbinah, Asibey, & Gyedu-Pensang, 2020).

These land laws are set out and executed by the land administration authority of a nation. Initially, the concept of land administration was mainly for the collection of taxes, maintaining reports on land ownership but with time, it has taken up the responsibility of land use planning; resolving land conflicts

through technical solutions; improving the efficiency of land resources; and providing legal security and support for land transactions (International Federation of Surveyors 1998).

The main component of land administration are: Subject about whom the task is to be carried out; Objects referring to land; Evidence (legal documentation on land); and Tenure System that will define who can hold and use land resources (Acharya, 2008). These are interlinked with each other to mobilize the administration process in a balanced manner. To address the land management strategies, details on land and related resources are necessary. The level of detail required depends on its application area (Geospatial World 2016). Achieving a higher level of details requires time and effort and involves cost. The approach for this process may differ with location, time and facilities (ibid.). There can be a huge difference in administrative and management process for each country as they have different legislation, implementation strategies and sets of tools.

### **The role of GIScience**

Geographic Information Science is considered as a discipline that deals with measurements on, above and below the surface of the earth. The concept of "where" integrated into a dataset can make it spatial information that could be utilized in a varied field of applications (Goodchild 2009). Geographic Information Science (GIScience) explain the concept and principles of details with knowledge of positioning. It deals with each step of acquiring, analyzing and visualizing information. The domain aims at better understanding and analyzing spatio-temporal phenomenon (Navratil 2020). The domain of GIScience seems to grow with the advancement of tools and technologies. It is interlinked with not only statistics, mathematics, computer science and geography, but also with psychology, political science, jurisdiction and many other disciplines (ibid.).

The practice of spatial tools and technologies in land administration can help in finding a way to keep a record of trustworthy data and in Land management to achieve sustainable development objectives (Rajabifard et al. 2007). Various GIScience tools have been adapted over time to achieve Land management goals in managing information on Land.

The term cadaster is used to refer to a Land Information System that undertakes tasks of providing and managing land rights. According to the International Federation of Surveyors (1998, p. 2), *“Cadastre is a parcel-based information system where information is geographically presented for each land units known as parcels. These parcels are provided with unique code and have formal or informal land boundaries. The practice of spatial tools and technologies in land administration can help in finding a way to keep a record of trustworthy data and in Land management to achieve sustainable development objectives”*.

Cadastre helps in avoiding duplication of ownership or information, which untimely acts as a solution for Land conflicts. Many world's inhabitants still don't have registered land rights. Also, in several parts of the world, land tenure rights are neither mapped nor recognized and with the traditional methodology to collect store, process and disseminate information will take more time and money (Navratil 2020).

For a rapid collection of details on land, the use of geospatial tools and technologies, aerial or satellite imagery is recommended to recognize, delineate and analyze spatial units and land patterns (Tan et al.

2021). The use of smart sketch map generated from field observations can be transferred to high scale maps allowing the landowners to claim land rights. Natural boundaries can be extracted from satellite images that can be further validated with the field surveys to generate cadastral maps. It also takes place by involving volunteered geographic informers for data collection under the professional guidance of surveyors and lawyers (Navratil 2020). Drone technologies have also been using these days to accurately map land in less time and reasonable cost. Figure 1 shows the different approaches for geospatial data collection with the purpose of land administration and management.

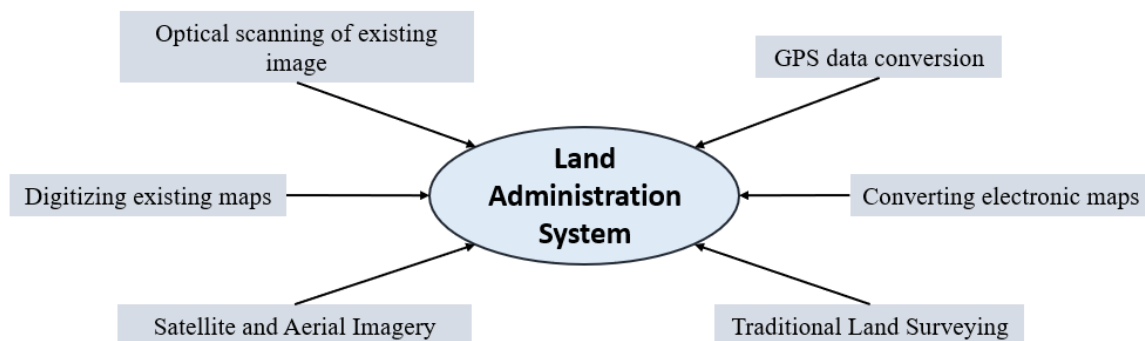


Figure 1: Spatial data source used in land administration

Standardization adopted land administration is an important factor for the efficient practice of land information management as there are many actors involved in the survey and the registration authority. This approach supports maintaining consistency in mapping parcel and maintaining its database. ISO (International Organization for Standardization) being an independent, non-governmental, international organization has taken up the responsibilities for developing standards to be followed around the world for ensuring the quality, safety, and efficiency of products, services, and systems. Land Administration Domain Model provided by ISO is followed as a primary standard in many aspects of land administration dealing with cadastral survey and measurements (Indrajit et al. 2020).

### **A case study on Land Administration in Nepal**

This case study aims to identify how geoinformation have been used in Nepal for the purpose of land administration. The measurement of land in Nepal is said to have started in Lichchavi Regime (350 -700 A.D) and with time the system was improvised and used (Subedi 2009). The government has enacted different rules and regulations in a different period to regulate the land administration using sophisticated spatial tools and techniques.

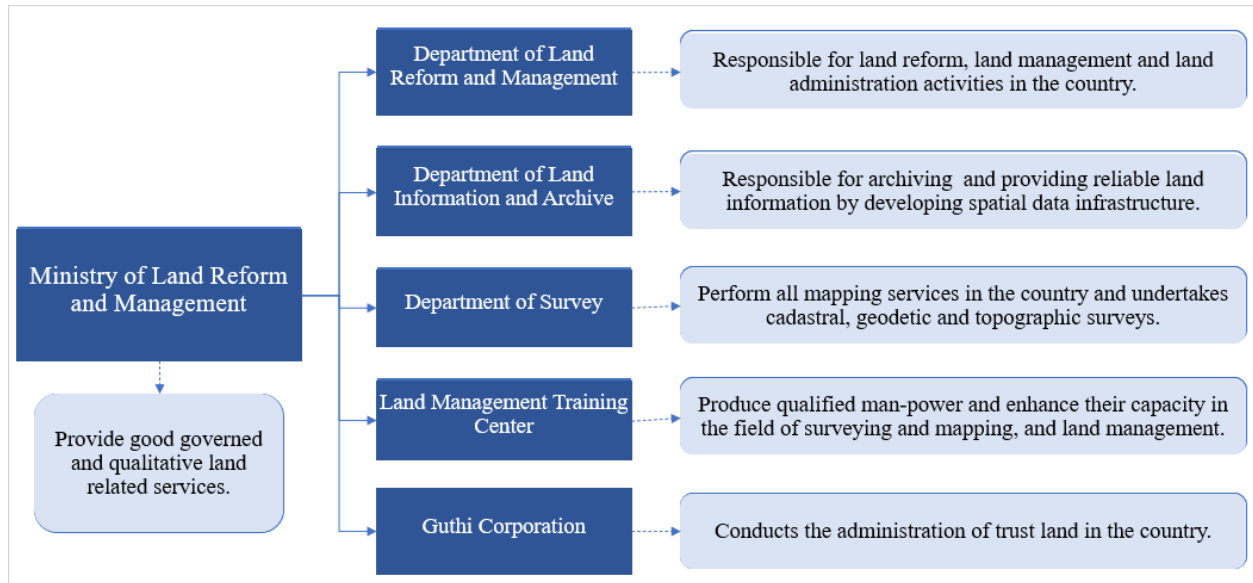


Figure 2: Organization structure of the Ministry of Land Reform and Management

The Department of Land Information and Archive is a central level authority responsible to conduct land administration services in Nepal. The department has successfully developed and implemented centralized web-based software called Land Records Information Management System (LRIMS). They have conducted several classes and courses for GIS and Survey Student from all around the country (Acharya 2008). The organization not only has been dedicated to government service but also contributing to the educational system by including advanced techniques of data acquisition and focusing on service oriented architecture of the system to replace manual transfer of documents and data (Acharya 2008).

According to Department of Land Administration in Nepal, the department is making use of spatial techniques for executing its several tasks including (DoLRM, n.d.):

- planning, implementing and evaluating of land reform, land revenue, surveying and mapping;
- maintain cadastral maps and coordinating surveying mapping and GIS activities;
- providing reliable land information and developing national spatial data infrastructure;
- producing qualified academic manpower in the field of surveying and mapping, land administration and geo-informatics;
- maintain tenancy records, adjudication of a tenancy;
- registration of deeds, maintaining ownership and restriction records, archiving deeds, amendment on attribute and cadastral data, collection of registration fee and other taxes and valuation of the land;
- and collection, maintenance and update of cadastral records and parcel sub-division.

Though the system has adopted advanced methodology to improve its land administration, it has been facing several challenges in the implementation processes. Some of the challenges faced in the implantation phase are:

- Lack of legal instruments due to poor economic conditions of the country;
- Lack of patience in service seekers;
- Lack of skilled human resource that are sufficient in spatial, technological and legal aspects;
- Lack of reliable network connectivity and difficulties in acquiring accurate data through traditional method of surveying (Subedi 2009).

## **Conclusion**

Land Administration can be taken as a process for securing land tenure, implementing reforms on land, protecting the land through proper land planning and a method to maintain efficient taxation procedure. A nation is said to have good governance where the Land Administration is unbiased and performs the task with the utilization of modern technologies for addressing land-related issues. Hence, several geospatial technologies such as GPS surveying, web-based GIS system, photogrammetry, remote sensing, etc. along with well-established land laws, can play a determined role for efficient utilization of land, taking into consideration security of land rights.

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