Sustainable Land Governance: Three Key Demands

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SUMMARY

Land governance is about the policies, processes and institutions by which land, property and natural resources are managed. This includes decisions on access to land, land rights, land use, and land development. All countries have to deal with the management of land. They have to deal with the four functions of land tenure, land value, land use, and land development in some way or another. A country's capacity may be advanced and combine all the activities in one conceptual framework supported by sophisticated ICT models. More likely, however, capacity will involve very fragmented and basically analogue approaches.

This paper provides an overall understanding of the land management paradigm towards spatially enabled government. Place matters! Everything happens somewhere. If we can understand more about the nature of "place" where things happen, and the impact on the people and assets on that location, we can plan better, manage risk better, and use our resources better. The cadastre is the core engine for spatially enabled land administration.

Spatial enablement is not primarily about accuracy – it is about adequate identification, completeness, and credibility. The systems should be built using a "fit for purpose" approach while accuracy can be incrementally improved over time when justified by serving the needs of citizens and society.

Land administration should also support the global agenda through addressing the key challenges of the new millennium such as climate change, natural disasters, poverty reduction, and rapid urban growth. Land Governance and the operational component of spatially enabled land administration systems therefore need high-level political support and recognition.

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1. INTRODUCTION

Imagine a country without any basic administration of land – their key asset. Imagine that tenure to land and property cannot be secured, and that mortgage loans cannot be established as a basis for property improvement and business development. Imagine that the use and development of land is not controlled through overall planning policies and regulations. And imagine a slum area of 250 hectares with more than 1 million inhabitants lacking the most basic occupation rights and without basic water and sanitary services.

Land administration systems (LAS) are about addressing these problems by providing a basic infrastructure for implementing land related policies and land management strategies to ensure social equity, economic growth and environmental protection. A system may involve an advanced conceptual framework supported by sophisticated ICT models as in many developed countries; or it may be through very fragmented and basically analogue approaches that are found in less developed countries.

Until 2008 the developed world often took land administration for granted and paid little attention to it. But the global economic collapse has sharply focused world attention on mortgage policies and processes and their related complex commodities, and on the need for adequate and timely land information. Simply, information about land and land market processes that can be derived from effective land administration systems plays a critical role in all economies (Williamson, Enemark, Wallace, Rajabifard, 2010)

The recent book "Land Administration for Sustainable Development" (Williamson, Enemark, Wallace, Rajabifard, 2010) explores the capacity of the systems that administer the way people relate to land. A land administration system provides a country with the infrastructure to implement land policies and land management strategies. An overall theme in the book is about 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 land administration systems, and putting land information to work for emergency management, environmental protection, economic decision making, and so on.

2. LAND GOVERNANCE

All countries have to deal with the management of land. They have to deal with the four functions of land tenure, land value, land use, and land development in some way or another. A country's capacity may be advanced and combine all the activities in one conceptual

framework supported by sophisticated ICT models; or the capacity may involve very fragmented and basically analogue approaches. Different countries will also put varying emphasis on each of the four functions, depending on their cultural basis and level of economic development.

Arguably sound land governance is the key to achieve sustainable development and to support the global agenda set by adoption of the Millennium Development Goals (MDGs). Land governance is about the policies, processes and institutions by which land, property and natural resources are managed. Land governance covers all activities associated with the management of land and natural resources that are required to fulfill political and social objectives and achieve sustainable development.

The cornerstone of modern land administration theory is the land management paradigm in which land tenure, value, use and development are considered holistically as essential and omnipresent functions performed by organised societies. Within this paradigm, each country delivers its land policy goals by using a variety of techniques and tools to manage its land and resources. What is defined as land administration within these management techniques and tools is specific to each jurisdiction, but the core ingredients, cadastres or parcel maps and registration systems, remain foundational. These ingredients are the focus of modern land administration, but they are recognised as only part of a society's land management arrangements. The land management paradigm is illustrated in figure 1 below.

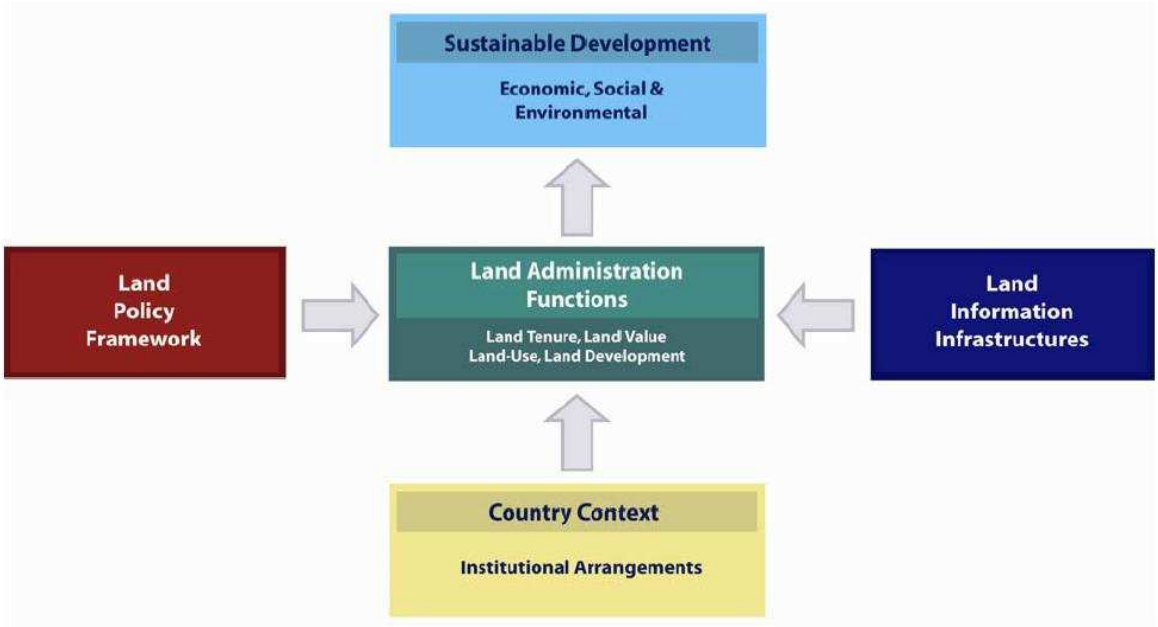

Figure 1. The land management paradigm (Williamson, Enemark, Wallace, Rajabifard, 2010)

The Land management paradigm allows everyone to understand the role of the land administration functions (land tenure, land value, land use, and land development) and how land administration institutions relate to the historical circumstances of a country and its policy decisions. Importantly, the paradigm provides a framework to facilitate the processes of integrating new needs into traditionally organised systems without disturbing the fundamental security these systems provide. While sustainability goals are fairly loose, the paradigm insists that all the core land administration functions are considered holistically, and not as separate, stand-alone, exercises.

Land policy is simply the set of aims and objectives set by governments for dealing with land issues. Land policy is part of the national policy on promoting objectives such as economic development, social justice and equity, and political stability. Land policies vary, but in most countries they include poverty reduction, sustainable agriculture, sustainable settlement, economic development, and equity among various groups within the society.

Land management activities reflect drivers of globalization and technology. These stimulate the establishment of multifunctional information systems, incorporating diverse land rights, land use regulations, and other useful data. A third driver, sustainable development, stimulates demands for comprehensive information about environmental, social, economic, and governance conditions in combination with other land related data.

The operational component of the land management paradigm is the range of land administration functions (land tenure, value, use and development) that ensure proper management of rights, restrictions, responsibilities and risks in relation to property, land and natural resources.

Sound land management requires operational processes to implement land policies in comprehensive and sustainable ways. Many countries, however, tend to separate land tenure rights from land use opportunities, undermining their capacity to link planning and land use controls with land values and the operation of the land market. These problems are often compounded by poor administrative and management procedures that fail to deliver required services. Investment in new technology will only go a small way towards solving a much deeper problem: the failure to treat land and its resources as a coherent whole.

2.1 Good governance

Governance refers to the manner in which power is exercised by governments in managing a country's social, economic, and spatial recourses. It simply means: the process of decision-making and the process by which decisions are implemented. This indicates that government is just one of the actors in governance. The concept of governance includes formal as well as informal actors involved in decision-making and implementation of decisions made, and the formal and informal structures that have been set in place to arrive at and implement the decision. Good governance is a qualitative term or an ideal which may be difficult to achieve. The term includes a number of characteristics as shown in figure 2 below.

Good governance is:
Sustainable and locally responsive: It balances the economic, social, and environmental needs of present and future generations, and locates its service provision at the closest level to citizens.
Legitimate and equitable: It has been endorsed by society through democratic processes and deals fairly and impartially with individuals and groups providing non-discriminatory access to services.
Efficient, effective and competent: It formulates policy and implements it efficiently by delivering services of high quality
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Transparent, accountable and predictable: It is open and demonstrates stewardship by responding to questioning and providing decisions in accordance with rules and regulations.
Participatory and providing security and stability: It enables citizens to participate in government and provides security of livelihoods, freedom from crime and intolerance.
Dedicated to integrity: Officials perform their duties without bribe and give independent advice and judgements, and respects confidentiality. There is a clear separation between private interests of officials and politicians and the affairs of government.

Figure 2: Characteristics of good governance. Adapted from (FAO, 2007).

3. LAND ADMINISTRATION SYSTEMS

A Land administration system (LAS) provides a country with the infrastructure to implement land-related policies and land management strategies. But land administration is not a new discipline. It has evolved out of the cadaster and land registration areas with their specific focus on security of land rights. Consolidation of land administration as a discipline in the 1990s reflected the introduction of computers and their capacity to reorganize land information. The UNECE viewed land administration as referring to "the processes of determining, recording and disseminating information about the ownership, value and use of land, when implementing land management policies"(UN-ECE, 1996).

For the first time, efforts to reform developing countries, to assist countries in economic transition from a command to a market-driven economy, and to help developed countries improve LAS could all be approached from a single disciplinary standpoint, at least in theory. That is, to manage land and resources "from a broad perspective rather than to deal with the tenure, value, and use of land in isolation" (Dale and McLaughlin 1999, preface).

The focus on information remains but the need to address land management issues systematically pushes the design of LAS toward an enabling infrastructure for implementing land policies and land management strategies in support of sustainable development. In simple terms, the information approach needs to be replaced by a model capable of assisting design of new or reorganized land administration systems to perform the broader and integrated functions now required. Such a global land administration perspective is presented in figure 3 below.

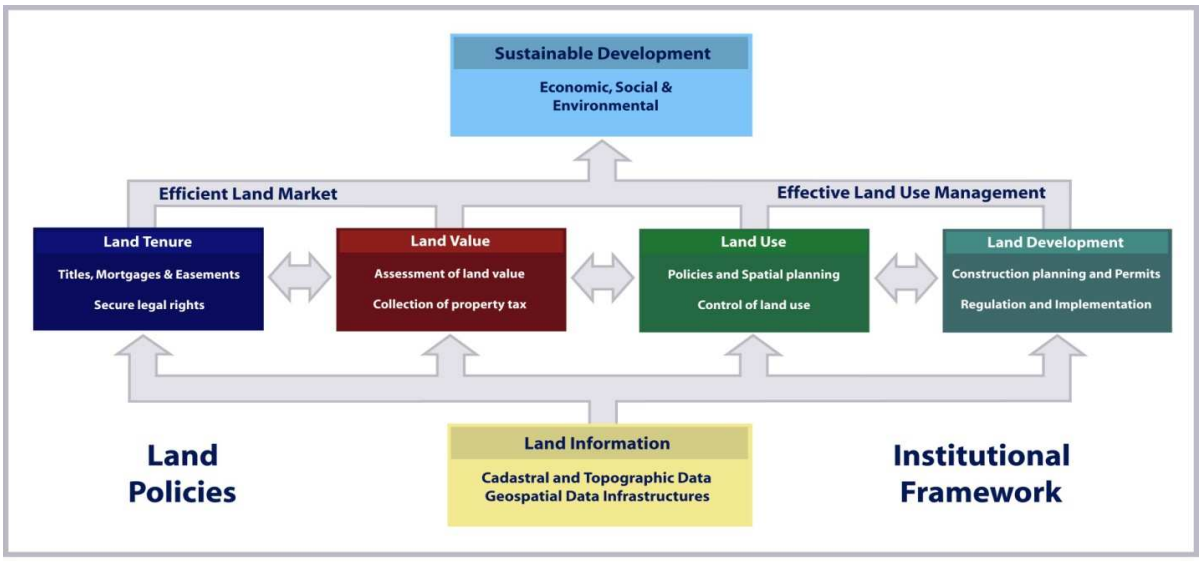

Figure 3: A global land administration perspective (Enemark, 2004)

The four land administration functions (land tenure, land value, land use, and land development) are different in their professional focus. However, even if land administration is traditionally centered on cadastral activities in relation to land tenure and land information management, modern land administration systems designed as described in figure 1 deliver an essential infrastructure and encourage integration of the processes related to *land tenure* (securing and transferring rights in land and natural resources); *land value* (valuation and taxation of land and properties); *land use* (planning and control of the use of land and natural resources); and, increasingly important, *land development* (implementing utilities, infrastructure and construction planning). Inevitably, all four functions are interrelated. The interrelations appear because the conceptual, economic, and physical uses of land and properties serve as an influence on land values. Land values are also influenced by the possible future use of land determined through zoning, land-use planning regulations, and permit-granting processes. And land-use planning and policies will, of course, determine and regulate future land development.

The four functions interact to deliver overall policy objectives, and they are facilitated by appropriate land information infrastructures that include cadastral and topographic datasets linking the built environment (including legal and social land rights) with the natural environment (including topographical, environmental, and natural resource issues). Land

information should, in this way, be organized through Spatial Data Infrastructures (SDI) at the national, regional, federal, and local level, based on relevant policies for data sharing, cost recovery, access to data, data models, and standards. Ultimately, the design of adequate systems of land tenure and land value should support efficient land markets capable of supporting trading in simple and complex commodities. The design of adequate systems to deliver land-use control and land development should lead to effective land-use management. The combination of efficient land markets and effective land-use management should support economic, social, and environmental sustainable development.

From this global perspective, land administration systems act within adopted land policies that define the legal regulatory pattern for dealing with land issues. They also act within an institutional framework that imposes mandates and responsibilities on the various agencies and organisations. They should service the needs of individuals, businesses, and the community at large. Benefits arise through the land administration systems guarantee of ownership, security of tenure and credit; facilitating efficient land transfers and land markets; supporting management of assets; and providing basic information and efficient administrative processes in valuation, land use planning, land development and environmental protection. LAS designed in this way forms a backbone for society and is essential for good governance because it delivers detailed information and reliable administration of land from the basic foundational level of individual land parcels to the national level of policy implementation.

4. TEN LAND ADMINISTRATION PRINCIPLES

Despite the uniqueness of local systems, the range of cognitive frameworks about land, and difficulties in transferring institutions, design of robust and successful LAS is possible. The ten land administration statements in figure 4 below set boundaries for designers, builders and managers of LAS to help them make decisions about their local system. Overall, the statements are written with the goal of making establishment and reform of LAS easier. The statements implement the modern philosophy in land administration to develop and manage assets and resources within the land management paradigm to deliver sustainable development. They are universally applicable. Countries at early stages of development will not be able to use the full array of technical options or specialist skills, but they can improve their land management through appropriately designed LAS.

The statements reflect a holistic approach for any LAS, and focus on sustainable development as the overriding policy for any national system, irrespective of whether a country implements property institutions, communal land arrangements, or socializes its land. They highlight the importance of information and participation of people. They set the framework in which the historical development of familiar ingredients, like cadastres and land registries, can be meshed with recent innovations, particularly incorporation of social tenures, new complex commodities appearing in highly organised land markets, and the technical potential of spatial information.

1. LAS	**LAS provide the infrastructure for implementation of land polices and land management strategies in support of sustainable development.** The infrastructure includes institutional arrangements, legal frameworks, processes, standards, land information, management and dissemination systems, and technologies required to support allocation, land markets, valuation and control of use and development of interests in land.
2. Land management paradigm	**The land management paradigm provides a conceptual framework for understanding and innovation in land administration systems.** The paradigm is the set of principles and practices that define land management as a discipline. The principles and practices relate to the four functions of LAS, namely land tenure, land value, land use and land development, and their interactions. These four functions underpin the operation of efficient land markets and effective land use management. "Land" encompasses natural and built environment including land and water resources.
3. People and institutions	**LAS is all about engagement of people within the unique social and institutional fabric of each country.** This encompasses good governance, capacity building, institutional development, social interaction and a focus on users, not providers. LAS should be re-engineered to better serve the needs of users, such as citizens, governments and businesses. This should be achieved through good governance in decision making and implementation. This requires building the necessary capacity in individuals, organisations and wider society to perform functions effectively, efficiently and sustainably.
4. Rights, restrictions and responsibilities	**LAS are the basis for conceptualising rights, restrictions and responsibilities (RRR) related to policies, places and people.** Rights are normally concerned with ownership and tenure whereas restrictions usually control use and activities on land. Responsibilities relate more to a social, ethical commitment or attitude to environmental sustainability and good husbandry. RRR must be designed to suit individual needs of each country or jurisdiction, and must be balanced between different levels of government, from local to national.
5. Cadastre	**The cadastre is at the core of any LAS providing spatial integrity and unique identification of every land parcel.** Cadastres are large scale representations of how the community breaks up its land into useable pieces, usually called parcels. Most cadastres provide security of tenure by recording land rights in a land registry. The spatial integrity within the cadastre is usually provided by a cadastral map that is updated by cadastral surveys. The unique parcel identification serves as the basis of any LAS and the land information it generates.

6. LAS are dynamic	**LAS are dynamic.** Dynamism has four dimensions. The first involves changes to reflect the continual evolution of people to land relationships. This evolution can be caused by economic, social and environmental drivers. The second is caused by evolving ICT and globalisation, and their effects on the design and operation of LAS. The third dimension is caused by the dynamic nature of the information within LAS, such as changes in ownership, valuation, land use and the land parcel through subdivision. The fourth dimension involves changes in the use of land information.
7. Processes	**LAS include a set of processes that manage change.** The key processes concern land transfer, mutation, creation and distribution of interests, valuation and land development. The processes, including their actors and their obligations, explain how LAS operate, as a basis for comparison and improvement. While individual institutions, laws, technologies or separate activities within LAS, such as property in land, a land registry, a specific piece of legislation or a technology for cadastral surveying are important in their own right, the processes are central to overall understanding of how LAS operate.
8. Technology	**Technology offers opportunities for improved efficiency of LAS and spatial enablement of land issues.** The potential of technology is far ahead of the capacity of institutions to respond. Technology offers improvements in the collection, storage, management and dissemination of land information. At the same time developments in information and communications technology (ICT) offer the potential for the spatial enablement of land issues by using location or place as the key organiser for human activity.
9. Spatial data infrastructure	**Efficient and effective land administration systems that support sustainable development require a spatial data infrastructure to operate.** The spatial data infrastructure (SDI) is the enabling platform that links people to information. It supports the integration of natural (primarily topographic) and built (primarily land parcel or cadastral) environmental data as a pre-requisite for sustainable development. The SDI also permits the aggregation of land information from local to national levels.
10. Measure for success	**Successful LAS are measured by their ability to manage and administer land efficiently, effectively and at low cost.** The success of LAS is not determined by complexity of legal frameworks or sophisticated technological solutions. Success lies in adopting appropriate laws, institutions, processes and technologies designed for the specific needs of the country or jurisdiction.

Figure 4: Ten land administration principles (Williamson, Enemark, Wallace, Rajabifard, 2010)

5. THREE KEY DEMANDS

In more general terms – and and next to the ten land administration principles presented above – sustainable land governance must respond to three key demands:

- Government (or society) should be *spatially enabled*.
  Place matters! Everything happens somewhere. If we can understand more about the nature of "place" where things happen, and the impact on the people and assets on that location, we can plan better, manage risk better, and use our resources better (Communities and Local Government, 2008). Spatially enabled government is achieved when governments use place as the key means of organising their activities in addition to information, and when location and spatial information are available to citizens and businesses to encourage creativity.

- The spatial framework should be *fit for purpose.*
  The spatial framework is the basic large scale mapping showing the way land is divided into parcels and plots for specific use and possession. The spatial framework underpins all four functions of land tenure, land value, land use and land development. In most western systems this framework is constituted by nationwide cadastral maps based on boundary surveys developed and maintained over centuries. In many developing countries, however, the cadastral coverage is less than one third of the country and the nationwide spatial framework is merely at a stage of entry. The term fit-for-purpose indicates that the spatial framework in the developing world should be designed using a flexible approach to accuracy and identification rather than copying the western style of cadastral mapping.

- Land Governance should *support the global agenda.*
  The global agenda is threefold and has changed over recent decades. In the 1990s the focus was on sustainable development; in the 2000s the Millennium Development Goals appeared as the overarching agenda; and in the 2010s there is increasingly focus on climate change and related natural disasters as well as rapid urbanisation. Governing the people to land relationship is in the heart of the global agenda. The land management perspective and the operational component of integrated and spatially enabled land administration systems therefore need high-level political support and recognition.

These three demands are further explored in the sections below.

6. SPATIALLY ENABLED

The term 'spatially enabled society' describes the emerging cultural and governance revolution offered by pervasive spatial information technologies and spatially equipped citizens. Spatially enabled societies make possible, amongst many other things, sustainable cities, early warning systems e.g. in relation to the global financial crisis, smarter delivery of housing,

improved risk management, and better macroeconomic decision making. Importantly, the concept is not about managing spatial information - it is about managing information, or governing society, spatially.

The term emerged in the mid 2000s as new spatial technologies began pervading mainstream user groups: in-car navigation systems, GPS enabled mobile devices, and various digital globes (e.g. Google Earth) quickly gained traction and popularity amongst the wider community. The concept, or vision, attempts to describe an emerging cultural and governance revolution: pervasive spatial information technologies and spatially equipped citizens are changing the way economies, people, and environments are managed and organized (Rajabifard et al, 2010). The vision, however, also represents the realization of the promises offered by building spatial data infrastructures and reforming land administration systems. These building blocks make possible spatially enabled societies where the large scale cadastral map presents how people are connected to their land. The cognitive understanding of land use patterns then form the core information sets that enable a country to build an overall administrative framework to manage rights, restriction and responsibilities related to land and natural resources in support of sustainable development.

New distribution concepts such as Google Earth provide user friendly information in a very accessible way. We should consider the option where spatial data from such concepts are merged with built and natural environment data. This unleashes the power of both technologies in relation to emergency response, taxation assessment, environmental monitoring and conservation, economic planning and assessment, social services planning, infrastructure planning, etc. This also include design and implementation of a suitable service oriented IT-architecture for organising spatial information that can improve the communication between administrative systems and also establish more reliable data based on the use of the original data instead of copies.

A spatially enabled government organises its business and processes around “place” based technologies, as distinct from using maps, visuals, and web-enablement. This relates to institutional challenges with a range of stakeholder interests including ministries, local authorities; utilities; and also civil society interests such as businesses and citizens. Creating awareness of the benefits of developing a shared platform for integrated land information management takes time. National Mapping/Cadastral Agencies have a key role to play in this regard in terms of coordinating the interests and potential of various stakeholders.

In this regard, in modern society, spatial information is an enabling technology or an infrastructure to facilitate decision making. Spatial information can be a unifying medium in which linking solutions to location and accommodating the user demand that has shifted to seeking improved services and delivery tools. This will be achieved by creating an environment so that we can locate, connect and deliver as illustrated in Figure 5.

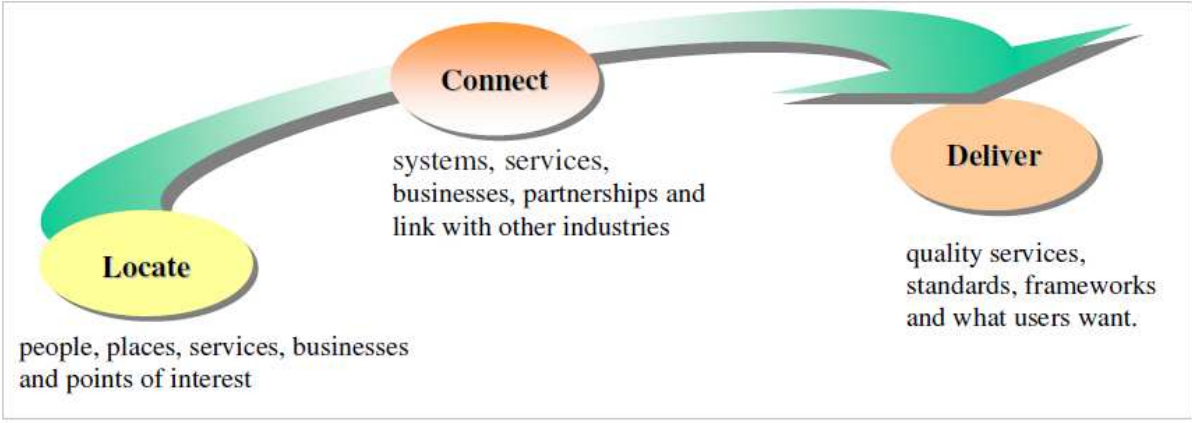

Figure 5: Locate, connect and deliver spatial information (Rajabifard, 2010).

With this in mind and in order to better manage and utilise spatial data assets, many countries around the world are developing Spatial Data Infrastructures (SDIs) as a way to facilitate data management and data sharing and utilise their spatial data assets as this information is one of the most critical elements underpinning decision making for many disciplines. The steps to develop an SDI model vary, depending on a country's background and needs, the stage of development, and the capacity and resources available.

In most SDIs throughout the world the cadastral information sits as fundamental building block. The unique cadastral capacity is to identify a parcel of land both on the ground and in the system in terms that all stakeholders can relate to, typically an address plus a systematically generated identifier (given addresses are often duplicated or are otherwise imprecise). The core cadastral information of parcels, properties and buildings, and in many cases legal roads, thus becomes the core of SDI information, feeding into utility infrastructure, valuation, land-use planning, natural resources, topographical images, and dozens of other datasets.

Advanced economies have continued to exploit the convergence of geospatial and ICT for public administration and responses as well as commerce and private businesses. On the other hand, developing countries, with international aid support, have been more focused on investing in the basic systems for land and property rights and planning, which over time should evolve into more sophisticated systems including SDIs (Bell, 2011). Importantly, such basic systems should be built for the purpose of implementing land policies through sustainable land governance rather than being driven by demands for using advanced technology and high accuracy solutions. These issues are further explored below.

7. FIT FOR PURPOSE

Land administration systems - whether highly advanced or very basic – require a large scale spatial framework to operate. This framework, or large scale mapping, should identify the spatial units such as land parcels as a basis for dealing with the land administration functions such as recordation of legal and social tenure; assessment of land value and taxation;

identification of current land use; planning for future land use and development; delivery of utility services; and administration and protection of natural resources.

In many developed countries this countrywide spatial framework has been developed over centuries as large scale cadastral mapping and maintained through property boundary surveys conducted to a high accuracy according to long standing regulations and procedures. Over recent decades these old analogue maps have been converted into a digital format based on the national grid and made suitable for a modern GIS environment. Technology development now provides opportunities of further improving the accuracy of cadastral surveys and thereby providing full consistency between cadastral, topographic, and other land related information such as utility data to form coherent and interactive digital land information systems supporting the concept of spatially enabled society.

In contrast, most developing countries have a cadastral coverage of less than 30 per cent of the country. The cadastral systems normally operate with western procedures for cadastral surveys and land registration as introduced (mainly for the elite) in colonial times, and the systems do not recognise the range of more informal or customary types of tenure. This means that over 70 per cent of the land in many developing countries, such as the sub-Sahara region, is generally outside the formal land administration system. This has caused enormous problems for example in cities, where over one billion people live in slums without proper water, sanitation, community facilities, security of tenure or quality of life. This has also caused problems for countries with regard to food security and rural land management issues.

Conventional Land Administration Systems are based on the 'parcel approach'. A more flexible system is needed for identifying the various kinds of land tenure in informal settlements or in customary areas as found in most developing countries. A solution to this problem is suggested by the so called Social Tenure Domain Model (STDM) as initiated by UN-HABITAT, the Global Land Tool Network and developed in cooperation with FIG, ITC and WB (FIG/GLTN, 2010). The STDM is based on the concept of a continuum of land rights, which includes rights that are documented, undocumented, individual and group, pastoralist, slums, legal, illegal and informal. The STDM is a pro poor land information management system which can be used to support the land systems of the poor in urban and rural areas, but which can also be linked to the formal cadastral system so that all information can be held on one system (Augustinus, 2010).

The discussion above underpins the need for a flexible approach to building the spatial framework in terms of technology and investment choices. Building such a spatial framework is of course not primarily about accuracy. It is about adequate identification and representation of the spatial objects and parcels; completeness to cover the total jurisdiction, and credibility in terms of reliable data being trusted by the users.

The required scale of the framework depends on topography and density of development and may vary from large scale mapping in dense urban areas to minor scale images in rural areas and remote regions. Also, accurate surveys of property boundaries may be justified in high

value urban areas while mapping identification, e.g. using satellite images, may be sufficient in rural areas using a general boundary approach. In any case, the framework should be linked to the national grid through a positioning infrastructure based on the Global Navigation Satellite Systems (GNSS) so that maintenance, updating, and upgrading can take place whenever needed or decided. Also, the framework may well include volunteered information provided by citizens (crowd sourcing) where authoritative data are not required.

In short – the spatial framework should be developed using a flexible and *fit-for purpose* approach rather than being guided by high tech solutions and costly field survey procedures. Accuracy can then be incrementally improved over time when relevant and justified by serving the needs of citizens and society. In relation to the concept of a continuum of land rights as mentioned above such a fit-for-purpose approach could then referred to as a "continuum of accuracy".

When considering the resources and capacities required to build such spatial frameworks in developing countries the western concepts may well be seen as the end target but not as the point of entry. When assessing the technology and investment choices the focus should be on building a fit-for-purpose framework that will meet the needs of society today and that can be incrementally improved over time. These solutions should include regulations and procedures to ensure easy and affordable access to secure tenure for all. Such an approach will also pave the way towards spatially enabled society and sustainable land governance.

8. SUPPORTING THE GLOBAL AGENDA

The key challenges of the new millennium are clearly listed already. They relate to climate change; food shortage; urban growth; environmental degradation; and natural disasters. These issues all relate to governance and management of land (Enemark, 2010).

The challenges of food shortage, environmental degradation and natural disasters are to a large extent caused by the overarching challenge of climate change, while the rapid urbanisation is a general trend that in itself has a significant impact on climate change. Measures for adaptation to climate change must be integrated into strategies for poverty reduction to ensure sustainable development and for meeting the Millennium Development Goals (FIG/WB, 2010).

8.1 Climate change and natural disasters

Adaptation to and mitigation of climate change, by their very nature, challenge governments and professionals in the fields of land use, land management, land reform, land tenure and land administration to incorporate climate change issues into their land policies, land policy instruments and facilitating land tools.

More generally, sustainable land administration systems should serve as a basis for climate change adaptation and mitigation as well as prevention and management natural disasters.

Climate change increases the risks of climate-related disasters, which cause the loss of lives and livelihoods, and weaken the resilience of vulnerable ecosystems and societies.

Adaptation to climate change can be achieved to a large extent through building sustainable and spatially enabled land administration systems. This should enable control of access to land as well as control of the use of land. Such integrated land administration systems should include the perspective of possible future climate change and any consequent natural disasters. The systems should identify all prone areas subject to sea-level rise, drought, flooding, fires, etc. as well as measures and regulations to prevent the impact of predicted climate change.

Key policy issues to be addressed should relate to protecting the citizens by avoiding concentration of population in vulnerable areas and improving resilience of existing ecosystems to cope with the impact of future climate change. Building codes may be essential in some areas to avoid damage e.g. in relation to flooding and earthquakes. Issues may also relate to plans for replacement existing settlements as an answer to climate change impacts.

In disaster zones relevant measures should be taken to build the preparedness for managing any disaster events. Land issues are an important component in the emergency relief phase. Land is necessary for emergency shelter and protection of displaced persons, and the selection of sites for emergency shelter can lead to long term conflict or tenure insecurity. Land is also necessary for restoration of livelihoods, and land grabbing after a disaster is a key risk to effective protection and emergency shelter activity. Humanitarian actors are therefore confronted with land issues as they undertake emergency shelter and protection activity (UN-HABITAT/FAO, 2010).

Vulnerable countries such as Bangladesh, and most small island states often claim to be the victim of climate change "crimes" caused by the richer part of the world. This issue of global responsibility is in the heart of the current climate change agenda. Loss of healthy life years as a result of global environmental change is predicted to be 500 times greater in poor African populations than in European populations. This global inequity is well presented in figure 7 showing at the top the world in terms of carbon emissions; and at the bottom the world in terms of increased mortality from climate change.

The measures of building integrated and spatially enabled land information systems does not necessarily relate to the inequity between the developed and less developed countries. Implementation of such systems will benefit all countries throughout the globe. Therefore, the integrated land administration systems should, in addition to appropriate registration of land tenure and cadastral geometry, include additional information that is required about environmental rating of buildings, energy use, and current and potential land use related to carbon stock potential and greenhouse gases emissions. This also relates to the fact that climate change is not a geographical local problem that can be solved by local or regional efforts alone. To address climate change, international efforts must integrate with local, national, and regional abilities.

8.2 Millennium Development Goals

The eight Millennium Development Goals (MDGs) form a blueprint agreed to by all the world's countries and the world's leading development institutions. The first seven goals are mutually reinforcing and are directed at reducing poverty in all its forms. The last goal - global partnership for development - is about the means to achieve the first seven. These goals are now placed at the heart of the global agenda. To track the progress in achieving the MDGs a framework of targets and indicators is developed. This framework includes 18 targets and 48 indicators enabling the on-going monitoring of the progress that is reported on annually (UN, 2000).

Land professionals – such as surveyors and other geospatial professionals – have a key role to play driving land administration systems in support of efficient land markets and effective land-use management. These functions underpin development and innovation and form a kind of "backbone" in society that supports social justice, economic growth, and environmental sustainability. Simply, no development will take place without having a spatial dimension, and no development will happen without the footprint of the land professionals.

The MDGs represent a wider concept or a vision for the future, where the contribution of the global surveying community is central and vital. This relates to the areas of providing the relevant geographic information in terms of mapping and databases of the built and natural environment, and also providing secure tenure systems, systems for land valuation, land use management and land development. These aspects are all key components within the MDGs.
In a global perspective the areas of surveying and land administration are basically about *people, politics***,** and *places*. It is about *people* in terms human rights, engagement and dignity; it is about *politics* in terms of land policies and good government; and it is about *places* in terms of shelter, land and natural resources (Enemark, 2006).

8.3 Rapid urbanisation

Urbanisation is another major change that is taking place globally. The urban global tipping point was reached in 2007 when over half of the world's population was living in urban areas: around 3.3 billion people.

This incredibly rapid growth of megacities (with more than 10 million inhabitants) causes severe ecological, economic and social problems. It is increasingly difficult to manage this growth in a sustainable way. It is recognised that over 70% of the growth currently happens outside of the formal planning process and that 30% of the world´s urban population live in slums or informal settlements, i.e. where vacant state-owned or private land is occupied illegally and used for illegal slum housing, see figure 6 below. In sub-Saharan Africa, 90% of all new urban settlements are taking the form of slums. These are especially vulnerable to climate change impacts as they are usually built on hazardous sites in high-risk locations. (UN-HABITAT, 2009)

Figure 6: Lagos is one the fastest growing cities in the world with huge slum areas expanding into the waters (Photo: Enemark, 2009).

Urbanisation is also having a very significant impact on climate change. The 20 largest cities consume 80% of the world's energy use and urban areas generate 80% of greenhouse gas emissions world-wide. Cities are where climate change measures will either succeed or fail. Rapid urbanisation is setting the greatest test for land professionals in the application of land governance to support and achieve the MDGs. The challenge is to deal with the social, economic and environment consequences of this development through more effective and comprehensive spatial and urban planning, resolving issues such as the resulting climate change, insecurity, energy scarcity, environmental pollution, infrastructure chaos and extreme poverty.

9. FINAL REMARKS

Land administration systems, in principle, reflect the social relationship between people and land recognized by any particular jurisdiction or state. However, land administration systems are not an end in itself. Instead, the systems facilitate implementation of land policies within the context of a wider national land management framework.

Land administration activities are not just about technical or administrative processes. The activities are basically political and reflect the accepted social concepts concerning people, rights, and land objects with regard to land tenure, land markets, land taxation, land-use control, land development, and protection and management of natural resources.

Sustainable land administration systems provide clear identification of the individual land parcels and land rights attached to these parcels. This information on the people to land relationship is crucial for accommodating the new vision of spatially enabled society. In this regard, the basic spatial framework should be developed using a fit-for-purpose approach rather than top end technological solutions.

The information on the people to land relationship also plays a key role in facing the global agenda through adaptation to climate change, management of natural disasters, alleviation of poverty, and management of rapid urban growth. Sustainable land governance and the operational component of integrated and spatially enabled land administration systems therefore need high-level political support and recognition.

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BIOGRAPHICAL NOTES

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