

# Understanding land administration systems

This paper introduces basic land administration theory and highlights four key concepts that are fundamental to understanding modern land administration systems – firstly the land management paradigm and its influence on the land administration framework, secondly the role that the cadastre plays in contributing to sustainable development, thirdly the changing nature of ownership and the role of land markets, and lastly a land management vision that promotes land administration in support of sustainable development and spatial enablement of society. We present here the first part of the paper. The second part that focuses on the changing role of ownership and the role of land markets, and a land management vision will be published in November issue of *Coordinates*



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**L**and administration systems (LAS) provide a country's infrastructure for implementation of its land-related policies and land management strategies. Land in modern administration includes resources, the marine environment, buildings, and all things attached to and under the surface. Each country has its own system, but the focus of this paper is about how to organise successful systems and improve existing systems.

This exploration of LAS provides an integrated framework to aid decision makers to make choices about improvement of systems. The story is based on the organised systems used throughout modern western economies where the latest technologies are available, but it is also applicable to developing countries that struggle to build even rudimentary systems.

The improvement of integrated land administration involves using four basic ingredients in the design of any national approach:

- the land management paradigm, with its four core administration functions of land tenure, land use, land valuation and land development,
- common processes found in every system,
- a toolbox approach, offering tools and implementation options, and

- a role for land administration in supporting sustainable development.

The land management paradigm is theoretical and universal in application, in that it can be used by any organisation, especially national governments, to design, construct and monitor their LAS. The core idea behind the paradigm involves moving land administration beyond its familiar functions of mapping, cadastral surveying, and registering land.

To achieve sustainable development these familiar functions need to be approached holistically and strategically integrated to deliver, or assist delivery of, the four functions in the paradigm (land tenure, value, use, and development). If the organizations and institutions performing these four functions are multi-purpose, flexible, and robust, they are capable of assisting the larger tasks of managing land, and dealing with global land and resource issues. The paradigm drives adaptability and flexibility of land administration, both in theory and in practice, and encourages developed countries to aim for good governance, eDemocracy and knowledge management, and developing countries to implement food and land security, and poverty reduction, while improving their governance, and, in many cases, building effective land markets.

While the theoretical framework offered by the land management paradigm is universal, particular implementation

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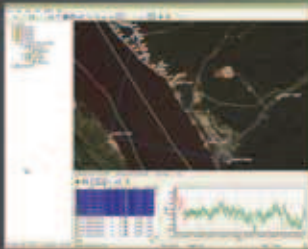
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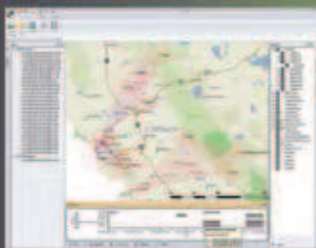
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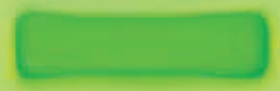
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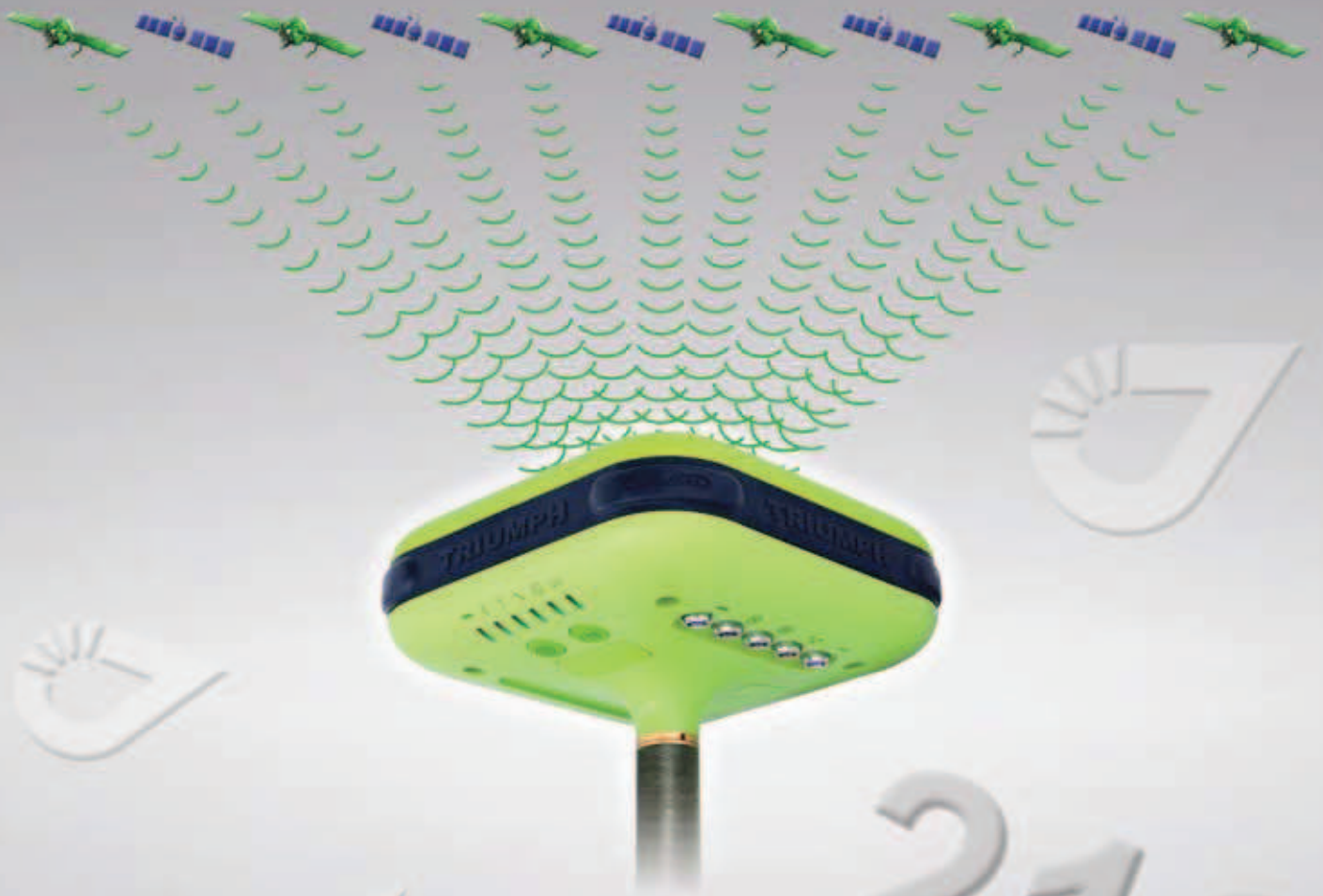


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paths must vary, depending on local, regional and national situations. This enigma of open-ended opportunities for implementation is solved by applying an engineering approach (design, build and manage) that relates design of a LAS to management of local practices and processes. These common processes are found in all countries and include dividing up land, allocating it to identifiable and secure uses, distributing areas to people, tracking social changes such as death and inheritance, and so on. Variations in how these processes are undertaken underlie the remarkable variety of existing LAS.

Among all the variations, market based approaches predominate, both in theory and practice. Their popularity arises from their relative success in managing these common processes and, at the same time, improving governance, transparency, and economic wealth for the countries where they are successfully used. Market based approaches thus provide best practice models for improvement of many national LAS where governments seek similar economic results. The tools used in market based systems are therefore frequently related to general economic improvement. This relationship is, however, far from self evident. Market based approaches are creatures of their history and cultural sources. Transferring them to other situations is difficult and a long term process that requires forethought, planning, and negotiation.

This leads to the third ingredient of good LAS design: the toolbox approach. The land administration toolbox for any particular country contains a variety of tools and options to implement them. The tools and their implementation reflect the capacity and history of the country. The selection of tools reflects the historical focus of land administration theory and practice in cadastral and registration activities, and includes, among others: general tools such as land policies, land markets and legal infrastructures; specialist tools such as tenure, registration systems, cadastral surveying and mapping and land boundaries; and emerging tools such as pro-poor land management and gender equity.

There are of course many other tools. Valuation, planning and development tools raise separate and distinct issues. Many countries include land use planning and valuation activities in their formal LAS. Other countries rely on separate institutions and professions to perform these functions and define their LAS more narrowly. For all LAS, however, these functions need to be undertaken in the context of the land management paradigm and integrated with the tenure function. The design of a tool by an agency engaged in any of the four functions therefore needs to reflect its integration with the others. The cadastre remains a most important tool, because it is capable of supporting all functions in the land management paradigm. Indeed, any LAS designed to support sustainable development will make the cadastre its most important tool.

The list of tools and their design will change over time, and so will the suitability of any particular tool for national LAS, and the options appropriate to deliver it. To successfully use the tool box approach, the LAS designer must understand the local situation, diagnose the next steps for improvement, and select appropriate tools and options from the possible array. Usually the steps can be clarified by international best practices explained in well-documented case studies, United Nations and World Bank reports and publications, and a wide variety of books, journal articles and reports.

design, even in countries with successful systems, is the isolation of components from each other. This is known generally as the problem of “silos”. Another problem is reliance on single tool solutions in complex situations. The toolbox approach addresses both these problems. It requires that each tool be considered in the context of all the others, and tested against the over-all land management paradigm. It relies on using methods and options appropriate to a situation, compared with a “one size fits all” suite of policy and technical options.

The options now available vary widely. Land identification systems, registration systems, digital support systems, tenures, surveying and mapping systems, and so on, are both variable and increasingly adaptable. Indeed, no LAS is static. The tools used are always being adapted to reflect changes to the ways people think about and use their land, and many other influences. These changes feed back into the overall design of the LAS and its capacity to inform land policy at large. The essential theme of this paper is to inform the design of any particular LAS by starting with the broad context of the land management paradigm, observing the common processes that are actually used, then choosing options for each of the tools to manage these processes according to a well grounded understanding of what is appropriate for local circumstances and international best practice.

In practice, from a land administration

One of the major problems with LAS

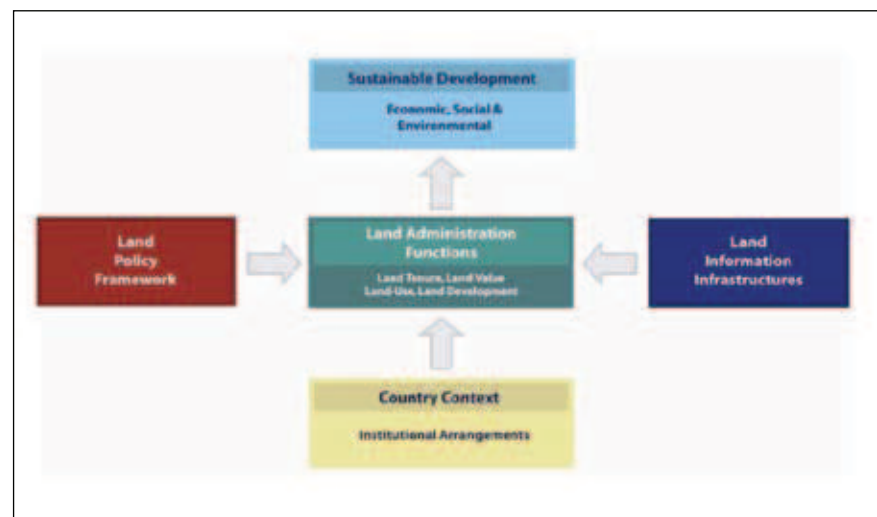


Figure 1: The land management paradigm (Enemark and others 2005)

design viewpoint, LAS problems are universally shared. Whether or not a country uses private property institutions as the foundation of its land rights, land security and land management are overriding imperatives capable of being implemented by the new role of land administration in supporting sustainable development. And whether a country is economically successful or resource hungry, betterment and improvement of existing systems are essential. An overall theme is therefore developing land administration capacity to manage change. For many countries, meeting the challenges of poverty alleviation, economic development, environmental sustainability, and management of rapidly growing cities, are immediate concerns. For more developed countries, immediate concerns involve updating and integrating agencies in relatively successful LAS, and putting land information to work for emergency management, environmental protection, economic decision making, and so on as part of a wider spatial enablement of government and wider society.

### The central role of the cadastre in land administration

The theoretical framework of a land administration role in delivery of sustainable development relies on using the land management paradigm to guide the selection of tools in the toolbox used to manage common processes. Within this framework a wide range of options and opportunities is available to LAS designers and land policy makers. One tool is, however, fundamental – the cadastre or land parcel map (Figure 2) (FIG, 1995). The history and influence of the cadastre explain how knowledge about land administration was gathered, particularly after World War II. This background demonstrates that modern cadastres have a much more significant role than their original designers envisaged. The cadastre, or the large scale, land parcel map related to parcel indices, is the vital information layer of an integrated land management system, and, in future, will underpin information systems of modern governments.

While some developed countries do without a formal “cadastre”, most generate digital parcel maps (or digital cadastral data base or DCDB) reflecting land allocation patterns, uses and subdivision patterns, and even addresses and photographs. A country’s DCDB is its core information layer that reflects the use and occupation of land by society – the built environment. Critically it provides the spatial component for LAS and more particularly the location and place dimension with the most useful output being a geocoded street address of each property. Simply the cadastre is the central component in spatially enabling government. It is destined for a much broader role as fundamental

government infrastructure equivalent to a major highway or railway, though it was originally created on behalf of taxpayers merely for better internal administration of taxation, and, more recently, titling of land in support of more efficient and effective land markets. Without these digital facilities, modern governments cannot understand the built environment of cities, manage land competently, utilise computer capacity to assist policy making, or retrieve significant value out of land.

The greatest potential of the DCDB lies with the information industry at large, as the principal means of translating geographic coordinates and spatial descriptors of land parcels into meaningful

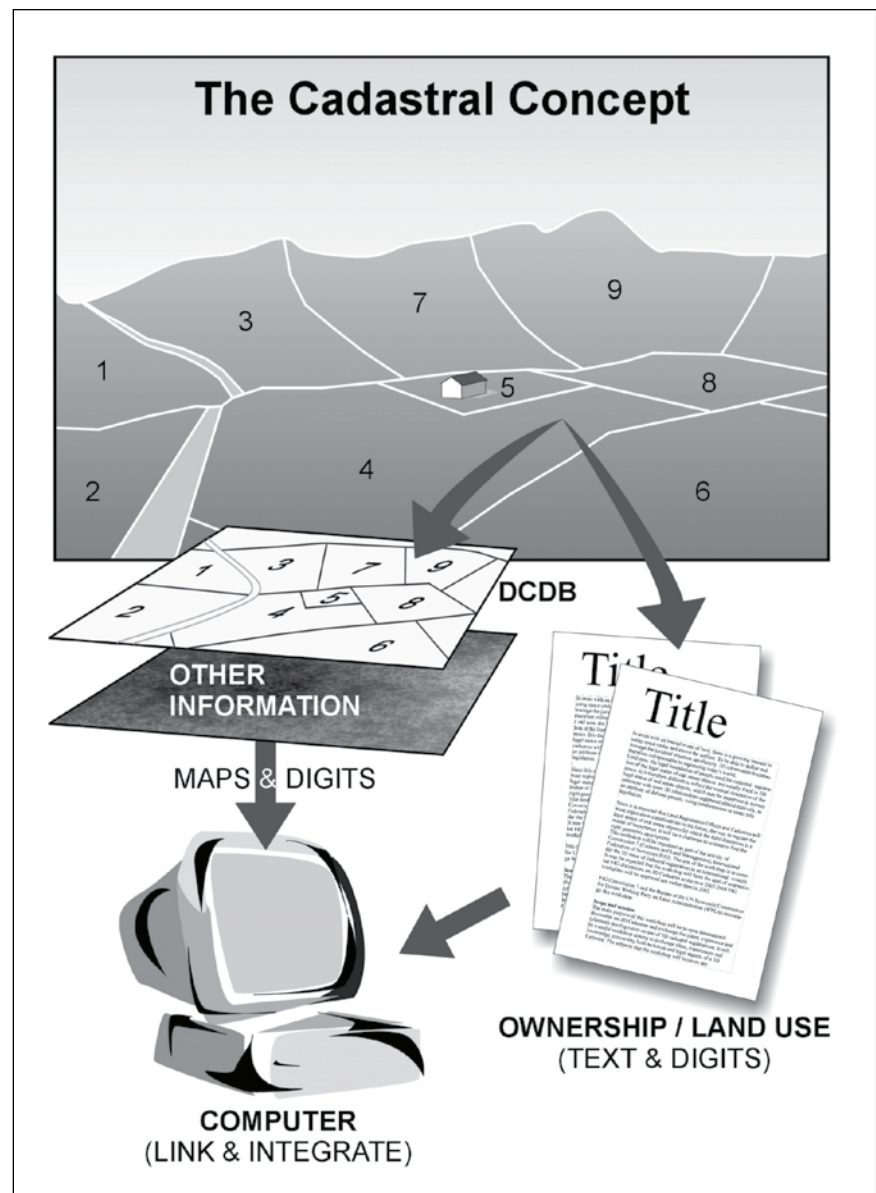


Figure 2 The Cadastral Concept (FIG, 1995)

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105°08'17.8710"W  
09:38:58 MDT

39°54'50.8894"N  
105°08'17.8650"W  
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descriptions of places that everybody can understand. Land parcels describe the way people physically use and think about their land. The familiar configuration of parcel based descriptions in the DCDB ensures people-friendly identification of precise locations of impact of private ownership and, more vitally, of government, business and community policies, regulations and actions. In cadastres supported by professional surveyors, the descriptions have the added advantage of being legally authoritative.

While having a cadastre is not mandatory for a LAS, all modern economies recognize its importance, and either incorporate a cadastre or its key components in their LAS. For example, Australian LAS did not evolve from a traditional cadastral focus as did many of their European counterparts, but their cadastres are equal to, and sometimes improve upon, the classic European approach.

The cadastral concept shown in Figure 2 is simple and shows the textual and spatial components, which are the focus of land surveyors, land registry and cadastral officials. The cadastre provides a spatial integrity and unique identification for land parcels within LAS. However, while the cadastral concept is simple, implementation is difficult and complex. After ten years, the model still remains a useful depiction of a cadastre. However it needs to be extended to incorporate the evolving and complex rights, restrictions and responsibilities operating in a modern society concerned with delivering

sustainable development as well as the social context of people to land relationships. It also does not show the important roles for the cadastre in supporting integrated land management, or in providing critically important land information to enable the creation of a virtual environment, and, at a more practical level, e-government.

Within the constant theme that land administration should be used to deliver sustainable development, the cadastre takes on extended functions as discussed above. In summary two features of the modern cadastre underpin these functions: cadastres provide the authoritative description of how people relate to specific land, and they are the basic spatial information in digital land information system (LIS).

Even with the help of a clear theoretical framework, an explanation of how cadastres should be used within an LAS focused on sustainable development, is far from easy. Cadastres take on many shapes and sizes. Some countries, for example, the USA, do not yet use them as such, though many or most of its cities, counties and states assiduously collect parcel information in some form. Other countries do not have the resources to build high-end cadastres, and need a well designed, incremental approach. To deal with situational variety, cadastres can

One of the major problems with LAS design, even in countries with successful systems, is the isolation of components from each other. This is known generally as the problem of "silos"

be categorised as three general types, depending on their history and functions: the European or German approach, the Torrens or English title approach and the Latin, French and Spanish approach (that includes the USA approach). The focus is on the European, map-based, cadastre with integrated land registration functions. The utility of this tool in land management is seen both in its successful use by its European inventors, and in the contrast of lack of land management capacity in countries using other approaches.

The relationship between cadastres, SDIs and LAS that interact to spatially enable government and wider society in pursuit of sustainable development objectives, is shown diagrammatically in Figure 3 below – the “butterfly” diagram. The diagram shows the critical role that the cadastre plays in providing built environmental data in a national SDI that has traditionally focused on natural environmental data (topographic data) and how the integrated SDI can then contribute to a LAS that supports effective land management. It is only by bringing together the SDI and the LAS that an integrated land policy can be implemented to support sustainable development. This integration also provides the key role of spatial enablement of the LAS, as well as government and wider society. Ironically only a relatively small number of countries, the “developed countries” have the ability at the present of achieving this objective. However the model does provide a road map for less developed countries to move down this path.

*To be continued in November 2008 issue of Coordinates.* ▽

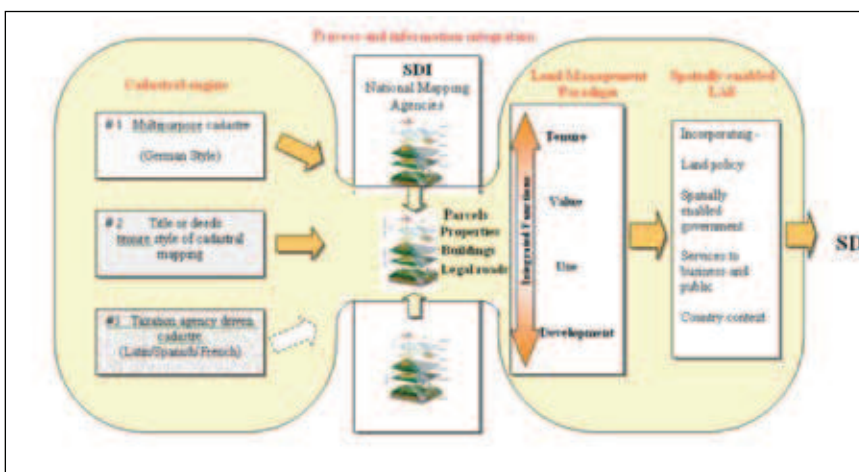


Figure 3. The cadastre as an engine of LAS. The “butterfly” diagram.