

Chapter 13

The Cadastral and Land Information Systems for an Effective Land Governance

Abdeslam Moulay Adad
ANCFCC, Morocco

ABSTRACT

The cadastral system as a civilian register of a property has a fundamental role in every society because it ensures the relationship between the land and the humankind. This relationship is evident in the form of property rights and established in many different manners from the full control, through communal forms of tenure, to the individual property rights. This chapter has the aim to deal with the nature and categories of the existing cadastral systems. It will highlight the new approaches and visions to establish cadastral systems that will meet the requirements of re-engineering the framework of land development projects. An overview of the state of the art of the modern concepts of cadastral systems will be provided such as Cadastre 2014, 3D Cadastre, and Marine Cadastre. The goal behind this approach is to enable decision makers to have an idea on the existing paradigms of land administration and to master the relationships between humankind and land, infrastructures and business systems, and between the human being and technological issues.

INTRODUCTION

The cadastral system is the basis used for the protection of the property by means of registration procedures and cadastral plans made from geodetic operations and surveying. Each parcel or property and its owners are registered and all the spatial structures consisting of location, boundaries and contents are graphically described in a cadastral map or digitally stored in a database. It may be a systematic or a sporadic and official description of properties affording information on real estate. The cadastral data need to be collected, managed, analyzed, and rationally stored to facilitate their retrieval. After being

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processed, these data become land information that allow users to make analysis and plan future projects. Recently, there is pressure to develop a modern cadastral system based on the information technology to create a unique reference for land properties as geometrical features and land tenure as attribute information. For many reasons, the cadastral system is a fundamental key providing accurate information about the lands and their attributes. It is a basis for establishing national geo-information infrastructure. The data are the basic resources of the information that is the fundamental key for all decision-making. The collected data in a manual or digital form are stored and processed in order to produce information, which may be analytical or graphical result. The aim of the information is to facilitate analysis, retrieval, and updating processes. The quality of the information depends largely upon both the quality of data and the quality of processing systems. The technological tools used to manage and process data include the so-called Geographic Information System (GIS) that facilitates collecting, modeling, and managing, analyzing and storing spatial and non-spatial data. Spatial data are lines, surfaces, or volumes and they have their positions located by a coordinate system. Whereas non-spatial data are specific attributes characterizing spatial data. The GIS tools enable spatial searching, overlay operations, spatial analysis and modeling. Several GIS applications have been developed dealing with many different data. A kind of applications or computerized systems based on this technology is Land Information System (LIS). The land information systems have the benefits to serve society on a long-term basis and on a long-term return on investment by taking in account both the static and dynamic components of land. The static aspects are the norms and values adopted in society to define rights and to record existing land tenure, value, and use ascertained by adjudication process and mapping. While dynamic aspects are the changes that affect the relationship between man and land according to the changing nature of land rights, land value; and land use.

CADASTRE AND LAND INFORMATION SYSTEMS

Meanings of the Cadastral Systems

Generally, the cadastre means the civilian state of a property. Its role becomes fundamental in every society because it ensures the relationship between the land and the humankind. This relationship is evident in the form of property rights and established in many different manners of life; from the full state control, through communal forms of tenure, to the individual property rights (Dale and McLaughlin, 1988).

According to Hensen [1995], the cadastre is described as a methodically arranged public inventory of data concerning properties within a jurisdiction, based on a survey of their boundaries. In certain countries, for example Portugal, the word cadastre means a land register system. Silva L. (2001) stated that this system is an inventory system consisting of data that characterizes and identifies existing land parcels. Its main objective is the unique identification of every land parcel by giving it a unique code as well as a unique characterization through an administrative description, geographic location, shape and area.

Dowson and Sheppard [1952] remark that it is impossible to give a definition of a cadastre that is both terse and comprehensive. Its distinctive character is readily recognized and may be expressed as the marriage of (a) technical record of the parcellation of the land through any given territory, usually represented on plans of suitable scale, with (b) authoritative documentary record, whether of a fiscal or proprietary nature or for two combined. The International Federation of Surveyors (FIG, 1995) defini-

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