

REALISING SPATIALLY ENABLED SOCIETIES
GSDI-12 WORLD CONFERENCE, SINGAPORE, 19-22 OCTOBER 2010

**Spatially Enabled Land Administration:
Addressing Societal Needs and responding to the Global Agenda**



**Prof. Stig Enemark
FIG President
Aalborg University, Denmark**

SUMMARY

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 land administration. 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.

Land administration is addressing societal needs. In Western cultures it would be hard to imagine a society without having property rights as a basic driver for development and economic growth. In most developing countries, however, about 70% of the land is outside the formal land administration system.

Land administration should also address the key challenges of the new millennium such as climate change, natural disasters, and rapid urban growth. The linkage between climate change adaptation and sustainable development should be self-evident. Measures for adaptation to climate change and disaster risk management must be integrated into strategies for poverty reduction to ensure sustainable development and for meeting the Millennium Development Goals.

The land management perspective and the operational component of spatially enabled land administration systems therefore need high-level political support and recognition.

1. THE GLOBAL AGENDA

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 ongoing 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.

- Goal 1: Eradicate extreme poverty and hunger**
- Goal 2: Achieve universal primary education**
- Goal 3: Promote gender equality and empower women**
- Goal 4: Reduce child mortality**
- Goal 5: Improve maternal health**
- Goal 6: Combat HIV/AIDS, malaria and other diseases**
- Goal 7: Ensure environmental sustainability**
- Goal 8: Develop a Global Partnership for Development**

Figure 1. The Eight Millennium Development Goals

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.

The global challenge can be displayed through a map of the world (figure 2) where the territory size shows the proportion of world wide wealth based on the Gross Domestic Product. In surveying terms, the real challenge of the global agenda is about bringing this map back to scale.

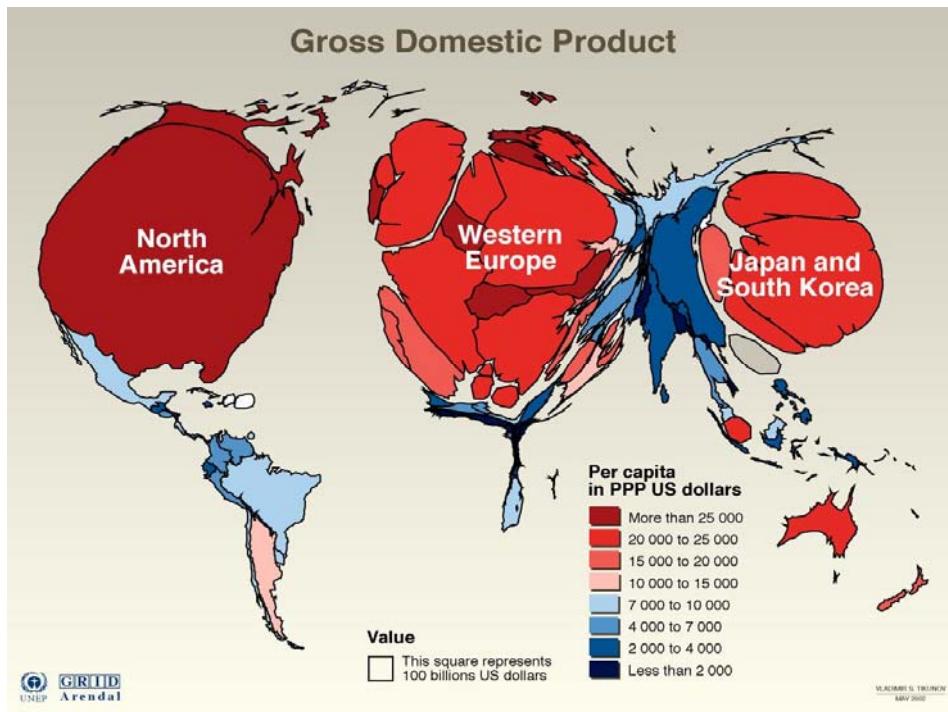


Figure 2. Map of the world where the territory size is shown based on the Gross Domestic Product.
(Source: UNEP).

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).

The key challenges of the new millennium are clearly listed already. They relate to climate change; food shortage; energy scarcity; urban growth; environmental degradation; and natural disasters. These issues all relate to governance and management of land. Land governance is a cross cutting activity that will confront all traditional “silo-organised” land administration systems.

This paper will focus on spatially enabled land administration and its relevance in addressing societal needs and responding to the global agenda.

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. More likely, however, capacity will 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. This includes decisions on access to land, land rights, land use, and land development. Land governance is basically about determining and implementing sustainable land policies. Such a global perspective for Land Governance or Land Management is shown in figure 3.

2.1 The land management paradigm

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 through the four functions of Land tenure, Land value, Land use and Land development. 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 3 below.

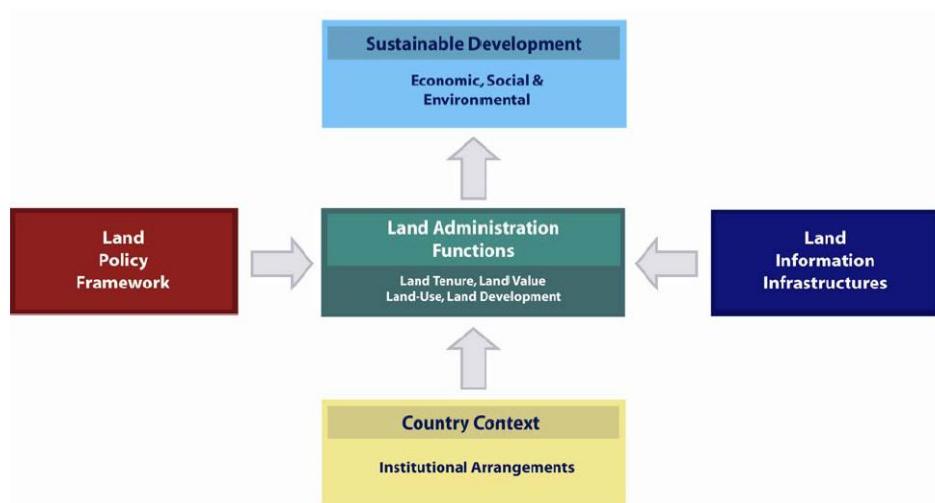


Figure 3. The land management paradigm (Enemark, 2004)

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.

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.

2.2 Land administration systems

The operational component of the land management concept is the range of land administration functions that include the areas of 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 land development (implementing utilities, infrastructure, construction planning, and schemes for renewal and change of existing land use).

These four functions ensure proper management of rights, restrictions, responsibilities and risks in relation to property, land and natural resources. The four functions are different in their professional focus, and are normally undertaken by a mix of professionals, including surveyors, engineers, lawyers, valuers, land economists, planners, and developers. Furthermore, the actual processes of land valuation and taxation, as well as the actual land-use planning processes, are often not considered part of land administration activities.

However, even if land administration is traditionally centred on cadastral activities in relation to land tenure and land information management, modern land administration systems designed as described in figure 4 deliver an essential infrastructure and encourage integration of the four functions:

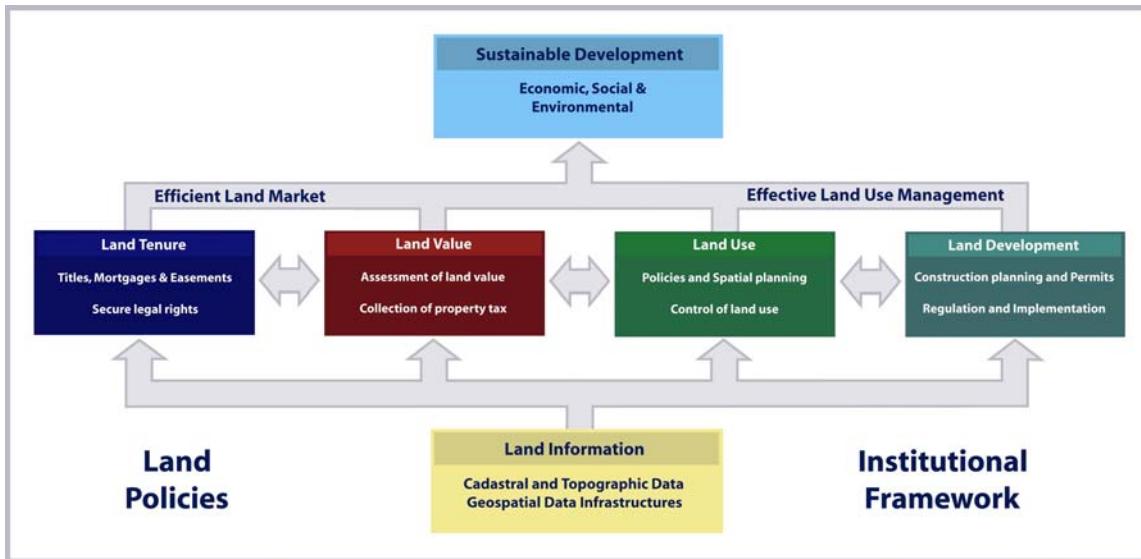


Figure 4. A Global Land Administration Perspective (Enemark, 2004).

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.

Land administration systems (LAS) are the basis for conceptualizing rights, restrictions and responsibilities. Property 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.

Sound land administration systems deliver a range of benefits to society in terms of: support of governance and the rule of law; alleviation of poverty; security of tenure; support for formal land markets; security for credit; support for land and property taxation; protection of state lands; management of land disputes; improvement of land use planning and implementation (Williamson, Enemark, Wallace, Rajabifard, 2010).

In more generic terms, land administration is about managing the relations between people, policies and places in support of sustainability and the global agenda set by the MDGs.

2.3 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: (adapted from FAO, 2007):

- **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.
- **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.

3. SPATIALLY ENABLED LAND ADMINISTRATION

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.

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. The Mapping/Cadastral Agencies have a key role to play in this regard. The technical core of Spatially Enabling Government is the spatially enabled cadastre.

4.1 Significance of the Cadastre

The land management paradigm makes a national cadastre the engine of the entire LAS, underpinning the country’s capacity to deliver sustainable development. The role of the cadastre as the engine of LAS is neutral in terms of the historical development of any national system, though systems based on the German and Torrens approaches, are much more easily focused on land management than systems based on the French/Latin approach. The cadastre as an engine of LAS is shown diagrammatically in figure 5.

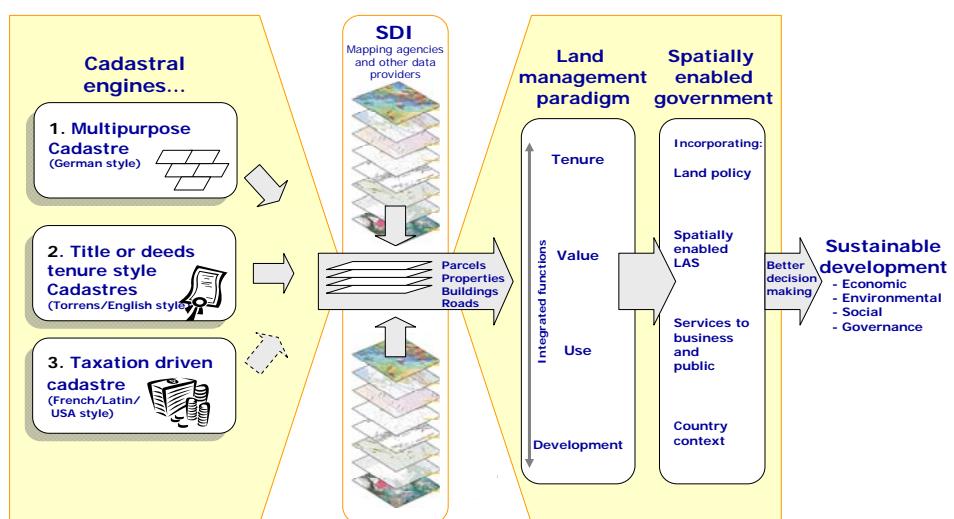


Figure 5. Significance of the Cadastre (Williamson, Enemark, Wallace, Rajabifard, 2010)

The diagram highlights the usefulness of the large scale cadastral map as a tool by exposing its power as the representation of the human scale of land use and how people are connected to their land. The digital cadastral representation of the human scale of the built environment, and the cognitive understanding of land use patterns in peoples' farms, businesses, homes, and other developments, then form the core information sets that enable a country to build an overall administrative framework to deliver sustainable development.

The diagram demonstrates that the cadastral information layer cannot be replaced by a different spatial information layer derived from geographic information systems (GIS). 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, hydrological, vegetation, topographical, images, and dozens of other datasets.

2.5 Limitations of formal cadastral systems

In the Western cultures it would be hard to imagine a society without having property rights as a basic driver for development and economic growth. Property is not only an economic asset. Secure property rights provide a sense of identity and belonging that goes far beyond and underpins the values of democracy and human freedom. Historically, however, land rights evolved to give incentives for maintaining soil fertility, making land-related investments, and managing natural resources sustainably. Therefore, property rights are normally managed well in modern economies. The main rights are ownership and long term leasehold. These rights are typically managed through the cadastral/land registration systems developed over centuries. Other rights such as easements and mortgage are often included in the registration systems.

The formalized western land registration systems are basically concerned with identification of legal rights in support of an efficient land market, while the systems do not adequately address the more informal and indigenous rights to land that is found especially in developing countries where tenures are predominantly social rather than legal. Therefore, traditional cadastral systems cannot adequately supply security of tenure to the vast majority of the low income groups and/or deal quickly enough with the scale of urban problems. A new and innovative approach is found in the continuum of land rights (including perceived tenure, customary, occupancy, adverse possession, group tenure, leases, freehold) where the range of possible forms of tenure is considered as a continuum from informal towards more formal land rights and where each step in the process of securing the tenure can be formalised (UN-HABITAT, 2008).

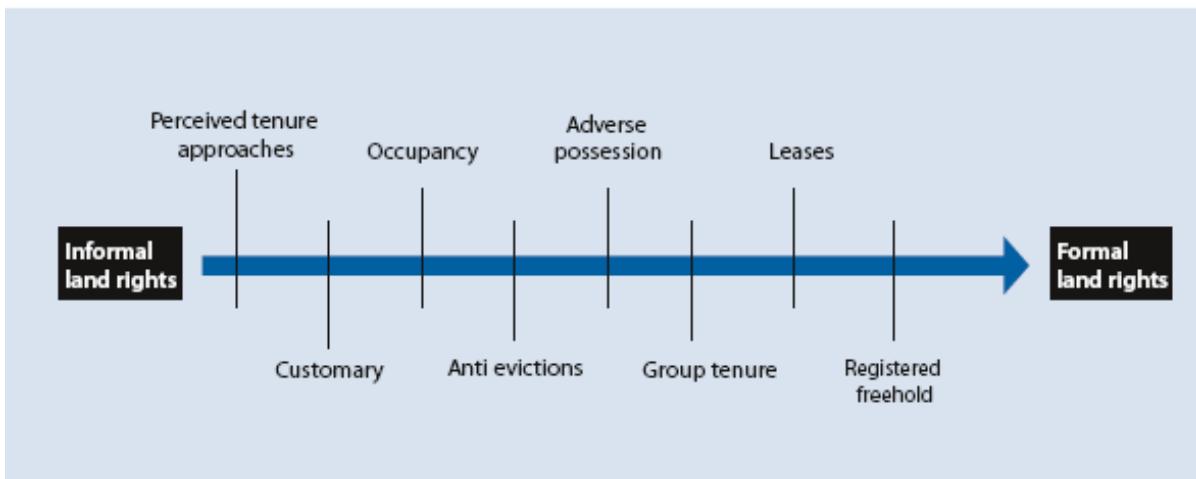


Figure 6. Continuum of land rights (UN-HABITAT, 2008).

Most developing countries have less than 30 percent cadastral coverage. This means that over 70 percent of the land in many countries is generally outside the land register. 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.

The security of tenure of people in these areas relies on forms of tenure different from individual freehold. Most off-register rights and claims are based on social tenures. The Global Land Tool Network (GLTN), facilitated by UN-HABITAT is a coalition of international partners (such as FIG and ITC) who has taken up this challenge and is supporting the development of pro-poor land management tools, to address the technical gaps associated with unregistered land, the upgrading of slums, and urban and rural land management.

This range of rights generally cannot be described relative to a parcel, and therefore new forms of spatial units are needed. A model has been developed to accommodate these social tenures, termed the Social Tenure Domain Model (STDM). A first prototype of STDM is available. This is a pro-poor land information management system that can be used to support the land administration of the poor in urban and rural areas so that all information – including informal and customary tenure arrangements – can be integrated (FIG, 2010).

The need for a complete coverage of all land by Land Administration Systems is urgent. Not only for the registration of formal rights and for the recordation of informal and customary rights but also for managing the value, the use of land and land development plans. This relates to the global land administration perspective presented as presented in figure 4 above. Complete coverage of all land in a Land Administration System is only possible with an extendable and flexible pro-poor land tool such as STDM that enables inclusion of all land and all people within the four land administration functions.

5. FACING THE NEW CHALLENGES

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, 2009).

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 MDGs.

5.1 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. The management of natural disasters resulting from climate change can be enhanced through building and maintenance of appropriate land administration systems. 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 therefore 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.

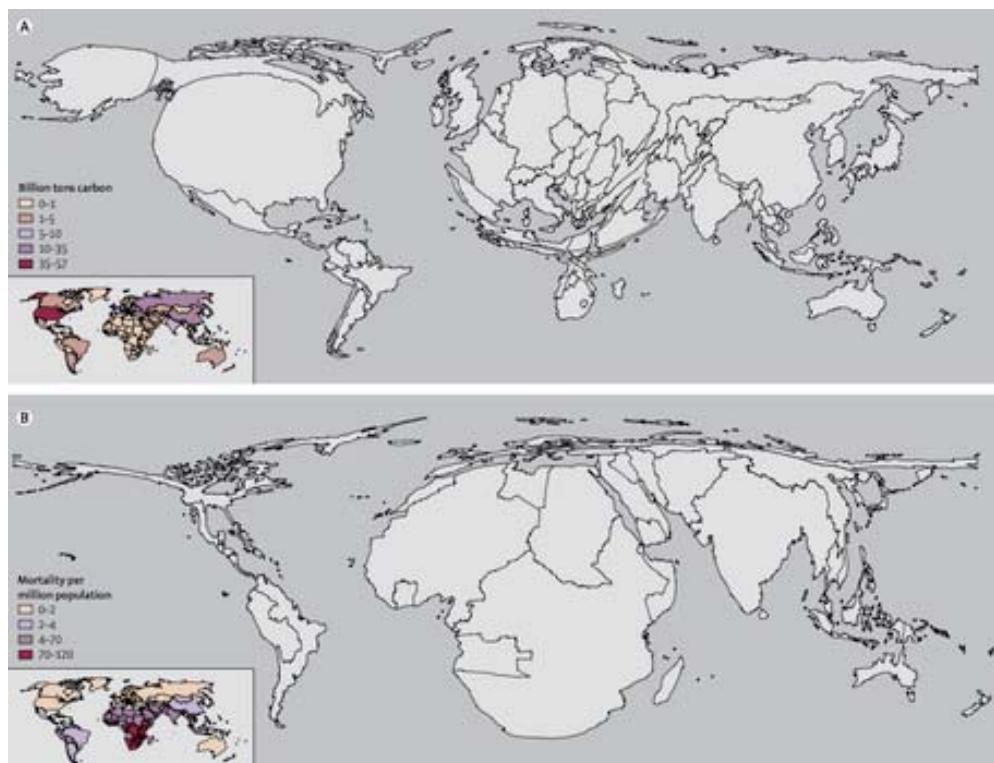


Figure 7. The world in terms of carbon emissions (top) and increased mortality (bottom)
http://voices.washingtonpost.com/ezra-lein/2009/05/why_should_america_prevent_cli.html

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.

5.2 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, economical 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 urban populations in developing countries living in slums or informal settlements, i.e. where vacant state-owned or private land is occupied illegally and used for illegal slum housing. 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. Even in developed countries unplanned or informal urban development is a major issue (FIG/WB 2010).

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.

In conclusion, the linkage between urban growth, climate change adaptation, and sustainable development should be self-evident. Measures to manage urban growth and for adaptation to climate change will need to be integrated into strategies for poverty reduction to ensure sustainable development.

7. FINAL REMARKS

No nation can build land management institutions without thinking about integration of activities, policies, and approaches. Technology opportunities provide additional motivation. Careful management of land related activities on the ground are crucial for delivery of sustainability.

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 but facilitate the implementation of the 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 environmental management.

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 and plays a key role in adaptation to climate change and in prevention and management of natural disasters.

Building sustainable and spatially enabled land administration systems will enable control of the access to land as well as the control of the use of land. The systems should identify all prone areas subject to sea-level rise, drought, flooding, fires, and potential natural disasters. The systems should also include relevant measures and regulations to prevent the impact on predicted climate change and provide preparedness for managing any disaster events.

The land management perspective and the operational component of integrated and spatially enabled land administration systems therefore need high-level political support and recognition.

REFERENCES

Communities and Local Government (2008): Place matters: the Location Strategy for the United Kingdom.

<http://www.communities.gov.uk/publications/communities/locationstrategy>

Enemark, S. (2004): Building Land Information Policies. Proceedings of Special Forum on Building Land Information Policies in the Americas. Aguascalientes, Mexico, 26-27 October 2004. http://www.fig.net/pub/mexico/papers_eng/ts2_enemark_eng.pdf

Enemark, S. (2006): People, Politics, and Places – responding to the Millennium Development Goals. Proceedings of international conference on Land Policies & legal Empowerment of the Poor. World Bank, Washington, 2-3- November 2006.
http://www.fig.net/council/enemark_papers/2006/wb_workshop_enemark_nov_2006_paper.pdf

FAO (2007), Good Governance in Land Tenure and Administration, FAO Land Tenure Series no 9. Rome. <ftp://ftp.fao.org/docrep/fao/010/a1179e/a1179e00.pdf>

FIG (2010): The Social Tenure Domain Model – A pro-poor land tool. FIG publication no 52. FIG Office, Copenhagen, Denmark. <http://www.fig.net/pub/figpub/pub52/figpub52.htm>

FIG/World Bank (2010): Land Governance in Support of the Millennium Development Goals. FIG publication no. 45. FIG Office, Copenhagen, Denmark.
<http://www.fig.net/pub/figpub/pub45/figpub45.htm>

United Nations (2000): United Nations Millennium Declaration. Millennium Summit, New York, 6-8 September 2000. UN, New York.

<http://www.un.org/millennium/declaration/ares552e.pdf>

UN-HABITAT (2008): Secure Land Rights for all. UN Habitat, Global Land Tools Network.

<http://www.gltnt.net/en/e-library/land-rights-and-records/secure-land-rights-for-all/details.html>

UN-HABITAT/FAO (2010): Land and Natural Disasters Guidance for Practitioners.

<http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2973>

Williamson, Enemark, Wallace, Rajabifard (2010): Land Administration Systems for Sustainable Development. ESRI Academic Press, Redlands, California, USA.

<http://esripress.esri.com/display/index.cfm?fuseaction=display&websiteID=165&moduleID=0>

BIOGRAPHICAL NOTES

Stig Enemark is President of the International Federation of Surveyors, FIG 2007-2010. He is Professor in Land Management and Problem Based Learning at Aalborg University, Denmark, where he was Head of School of Surveying and Planning 1991-2005. He is a well known international expert in the areas of land administration systems, land management and spatial planning, and related educational and capacity building issues. He has published widely in these areas and undertaken consultancies for the World Bank and the European Union especially in Eastern Europe, Sub Saharan Africa.

CONTACTS

Prof. Stig Enemark
FIG President
Department of Development and Planning,
Aalborg University, 11 Fibigerstede
9220 Aalborg, DENMARK
Email: enemark@land.aau.dk
Website: www.land.aau.dk/~enemark