Underpinning Sustainable Land Administration Systems for Managing the Urban and Rural Environment

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Key words: Cadastre, Land Administration, Land Management, FIG.

SUMMARY

The paper presents a conceptual understanding in the areas of Cadastre, Land Administration, and Land Management. To develop this understanding the analysis looks at each area as a system or infrastructure designed for handling specific tasks and serving specific needs in society. The paper analyzes the function and the basic elements of the systems and looks at the interaction between the three areas of land tenure, land value and land use.

Basically such systems are embedded in the historical, cultural and judicial setting of the individual country. However, in spite of the different origins the systems seems to merge into a global model serving some basic societal needs. The paper presents an outline of this development towards a global model for sustainable land administration infrastructures, and the paper underlines the role of FIG, the International Federation of Surveyors, in this regard.

Finally, the paper points at some educational, professional and institutional challenges to be faced by the land administration community in the third millennium.

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1. INTRODUCTION

"Civilized living in market economies is not simply due to greater prosperity but to the order that formalized property rights bring" (Hernando de Soto, 1993).

The quote is from a famous article "The Missing Ingredient" in The Economist, September 1993. The quote may also be used as an expression of the importance that international organizations, such as the UN, FAO, and Habitat attach to cadastral systems. Also the World Bank has recognized the importance of establishing appropriate land administration systems as a basis to promote economic development, social coherence and environmental sustainability. This perspective is therefore the focus of many recent donor projects in developing countries. Security in land rights is seen as a basic element for generating a societal economy based on the value of these rights. Land is increasingly seen an asset.

Cadastral reforms are taking place also in developed countries. The last decade has seen moves towards establishment of fully digitised cadastral systems throughout the world. It is recognized that cadastral systems are not ends in themselves. Cadastral systems must serve a multi-purpose use and thereby meet the challenge of a modern GIS and IT environment.

Cadastral systems should be seen as a core component of more comprehensive land administration systems or infrastructures concerned with the processes of determining, recording and disseminating information about tenure value and use of land when implementing land policies. Appropriate land administration systems then provide the basis for sound land management towards economic, social and environmental sustainability.

Since the early 1990´s there has been a major evolution in this area of land administration. FIG has played a significant role in terms of facilitating the understanding of the role of land administration, and by establishing a powerful link between appropriate land administration and sustainable development.

Organisations such FIG, UN, the World Bank and also the whole surveying/land administration community should recognize that the increasing demand for sustainable land administration infrastructures includes some educational, professional, capacity building, and institutional challenges to be met at the threshold of the third millennium.

2. CADASTRAL SYSTEMS

The International Federation of Surveyors (FIG, 1995) defines a cadastre as a "parcel based and up-to-date land information system containing a record of interests in land (e.g. rights, restrictions and responsibilities). It usually includes a geometric description of land parcels linked to other records describing the nature of the interests, ownership or control of those interests, and often the value of the parcel and its improvements. It may be established for fiscal purposes (valuation and taxation), legal purposes (conveyancing), to assist in the management of land and land-use control (planning and administration), and enables sustainable development and environmental improvement".

However, the concept of Cadastre is difficult to identify. It may be designed in many different ways, depending on the origin, history and cultural development of the region or country. Basically, a cadastre as such is just a record that identifies the individual land parcels/properties. The purpose of this identification may be taxation (as was the original reason for establishing the European cadastres) or it may be security of land rights (as was the case when establishing the Torrens systems in the new world such as Australia). Today, most cadastral registers around the world are linked to both the land value/taxation area and the area of securing legal rights in land.

Therefore, it makes sense to talk about Cadastral Systems or Cadastral Infrastructures rather than just cadastre. Such systems or infrastructures include the interaction between the identification of land parcels, the registration of land rights, the valuation and taxation of land and property, and the present and possible future use of land. Such cadastral systems may be organized in many different ways as described below.

The point is, however, that even though the systems around the world are clearly different in terms of structure, processes, actors, they are increasingly coming together to form a unified global model – the multipurpose cadastre. This is due to some global drivers: globalisation and technology development. These trends supports establishment of multifunctional information systems with regard to land rights and land use regulations. A third global driver is about sustainable development with its demand for comprehensive information on the environmental conditions in combination with other land and property related data.

The cadastral identification provides the basic infrastructure for running the interrelated systems within the areas of Land Tenure, Land Value, and Land Use. As a result, the traditional surveying, mapping and land registration focus have moved away from being primarily provider-driven to now being clearly user-driven. However, each of those systems includes tasks and processes that impose quite different demands on the cadastral system. The success of a cadastral system is a function of how well it achieves these broad social, economic and environmental objectives.

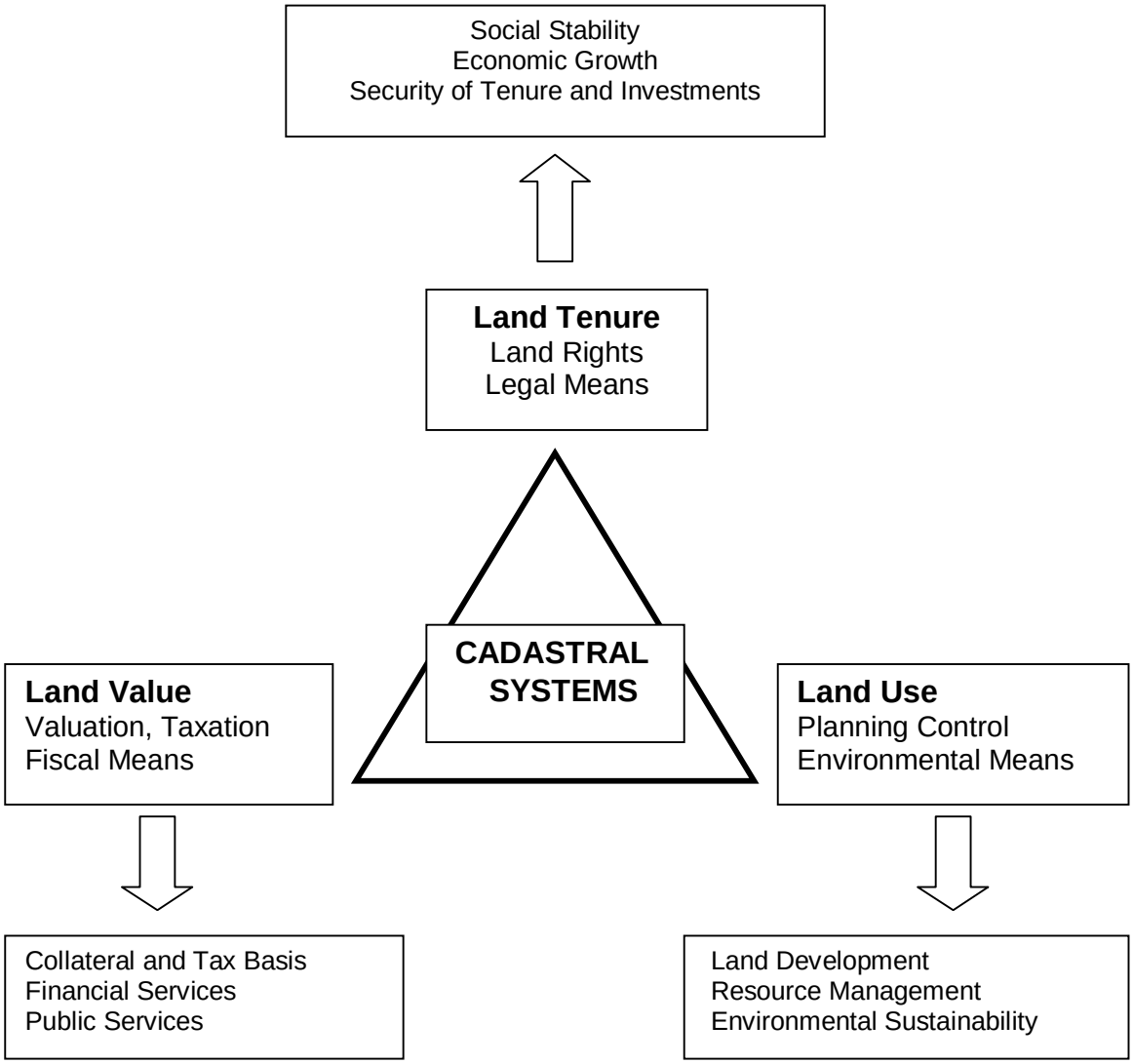


Fig. 1: Cadastral systems provide a basic land information infrastructure for running the interrelated systems within the areas of Land Tenure, Land Value, and Land Use.

2.1 Land Registration Systems

Cadastral Systems are organized in different ways throughout the world, especially with regard to the Land Registration component. Basically, two types of systems can de identified: the Deeds System and the Title System. The difference between the two concepts relates to the extent of involvement of the state, and to the cultural development and judicial setting of the country.

The key difference is found in whether only the transaction is recorded (the deeds system) or the title itself is recorded and secured (the title system). The Deeds System is basically a register of owners focusing on "who owns what" while the Title System is a register of properties presenting 2what is owned by whom". The cultural and judicial aspects relate to whether a country is based on Roman law (Deeds Systems) or Germanic or common-Anglo law (Title Systems). This of course also relates to the history of colonization.

Deeds registration is rooted in Roman culture and is, therefore, common in Latin cultures in Europe (France, Spain, Italy, Benelux), in South America, and parts of Asia and Africa who have been influenced by these cultures. The concept is also used in most of the United States. The Deeds Systems is found in different forms, where the role of the cadastral identification as well as the role of the surveyors varies significantly.

Title registration has its origin in the German culture and is found in the central European countries (Germany, Austria, Switzerland). Different versions of the German system are found in the Eastern European and the Nordic countries. The versions relate to the use of the property concept and the organization of the cadastral process including the use and the role of private licensed surveyors. A special version of the Title System is found in UK, where the concept of general boundaries is used to identify the land parcels on the large-scale topographic map series. Title registration is found in a third variant: the Torrens system (developed by Sir Robert Torrens) and introduced in Australia by mid 1800´s to serve the need of securing land rights in the "new world". The Torrens Systems is implemented in Australia, New Zealand, Western states of Canada, and some countries in Asia and Africa.

The systems in South America, Africa and Asia are often rather incomplete in terms of content as well coverage (indicated with diagonal signature on the map). Furthermore, some land rights cannot be recorded in Western judicial systems due to the nature of the rights. This relates to the traditional land rights on the African continent known as "customary rights", and also the "indigenous land rights" related to the indigenous people in the American and Australian parts of the world. In many parts of the world, there is a problem of providing shelter for people migrating to settle in the major urban areas to find a living. These "informal settlements" or "squatting" are often basically illegal and not based on any kind of formal rights.

The formalized western land registration systems are basically concerned with identification of legal rights in support of an efficient the land market, while the systems do not adequately address the more informal and indigenous rights.

2.2 Comparing Cadastral Systems

The basic grouping into deeds and title systems may still provide the best picture. The grouping may, however, be supplemented with a number of other elements. The processes around property formation and property transfer vary quite significantly with regard to the actors and institutions involved, and with regard to the outcome of process in terms of accessibility, identification and security of rights. The role of the surveyors also varies a lot

from being a private consultant, a public servant, or being non-existent. To compare different cadastral systems at least four issues must be taken into account:

- *Property definition* –the legal/economic/physical concept;
- *Property determination* – process of determination; general/fixed boundaries;
- *Property formation* – process, institutions and actors; the role of the surveyors*;*
- *Property transfer* – process, institutions and actors; legal consequences.

By focusing on processes, institutions, and actors, the systems reflect the cultural and judicial setting of which they are an integrated part.

2.3 Evolution of Cadastral Systems

Throughout the world, the cadastral concept has developed significantly over the past few decades. The most recent examples are current world concerns of environmental management, sustainable development and social justice. The cumulative evolution of the humankind/land relationship and the consequent evolution of cadastral applications are shown below.

	Feudalism - 1800	**Industrial revolution 1800-1950**	**Post-war reconstruction 1950-1980**	**Information revolution 1980 -**
Human kind to land evolution	Land as wealth	Land as a commodity	Land as a scarce resource	Land as a community scarce resource
Evolution of cadastral applications	Fiscal Cadastre. Land valuation and taxation paradigm	Legal Cadastre. Land market paradigm	Managerial Cadastre. Land management paradigm	Multi-purpose Cadastre. Sustainable development paradigm

Fig. 2: Evolution of Western Cadastral System (Developed from Williamson and Ting, 1999)

The human kind to land relationship is dynamic and is changing over time as a response to general trends in societal development. In the same way, the role of the cadastral systems is changing over time, as the systems underpin these societal development trends. In the Western world this dynamic interaction may be described in four phases as shown in the diagram in figure 2. Over the last few decades land is increasingly seen as a community scarce resource. The role of the cadastral systems has then evolved to be serving the need for comprehensive information regarding the combination of land-use and property issues. New information technology provides the basis for this evolution. This forms the new role of the cadastral systems: the multi-purpose cadastre.

3. LAND ADMINISTRATION SYSTEMS

Land administration systems are concerned with the social, legal, economic and technical framework within which land managers and administrators must operate (UN-ECE, 1996). Land administration comprises an extensive range of systems and processes to administer:

- *Land Tenure:* the allocation and security of rights in lands; the legal surveys to determine the parcel boundaries; the transfer of property or use from one party to another through sale or lease; and the adjudication of doubts and disputes regarding rights and parcel boundaries.
- *Land Value:* the assessment of the value of land and properties; the gathering of revenues through taxation; and the adjudication of land valuation and taxation disputes.
- *Land-Use:* the control of land-use through planning policies, regulations and enforcement; the implementation of construction planning through granting of permits; and the adjudication of land use conflicts.

The design of adequate systems in the area of Land Tenure and Land Value should lead to the establishment of an efficient land market; and the design of adequate systems in the areas of Land-Use Control and Development should lead to an effective land-use administration. The combination of an efficient land market and an effective land-use administration should then form the basis for a sustainable approach to economic, social and environmental development.

Land administration is defined as the processes of determining, recording and disseminating information about tenure value and use of land when implementing land policies (UN-ECE, 1996). It is considered to include a core parcel based cadastral and land registration component, multi-purposed cadastres and/or land information systems, and in many systems facilitates or includes information on land use planning and valuation/land taxation systems – although land administration does not usually include the actual land use planning and land valuation processes.

Land administration systems, and particularly their core cadastral components, are an important infrastructure which facilitates the implementation of land policies in both developed and developing countries (UN/FIG 1999). These systems are concerned with the administration of land as a natural resource to ensure its sustainable development.

The cadastral identification of land parcels permeates through the land administration and land management systems and provides the basic infrastructure for running the interrelated systems within the areas of Land Tenure, Land Value, and Land Use. As a result, the traditional surveying, mapping and land registration focus have moved away from being primarily provider-driven to now being clearly user-driven.

The foundation of any system of social order is the framework of laws, which reflect the Constitution of the country, governs the administrative processes, and expresses the rights and obligations to the citizen. In the case of land laws relating to land administration, the

following indicates what should be included when drafting and enacting appropriate land laws (developed from UN-ECE, 1998):

- Define legal forms of land tenure (ownership, leasehold, use of land);
- Distinguish between real and personal property (immovable and movable property);
- Distinguish between different forms of land tenure (ownership, leasehold, use);
- Define how rights can be established and transferred;
- Establish an independent public land registration institution, with clear powers
- Ensure that registered rights are guaranteed by the State
- Establish simple administrative systems for land transfer and property formation
- Establish quick and simple procedures for mortgage and forced sales
- Co-ordinate legislation related to planning, land use, land value, land registration
- Ensure clarity of responsibilities and authorities
- Specify the administrative role of the agencies and actors involved.

A detailed presentation of the Danish approach to Land Administration can be found in "The Danish Way" (ten thematic articles) on the address: www.ddl.org/thedanishway. (Enemark and Schoeler, 2002)

3.1 Land Information Management

The modern land administration system is concerned with detailed information at the individual land parcel level. As such it should service the needs of both the individual and the community at large. Benefits arise through its application to e.g.: guarantee of ownership and security of tenure and credit; facilitate efficient land transfers and land markets; support management of assets; and provide basics information in processes of physical planning, land development and environmental control. The system, this way, acts as a kind of backbone in society.

These ambitious goals will not be achieved unless there is a commitment to designing and implementing effective land administration infrastructures. These may be described as the organisations, standards, processes, information and dissemination systems and technologies required to support the allocation, transfer, dealing and use of land (UN/FIG, 1999). Information technology will play an increasingly important role both in constructing the necessary infrastructure and in providing effective citizen access to information. Also, there must be a total commitment to the maintenance and upgrading of the land administration infrastructure.

City Governments currently manage considerable collections of land related information. However, the traditional separation of this information into different component themes, combined with disjoint information management regimes, leads to a considerable loss in value of the information as a resource. Comprehensive and City-wide Land Information Management (LIM) provides the means to technically and institutionally integrate these component themes of land information into a truly corporate information resource (FIG/UN-HABITAT, 2002).

Figure 3 below illustrates how this concept can add value by combining information concerning use, condition, value, and tenure of land and disseminating this to the decision makers.

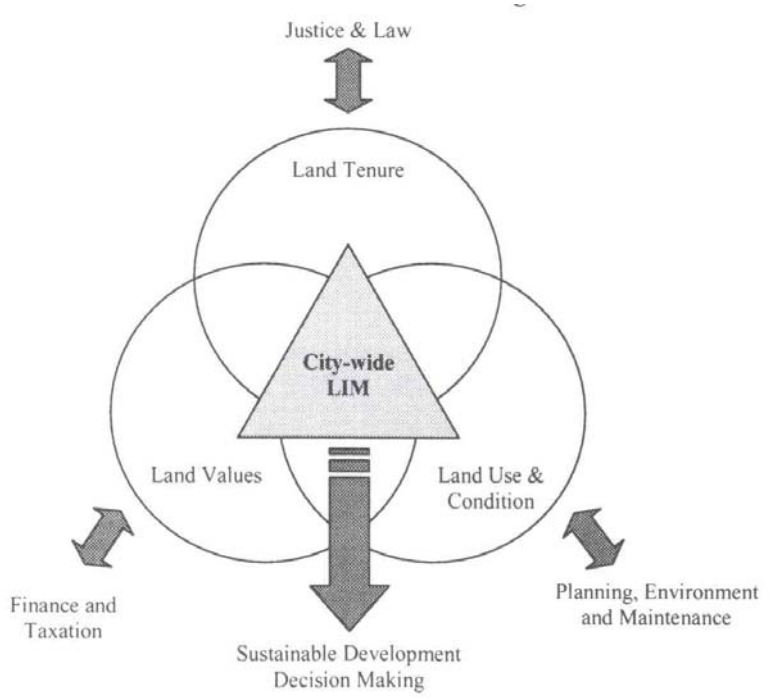


Fig. 3: City-wide Land Information Management in support of sustainable development decision-making (FIG/UN-HABITAT, 2002)

The Land Information Management System of a city should fit into the corresponding spatial data infrastructure of the country (see section 4.1 below). Certain information needs can best be served from the national level e.g. data standardisation, small-scale mapping, and policies for cost recovery and access to data.

Bringing together the UN-HABITAT Best Practice Database and the FIG Best Practice Guidelines provides cities with a valuable resource from which to draw upon. These sources provide complementary information at several levels to support those that face the challenge of providing comprehensive and sustainable use of land within the urban environment.

4. LAND MANAGEMENT

An efficient system of land administration is necessary but not sufficient to ensure the best use of land as a resource. Land management can be described as the process by which the resources of lands are put to good effect. It covers all activities concerned with the management of land as a resource both from an economic, social and environmental perspective. It includes policies and regulations for farming, mineral extraction, nature protection, property conveyancing, property valuation and taxation, development and management of utilities and services, and physical planning.

Land management is the process by which the resources of land are put into good effect (UN-ECE 1996). Land management is about policies, planning control, regulation, implementation, and development. Land management, this way, encompasses all those activities associated with the management of land as a resource that are required to achieve sustainable development.

Land policy is a part of the national policy on promoting objectives such as economic development, social justice and equity, and political stability. Land policies may be associated with: security of tenure; land transactions and access to credit; sustainable management and control of natural resources and the environment; the provision of land for the poor; ethical minorities and women; land use and physical planning; real property taxation; measures to prevent land speculation; and to prevent land disputes.

A coherent national land policy should guide policies within the different sectors. Sound land management is then the operational processes of implementing these sectoral land policies in a comprehensive and sustainable way.

The core element of a comprehensive land management system is the system of planning control including procedures for regional and local planning and decision-making to guide and control the future use of land. The planning control system should be is supported by the sectoral land use acts and sectoral policies within areas such as agricultural regulation, environmental protection and nature preservation. Furthermore, the system should be based on supported appropriate land information infrastructures combining the relevant land registers and maps.

In many countries, however, there is a tendency to separate land tenure rights from land use rights. There is no effective institutional mechanism for linking planning and land use controls with land values and the operation of the land market. The problems are often compounded by poor administrative and management procedures that fail to deliver the services that are needed. Investment in new technology will only go a small way towards solving a much deeper problem, which is the failure to treat land and its resources as a coherent whole.

Good land resource management will help to promote economic and social development in both urban and rural areas. For developing and transition countries, land reform policies are key components in achieving these goals. The challenges in this regard relates to educational, professional, and institutional issues. These challenges are further explored in section 7 below.

4.1 Spatial Data Infrastructures

Spatial data infrastructures in a land management framework provide mechanisms for sharing geo-referenced information. These mechanisms are conceptual, political and economic, and they are of course interrelated. Key elements include adoption and implementation of technical standards, adoption of access policies and cost recovery policies, and design of co-operative relationships between governmental levels and between the public and private sector.

- *Conceptual mechanisms* include design of organisational concepts for data sharing and custodianship, e.g. a centralised or a decentralised approach. The process of designing concepts for data sharing will always include some political and economic aspects as well.
- *Political mechanisms* include provision of an effective institutional framework and the distribution of power between the governmental levels. It also includes design and adoption of policies for access to data, e.g. policies for protection of privacy such as personal and financial integrity of the individual.
- *Economic mechanisms* include cost recovery policies as well as strategies for distribution and maintenance. The key issue here is provision of a universally accepted policy for access to data. The tension between claimed need for cost recovery and the societal benefits of free data sharing is the crucial issue in most countries when designing spatial information strategies.

By creating an infrastructure and the relevant linkages positive results will emerge. Clear responsibility for data maintenance and upgrade will be established, duplication will be reduced and analysis improved. Sound decision-making processes are developed for governments at all levels, and valuable information is created for academic institutions, the private sector and the community. Throughout this environment there is a general expectation for the public sector to play a co-ordinating role in developing the spatial data infrastructure and for governments to initiate this process “for public good”. (Grant, 1999).

5. A CONCEPTUAL APPROACH

The conceptual understanding may take the form of a hierarchy of levels. The foundation stone is an overall national land policy. Appropriate cadastral systems support land policies by providing identification of the land parcels and a framework for security of tenure. Appropriate cadastral systems support a wider land administration infrastructure within the areas of land tenure, land value and land use. Appropriate land administration systems then form the basic for sound land management towards economic, social and environmental sustainability. The Land policies and the land policy instruments may then be revised and adapted to meet the changing needs in society. The process of adjustment should then be based on monitoring the results of the land administration and land management activities. A draft model for such a conceptual understanding is presented in figure 4 on the following page.

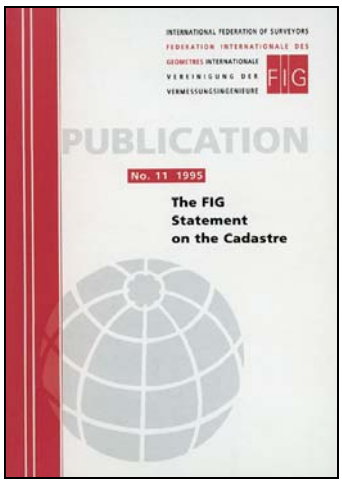
Level	Objective	Context	Tool Box
Overall Land Policy	▪ Determining values and objectives in relation to land and property as a legal, economic and physical object.	▪ Social equity ▪ Land tenure issues ▪ Land economics ▪ Land use ▪ Land and natural resources	▪ Constitutional Land Laws
1. Cadastre	▪ Securing Land Rights ▪ Facilitating land markets ▪ Enabling Land Taxation ▪ Enabling Land Use Control ▪ Basis for sound land administration	▪ Land parcel identification ▪ Land registration systems	▪ Land recording laws ▪ Land registration laws
2. Land Administration	▪ Systems for administration of: ▪ Land Tenure ▪ Land Value ▪ Land Use ▪ Basis for sound land management	▪ Land Tenure Systems ▪ Land Value Systems ▪ Land Use Control Systems ▪ Land Development Systems	▪ Institutional frameworks ▪ Spatial data systems and infrastructures
3. Land Management	▪ Organise for management of land and properties as an asset and a scarce resource ▪ Basis for economic, social, environmental sustainability	▪ Natural resource policies ▪ Land use policies ▪ Land data policies	▪ Land use laws ▪ Policies and strategies for: ▪ Land resource management ▪ Institutional Infrastructures ▪ National spatial data infrastructures

Fig 4: Cadastre, Land Administration and Land Management – a conceptual approach

6. THE FIG AGENDA

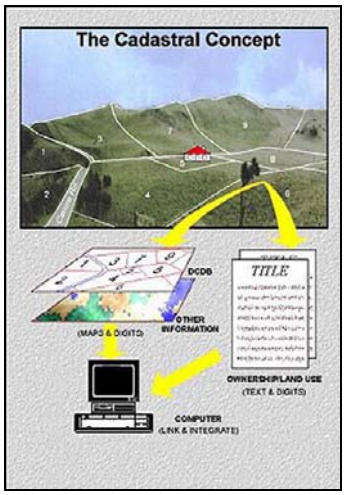
The international development in the area of Cadastre and Land Administration has been remarkable with FIG Commission 7 (Cadastre and Land Management) taking a leading role. Throughout the last 10-15 years a number of initiatives have been taken with a focus to explain the importance of sound land administration systems as a basis for achieving "the triple bottom line" in terms of economic, social and environmental sustainability. International organizations such as UN, FAO, HABITAT and especially the World Bank have been key actors in this process.

6.1 The FIG Statement on the Cadastre



In 1995 FIG published an important and very timely publication entitled "The FIG statement on the Cadastre". In many countries throughout the world the cadastral systems were revised, mainly due to technology development. Cadastral reform was on the agenda in most developing countries. At the same time, there was also an increasing focus on the cadastral systems in Eastern Europe – the so-called countries in transition. And in the third world there was an increasing awareness about the importance of these systems as a basis for developing a modern and market oriented society.

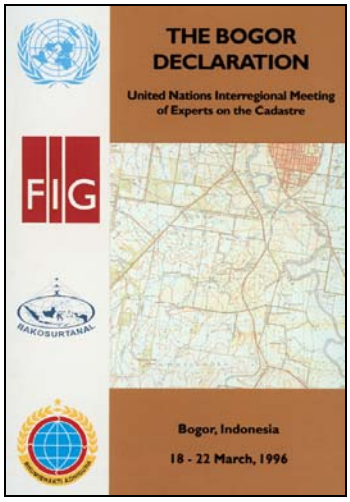
The FIG Statement on the Cadastre, this way, established a standard. The concepts were explained, settled, and made operational according to the specific conditions in different parts of the world. The FIG definition of cadastre is quoted in section 2 of this paper.



The FIG statement points at the importance of the cadastral systems as a basic land information systems in support of sustainable development. Examples are given on the legal, organizational and technical issues to be dealt with designing, establishing and maintaining cadastral systems. The statement also highlights the important role of the surveyors in managing these systems. The statement, however, does not recommend one specific system being appropriate for all countries. Instead, the Statement recognizes the historical and cultural settings that determine the systems to be developed in different versions even if they basically serve the same purposes.

The FIG Statement on the Cadastre is translated into a significant number of languages.

6.2 The Bogor Declaration



The co-operation between FIG and the UN-organizations was strongly intensified through the second half of the 1990´s. The so-called Bogor Declaration is a good example of this intensified co-operation. The declaration is a result of an interregional meeting of cadastral experts held in Bogor, Indonesia, March 1996. Next to a number of distinguished representatives from the UN and the Indonesian cadastral Agency, the participants were appointed by FIG Commission 7 coming from 14 countries primarily in the South East Asia and Australian region of the world, in total around 30 participants.

The Bogor meeting was organized as a result of a recommendation from the UNCCAP Conference in Beijing in 1994. The meeting was also part of the efforts to develop an active response to the problems of land management and environmental protection as stipulated in the Global Plan of Action for Habitat II, and to the recommendations contained in Agenda 21 from "The Earth Summit" in Brazil 1992. The declaration was, this way, also to be seen as a part of the preparation for the Habitat conference "the City Summit" held in Istanbul in June 1996.

The cadastral systems were hereby officially recognized for the first time as a core part of the infrastructure supporting a sustainable environmental and nature resource management. The cadastral systems also support security of land tenure and thereby support social justice and economic development.

The objective was to develop a document setting out the desirable requirements and options for cadastral systems of developing countries in the Asian and Pacific region and to some extent globally. The declaration includes a clear vision:

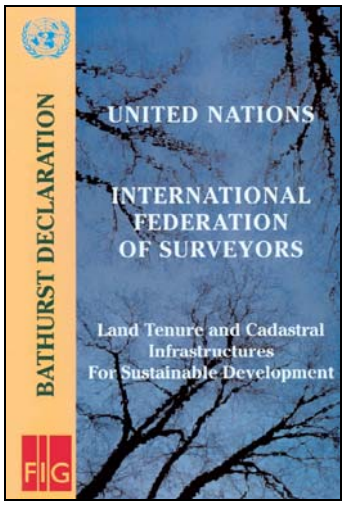
…."to develop modern cadastral infrastructures that facilitate efficient land and property markets, protect the land rights of all, and support long term sustainable development and land management". And to facilitate planning and development of cadastral infrastructures so that they may fully service the escalating needs of greatly increased populations. These will result from the rapid expansion of cities that is already taking place and which is projected to continue into the 21st century."

The Bogor Declaration, this way, builds on the Statement on the Cadastre. It is probably fair to say, that the FIG Statement on the Cadastre is a professional report which explains and reasons around the cadastral concept and processes. The Bogor Declaration, contrary, is a political report arguing around the design and use of the cadastral systems in relation to the international agenda on economic, social and environmental problems such as presented through Agenda 21 and the Habitat II action plan. The Bogor Declaration therefore contains a

number of more political and action oriented recommendations aiming at the UN organizations, national governments, and the NGO´s.

The Bogor Declaration established a new international agenda. A number of following UN conferences recognized this new agenda and it was recommended that increased attention was given to the role of the cadastre and land administration in general, such as to establish a joint UN/FIG "Global Workshop on land Tenure and Cadastral Infrastructures in Support of Sustainable Development". This workshop was held in Bathurst, Australia, October 1999.

6.3 The Bathurst Declaration



The Bathurst Workshop attracted 40 invited experts from 23 countries representing all continents to develop the declaration in a series of workshops and plenary sessions. Half of the participants were surveyors from FIG, the other half were experts from other professions and representatives from UN organizations such as the UN, FAO, Habitat, and the World Bank. The Bathurst Workshop examined the major issues relevant to strengthening land policies, institutions and infrastructures. It investigated and provided recommendations as to how land tenures, land administration institutions and infrastructures should evolve to enable the challenges of change in the 21st century to be met.

The workshop was organized around five core themes: The Dynamic Humankind-Land Relationship; The Role of Land in Sustainable Development; Food, Water and Land; Land Tenure and Land Administration; The Interface between Markets, Land Registration, Spatial Planning and Valuation; and Re-engineering land Administration Systems. As a background for discussion 25 position papers were commissioned from the experts.

The workshop concluded with a discussion of recommendations and an implementation strategy. The key conclusion of the workshop may be summarized as follows:

The Bathurst Declaration on Land Registration for Sustainable Development calls for a commitment to provide effective security of tenure and access to property for all men and women, including indigenous peoples and those living in poverty or other disadvantaged groups. It identifies the needs for the promotion of institutional reforms to facilitate sustainable development and for investing in the necessary land administration infrastructure. This gives people full and equal access to land-related economic opportunities. Sustainable development is not attainable without sound land administration".

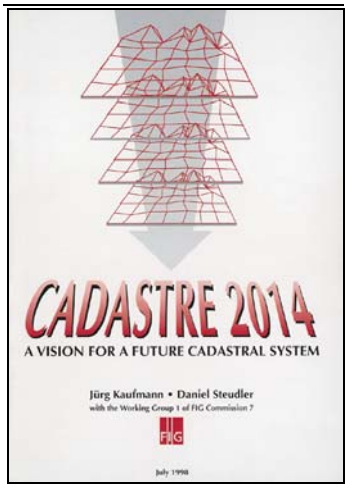
The conclusion is detailed in a number of statements representing 20 resolutions. Most significantly the Declaration justifies and calls for a commitment on the part of the

international and governments to halve the number of people around the world who do not effective access to property rights in land by the year 2010.

The Bathurst Declaration established a powerful link between appropriate land administration and sustainable development. The need to develop land administration infrastructures that effectively address the constant evolving requirements of the community is critical. Consequently, the role of land administration systems is placed very high at the UN agenda.

6.4 Cadastre 2014

The cadastral systems differ throughout the world in terms of purpose, content and design, and the technical and economic effectiveness vary a lot. These relations should be discussed in an international and perspective, partly in terms of benchmarking design and effectiveness (see Steudler, et.al., 1997) and partly in terms of developing a vision for the future.



Such a vision is presented in "Cadastre 2014" (Jürg Kaufmann and Daniel Steudler, 1998). It presents a vision for the future cadastral systems aiming to fulfil the multipurpose role based on modern information technology. The vision is based on a fully implemented digital environment, while privatisation and cost recovery are the core component at the organizational level. The vision is presented in six statements for development of the cadastral systems over the next ten years. Each statement is explained in details. The statements read as follows:

- Cadastre 2014 will show the complete legal situation of land including public rights and restrictions.
- Separation between maps and registers will be abolished
- The cadastral mapping will be dead! Long live modelling
- Paper and pencil cadastre will have gone
- Cadastre 2014 will be highly privatised! Public and private sector are working closely together
- Cadastre 2014 will be cast recovering

The vision has obtained a remarkable international attention and established a new agenda for discussing these issues.

6.5 The FIG Publication Series

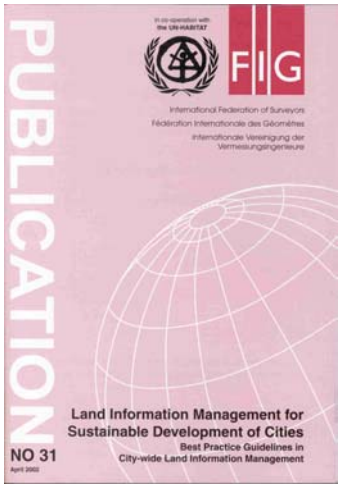


FIG has established a number of relevant initiatives in terms of co-operation with international bodies such as the UN organizations. These are reported in the FIG publication series, such as No. 22 (Co-operation between FIG and The UN Agencies 2000-2003) 1999, No. 23 (FIG Agenda 21) 2001; no 24 (Women's Access to Land – FIG Guidelines) 2001; No 30 (the Nairobi Statement on Spatial Information for Sustainable Development) 2002; and No 31 (Land Information management for Sustainable Development of Cities – Best Practice Guidelines in City-wide Land Information management), 2002.

The FIG publication Series also includes a number of publications addressing educational, professional, and institutional issues of global relevance, such as Continuing Professional Development, Ethical Principles, Business Matters for Professionals, Standardisation, and Mutual Recognition of Professional Qualifications. The FIG Publication Series is available on-line at the FIG Home Page http://www.fig.net/figtree/pub/publications.htm

6.6 Other Initiatives

ECE-WPLA (Working Party on Land Administration) in Europe has produced a number of relevant publications with "Land Administration Guideline (UN-ECE 1996) being the most important one. WPLA (formerly known as MOLA) is also an example of a well-functioning professional forum for discussing and developing land administration issues. Some WPLA meetings are held jointly with FIG Commission 7 (Cadastre and Land Management), such as the recent meeting in Athens, May 2003, addressing Spatial Information Management for Sustainable Real Estate Markets and Best Practice Guidelines on Nation-wide Land Administration. The activities of WPLA can be found at http://www.unece.org/env /hs/wpla/welcome.html

A new FIG policy has introduced regionalisation in respect of globalisation by emphasising on more regional activities. As a result of this policy the 2nd Regional Conference is held in Marrakech, Morocco, 2-5 December 2003. The conference is open to participants from all over the world with the main focus on Arab and Francophone African countries. The theme of the conference is on Urban-Rural Relationship for Sustainable Environment. The theme will be addressed in co-operation with UN-FAO, UN-HABITAT and UN-ECA. The 1st FIG Regional Conference was held in October 2001 in Nairobi, Kenya, and the 3rd FIG Regional Conference is planned to take place in Jakarta, Indonesia, October 2004.

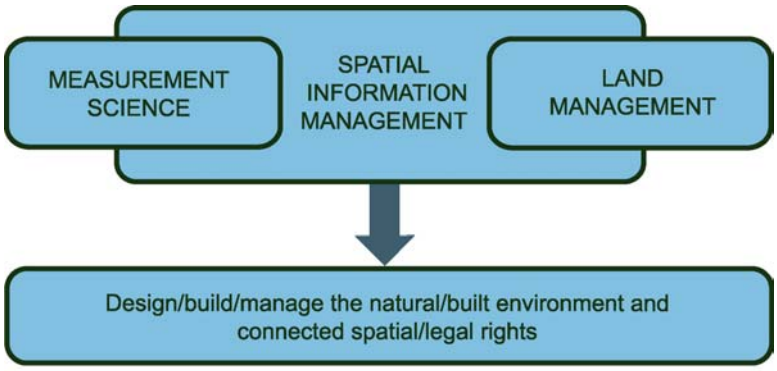
7. FACING THE CHALLENGES OF THE FUTURE

Good land resource management will help promote economic and social development in both urban and rural areas. For developing and transition countries, land reform policies are key components in achieving these goals. The challenges in this regard relates to educational, professional, and institutional issues. These challenges are further explored below.

7.1 The Educational Challenges

Traditional education of surveyors has focused on geometry and technology more than on land use and land administration. Taking a land administration approach to surveying education, there is a need to change the focus from being seen very much as an engineering discipline. There is a need for a more managerial and interdisciplinary focus as a basis for developing and running adequate systems of land administration.

A future educational profile for land administrators should be composed by the areas of Measurement Science and Land Administration and supported by and embedding in a broad interdisciplinary paradigm of Geographic Information Management. Such a profile is illustrated below (Enemark, 2001).



THE EDUCATIONAL PROFILE OF THE FUTURE

7.2 The Professional Challenges

The spatial information revolution and the evolving land management paradigm in support of sustainable development have had many influences on education and professional structures over the last two decades. Professions such as surveying are being re-engineered and re-invented to accommodate the spatial information revolution, while endeavouring to maintain traditional services.

The international surveying profession and the national associations will have to adapt to these challenges and develop structures that accommodate a modern interdisciplinary profile. This includes adoption of ethical principles and model codes of professional conduct suitable for performing this modern role.

The profile of the surveying profession in the third millennium will include a mix of technical surveying and mapping professionals, business practitioners, spatial data managers, land and environmental resource managers (in public as well as private sector), and legal and financial consultants on land management matters.

7.3 The Capacity Building Challenges

Capacity building is increasingly seen as a key component of land administration projects in developing and transition countries such as World Bank projects. However, the capacity building concept is often used in a very narrow meaning such as focusing on staff development through formal education and training programmes to meet the deficit of qualified personnel in the actual project in the short term. Where a donor project is established to create land administration infrastructures in developing or transition countries, it is critical that capacity building is a main steam component that is addressed up front, not as an add-on. In fact, such projects should be dealt with as capacity building projects in themselves. While attention should still be given to doing the project, the key focus should be on building capacity to meet the medium and long term needs (Enemark and Williamson, 2003).

The relationship of humankind to land varies in and between countries and regions, and adequate responses in terms of capacity building must reflect these fundamental conditions. For example if a country such as Indonesia wished to have a land administration system supported by a land title and cadastral surveying system similar to Denmark or Australia, this could possibly require 40,000 professional land surveyors and 30 or more university programs educating professional surveyors (based on Steudler et. al., 1997). Clearly this is not realistic even in a medium term perspective. As a result, there is a need to develop appropriate solutions matching the stage of development and specific characteristics and requirements of the individual country.

7.4 The Institutional Challenges

Establishing appropriate institutional and organisational infrastructures is seen as a crucial key for achieving sustainability in any society. In a theoretical sense, the concept of property rights is such an institution. Appropriate cadastral systems play a most important role in terms of facilitating the real property transactions such as land transfers, land taxation and control of land use and land development.

Another institutional challenge is about establishing a suitable balance between national policy-making and local decision-making. This challenge relates to good governance and to the issue of decentralisation with regard to the delegation being made between governmental levels. Decentralisation of land-use planning and decision-making immediately raise the question of suitable local institutions and organisations for managing these tasks. Such local institutions and organisations must be able to handle conflicts in a very concrete and direct sense. In the context of sustainability, the conflict between immediate gains and needs on one hand, and the concern of future generations on the other, is of course crucial.

At the Seventh United Nations Regional Cartographic Conference for the Americas (UNRCCA) held in New York, January 2001, a resolution was passed that recognize the importance of efficient and effective land administration systems in supporting the development of land markets, in providing security of land tenure and access to land, in facilitating the provision of credits to farmers, in ensuring equitable land taxation, promoting better land use planning, and, more generally, in promoting economic development, social cohesion and sustainable development.

A fundamental institutional challenge in this regard is related to understanding the value of developing appropriate institutional, legal and technical processes to integrate land administration and topographic mapping programs within the context of a wider national strategy for spatial data infrastructure.

This issue will be the key focus of a UN, FIG, PC IDEA Workshop on "Building Land Information Policies" (Politicas para la gestion de la tierra) to be held in Aguascalientes, Mexico, September/October 2004. The workshop will focus on the key institutional issues for the Latin American Region to build sustainable land administration infrastructures.

The institutional challenges with regard to establishing appropriate land administration infrastructures will also be a key issue at the upcoming FIG/UN regional conference to be held in Jakarta, Indonesia, 4-7 October 2004.

8. FINAL REMARKS

The objective of this paper is to build a general understanding of the concept, purpose and benefits of establishing sustainable land administration systems. Especially in developing countries the debate should move from "whether this is desirable" to "what is the most appropriate land administration system to serve the needs of an individual country or jurisdiction". This debate should be aware of the global trends in this area while still recognising that the design of such systems will always be unique due to the different geographic and cultural preconditions and needs of each respective country.

Organisations such FIG, UN, the World Bank and also the whole surveying/land administration community should recognize that the increasing demand for sustainable land administration infrastructures includes some educational, professional, capacity building, and institutional challenges to be met at the threshold of the third millennium.

This calls for increased international co-operation. FIG is prepared to invest in such corporative efforts.

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BIOGRAPHICAL NOTES

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