Key demands for sustainable land administration

Spatially enabled, fit for purpose, and supporting the global agenda

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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. Imagine that the use and development of land is not controlled through overall planning policies and regulations.

Land administration systems (LAS) are about addressing these problems by providing a basic infrastructure for implementing land related policies to ensure social equity, economic growth and environmental protection. Until 2008, the developed world often took land administration for granted. But the global economic collapse has sharply focused on mortgage policies and on the need for adequate and timely information. Simply, information about land from effective LAS plays a critical role in all economies.

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. An LAS 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 LAS, and putting land information to work for emergency management, environmental protection, economic decision making, etc.

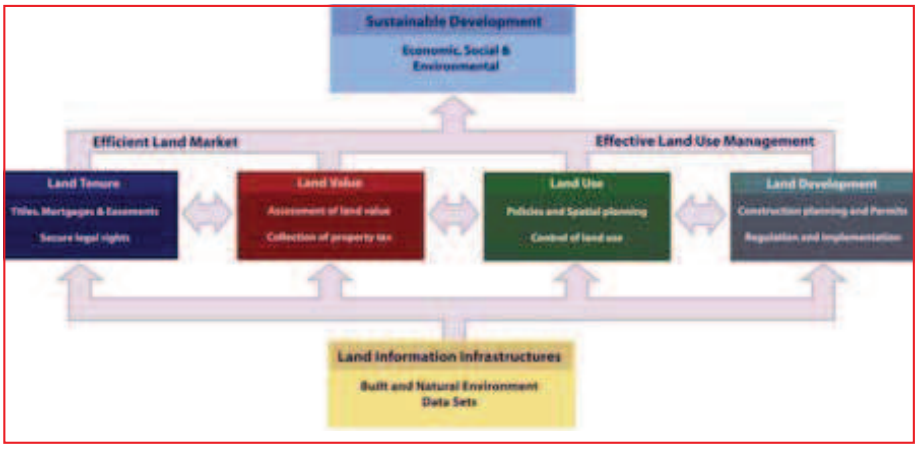

Figure 1: A global land administration perspective (Williamson, Enemark, Wallace, Rajabifard, 2010).

Land administration systems

A land administration system (LAS) provides a country with the infrastructure to implement land-related policies and management strategies. It is not a new discipline but has evolved out of the cadastre and land registration areas with specific focus on security of land rights. The need to address land management issues systematically pushes the design of LAS towards an enabling infrastructure for implementing land policies. Such a global land administration perspective is presented in figure 1.

The four land administration functions are different in their professional focus. Even if land administration is traditionally centred on cadastral activities, modern LAS deliver an essential infrastructure and encourage integration of the processes related to *land tenure* (securing and transferring land rights); *land value* (valuation and taxation of land); *land use* (planning and control

LAS	LAS provides the infrastructure for implementation of land polices and landmanagement strategies in support of sustainable development.
Land management paradigm	The land management paradigm provides a conceptual framework for understanding and innovation in land administration systems.
People and institutions	LAS is all about engagement of people within the unique social and institutional fabric of each country.
Rights, restrictions and responsibilities	LAS are the basis for conceptualising rights, restrictions and responsibilities (RRR) related to policies, places and people.
Cadastre	The cadastre is at the core of any LAS providing spatial integrity and unique identification of every land parcel.
LAS are dynamic	LAS are dynamic and reflect the people to land relationship over time .
Processes	LAS include a set of processes that manage change in relation to land tenures, land values, and land uses
Technology	Technology offers opportunities for improved efficiency of LAS and spatial enablement of land issues.
Spatial data infrastructure	Efficient and effective land administration systems that support sustainable development require a spatial data infrastructure to operate.
Measure for success	Successful LAS are measured by their ability to manage and administer land efficiently, effectively and at low cost.

Figure 2: Ten land administration principles (Williamson, Enemark, Wallace, Rajabifard, 2010,)

of the use of land); and *land development* (implementing utilities, infrastructure and construction planning). 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 and natural environment.

Ultimately, the design of adequate systems of land tenure and 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, LAS act within adopted land policies that define the legal regulatory pattern for dealing with land issues. Benefits that arise through LAS include guarantee of ownership, security of tenure and credit; facilitating efficient land transfers; supporting management of assets; and providing basic information and efficient administrative processes in valuation, land use planning, development and environmental protection.

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 2 set boundaries for designers, builders and managers of LAS to help them design and refine their local system. 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.

Three key demands

In more general terms, sustainable land governance must respond to three key demands:

- Government/society should be *spatially enabled*.
  If we can understand more about the nature of "place" where things happen, and the impact on people and assets there, we can plan better, manage risk better, and use our resources better (Communities and Local Government, 2008). Spatially enabled government is achieved when "place" is used as the key means of organising activities, 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. The spatial framework underpins all four functions of LAS. However, in many developing countries the cadastral coverage is less than one third of the country. The nationwide spatial framework is merely at a stage of entry and should be designed using a more flexible "fit for purpose" approach to accuracy and identification..
- Land Governance should *support 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 MDGs appeared as the overarching agenda; and in the 2010s there is increasingly focus on climate change and rapid urbanisation. 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.

Spatially enabled

The term 'spatially enabled society' describes the emerging cultural and governance revolution offered by pervasive spatial IT and spatially equipped citizens. Spatially enabled societies make possible sustainable cities, early warning systems, 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) gained popularity. New distribution concepts such as Google Earth provide user friendly information in an 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, infrastructure planning, etc.

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 by coordinating the interests and potential of various stakeholders. Thus, spatial information is an enabling technology to facilitate decision making. This will be achieved by creating an environment so that we can locate, connect and deliver as illustrated in Figure 3.

With this in mind, many countries are developing Spatial Data Infrastructures (SDIs) as a way to facilitate data management and sharing and utilise their spatial data assets as this information is one of the most critical elements underpinning decision making for many disciplines. 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.

Advanced economies have continued to exploit the convergence of geospatial and ICT for public administration as well as commercial 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).

Fit for purpose

LAS require a large scale spatial framework to operate. This framework should identify the spatial units such as land parcels as a basis for dealing with the land administration functions. In many developed countries, this countrywide highly accurate spatial framework has been developed over centuries as large scale cadastral mapping and maintained through property boundary surveys. 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.

In contrast, most developing countries have a cadastral coverage of less than 30 per cent of the country.

Conventional LAS are based on the 'parcel approach'. A more flexible system is needed for identifying the various kinds of land tenure in informal settlements. 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 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 more about adequate identification and representation of spatial parcels. 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. 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.

In short – the spatial framework should be developed using a flexible and *fit-for purpose* approach rather than being guided by costly field survey procedures. 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.

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 challenges of are to a large extent caused by the overarching challenge of climate change, while the rapid urbanisation is a general trend in itself. Measures for adaptation to climate change must be integrated into strategies for poverty reduction to ensure sustainable development and for meeting the MDGs (FIG/WB, 2010).

Figure 3: Locate, connect and deliver spatial information (Rajabifard, 2010).

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Climate change and natural disasters

Adaptation to and mitigation of climate change challenge governments and professionals to incorporate climate change issues into their land policies, land policy instruments and facilitating land tools. Adaptation to climate change can be achieved to a large extent through building sustainable and spatially enabled LAS. 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 ecosystems. Integrated LAS should 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. LAS should thereby serve a key means for climate change adaption.

Millennium Development Goals

The eight MDGs form a blueprint agreed to by all the world's countries and the world's leading development institutions. The first seven 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. To track the progress in achieving the MDGs a framework of targets and indicators is developed. Land professionals have a key role to play driving LAS s in support of efficient land markets and land-use management.

The MDGs represent a vision for the future, where the contribution of the global surveying community is vital. 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.

Figure 4: Lagos is one the fastest growing cities in the world with huge slum areas expanding into the waters (Photo: Enemark, 2009).

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. This rapid growth of megacities causes severe ecological, economic and social problems. It is recognised that over 70% of the growth currently happens outside of the formal planning process and that one billion people, 30% of the world´s urban population, live in slums or informal settlements, see figure 4.

Rapid urbanisation is also having a significant impact on climate. It is setting the greatest test for land professionals. The challenge is to deal with the social, economic and environment consequences of this development through more effective and comprehensive spatial and urban planning and administration.

Final remarks

LAS, in principle, reflect the social relationship between people and land recognized by any particular jurisdiction or state. However, LAS are not an end in itself. Instead, the systems facilitate implementation of land policies within the context of a wider national land management framework. Sustainable LAS provide clear identification of the individual land rights attached to these parcels. This information is crucial for accommodating the new vision of spatially enabled society. This information 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.

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